



# **ENCOURAGING INNOVATION BY CDOT WORKERS**

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**COLORADO DEPARTMENT OF TRANSPORTATION**  
**DTD APPLIED RESEARCH AND INNOVATION BRANCH**

## **DISCLAIMER**

Colorado School of Mines has undertaken and completed Study 98.20 “Encouraging Innovation by CDOT Workers.” As part of this study, CSM personnel developed the documents summarized within. Colorado School of Mines and members of the Study 98.20 research team assume no responsibility or liability for any damages or loss of any kind that might arise or result from the use or misuse of the innovations addressed in this study, or the use or misuse of the User Manual, Mechanical Drawings, Preliminary Patentability Assessment, Report on Potential Safety Risks, or any other deliverables resulting from or associated with Study 98.20. No warranties, expressed or implied, are provided by Colorado School of Mines or the members of the Study 98.20 research team in conjunction with the research work or deliverables provided in connection with Study 98.20, including any warranty of merchantability or fitness for a particular purpose.

As part of Study 98.20, a set of mechanical drawings are provided for devices invented by CDOT employees. No engineering, design improvements, or qualifications of any kind were performed on these drawings or the devices that they represent. For example, no evaluation of function, design modifications to improve manufacturability, consideration of tolerance on the drawings, calculations of factor of safety, or any other form of engineering evaluation have been performed. The innovations were documented as presented by the innovator(s). No warranties, expressed or implied, are provided by Colorado School of Mines or the members of the Study 98.20 research team in conjunction with these drawings or any other deliverables provided in connection with Study 98.20, including any warranty of merchantability or fitness for a particular purpose.

This report includes a list of potential safety risks. This report was prepared by the Study 98.20 research team based on information provided by the innovator(s) (CDOT employees) and other CDOT personnel. This report is preliminary and represents only the collective opinion of the Study 98.20 research team members. No engineering analysis or testing was performed to formally identify and assess the safety risks. The examination of potential safety risks is not intended to be an exhaustive list of all possible safety risks and hazards associated with the use of the innovation or further refinement or modification of the innovation. Not all field uses and applications for this innovation may have been contemplated by the innovator and/or research team.

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16. Abstract In the course of their work, Colorado DOT employees have been known to create devices that improve the safety, efficiency, and quality of their work. The purpose of this study was to identify recent devices that were created by CDOT employees and to document them. In response to a request for innovations, CDOT employees submitted 34 candidate innovations. An Inventing and Patenting workshop was developed and delivered to these and other CDOT employees. A series of documents were developed for 23 of the 34 devices, namely: (1) Device Costs and Benefits, (2) User Manual, (3) Mechanical Drawing Package, and (4) Preliminary Patentability Assessment. The intent of this effort was to help disseminate, if appropriate, innovative devices throughout CDOT and other DOTs, and to provide input on patentability to the device developers.					
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## **EXECUTIVE SUMMARY**

This report presents the findings from CDOT Study 98.20 “Encouraging Innovation by CDOT Workers.” In the course of their work, CDOT employees have been known to create devices that improve the safety, efficiency, and quality of their work. The purpose of this study was to identify recent devices that were created by CDOT employees and to document them. Ideas for encouraging innovation within CDOT were developed as was a process to gather device information in the future.

A survey requesting information about devices that were made by CDOT employees was created and circulated to the six Engineering Regions. Thirty-four submissions were received and reviewed. Employees that submitted information about devices were invited to attend an inventing and patenting workshop developed specifically as part of this project. The purpose of this workshop was to impart to the innovators a basic knowledge of the concepts and practical aspects of intellectual property (IP), patenting, and licensing. The inventing and patenting workshop provided a step-by-step approach to documenting and protecting ideas and inventions. At the workshop, the innovators were requested to fill out two additional questionnaires in order to gather information about patentability and the potential for widespread application of each device.

Four documents were developed for each submitted device:

- Device Cost and Benefits
- User Manual
- Mechanical Drawing Package
- Preliminary Patentability Assessment

The Device Costs and Benefits document provides information essential for deciding whether to replicate a device. The User Manual describes the installation and use of the device. The Mechanical Drawing Package is a set of part and assembly drawings required to replicate the device. The Preliminary Patentability Assessment presents the findings based on a prior art search regarding patentability addressing the three criteria: novelty, non-obviousness, and usefulness.

Over the course of the project, questions arose regarding ownership of the intellectual property associated with inventions. During the workshop a representative from the Attorney General’s office stated that CDOT does not have a contract with the employee for ownership of IP. Unless there is an agreement with CDOT, the employee has the right to pursue IP protection, e.g., patenting, copyright, on their own. If CDOT wants to pursue IP protection, they must negotiate arrangements and compensation with the employee. Promise of continued employment is not considered compensation. If the device (or other form of invention, such as software) was invented on CDOT time and/or with CDOT material then CDOT can claim “shop rights” meaning that CDOT can use the device (or other form of invention, such as software) without payment to the inventor. Even if CDOT claims shop rights to an invention, the inventor still retains the right to seek patent, copyright and/or trademark protection for the invention and also retains the right to market the invention to others. If the invention is developed on the employee’s own

time with employee's own materials, CDOT cannot claim shop rights to the invention. The representative from the Attorney General's office recommends that the employee hire a patent attorney if the employee would like to pursue IP protection.

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# **CHAPTER 1: INTRODUCTION**

## **1.1 Overview and Objectives**

CDOT Maintenance and Traffic Operations personnel have historically demonstrated their ingenuity and ability to develop innovative devices and equipment. These innovations have improved productivity and employee safety. Examples of such devices and equipment include a guardrail aligning tool, a snow plow blade dolly, and a tool to make loading of glass beads into a striping truck faster and safer. These are not isolated incidents, but rather a reflection of a potential for innovation in the CDOT work force. These devices, though used individually, have not been well documented or described, and have not been implemented systematically statewide.

To advance systemic adoption of CDOT employee-led innovations and to further encourage innovation by employees, Study 98.20 was undertaken to identify recent innovations in use at CDOT, catalog such innovations for CDOT-wide dissemination, and to educate employees about intellectual property and the various forms of intellectual property protection, e.g., patents, copyright, etc.

This report chronicles the work carried out in Study 98.20 and the resulting employee-developed innovations that were thoroughly documented. Study 98.20 was led by Colorado School of Mines (hereafter, the Study team) with considerable assistance from the CDOT Research Division and the Study Panel.

## **1.2 Intellectual Property Policy and Background**

### **Patentability and the Patenting Process**

For an invention to be patentable it must satisfy a number of legal requirements. The invention must:

- (1) fall into an acceptable statutory class (in simple terms, the invention must be a device, a composition of matter or a process)
- (2) be novel (i.e., the invention, as defined by the patent claims, must not already exist prior to certain legally specified dates)
- (3) be unobvious (at the time of invention, and to a person having ordinary skill in the art), and
- (4) be useful (i.e., the invention must have a stated use; the invention must be operable as described in the patent application).

Formal legal opinions as to patentability can only be provided by a patent attorney or patent agent. Preliminary, informal opinions on patentability of the submitted inventions are provided in this report for the benefit of the individual inventors. However, any inventor who is planning to seek patent protection should obtain a patentability opinion from a patent attorney or patent agent.

The process consists of submitting a patent application, usually through a patent attorney or patent agent, to the U.S. Patent & Trademark Office (USPTO). The patent application consists largely of a description of the invention and of how to make and use it. The patent application must conclude with the patent claims that comprise a section written in highly stylized legal jargon that actually is the basis for defining the invention for which a patent is being sought. The patent application is reviewed by a Patent Examiner at the USPTO for conformance to the four requirements stated above as well as conformance to other formal requirements. While the patent application document as a whole is reviewed by the Examiner, the patent claims are generally the basis for the most serious objections by the Examiner.

It is common for the Examiner to reject most or all of the claims at this stage. This begins a process of back-and-forth arguments between the patent attorney and the Examiner where the attorney is attempting to have claims allowed and the Examiner is attempting to reject the claims. This process eventually leads to the allowance of patent claims, and thus allowance of the patent, or the converse where all claims are rejected and thus the patent is not allowed. There are several levels of appeals where the patent applicant has the right to appeal the Examiner's decision within the USPTO and in the courts. The patent application process can be expensive and a very complex undertaking. While individual inventors have the legal right to file patent applications on their own, without the assistance of a patent attorney or patent agent, it is generally not advisable to do so because the path is so fraught with complexities and legal subtleties that the inexperienced can fall into numerous traps throughout the process. A detailed discussion of these matters was presented at the two-day Inventing and Patenting workshop.

### **CDOT Intellectual Property Policy**

During the Inventing and Patenting workshop (Section 2.2), a representative from the Attorney General's office spoke about the CDOT IP policy. She stated that CDOT does not have a contract with the employee for ownership of IP. Unless there is an agreement with CDOT, the employee has the right to pursue IP protection, e.g., patenting, copyright, on their own. If CDOT wants to pursue IP protection, they must negotiate arrangements and compensation with the employee. Promise of continued employment is not considered compensation. The representative from the Attorney General's office recommends that the employee hire a patent attorney if the employee would like to pursue IP protection.

If the device (or other form of invention, such as software) was invented on CDOT time and/or with CDOT material, then CDOT can claim "shop rights" meaning that CDOT can use the device or software without payment to the inventor. Even if CDOT claims shop rights to an invention, the inventor still retains the right to seek patent, copyright and/or trademark protection for the invention and also retains the right to market the invention to others. If the invention is developed on the employee's own time with employee's own materials, CDOT cannot claim shop rights to the invention. The Study team determined that CDOT could claim shop rights to all but five of the innovations (submissions 7, 12, 26, 30 and 33).

## **CHAPTER 2: PRELIMINARY INFORMATION GATHERING**

### **2.1 Identification of Recently Developed Innovations at CDOT**

A survey questionnaire “CDOT Invention and Innovation Ideas Form” (see Appendix C) was developed and distributed to all CDOT Maintenance and Traffic Operations employees throughout the seven regions. The questionnaire requested a description of the innovation, its purpose and other relevant information. The Study team developed the questionnaire in conjunction with David Wieder, CDOT Maintenance and Operations Branch Manager and Richard Sarchet of the CDOT Research Division. In response to the questionnaire, CDOT employees submitted information for 34 candidate innovations. A summary of the submitted innovations, numbered chronologically as they were received, is provided in Table 2-1.

### **2.2 Inventing and Patenting Workshop**

A key objective of this project was to develop and deliver a workshop to CDOT employees on inventing and patenting. The broader goal behind the workshop is to grow the knowledge base within CDOT regarding innovation. To effectively capitalize on innovation, it is important that innovators have at least a basic knowledge of the concepts and practical aspects of intellectual property (IP), patenting, licensing, etc. An understanding of patents by CDOT innovators would also facilitate more efficient and effective communication between those individuals and patent counsel when individual innovators decide to pursue IP protection on their own. Accordingly, the Study team developed and delivered a two-day workshop on inventing and patenting to CDOT innovators and staff. The workshop was delivered April 20 - 21, 2010 at CDOT Maintenance & Operations in Golden, CO. Those who submitted innovation information were invited to attend the workshop.

The Inventing & Patenting workshop provided a step-by-step approach to documenting and protecting ideas and inventions. The workshop explained the differences between the various forms of IP including patents, trademarks, copyrights, and trade secrets. The workshop explained what can happen after a patent is issued, and offered the necessary information to make better decisions at an early stage to avoid mistakes that may prove costly later. The many misconceptions that are commonly held by inventors and the subtleties of patent claims, patent interference, and patent infringement were addressed. Factors that lead to patent infringement litigation were discussed. Several case histories were presented, providing participants with a hands-on appreciation for the diverse aspects of inventing and patenting. The patent statutes most frequently encountered by inventors were introduced and explained. The basics of searching the prior art were presented and the importance of maintaining proper documentation at several stages of the process was explained. The parts of the patent document were explained and the dos and don'ts of disclosing inventions were presented.

The specific agenda for the two-day Inventing & Patenting workshop is shown in Table 2-2.



**Table 2-1 Innovation Information Submitted by CDOT Employees**

<b>No.</b>	<b>Title</b>	<b>Submitted by</b>	<b>Innovator(s)</b>
1	Traffic Control Trailer	Trevor E Allen	Trevor Allen, Joe McQuiston
2	Corbel Template	Grant (Gene) Fisher	Carl Magdaleno
3	Joint Extraction Tool	Daniel Glass	Daniel Glass
4	BobCat Dozer Blade	Phillip Anderle	David Rios
5	Box Down Wing Up Sign	Phillip Anderle	David Rios
6	Region 4 Mirrors	Phillip Anderle	David Rios
7	Sign Elevator Bracket	Phillip Anderle	Jerry Buchanan
8	Alamo Pump Holder	Phillip Anderle	James (Jim) Pickett
9	Husting Hitch Plow Rollers	Phillip Anderle	James (Jim) Pickett
10	Clutch Pedal Holder	Phillip Anderle	James (Jim) Pickett
11	McCoy Guardrail Alignment Tool	Harry (Drew) McFarland	Harry (Drew) McFarland, Chad Wood
12	CDOT Sign Clip	Joseph Shupe	Joseph Shupe
13	Theft Deterrent Box	Bradley (Brad) Bauer	Bradley (Brad) Bauer, Mark Pennington
14	Loader Bull Plow Legs	Donald Holdridge	Jay Unrein, Kevin Weingardt, Jim Krager
15	Hustin Plow Slide	Phillip Anderle	John Sieck, Stan Garrett, Charlie Kesterson
16	Delineation Base	Phillip Anderle	Vicky Shieler
17	Post Puller	Phillip Anderle	Stan Garrett
18	Metal Squeegee	Phillip Anderle	Stan Garrett
19	Folding Road Closure Gate	Vincent Estreich	Vincent Estreich
20	Portable Arrow Board	Phillip Anderle	Steven Intermill
21	Boring Tool	Phillip Anderle	Clay Adams
22	Brifen Barrier Mat	Phillip Anderle	Mike Zoller
23	Hot Seal/Crack Seal Cup	Phillip Anderle	Nathan Torrez
24	Delineator Post Puller	Phillip Anderle	Nathan Torrez
25	"Hula Skirt" Sander Belting	Byron Rogers	Roger Hessler, Bill G.Ertle
26	Easy Puller Delineation Puller	Byron Rogers	Roger Hessler, Bill G.Ertle
27	Slide-In Heat Box	Anthony Martinez	Anthony Martinez
28	4 Foot Slide Post Pounder	Anthony Martinez	Anthony Martinez
29	Hydraulic Delineation Post Remover	Anthony Martinez	Anthony Martinez
30	12-Volt Hydraulic Guardrail Post Remover	Anthony Martinez	Anthony Martinez
31	Temp Traffic Control Work Zone Planning Tool	Charlie Kesterson	Charlie Kesterson
32	Guardrail Post puller	Eric Langford	Micheal (Jerry) Trant
33	Windshield snow & ice removal tool	Michael Aguirre	Michael Aguirre
34	Delineator Post Puller	Phillip Anderle	Mickey Madalino

**Table 2-2 Inventing and Patenting Workshop Agenda**

<b>Day 1: Tuesday, April 20th, 2010</b>	
8:00-8:15	Welcome
8:15-8:30	Course Introduction (Section A)
8:30-9:30	Forms of Intellectual Property (Section B)
9:30-9:45	Explanation of CDOT legal policies
9:45-10:00	Break
10:00-11:30	Inventing and Patenting – An Overview (Section C)
11:30-12:00	Experimentation and Prototypes (Section D)
12:00-1:00	Lunch
1:00-2:00	Prior Art Searching (Section E)
2:00-2:45	Concept of Patent Infringement (Section F)
2:45-3:00	Break
3:00-3:30	Understanding Patent Laws, Part 1 (Section G)
3:30-4:30	Patentability Assessment Exercise
4:30-5:00	Understanding Patent Laws, Part 2 (Section G, Continued)
<b>Day 2: Wednesday, April 21st, 2010</b>	
8:00-8:30	Documenting the Invention (Section H)
8:30-10:00	Case Histories (Section I)
10:00-10:15	Break
10:15-10:45	More Detailed Study of 35 USC Section 102 (Section J)
10:45-11:00	Revisit Patentability Assessment
11:00-11:30	Supplemental Information Questionnaire
11:30-12:00	Preparing and Submitting a Patent Application, Part 1 (Section K)
12:00-1:00	Lunch
1:00-1:30	Preparing and Submitting a Patent Application, Part 2 (Section K, Cont.)
1:30-3:00	Introduction to Patent Claims (Section L)
3:00-3:15	Break
3:15-3:45	Description Activity
3:45-4:15	Infringement of Patent Claims (Section M)
4:15-4:45	The Strength of a Patent (Section N)
4:45-5:00	Concluding Comments (Section O)

At the workshop, innovators were encouraged to complete a Supplementary Information Questionnaire and a Preliminary Patent Assessment form. The submitted forms are included in Appendix C.

An assessment survey completed by the workshop participants revealed strong satisfaction by CDOT employees. Employee comments about the workshop are included in Appendix D.

## **CHAPTER 3: DOCUMENTATION OF DEVICES**

### **3.1 Overview**

Four documents were developed for each device that was submitted with sufficient information and that was deemed innovative. These documents included:

- Device Costs and Benefits
- User Manual
- Mechanical Drawing Package
- Preliminary Patentability Assessment

Three devices, submissions 5, 6 and 12, were deemed too simple and were therefore not pursued, i.e., these devices are commercially available in various forms. For seven of the submissions, insufficient information was provided by the innovators. Multiple attempts were made to contact these innovators with no response. One submission was withdrawn. Twenty-three (23) of the 34 submissions had sufficient information to complete the documents. Table 3.1 categorizes these 23 devices into the following categories:

- Equipment addition – devices that are attached to existing equipment to protect or improve performance of that equipment
- Stand-alone tool – a device that can be used on its own
- Template – a device that is used as a template
- Skid loader tool – a device attached or used in conjunction with a skid loader
- Trailer – a device that is a trailer
- Truck mount – a device that mounts on a truck

Only one of these 23 devices (submission 7) was designed and built on the innovators own time and without CDOT materials. Accordingly, CDOT does not have shop rights to submission 7 according to the Attorney General's office. Devices in this category are designated in the table below.

**Table 3-1 Types of Devices**

<b>Submission</b>	<b>Description</b>	<b>equipment addition</b>	<b>stand-alone tool</b>	<b>template</b>	<b>skid loader tool</b>	<b>trailer</b>	<b>truck mount</b>
1	Traffic Control Trailer					Y	
2	Corbel Template			Y			
3	Joint Extraction Tool				Y		
4	BobCat Dozer Blade				Y		
7	Sign Elevator Bracket				Y		
8	Alamo Pump Holder	Y					
9	Husting Hitch Plow Rollers	Y					
10	Clutch Pedal Holder		Y				
11	McCoy Guardrail Alignment Tool		Y				
13	Theft Deterrent Box	Y					
14	Loader Bull Plow Legs	Y					
15	Husting Plow Slide	Y					
17	Post Puller		Y				
18	Metal Squeegee		Y				
19	Folding Road Closure Gate	Y					
20	Portable Arrow Board						Y
23	Hot Seal/Crack Seal Cup		Y				
25	"Hula Skirt" Sander Belting	Y					
27	Slide-In Heat Box						Y
28	4 Foot Slide Post Pounder		Y		Y		
29	Hydraulic Delineation Post Remover		Y				
32	Guardrail Post puller		Y				
34	Delineator Post Puller		Y				

### 3.2 Device Costs and Benefits

It may be desirable for CDOT to replicate a device for use across regions in CDOT or even in other DOTs. To aid in this decision, criteria were established to capture the costs and benefits of each device. The criteria included:

- Usefulness
- Ease of use
- Manufacturability
- Potential for widespread application
- Potential safety risks
- Availability of similar equipment for purchase
- Patent information

The potential for widespread application of each device depends on its complexity, usefulness, and benefits. The criteria used to determine the potential for widespread application included:

- Time to train operator
- Improvement in safety
- Reduction in time to complete task
- Improvement in quality
- Number of months device can be used during the year
- Hours per month for typical use of device
- Units required
- Use in other states

Each innovator was asked to complete the Supplementary Questionnaire form providing answers to establish the metrics for each device. The innovator's response was reported when available. Otherwise, the Study team evaluated the criteria based on the understanding of the use and operation of the device. Table 3-1 summarizes the potential for widespread application of each device. An asterisk designates that the information supplied by the inventor was insufficient to determine the particular attribute. A blank indicates that the information was not supplied by the inventor.

Each device was evaluated for potential safety risks due to use and misuse of the device and due to failure of the device. It is difficult to foresee all uses and applications for each device. Therefore, the list of potential safety risks is not intended to be an exhaustive list of all possible safety risks and hazards associated with the use of the innovation.

Any device that is a tool has inherent safety risks associated with use and misuse as well as failure of the device. Most of these devices have safety risks that are typical of these device types. Submission 27, the Slide in Heat Box, should be considered carefully. The Study team's discovery of similar commercially available devices included multiple

safety features to provide automatic control of the temperature and exhaust. If CDOT pursues the use of this device, such safety features should be included.

A summary of the findings from the Preliminary Patentability Assessment (Section 3.5) is included in this document because it may have an impact on the decision whether to replicate a device. One important aspect to consider is that CDOT may run the risk of patent infringement if it produces and/or uses an employee's innovation that is covered by one of more valid claims of an already existing, in force U.S. patent.

**Table 3-2 Potential for Widespread Application Criteria**

Submission	Description	Time to train operator (min)	Improvement in safety	Reduction in time	Improvement in quality	Number of months in use	Hours per month in use	Units required
1	Traffic Control Trailer	60	Y	Y	Y	12	40	1/crew
2	Corbel Template	10	Y	Y	Y	12		1/crew
3	Joint Extraction Tool	20	Y	Y	Y	6	20	2/section
4	BobCat Dozer Blade	20	Y	Y	Y	12		1/patrol
7	Sign Elevator Bracket	60	Y	Y	n/a	12		1/patrol
8	Alamo Pump Holder	10	Y	Y	Y	4		1/mower
9	Husting Hitch Plow Rollers	0	Y	Y	Y	6		2/plow
10	Clutch Pedal Holder	5	n/a	Y	n/a	12		1/mechanic
11	McCoy Guardrail Alignment Tool	20	Y	Y	Y	12		1/patrol
13	Theft Deterrent Box	10	Y	n/a	Y	12		1/street light
14	Loader Bull Plow Legs	10	Y	Y	n/a	12		2/plow
15	Husting Plow Slide	0	Y	Y	n/a	7		2/plow
17	Post Puller	5	Y	Y	n/a	6		1/patrol
18	Metal Squeegee	5	Y	Y	n/a	5		1/patrol
19	Folding Road Closure Gate	60	Y	Y	n/a	12		1/gate
20	Portable Arrow Board	5	Y	Y	n/a	12		1/truck
23	Hot Seal/Crack Seal Cup	5	Y	Y	n/a	12		1/crew
25	"Hula Skirt" Sander Belting	0	Y	n/a	Y	6		1/truck
27	Slide-In Heat Box	30	N	Y	Y	12	12	1/patrol
28	4 Foot Slide Post Pounder	10	Y	Y	Y	12		1/patrol
29	Hydraulic Delineation Post Remover	5	Y	Y	n/a	12	40	1/patrol
32	Guardrail Post puller	20	Y	Y	Y	12		1/TMIII area
34	Delineator Post Puller	20	*	*	*	12		1/patrol

### **3.3 User Manual**

The purpose of the User Manual is to communicate instructions in written form for installation and operation of the device. A draft user manual was created for each device based upon the information submitted by the innovator. This draft was then sent to the innovator for review. Any additions or revisions made or mentioned by the innovator were implemented and a final draft was returned to the innovator for approval. These operating instructions should be verified by CDOT management prior to their dissemination to CDOT personnel. Pictures were included whenever possible. These pictures were either provided by the innovator or generated from the SolidWorks CAD package based upon the parts developed for the drawing package. The User Manual for each device is included in the appendix of this report.

### **3.4 Mechanical Drawing Package**

The Study team worked directly with the innovators to collect photo documentation for each device. Detailed mechanical drawings were completed for each innovation using SolidWorks 3D CAD software. The drawings were prepared based on information provided by the appropriate innovator(s). No modifications or verification of dimensions were performed on these drawings by the Study team. The mechanical drawing package for each device is included in the appendix of this report.

The purpose of a mechanical drawing package is to fully define every part and the assembly for an invention. Part drawings are fully dimensioned, specify material and finish, and specify manufacturing tolerance for every dimension. Assembly drawings specify the parts required, the quantity required for every part, and any assembly processes required to fully assemble the device. With this information a qualified machine shop should be able to reproduce the device in its entirety.

A mechanical drawing package was created for each device. The approximate size and shape of each part in the device was created using the SolidWorks CAD package. An approximate drawing of each part based upon the CAD model was then sent to the innovator. The innovator marked the correct measurement for each dimension and returned the marked up drawings. The CAD drawings were then updated with the correct dimensions and returned to the innovator for final review and approval.

Part tolerancing was accomplished with the use of a standard block tolerance. This form of tolerance indicates an allowance for variability in dimension based on the number of decimal places shown on a dimension. In this manner, a dimension with two or three decimal places shown will have a much more precise tolerance than a dimension with zero or one decimal places shown. Each part was roughly evaluated for tolerance based upon overall size and reasonable manufacturing quality. Tolerance analyses were not conducted on any of the inventions. These time and labor intensive analyses would have evaluated the overall fit of the assembly using these tolerances at their extremes.

Typically in the process of designing a new device, some engineering is performed. This may include stress analysis, finite element analysis and/or design optimization for cost,

function, manufacturability, safety, and ease of use. In addition when creating a drawing package, material selection is considered and appropriate fits and tolerances are designated so that the assembly will function properly with consideration for cost. No engineering, design improvements, or qualifications of any kind have been performed on these drawings or the devices that they represent. Each design is entirely that of the innovator. The innovations were documented as presented by the innovator(s).

Table 3-3 provides information regarding the complexity/simplicity of each device based on the number of parts in the device and the types of manufacturing process used to make the parts. The number of each type of custom fabricated part is listed in the “number of parts” column. The number in parentheses includes fasteners and other purchased parts.

**Table 3-3 Part Information for Each Device**

<b>Submission Number</b>	<b>Description</b>	<b>Number of parts</b>	<b>wood</b>	<b>weldment</b>	<b>machined</b>
1	Traffic Control Trailer	32 (38)		Y	Y
2	Corbel Template	5 (5)	Y		
3	Joint Extraction Tool	15 (15)		Y	Y
4	BobCat Dozer Blade	3 (5)		Y	Y
7	Sign Elevator Bracket	4 (5)		Y	Y
8	Alamo Pump Holder	6 (9)		Y	Y
9	Husting Hitch Plow Rollers	3 (5)		Y	Y
10	Clutch Pedal Holder	5 (7)		Y	Y
11	McCoy Guardrail Alignment Tool	4 (6)		Y	Y
13	Theft Deterrent Box	4 (6)		Y	Y
14	Loader Bull Plow Legs	4 (5)		Y	Y
15	Husting Plow Slide	1 (2)			Y
17	Post Puller	2 (2)		Y	Y
18	Metal Squeegee	5 (5)		Y	Y
19	Folding Road Closure Gate	12 (19)		Y	Y
20	Portable Arrow Board	10 (16)		Y	Y
23	Hot Seal/Crack Seal Cup	4 (5)		Y	Y
25	"Hula Skirt" Sander Belting	8 (8)			Y
27	Slide-In Heat Box	46 (52)		Y	Y
28	4 Foot Slide Post Pounder	7 (9)		Y	Y
29	Hydraulic Delineation Post Remover	14 (22)		Y	Y
32	Guardrail Post puller	10 (14)		Y	Y
34	Delineator Post Puller	7 (10)		Y	Y



### 3.5 Preliminary Patentability Assessment

The purpose of the preliminary patentability assessment was to discover existing prior art and evaluate novelty, non-obviousness and usefulness in view of this prior art. U.S. patent law stipulates that an invention must be sufficiently non-obvious (*at the time the invention was made and to a person having ordinary skill in the art to which the invention pertains*) in order to be patentable. That is, a person having ordinary skill in the art would not know how to solve the problem that the invention addresses using the same mechanism as that seeking to be patented. The Study team employed the Graham Factors to gauge obviousness by examining: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and prior art, and (4) objective evidence of non-obviousness of the type suggested in the Graham vs John Deere Supreme Court decision of 1966.

A search using the U.S. patent office website was performed to find similar devices or devices with similar features or used for similar purposes. Keywords were used to find relevant patents. When a relevant patent was found, the abstract and figures were reviewed. In addition, patents that were referenced by these patents were also reviewed. A web search for similar devices was also performed. Devices that were similar enough to question the non-obviousness or novelty of the device were noted and a picture included. The claims of the prior art patents were not examined and none of the submitted inventions was submitted to a freedom-to-operate analysis, i.e., a search of unexpired, valid patent claims to determine if one can make, use or sell an invention, patented or unpatented, without infringing an already-existing patent.

The Study team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this preliminary patentability assessment intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study team members is a patent attorney or patent agent.

The date of public disclosure was also identified. From the date of public disclosure, an inventor has one calendar year to file a patent application. If the patent application is not filed in the one year time frame, the inventor loses their right to a patent and the invention enters the public domain unless it is already covered by the claims of an earlier valid, in-force patent. Public disclosure can occur in a variety of ways, for example by any of the following events: the device is shown to another person, the device is visible to others who are not bound by a confidentiality agreement, the inventor discloses the invention in a publication. In addition, certain events occurring before the legally determined date of invention can also constitute a barrier to patentability.

In the context of CDOT employee inventions, if CDOT replicates these devices and puts them into use, this will constitute public disclosure and affect the innovators ability to secure a patent if the patent application is not filed within one calendar year of the date of public disclosure. If the device is modified significantly, then it may be considered a new invention and the public disclosure time clock may start over.

Table 3-4 summarizes the preliminary patentability assessment results for each device (complete assessments for each device are included in the appendices). As illustrated in Table 3-4, 16 innovations were deemed novel. These devices are applied or designed in a manner that was not found in the prior art so they can be considered novel. All of the devices were deemed useful. Only 2 innovations were deemed non-obvious. All of the devices with stated public disclosure dates have exceeded the 12 months since first public disclosure unless it can be shown that there have been modifications to the device that cause the public disclosure date to be more recent.

**Table 3-4 Preliminary Patentability Assessment Findings**

<b>Submission</b>	<b>Description</b>	<b>novel</b>	<b>non-obvious</b>	<b>Useful</b>	<b>shop rights</b>	<b>public disclosure</b>
1	Traffic Control Trailer	N	N	Y	Y	2007
2	Corbel Template	Y	N	Y	Y	NR
3	Joint Extraction Tool	Y	N	Y	Y	May 2006
4	BobCat Dozer Blade	Y	N	Y	Y	2003
7	Sign Elevator Bracket	Y	Y	Y	N	2009
8	Alamo Pump Holder	Y	N	Y	Y	NR
9	Husting Hitch Plow Rollers	Y	N	Y	Y	NR
10	Clutch Pedal Holder	Y	N	Y	Y	NR
11	McCoy Guardrail Alignment Tool	Y	N	Y	Y	NR
13	Theft Deterrent Box	Y	N	Y	Y	Nov 2008
14	Loader Bull Plow Legs	N	N	Y	Y	April 2008
15	Husting Plow Slide	Y	N	Y	Y	Nov 2004
17	Post Puller	N	N	Y	Y	2005
18	Metal Squeegee	Y	N	Y	Y	2004
19	Folding Road Closure Gate	N	N	Y	Y	2009
20	Portable Arrow Board	Y	Y	Y	Y	2009
23	Hot Seal/Crack Seal Cup	Y	N	Y	Y	Fall 2008
25	"Hula Skirt" Sander Belting	Y	N	Y	Y	NR
27	Slide-In Heat Box	N	N	Y	Y	Feb 2008
28	4 Foot Slide Post Pounder	N	N	Y	Y	May 2008
29	Hydraulic Delineation Post Remover	Y	N	Y	Y	Jan 2010
32	Guardrail Post puller	Y	N	Y	Y	NR
34	Delineator Post Puller	N	N	Y	Y	NR

NR = Not reported by inventor

Because the prior art searches conducted for each of the submitted inventions was not intended to be exhaustive, the Study team's judgment of novelty and non-obviousness for each of the submitted inventions is not intended to constitute a formal, legal assessment of novelty and non-obviousness. Statements regarding novelty and non-obviousness in this report are based on information gleaned from reviewing abstracts of prior art patents found in the searches as conducted and on information found from Internet searching. Inventions listed as not novel or obvious (i.e. not non-obvious) in Table 3-4 may indeed be novel and/or non-obvious in the context of patentability depending on the precise wording used in the claims of any patent applications that might be submitted for those inventions. Such information (drafts of potential patent claims) is not available for any of the submitted inventions.

## **CHAPTER 4: SUMMARY AND RECOMMENDATIONS**

After reviewing all of the devices submitted by CDOT employees, it became very clear to the Study team that there is a strong desire on the part of CDOT employees to improve the safety, efficiency and quality of their work. Most of the devices were simple and very clever. These devices were created from the employees own initiative. It is clear that further encouraging innovation among CDOT employees will result in additional innovations that will improve safety, efficiency and quality.

### **4.1 Summary of Devices**

CDOT employees submitted questionnaires for 34 candidate innovations. Three of the submittals were deemed too simple, one was withdrawn by the innovator, and sufficient information was not provided for seven submittals (despite numerous contact attempts). The Study team performed a complete analysis and developed documentation for the remaining 23 innovations.

The Study team determined that CDOT could claim shop rights to all but one of the innovations (submission 7). Most of the innovations were deemed obvious by the Study team because they are similar to existing equipment or are standard techniques for solving a particular problem. Many of the devices are applied or designed in a manner that was not found in the prior art so they can be considered novel. All of the devices, by nature of the observed need for them, can be deemed useful. Devices 7 and 20 meet all three criteria of novel, non-obvious and useful. All of the devices with stated public disclosure dates have exceeded the 12 months since first public disclosure.

Many of these devices were simple yet yielded significant benefit (e.g., submissions 2, 7, 8, 9, 11, 14, 15, 18, 23, 25, 28). All of these would be inexpensive to manufacture and would seem to provide value. Submission 25 is a simple skirting around the sand truck to prevent sand from flying up and has resulted in a reduction in complaints of broken windshields. Submission 2 is a lightweight template that allows the location and drilling of holes for corbels eliminating the need to lift and hold the corbel in place during drilling. Several of the devices are legs so that when equipment is unhitched from the

truck it remains in an elevated position and eliminating the need to lift it when connecting it to the hitch. Submission 28 is a post pounder that is longer than usual to provide better stability during pounding and sets the correct depth of the post.

Multiple devices were developed to remove posts (submissions 17, 29, 32, 34) and may indicate that the equipment that is currently in use is not meeting the needs of the road crews. Most of these devices focused on better mechanical advantage so that less force was required, thereby affecting safety and time to complete a job. Many similar devices were found in the prior art; therefore, none of these devices were non-obvious and some were not novel since they were almost identical to available equipment. CDOT should explore the reasons that existing equipment does not meet current needs, and whether there is commercially available equipment that can address these issues.

Some of the devices (e.g., submissions 4, 10, 17, 34) appeared similar to commercially available equipment. In these cases, CDOT is potentially susceptible to patent infringement if these devices are IP-protected. In these instances, CDOT should not reproduce these devices, and rather should use commercially available equipment.

One device that should be considered very carefully is submission 27, the Slide in Heat Box. The search of prior art found commercially available devices for the same purpose; however, most had multiple safety features to provide automatic control of the temperature and exhaust. If CDOT chooses to use this device, these safety features should be addressed.

## **4.2 Proposed Process for Future Innovations**

The following recommendations are offered to further promote innovation among CDOT employees on a continuing basis.

- Establish a written policy regarding employee rights to IP. In this context, it would appear appropriate that CDOT management, in association with the Colorado Attorney General's Office, establish a written policy as to the disposition of inventions and other intellectual property generated by CDOT employees. Employee-owned IP is a tremendous incentive for innovation, and CDOT should broadly publicize the policy via traditional means, e.g., pamphlets, posters, Internet.
- Establish and implement a systematic means for inventor-employees to submit invention disclosures for consideration by management. A proposed Invention Disclosure Form for consideration by CDOT management is provided below. This form should be reviewed by CDOT legal counsel and modified as necessary to satisfy the interests of CDOT and CDOT employees.
- Implement a process for evaluating submitted invention disclosures and for providing a response to the submitter in a timely manner. Such a system should examine the ownership of any intellectual property that may be associated with

the submitted invention and determine what, if any, rights to the invention that CDOT may have.

- Improve employee knowledge about patenting and licensing through periodic workshops and incorporation of innovation presentations in existing CDOT meetings/forums. The workshop format could be similar to the two day workshop developed for this project or it could be condensed to one day. At a minimum, the workshop could be offered to supervisors with the intent that supervisors would promote innovation to their employees.
- Recognize employee-developed innovations through annual awards, publicity and perhaps cash prizes.

A suggested form for CDOT employees to submit information about future innovations to CDOT management is provided on the following page.

# **CDOT Invention Disclosure Form**

The purpose of this Invention Disclosure Form is to provide a means for CDOT employees to submit information about their inventions and innovations to CDOT management. CDOT management will evaluate the information provided and respond to the submitter in a timely manner.

## **1. Title of the Invention:**

Provide a brief title to the invention.

## **2. Description of Invention**

On a separate sheet of paper, please describe the invention in enough details so that the invention can be understood by someone else in the field of the invention. This information could include, but is not limited to: drawings, photographs, data and prototypes.

## **3. Applications and Advantages of Invention**

Describe how the invention is used. What are its potential commercial applications? What problem(s) does it solve? What advantages does the invention have compared to other approaches to solving the problem? What competitive products are already available on the market?

## **4. Conception of Invention**

Conception of an invention refers to the time that you first came up with the idea for the invention. Provide information regarding conception of the invention. When did you first come up with the idea for the invention? Do you have any written record of when you first came up with the idea? Are there any witnesses to the original conception? If so, please provide a list of names and contact information.

## **5. Reduction to Practice**

Reduction to practice refers to physically making and successfully using the invention. Please provide the following information.

Was invention reduced to practice? If so, when did you first reduce the invention to practice? Where was the invention first reduced to practice? Do you have any written record of when you first reduced the invention to practice? Are there any witnesses to the reduction to practice? If so, please provide a list of names and contact information.

## **6. Prior Disclosure**

Please list any disclosure of the invention to others within or outside of CDOT. Such disclosure may have occurred through written documents, e-mails, conversations or by other means. Public disclosure of an invention can limit the period for filing a US patent application and possibly preclude foreign patents altogether. Provide a list of all such disclosures, if any, the names and contact information of all to whom such disclosures were made as well and the dates of such disclosures.

## **APPENDIX A**

### **COMPLETE PREPARED DOCUMENTS**

Four documents described in Chapter 3.1 were prepared for each innovation that had sufficient information to complete such documents.

<b>No.</b>	<b>Device</b>	<b>Page No.</b>
2	Corbel Template	28
3	Joint Extraction Tool	43
4	BobCat Dozer Blade	72
7	Sign Elevator Bracket	85
8	Alamo Pump Holder	96
9	Husting Hitch Plow Rollers	115
10	Clutch Pedal Holder	128
11	McCoy Guardrail Alignment Tool	144
13	Theft Deterrent Box	159
14	Loader Bull Plow Legs	171
25	"Hula Skirt" Sander Belting	188
27	Slide-In Heat Box	204
28	4 Foot Slide Post Pounder	285
29	Hydraulic Delineation Post Remover	304
32	Guardrail Post puller	331
34	Lever Post Puller	356

## Device Costs and Benefits

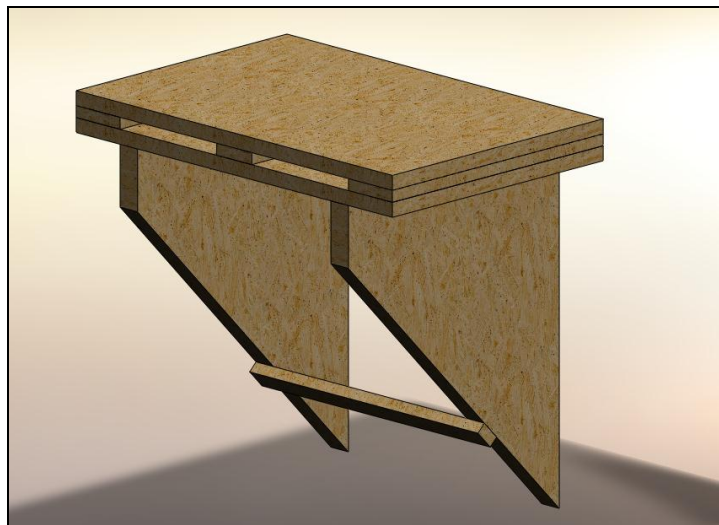
**Submission Number:** 2

**Title of the Innovation:** Corbel Template

**Innovator(s):** Carl Magdaleno

### Device Description

The corbel template is a tool that allows the installation location of a metal corbel to be marked without holding the heavy metal corbel in place.



#### 1. Usefulness

- Corbels provide bearing support for bridge girders that have failed due to either pier cap spalling or the end of the concrete girders being broken. Corbels are made out of heavy steel and bolted onto the existing pier caps. When locating a site for proper installation in the past, the steel corbel had to be lifted into place and adjustments made to finalize the location. This is a very heavy and dangerous job because corbels usually weigh 200 pounds. The wooden corbel template weighs less than 10 pounds and can be handled by one person to mark the site for installing the heavy steel corbels.

#### 2. Ease of use

- This device makes the task of marking the location of the corbel holes much easier because it weighs much less than a steel corbel.

### Manufacturability

This is a very simple device made of five plywood parts. None of the parts are difficult to manufacture.



## **Potential for Widespread Application**

1. Time to train operator
  - It will take less than 10 minutes to train a person how to use this device.
2. Reduction in time to complete task
  - This device reduces the time to mark the holes because it is easy to adjust the template due to its light weight.
  - Its use reduces the number of personnel required, from 2-3 to 1-2.
3. Improvement in quality
  - The holes for the corbel are marked more accurately because it is easier to adjust this light weight template.
4. Expected annual usage
  - This device can be used throughout the year.
5. Units required
  - One device is required for each bridge maintenance crew.
6. Use in other states
  - All states that use corbels on their bridges would benefit from this device.

## **Safety**

1. Improvement in safety
  - The steel corbel is heavy and requires 2-3 people to lift and hold in place while one is marking the holes for core drilling. Many times this is performed on scaffolding. The reduced weight of the corbel template results in fewer personnel required and less risk of injury due to lifting of the heavy steel corbel.
2. Safety concerns due to use or misuse of the device
  - No concerns due to use or misuse of the device could be identified.
3. Safety concerns due to failure of the device
  - Could cause splinters; therefore, the device should be well sanded.

## **Availability of Similar Equipment for Purchase**

The prior art search did not find similar equipment.

## **Patent Information**

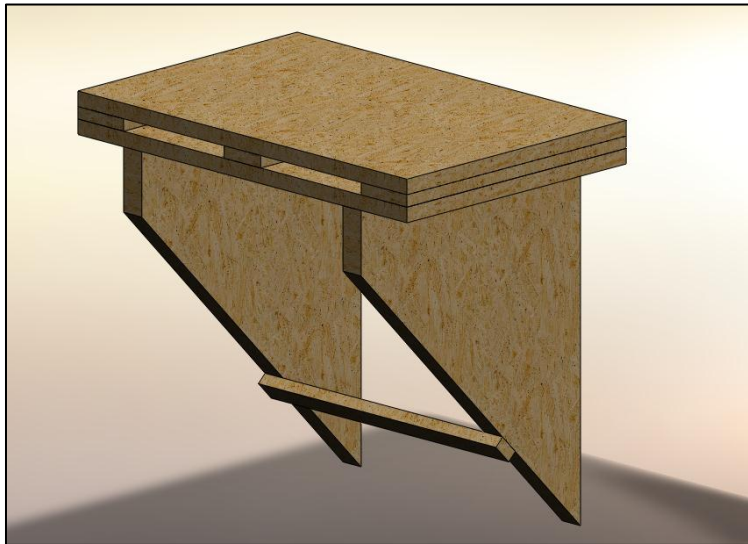
(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious in the patent examiners' evaluation.
  - This innovation has been publicly disclosed; however, the innovator is unclear regarding the date and duration of public disclosure.

## 2. Patent infringement

- The prior art search did not find a patent for a template for use with bridge maintenance. However, there are a number of specialized templates that have been patented. The risk of this device infringing on an existing patent depends on the patent examiner's evaluation of non-obviousness.

## Corbel Template User Manual

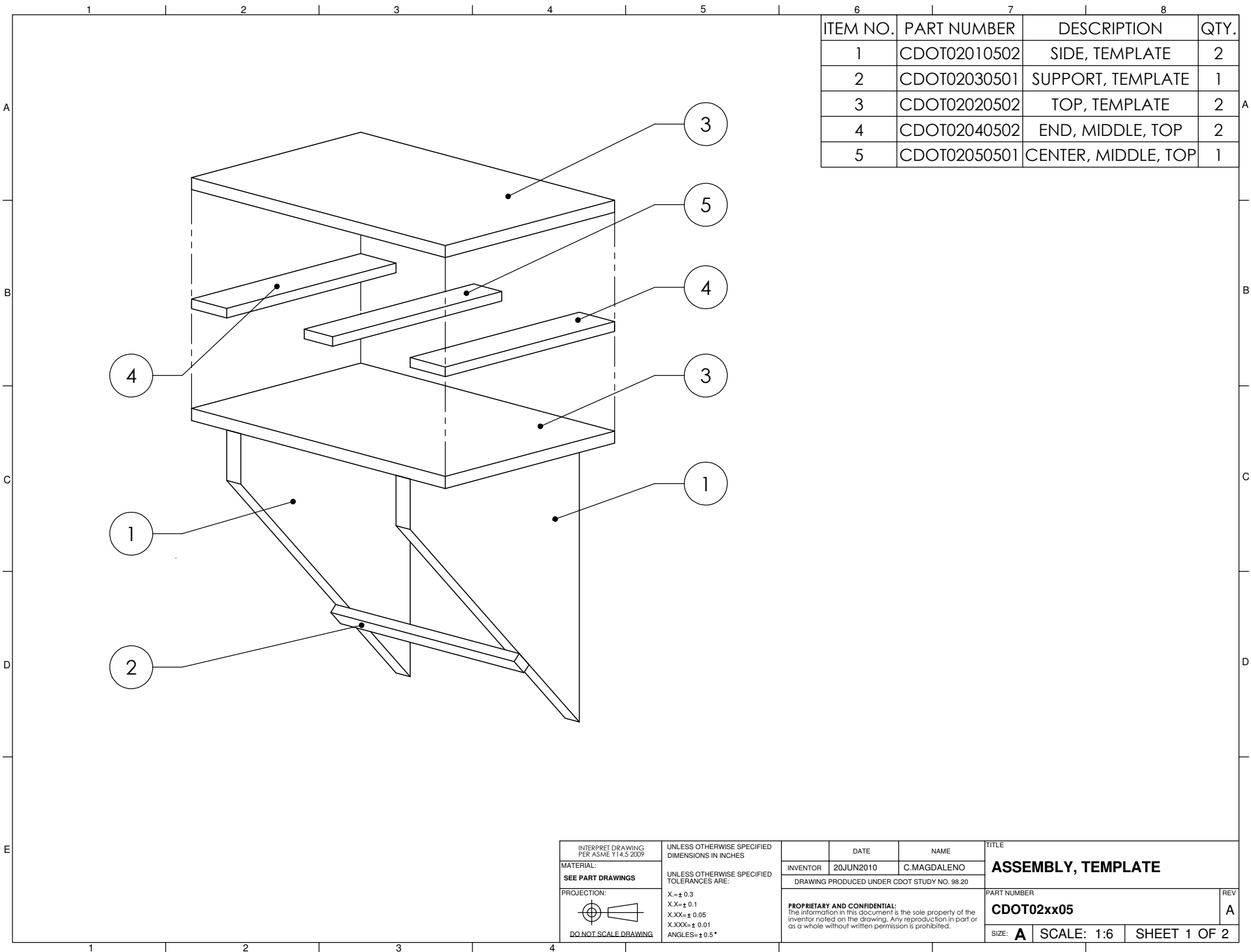


### Device Description

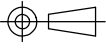
The corbel template is a tool that allows the installation location of a metal corbel to be marked without holding the heavy metal corbel in place.

### Operating Instructions

1. Position the template at the desired location of the metal corbel.
2. Mark the installation location by tracing around all or portions of the template.
3. Remove the template and install the metal corbel according to the markings.

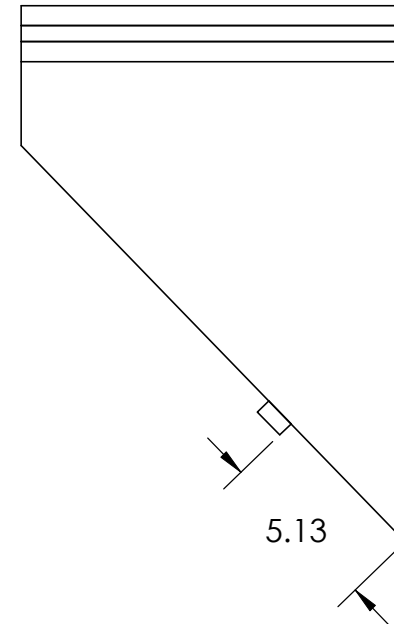
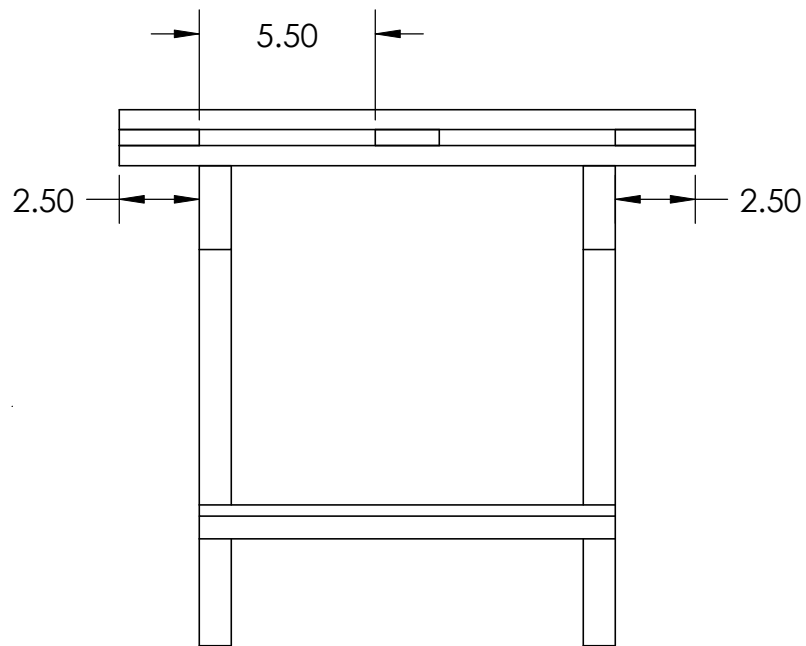


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT02010502	SIDE, TEMPLATE	2
2	CDOT02030501	SUPPORT, TEMPLATE	1
3	CDOT02020502	TOP, TEMPLATE	2
4	CDOT02040502	END, MIDDLE, TOP	2
5	CDOT02050501	CENTER, MIDDLE, TOP	1

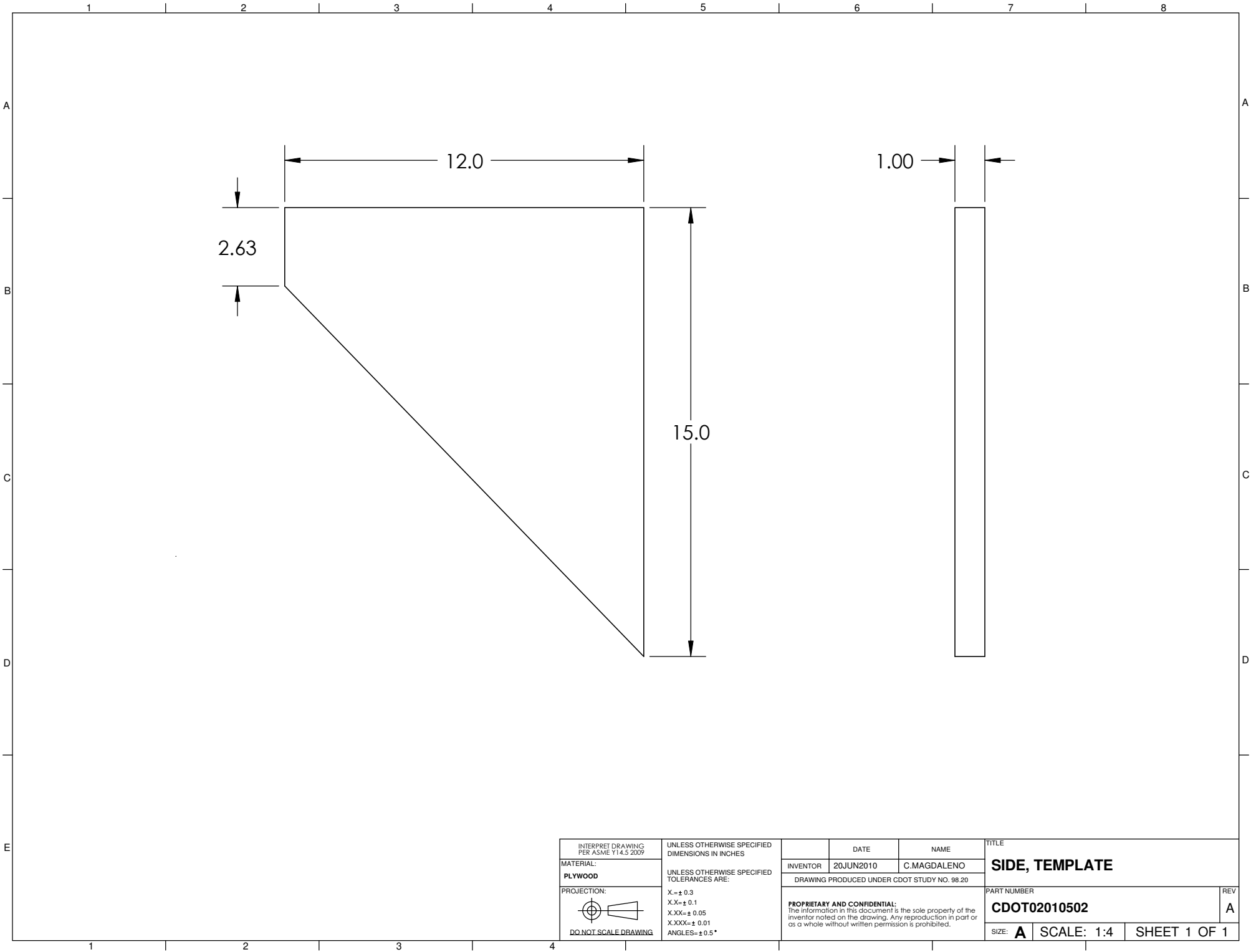
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DO NOT SCALE DRAWING		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		NAME	
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				SHEET 1 OF 2	

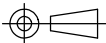
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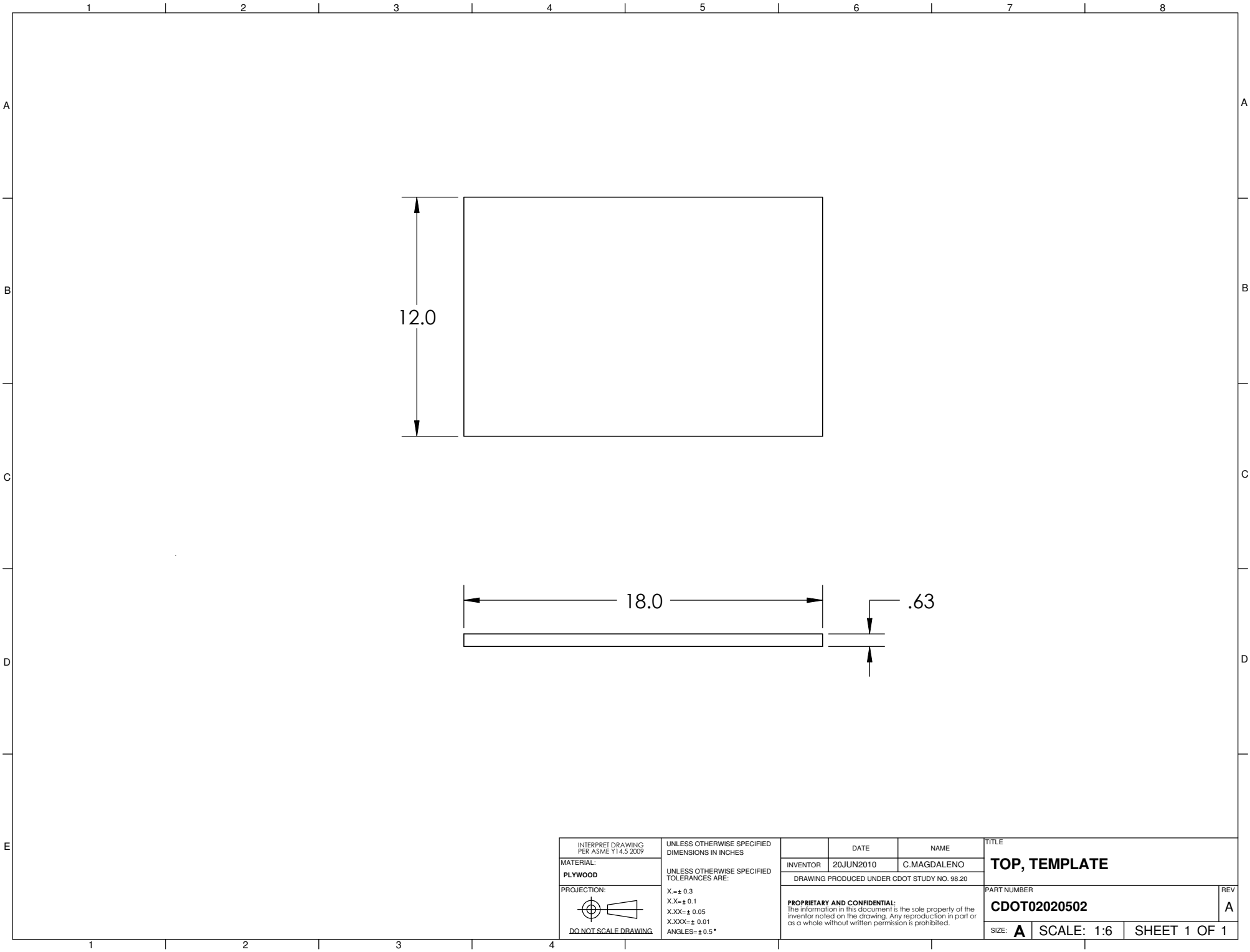
1. THE TOP ASSEMBLY IS HELD ONTO THE SIDES WITH WOOD GLUE AND THREE 1.5" SCREWS PER SIDE, TOTALING 6 SCREWS. THE SCREWS PASS THROUGH THE BOTTOM LAYER OF THE TOP ONLY.
2. THE TOP THREE LAYERS ARE HELD TOGETHER WITH WOOD GLUE AND THREE 1.5" SCREWS THROUGH EACH MIDDLE PIECE, TOTALING 9 SCREWS. COMPLETE THE TOP ASSEMBLY AFTER AFFIXING THE SIDES TO THE BOTTOM LAYER.
3. THE SUPPORT IS HELD ONTO THE SIDES WITH GLUE AND ONE 1.5" SCREW INTO EACH END OF THE SUPPORT PIECE.

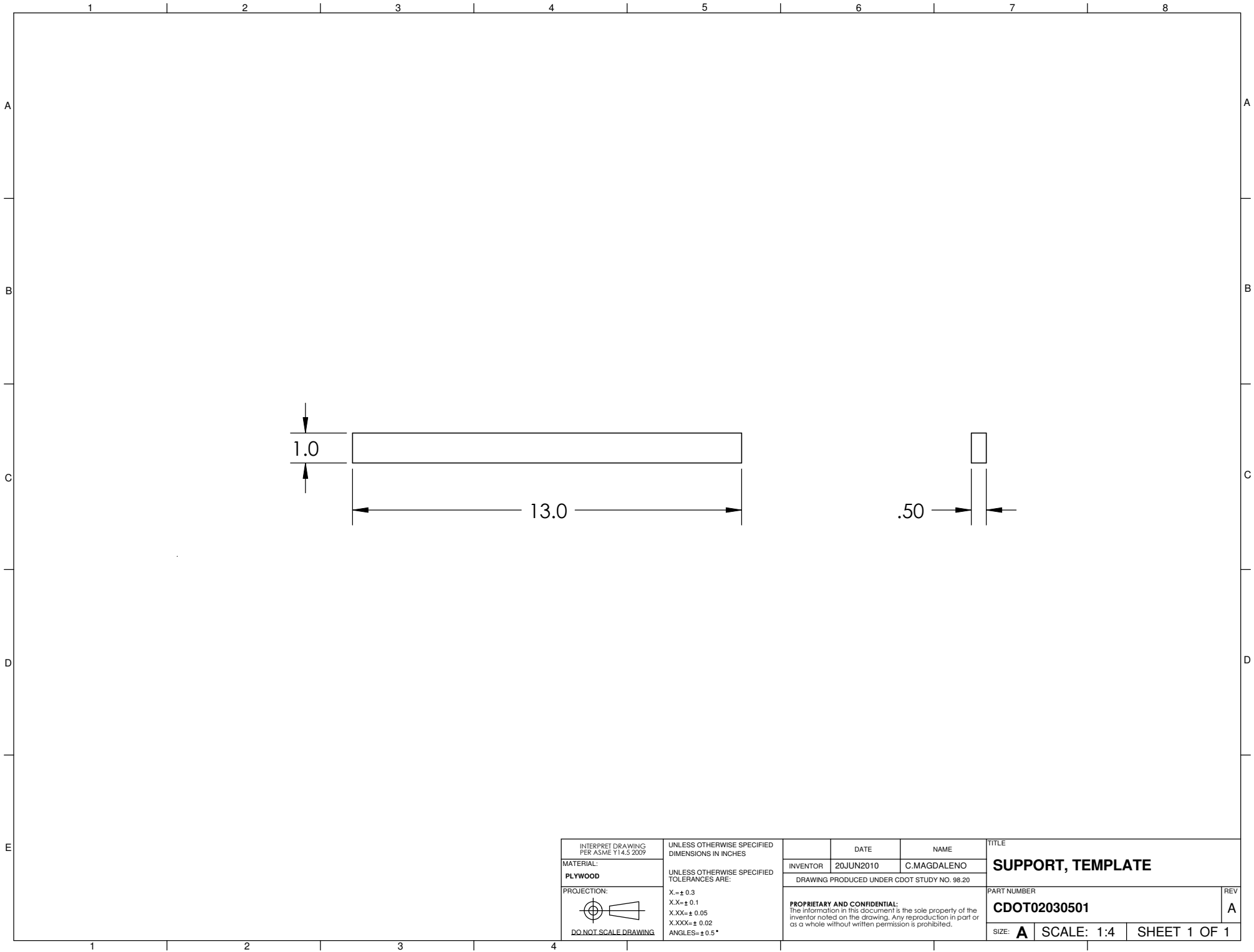


TITLE		
ASSEMBLY, TEMPLATE		
PART NUMBER		REV
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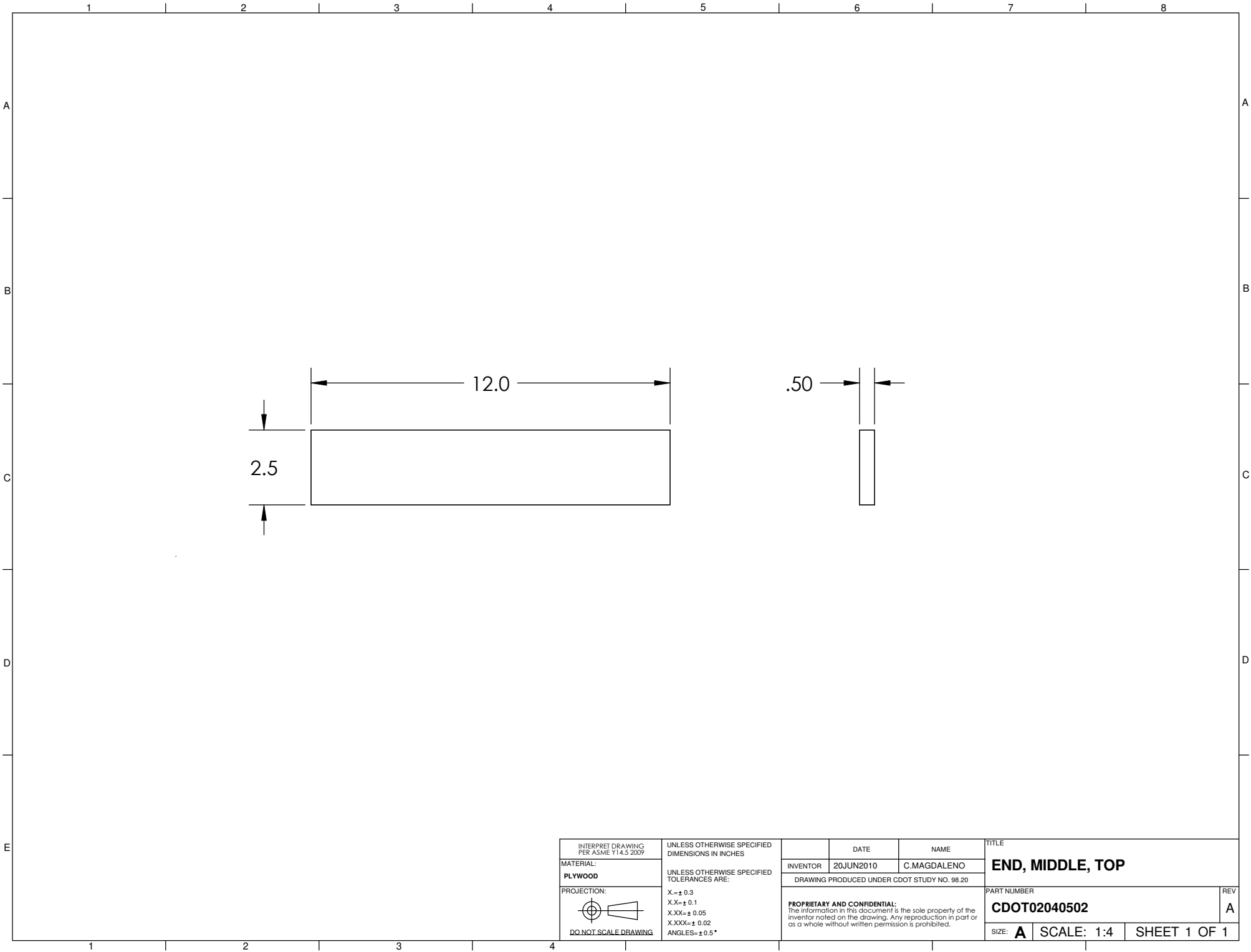


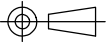
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DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						
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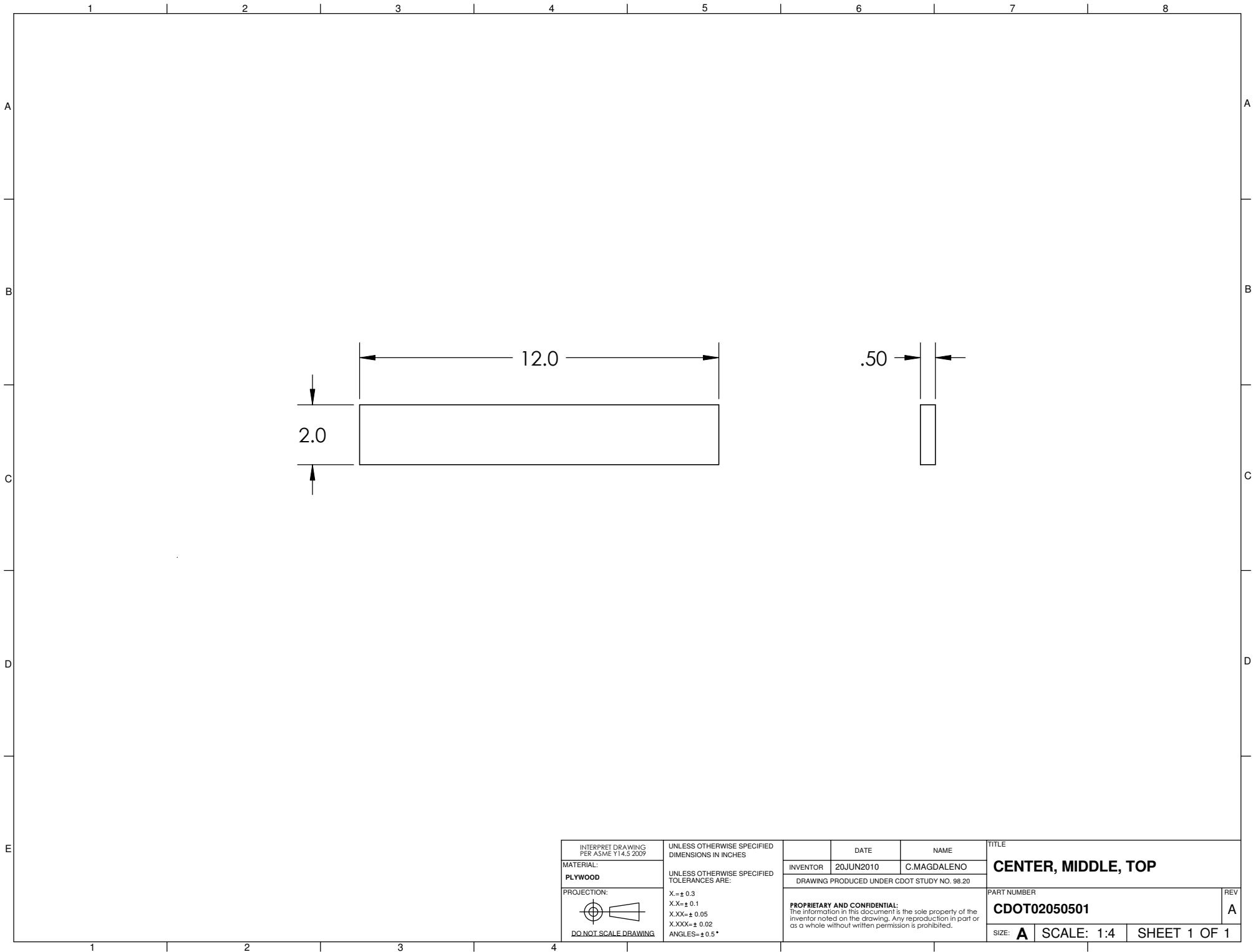


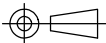






INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE			
MATERIAL: PLYWOOD		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	20JUN2010	C.MAGDALENO	END, MIDDLE, TOP		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.02 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER		REV
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			CDOT02040502		A
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INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: PLYWOOD		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	20JUN2010	C.MAGDALENO		CENTER, MIDDLE, TOP	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.02 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER		
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			CDOT02050501		REV
							SIZE: <b>A</b>	SCALE: 1:4	SHEET 1 OF 1

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Corbel Template

**Innovator(s):** Carl Magdaleno

**Summary:** It is common practice to use a template for marking the location of holes or as a drill guide. The prior art search found patents for templates designed for a variety of specialized tasks, so it is possible to patent a specialized template. These patents are listed under the category of possible non-obviousness. The prior art search did not find a patent for a template for use with bridge maintenance.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: corbel & template, corbel & girder, bridge & corbel, bridge & template, bridge & assembly, bridge & support, hole & template

Field of search: title

Patent Number	Year	Title of Invention
• 3,804,546	1974	Drill Guide
• 4,005,945	1977	Drill Guide
• 4,030,854	1977	Utility Pole Drill Guide

- 4,256,420      1981    Nail Head Drilling Guide
- 4,280,776      1981    Apparatus for Installation of a Door Lockset
- 4,330,228      1982    Drilling and Tapping Jig for Skis
- 4,461,603      1984    Drilling Fixture
- 4,893,970      1990    Hand Held Drill Guide
- 5,114,285      1992    Door Drilling Template
- 5,415,502      1995    Drill and Tap Guide
- 5,573,352      1996    Unitary Door Routing Template
- 5,762,115      1998    Door Template for Use with a Drill and a Router
- 6,193,449      2001    Bracket Drill Template
- 6,435,781      2002    Template Guide for Centering Drill in Removing of Broken Stud
- 7,073,990      2006    Dowel Gauge
- 7,189,034      2007    Drill Template

## **2. Existing Product Search**

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.schmidtprecision.com/4.html>

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### **1. Evaluation of Novelty**

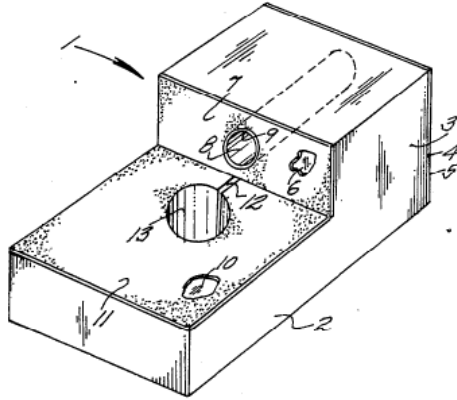
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawings.

### **2. Evaluation of Non-obviousness**

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation.

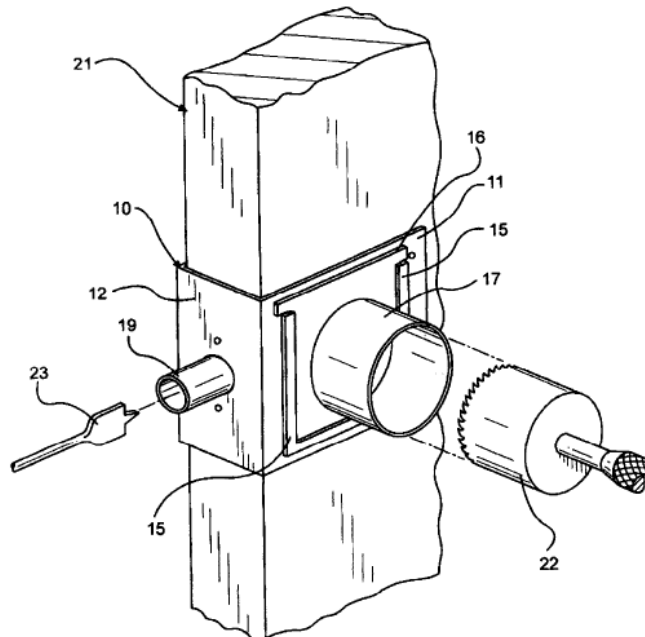
a. 4,893,970 Hand Held Drill Guide

This device is held against the edge of a board to guide the drill at the correct location in two orthogonal directions.



b. 6,193,449 Bracket Drill Template

This device is held against the edge of a board to guide the drill at the correct location in two orthogonal directions.



- c. <http://www.schmidtprecision.com/4.html>

This device is a wood corbel used as a shelf bracket. It comes with a screw locating template but does not have a physical replica as a template.



### **3. Usefulness**

Based on the information provided by the innovator, this device appears to meet the criteria for usefulness.

The corbel template is a tool that allows the installation location of a metal corbel to be marked without holding the heavy metal corbel in place.

### **4. Public Disclosure**

According to the innovator, this device has been used several times by the Region 4 bridge crew. A date when this device was first built and used was not given.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

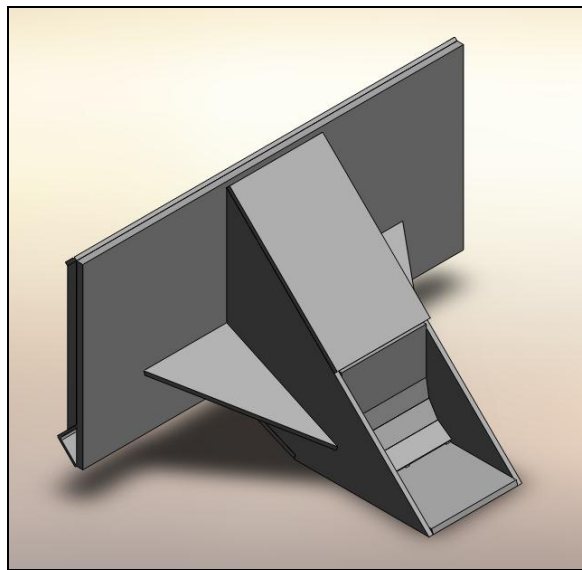
**Submission number:** 3

**Title of the Innovation:** Joint Extraction Tool

**Innovator(s):** Dan Glass

### Device Description

The joint extraction tool is a skid loader attachment that assists in the removal of rubber from expansion joints 11 inches wide or larger.



#### 1. Usefulness

- This joint extraction tool can has a cutting edge at the end of a scoop so that it can cut into an expansion joint opening cleanly and remove the rubber from the joint.
- The device can also lift the removed material.

#### 2. Ease of use

- This device is easy to use but requires that the operator is proficient in use of a skid loader.

### Manufacturability

This device is constructed of 15 welded and/or machined parts. It is simple and does not have any features that are difficult to manufacture.

## **Potential for Widespread Application**

1. Time to train operator
  - It will take less than 20 minutes to train an operator proficient in the use of a skid loader.
2. Reduction in time to complete task
  - This device reduces the time to remove the rubber from the expansion joint.
  - According to the innovator, this device will save about 7 hours in an 8 hour shift when removing rubber from a joint in the road.
  - The joint opening still requires sand blasting; however, there is less material to remove by hand.
3. Improvement in quality
  - This device scrapes the bottom and the sides of the joint opening so that the opening is much cleaner than when the task is performed manually.
4. Expected annual usage
  - Expansion joint repair is performed during good weather. Therefore, it is expected to be able to use this device at least 6 months of the year.
  - The current prototype is in use 20 hours per month.
5. Number of devices required
  - Two devices are required for each CDOT section.
6. Use in other states
  - All states that remove rubber from expansion joints would benefit from this device.

## **Safety**

1. Improvement in safety
  - This device eliminates much of the manual labor involved in expansion joint repair so there is less likelihood of worker injury.
  - Workers spend less time on the road and at risk of traffic-related injury.
2. Safety concerns due to use or misuse of the device
  - Workers could pinch fingers when attaching the device to the skid loader.
3. Safety concerns due to failure of the device
  - Very minimal. This device mounts on a skid loader. If the device breaks during use, the operator is in the cab of the skid loader and protected from any pieces that are thrown after breakage.

## **Availability of Similar Equipment for Purchase**

The prior art search did not find similar commercially available products.



## **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

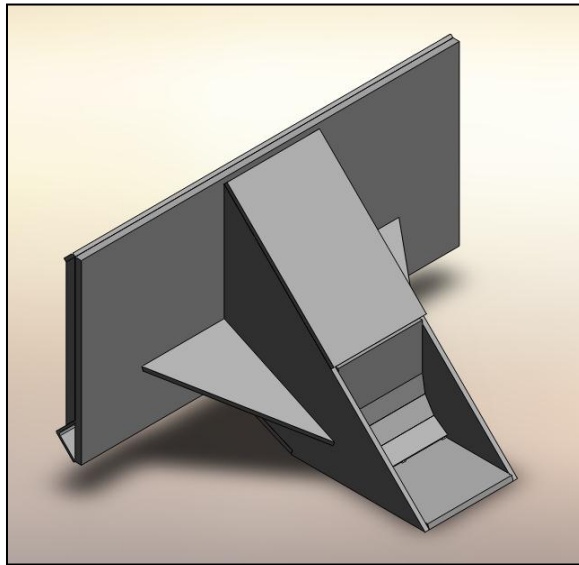
### **1. Patentability**

- This device may be considered novel and useful but may not be considered non-obvious in the patent examiner's evaluation.
- According to the innovator, this innovation was publicly disclosed in its current form in May, 2006.

### **2. Patent infringement**

- Patents were found for devices that performed the same task. However, none of these devices attached to a skid loader and none were similar in configuration. The risk of this device infringing on an existing patent depends on the patent examiner's evaluation of non-obviousness.

## Joint Extraction Tool User Manual



### Device Description

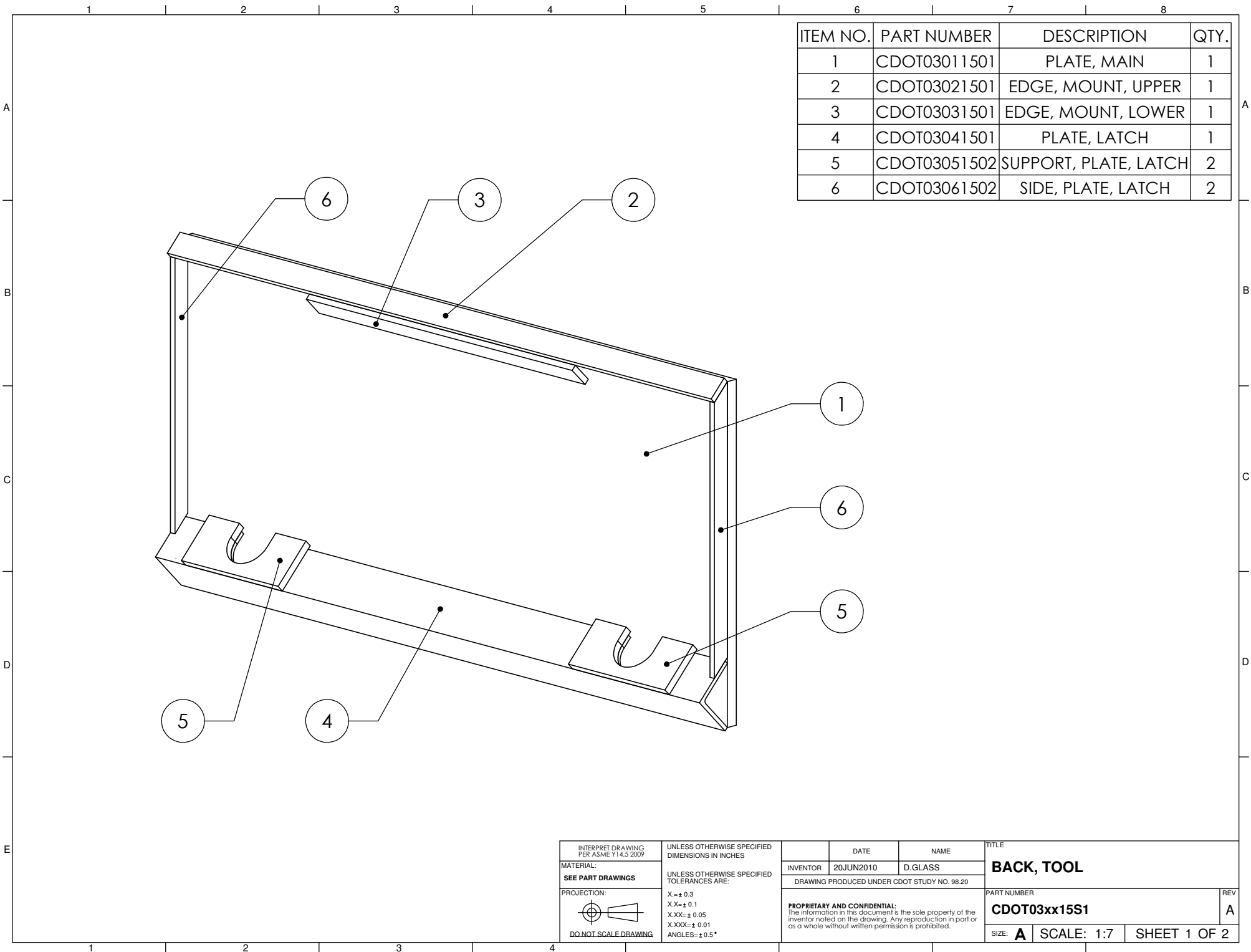
The joint extraction tool is an attachment for skid loader that assists in the removal of rubber from road joints 11 inches in width or larger.

### Installation Instructions

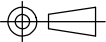
1. Mount the joint extraction tool to the skid loader using a standard mounting system such as the Bobcat® Bob-Tach™ attachment.

### Operating Instructions

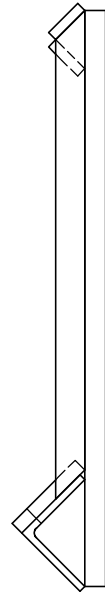
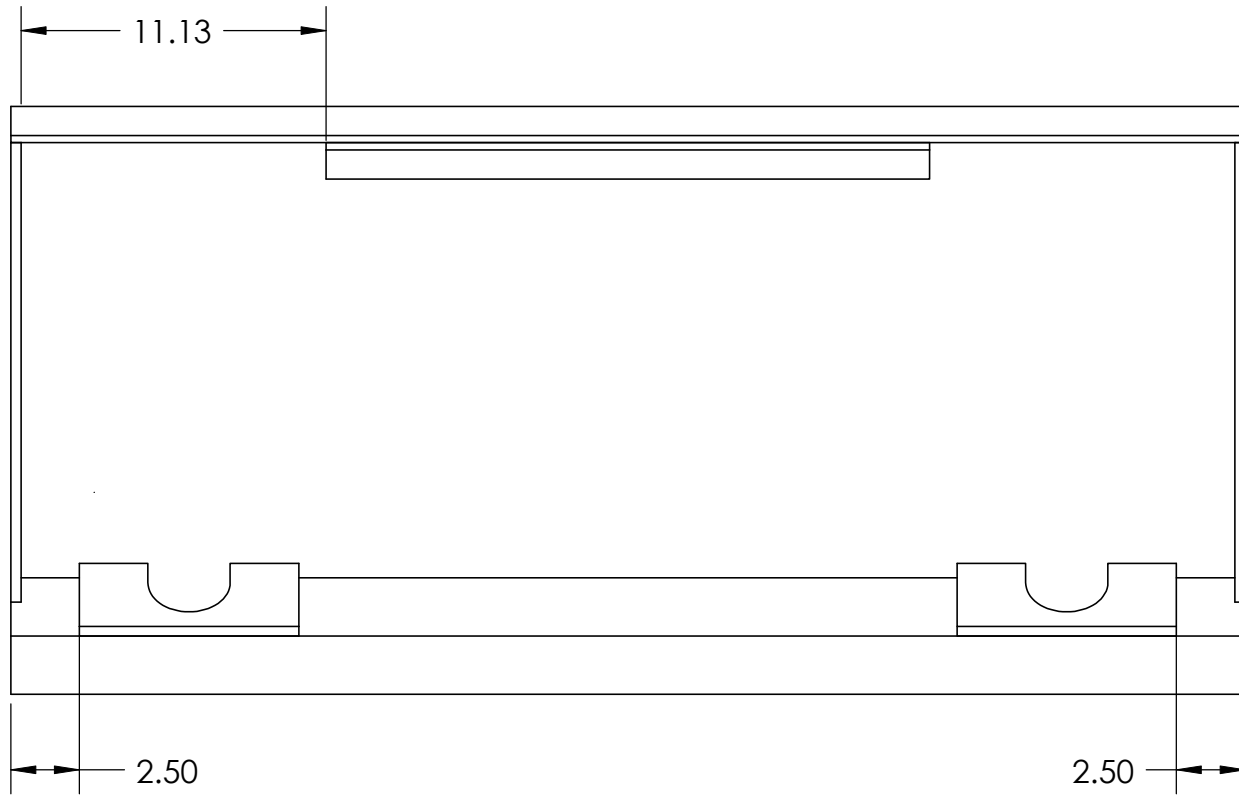
1. Using a blade or other cutting implement, cut the sides of the joint to be removed.
2. Approach one end of the joint with the skid loader.
3. Align the joint extraction tool parallel to the length of the joint and at an angle of 45 degrees from the vertical.
4. Push the tool into the joint until the bottom of the joint tray is reached.
5. Level the extraction tool so that the bottom of the tool is parallel to the ground.
6. Move the tool forward along the joint, removing the rubber from the joint as the tool progresses.
7. When you cannot move any further, lift the tool out of the joint tray.
8. Repeat steps 3-7 until the job is completed.



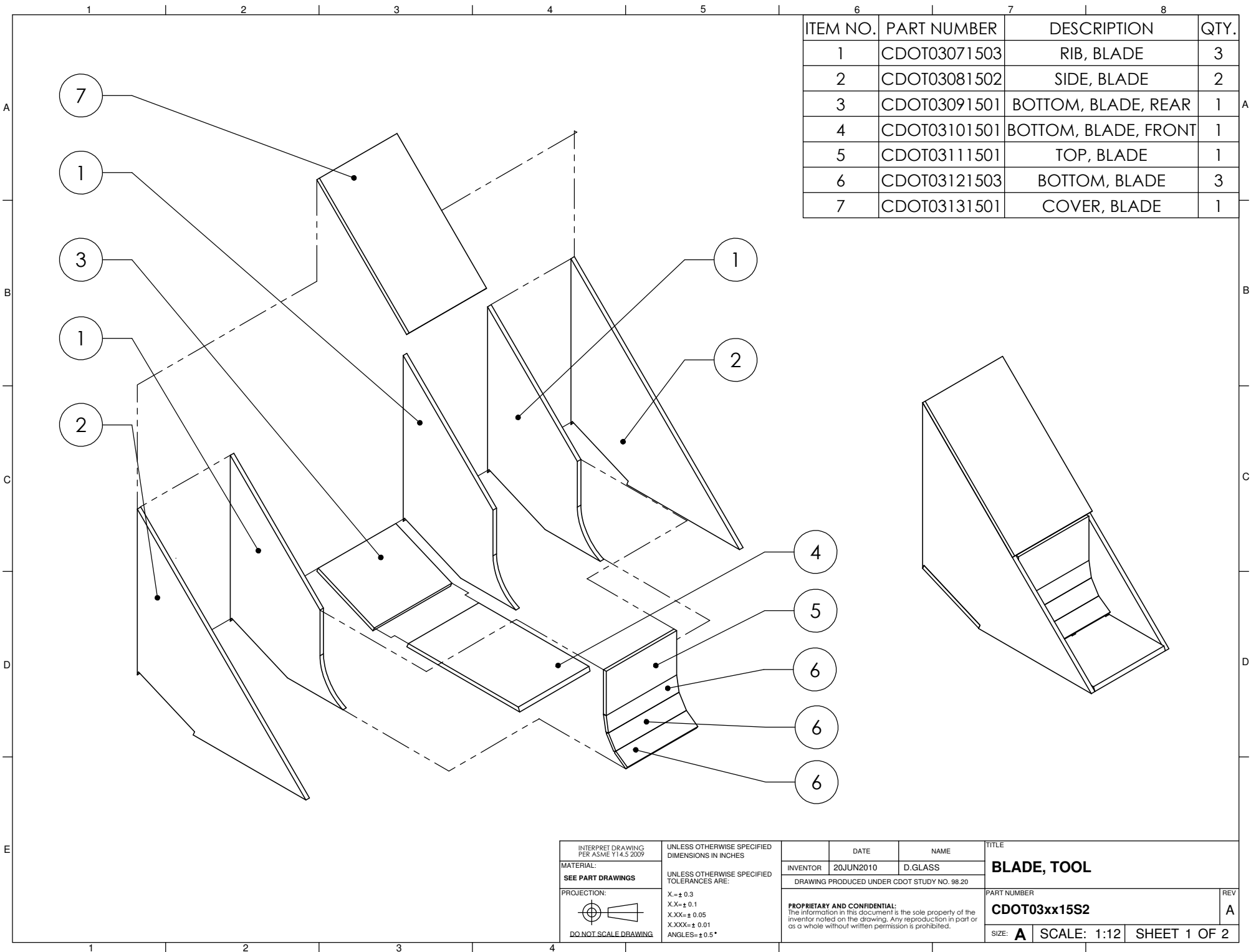
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3	CDOT03031501	EDGE, MOUNT, LOWER	1
4	CDOT03041501	PLATE, LATCH	1
5	CDOT03051502	SUPPORT, PLATE, LATCH	2
6	CDOT03061502	SIDE, PLATE, LATCH	2

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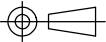
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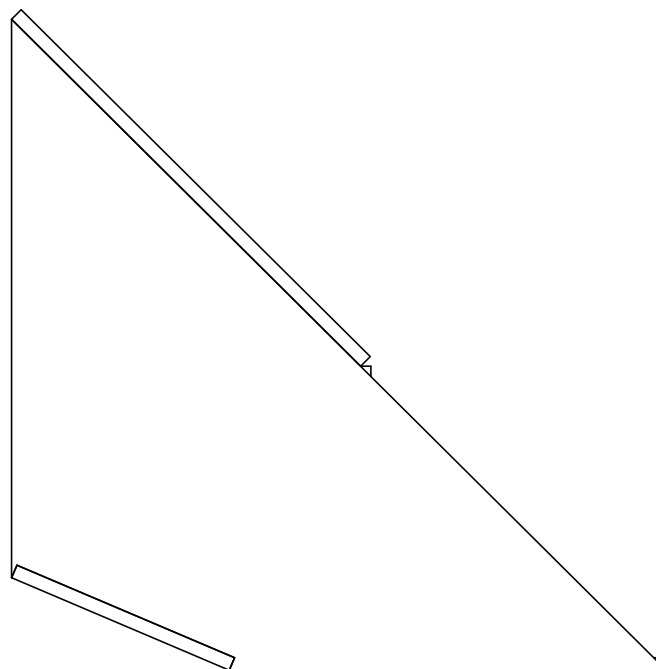
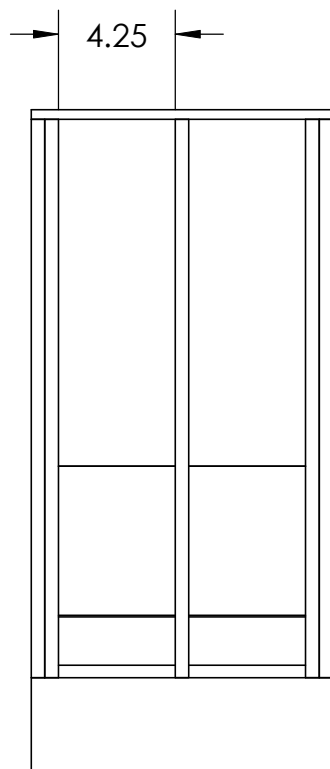
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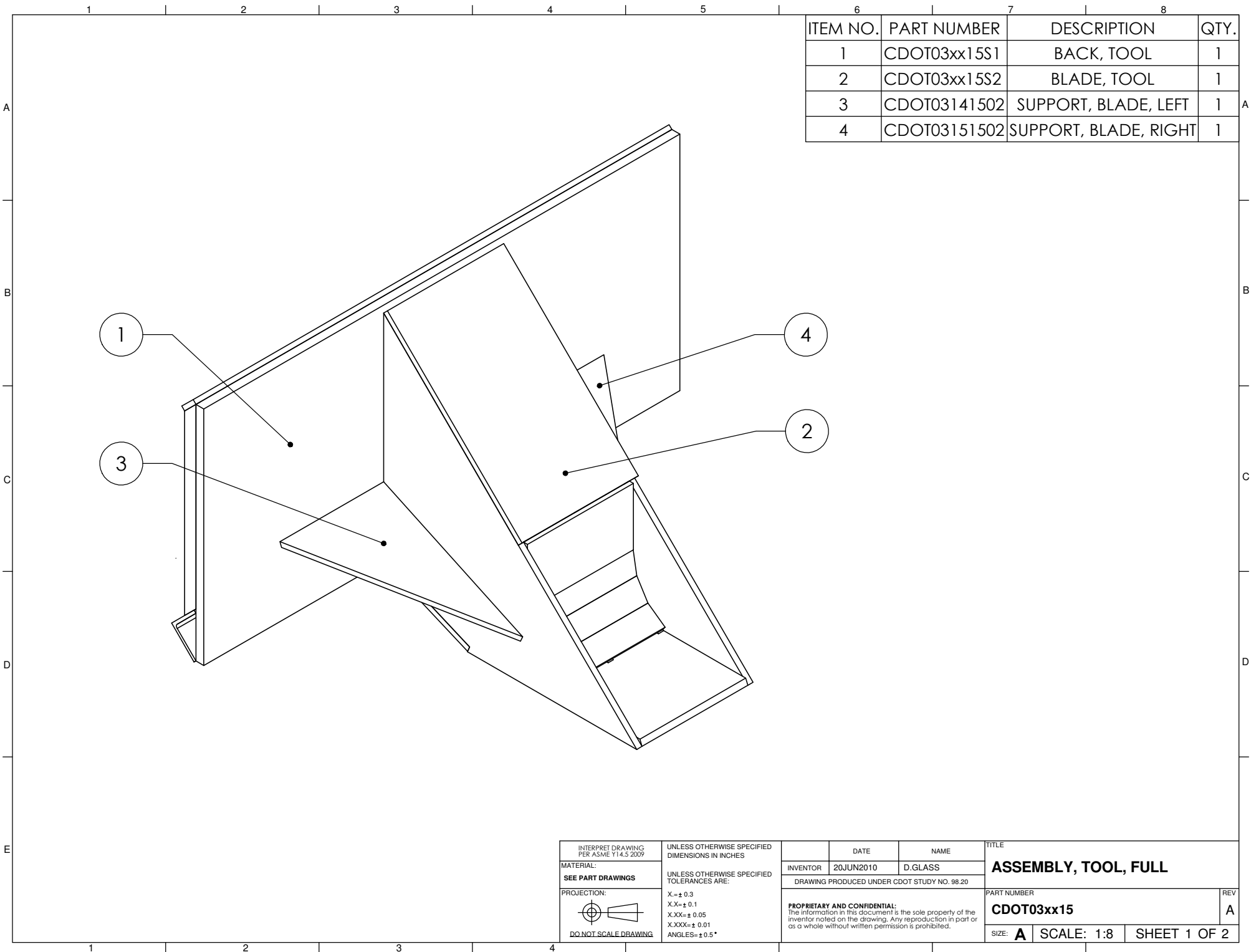
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4	CDOT03101501	BOTTOM, BLADE, FRONT	1
5	CDOT03111501	TOP, BLADE	1
6	CDOT03121503	BOTTOM, BLADE	3
7	CDOT03131501	COVER, BLADE	1

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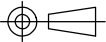
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TITLE		
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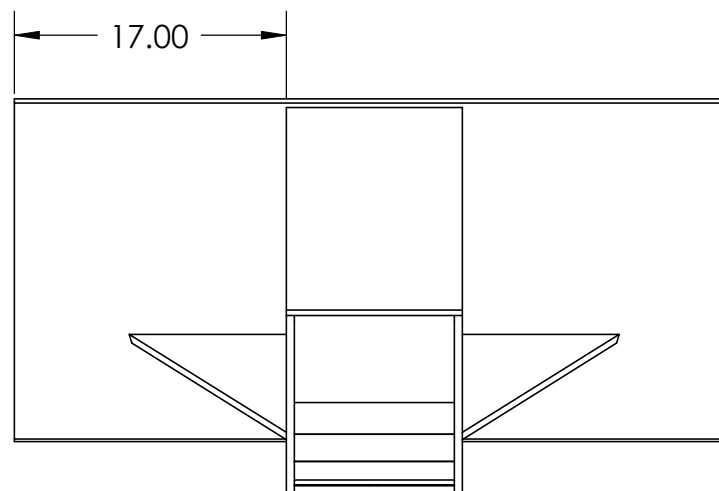
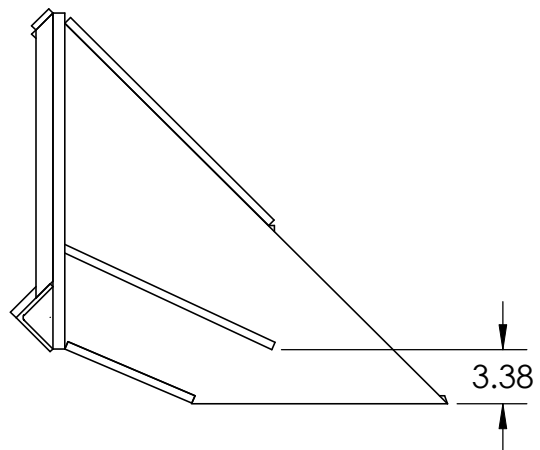


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4	CDOT03151502	SUPPORT, BLADE, RIGHT	1

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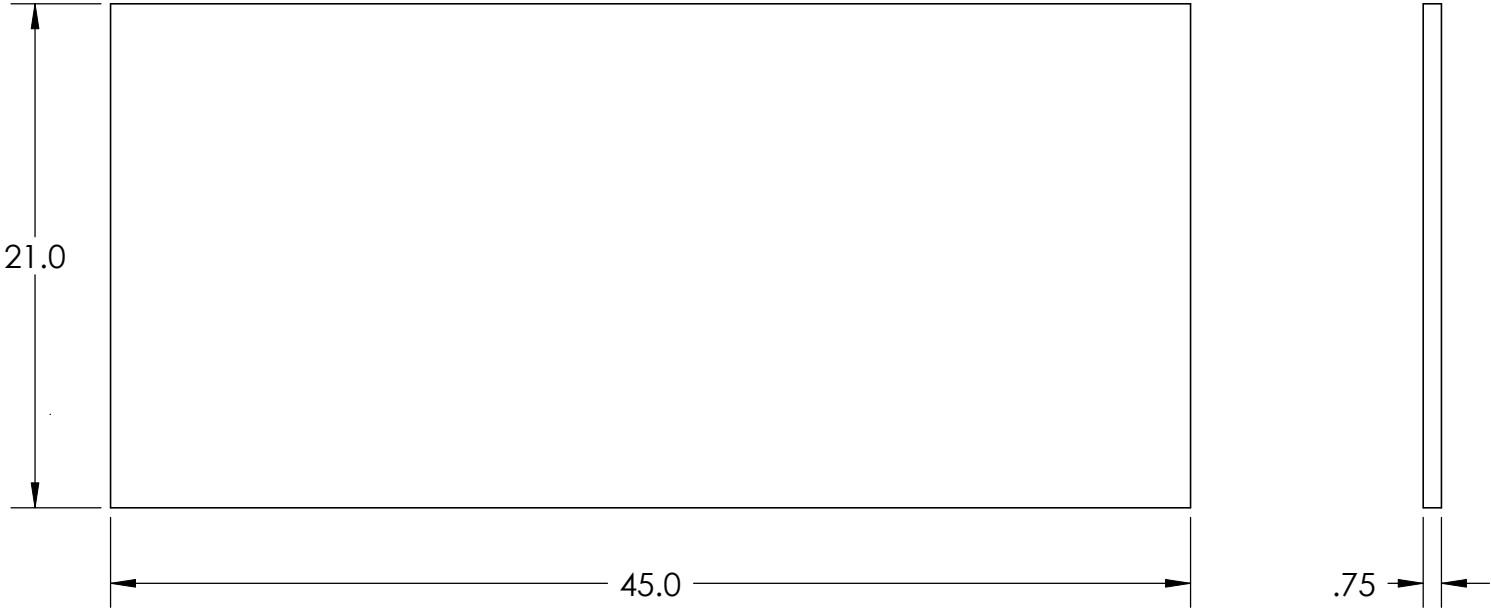
1. ALL JOINTS ARE FULLY WELDED
2. MEASUREMENTS SHOWN ON LEFT BLADE SUPPORT ALSO APPLY TO RIGHT BLADE SUPPORT
3. THE ANGLED EDGE ON THE BLADE SUPPORTS SITS FLUSH WITH THE MAIN PLATE

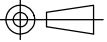


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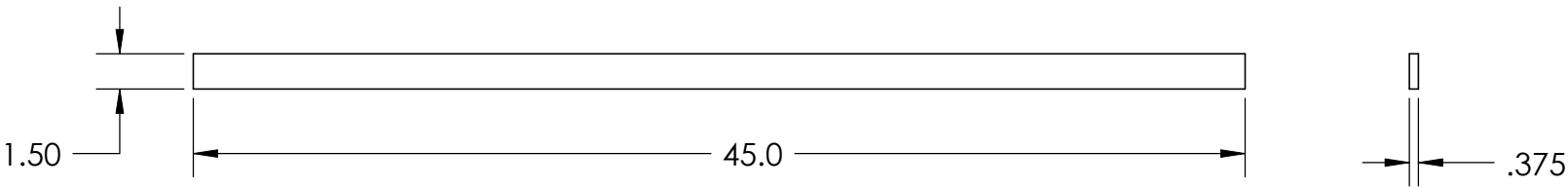


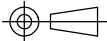
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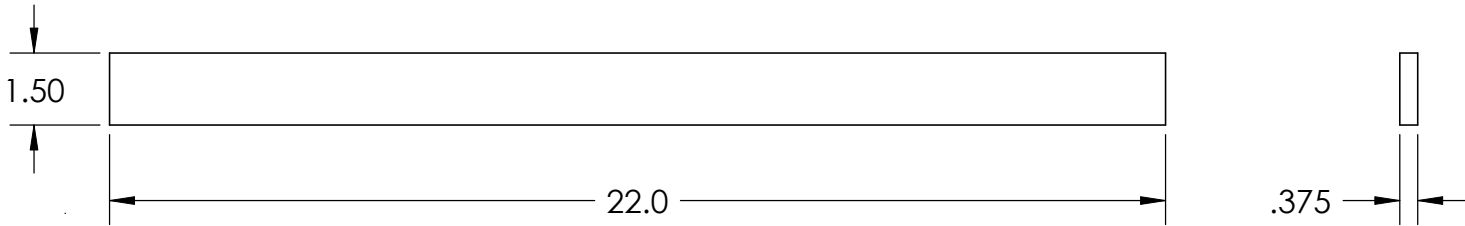
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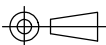
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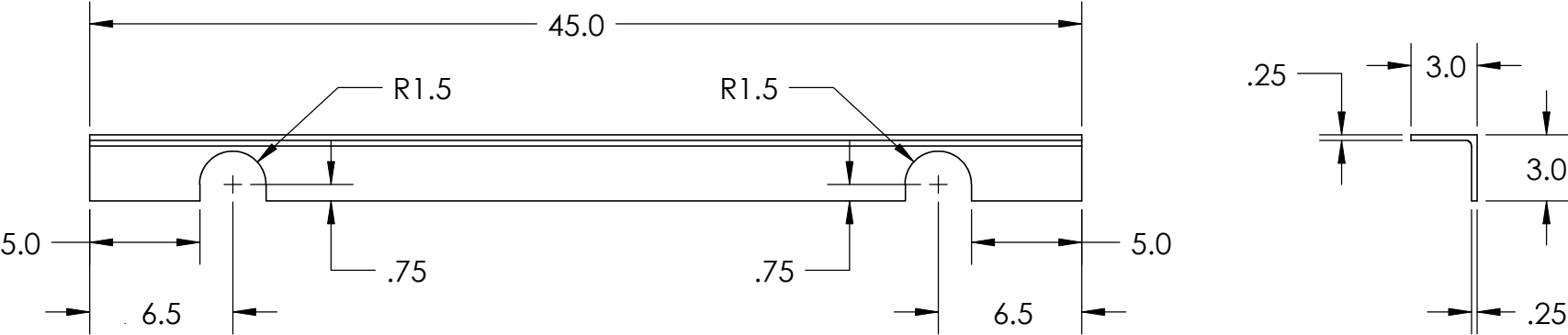
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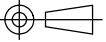
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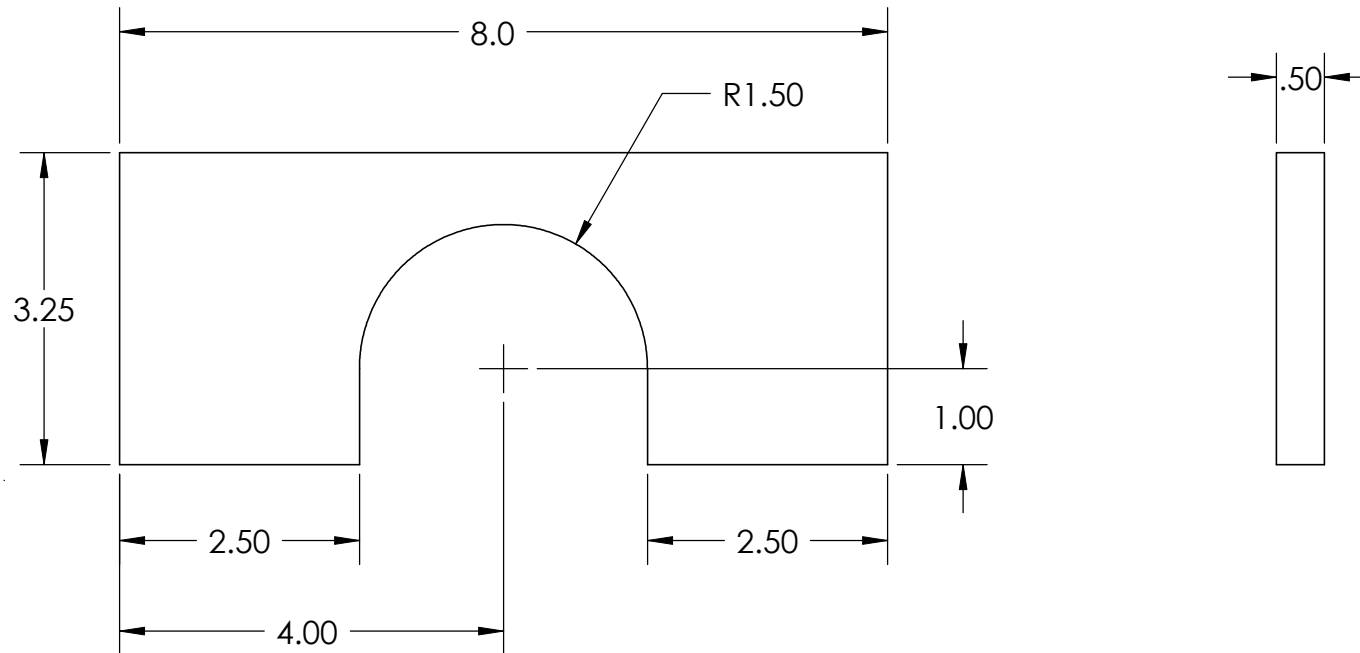
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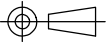
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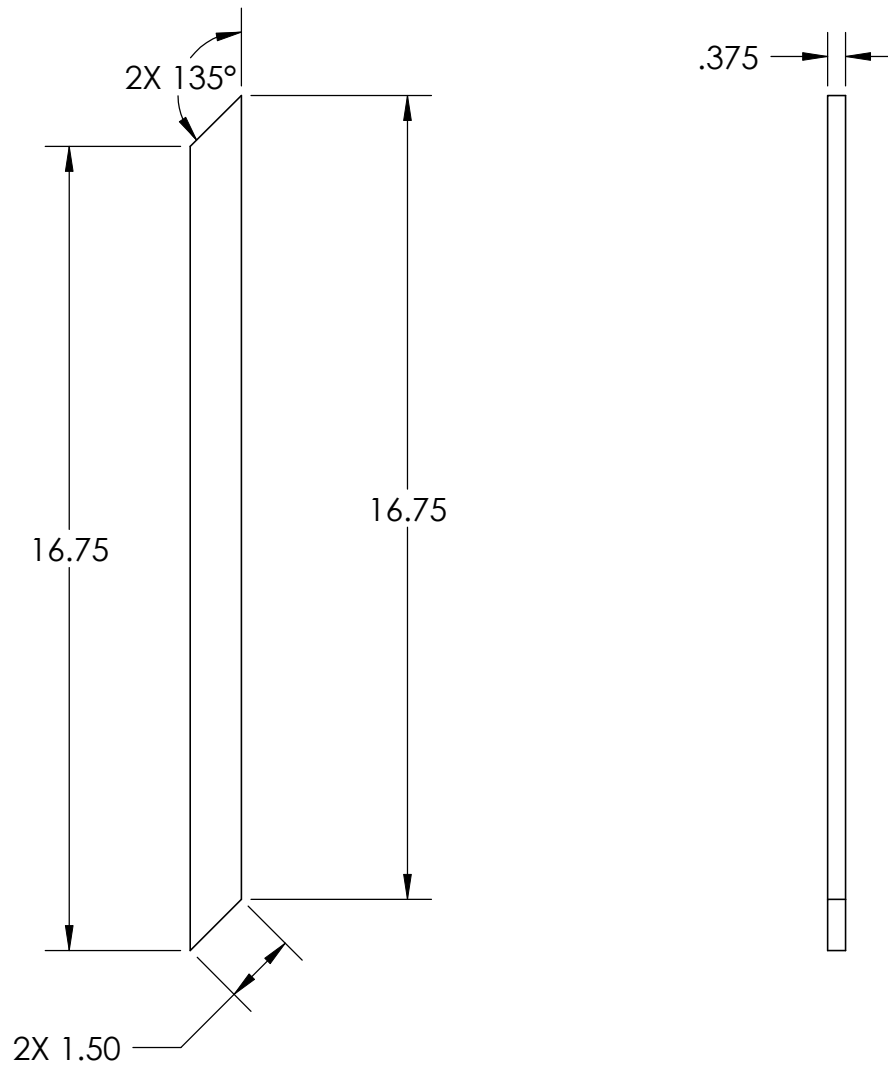
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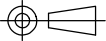
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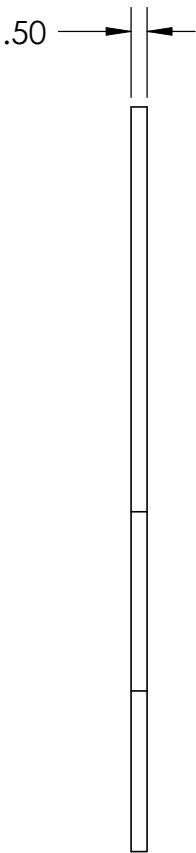
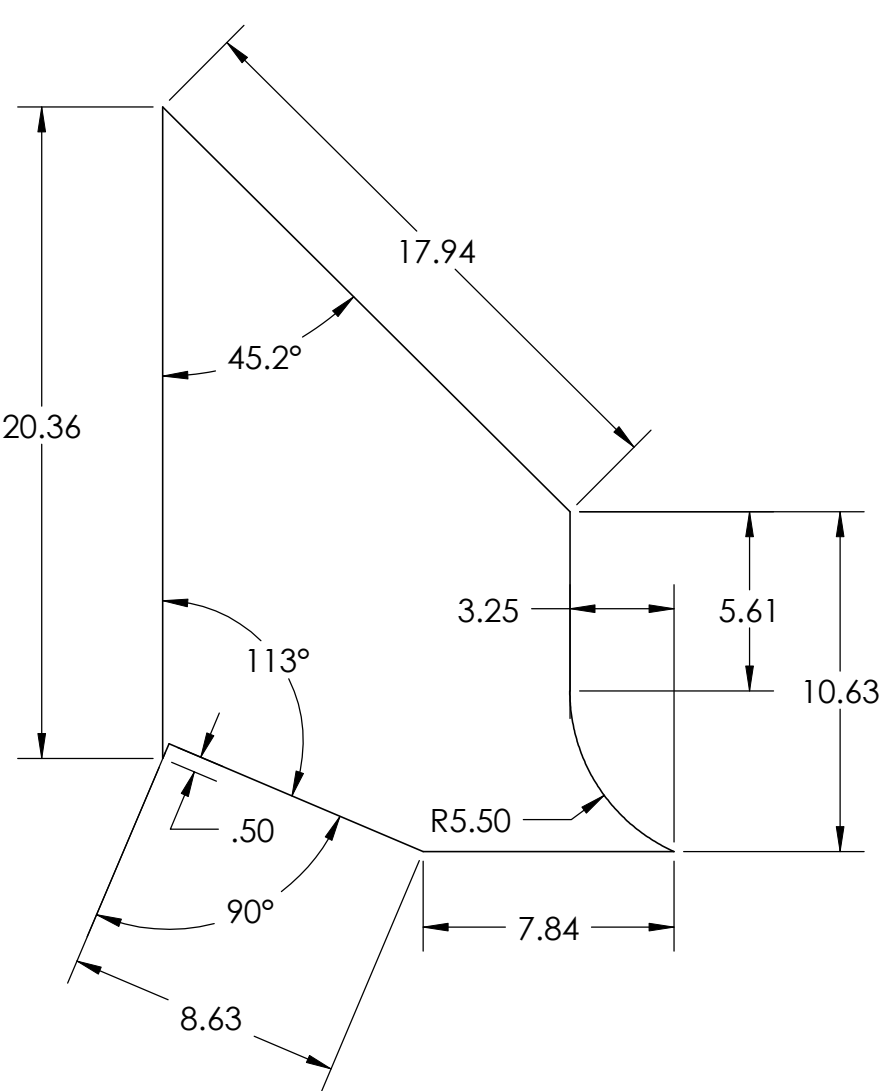
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								REV A	

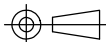
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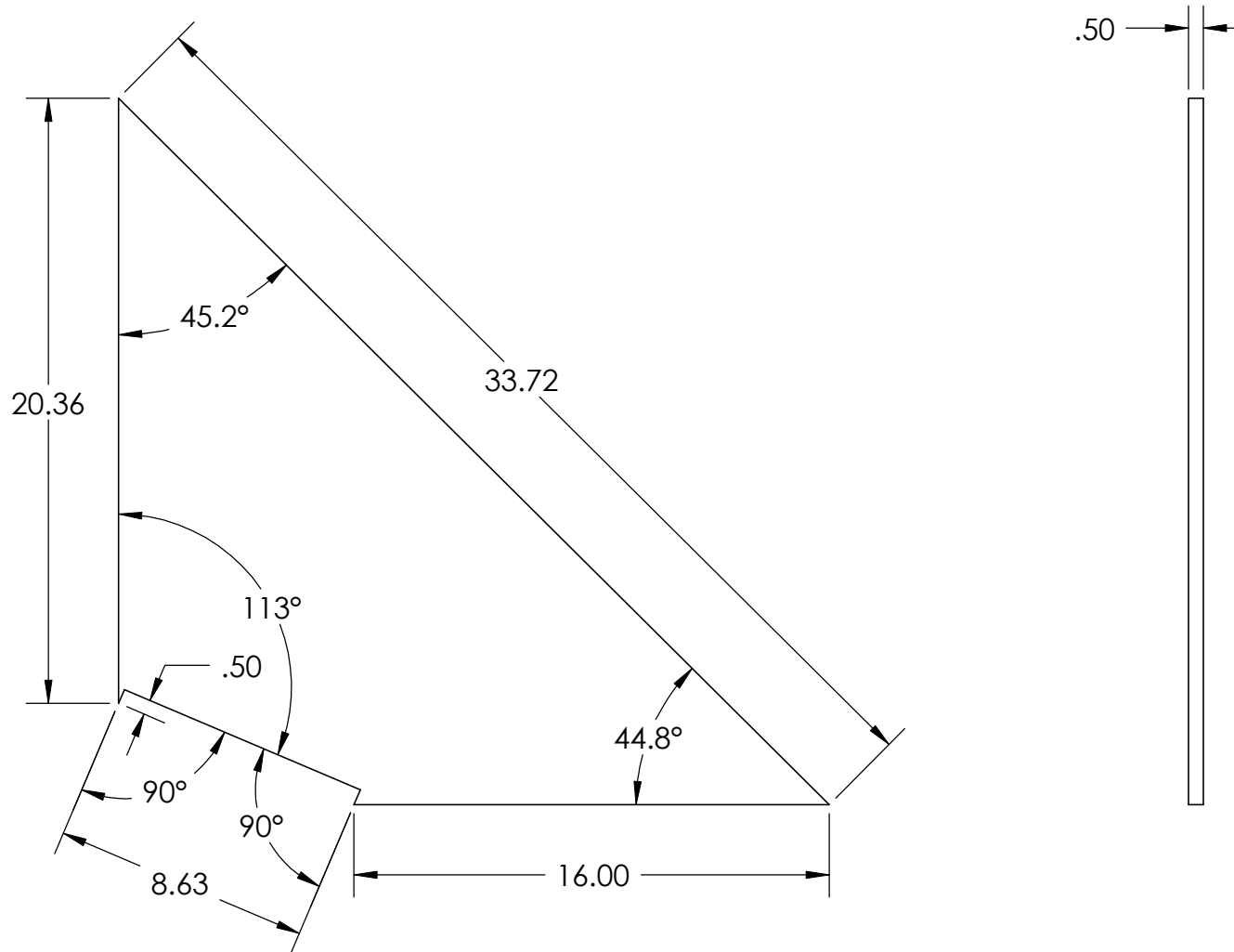
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								SHEET 1 OF 1	


NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



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DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER		REV
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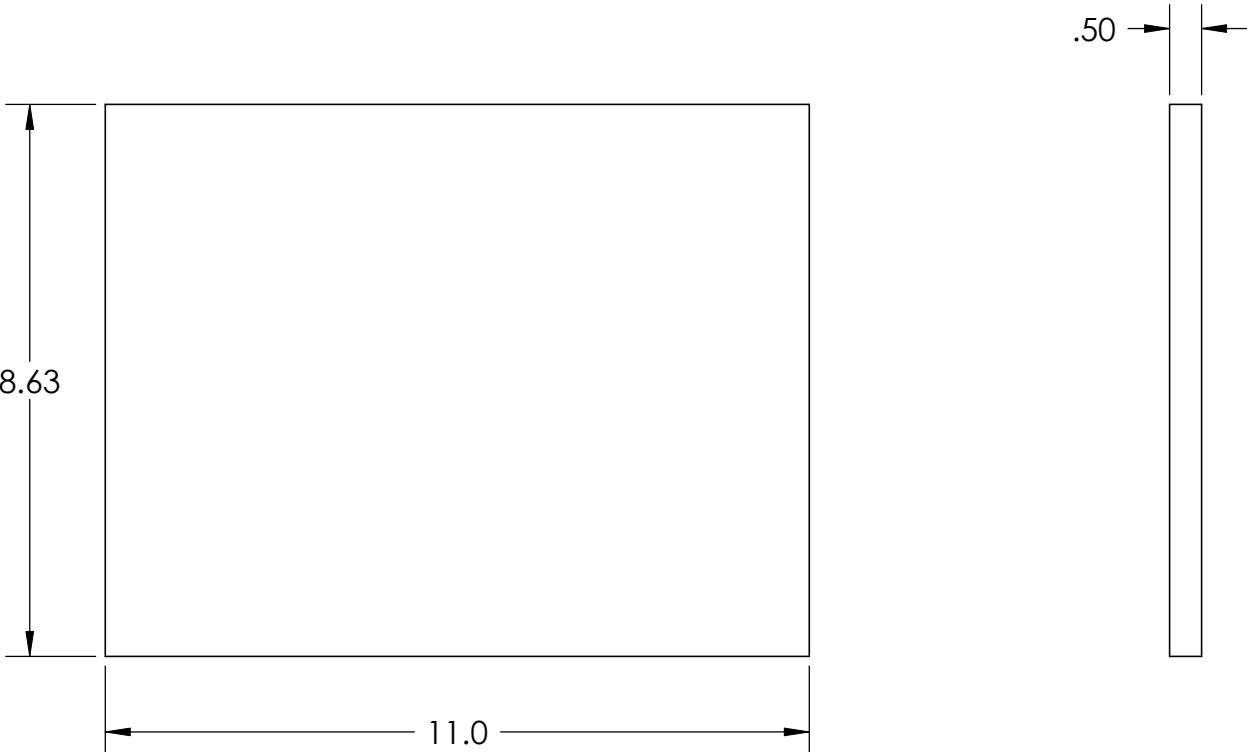
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

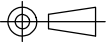


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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER		REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT03081502				A
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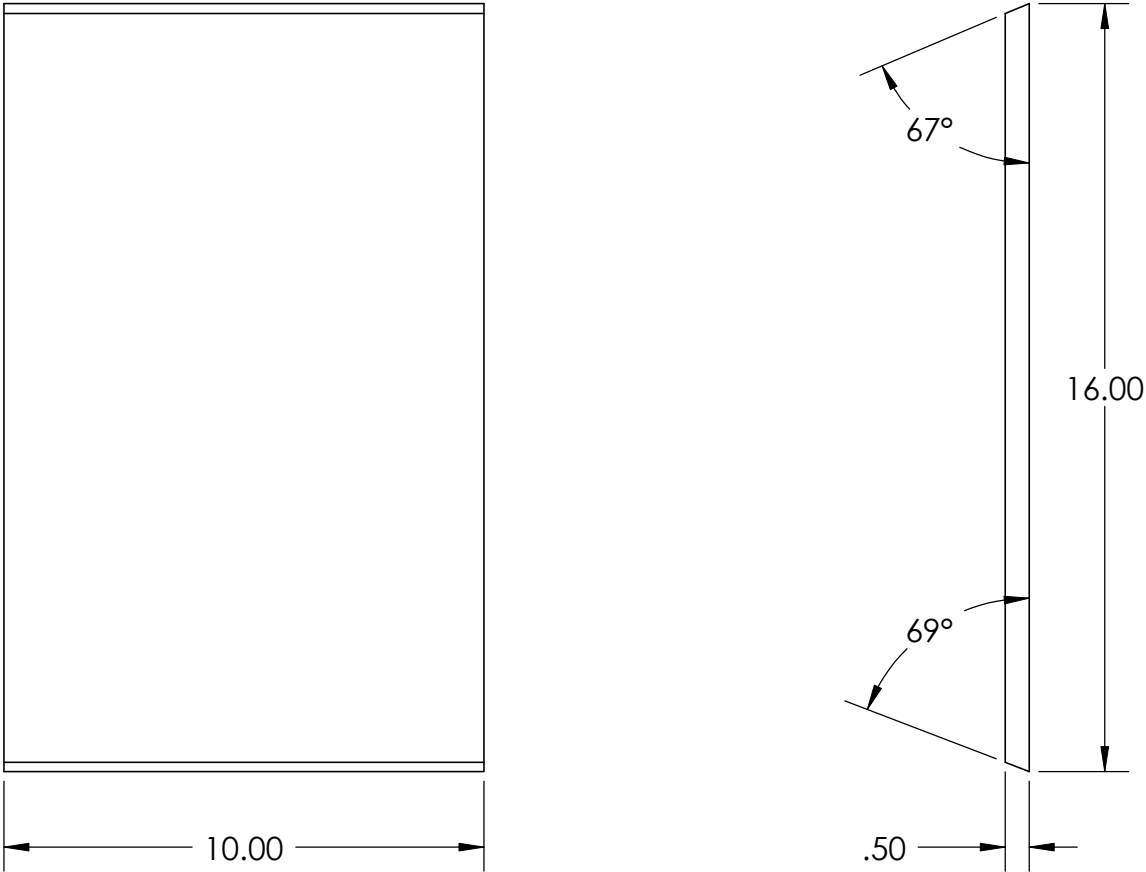



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1. REMOVE ALL BURRS AND SHARP EDGES



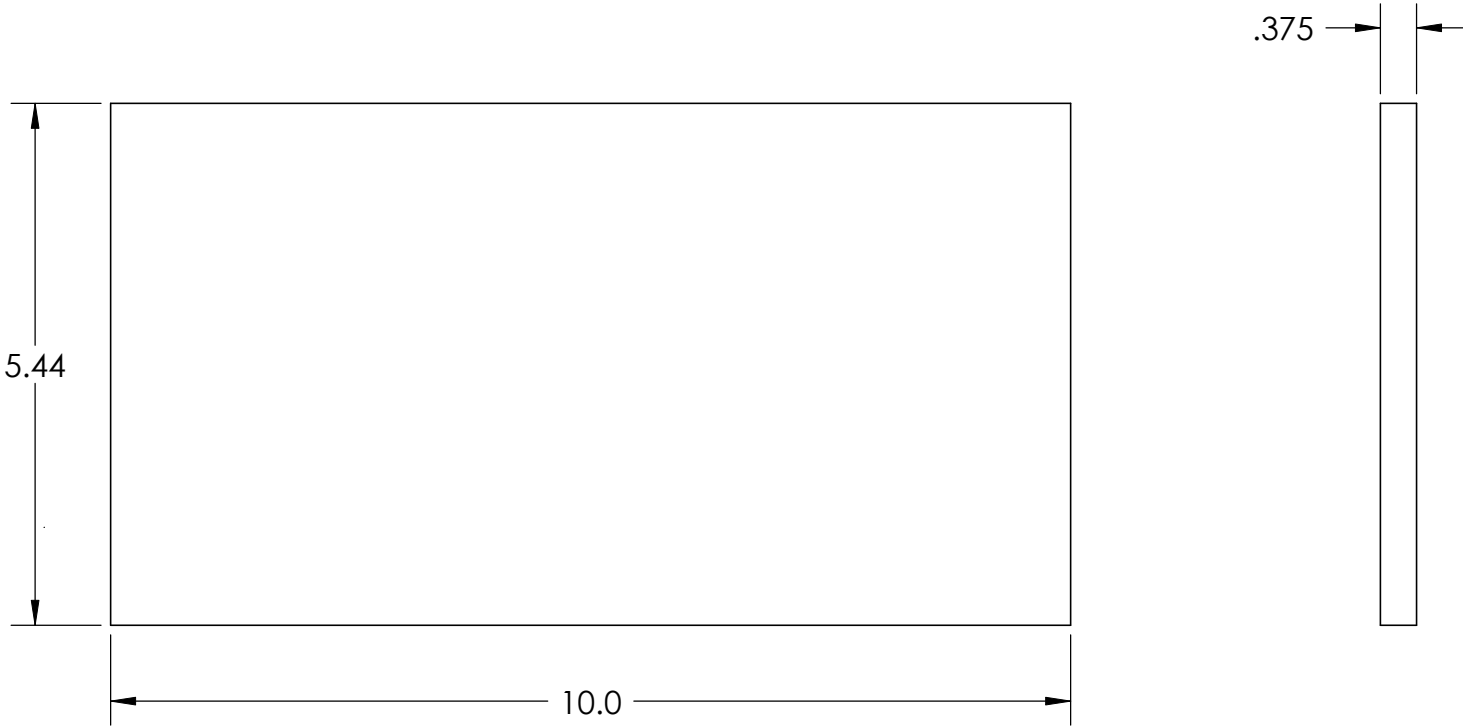
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DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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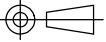
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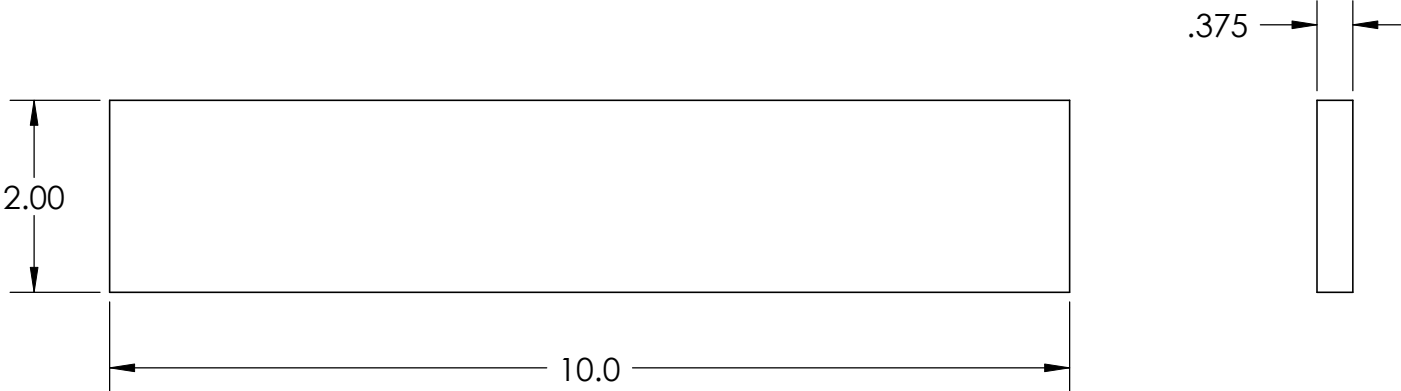
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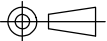
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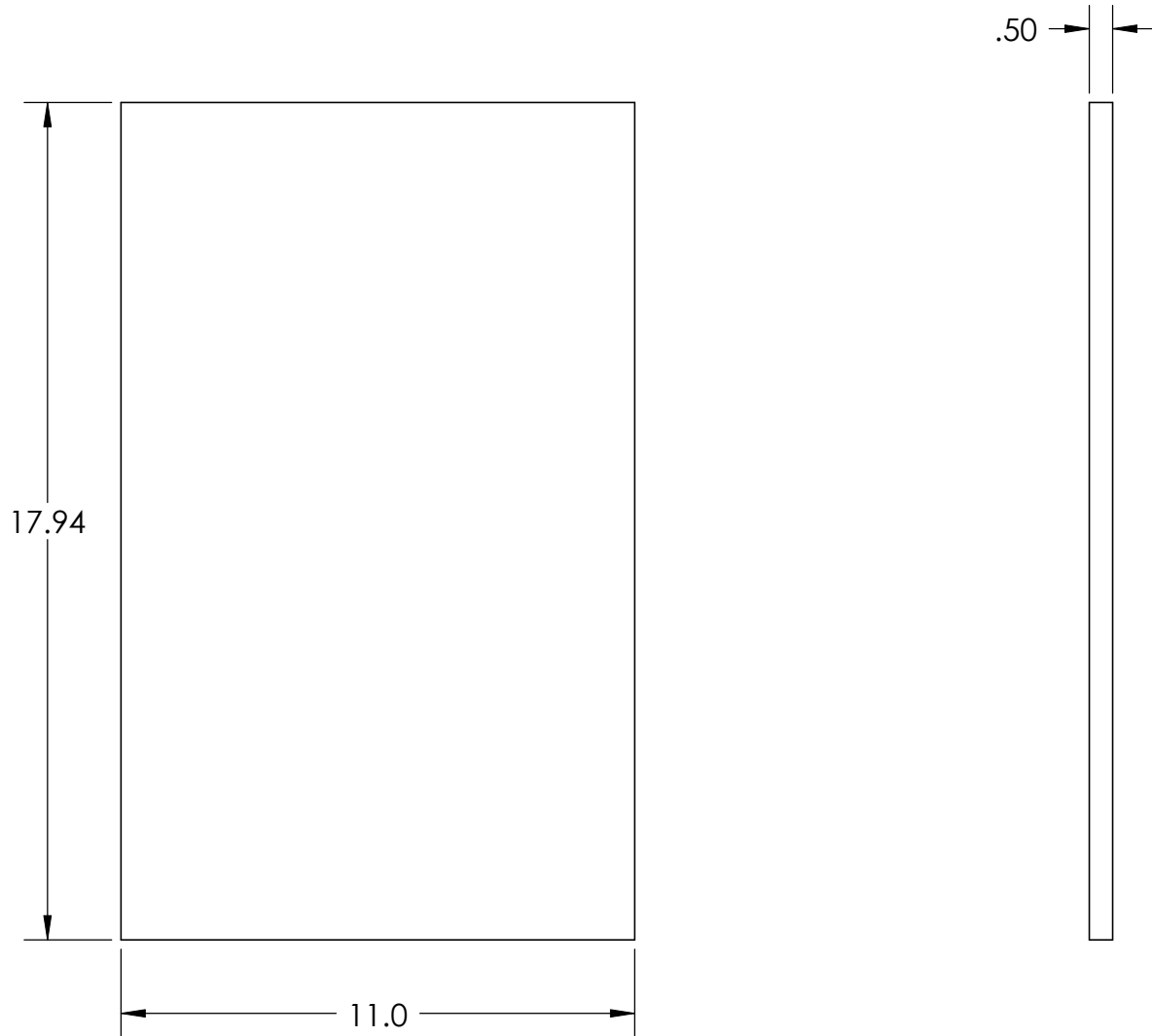
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



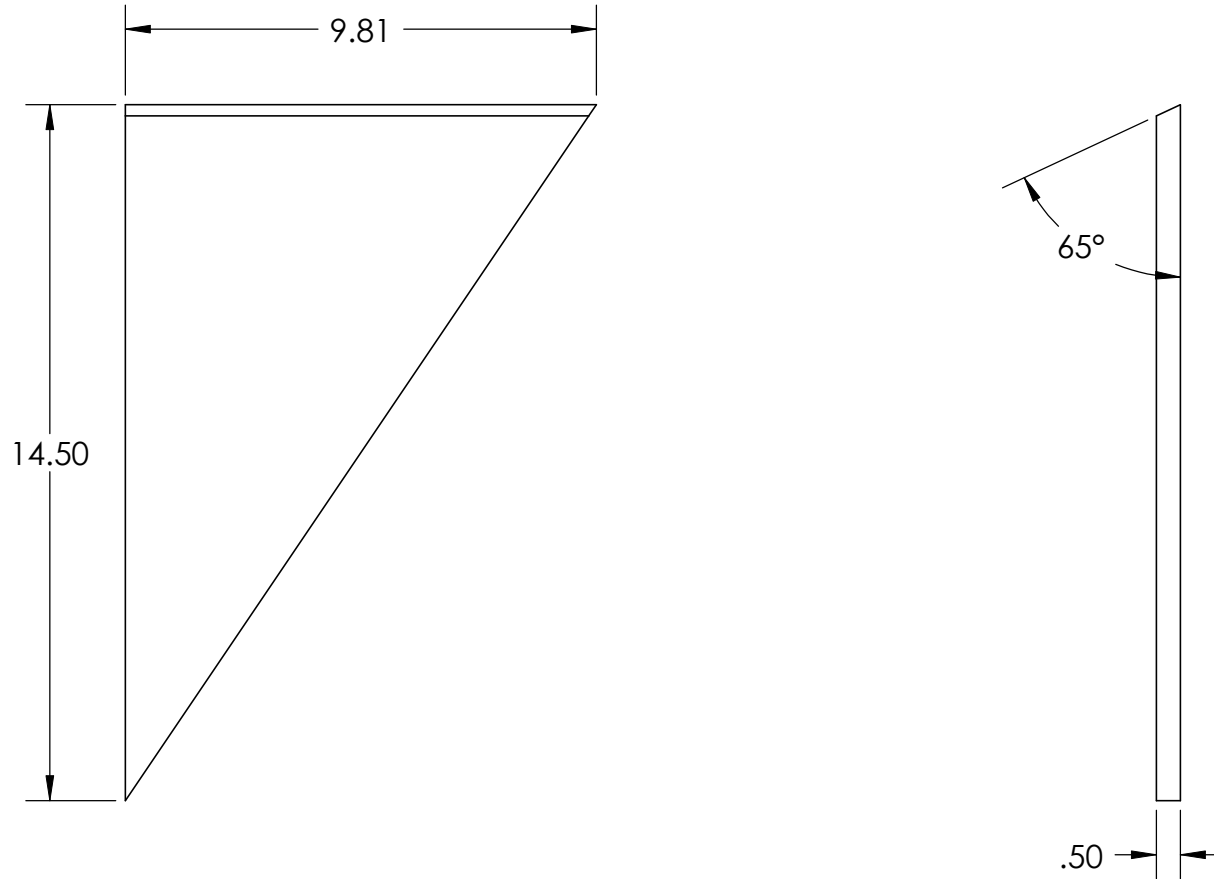
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DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			CDOT03121503				REV A
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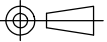
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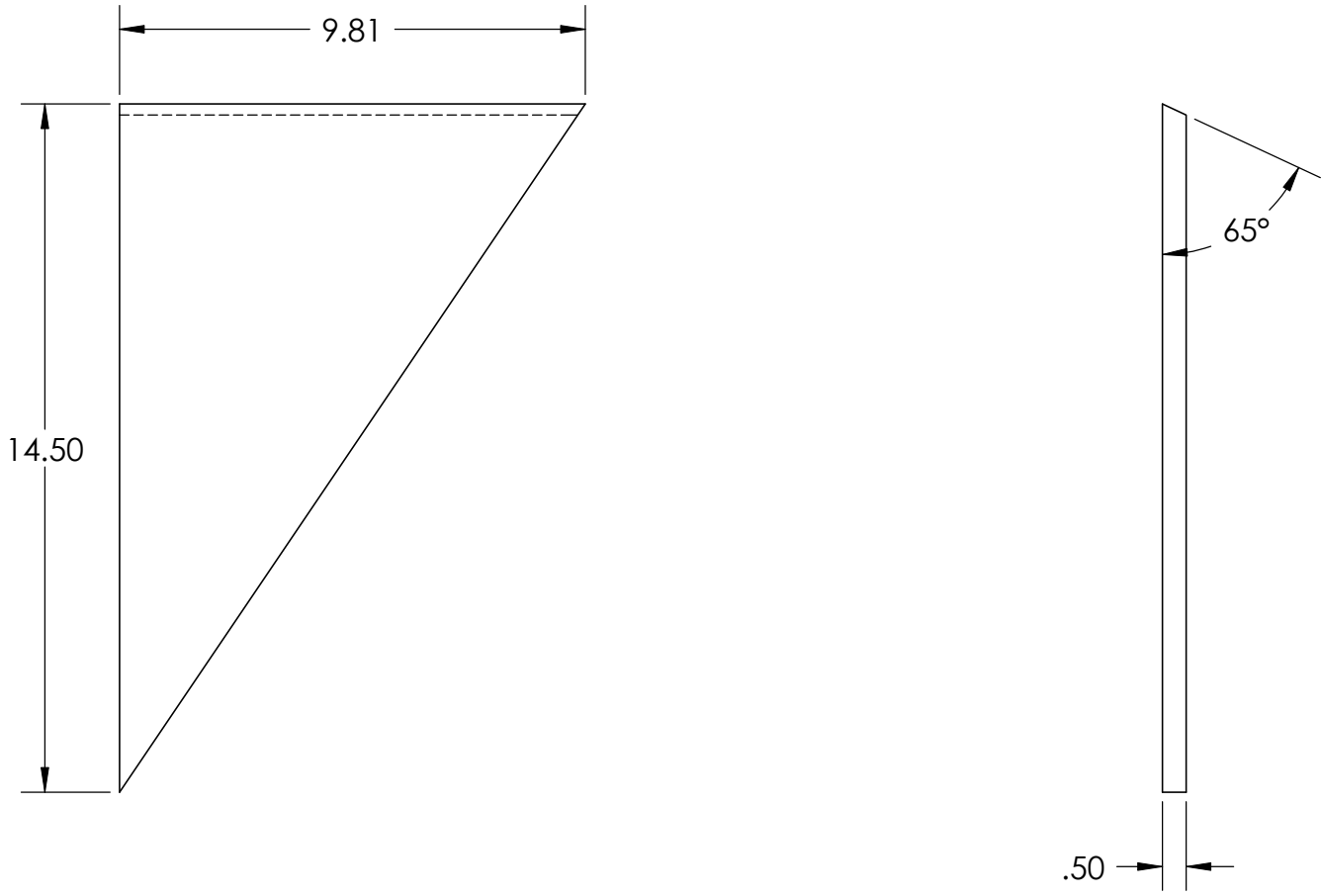
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DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			PART NUMBER				REV
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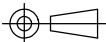
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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT03141502		A	
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	20JUN2010	D.GLASS	SUPPORT, BLADE, RIGHT
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DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT03151502	REV A
						SIZE: A	SCALE: 1:4 SHEET 1 OF 1

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Joint Extraction Tool

**Innovator(s):** Dan Glass

**Summary:** The criteria of non-obviousness and public disclosure may pose patentability challenges for this innovation.

### ***Prior Art Search***

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were searched. All patents cited in the "References cited" section were also reviewed. Older patents were found using [www.freepatentsonline.com](http://www.freepatentsonline.com).

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: expansion joint & removal, expansion joint & tool, rubber joint & removal, rubber joint & tool

Field of search: title, abstract

Patent Number	Year	Title of Invention
• 2,541,309	1951	Joint Digger and Cleaner for Concrete Pavements
• 2,584,993	1952	Expansion Joint Cleaner
• 2,984,471	1961	Portable Crack Router
• 3,791,696	1974	Expansion Joint Cleaning Apparatus and Method
• 4,171,849	1979	Apparatus for Cleaning Pavement Expansion Joints



## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- a. [http://www.icscompany.net/fein\\_caulk\\_cutters\\_&\\_blades.htm](http://www.icscompany.net/fein_caulk_cutters_&_blades.htm)

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

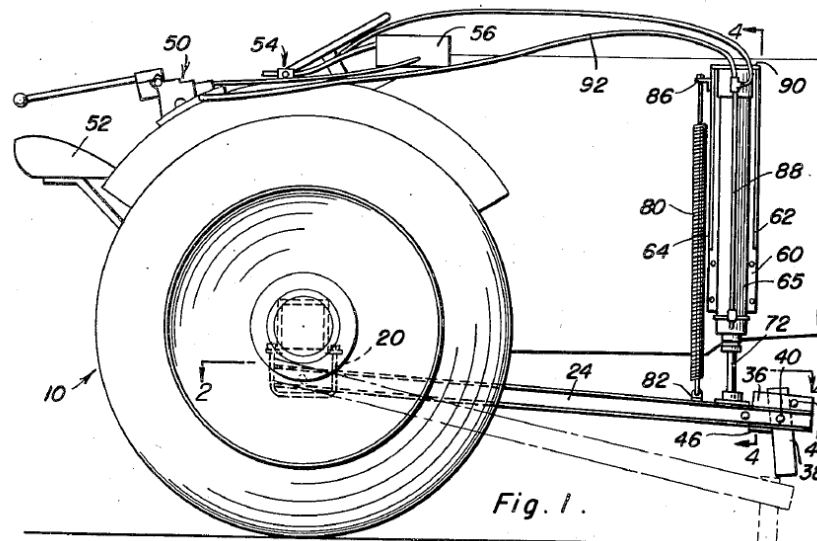
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

### 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

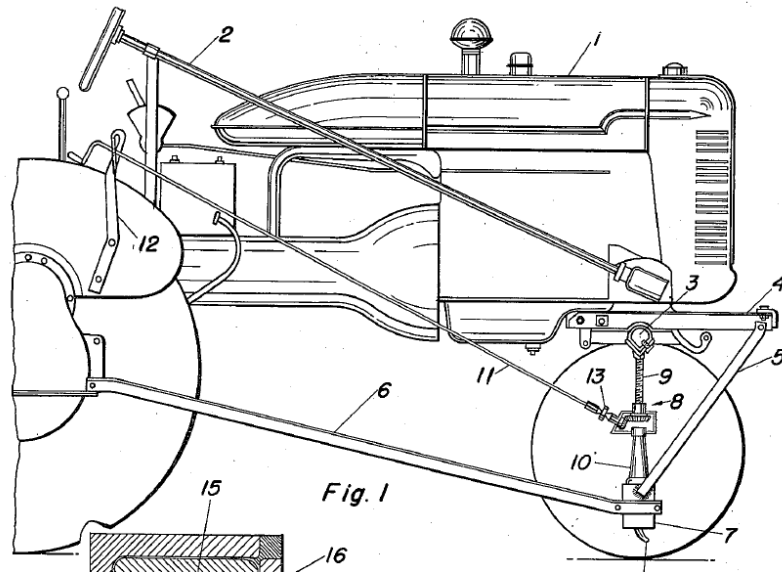
- a. 2,541,309 Joint Digger and Cleaner for Concrete Pavements

This device uses a blade to clean the joint but is attached to a wheeled device that is not similar to a skid loader.



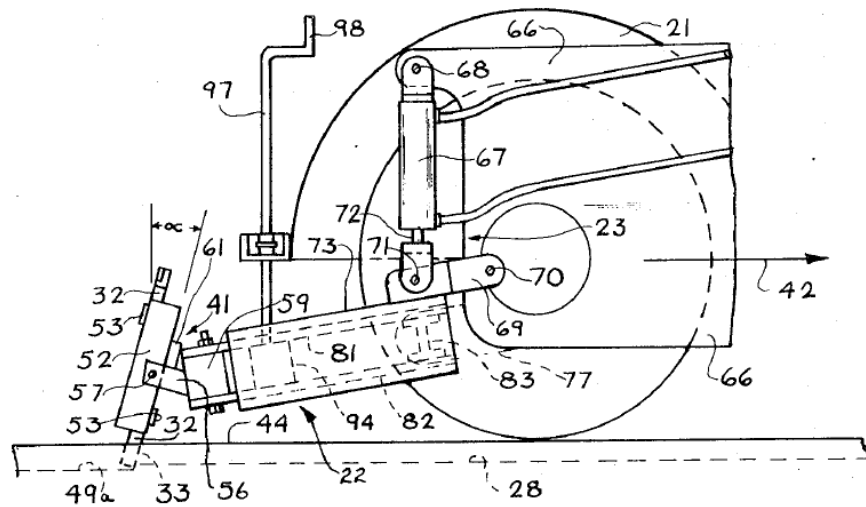
b. 2,584,993 Expansion Joint Cleaner

This device uses a sled to clean the expansion joint and is attached to a tractor.

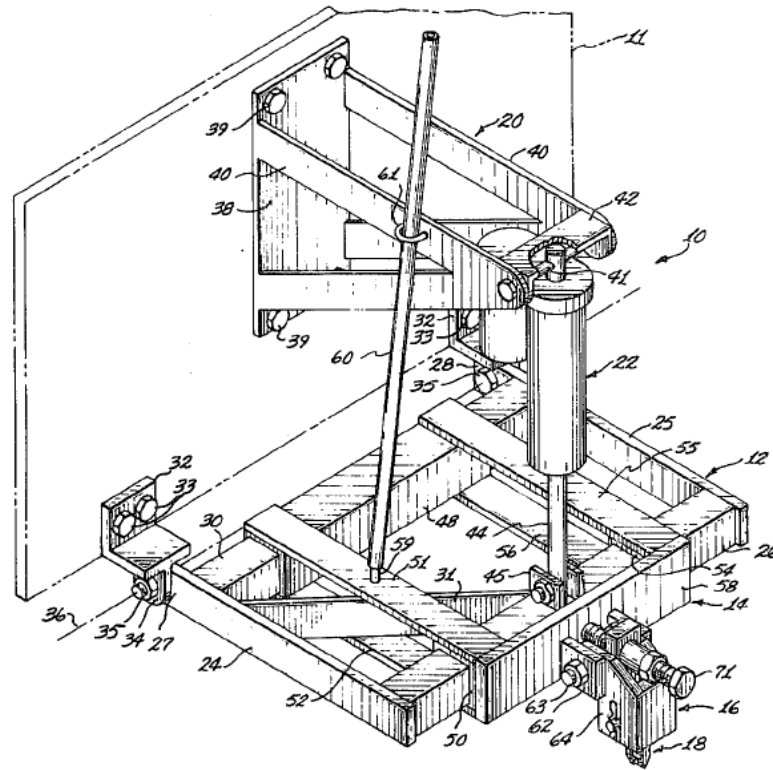


c. 3,791,696 Expansion Joint Cleaning Apparatus and Method

This device pulls a tool along the crack to clean it. The tool is attached to a wheeled device that is not similar to a skid loader.



- d. 4,171,849 Apparatus for Cleaning Pavement Expansion Joints  
A device with a tool can be pulled along to clean the crack. The pulling mechanism is not shown.



### 3. Usefulness

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

This device is an attachment to a skid loader that has a cutting edge at the end of a scoop so that it can cut into a road joint and peel the rubber out of the joint.

### 4. Public Disclosure

According to the innovator, this device was first made and used in May 2006. Region 3 employees use this device. Some modifications have been made to the device.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

**Submission number:** 4

**Title of the Innovation:** Skid Loader Blade

**Innovator(s):** David Rios

### Device Description

The skid loader blade is an attachment for a skid loader designed to remove debris from underneath fencing without removing or replacing any part of the fence.



#### 1. Usefulness

- This device is well configured to clean dirt and debris built up under fences. The skid loader blade is 84 inches wide and 8 inches tall, and can therefore fit between most fence posts and underneath most fences.

#### 2. Ease of use

- The device is easy to attach to the skid loader and works in a manner similar to other skid loader attachments.

### Manufacturability

This device is constructed of three machined and/or welded parts. It is simple and does not have features that are difficult to manufacture.

### Potential for Widespread Application

#### 1. Time to train operator

- It will take less than 20 minutes to train a person proficient in the use of a skid loader.
- The use of this device is similar to any skid loader attachment.

2. Reduction in time to complete task
  - This device provides a significant savings in time because it eliminates the need to remove the fence wire to clean underneath the fence if the skid loader bucket were to be used.
3. Improvement in quality
  - There is no impact on the quality of fence clearing.
4. Expected annual usage
  - This device can be used throughout the year.
5. Units required
  - One device is required for each patrol.
6. Use in other states
  - All states with that perform fence clearing operations would benefit from this device.

### **Safety**

1. Improvement in safety
  - This device eliminates the need to remove the fence wire to clean underneath the fence. Therefore, the use of this device eliminates injuries due to handling of fence wire.
2. Safety concerns due to use or misuse of the device
  - Personnel could pinch fingers when attaching/detaching blade.
  - The addition of this device makes the skid loader longer and may be more difficult to maneuver.
3. Safety concerns due to failure of the device
  - Very minimal. If the device breaks during use, the operator is in the cab of the skid steer and protected from any pieces that are thrown after breakage.

### **Availability of Similar Equipment for Purchase**

The prior art search found a commercially available device called “the eliminator” that may be able to do the same job.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious in the patent examiner’s evaluation.
  - According to the innovator, this innovation was publically disclosed in its current form in 2003.
2. Patent infringement
  - There are a number of patents for devices that perform grading operations. Consequently, this device may infringe on existing patents.

## Skid Loader Blade User Manual



### Device Description

The skid loader blade is an attachment for a skid loader designed to remove debris from underneath fencing without removing or replacing any part of the fence.

### Installation Instructions

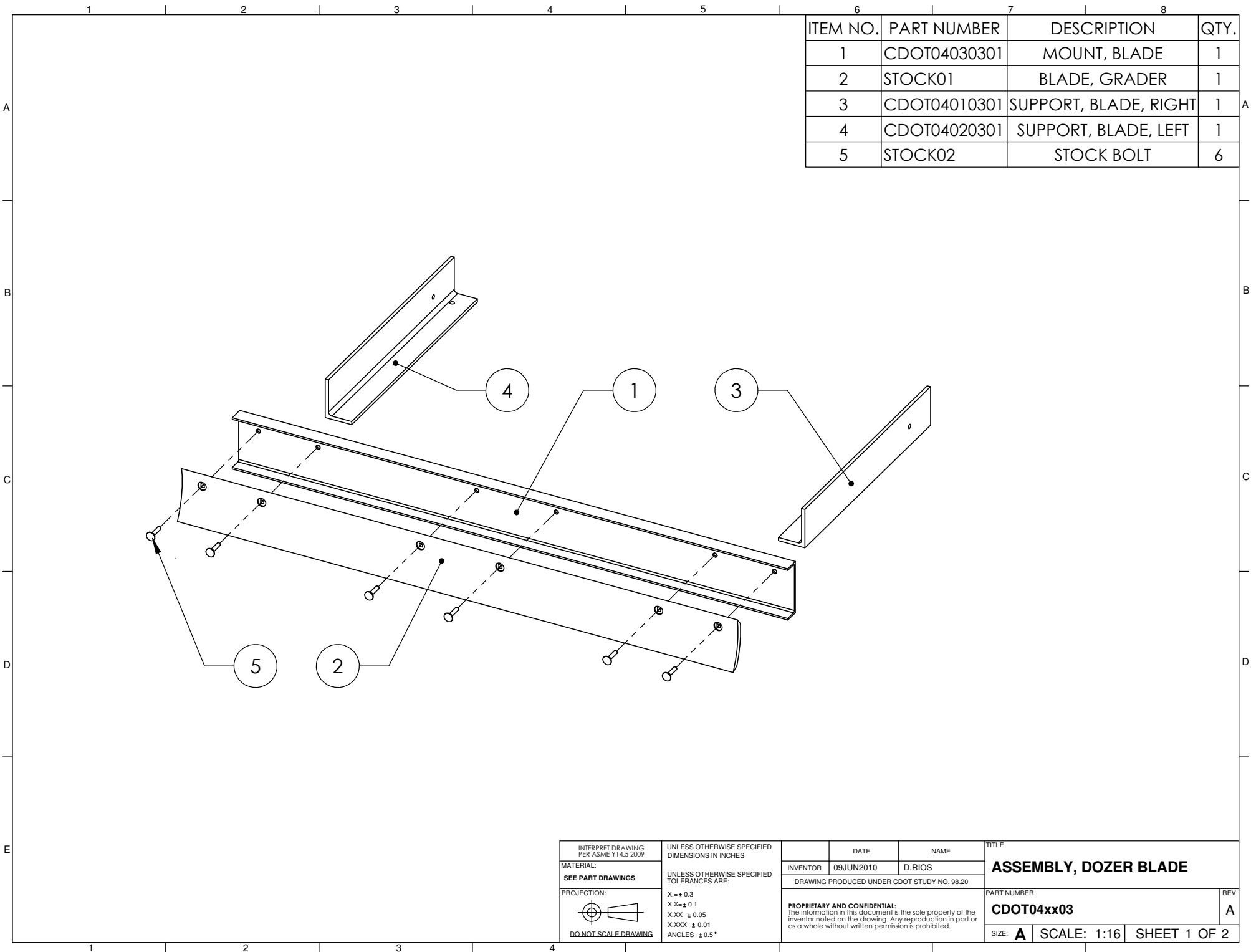
Attach the blade to the skid loader bucket using four bolts and nuts as shown below (5/8 inch recommended). Use a locking washer against each nut to prevent loosening.



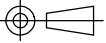
### Operating Instructions

1. Lower the bucket so that the front of the blade is against the ground.
2. Move the skid loader forward or backward to clear any dirt or debris from underneath the fence. Be careful to position the blade between any fence posts to prevent fence damage.

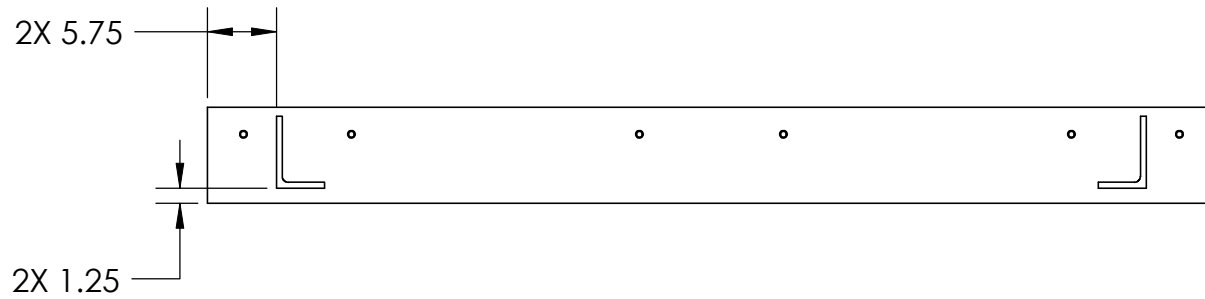
Innovator(s): David Rios



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3	CDOT04010301	SUPPORT, BLADE, RIGHT	1
4	CDOT04020301	SUPPORT, BLADE, LEFT	1
5	STOCK02	STOCK BOLT	6

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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER CDOT04xx03	
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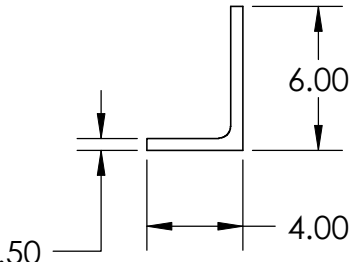
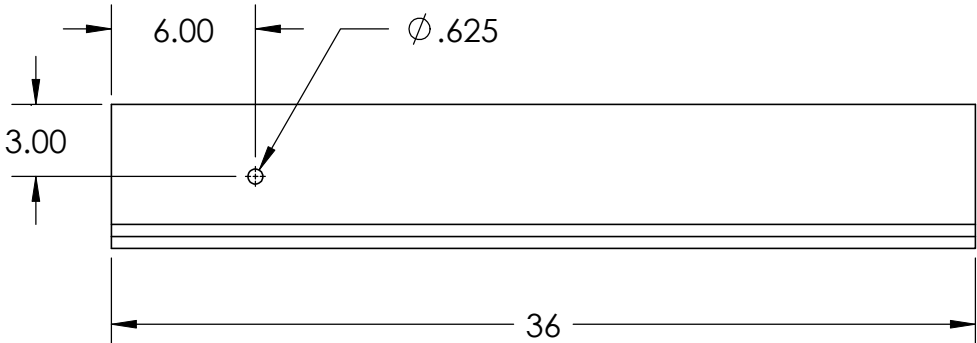
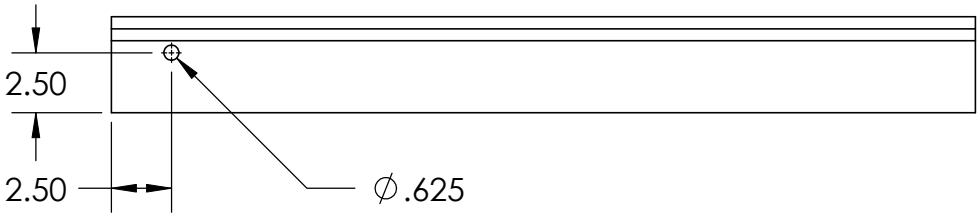
NOTES:  
1. JOINTS BETWEEN BLADE SUPPORTS AND BLADE MOUNT ARE FULLY WELDED

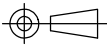


TITLE		
ASSEMBLY, DOZER BLADE		
PART NUMBER		REV
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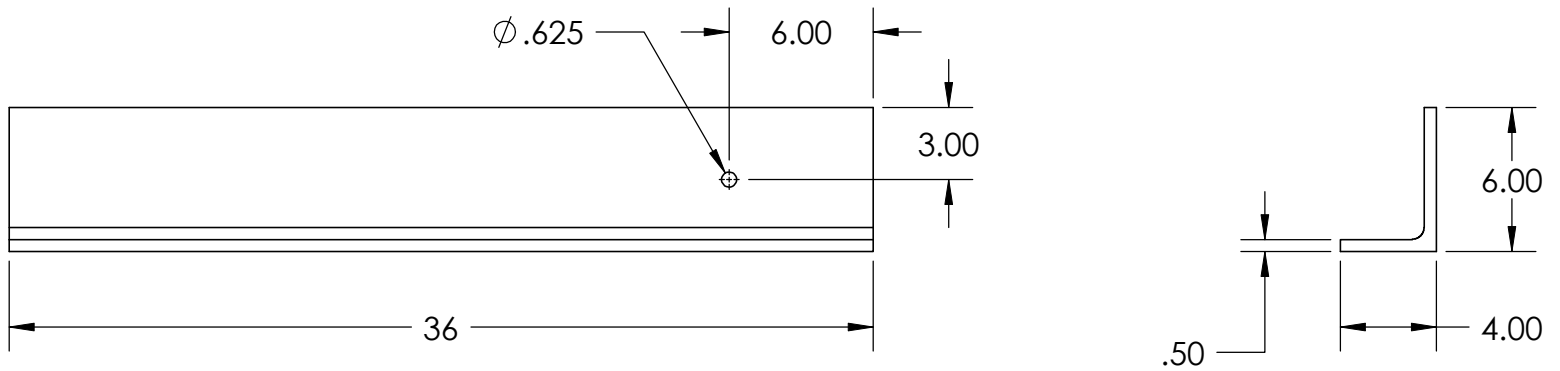


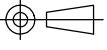
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



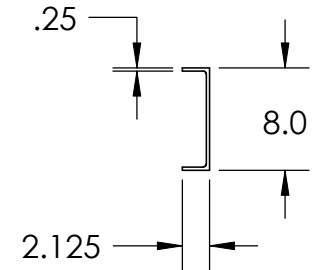
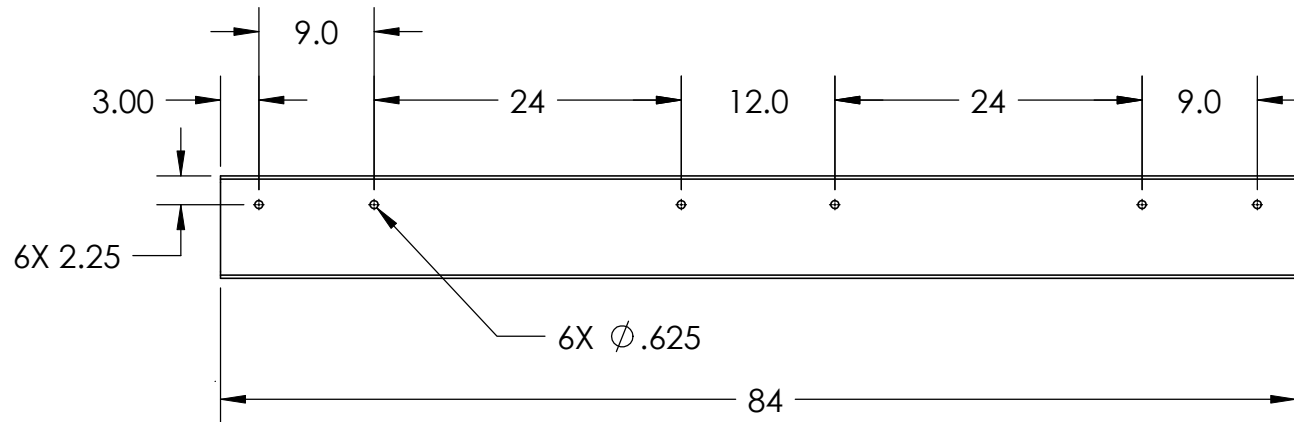
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DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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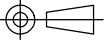
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DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT04020301		A	
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



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PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.005 X.XXX= ± 0.002 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT04030301		SIZE: <b>A</b>	SCALE: 1:15
						SHEET 1 OF 1	
						REV <b>A</b>	

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Skid Loader Blade

**Innovator(s):** David Rios

**Summary:** There are a number of devices in the prior art that perform grading operations. The criteria of non-obviousness and public disclosure appear to pose patentability challenges for this innovation.

### ***Prior Art Search***

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: bulldozer & blade, bulldozer & attachment, skid loader & attachment, skid loader & blade  
Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |  |
|-------------|------|--|
| • 3,934,654 | 1976 | Earthworking Blade Device                                      |
| • 4,009,529 | 1977 | Grading Blade for a Toothed Shovel                             |
| • 4,049,060 | 1977 | Sod Cutter   |
| • 4,208,815 | 1980 | Straight Edge Blade for Installation on an Earth Moving Bucket |
| • 4,360,980 | 1982 | Backhoe Adapter  |
| • 4,463,507 | 1984 | Grader Blade Attachment  |
| • 4,521,980 | 1985 | Grading and Smoothing Attachment for a Loader Bucket           |
| • 4,753,299 | 1988 | Grader Blade Assembly and Pick Therefor                        |
| • 5,062,228 | 1991 | Compactor and Blade Attachment for Loader                      |
| • 5,181,574 | 1993 | Scraper Blade Mount for Bulldizer                              |
| • 5,253,449 | 1993 | Detachable Finishing Blade for Excavating Bucket               |
| • 5,918,389 | 1999 | Scraper Blade for Toothed Buckets of Earth Working Machines    |
| • 6,088,938 | 2000 | Implement Adapter for an Excavation Tool                       |
| • 6,243,975 | 2001 | Blade Attachment for Excavator Bucket                          |
| • 6,446,368 | 2002 | Innovative Inclined Plane Earth Engaging Tool                  |
| • 6,484,813 | 2002 | Bulldozer Attachment to Facilitate Grading                     |

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- [http://www.skidsteersolutions.com/BXS\\_60\\_Bucket\\_p/bxs-60.htm](http://www.skidsteersolutions.com/BXS_60_Bucket_p/bxs-60.htm)
- [http://www.skidsteersolutions.com/Skid\\_Steer\\_Grader\\_72\\_p/dg-72.htm](http://www.skidsteersolutions.com/Skid_Steer_Grader_72_p/dg-72.htm)
- <http://www.abcgroff.com/ic/loeg1.htm#1>
- <http://www.buyattachmentsdirect.com/skidsteerattachments/planer-scarifier/>
- [http://www.virnigmfg.com/products.html?page=shop.product\\_details&flypage=flypage.tpl&product\\_id=49&category\\_id=3](http://www.virnigmfg.com/products.html?page=shop.product_details&flypage=flypage.tpl&product_id=49&category_id=3)

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### **1. Evaluation of Novelty**

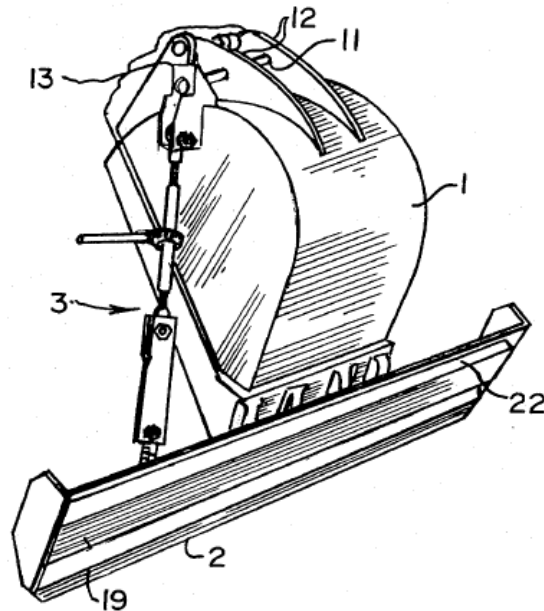
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

## 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation.

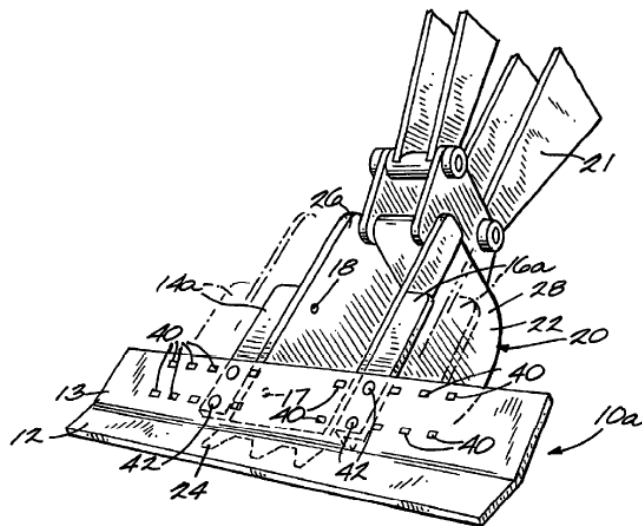
### a. 4,360,980 Backhoe Adapter

This device attaches to a backhoe. It does not extend as far as the skid loader blade and therefore appears not intended for the same purpose.

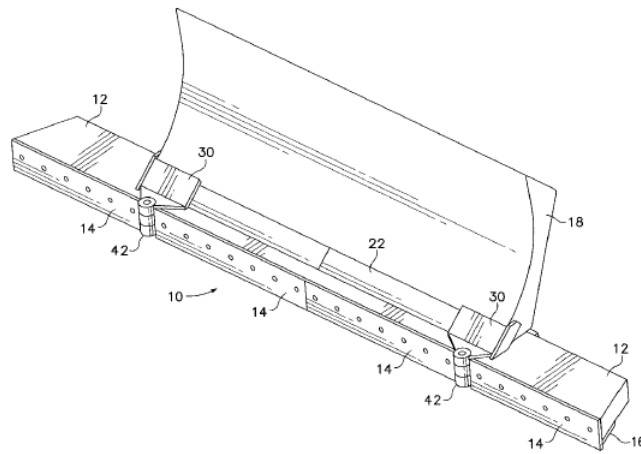


### b. 6,243,975 Blade Attachment for Excavator Bucket

This device attaches to a bucket; has a blade for scraping dirt & debris.



- c. 6,484,813 Bulldozer Attachment to Facilitate Grading  
This device attaches to the bulldozer blade and is used for moving dirt and debris.



- d. [http://www.skidsteersolutions.com/Skid\\_Steer\\_Grader\\_72\\_p/dg-72.htm](http://www.skidsteersolutions.com/Skid_Steer_Grader_72_p/dg-72.htm)  
This device is a grader that attaches to a skid loader, however, it is much larger and therefore cannot perform the same tasks.

**DG-72  
Box Grader**



- e. <http://www.abcgroff.com/ic/loeg1.htm#1>

This device is a grading rake and can also move scrub and small vegetation.



### 3. Usefulness

Based on the device description in the User Manual and provided below, this device appears to meet the criteria for usefulness.

The Skid Loader Blade is a tool designed to remove dirt and debris from underneath fencing without removing or replacing any part of the fence.

### 4. Public Disclosure

According to the innovator, this device was first built and used in 2003. CDOT employees in the Brush area are using this device. Information regarding this device has been shared with Region 4. The original version of this device is being used without modifications.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.



## Device Costs and Benefits

**Submission number:** 7

**Title of the Innovation:** Sign Elevator Bracket

**Innovator(s):** Jerry Buchanan

### Device Description

The sign elevator bracket is a device that allows a post-mounted sign to be lifted into the air using a loader during sign installation or repair. This decreases the number of required workers, and increases worker safety.



1. Usefulness
  - This bracket makes it safer to lift signs and bolt in place.
2. Ease of use
  - This device eliminates the need to use force to lift the sign.
  - It also eliminates the possibility of pinching fingers during the lifting process.
  - After the sign is in place the bracket slides down the post eliminating the need to climb up the post to unchain the bracket.

### Manufacturability

This device is constructed of 4 machined and/or welded parts. The parts are simple and do not have any features that are difficult to manufacture.

### Potential for Widespread Application

1. Time to train operator
  - It would take one hour to train an operator to use this device.

2. Reduction in time to complete task
  - This device does not reduce the time required to put a sign in place.
3. Improvement in quality
  - This device does not affect the quality of the sign placement.
4. Expected annual usage
  - This device could be used year round.
5. Units required
  - One device per patrol or maintenance crew is required.
  - Nine or ten of these devices are already in use in R4.
6. Use in other states
  - All states that have to lift sign into place would benefit from this device.

### **Safety**

1. Improvement in safety
  - Manual lifting of the sign is eliminated.
  - Operators fingers are not in the area of the sign so cannot get pinched during lifting.
  - There is no need to climb the sign to release the bracket as was done in the past.
2. Safety concerns due to use or misuse of the device
  - Fingers may be pinched during opening and closing of the bracket.
  - Bracket may fail and suddenly snap if used to lift objects heavier than standard road signs.
3. Safety concerns due to failure of the device
  - Chain may fail under high loading or fatigue and send metal particles into the immediate area.
  - Pin sleeve welding may fail and bracket could open during lifting, dropping the sign from any lifted elevation.

### **Availability of Similar Equipment for Purchase**

The prior art search did not find similar equipment available for purchase.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful and may be considered non-obvious depending on the Patent Examiner's evaluation.
  - According to the innovator, this innovation was publicly disclosed in its current form in 2009.
2. Patent infringement
  - The prior art search did not find a similar device.

## Sign Elevator Bracket User Manual



### Device Description

The sign elevator bracket is a device that allows a post-mounted sign to be lifted into the air using a loader during sign installation or repair. This decreases the number of required workers, and increases worker safety.

### Operating Instructions

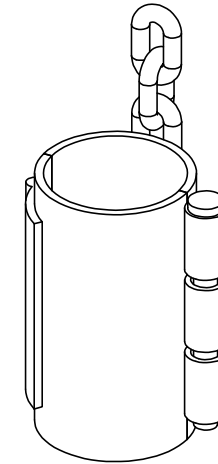
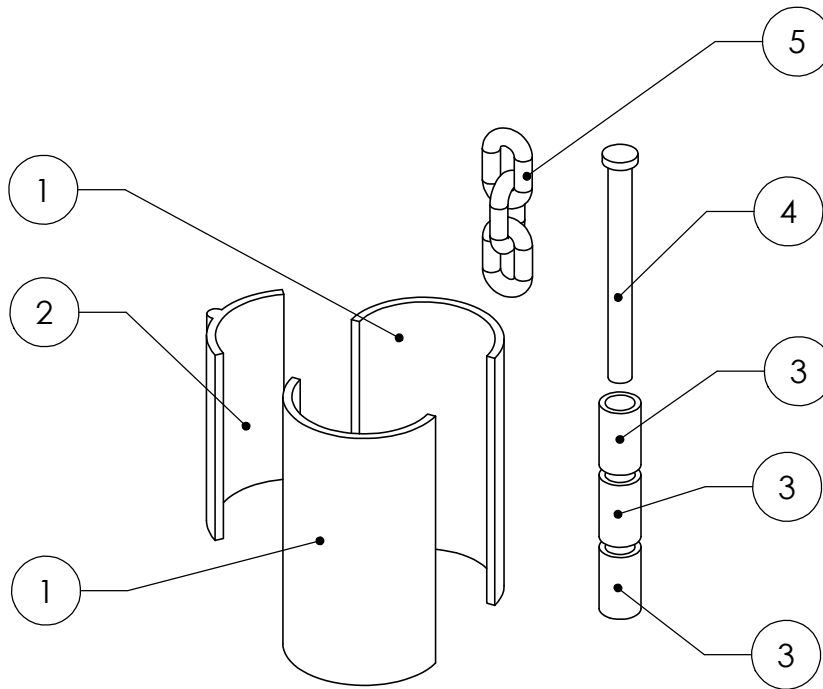
1. Drive the loader as close to the sign installation site as possible.
2. Attach the sign elevator bracket to a loader bucket using the included chain and chain hook.
3. Lower the loader bucket as close to the sign to be lifted as possible.
4. Remove the locking pin from the bracket.
5. Open and place the bracket around the sign post.
6. Close the bracket and replace the locking pin.
7. Lift the loader bucket slowly, lifting the sign in the process.
8. Position the loader as necessary to line up the sign with the mounting hole.
9. Lower the loader bucket as needed and install the sign.
10. Once the sign is properly secured in the mounting hole, remove the locking pin and bracket from the sign post.
11. Remove the sign elevator bracket from the loader.

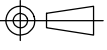
Innovator: Jerry Buchanan

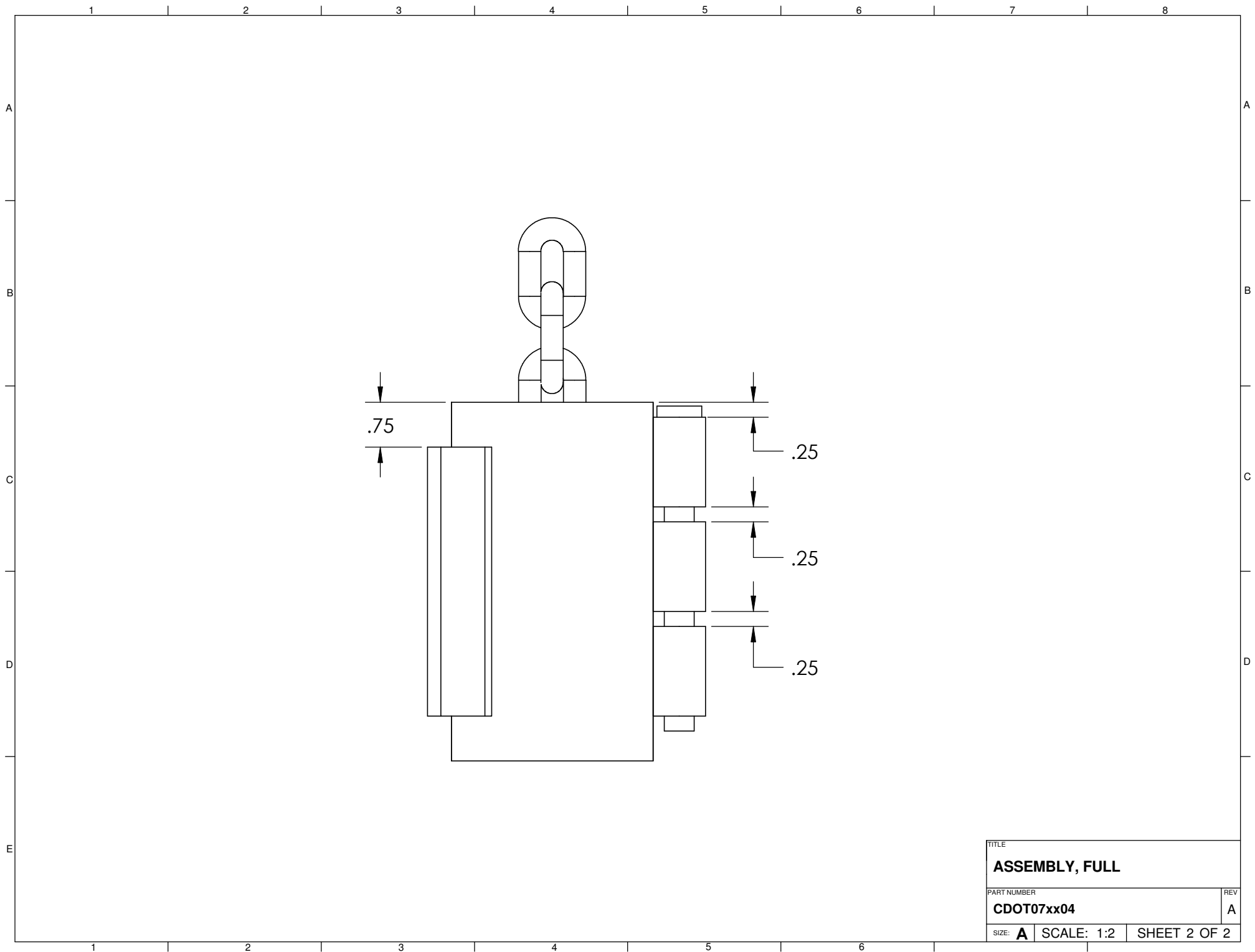
NOTES:

1. HINGE IS FULLY WELDED TO BOTH HALVES OF THE MAIN BODY
2. THE UPPER AND LOWER LOCKING SLEEVES ARE WELDED TO ONE HALF OF THE MAIN BODY WHILE THE MIDDLE IS WELDED TO THE OPPOSITE HALF
3. THE CHAIN IS 24" LONG AND THE LOWER LINK IS WELDED TO THE MAIN BODY
4. THERE IS A CHAIN HOOK ATTACHED TO THE FREE END OF THE CHAIN (NOT SHOWN)

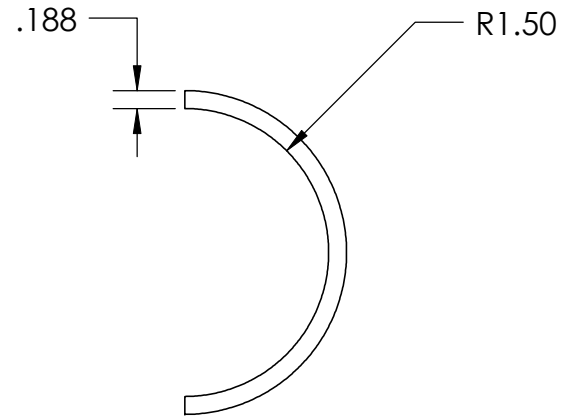
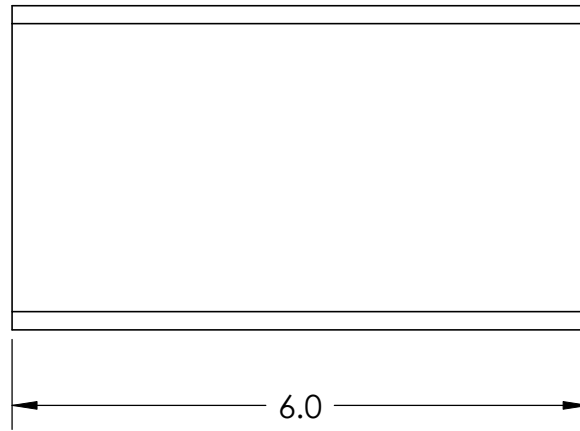
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT07010402	BODY, MAIN	2
2	CDOT07020401	HINGE	1
3	CDOT07030403	SLEEVE, LOCKING	3
4	CDOT07040401	PIN, LOCKING	1
5	CDOTSTOCK1	X" LINK CHAIN	3

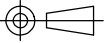


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJAN2011		J.BUCHANAN	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT07xx04	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:4	
								SHEET 1 OF 2	
								REV	
								A	



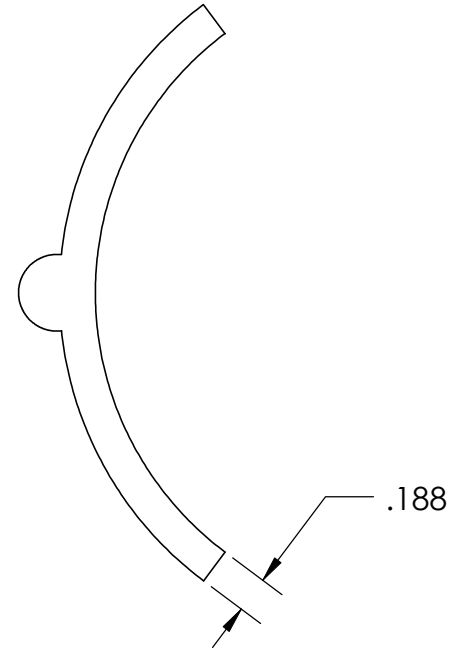
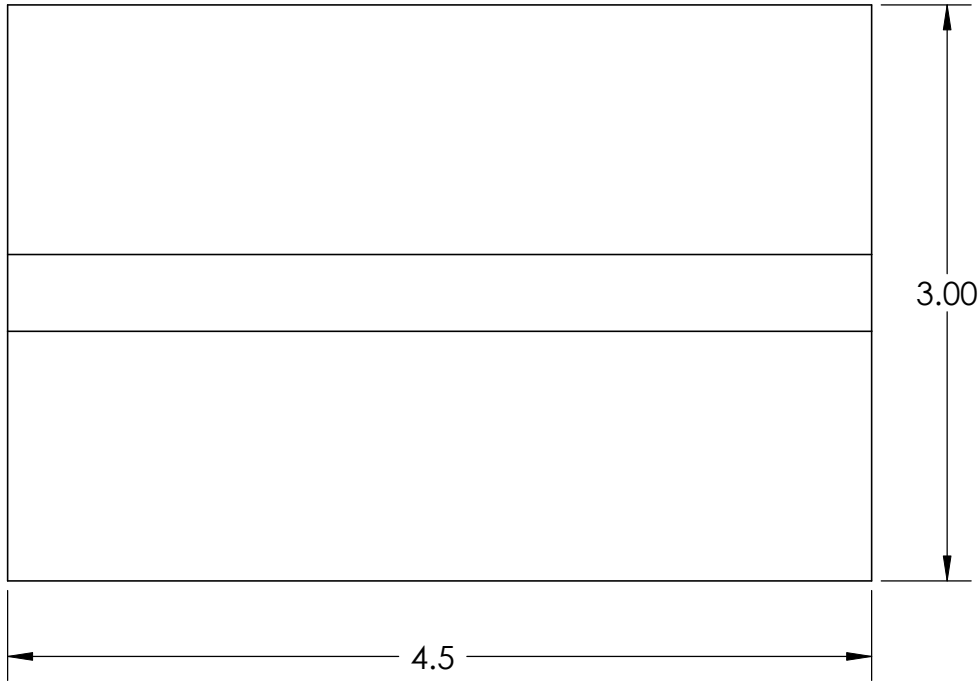
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE XXJAN2011		NAME J.BUCHANAN		TITLE BODY, MAIN			
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER CDOT07010402		REV A			
PROJECTION: 		DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:2		SHEET 1 OF 1	

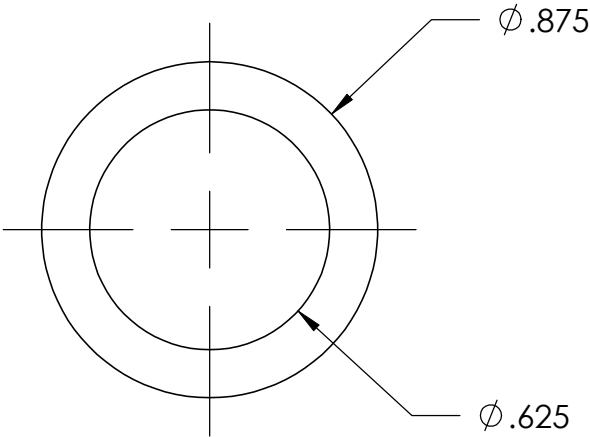
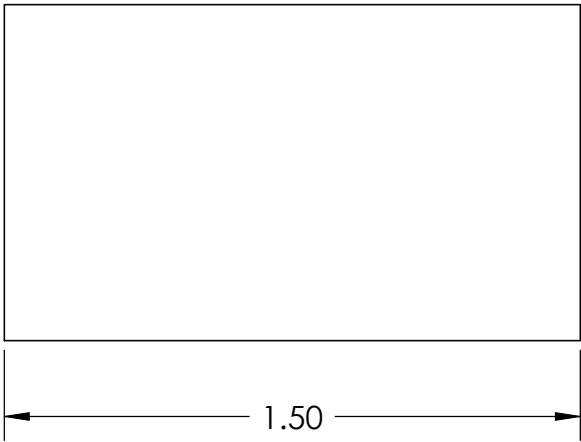
NOTES:

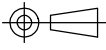
1. REMOVE ALL BURRS AND SHARP EDGES
2. HINGE IS FORMED TO CONFROM TO SHAPE OF MAIN BODY FROM STANDARD HINGE



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJAN2011		J.BUCHANAN	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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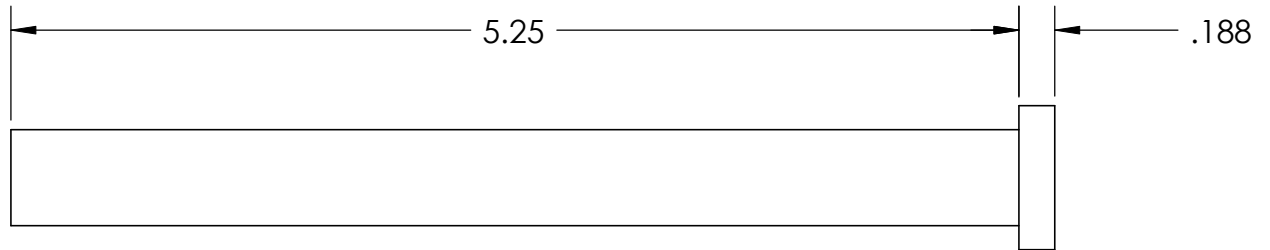
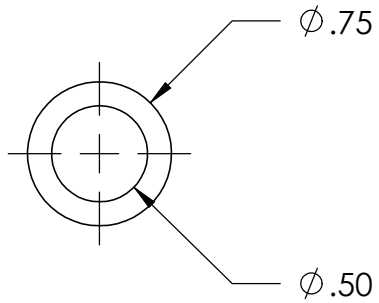
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

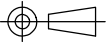


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJAN2011		J.BUCHANAN	
PROJECTION: 		X.= ± 0.3 X.X.= ± 0.1 X.XX.= ± 0.05 X.XXX.= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.							



NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJAN2011		J.BUCHANAN	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER					
				CDOT07040401					
				REV					
				A					
				SIZE: A		SCALE: 1:1		SHEET 1 OF 1	

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Sign Elevator Bracket

**Innovator(s):** Jerry Buchanan

**Summary:** The prior art search did not find a patent for any device to lift a sign on a post into place.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: sign & bracket, sign & elevator, sign & post, sign & installation, sign & repair

Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- None

#### **2. Existing Product Search**

- No similar products were found using [www.google.com](http://www.google.com)

## *Evaluation of Innovation*

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### **1. Evaluation of Novelty**

An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawings.

### **2. Evaluation of Non-obviousness**

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. No patents were found for similar devices.

### **3. Usefulness**

Based on the information provided by the innovator, this device appears to meet the criteria for usefulness.

The sign elevator bracket is used in conjunction with a skid loader to lift a post and sign that is a new installation or a sign and post that is being repaired.

### **4. Public Disclosure**

According to the innovator, this device was built in 2009 and has been in use by the Brush area patrol.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

**Submission number:** 8

**Title of the Innovation:** Alamo Pump Holder

**Innovator(s):** James Pickett

### Device Description

The Alamo pump holder is an integral part of a trailer with a hydraulic pump. It is designed to support and hold the hydraulic pump found on trailer equipment when not in use. This removes the issue of where and how to store the pump when not in use.



#### 1. Usefulness

- This device holds the hydraulic pump when it is detached from the tractor making it possible for a single person to disconnect and reconnect the pump to the tractor.

#### 2. Ease of use

- This device makes connecting and disconnecting the pump much easier because the pump is hanging in the correct position.

### Manufacturability

This device is constructed of six machined and/or welded parts. It is simple and does not have any features that are difficult to manufacture.

### Potential for Widespread Application

#### 1. Time to train operator

- It would take about 5-10 minutes to train an operator to use this device.

2. Reduction in time to complete task
  - This device makes it much easier to disconnect and reconnect the hydraulic pump because it holds the pump at the correct height. This reduces the amount of time it takes to connect the pump.
3. Improvement in quality
  - The device prevents the kinking of the hydraulic hoses.
4. Expected annual usage
  - This hydraulic pump is expected to be used four months of the year but storage of the pump is required all year.
  - It is used when the pump is stored and every time the tractor is disconnected.
5. Units required
  - One device is required for each hydraulic mower.
6. Use in other states
  - All states that have hydraulic pumps would benefit from this device.

## **Safety**

1. Improvement in safety
  - By hanging the pump at the correct position there is no lifting or lifting and twisting required by the operator when connecting the pump thereby reducing the chance of worker injury as the gearbox weighs 60-100 pounds.
2. Safety concerns due to use or misuse of the device
  - There are no identifiable concerns due to use or misuse of the device.
3. Safety concerns due to failure of the device
  - Winch cable could break.
  - Attaching carabiners could fail.
  - Could get fingers caught in cable or gearing of winch.

## **Availability of Similar Equipment for Purchase**

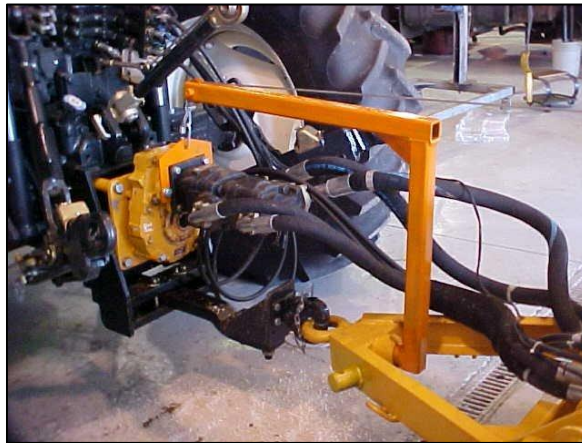
The prior art search did not find similar commercially available products.

## **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious depending on the Patent Examiner's evaluation.
2. Patent infringement
  - There are quite a few patents and products for lifting heavy devices. There were no patents or products that were found that were specifically mounted on a trailer and used for holding a pump. Most of the patents and products used a hydraulic actuator to lift the boom but several used a winch to lift the heavy object and so were listed under the category of possible non-obviousness.

## Alamo Pump Holder User Manual



### Device Description

The Alamo pump holder is designed to support and hold the hydraulic pump found on trailer equipment when not in use. This removes the issue of where and how to store the pump when not in use.

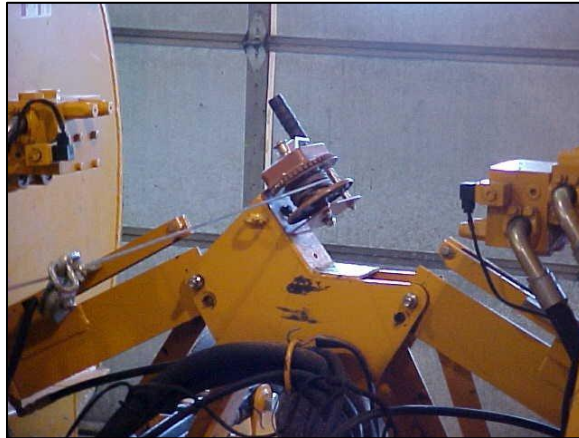
### Installation Instructions

1. Attach the arm to the trailer frame by inserting the short arm into the existing mounting hole on the trailer.
2. Fix the arm in place by inserting the existing lock pin through the mounting hole and the short arm.



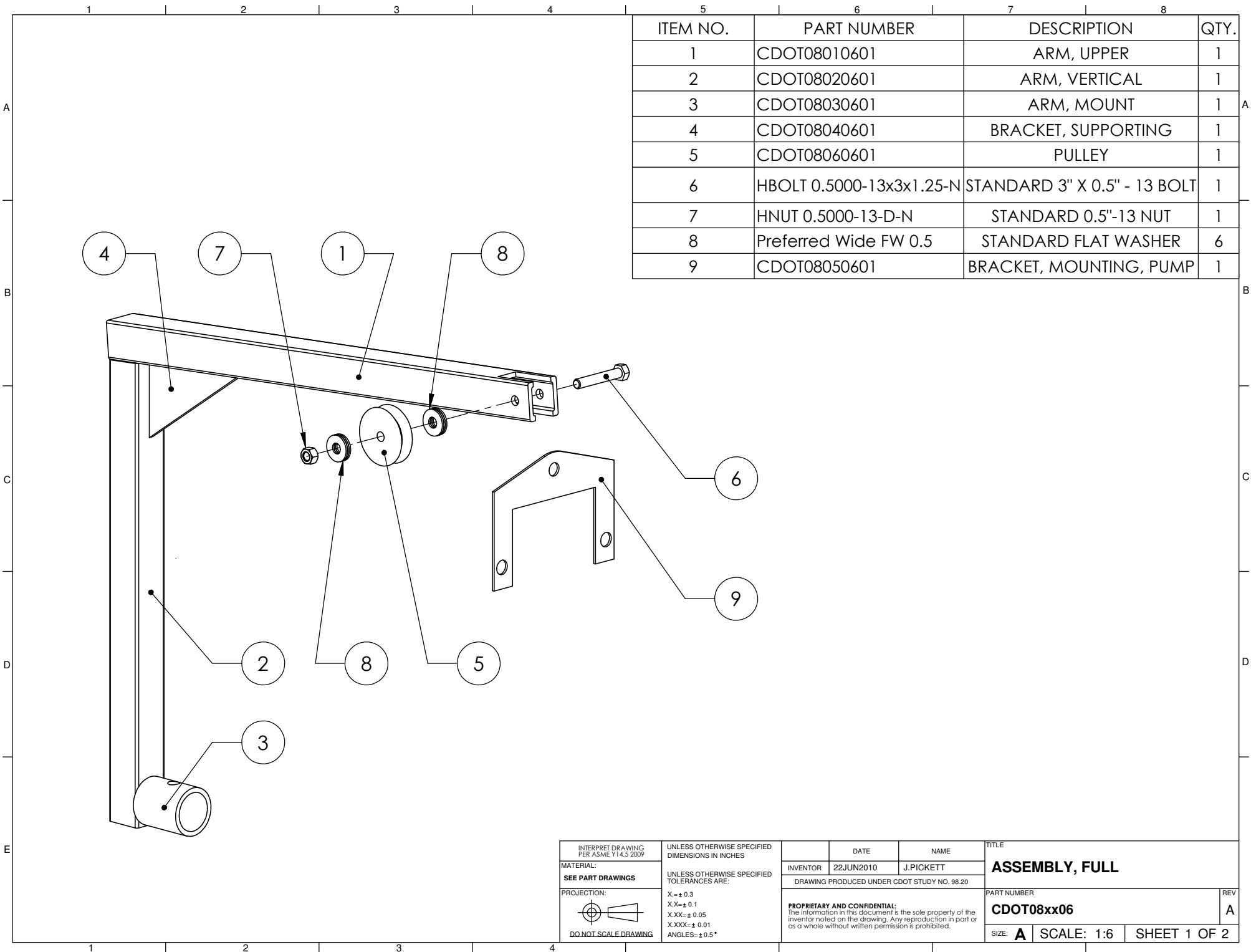
3. Bolt the pump mounting bracket to the pump using the two holes on the side of the bracket and the existing holes on the pump housing.
4. Bolt a small hand winch to the upper part of the trailer frame.
5. Attach a winching cable to the pump mounting bracket using two carabiners.
6. Run the cable from the carabiners over the pulley on the arm, and towards the winch.
7. Wind the excess cable into the hand winch, lifting the pump in the process.

Innovator(s): James Pickett

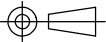


### Operating Instructions

1. Reverse the tractor up to the trailer equipment, and connect the trailer to the hitch.
2. Adjust the height of the pump using the hand winch as necessary to align the mounting holes on the tractor to the mounting holes on the pump.
3. Bolt the pump to the tractor following standard procedure.
4. Unwind the cable slightly to allow for some slack during operation.
5. Reverse the procedure to remove the pump from the tractor.



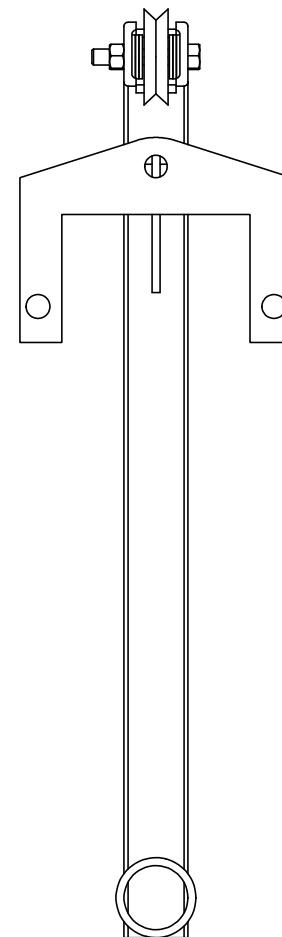
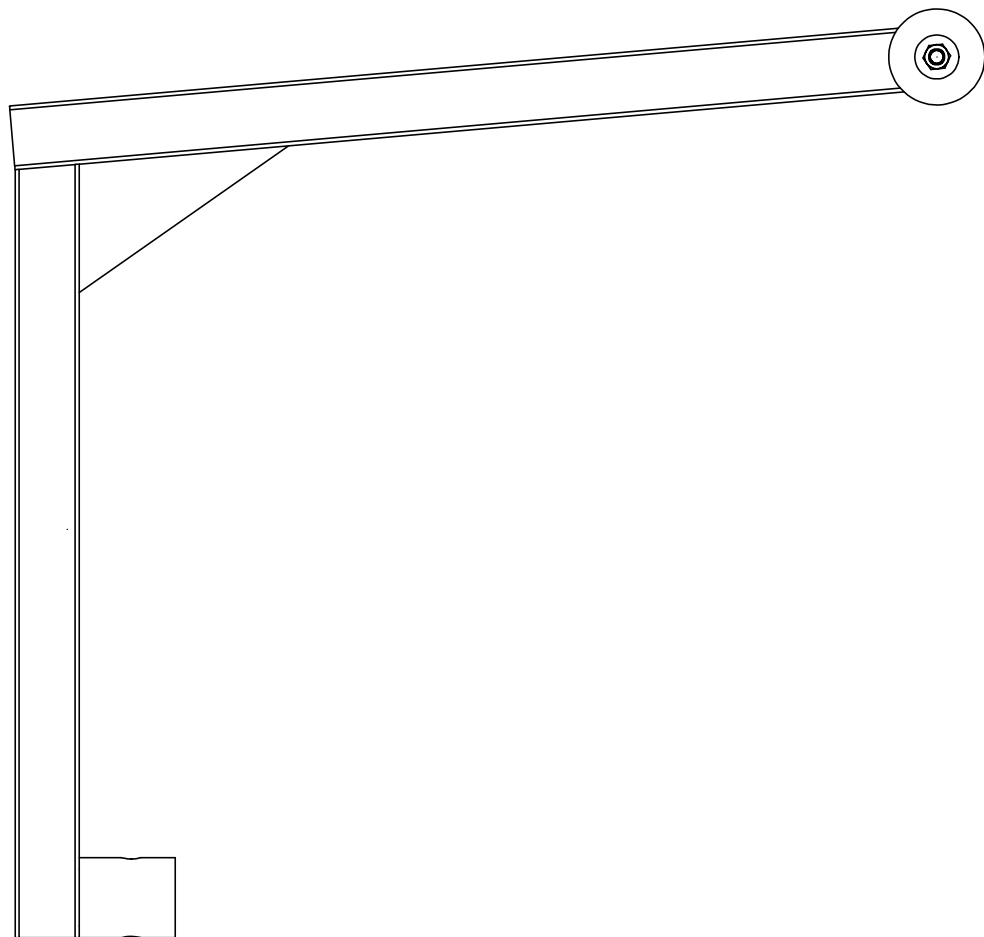
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT08010601	ARM, UPPER	1
2	CDOT08020601	ARM, VERTICAL	1
3	CDOT08030601	ARM, MOUNT	1
4	CDOT08040601	BRACKET, SUPPORTING	1
5	CDOT08060601	PULLEY	1
6	HBOLT 0.5000-13x3x1.25-N	STANDARD 3" X 0.5" - 13 BOLT	1
7	HNUT 0.5000-13-D-N	STANDARD 0.5"-13 NUT	1
8	Preferred Wide FW 0.5	STANDARD FLAT WASHER	6
9	CDOT08050601	BRACKET, MOUNTING, PUMP	1

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>ASSEMBLY, FULL</b>		
MATERIAL:  SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	22JUN2010	J.PICKETT				
PROJECTION:    DO NOT SCALE DRAWING		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER  <b>CDOT08xx06</b>		REV  <b>A</b>
				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				SIZE: <b>A</b> SCALE: 1:6    SHEET 1 OF 2		



NOTES:

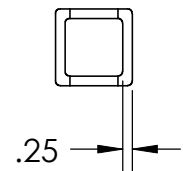
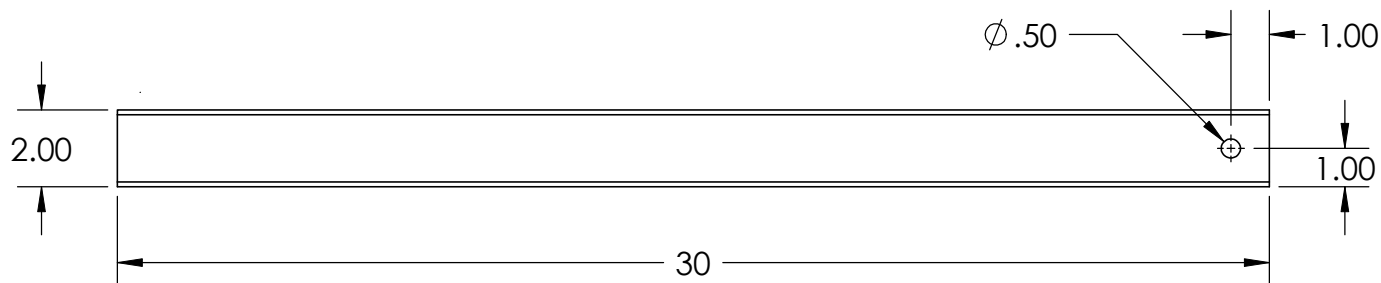
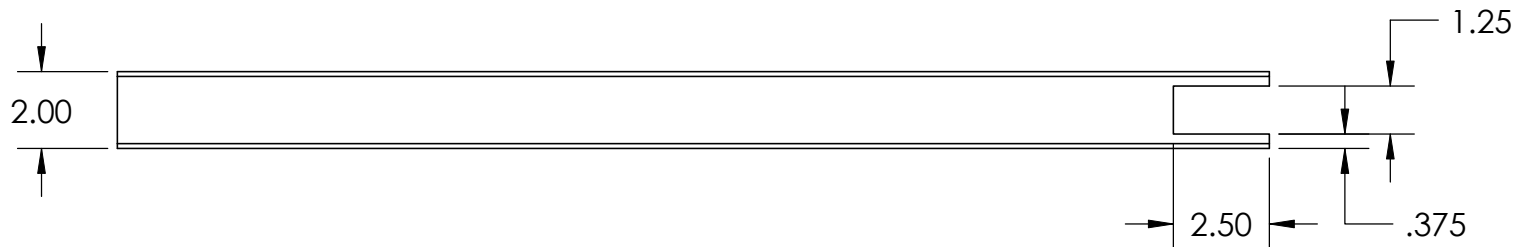
1. ALL JOINTS ARE FULLY WELDED EXCLUDING THE BOLT, PULLEY, WASHERS, AND NUT.
2. THE PUMP MOUNTING BRACKET IS BOLTED TO THE PUMP USING THE LOWER TWO HOLES, WHILE THE UPPER HOLE IS USED TO CONNECT TO THE WINCH CABLE. THE WINCH CABLE ATTACHES TO THE BRACKET WITH CARABINERS, THEN PASSES OVER THE PULLEY. THE END OF THE WINCH CABLE IS ATTACHED TO A HAND WINCH, WHICH IS BOLTED TO THE FRAME OF THE DEVICE THAT THE PUMP POWERS.

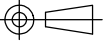


TITLE		
ASSEMBLY, FULL		
PART NUMBER		REV
CDOT08xx06		A
SIZE: A	SCALE: 1:6	SHEET 2 OF 2

NOTES:

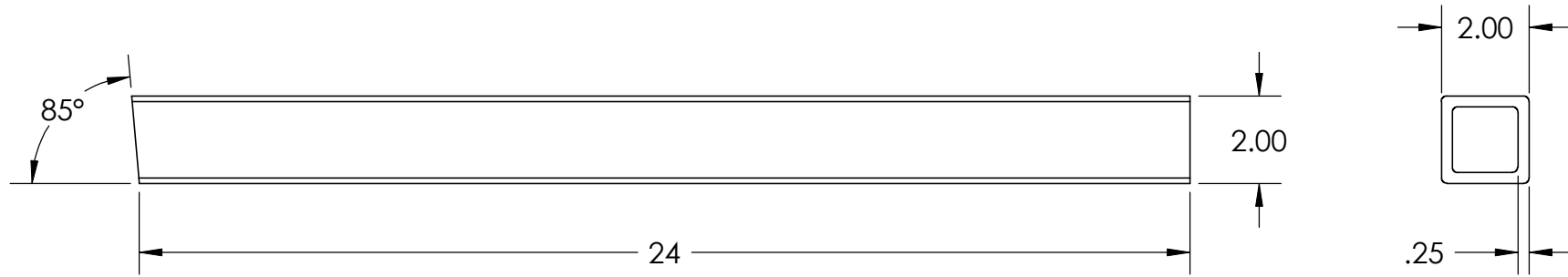
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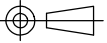


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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT08010601		A	
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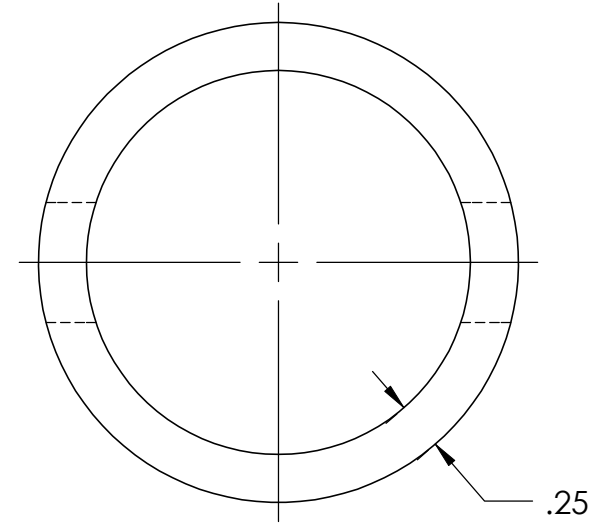
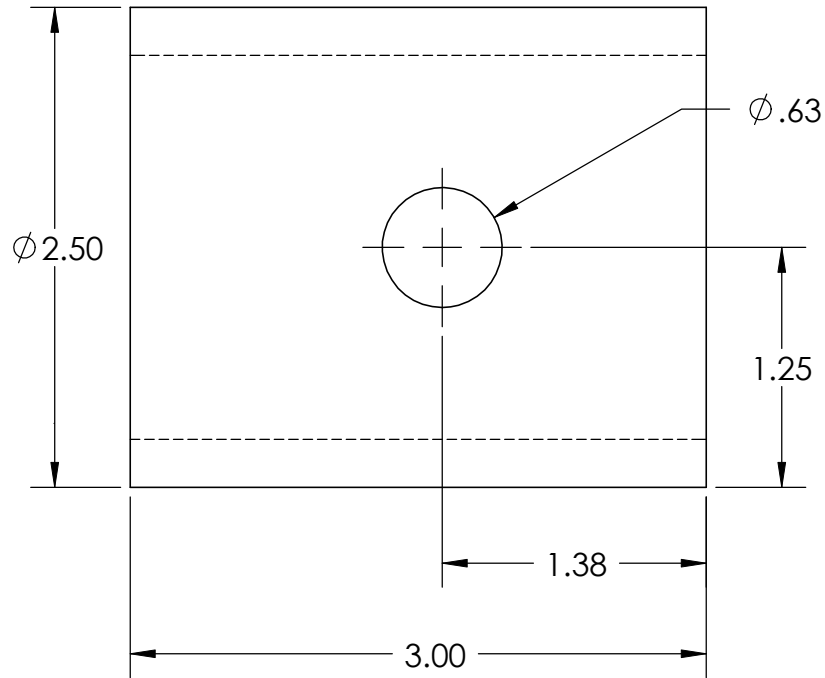
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INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	22JUN2010	J.PICKETT	ARM, VERTICAL
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			CDOT08020601
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							REV A

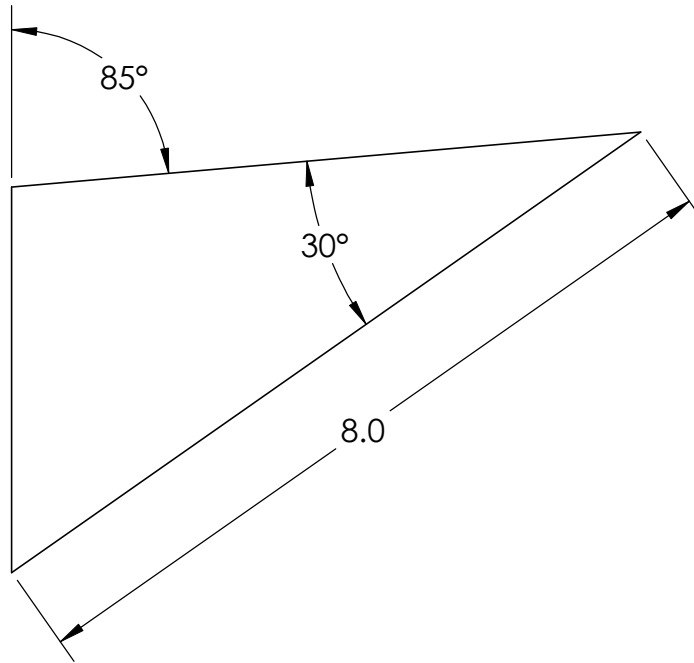
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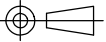
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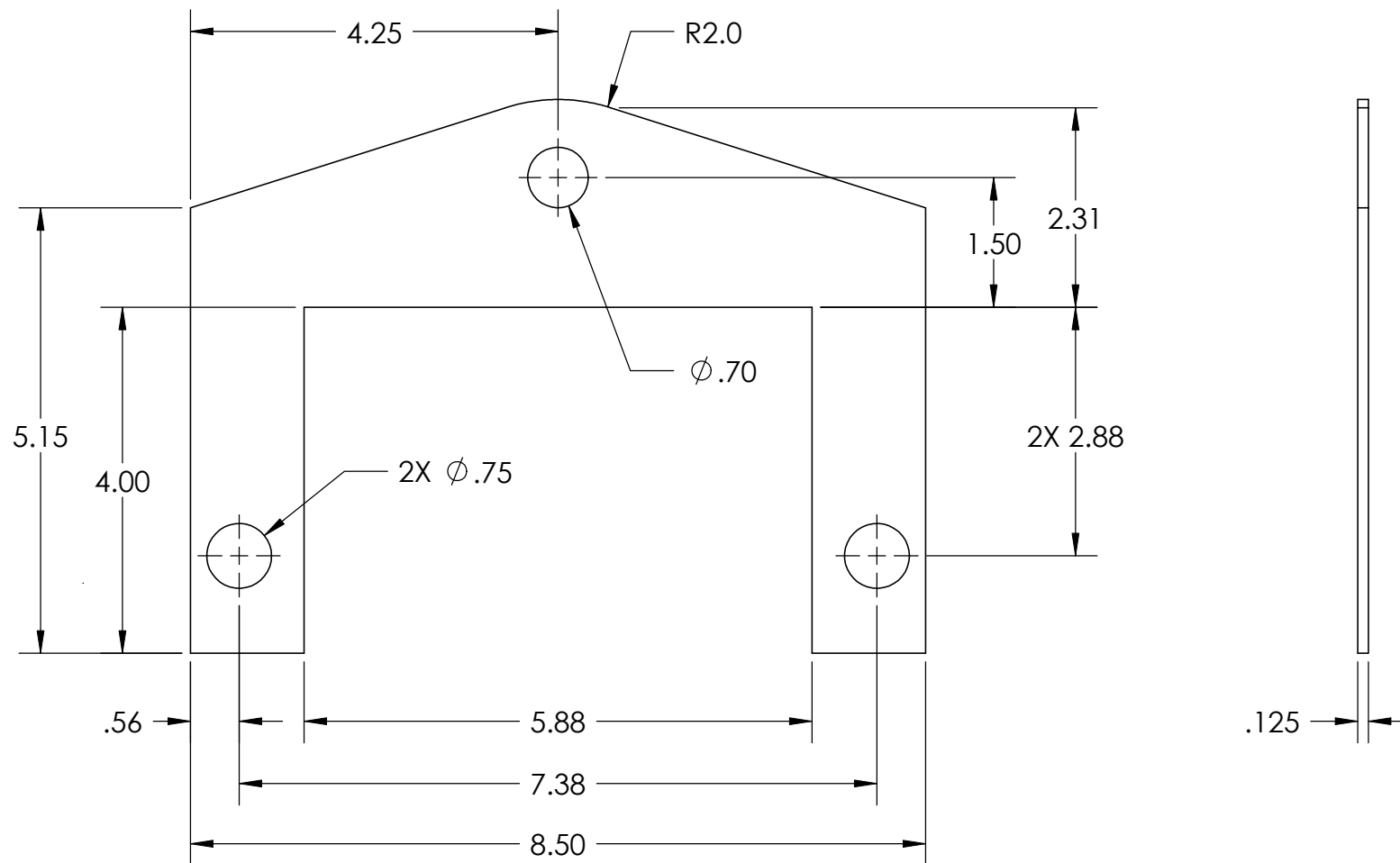
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MATERIAL: <b>STANDARD STEEL TUBING</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	22JUN2010	J.PICKETT			
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



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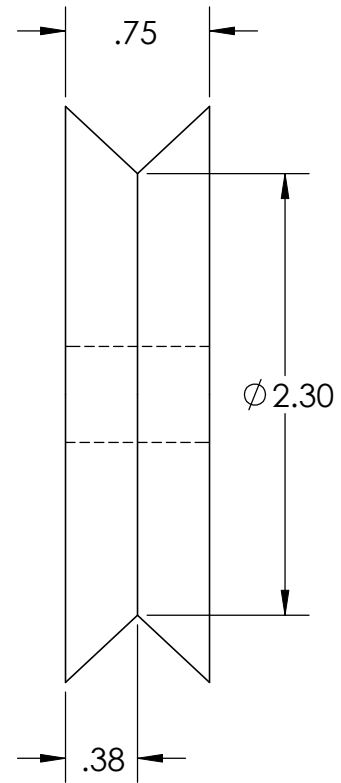
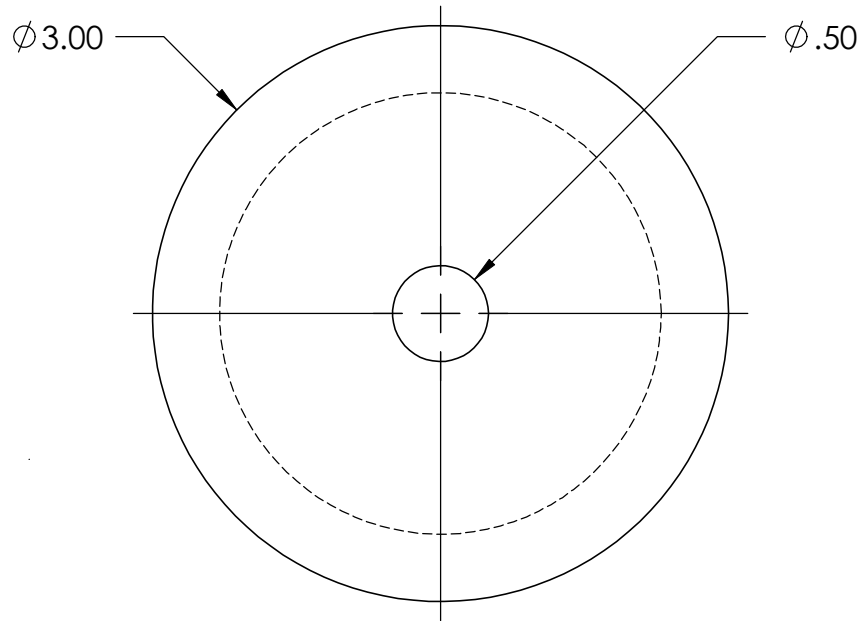
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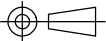


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MATERIAL: <b>STEEL</b>	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	INVENTOR	J.PICKETT	<b>BRACKET, MOUNTING, PUMP</b>
PROJECTION:		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		
	X = ± 0.3 X.X = ± 0.1 X.XX = 0.05 X.XXX = 0.01 ANGLE = ± 0.5 °	<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER
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NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES



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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	REV	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT08060601		A
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## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Alamo Pump Holder

**Innovator(s):** James Pickett

**Summary:** There are quite a few patents and products for lifting heavy devices. There were no patents or products that were found that were specifically mounted on a trailer and used for holding a pump. Most of the patents and products used a hydraulic actuator to lift the boom but several used a winch to lift the heavy object and so were listed under the category of possible non-obviousness.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: stand & boom, stand & pump, pump & hangar, crane & hoist, engine & hoist, crane & winch  
Field of search: title

Patent Number	Year	Title of Invention
• 3,814,413	1974	Device for Holding and Moving Work Object
• 4,027,800	1977	Gantry Crane with Plural Hoist Means
• 4,058,229	1977	Lifting Mechanism for Trucks



- 4,069,922 1978 Portable Crane with Hoist Mounting and Outrigger Support Apparatus
- 4,090,625 1978 Portable Hydraulic Hoist for Vehicular Engines
- 4,127,295 1978 Truck Bumper and Cable Winch Unit
- 4,265,585 1981 Loading Devices for Vehicle Beds
- 4,479,632 1984 Dolly for an Automotive Engine
- 4,497,469 1985 Van Engine Removal Assembly
- 4,721,431 1988 Self Loading System
- 4,749,324 1988 Apparatus for Lifting and Positioning Construction Material
- 4,770,304 1988 Mobile Engine Hoist and Rebuild Stand Assembly
- 4,806,063 1989 Portable Wild Game Hoist
- 5,052,566 1991 Engine Hoist and Support Apparatus
- 5,076,448 1991 Portable Hydraulic Crane
- 5,081,775 1992 Plow Attaching Device and Method
- 5,261,640 1993 Portable Engine Hoist
- 5,897,100 1999 Apparatus for Removing an Engine from a Van
- 5,934,490 1999 Combination Engine Hoist and Stand
- 6,276,665 2001 Mobile Floor Crane
- 6,457,700 2002 Lift Device
- 7,080,823 2006 Engine Hoist Mounting a Transmission Adapter

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.airtechnical.com/products.php?page=reversbm.htm>
- b. <http://www.airtechnical.com/products.php?page=knuckle.htm>
- c. <http://cranes.e-rackonline.com/truck-mounted-jib-cranes/>
- d. <http://www.rugerindustries.com/>

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

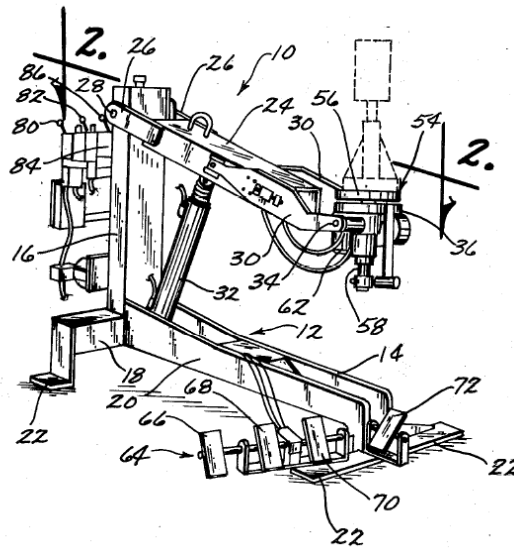
An examination of the information presented above does not reveal prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

## 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

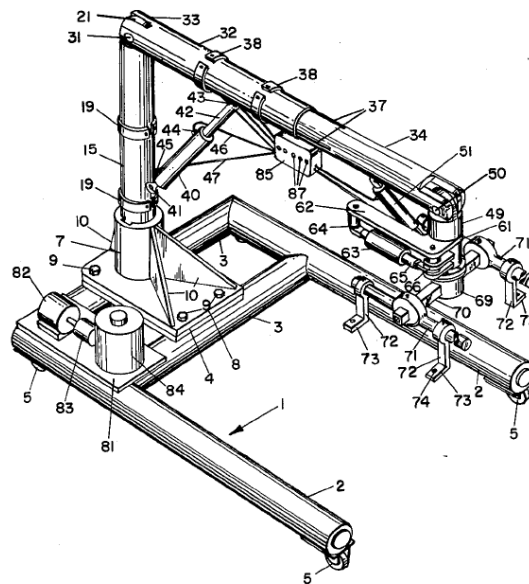
### a. 3,814,413 Device for Holding and Moving Work Object

This device has a boom and special attachments at the end to hold a work object.

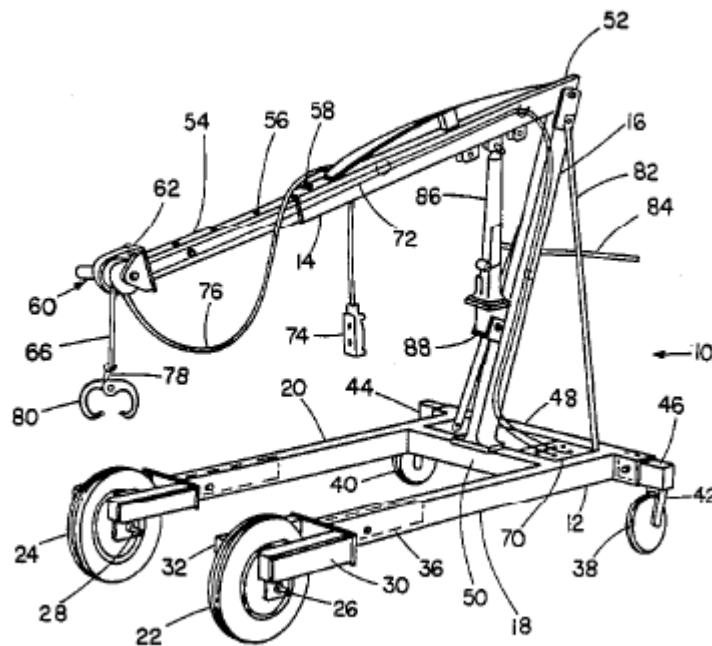


### b. 4,090,625 Portable Hydraulic Hoist for Vehicular Engines

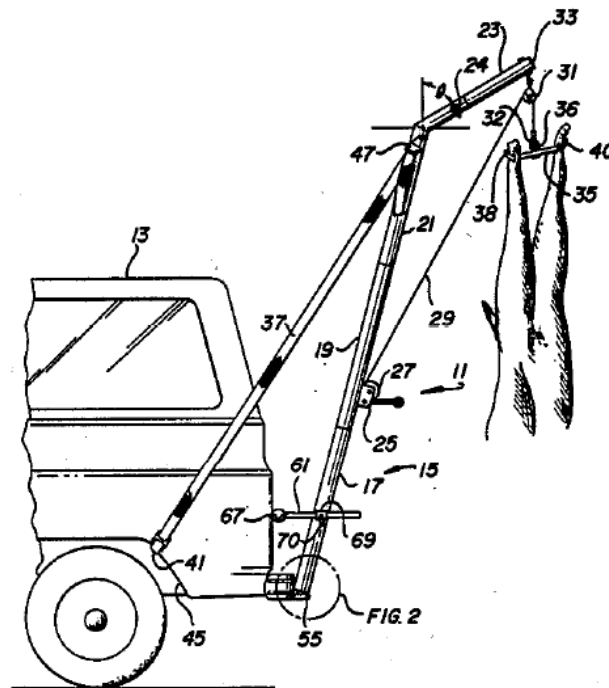
This device has a boom and special attachments at the end to hold the engine.



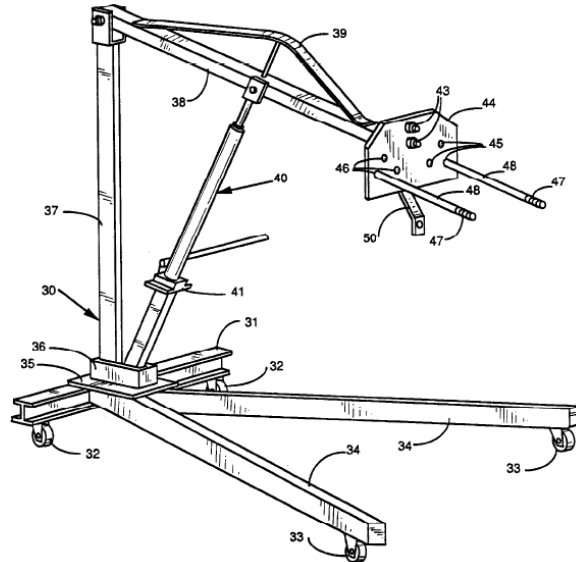
- c. 4,749,324 Apparatus for Lifting and Positioning Construction Material  
This device has a boom and a winch for lifting.



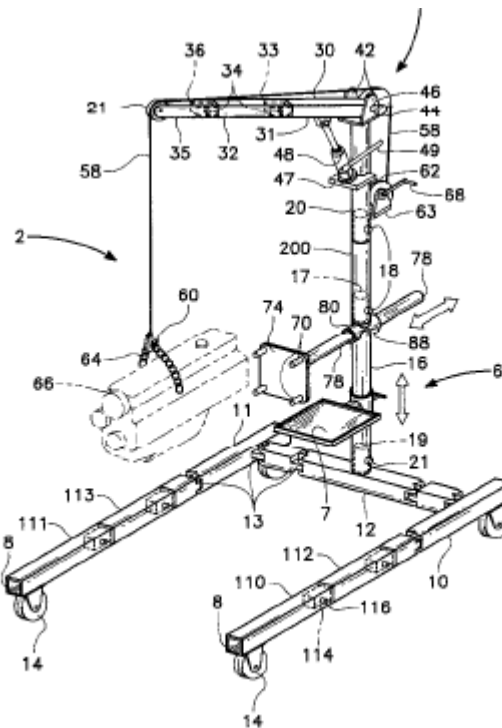
- d. 4,806,063 Portable Wild Game Hoist  
This device has a boom attached to an automobile and a winch for lifting wild game.



- e. 5,897,100 Apparatus for Removing an Engine from a Van  
This device has a boom and special attachments at the end to hold the engine.



- f. 5,934,490 Combination Engine Hoist and Stand  
This device has a boom and a winch for lifting.



- g. <http://www.airtechnical.com/products.php?page=reversbm.htm>  
This device uses a winch and a boom to lift heavy items.



- h. <http://www.airtechnical.com/products.php?page=knuckle.htm>  
This device is truck mounted and uses a winch and a boom to lift heavy items.



- i. <http://cranes.e-rackonline.com/truck-mounted-jib-cranes/>  
This device is truck mounted and uses a winch and a boom to lift heavy items.



- j. <http://www.rugerindustries.com/>  
This device uses a winch and a boom to lift heavy items.



### 3. Usefulness

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

This device holds the hydraulic pump when it is detached from the tractor making it possible for a single person to disconnect and reconnect the pump to the tractor.

### 4. Public Disclosure

This innovation may have been publicly disclosed; however, the innovator is unclear regarding the date and duration of public disclosure. According to the innovator, other CDOT employees have not used this device. Information regarding the device has been shared with coworkers. The device currently in use is the original design. A date when this device was first built and used was not given.

Information regarding this device has been shared with others which may be considered public disclosure depending on the circumstances in which the information was shared.

## Device Costs and Benefits

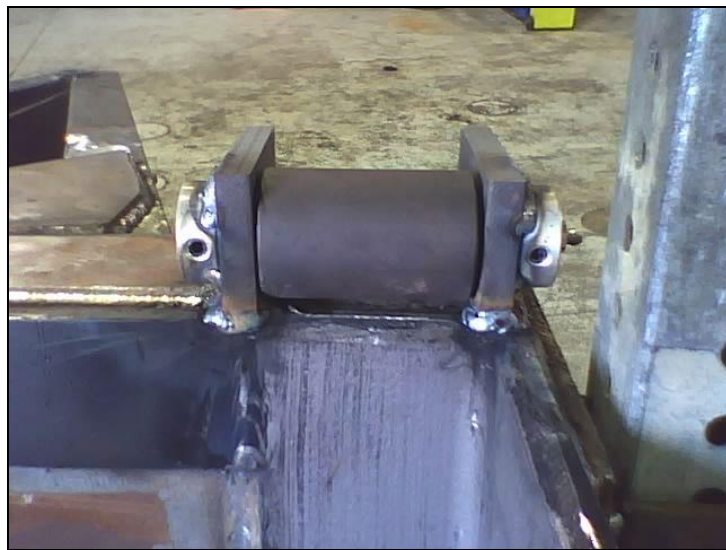
**Submission number:** 9

**Title of the Innovation:** Husting Hitch Plow Rollers

**Innovator(s):** James Pickett

### Device Description

The hitch plow rollers are permanently installed on Husting type hitches to prevent the plow legs from binding during lowering.



#### 1. Usefulness

- These rollers were added to the Husting hitch plow so that the plow legs could be moved up and down without getting stuck.

#### 2. Ease of use

- Once the rollers are installed on the plow the operator does not have to do anything to use them.

### Manufacturability

This device is constructed of three machined and/or welded parts. It is simple and does not have any features that are difficult to manufacture.

### Potential for Widespread Application

#### 1. Time to train operator

- This device is an integral part of the legs and does not require training.

2. Reduction in time to complete task
  - Without the rollers an operator has to tap on the legs in order to get the plow legs to move. This is time consuming. With the addition of the rollers this is no longer necessary.
3. Improvement in quality
  - The plow legs move up and down more freely when the rollers are added.
4. Expected annual usage
  - The rollers will be permanently installed on the plow hitch legs and will be used year round for storage or will be retracted when the plow is in use during the snowy months which is approximately six months of the year.
5. Units required
  - One set of two rollers is required for each plow with a Husting hitch.
6. Use in other states
  - All states that have plows with a Husting hitch would benefit from this device.

## **Safety**

1. Improvement in safety
  - When the plow legs stick when being lowered, they can suddenly become unstuck and drop. This can cause a serious injury if the operator is nearby. By adding the rollers to the plow legs the legs no longer stick.
2. Safety concerns due to use or misuse of the device
  - There are no identifiable concerns due to use or misuse of the device.
3. Safety concerns due to failure of the device
  - Set screw could come free and then spindle can come out.

## **Availability of Similar Equipment for Purchase**

The prior art search did not find commercially available rollers for the plow legs.

## **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious depending on the Patent Examiner's evaluation.



## 2. Patent infringement

- The prior art search found a roller kit made by Monroe but the specific information about this kit could not be found.
- When two objects slide along each other they are more likely to bind than when they roll along each other. For this reason it is common to add a rolling element to enable smooth linear motion. It is questionable whether a device that is a roller that aids in smooth linear motion is patentable or is obvious because it is common knowledge. One patent for a hitch using this technique is cited as an example.

## Husting Hitch Plow Rollers User Manual



### Device Description

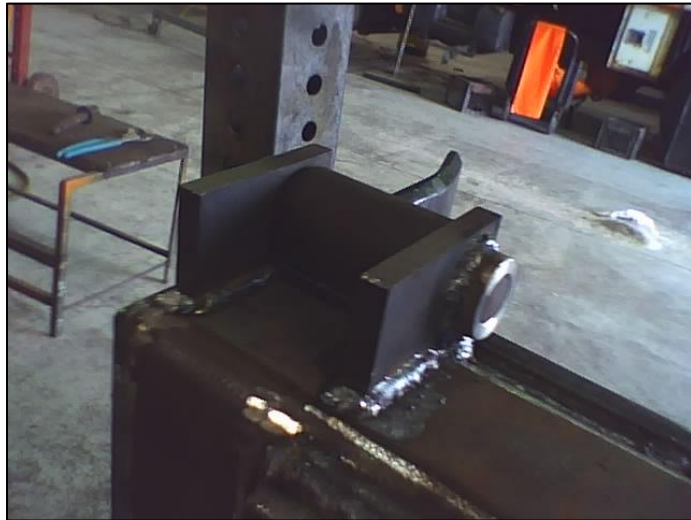
The hitch plow rollers are installed on Husting type hitches to prevent the plow from becoming stuck during lowering. They act as a near-friction free surface at the bottom of the hitch to prevent binding between the sliding metal surfaces.

### Installation Instructions

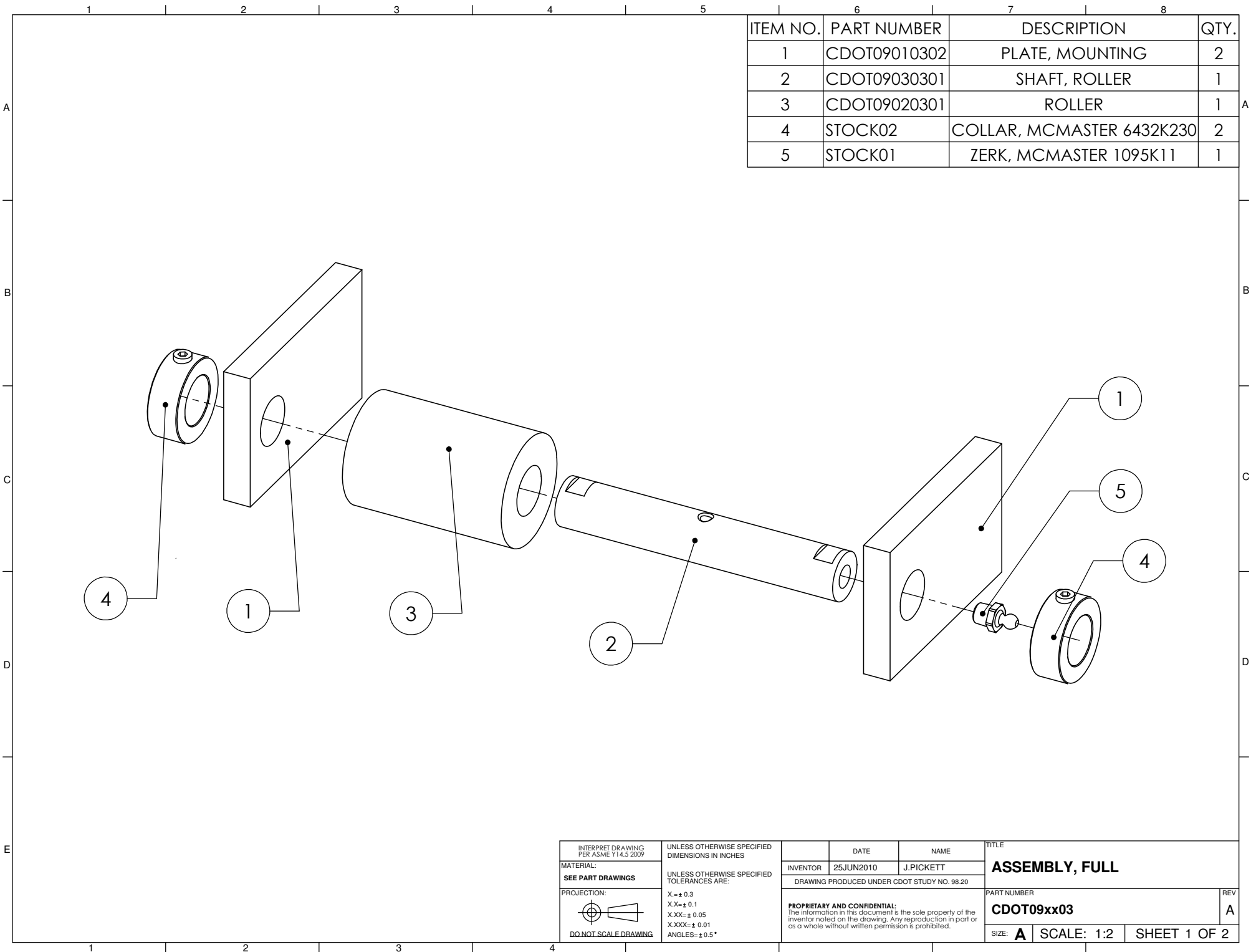
1. Turn the plow's Husting hitch upside down so that the roller assembly can be welded to the bottom.
2. Position the roller directly in the path of the sliding track, one roller assembly per track (or two per Husting hitch).
3. Gently adjust the position so that the roller will hang out over the hitch's edge and contact the slide when moving. This will usually have the edge of the roller hanging out approximately 0.1 inch in relation to the sliding track.



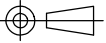
4. Tack the mounting brackets into place, and test the function of the hitch on the truck with minimal loading.
5. If the roller is mounted correctly, remove the hitch from the truck and disassemble the roller, leaving only the mounting brackets.
6. Fully weld the mounting brackets to the hitch.

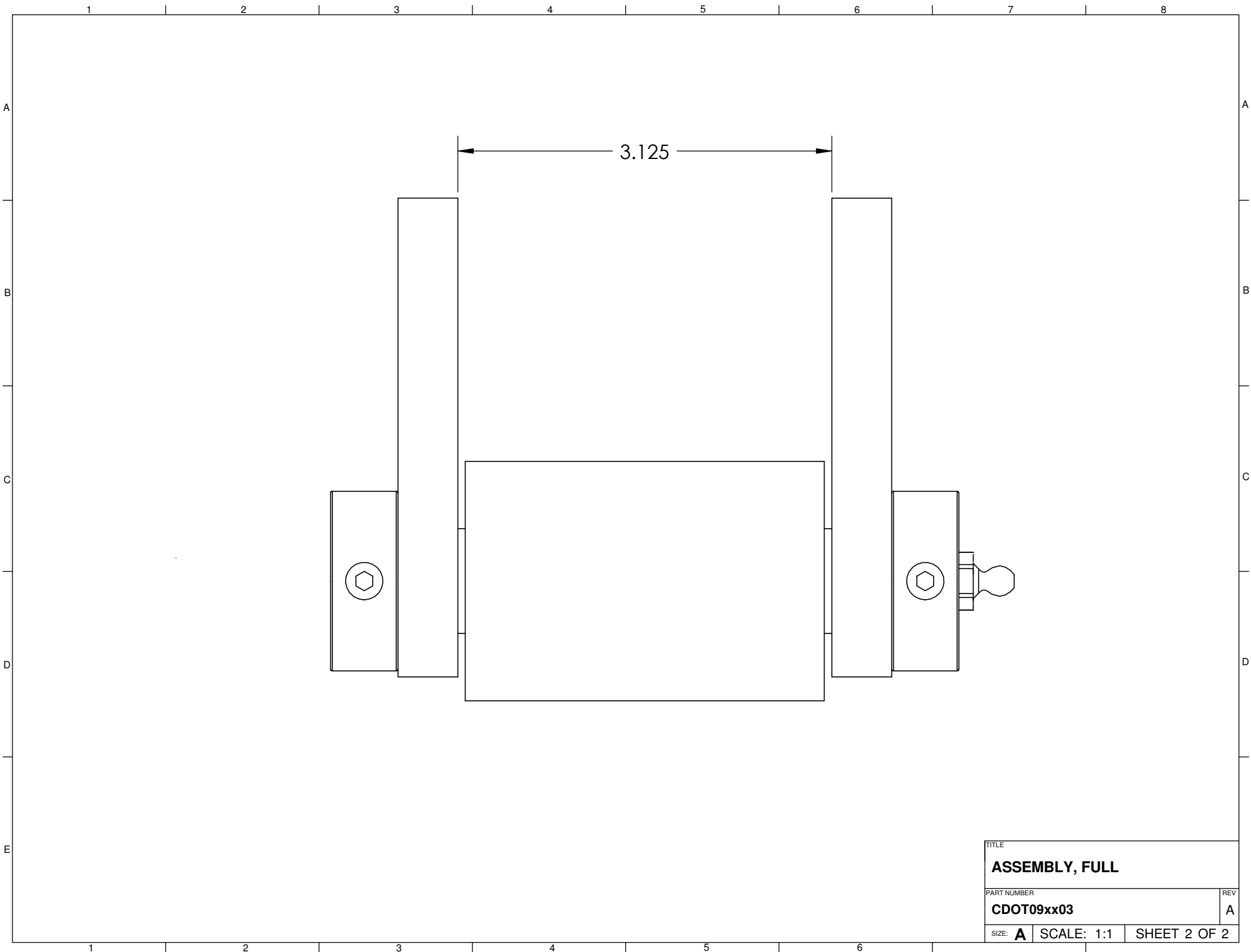


7. Reassemble the roller.
8. Weld the locking collar to the mounting brackets.
9. Use the zerk grease fitting to lubricate the shaft and the roller.



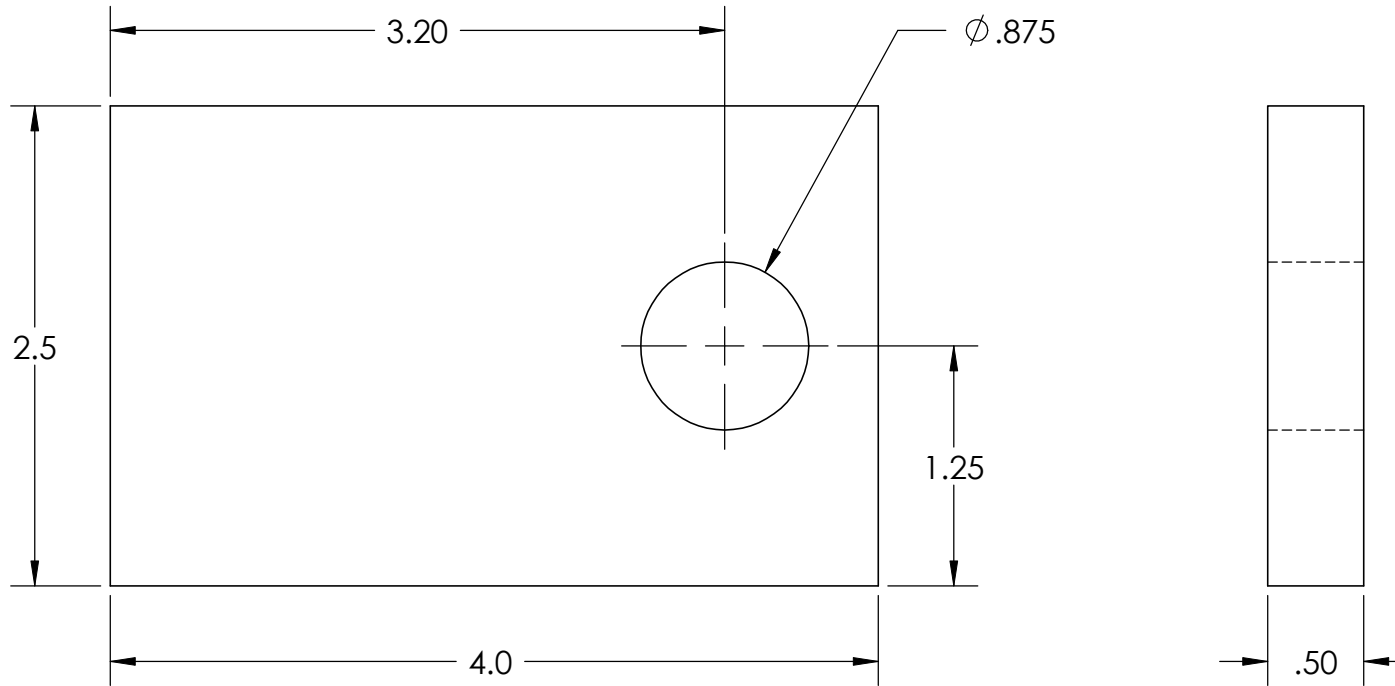
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2	CDOT09030301	SHAFT, ROLLER	1
3	CDOT09020301	ROLLER	1
4	STOCK02	COLLAR, MCMASTER 6432K230	2
5	STOCK01	ZERK, MCMASTER 1095K11	1

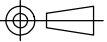
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MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		J.PICKETT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT09xx03	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:2		SHEET 1 OF 2	
								REV A	



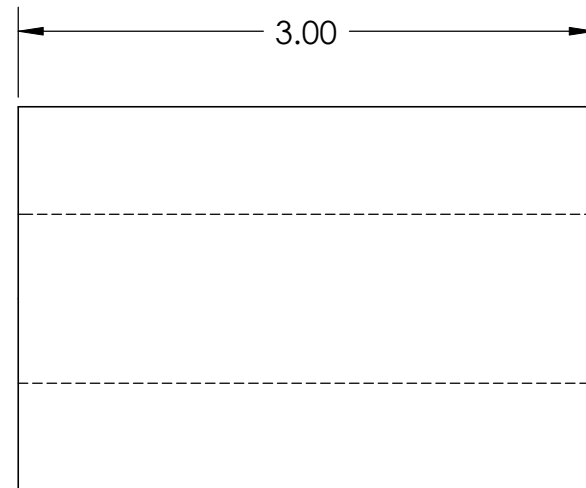
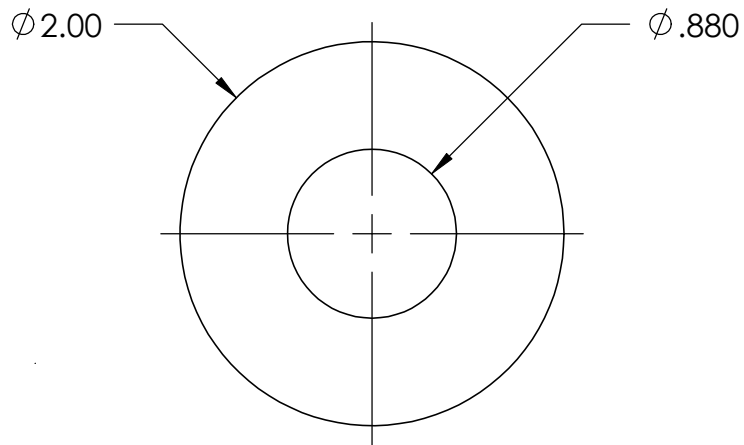
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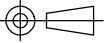
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



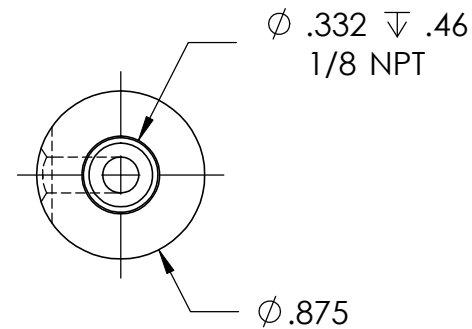
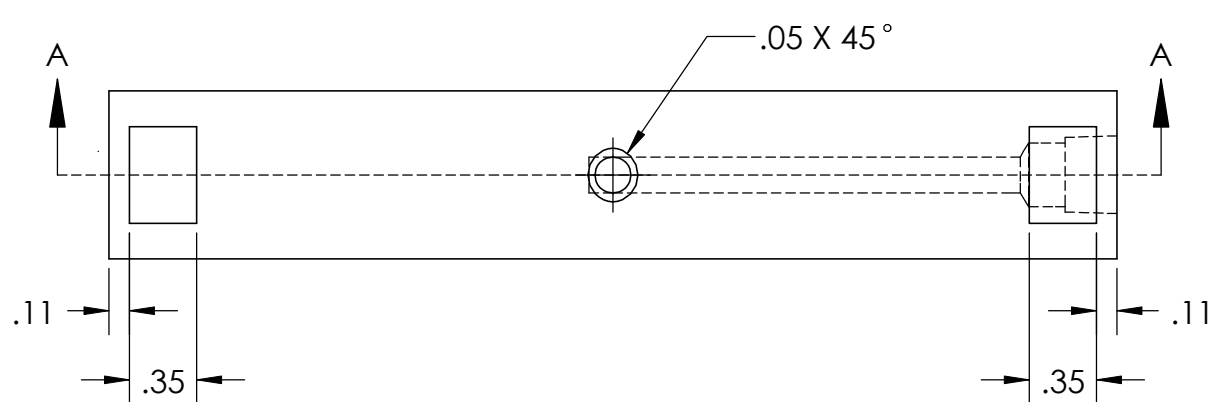
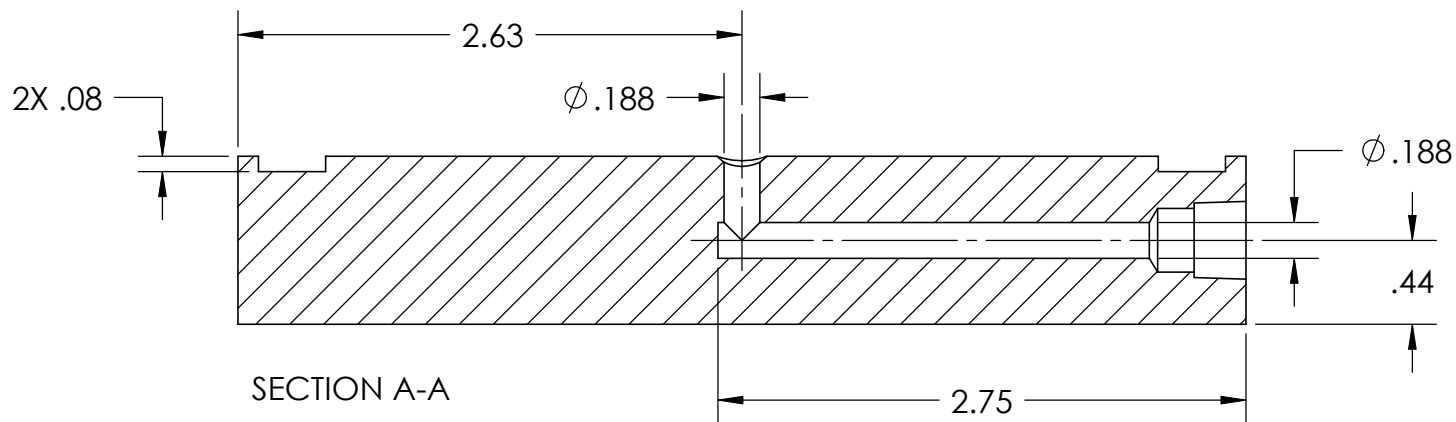
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	J.PICKETT	PLATE, MOUNTING
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT09010302		A	
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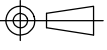
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	J.PICKETT	ROLLER
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.02 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT09020301		SIZE: A	A
				SCALE: 1:1		SHEET 1 OF 1	

NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	J.PICKETT	<b>SHAFT, ROLLER</b>
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.02 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT09030301		SIZE: <b>A</b>	A
				SCALE: 1:1		SHEET 1 OF 1	



## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Husting Hitch Plow Rollers

**Innovator(s):** James Pickett

**Summary:** The prior art search found a roller kit made by Monroe but the specific information about this kit could not be found. When two objects slide along each other they are more likely to bind than when they roll along each other. For this reason it is common to add a rolling element to enable smooth linear motion. It is questionable whether a device that is a roller that aids in smooth linear motion is patentable or is obvious because it is common knowledge. One patent for a hitch using this technique is cited here as an example.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: hitch & roller, plow & roller

Field of search: title, abstract

Patent Number	Year	Title of Invention
• 4,564,209	1986	Trailer Hitch Assembly

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://monroetruck.com/Pdf/Literature/SI/Hitch.pdf> this website references a roller kit but there is no visible information on the kit

## Evaluation of Innovation

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

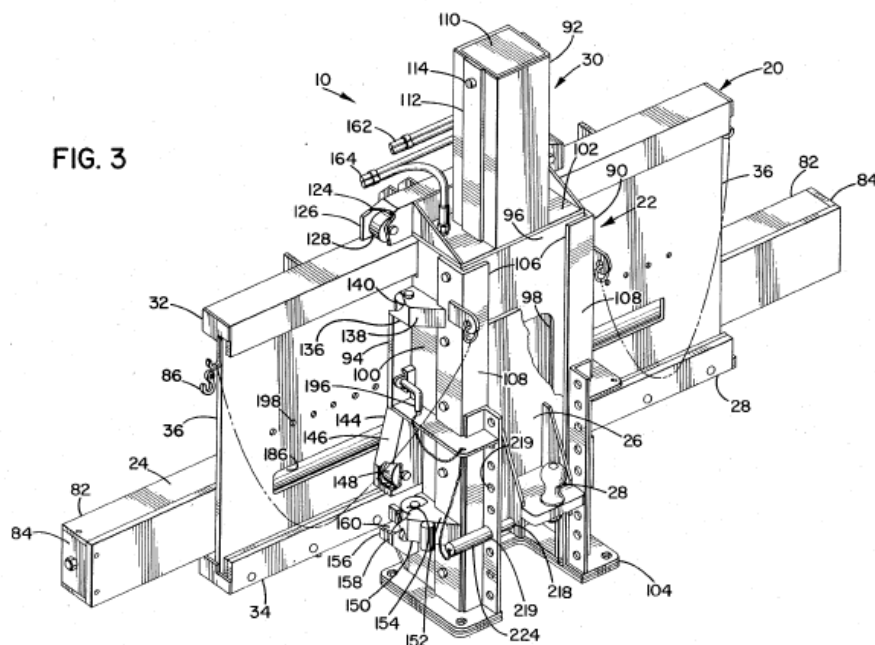
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

### 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question.

- a. 4,564,209 Trailer Hitch Assembly

This device uses rollers to assist in the linear motion of an arm relative to its supports.



### **3. Usefulness**

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

Rollers were added to the Husting hitch plow so that the plow legs could be moved up and down without getting stuck.

### **4. Public Disclosure**

This innovation may have been publicly disclosed; however, the innovator is unclear regarding the date and duration of public disclosure. According to the innovator, this device has not yet been used by CDOT employees. The date when the device was first built was not given. The innovator has shared information regarding this device with coworkers. No modifications have been made to this device since it was first built.

Information regarding this device has been shared with others which may be considered public disclosure depending on the circumstances in which the information was shared.

## Device Costs and Benefits

**Submission number:** 10

**Title of the Innovation:** Clutch Pedal Holder

**Innovator(s):** James Pickett

### Device Description

The clutch pedal holder is designed to keep the clutch pedal depressed. This allows adjustments to be made on the clutch with only one worker, removing the need for a second worker to depress the pedal.



#### 1. Usefulness

- This device was built so that one person could adjust the clutch without assistance on a large truck. It holds the clutch pedal down so that a second person does not need to sit in the truck and depress the clutch.
- It can also be used to hold down the brake pedal to check for fluid leaks and brake light operation.

#### 2. Ease of use

- This is a simple device that is intuitive to use.

### Manufacturability

This device is constructed of five machined and/or welded parts. It is simple and does not have any features that are difficult to manufacture.

### **Potential for Widespread Application**

1. Time to train operator
  - It would take less than 5 minutes to train an operator to use this device.
2. Reduction in time to complete task
  - This device makes a clutch adjustment or brake job a one person job.
3. Improvement in quality
  - This device does not affect the quality of the task.
4. Expected annual usage
  - This device could be used all year.
5. Units required
  - One device is required per mechanic.
6. Use in other states
  - All states that perform clutch or brake maintenance would benefit from this device.

### **Safety**

1. Improvement in safety
  - This device does not affect the safety of the mechanic doing the task.
2. Safety concerns due to use or misuse of the device
  - If the device is misaligned with steering wheel or pedal it could break free.
3. Safety concerns due to failure of the device
  - If bolt comes loose the device will collapse and release pedal.
  - The threads on the nut or on the threaded rod could wear and the device would not stay in the extended state.

### **Availability of Similar Equipment for Purchase**

The prior art search did not find commercially available devices that perform this task.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful and may not be considered non-obvious depending on the Patent Examiner's evaluation.
2. Patent infringement
  - Quite a few patents were found for devices that perform the same task. None of these devices were identical to the submitted device so are listed in the category of possible non-obviousness.

## Clutch Pedal Holder User Manual



### Device Description


The clutch pedal holder is designed to keep the clutch pedal depressed. This allows adjustments to be made on the clutch with only one worker, removing the need for a second worker to depress the pedal.

### Operating Instructions

1. Pull the bolt away from the threaded rod to release the nut and allow the threaded rod to travel into or out of the main tube.
2. Place the angle iron at the end of the threaded rod against the bottom of the steering wheel.
3. Place the other angle iron against the clutch pedal.
4. Press down the clutch pedal and extend the pedal holder to follow.
5. Press the bolt towards the threaded rod, engaging the nut and locking the pedal holder in position.
6. Gently shake the holder to ensure that the nut is fully engaged and the threaded rod is held securely in position.
7. When finished, reverse the engaging procedure.

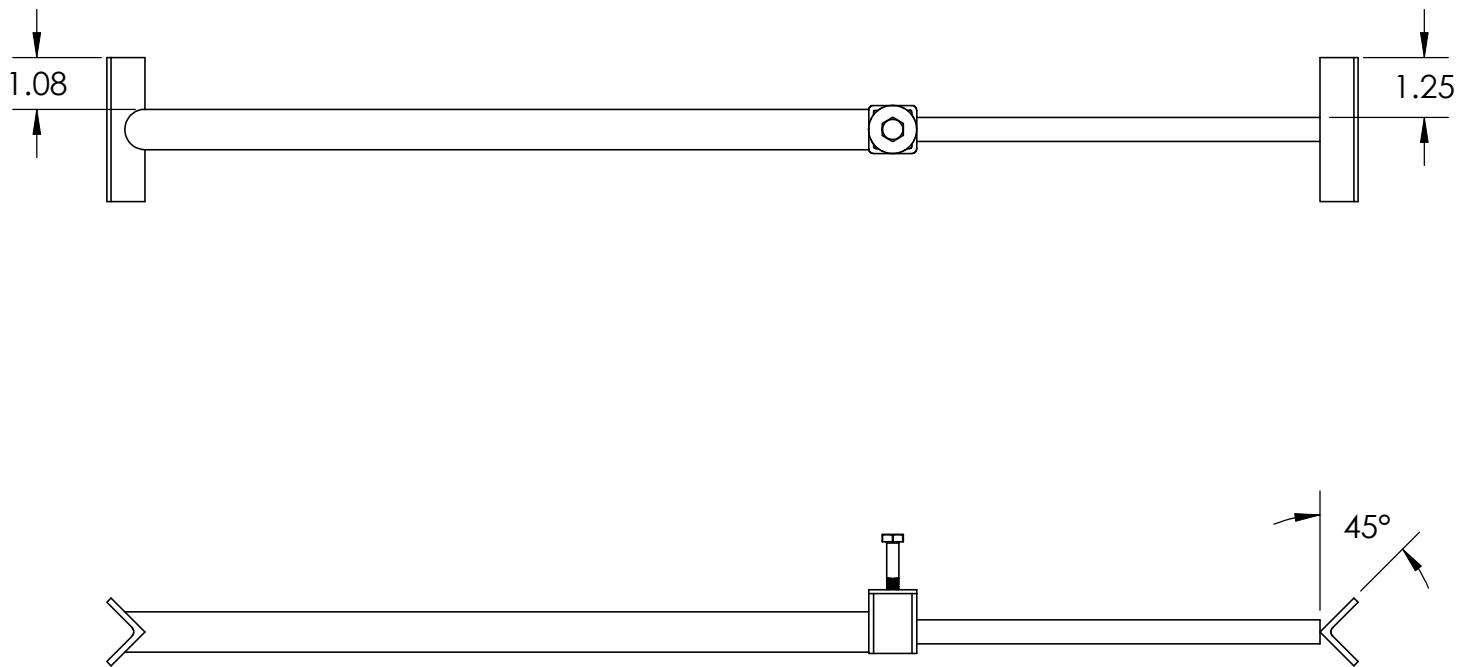
Innovator(s): James Pickett

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT10030402	ANGLE, END	2
2	CDOT10010401	TUBING, BODY	1
3	CDOT10020401	HOUSING, LOCK	1
4	90499A033	NUT, MCMASTER 90499A033	1
5	STOCK01	ROD, THREADED	1
6	STOCK02	WASHER, FENDER	1
7	91247A546	BOLT, MCMASTER 91247A546	1

INTERPRET DRAWING PER ASME Y14.5 2009	UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES	DATE	NAME	TITLE	
MATERIAL: <b>SEE PART DRAWINGS</b>	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	INVENTOR	J.PICKETT	<b>ASSEMBLY, FULL</b>	
PROJECTION: 	X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°	DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
<b>DO NOT SCALE DRAWING</b>		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		<b>CDOT10xx04</b>	<b>A</b>
				SIZE: <b>A</b>	SCALE: 1:4
				SHEET 1 OF 2	

NOTES:

1. ALL JOINTS ARE FULLY WELDED
2. THE MODIFIED NUT IS WELDED TO THE BOLT AFTER THE WASHER IS PLACED ON THE BOLT. THIS ASSEMBLY IS THEN PLACED INTO THE LOCK HOUSING AND THE WASHER IS TACKED ONTO THE HOUSING.

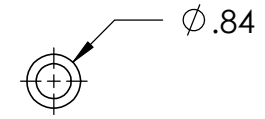
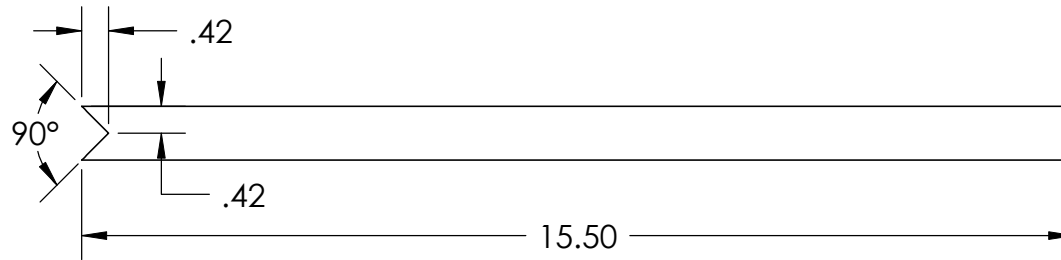


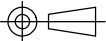
TITLE		
ASSEMBLY, FULL		
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NOTES:

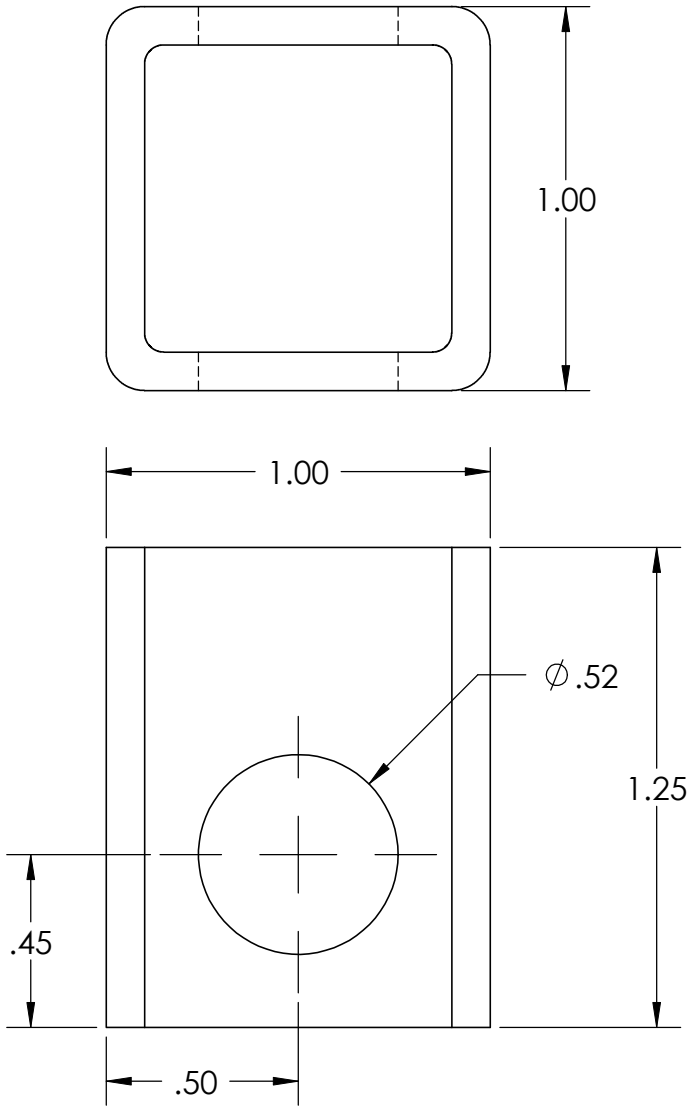
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2. MATERIAL STOCK IS STANDARD TUBING WITH MINIMUM ID OF 0.55"

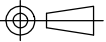


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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		J.PICKETT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.005 X.XXX= ± 0.002 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PART NUMBER					
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				REV					
				A					

NOTES:

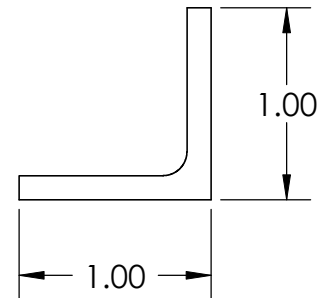
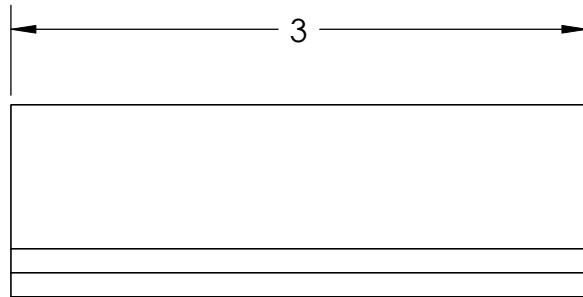
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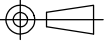


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	J.PICKETT	<b>HOUSING, LOCK</b>
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.005 X.XXX= ± 0.002 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT10020401		SIZE: <b>A</b>	SCALE: 2:1
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						REV <b>A</b>	

NOTES:

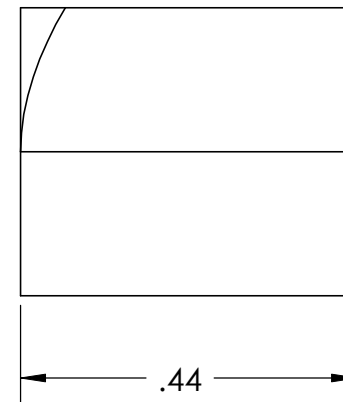
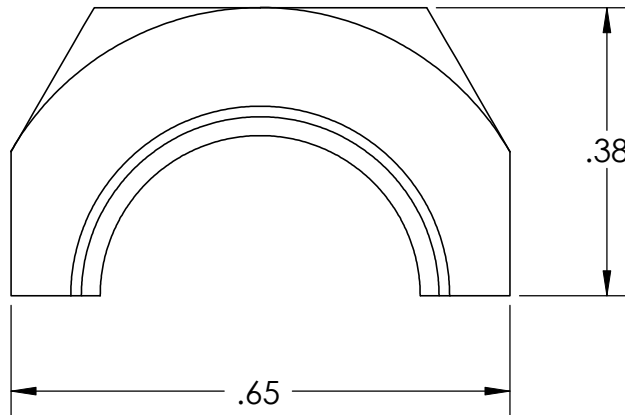
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2. MATERIAL STOCK IS STANDARD STEEL ANGLE

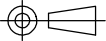


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	J.PICKETT	ANGLE, END
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.005 X.XXX= ± 0.002 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT10030402		SIZE: A	A
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NOTES:

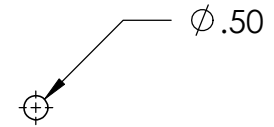
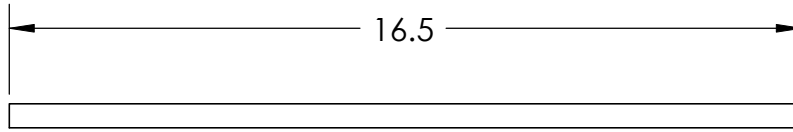
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2. MATERIAL STOCK IS STANDARD 0.75" NUT

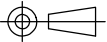


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>NUT, MCMMASTER 90499A033</b>	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	J.PICKETT	DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.02 ANGLES= ±		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
DO NOT SCALE DRAWING							SIZE: <b>A</b>	SCALE: 4:1	SHEET 1 OF 1

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD THREADED ROD, 0.5"-13 ALONG ENTIRE LENGTH



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		J.PICKETT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER	
								REV	
								A	
				SIZE: A		SCALE: 1:4		SHEET 1 OF 1	

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Clutch Pedal Holder

**Innovator(s):** James Pickett

**Summary:** Quite a few patents were found for devices that perform the same task. None of these devices were identical to the submitted device so are listed in the category of possible non-obviousness. Commercially available products that perform the same task were not found.

### ***Prior Art Search***

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: clutch & pedal, clutch & adjustment, clutch & tool

Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |  |
|-------------|------|--|
| • 4,186,595 | 1980 | Brake Testing Apparatus  |
| • 4,424,723 | 1984 | Portable Hand Control Apparatus  |
| • 4,696,172 | 1987 | Anti-Theft Device for Road Vehicles  |
| • 4,788,879 | 1988 | Apparatus for Hand Operation of Throttle and Brake Pedal, and Methods of Constructing and Utilizing Same |

- 5,012,689     1991   Vehicle Foot Pedal Actuator Apparatus and Method
- 5,119,688     1992   Portable Device for the Hand Operation of a Motor Vehicle Accelerator Pedal
- 5,201,488     1993   Telescoping Tubular Body
- 5,299,668     1994   Assembly for Depressing a Vehicle Pedal for Bleeding Brakes
- 5,417,127     1995   Adjustable Device for Depressing a Vehicle Pedal to a Predetermined Setting
- 6,131,712     2000   Brake Pedal Actuator for Bleeding Brakes
- 6,279,418     2001   Clutch Depressing Tool

## **2. Existing Product Search**

Similar products were searched but not found using [www.google.com](http://www.google.com)

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### **1. Evaluation of Novelty**

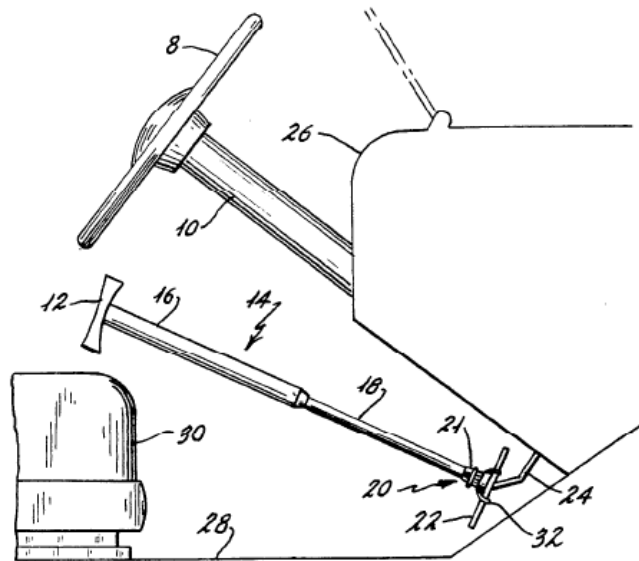
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

### **2. Evaluation of Non-obviousness**

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

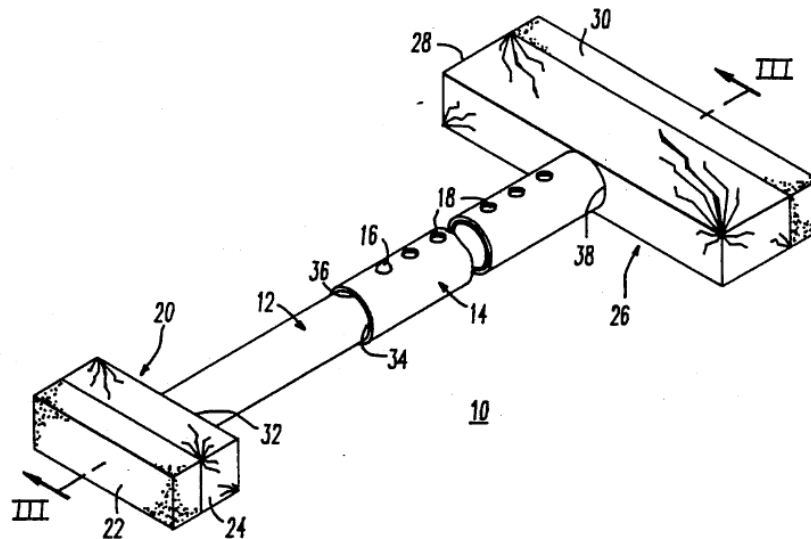
- a. 5,119,688 Portable Device for the Hand Operation of a Motor Vehicle Accelerator Pedal

This device uses a telescoping rod to reach the accelerator pedal.



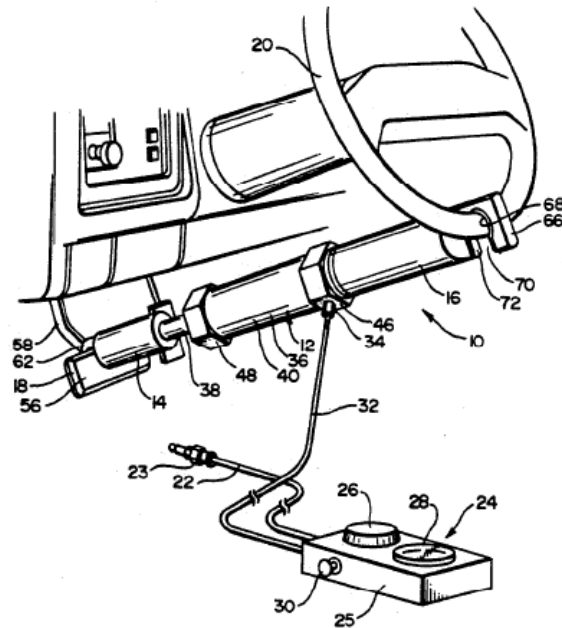
- b. 5,201,488 Telescoping Tubular Body

This device is a telescoping rod with broad claims. It uses a pin in a hole in the tube instead of a clamp piece for adjusting the length of the rods.

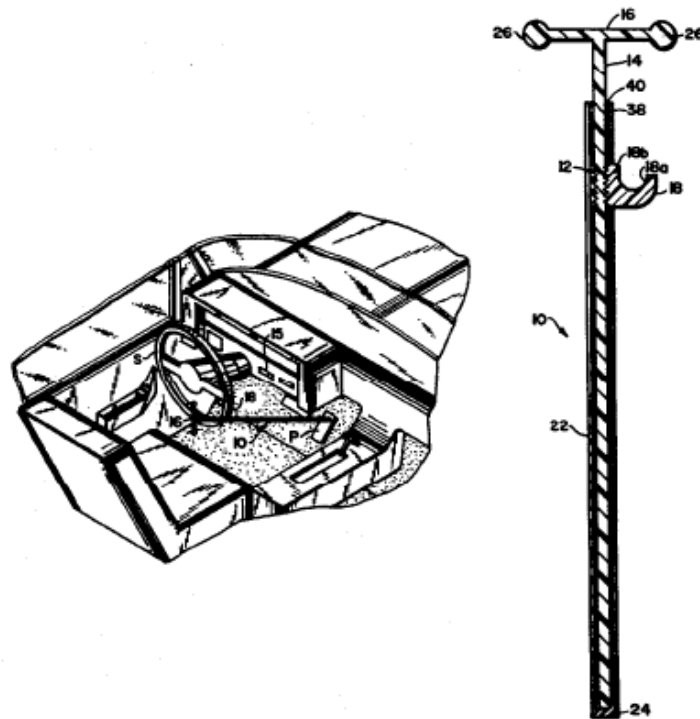




- c. 5,299,668 Assembly for Depressing a Vehicle Pedal for Bleeding Brakes  
This device attaches to the steering wheel and pushes on the brake pedal but is controlled by a pneumatic cylinder.

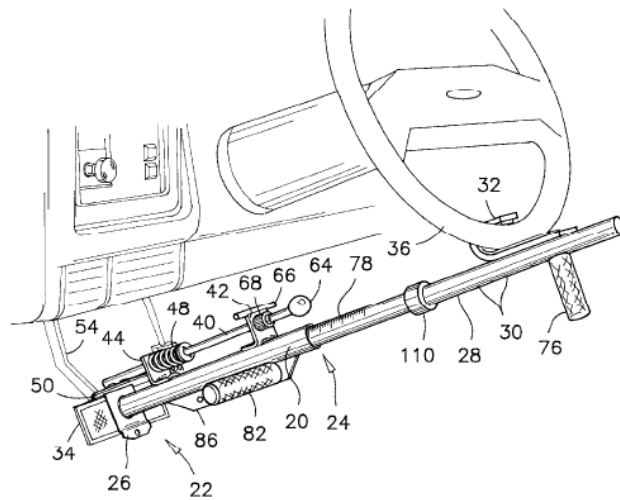


- d. 5,417,127 Adjustable Device for Depressing a Vehicle Pedal to a Predetermined Setting  
This device is pressed between the pedal and the steering wheel but uses a threaded rod to adjust the overall length.



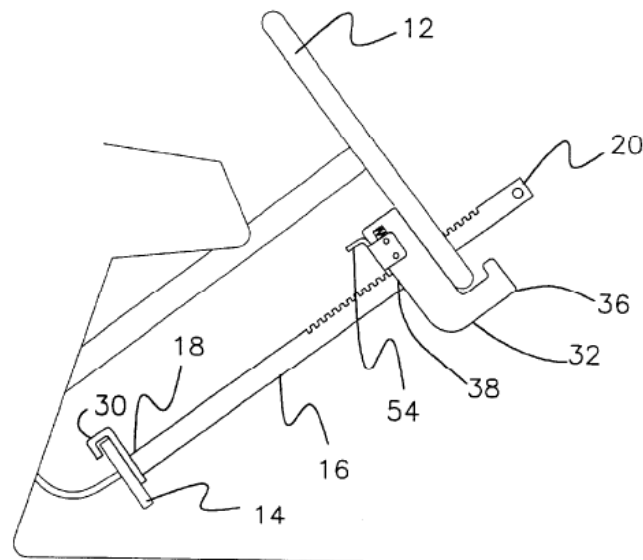
e. 6,131,712 Brake Pedal Actuator for Bleeding Brakes

This device mounts between the steering wheel and the brake pedal. It uses a locking sleeve to lock the two rods together.



f. 6,279,418 Clutch Depressing Tool

This device hooks over the clutch pedal and pushes on the steering wheel. A spring loaded pawl locks into notches.



### **3. Usefulness**

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

This device was built so that one person could adjust the clutch without assistance on a large truck. It holds the clutch pedal down so that a second person does not need to sit in the truck and depress the clutch. It can also be used to hold down the brake pedal to check for fluid leaks and brake light operation.

### **4. Public Disclosure**

According to the innovator, this device has not yet been used by CDOT employees. The date when the device was first built was not given. The innovator has shared information regarding this device with coworkers. No modifications have been made to this device since it was first built.

Information regarding this device has been shared with others which may be considered public disclosure depending on the circumstances in which the information was shared.

## Device Costs and Benefits

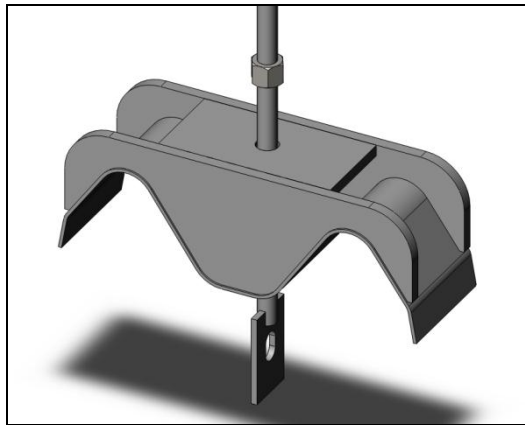
**Submission number:** 11

**Title of the Innovation:** McCoy Guardrail Alignment Tool

**Innovator(s):** Harry MacFarland, Chad Wood

### Device Description

The guardrail alignment tool is designed to aid in the assembly or re-assembly of guardrail sections that have been bent out of shape or are otherwise out of alignment. It replaces the need for hammers and punches in the process of aligning the bolt holes between guardrail sections.



#### 1. Usefulness

- The device uses a new guardrail piece cut to size and pulls the two pieces of rail together, allowing the user to line up most bolt holes with minimal effort. The device eliminates the use of hammers and punches. As the device pulls the two overlapping pieces of guardrail together against the new piece of guardrail it reshapes the pieces if they have flattened out.
- This device could be modified to fit any shape of guardrail.

#### 2. Ease of use

- This device is intuitive and easy to use.

### Manufacturability

This device is constructed of four machined and/or welded parts. It is simple and does not have any features that are difficult to manufacture.

### Potential for Widespread Application

#### 1. Time to train operator

- It would take less than 20 minutes to train an operator to use this tool.

2. Reduction in time
  - This device reduces the time required because it easily pulls the guardrail together and aligns the holes.
  - It can reduce the amount of time to align the two guardrail segments by up to 50% depending on how out of alignment they are.
3. Improvement in quality
  - This device has no effect on the quality of the finished task.
4. Expected annual usage
  - This device could be used year round.
5. Number of devices required
  - One device is required per patrol.
6. Use in other states
  - All states that repair guardrails would benefit from this device.

### **Safety**

1. Improvement in safety
  - This device greatly reduces the chances of getting cut, pinched, hit by a hammer or chip metal flying when forcing the two pieces of guardrail together and aligning the bolt holes. The device was made after an employee was injured on the job.
2. Safety concerns due to use or misuse of the device
  - Could pinch fingers between rails or between rail and device.
3. Safety concerns due to failure of the device
  - If the rod flange breaks off the tension shaft then the rails spring open and the device would move towards the operator at a potentially harmful speed.

### **Availability of Similar Equipment for Purchase**

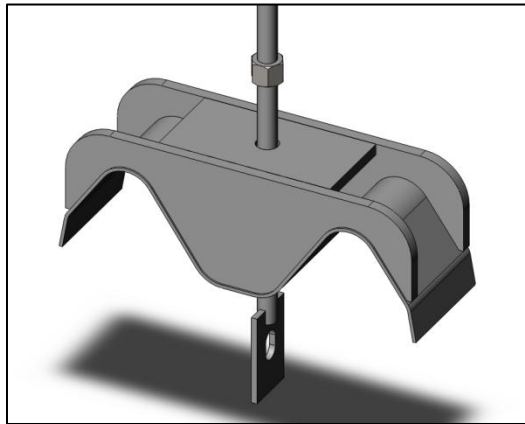
The prior art search did not find a commercially available product to accomplish the same task.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious depending on the Patent Examiner's evaluation.
  - This device has been used by others which may be considered public disclosure depending on the circumstances of use.
2. Patent infringement
  - Only one patent was found for a similar device that could be a possible argument for obviousness.

## Guardrail Alignment Tool User Manual

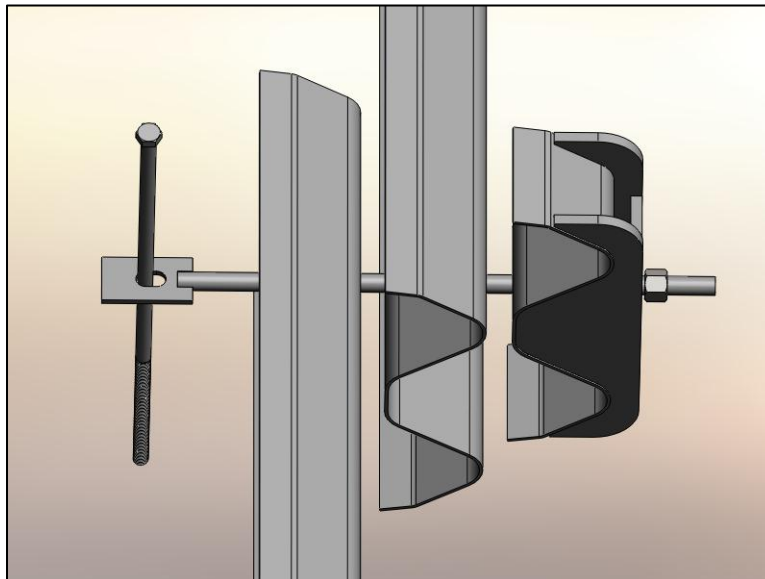


### Device Description

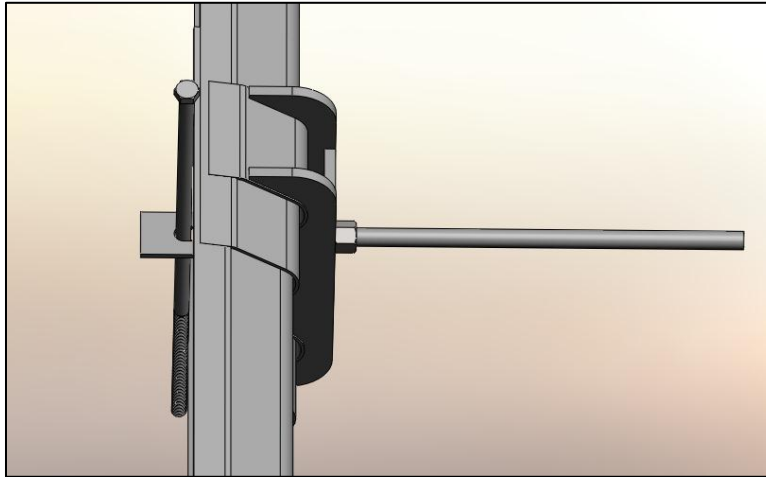
The guardrail alignment tool is designed to aid in the assembly or re-assembly of guardrail sections that have been bent out of shape or are otherwise out of alignment. It replaces the need for hammers and punches in the process of aligning the bolt holes between guardrail sections.

### Operating Instructions

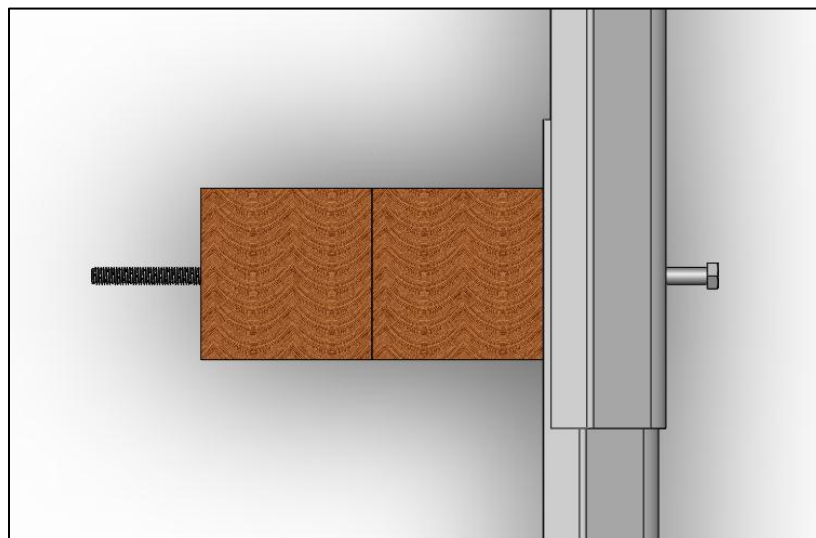
1. Loosen the nut along the tension shaft sufficiently to allow the rod flange to pass through the rail sections to be aligned.
2. Place the rod through the guardrail sections, and insert the 18 inch button head post bolt through the eye in the rod flange.



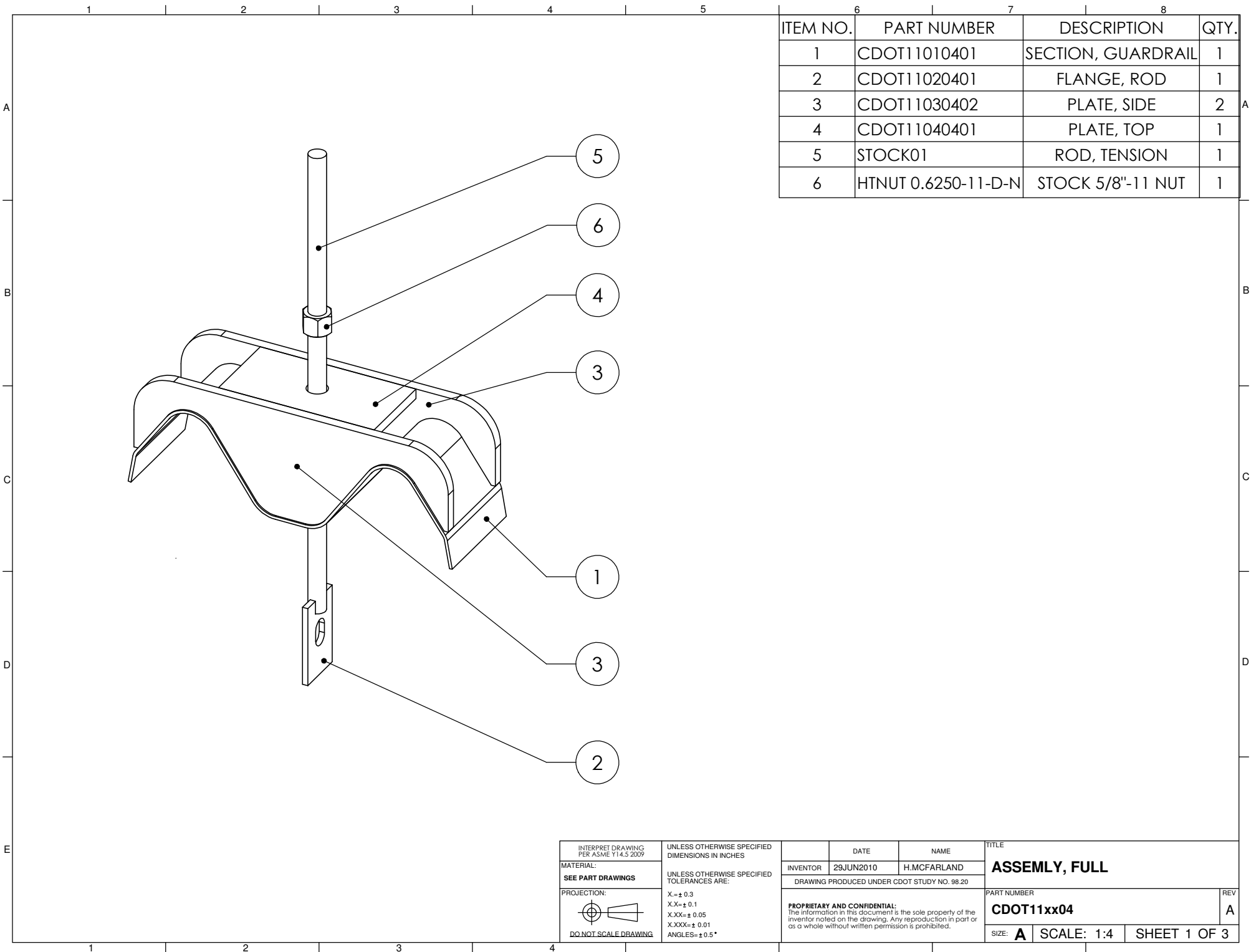
3. Tighten the nut until the guardrail is aligned as needed.



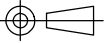
4. Bolt the sections of guardrail together, then remove the alignment tool.
5. After the rail sections are aligned and the rail face button head bolts are secure, assemble the post/block/rail assembly by inserting the 18 inch button head post bolt through all elements and tighten.



6. Store the alignment tool with the nut on the rod to ensure no parts are lost.

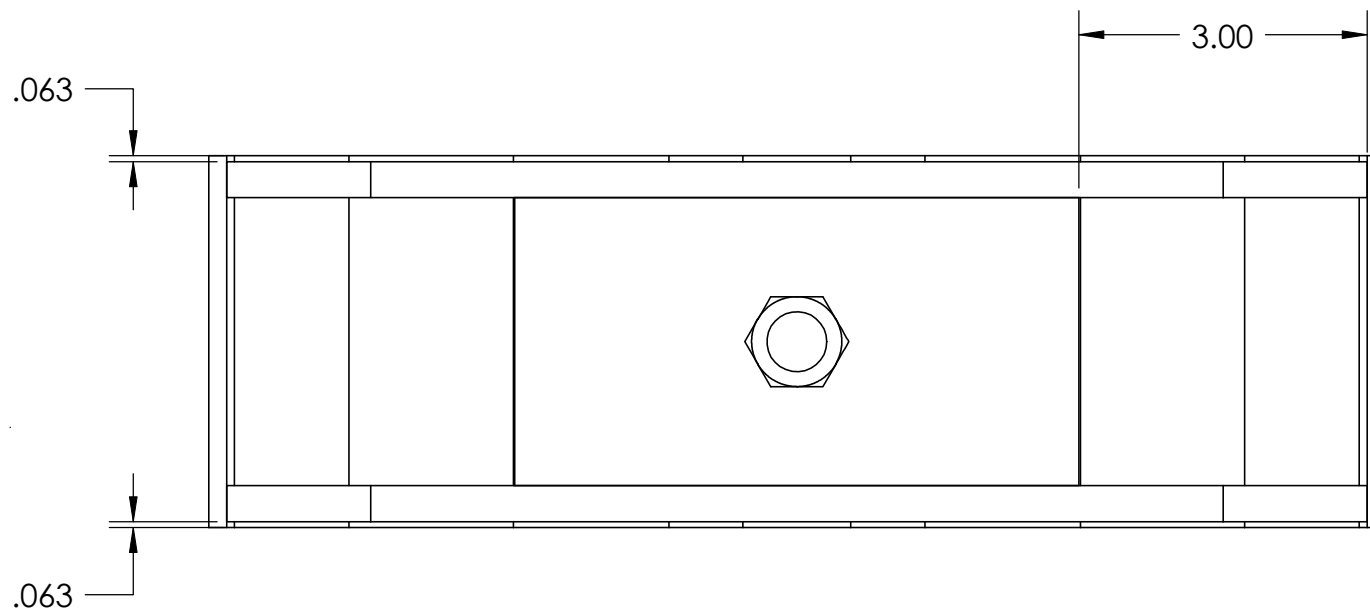


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT11010401	SECTION, GUARDRAIL	1
2	CDOT11020401	FLANGE, ROD	1
3	CDOT11030402	PLATE, SIDE	2
4	CDOT11040401	PLATE, TOP	1
5	STOCK01	ROD, TENSION	1
6	HTNUT 0.6250-11-D-N	STOCK 5/8"-11 NUT	1

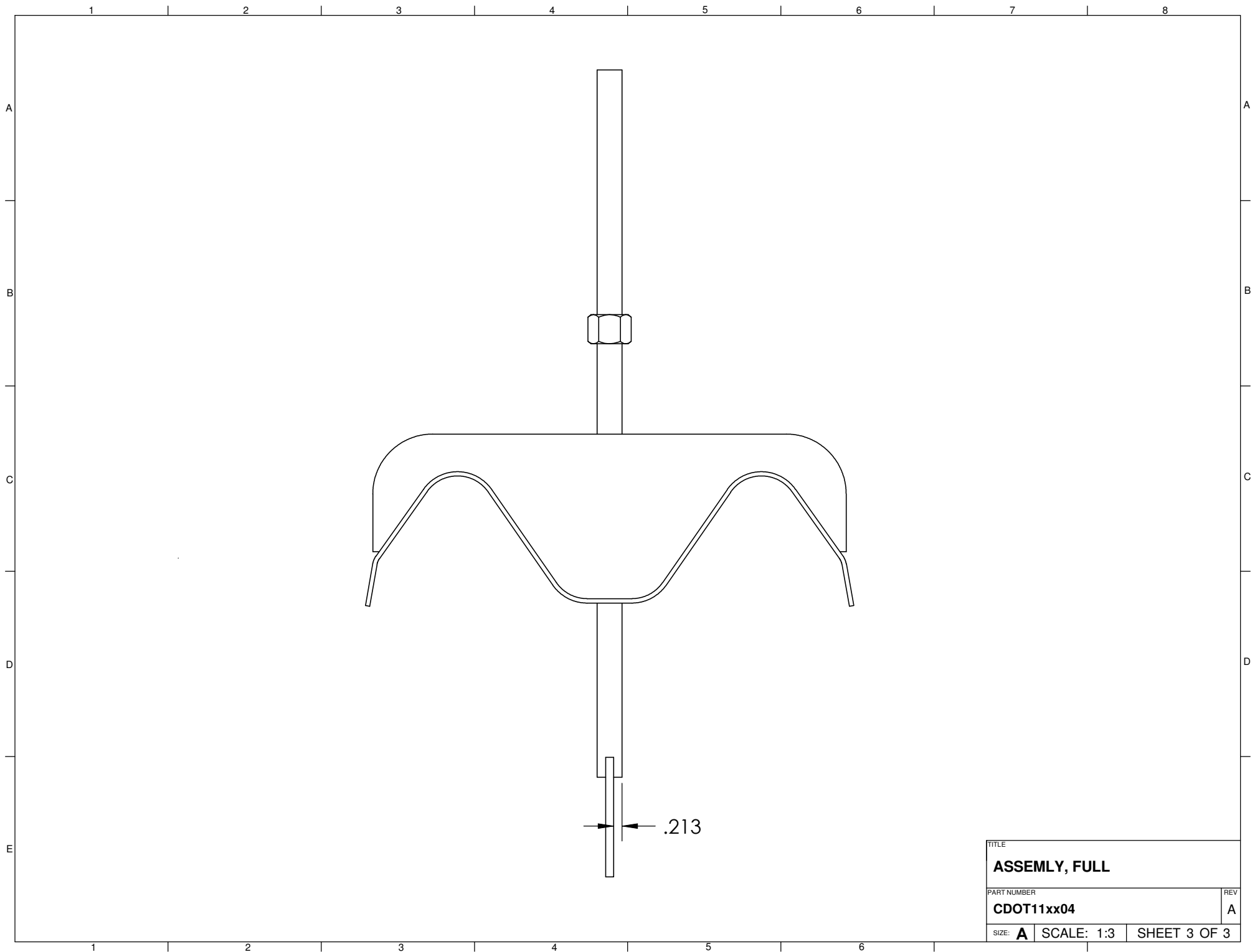
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MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR 29JUN2010 H.MCFARLAND	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER	
				CDOT11xx04	
				SIZE: A	SCALE: 1:4 SHEET 1 OF 3
				REV	A



NOTES:  
1. ALL JOINTS ARE FULLY WELDED



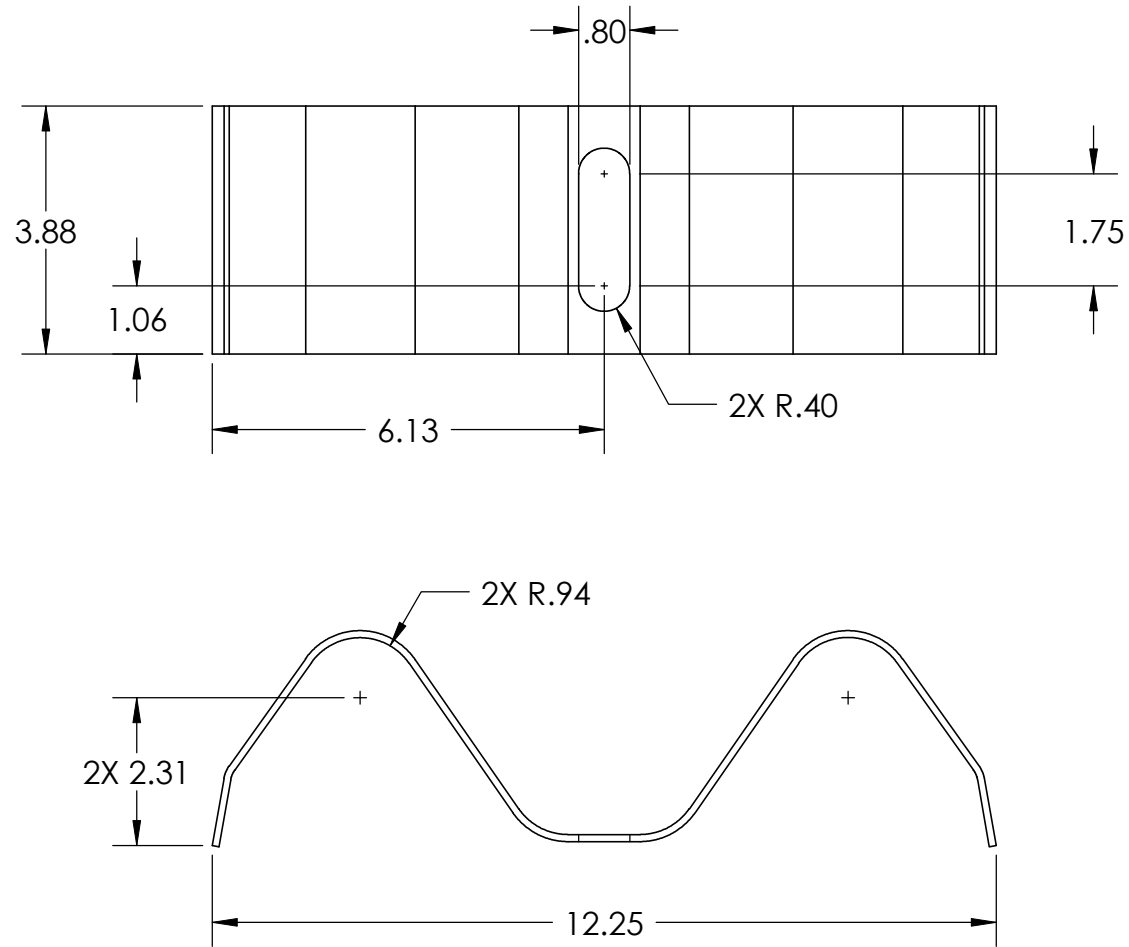
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ASSEMBLY, FULL		
PART NUMBER		REV
CDOT11xx04		A
SIZE: A	SCALE: 1:2	SHEET 2 OF 3




TITLE		
ASSEMBLY, FULL		
PART NUMBER	REV	
CDOT11xx04	A	
SIZE: A	SCALE: 1:3	SHEET 3 OF 3

NOTES:

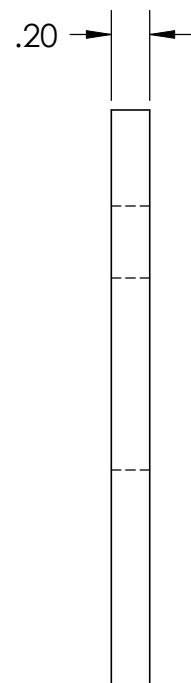
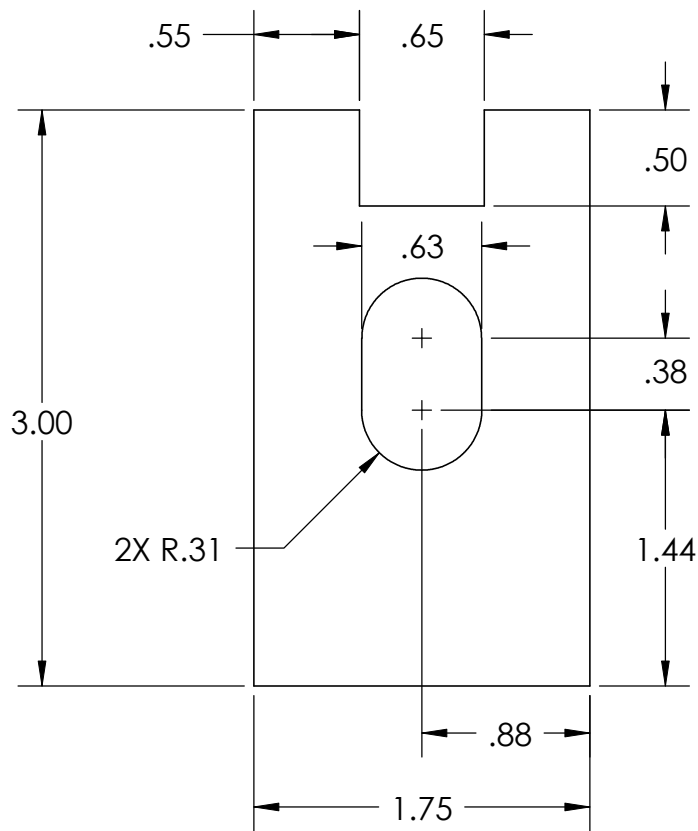
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD GUARDRAIL WHICH MEETS AASHTO M-180 STANDARD, TYPE RWM02A

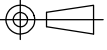


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE			
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		H.MCFARLAND		SECTION, GUARDRAIL			
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		29JUN2010		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER		REV	
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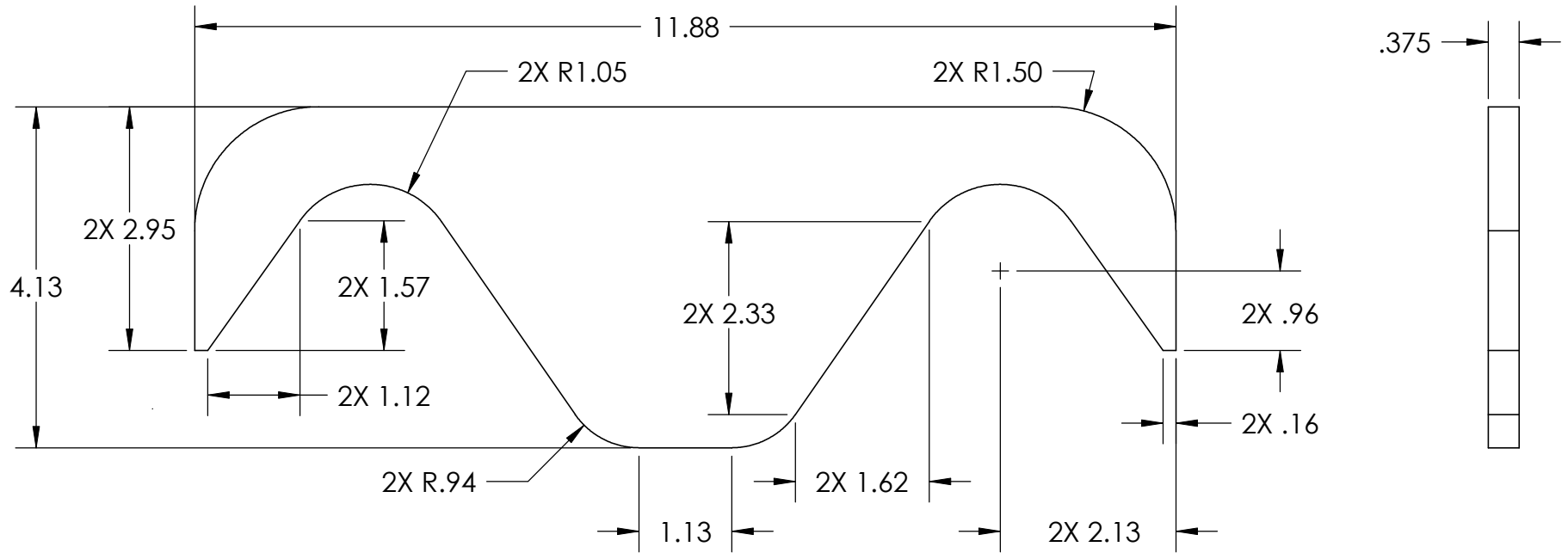
1. REMOVE ALL BURRS AND SHARP EDGES

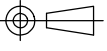


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MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR 29JUN2010 H.MCFARLAND	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER <b>CDOT11020401</b>	
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				REV <b>A</b>	

NOTES:

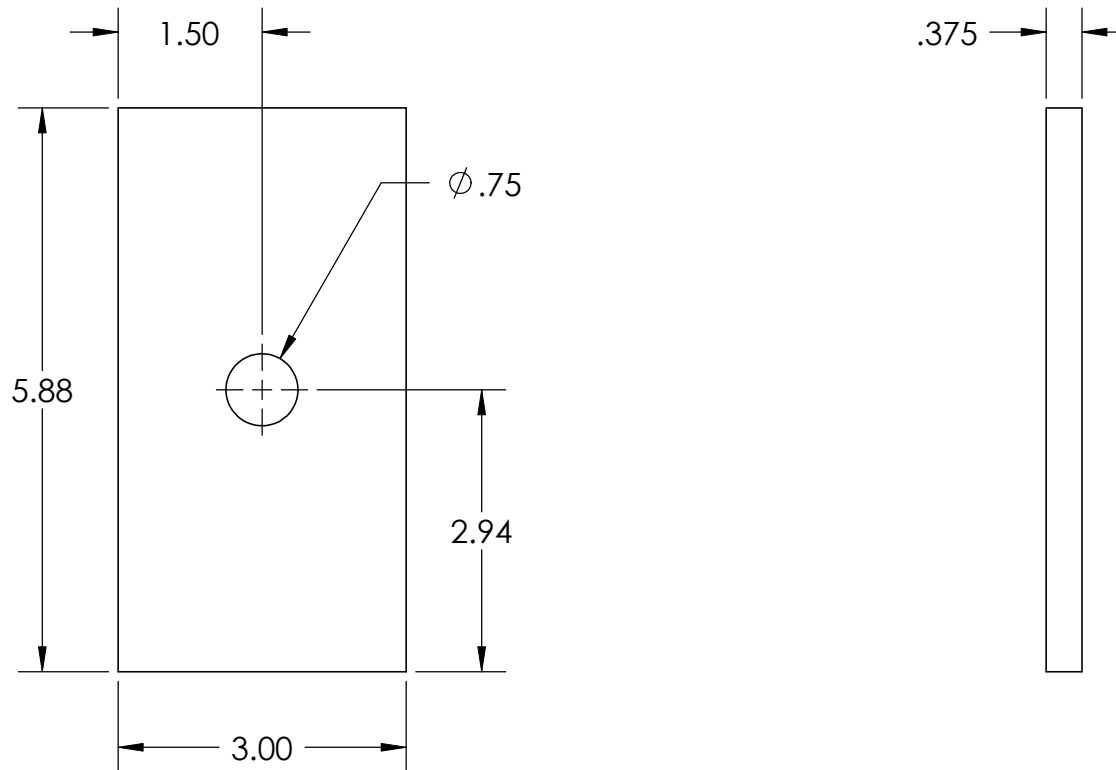
1. REMOVE ALL BURRS AND SHARP EDGES
2. BOTTOM CURVE IS CUT TO FIT STANDARD GUARDRAIL TYPE RWM02A




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		H.MCFARLAND		<b>PLATE, SIDE</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT11030402	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: <b>A</b>		SCALE: 1:2	
						SHEET 1 OF 1		REV <b>A</b>	

NOTES:

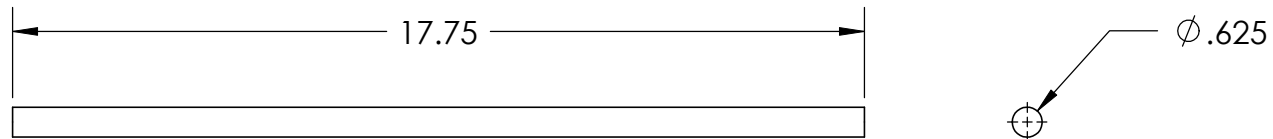
1. REMOVE ALL BURRS AND SHARP EDGES

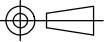


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	20JUN2010	H.MCFARLAND		PLATE, TOP	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT11040401		REV	
						SIZE: A		SCALE: 1:2	
								SHEET 1 OF 1	
								A	

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL IS STOCK THREADED ROD, 5/8"-11 ALONG ENTIRE LENGTH



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	29JUN2010	H.MCFARLAND	<b>ROD, TENSION</b>
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			<b>STOCK01</b>
				SIZE: <b>A</b>			SCALE: 1:4
							SHEET 1 OF 1
							REV <b>A</b>

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** McCoy Guardrail Alignment Tool

**Innovator(s):** Harry McFarland, Chad Wood

**Summary:** Only one patent was found for a similar device that could be a possible argument for obviousness. No commercially available products were found that accomplish the same task.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: guard rail & tool, guard rail & alignment, guard rail & McCoy, rail & tool, rail & alignment, guardrail & tool, guardrail & alignment

Field of search: title, abstract

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |  |
|-------------|------|--|
| • 6,925,697 | 2005 | Guard Rail Tool  |
| • 5,575,416 | 1996 | Device for Aligning and Retaining Two Rails Whose Ends are to be Welded Together |
| • 4,763,835 | 1988 | Rail Connecting and Alignment Device   |
| • 4,074,898 | 1978 | Metal Beam Guard Rail Assembling Clamp   |



## 2. Existing Product Search

Similar products were searched but not found using [www.google.com](http://www.google.com)

### ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

#### **1. Evaluation of Novelty**

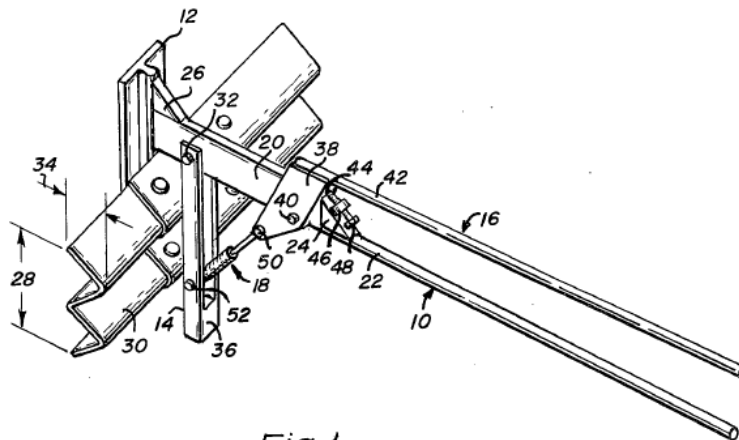
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

#### **2. Evaluation of Non-obviousness**

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

##### **a. 4,074,898 Metal Beam Guard Rail Assembling Clamp**

This device is clamps the two guardrails together but does not interface with the guard rail post.



*Fig. 1*

### **3. Usefulness**

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

The device uses a new guardrail piece cut to size and pulls the two pieces of rail together, allowing the user to line up most bolt holes with minimal effort. The device eliminates the use of hammers and punches. As the device pulls the two overlapping pieces of guardrail together against the new piece of guardrail it reshapes the pieces if they have flattened out.

### **4. Public Disclosure**

According to the innovator, all of Region 5 is using this device and it has been given to Region 3. The date when the device was first built was not given. The innovators have shared information regarding this device with many people. The existing device is the original version.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

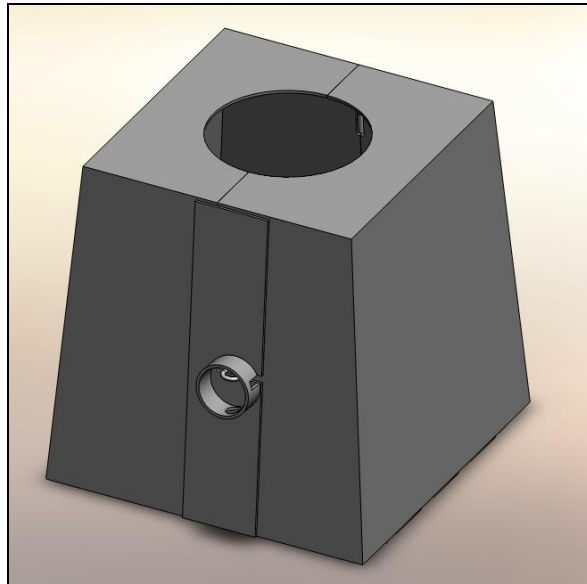
**Submission number:** 13

**Title of the Innovation:** Theft Deterrent Box

**Innovator(s):** Bradley Bauer, Mark Pennington

### Device Description

The theft deterrent box is designed to protect light pole pedestal boxes from copper theft. By covering the pedestal box with a solid steel shroud, the light pole wiring is effectively protected from theft.



#### 1. Usefulness

- This box is designed to be an external steel cover over the existing light pole base. The purpose of the box is to secure the copper wiring inside the base from copper thieves. The current light pole bases do not adequately secure the wiring because the access panel is easily removed or broken thereby exposing the wiring.

#### 2. Ease of use

- This box is installed once and then unlocked and opened to gain access to the wiring when needed.

### Manufacturability

This device is constructed of four machined and/or welded parts. It is simple and does not have any features that are difficult to manufacture.

## **Potential for Widespread Application**

1. Time to train operator
  - It would take approximately ten minutes to train an operator to install this device.
2. Reduction in time
  - Replacing wires could take hours to feed through the conduit. Prevention of theft of wires results in a significant time and cost savings.
3. Improvement in quality
  - This device is stronger and more secure than the existing pole base.
  - It can withstand severe punishment from thieves and vehicles.
4. Expected annual usage
  - This device is installed on the streetlight and is left there all year round.
  - This device could be installed anytime during the year.
5. Units required
  - A single device is installed on each streetlight.
  - Several hundred thousand of these devices would be needed in Colorado to protect against wire theft.
6. Use in other states
  - Other state DOTs could also use this device because copper theft has become a problem all over the country.

## **Safety**

1. Improvement in safety
  - By preventing theft, safety is improved because replacement of stolen wires is not required.
2. Safety concerns due to use or misuse of the device
  - Pinching could occur during closing.
  - The device may be heavy, though one person could lift it.
3. Safety concerns due to failure of the device
  - There are no identifiable safety concerns due to the failure of this device.

## **Availability of Similar Equipment for Purchase**

The prior art search did not find similar commercially available products.

## **Patent Information**

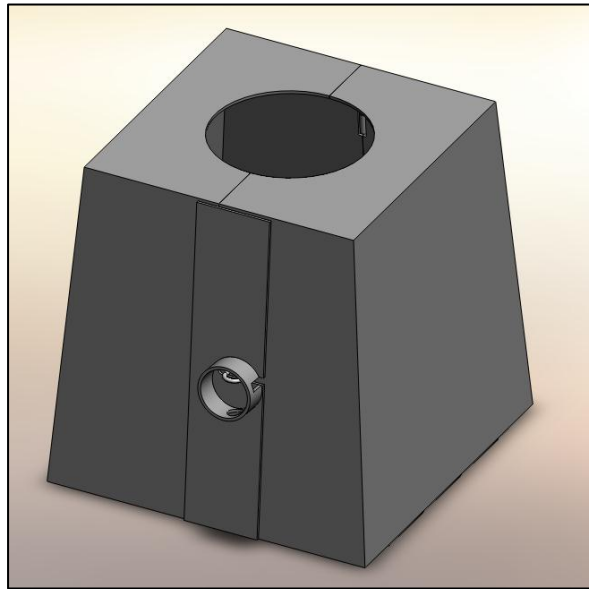
(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel, non-obvious, and useful but in the patent examiner's evaluation.
  - According to the innovator, this innovation was publicly disclosed in its current form in November 2008.

## 2. Patent infringement

- The prior art search did not find similar devices.

## Theft Deterrent Box User Manual

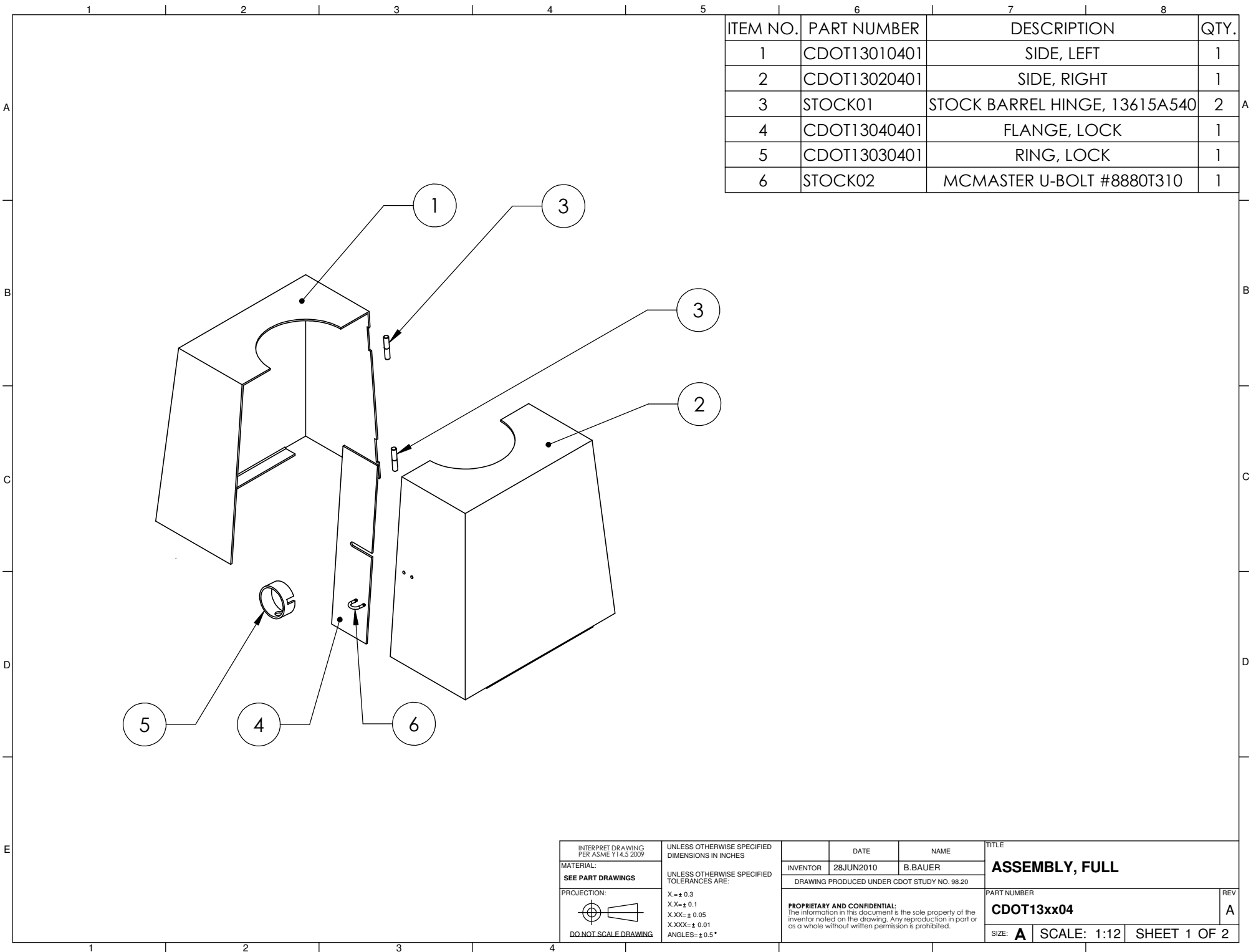


### Device Description

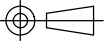
The theft deterrent box is designed to protect light pole pedestal boxes from copper theft. By covering the pedestal box with a solid steel shroud, the light pole wiring is effectively protected from theft.

### Installation Instructions

1. Clear the ground around the light pole pedestal box of any debris or obstructions.
2. Open the theft deterrent box and place around the light pole pedestal box.
3. Close the theft deterrent box around the pedestal box, ensuring that the tabs on the bottom of the theft deterrent box slide underneath the pedestal box.
4. Place the hidden shackle padlock (Master 6270) into the lock ring and over the u-bolt.
5. Insert the padlock's tumbler and shackle into the padlock, lock, and remove the key.

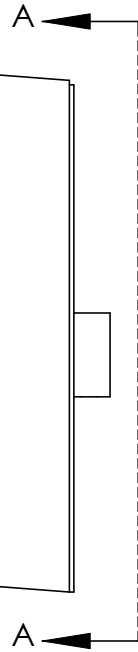


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
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2	CDOT13020401	SIDE, RIGHT	1
3	STOCK01	STOCK BARREL HINGE, 13615A540	2
4	CDOT13040401	FLANGE, LOCK	1
5	CDOT13030401	RING, LOCK	1
6	STOCK02	MCMASTER U-BOLT #8880T310	1

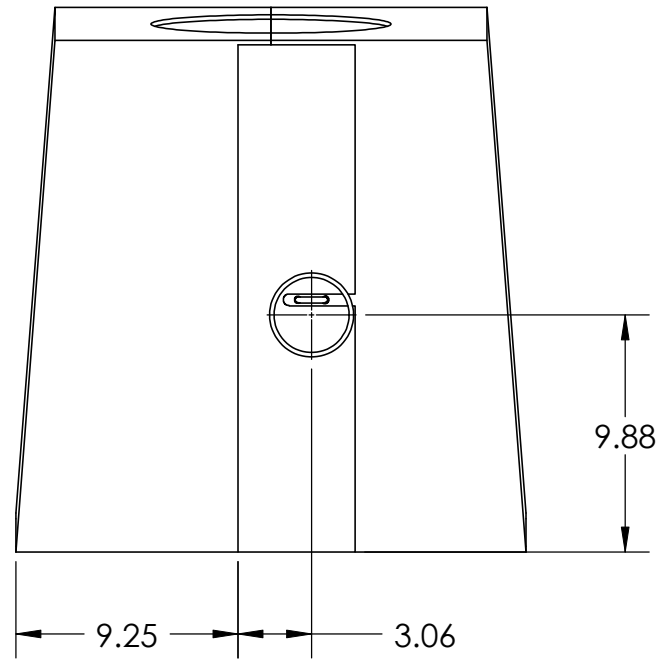
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MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		28JUN2010		B.BAUER	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT13xx04	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:12	
						SHEET 1 OF 2		REV	
								A	

NOTES:

1. THE LOCK FLANGE IS FULLY WELDED TO THE LEFT SIDE OF THE BOX.
2. THE LOCK RING IS FULLY WELDED TO THE LOCK FLANGE.
3. THE U-BOLT IS WELDED IN PLACE TO THE RIGHT SIDE OF THE BOX. EXCESS BOLT THREADING IS CUT OFF ONCE WELDED IN PLACE.
4. THE BARRELL HINGES ARE FULLY WELDED TO THE RESPECTIVE SIDES THAT ALLOW THE BOX TO SWING OPEN FROM THE FRONT.



VIEW A-A

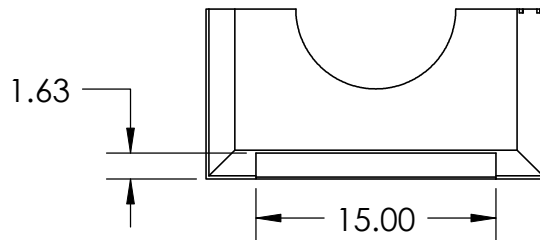
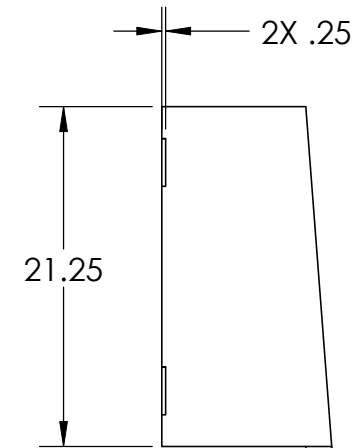
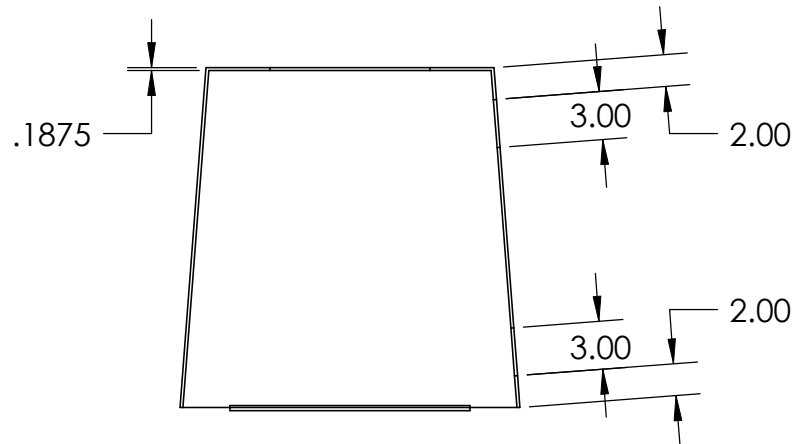
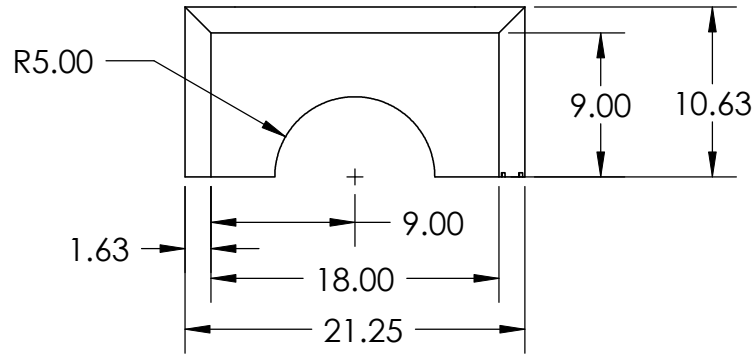


TITLE		
<b>ASSEMBLY, FULL</b>		
PART NUMBER		REV
<b>CDOT13xx04</b>		<b>A</b>
SIZE: <b>A</b>	SCALE: 1:8	SHEET 2 OF 2



NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL

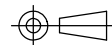


INTERPRET DRAWING  
PER ASME Y14.5 2009

MATERIAL:

STEEL

PROJECTION:



DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS IN INCHES

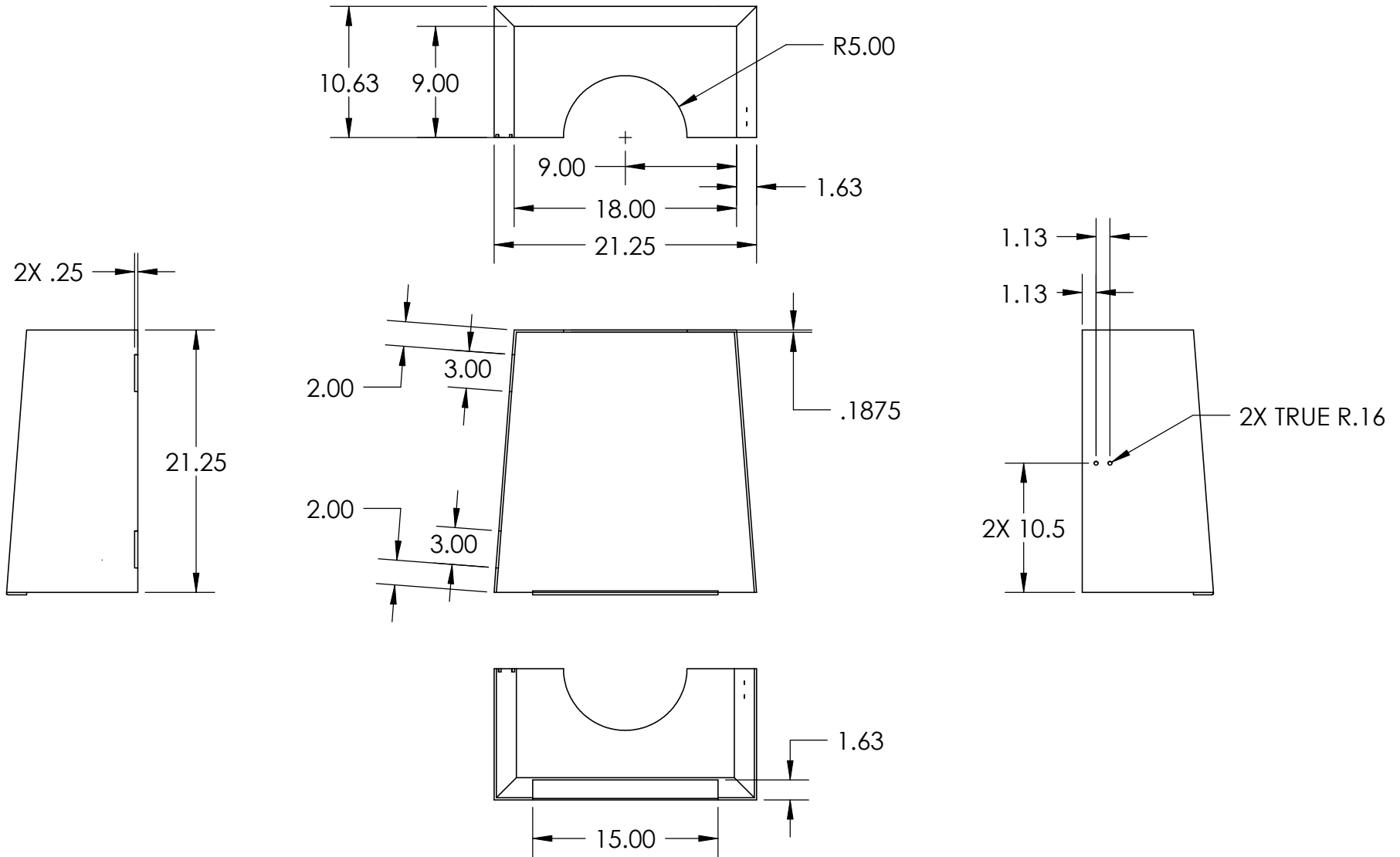
UNLESS OTHERWISE SPECIFIED  
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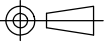
X = ± 0.3  
X.X = ± 0.1  
X.XX = ± 0.05  
X.XXX = ± 0.01  
ANGLES = ± 0.5°

INVENTOR	DATE	NAME	TITLE	
B.AUER	28JUN2010	B.AUER	SIDE, LEFT	
DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER	REV
<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			CDOT13010401	A
SIZE: A			SCALE: 1:12	SHEET 1 OF 1

NOTES:

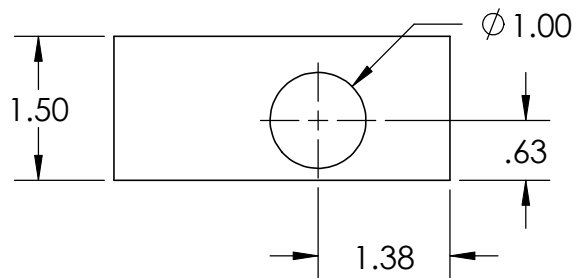
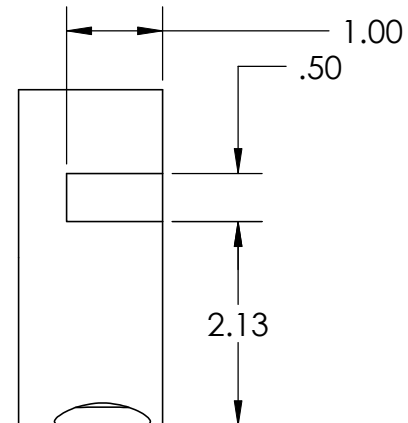
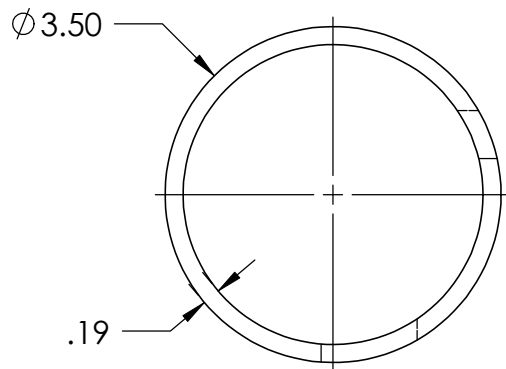
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL

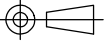


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		B.AUER		<b>SIDE, RIGHT</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT13020401	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: <b>A</b>		SCALE: 1:12	
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NOTES:

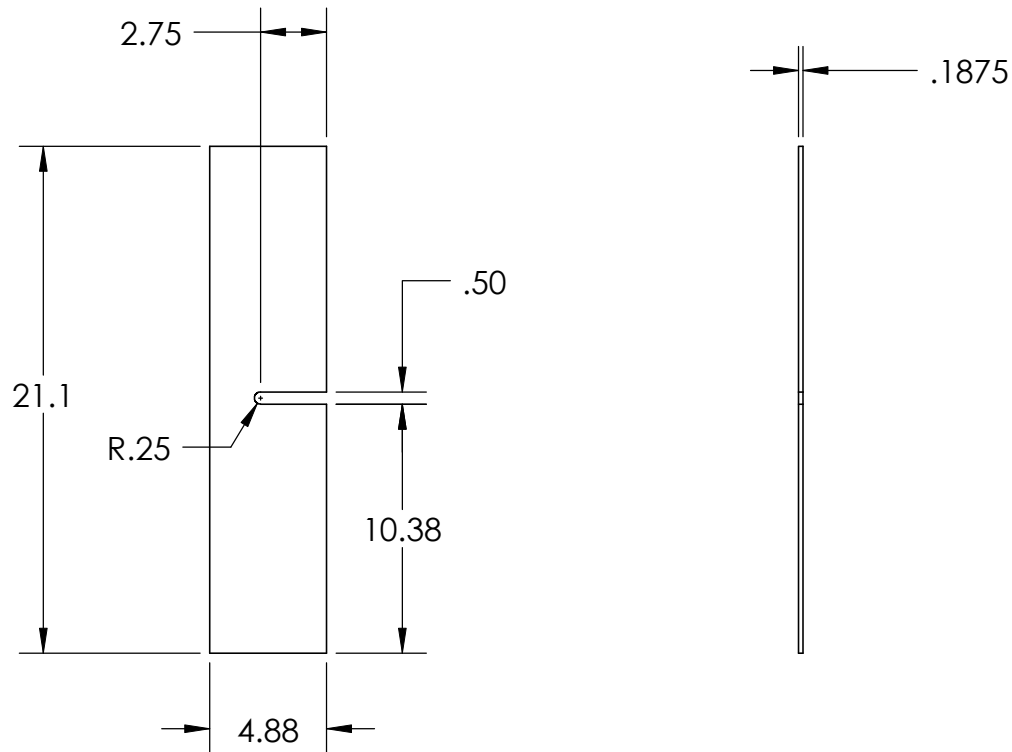
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBE STEEL




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		28JUN2010		B.BAUER	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT13030401	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: <b>A</b>		SCALE: 1:2	
						SHEET 1 OF 1		REV <b>A</b>	

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>FLANGE, LOCK</b>		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	28JUN2010	B.BAUER				
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT13040401</b>		REV <b>A</b>
				SIZE: <b>A</b>		SCALE: 1:8		SHEET 1 OF 1		

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Theft Deterrent Box

**Innovator(s):** Bradley Bauer, Mark Pennington

**Summary:** The prior art search did not find devices that were similar enough to this device to question novelty or non-obviousness.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: light pole & box, pole & box, pole & protection, pole & theft, theft & box, security & box

Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |   |
|-------------|------|---|
| • 4,914,258 | 1990 | Utility Pole Having an Access Opening Cover Over a Raised Perimeter Access Opening  |
| • 5,446,473 | 1995 | Vandalism-Resistant Antenna for Wire and Radio-Communicating Post Mounted Electronic Devices, Particularly Irrigation Controllers |
| • 5,483,019 | 1996 | Utility Structure Having a Utility Pole and a Closure Apparatus   |

- 5,581,958     1996   Pole and Cabinet Structure for Antenna Mounting at Communications Site
- 5,820,255     1998   Lighting Fixture Support Pole
- 5,870,910     1999   Lock-Down Security Box
- 6,905,024     2005   Anti-Theft Display Box Assembly

## **2. Existing Product Search**

Similar products were searched for but not found using [www.google.com](http://www.google.com)

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### **1. Evaluation of Novelty**

An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

### **2. Evaluation of Non-obviousness**

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. There are no patents from the list above that bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation.

### **3. Usefulness**

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

This device was built to deter theft of copper wires from light poles.

### **4. Public Disclosure**

According to the innovator, the first prototype of this device was built in November 2008. Information regarding this device has been shared with the Region 2 traffic engineer, superintendent, and foreman. Modifications have been made to the original design in the area of the hinges and the locking mechanism.

Information regarding this device has been shared with others which may be considered public disclosure depending on the circumstances in which the information was shared.

## Device Costs and Benefits

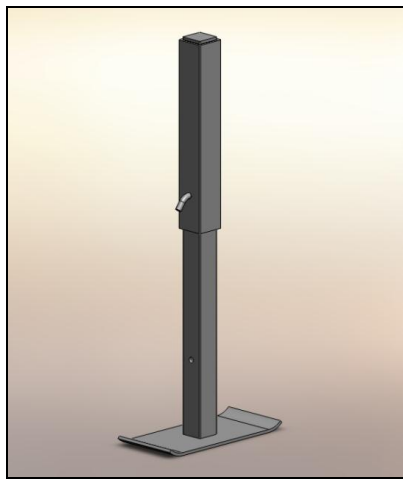
**Submission number:** 14

**Title of the Innovation:** Loader Bull Plow Legs

**Innovator(s):** Jay Unrein, Kevin Weingardt, Jim Krager

### Device Description

The loader bull plow legs are designed to replace wooden blocks in supporting the hitch side of an unhitched loader bull plow. Only one worker is now required to connect or disconnect the plow.



#### 1. Usefulness

- This device was built to support the back side of the loader bull plow when it was unattached. Previously wood blocks were used but they weren't stable and it took two people to hook and unhook the bull plow. With the addition of the retractable and adjustable legs it only takes one person to hook and unhook the plow thereby reducing labor and improving safety.

#### 2. Ease of use

- These plow legs are easy to use.

### Manufacturability

This device is constructed of four machined and/or welded parts. It is simple and does not have any features that are difficult to manufacture.

### Potential for Widespread Application

#### 1. Time to train operator

- It would take less than 10 minutes to train an operator to use these plow legs.

2. Reduction in time
  - This device eliminates the need for placing wooden blocks to support the back side of the plow.
  - A second person is no longer required.
3. Improvement in quality
  - This device does not affect the quality of the work to be performed.
4. Expected annual usage
  - The legs are permanently attached to the plow hitch so are either in the down position for storage or the up position when the plow is in use.
5. Units required
  - One set of two legs are required for each plow.
6. Use in other states
  - All states that have plow hitches would benefit from this device.

### **Safety**

1. Improvement in safety
  - This device allows the plow to be safely attached and detached by a single person.
2. Safety concerns due to use or misuse of the device
  - There are no identifiable concerns due to use or misuse of the device.
3. Safety concerns due to failure of the device
  - If safety pin fails the plow could drop.

### **Availability of Similar Equipment for Purchase**

This device is permanently attached to the plow. The prior art search did not find legs with the configuration required to attach to the plow available for purchase.

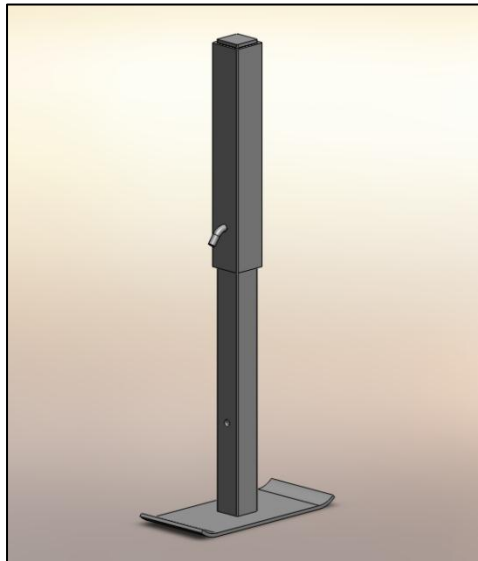
### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered useful but may not be considered novel or non-obvious depending on the Patent Examiner's evaluation.
  - According to the innovator, this innovation was publicly disclosed in its current form in April, 2008.
2. Patent infringement
  - It is common practice to use telescoping legs to stabilize parked equipment such as a camper, vehicle, detachable tool or table. There were quite a few patents covering telescoping legs for this purpose. The prior art search also found products that are detachable that have stabilizing legs. Several patents appeared identical bringing into question the novelty of this device.



## Loader Bull Plow Legs User Manual

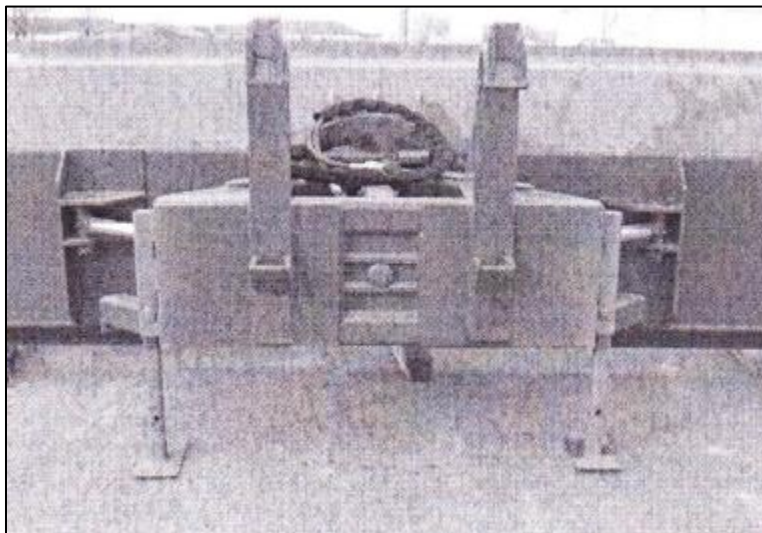


### Device Description

The loader bull plow legs are designed to replace wooden blocks in supporting the hitch side of an unhitched loader bull plow. Only one worker is now required to connect or disconnect the plow.

### Installation Instructions

1. Thoroughly clean the sides of the hitch at the rear of the plow.
2. Place the receptor portion of the leg on the area just cleaned, 1 inch below the top of the side vertically and in the middle horizontally. Ensure the locking pin holes are facing the plow, and not being blocked by the hitch side.
3. Fully weld the receptor on both sides to the hitch side.

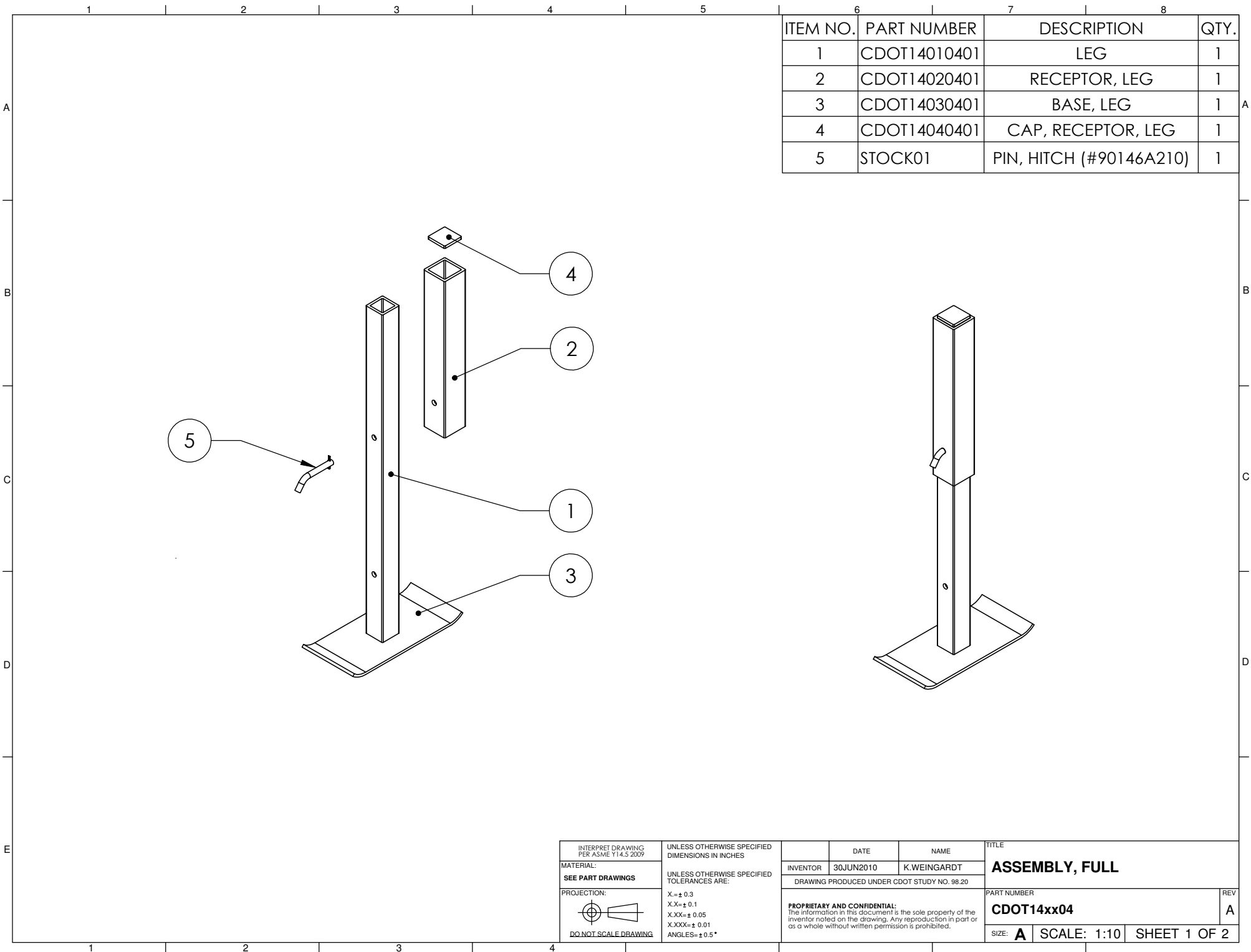


#### Operating Instructions (Unhitching the Plow)


1. Pull the truck up to the location where the plow is to be stored.
2. Lower or raise the plow as needed to have approximately 5 inches of clearance between the plow and the final resting height.
3. On one side of the plow, remove the hitch pin and lower the leg down.
4. Lock the leg in the down position with the hitch pin.
5. Repeat steps 3 and 4 for the other side of the plow.
6. Lower the plow until it is resting on the ground, and unhitch from the truck.

#### Operating Instructions (Hitching the Plow)

1. Pull the truck up to the plow, and hitch to the truck.
2. Raise the plow until there is approximately 5 inches below both of the plow legs.
3. Remove one of the hitch pins and raise the leg into the upper position.
4. Lock the leg into the upper position with the hitch pin.
5. Repeat steps 3 and 4 for the other leg.
6. Lower or raise the plow to the appropriate driving height.

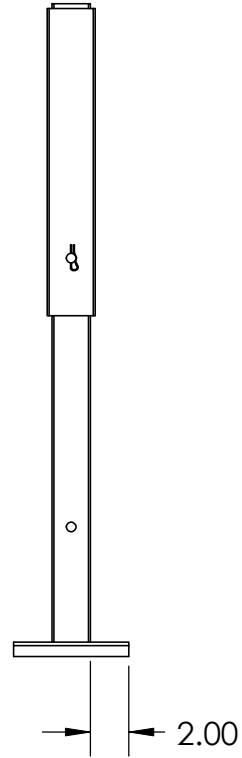
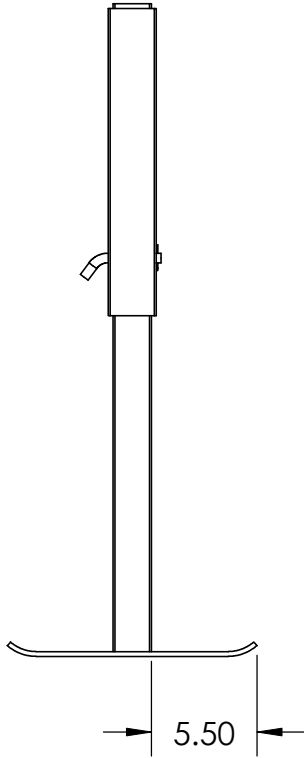


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT14010401	LEG	1
2	CDOT14020401	RECEPTOR, LEG	1
3	CDOT14030401	BASE, LEG	1
4	CDOT14040401	CAP, RECEPTOR, LEG	1
5	STOCK01	PIN, HITCH (#90146A210)	1

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	30JUN2010	K.WEINGARDT		ASSEMBLY, FULL		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						
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NOTES:

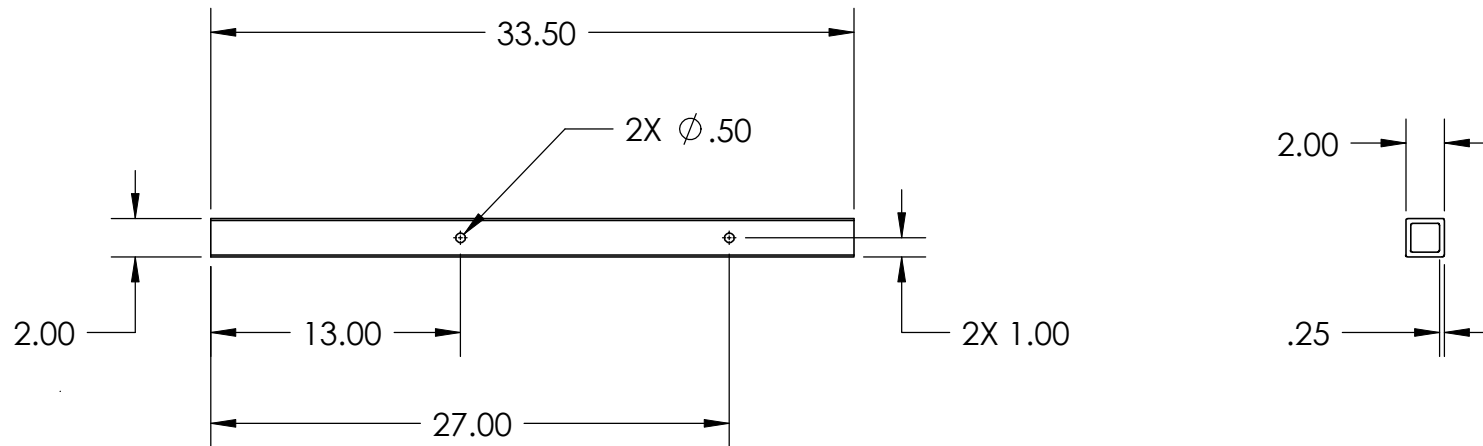
- 1. THE LEG RECEPTOR CAP IS FULLY WELDED TO THE TOP OF THE LEG.
- 2. THE LEG IS FULLY WELDED TO THE LEG BASE.




TITLE		
ASSEMBLY, FULL		
PART NUMBER		REV
CDOT14xx04		A
SIZE: A	SCALE: 1:10	SHEET 2 OF 2

NOTES:

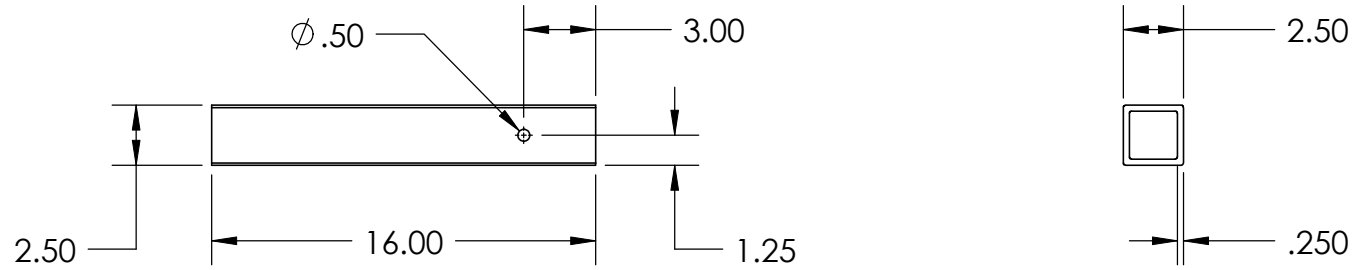
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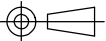


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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		30JUN2010		K.WEINGARDT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER	
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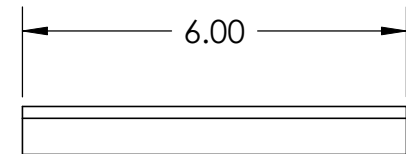
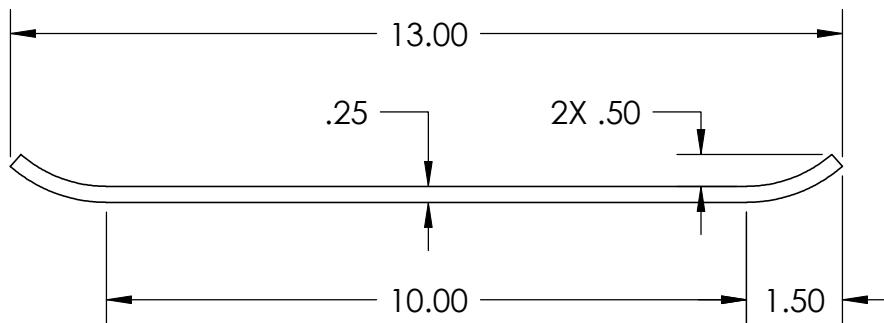
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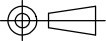
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	30JUN2010	K.WEINGARDT		RECEPTOR, LEG	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT14020401	
				SIZE: A				SCALE: 1:8	
								SHEET 1 OF 1	
								REV A	

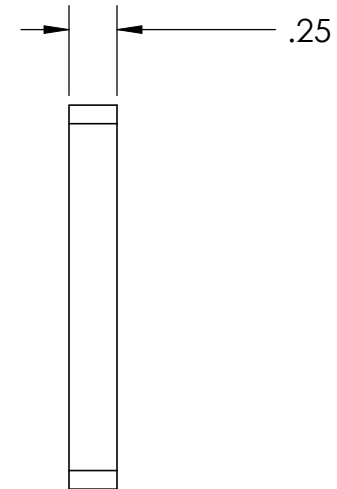
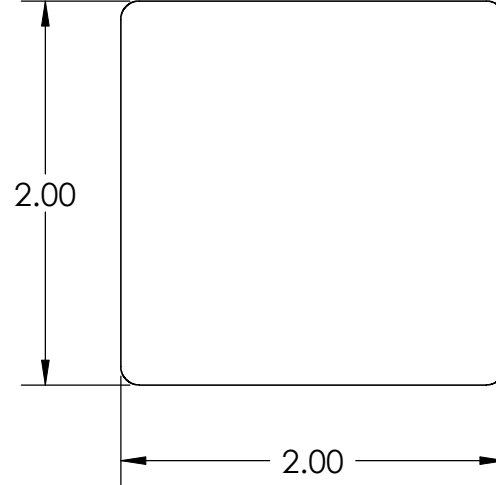
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

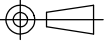


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	30JUN2010	K.WEINGARDT		BASE, LEG	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT14030401		SIZE: A	SCALE: 1:3
								SHEET 1 OF 1	

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. CORNERS ARE GROUND TO MATCH THE LEG CORNER RADIUS



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	30JUN2010	K.WEINGARDT		<b>CAP, RECEPTOR, LEG</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	
DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				<b>CDOT14040401</b>			REV <b>A</b>
				SIZE: <b>A</b>		SCALE: 1:1		SHEET 1 OF 1	



## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Loader Bull Plow Legs

**Innovator(s):** Jay Unrein, Kevin Weingardt, Jim Krager

**Summary:** It is common practice to use telescoping legs to stabilize parked equipment such as a camper, vehicle, detachable tool or table. There were quite a few patents covering telescoping legs for this purpose. The prior art search also found products that are detachable that have stabilizing legs. Several patents appeared identical bringing into question the novelty of this device.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: adjustable & plow support, adjustable & legs, plow & support

Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |                            |
|-------------|------|----------------------------|
| • 3,879,055 | 1975 | Vehicle Stabilizing Device |
| • 3,934,852 | 1976 | Trailer Tongue Jack        |
| • 4,010,926 | 1977 | Adjustable Pedestal        |
| • 4,015,822 | 1977 | Camper Jack                |
| • 4,070,041 | 1978 | Vehicle Stabilizer         |

- 4,080,080 1978 Adjustable Leg Assembly
- 4,091,893 1978 Ladder Having Adjustable Leg Extensions
- 4,275,984 1981 Parking Stand
- 4,279,084 1981 Snowplow Blade Lift Mount Assembly
- 4,347,031 1982 Parking Stand for Tractor-Dismounted Front Loader
- 4,416,439 1983 Adjustable Leg Assembly
- 4,637,772 1987 Loader Mount
- 4,726,516 1988 Foldable Ramp
- 4,776,115 1988 Snow Plow Blocking Unit
- 5,142,799 1992 Tractor Backhoe Attachment
- 5,353,530 1994 Quick Mounting Snow Plow Assembly
- 5,356,100 1994 Sliding Fit Operating Table Stabilizing Post and Rack
- 7,225,493 2007 Support Leg System and Method for Supporting a Dock Leveler

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- a. [http://www.skidsteersolutions.com/Skid\\_Steer\\_Push\\_Pull\\_Silt\\_Fence\\_Installer\\_p/sfp-pp-48.htm](http://www.skidsteersolutions.com/Skid_Steer_Push_Pull_Silt_Fence_Installer_p/sfp-pp-48.htm)
- b. [http://www.skidsteersolutions.com/Skid\\_Steer\\_Silt\\_Fence\\_Installer\\_p/sfp-rs-36.htm](http://www.skidsteersolutions.com/Skid_Steer_Silt_Fence_Installer_p/sfp-rs-36.htm)

## ***Evaluation of Innovation***

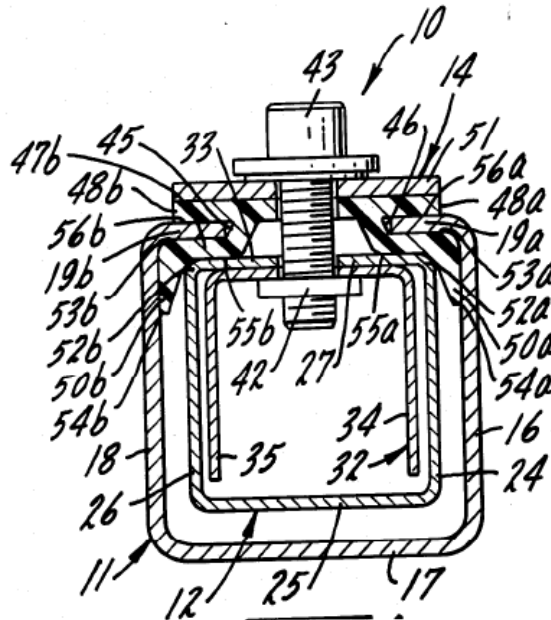
An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

An examination of the information presented above does reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

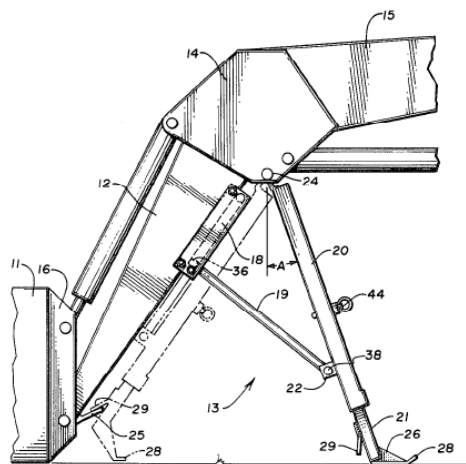
a. 4,080,080 Adjustable Leg Assembly

This device is a square cross section telescoping leg held in position by a bolt from the side and used for any leg supporting application.



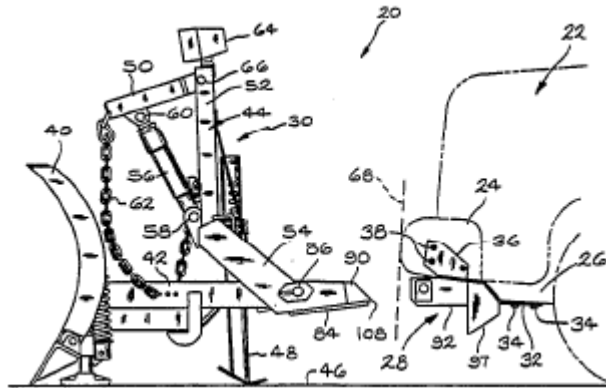
b. 4,275,984 Parking Stand

This device is a square cross section telescoping leg held in position by a bolt from the side and used for any leg supporting application. It is used for parking an implement.



c. 5,353,530 Quick Mounting Snow Plow Assembly

This device is a square cross section telescoping leg held in position by a spring pin from the side.



d. [http://www.skidsteersolutions.com/Skid\\_Steer\\_Silt\\_Fence\\_Installer\\_p/sfp-rs-36.htm](http://www.skidsteersolutions.com/Skid_Steer_Silt_Fence_Installer_p/sfp-rs-36.htm)

This device has retractable storage legs with pads for stability.

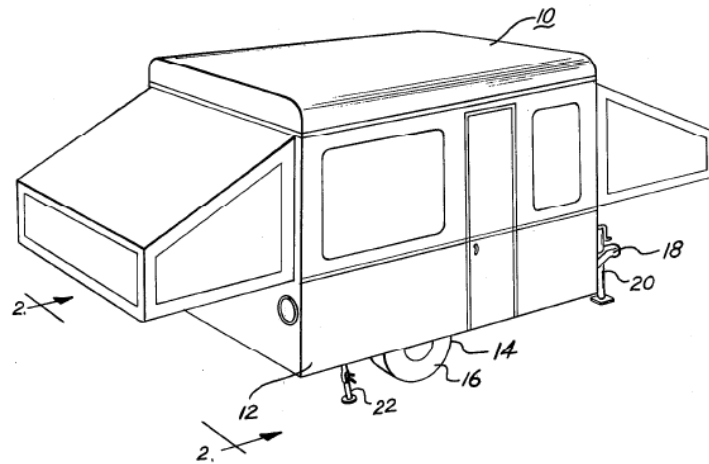


2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

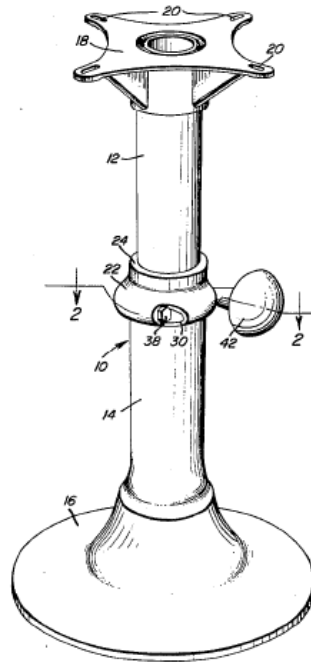
a. 3,879,055 Vehicle Stabilizing Device

This device has circular telescoping legs that are latched in position.



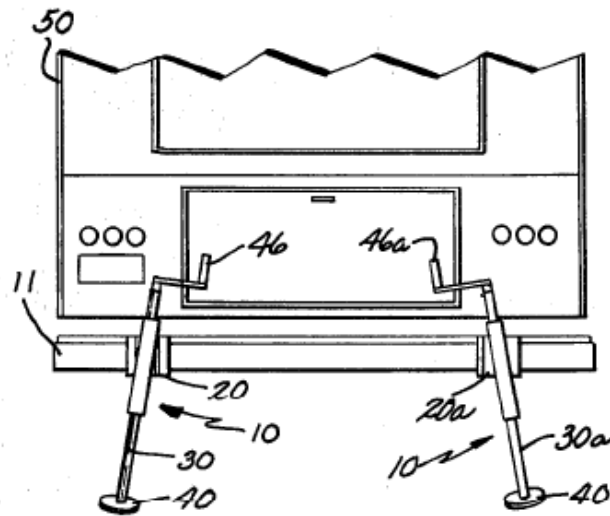
b. 4,010,926 1977 Adjustable Pedestal

This device is a tubular telescoping device locked in position by a groove and threaded handle.



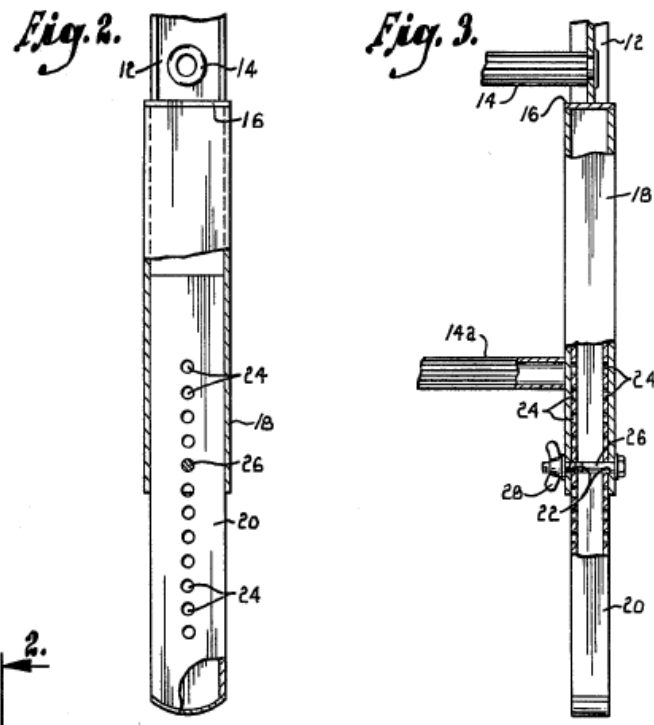
c. 4,070,041 Vehicle Stabilizer

This device is a tubular telescoping jack that locks in place with a threaded coaxial rod.



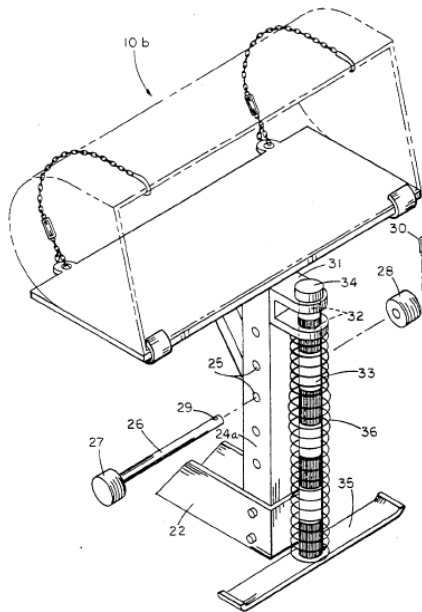
d. 4,091,893 Ladder Having Adjustable Leg Extensions

This device is a rectangular cross section telescoping leg for a ladder that is held in position by a bolt through holes.



e. 5,142,799 Tractor Backhoe Attachment

This device is a rectangular cross section telescoping leg for a ladder that is held in position by a pin through holes.



f. [http://www.skidsteersolutions.com/Skid Steer Push Pull Silt Fence Installer\\_p/sfp-pp-48.htm](http://www.skidsteersolutions.com/Skid_Steer_Push_Pull_Silt_Fence_Installer_p/sfp-pp-48.htm)

This device has retractable legs that allow you to park the machine when not in use.

### 3. Usefulness

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

This device was built to support the back side of the loader bull plow when it was unattached. Previously wood blocks were used but they weren't stable and it took two people to hook and unhook the bull plow. With the addition of the retractable and adjustable legs it only takes one person to hook and unhook the plow thereby reducing labor and improving safety.

### 4. Public Disclosure

According to the innovator, the idea for this device first came up in April 2008. The device was first used in December 2009. Two patrols in two locations have used this device. Information regarding this device has not been shared with anyone other than the patrols using the device. The device in use is the original design.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

**Submission number:** 25

**Title of the Innovation:** Hula Skirt

**Innovator(s):** Roger Hessler, Bill G. Ertle

### Device Description

The hula skirt sander belting is a surround that is attached to common road sanding trucks.



#### 1. Usefulness

- This skirt around the truck reduces damage to surrounding cars, and increases the effective density of the sand on the road surface in the path that the sanding truck takes. An increased density allows for better grip on icy surfaces with less sand.

#### 2. Ease of use

- This device is attached to the truck and does not require any instructions for use.

### Manufacturability

This device is constructed of eight machined parts. The parts are simple and do not have any features that are difficult to manufacture.

### Potential for Widespread Application

1. Time to train operator
  - No training is required because the skirt is attached to the truck.
2. Reduction in time to complete task
  - This device has no effect on the time it takes to spread sand.
3. Improvement in quality
  - This device prevent damages to surrounding cars.



- It also increases the effective density of the sand on the road surface in the path that the sanding truck takes. An increased density allows for better grip on icy surfaces with less sand.
- 4. Expected annual usage
  - The skirt is attached to the truck year round but the truck is used during the snowy months which are typically five or six months.
- 5. Units required
  - One device is required per truck.
- 6. Use in other states
  - All states that have sand trucks would benefit from this device.

### **Safety**

1. Improvement in safety
  - Preventing sand from hitting the windshield of passing cars increases safety because this can sometime lead to accidents.
  - Better spreading of sand on road provides better traction on snowy days.
2. Safety concerns due to use or misuse of the device
  - There are no identifiable concerns due to use or misuse of the device.
3. Safety concerns due to failure of the device
  - There are no identifiable concerns due to failure of the device.

### **Availability of Similar Equipment for Purchase**

The prior art search did not find similar equipment available for purchase.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious depending on the Patent Examiner's evaluation.
  - This innovation has been publicly disclosed; however, the innovator is unclear regarding the date and duration of public disclosure.
2. Patent infringement
  - A patent was found using a similar technique that was applied to a salt truck. This may mean that the device is obvious and could infringe on the existing patent.

## Hula Skirt Sander Belting User Manual

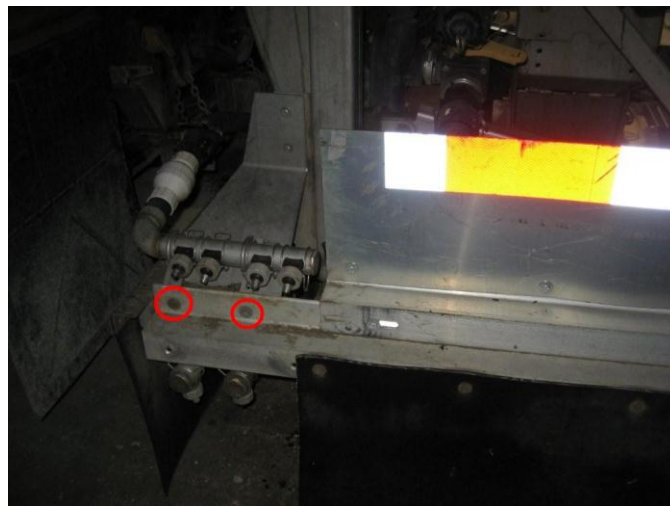


### Device Description

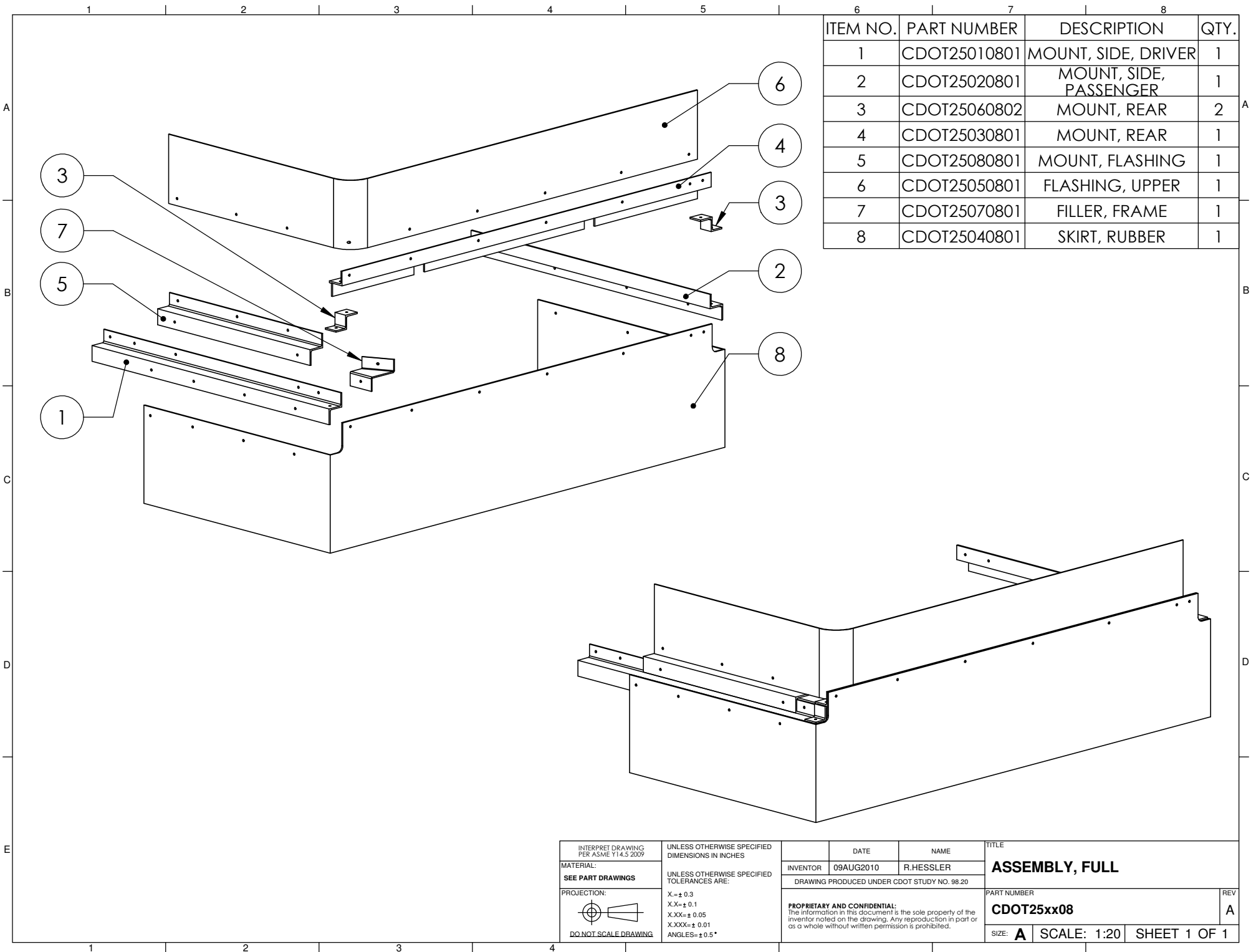
The hula skirt sander belting is a surround that is attached to common road sanding trucks. This reduces damage to surrounding cars, and increases the effective density of the sand on the road surface in the path that the sanding truck takes. An increased density allows for better grip on icy surfaces with less sand.

### Installation Instructions

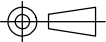
Once assembled, the skirt belting is bolted onto the truck in four locations. Two bolts are used through the side of the skirt frame at the immediate back of the truck on both sides. One bolt is used through the top of the back of the skirt frame in two locations, each into the existing supports for the sand hopper.



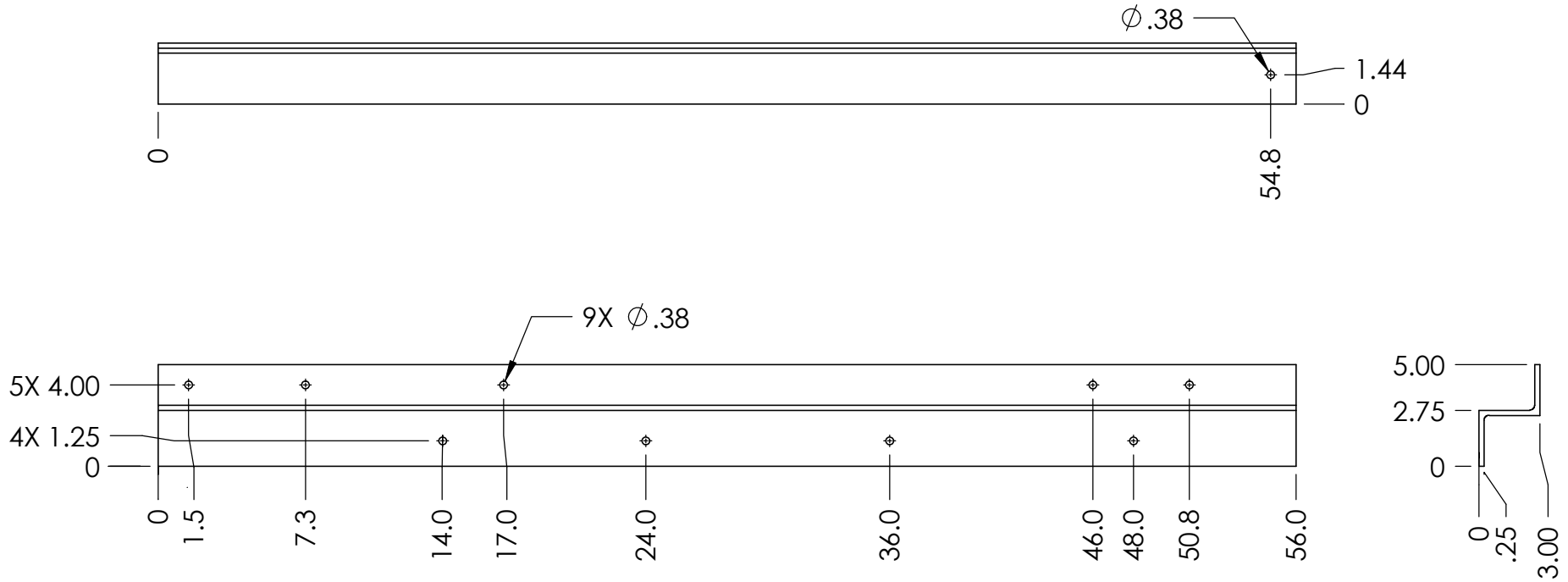


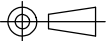


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
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2	CDOT25020801	MOUNT, SIDE, PASSENGER	1
3	CDOT25060802	MOUNT, REAR	2
4	CDOT25030801	MOUNT, REAR	1
5	CDOT25080801	MOUNT, FLASHING	1
6	CDOT25050801	FLASHING, UPPER	1
7	CDOT25070801	FILLER, FRAME	1
8	CDOT25040801	SKIRT, RUBBER	1

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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



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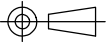
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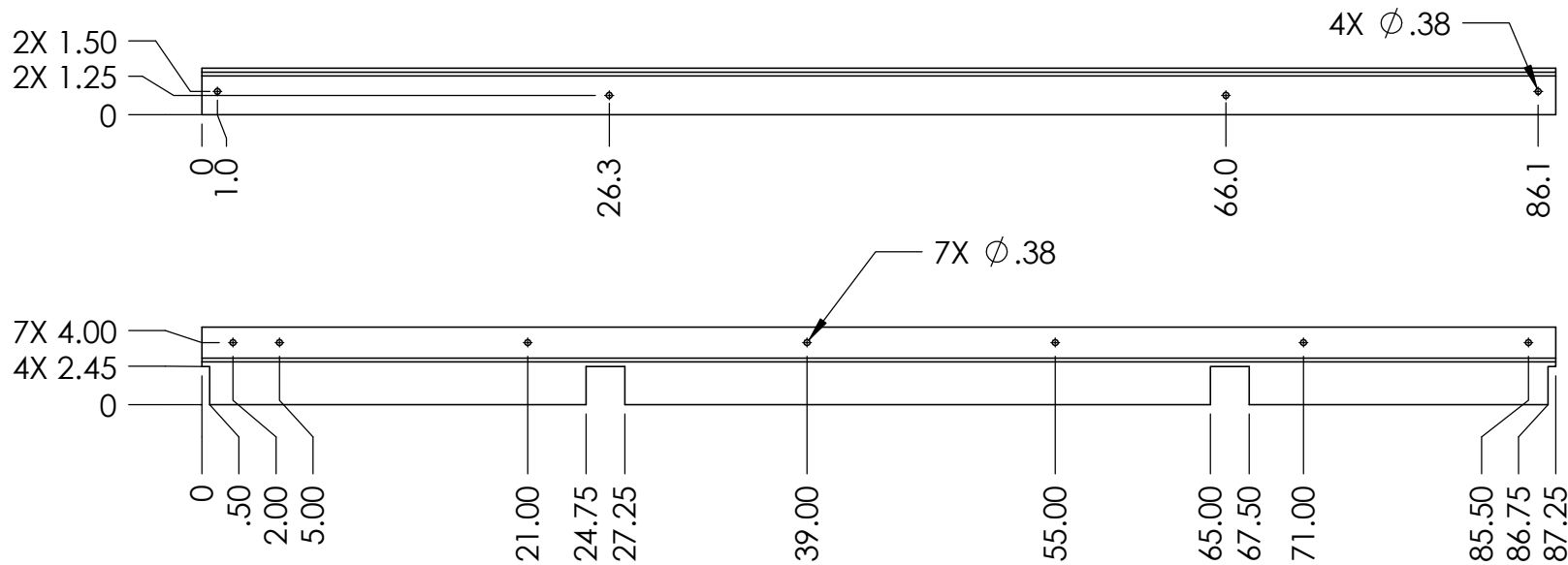
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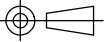
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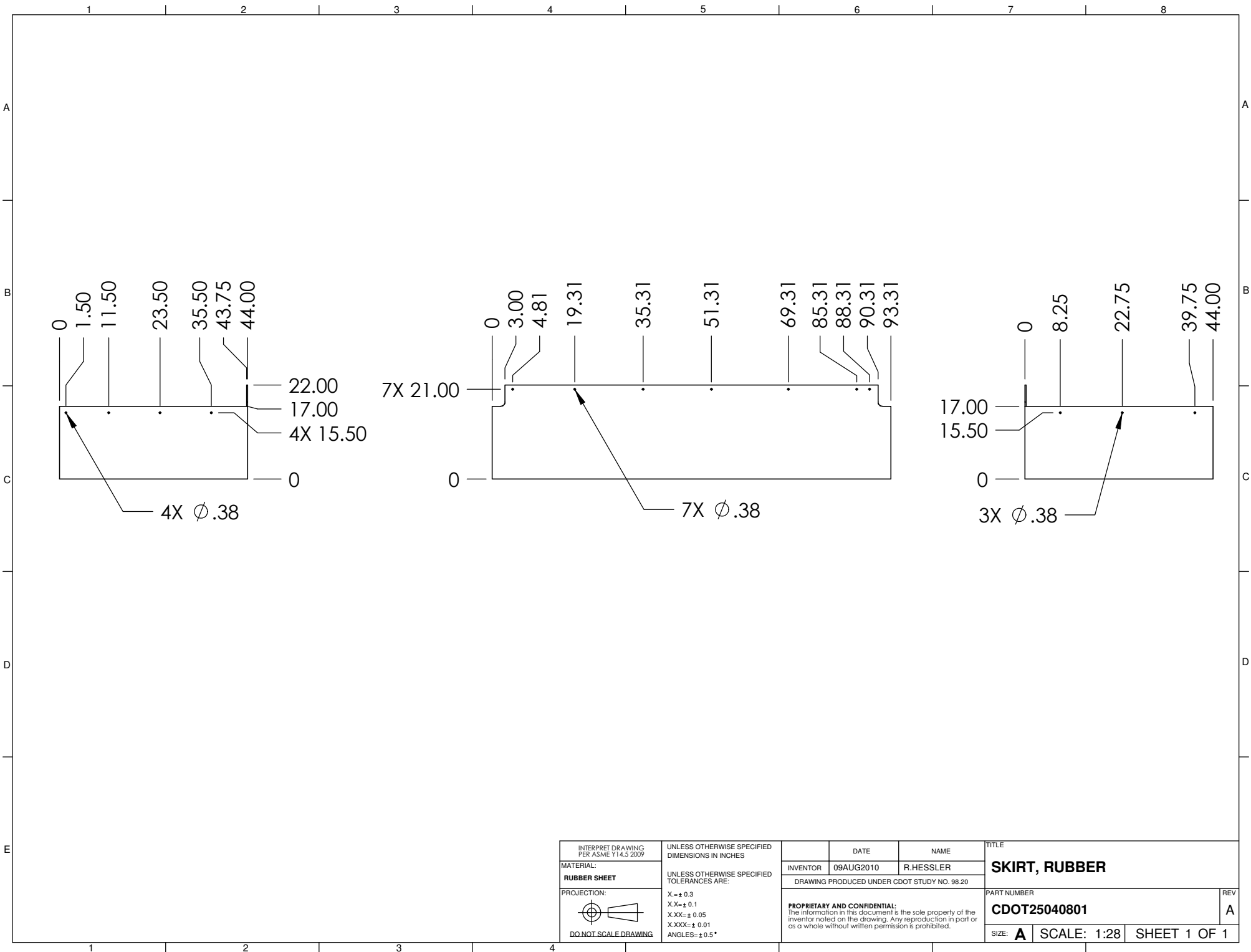
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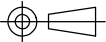
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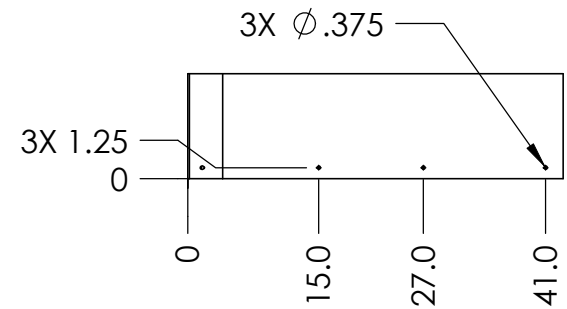
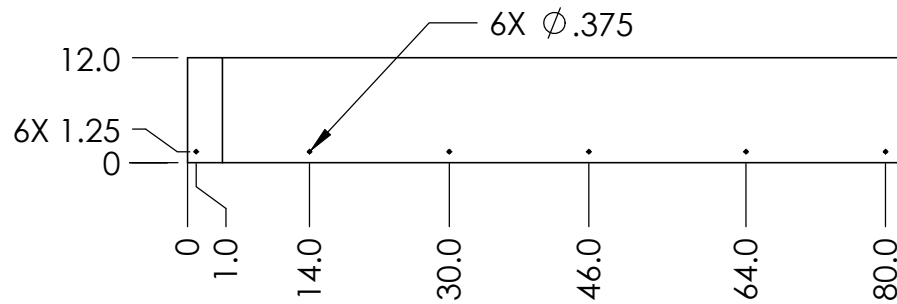
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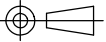


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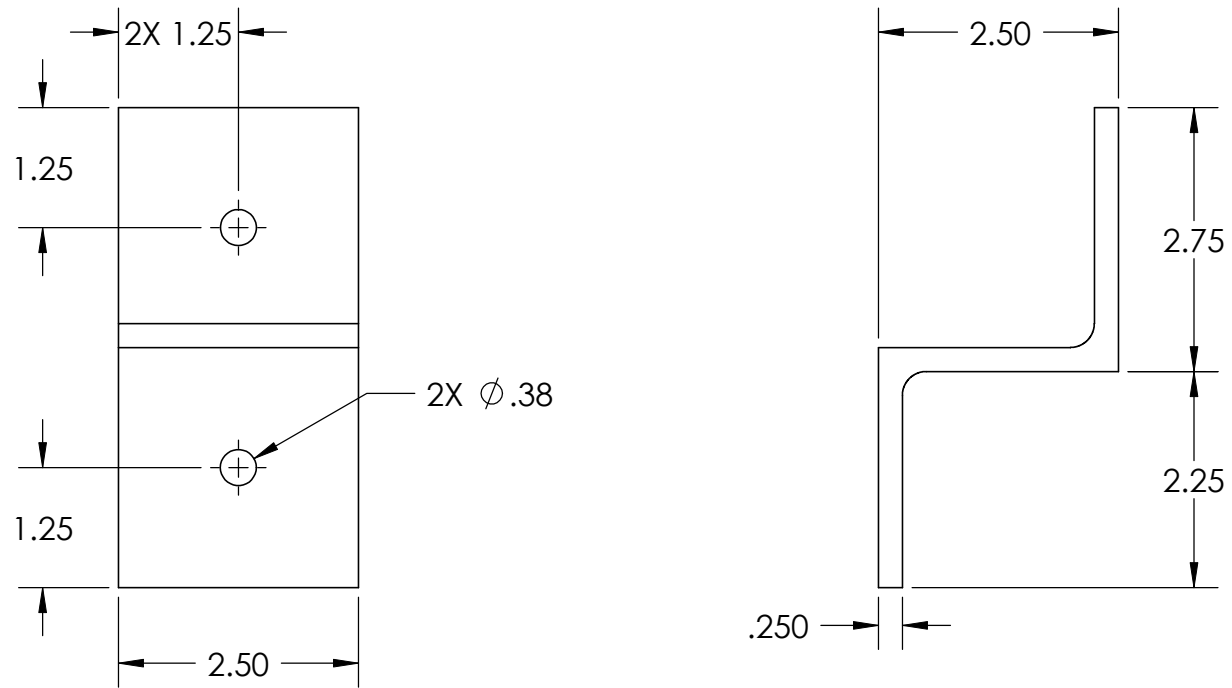


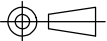
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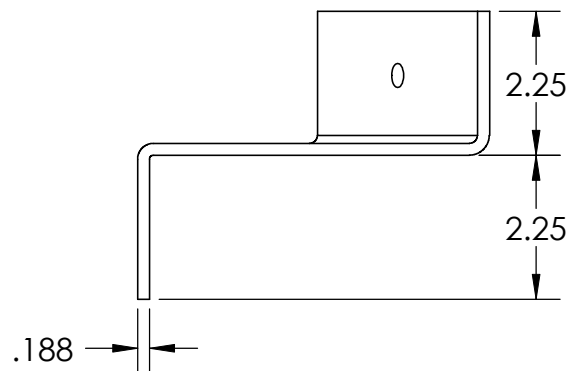
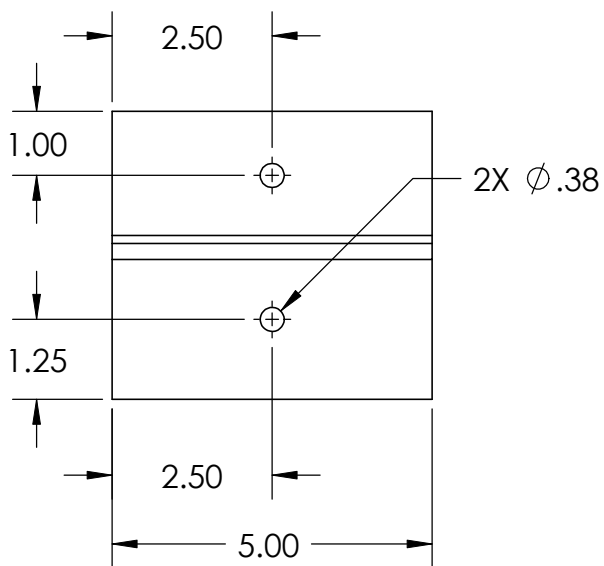
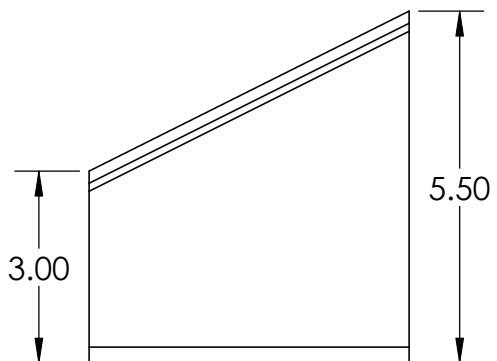
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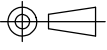


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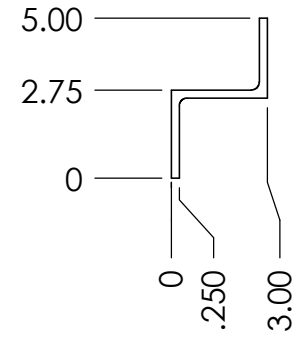
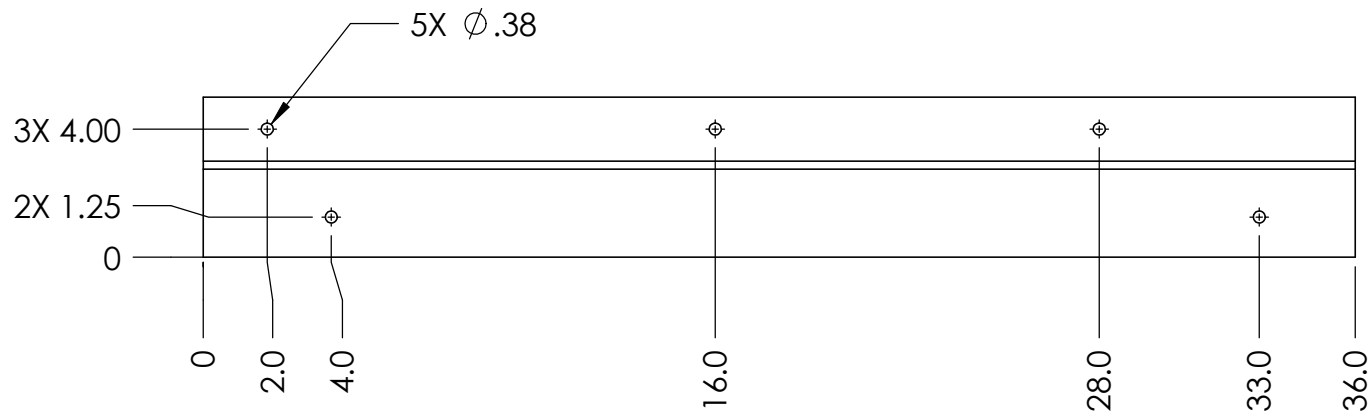
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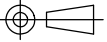
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DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER	
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## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Hula Skirt

**Innovator(s):** Roger Hessler, Bill G.Ertle

**Summary:** This device is similar to a mud flap but for sand or salt that is dispersed on the road. The prior art search found one patent for sand trucks that described this technique. This patent was not identical so this invention falls in the category of non-obviousness.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: sand & truck, sand & guard, sand & flap, salt & truck, truck & flap, salt & guard  
Field of search: title

Patent Number	Year	Title of Invention
5004164	1991	Salt Truck

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.inlad.com/BuyersSaltandSandSpreaders.aspx>
- b. <http://www.truckbo199xdirect.com/BuyersSnowSpreaders.aspx>
- c. <http://www.nbctruckequip.com/salt-spreaders-sand.html>

## Evaluation of Innovation

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references an Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

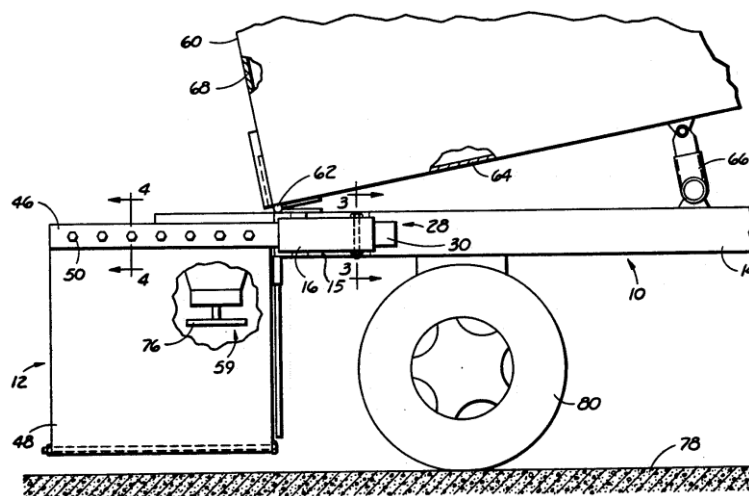
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

### 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

#### a. 5004164 – Salt Truck

This device has a guard that stops the salt being dispersed from shooting too far to each side.



### **3. Usefulness**

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

This device is a shield that is used to better control the placement of salt/sand on the road.

### **4. Public Disclosure**

This innovation has been publicly disclosed; however, the innovator is unclear regarding the date and duration of public disclosure. Other patrols in the area have adapted this idea to their trucks.

## Device Costs and Benefits

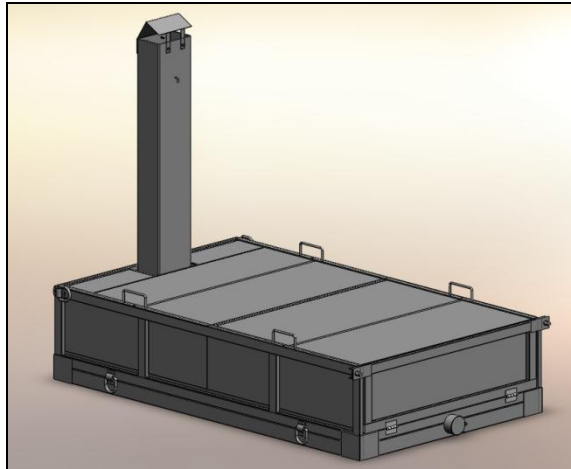
**Submission number:** 27

**Title of the Innovation:** Slide-in Heat Box

**Innovator(s):** Anthony Martinez

### Device Description

The slide-in heat box is designed to heat “cold mix”, a road repair mix often used for road repair during winter months. Heating the “cold mix” renders it more malleable, reducing effort required to work with the material and improving the quality of the repair.



#### 1. Usefulness

- The heat box is a unit that heats cold mix asphalt to make it more pliable. The asphalt bonds to the road better when the mix is heated. The heat box keeps the mix warm for up to four hours. This eliminates the need for the maintenance crew to climb on and off the truck to break up cold mix into chunks. Use of this device makes the task of filling cracks with asphalt easier, quicker and safer by getting the workers off the highway sooner.

#### 2. Ease of use

- The maintenance crew does not need to climb onto the truck to break up the cold mix. They just shovel the hot mix into the cracks making it easier to fill in the cracks in the road.

### Evaluation of Manufacturability

This device is constructed of 46 machined and/or welded parts. The parts are fairly simple and do not have features that are difficult to manufacture.



## **Potential for Widespread Application**

1. Time to train operator
  - It would take 30 minutes to train someone to use this device.
2. Reduction in time to complete task
  - It is easier to fill cracks in the road with hot mix than with chunks of cold mix. The chunks of cold mix have to be broken up. Using hot mix reduces the time it takes to fill the cracks.
3. Improvement in quality
  - The hot mix bonds better to the road than cold mix.
  - The quality of the patch is better and it does a better job of filling the hole.
4. Expected annual usage
  - This device is being used 12 months of the year for about 10-12 hours per month.
  - In winter months it is used more each month.
5. Units required
  - One device is required for each patrol.
6. Use in other states
  - All states that patch asphalt, particularly in cold weather, would benefit from this device.

## **Safety**

1. Improvement in safety
  - This device does make the process of filling cracks with asphalt mix quicker getting the maintenance crew off the road sooner.
  - This device makes the job safer because with a cold mix the operator must break it apart. This takes a bar or a pick and jumping on a shovel. When the mix is warm the operator is able to simply shovel is out of the hot box.
2. Safety concerns due to use or misuse of the device
  - The operator could get burned by the propane torch.
  - There is no temperature control for the asphalt so it could become overheated.
  - The operator could forget to turn the propane torch off.
  - The operator could forget to open the damper on the chimney so that exhaust gases would build up in the box.
  - This device is heavy and must be installed with an overhead crane so there are safety concerns with installing it in the truck.
3. Safety concerns due to failure of the device
  - If the two metal tie downs fail then the box could slide around in the bed of the truck causing damage. The truck gate is closed when the device is installed, greatly reducing the chance of it sliding out the back of the truck if the metal tie downs were to break.

- There is nothing other than friction to keep the damper on the exhaust in the open position.

### **Availability of Similar Equipment for Purchase**

The prior art search found similar equipment that was commercially available. Both of the devices have a built in heat source.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

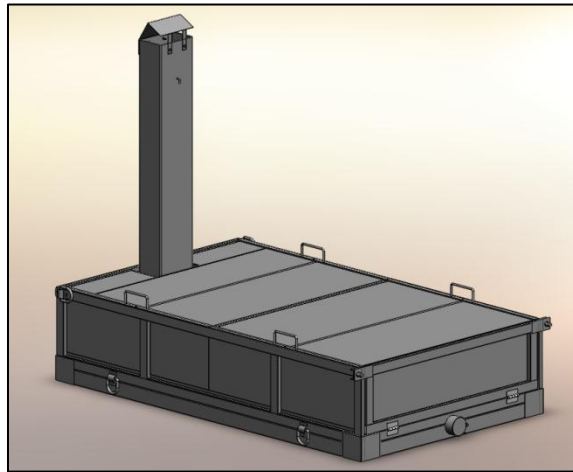
#### **1. Patentability**

- This device may be considered useful but may not be considered novel or non-obvious depending on the Patent Examiner's evaluation.
- According to the innovator, this innovation was publicly disclosed in its current form in February, 2008.

#### **2. Patent infringement**

- Patents and products were found that perform the same task. Most of these included a heat source with control. One of the devices was similar enough that the novelty of this device is in question.

## Slide-In Heat Box User Manual



### Device Description

The slide-in heat box is designed to heat “cold mix”, a road repair mix often used for road repair during winter months. Heating the “cold mix” renders it more malleable, reducing effort required to work with the material and improving the quality of the repair.

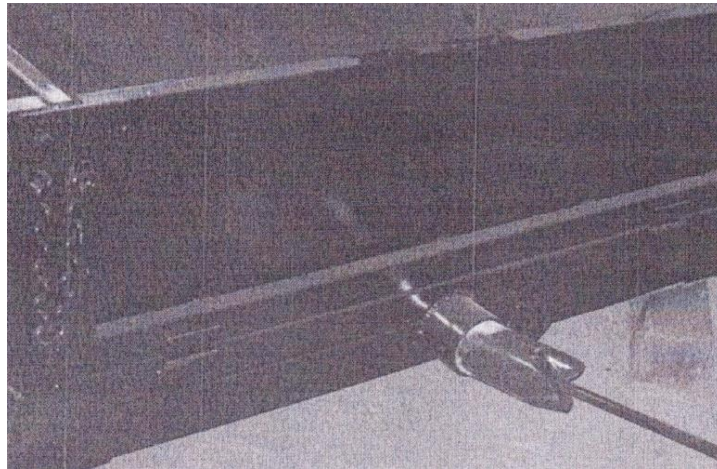
### Installation Instructions

1. Lift the heating box using the d-rings on the box and a ceiling mounted lift crane.
2. Maneuver the box into the empty truck bed and lower it into place with the chimney placed near to the truck cab.
3. Attach the box to the bed using the two upper d-rings and an appropriate set of metal tie-downs.



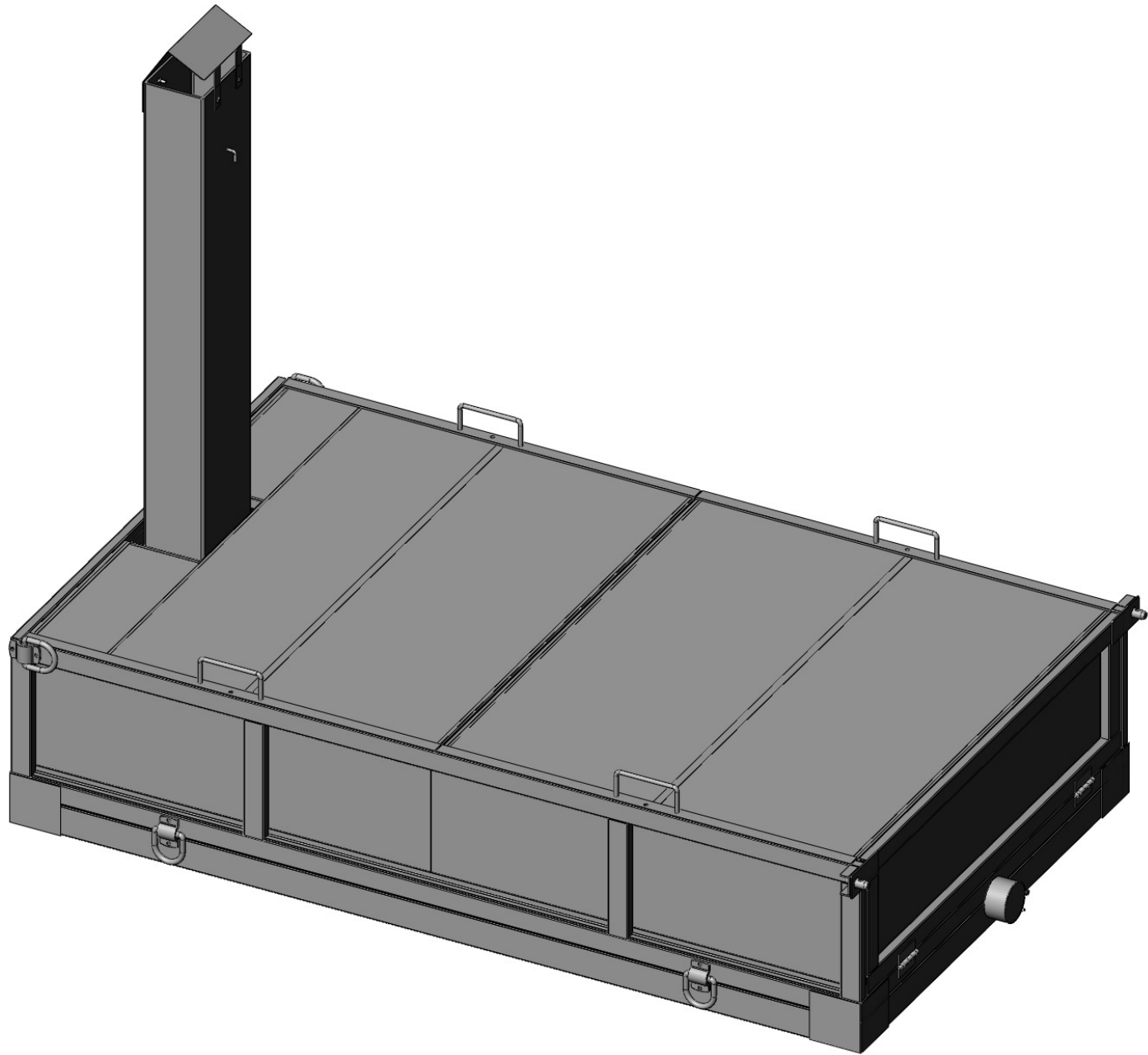
### Operating Instructions


1. Remove the two top covers on the heat box and make sure the front gate on the box is closed.
2. Place the quantity of cold mix that you want heated into the heat box. Keep in mind that the less cold mix in the box, the warmer it will get and the more thoroughly it will heat.
3. If the gate on the truck is not open yet, open it to allow access to the heat chamber.
4. Open the damper on the chimney to allow gases formed during heating to escape.
5. Light a standard 3 inch tip propane torch, and adjust to a low setting.
6. Open the cover on the heat chamber, and insert the tip of the torch. Turn the heat setting on the torch up to a medium-high setting.



**Starting to Insert the Torch Tip**

7. Allow the torch to heat the chamber until the mix begins to soften.
8. Stir the cold mix as necessary with a shovel to distribute the heat throughout the mix. Move the colder mix closer to the center of the box and the warmer mix towards the outer edges.
9. Once the mix is thoroughly heated to the desired consistency, turn the torch off, remove it from the heat chamber, and close the chamber cover.
10. Close the gate on the truck, and replace the top covers on the heat box.
11. Close the damper on the chimney to minimize heat loss.
12. When at the site where a road repair is needed, remove the warmed cold mix through the gate on the heating box. This will allow less heat to escape during the repair. The warmed cold mix can be removed through the top by removing one of the top covers, but the remaining mix will lose more heat with this method.
13. After returning to the heating box storage location, remove any unused cold mix from the box before it hardens.
14. Should the mix become stuck in the heat box, reheat it so that it can be removed.

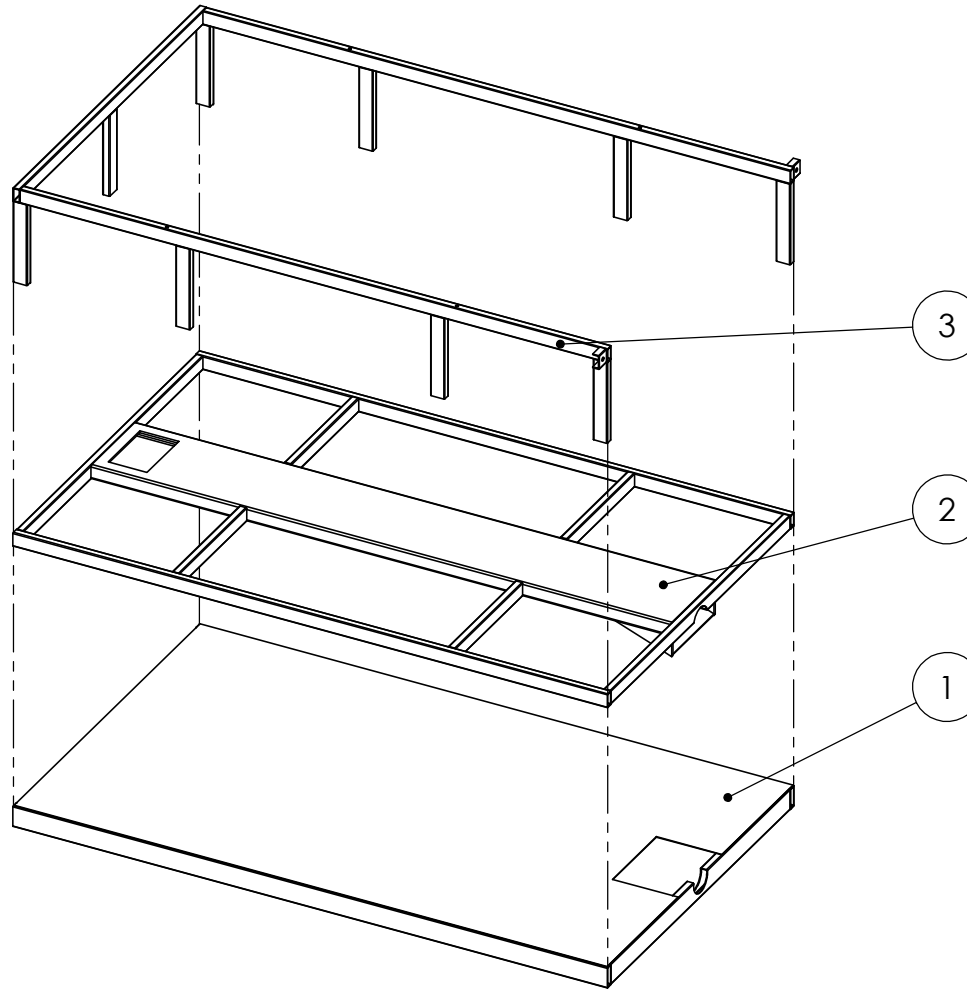


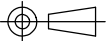
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MATERIAL: <b>SEE PART DRAWINGS</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		SLIDE-IN HEAT BOX, #27	
PROJECTION: 		X.=± X.X=± X.XX=± X.XXX=± ANGLES=±		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				STARTPAGE		A	
				SIZE: A		SCALE: 1:14		SHEET 1 OF 1	

NOTES:

1. THE JOINT BETWEEN THE BOTTOM FRAME AND MIDDLE FRAME IS WELDED IN 12" LENGTHS WITH 12" SPACING, AND AROUND ALL CORNERS. THIS WELD WILL ALSO FIX THE PANEL BETWEEN THE TWO FRAMES IN PLACE. WELDING AROUND THE PANEL WHERE THE HEAT CHAMBER PROTRUDES THROUGH IS NOT NECESSARY.
2. THE JOINTS BETWEEN THE UPPER FRAME AND MIDDLE FRAME ARE FULLY WELDED.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27xx4601	FRAME, BOTTOM	1
2	CDOT27xx4602	FRAME, MIDDLE	1
3	CDOT27xx4603	FRAME, UPPER	1

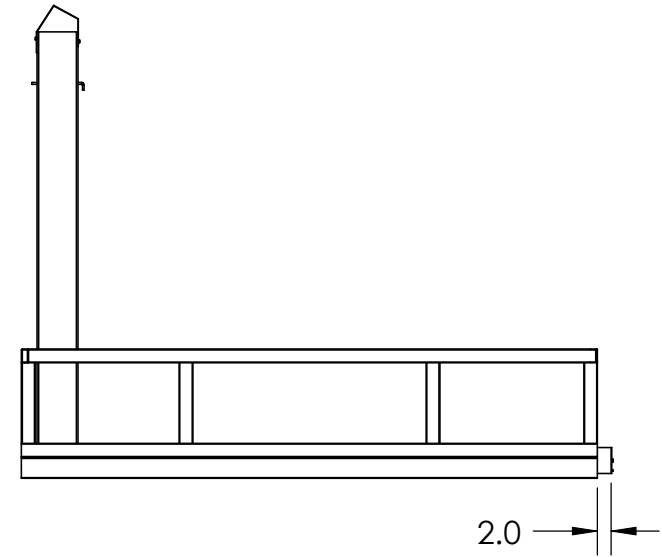
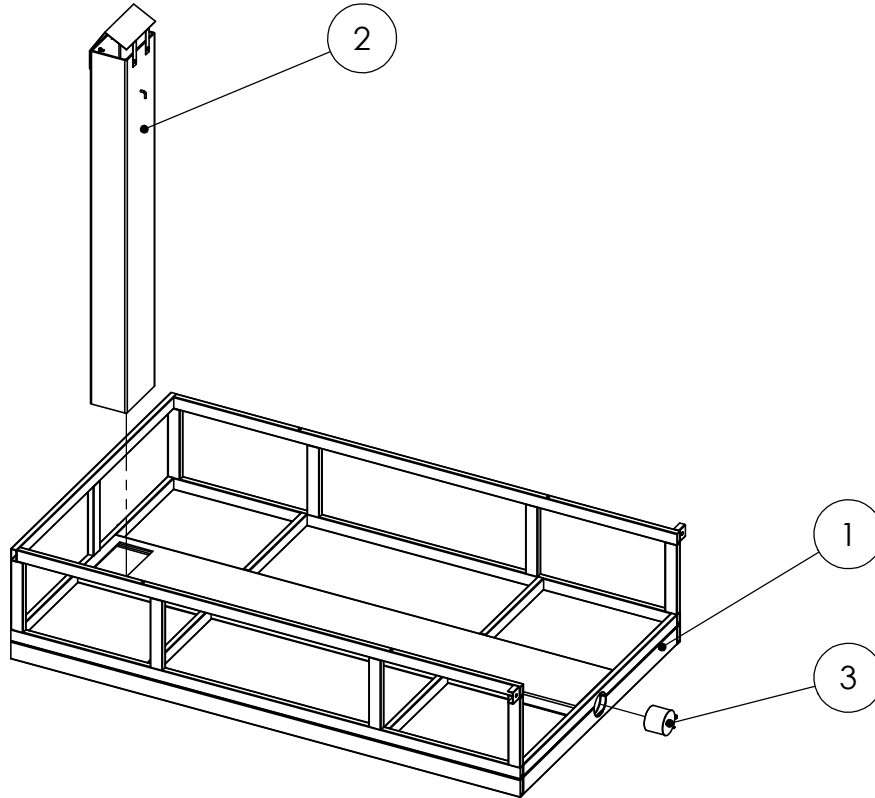


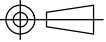
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MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ		ASSEMBLY, FRAME		
PROJECTION: 		X.=± X.X=± X.XX=± X.XXX=± ANGLES=±		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20								
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER		REV
										CDOT27xx46S1		A
										SIZE: A	SCALE: 1:24	
										SHEET 1 OF 1		

NOTES:

1. THE CHIMNEY IS CENTERED OVER THE HOLE IN THE HEAT CHAMBER, THEN FULLY WELDED.
2. THE ENTRY ASSEMBLY IS POSITIONED WITH THE WELDED BOLT PLACED HORIZONTAL SO THAT THE FLAP STAYS CLOSED WITH GRAVITY.

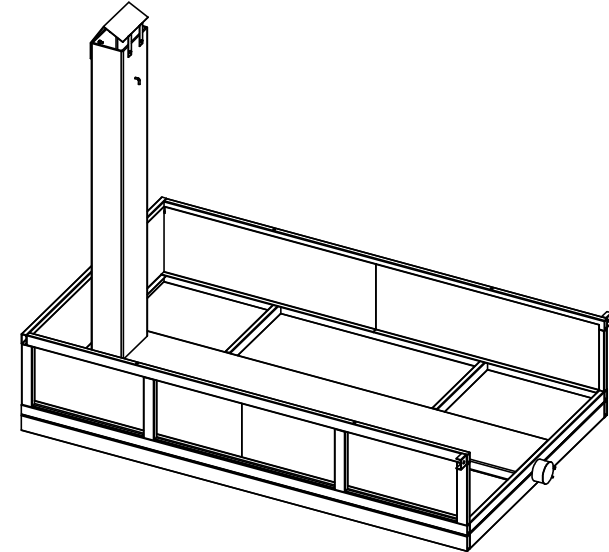
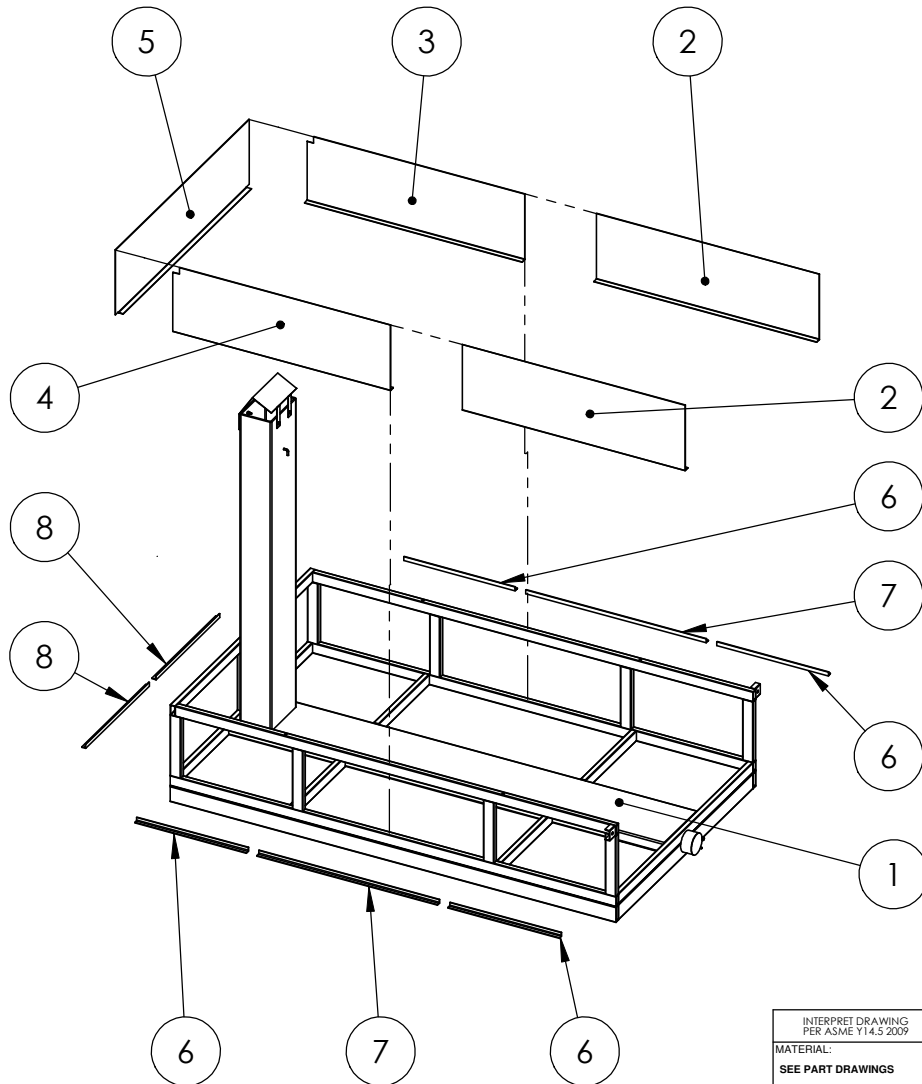
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27xx46S1	ASSEMBLY, FRAME	1
2	CDOT27xx4604	ASSEMBLY, CHIMNEY	1
3	CDOT27xx4606	ASSM, ENTRY, HEAT CHAMBER	1



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ	
PROJECTION: 		X.=± X.X=± X.XX=± X.XXX=± ANGLES=± °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT27xx46S2	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:28	
								SHEET 1 OF 1	
								REV A	

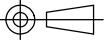
- NOTES:
1. THE PANELS ARE WELDED INTO THE FRAME FROM THE OUTSIDE WITH 1" WELDS SPACED 4" APART.
  2. THE PANELS ARE WELDED INTO THE UPPER FRAME STARTING WITH THE REAR PANELS. THE FRONT PANELS ARE THEN WELDED IN, FOLLOWED BY THE BACK PANEL.
  3. THE PANEL SUPPORTS ARE WELDED INTO THE BOTTOM EDGE OF THE PANEL ON THE OUTSIDE WITH THE SAME WELD SCHEME AS THE PANELS.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27xx46S2	ASSEMBLY, FRAME AND CHIMNEY	1
2	CDOT27284602	PANEL, SIDE, FRONT	2
3	CDOT27294601	PANEL, SIDE, REAR, RIGHT	1
4	CDOT27304601	PANEL, SIDE, REAR, LEFT	1
5	CDOT27314601	PANEL, BACK	1
6	CDOT27344604	SUPPORT, PANEL, SIDE, SHORT	4
7	CDOT27354602	SUPPORT, PANEL, SIDE, LONG	2
8	CDOT27364602	SUPPORT, PANEL, REAR	2



INTERPRET DRAWING  
PER ASME Y14.5 2009

MATERIAL:  
SEE PART DRAWINGS

PROJECTION:  


DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS IN INCHES

UNLESS OTHERWISE SPECIFIED  
TOLERANCES ARE:

X.=±  
X.X=±  
X.XX=±  
X.XXX=±  
ANGLES=± °

INVENTOR	DATE	NAME
INVENTOR	25JUN2010	A.MARTINEZ
DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		

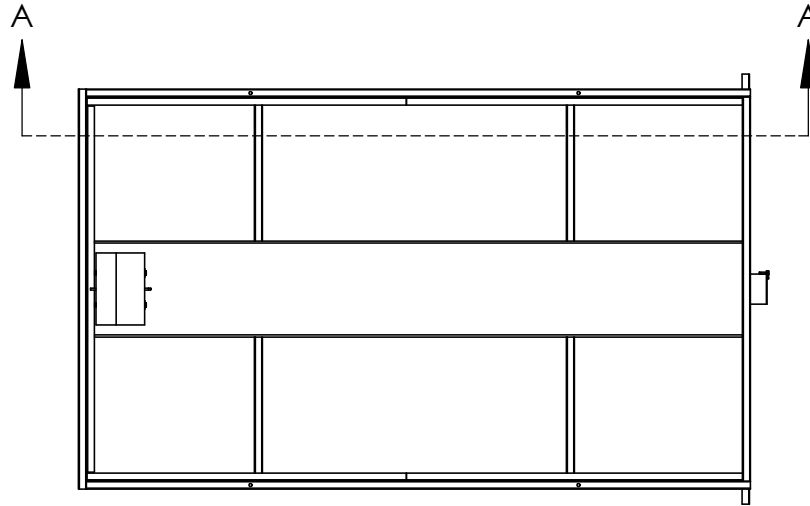
**PROPRIETARY AND CONFIDENTIAL:**  
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TITLE	
ASSEMBLY, PANELED FRAME	
PART NUMBER	REV
CDOT27xx46S3	A
SIZE: A	SCALE: 1:32 SHEET 1 OF 2

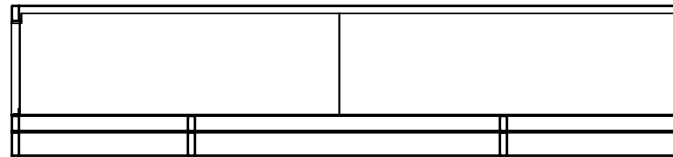


NOTES:

1. THE REAR PANEL SITS FLUSH WITH THE REAR OF THE FRAME. THE FRONT PANEL IS BUTTED AGAINST THE REAR PANEL, LEAVING A 1" SPACE BETWEEN THE FRONT OF THE FRONT PANEL AND THE FRONT OF THE FRAME.



1.00



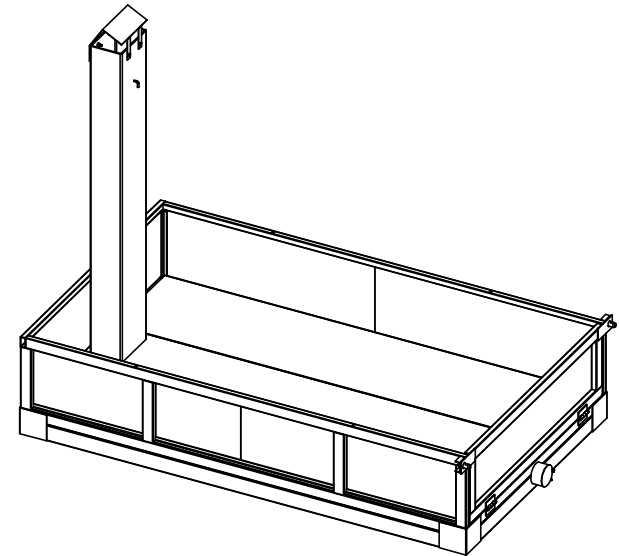
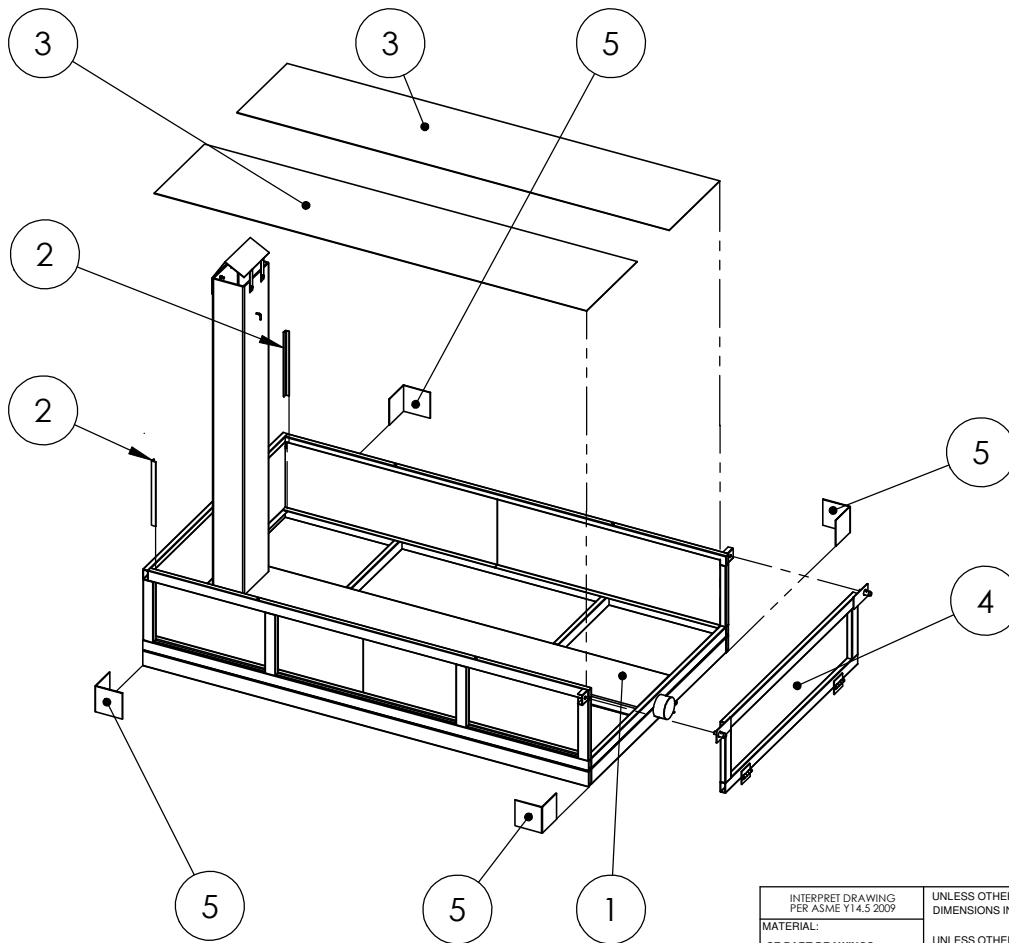
SECTION A-A

TITLE		
ASSEMBLY, PANELED FRAME		
PART NUMBER		REV
CDOT27xx46S3		A
SIZE: A	SCALE: 1:24	SHEET 2 OF 2

NOTES:


1. THE SPACE IN THE MIDDLE FRAME TO THE SIDES OF THE HEAT CHAMBER ARE FILLED WITH FIBERGLASS BLANKET INSULATION TO REDUCE HEAT LOSS. CUT THE SIX SECTIONS TO FIT INSIDE THE FRAME SPACES BEFORE ATTACHING THE MIDDLE FRAME PANELS INTO THE ASSEMBLY.
2. THE MIDDLE FRAME PANELS ARE WELDED INTO PLACE FIRST WITH 1" WELDS SPACED 2" APART, EXCLUDING WHERE THE PANELS MEET THE HEAT CHAMBER. THESE WELDS ARE SOLID ALONG THE LENGTH OF THE HEAT CHAMBER.
3. THE CORNER END PLATES ARE FULLY WELDED AROUND THEIR PERIMETER.
4. THE GATE IS ALIGNED BY ATTACHING THE LOCK PINS INTO THE UPPER FRAME, SQUARING THE GATE IN THE FRAME, THEN FULLY WELDING THE BOTTOM OF THE HINGE ONTO THE FRAME.
5. THE INNER PANEL SUPPORTS HAVE 1" WELDS SPACED 1" APART.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27xx46S3	ASSEMBLY, PANELED FRAME	1
2	CDOT27374602	SUPPORT, PANEL, REAR, INNER	2
3	CDOT27334602	PANEL, TOP, FRAME, MIDDLE	2
4	CDOT27xx4605	GATE	1
5	CDOT27274604	END PLATE, CORNER	4



INTERPRET DRAWING  
PER ASME Y14.5 2009

MATERIAL:  
**SEE PART DRAWINGS**

PROJECTION:  


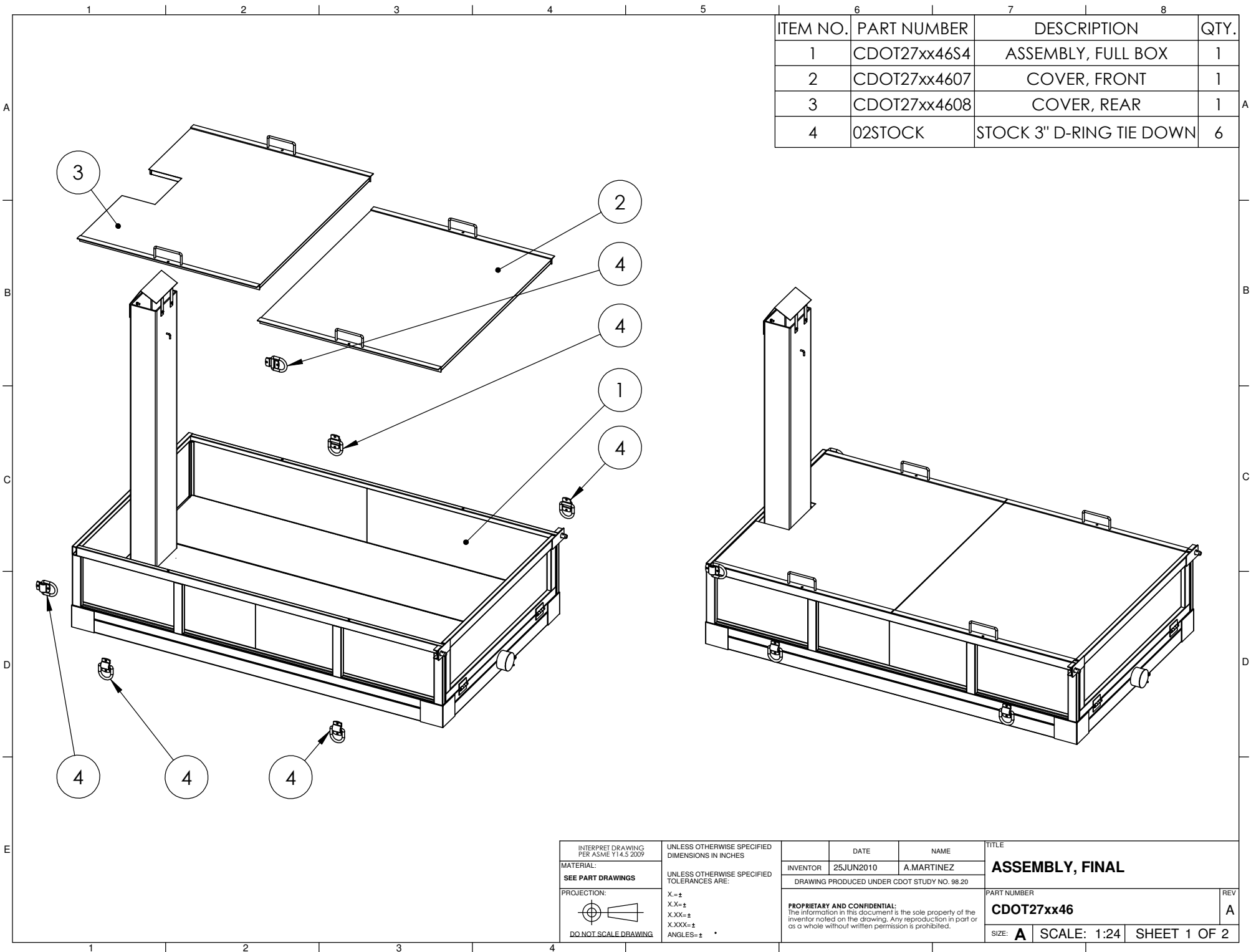
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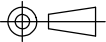
UNLESS OTHERWISE SPECIFIED  
DIMENSIONS IN INCHES

UNLESS OTHERWISE SPECIFIED  
TOLERANCES ARE:

X.=±  
X.X=±  
X.XX=±  
X.XXX=±  
ANGLES=± °

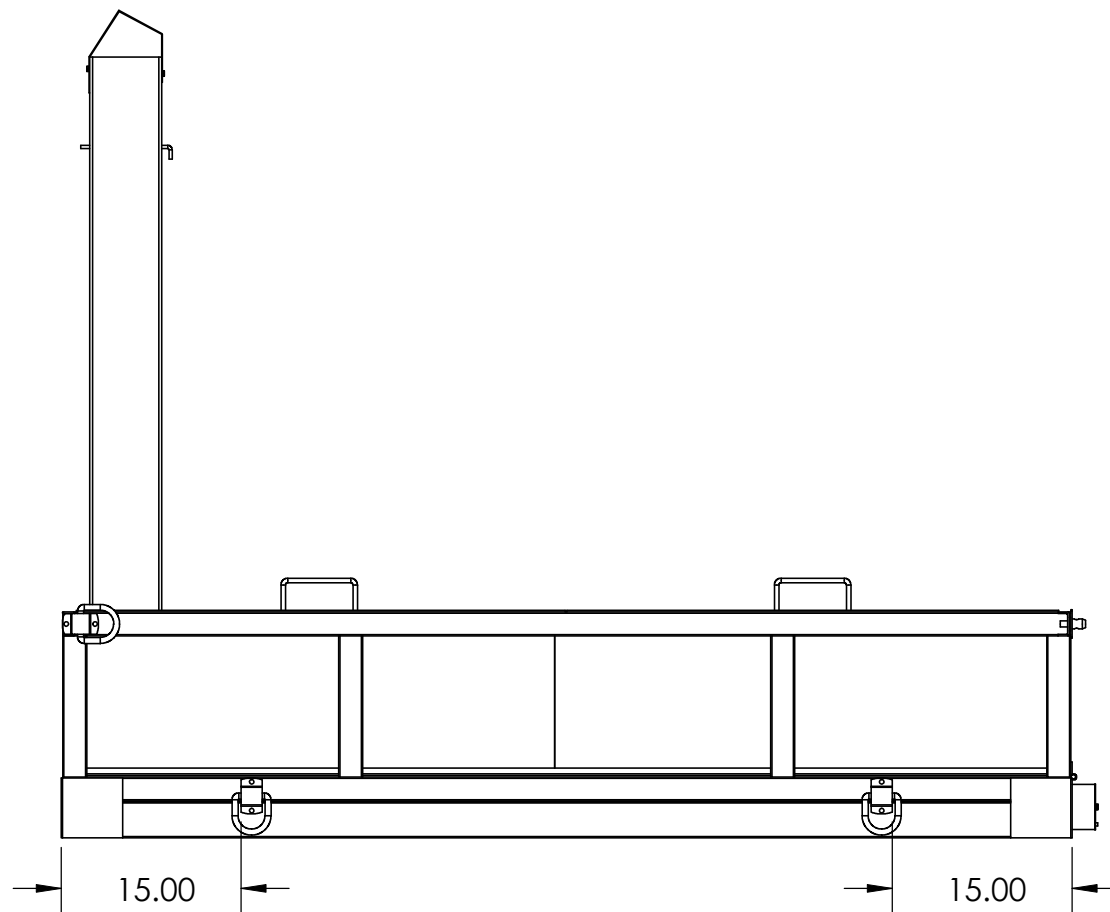
INVENTOR	DATE	NAME	TITLE
INVENTOR	25JUN2010	A.MARTINEZ	<b>ASSEMBLY, FULL BOX</b>
DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER
<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			<b>CDOT27xx46S4</b>
SIZE: <b>A</b>			SCALE: 1:32
SHEET 1 OF 1			REV <b>A</b>



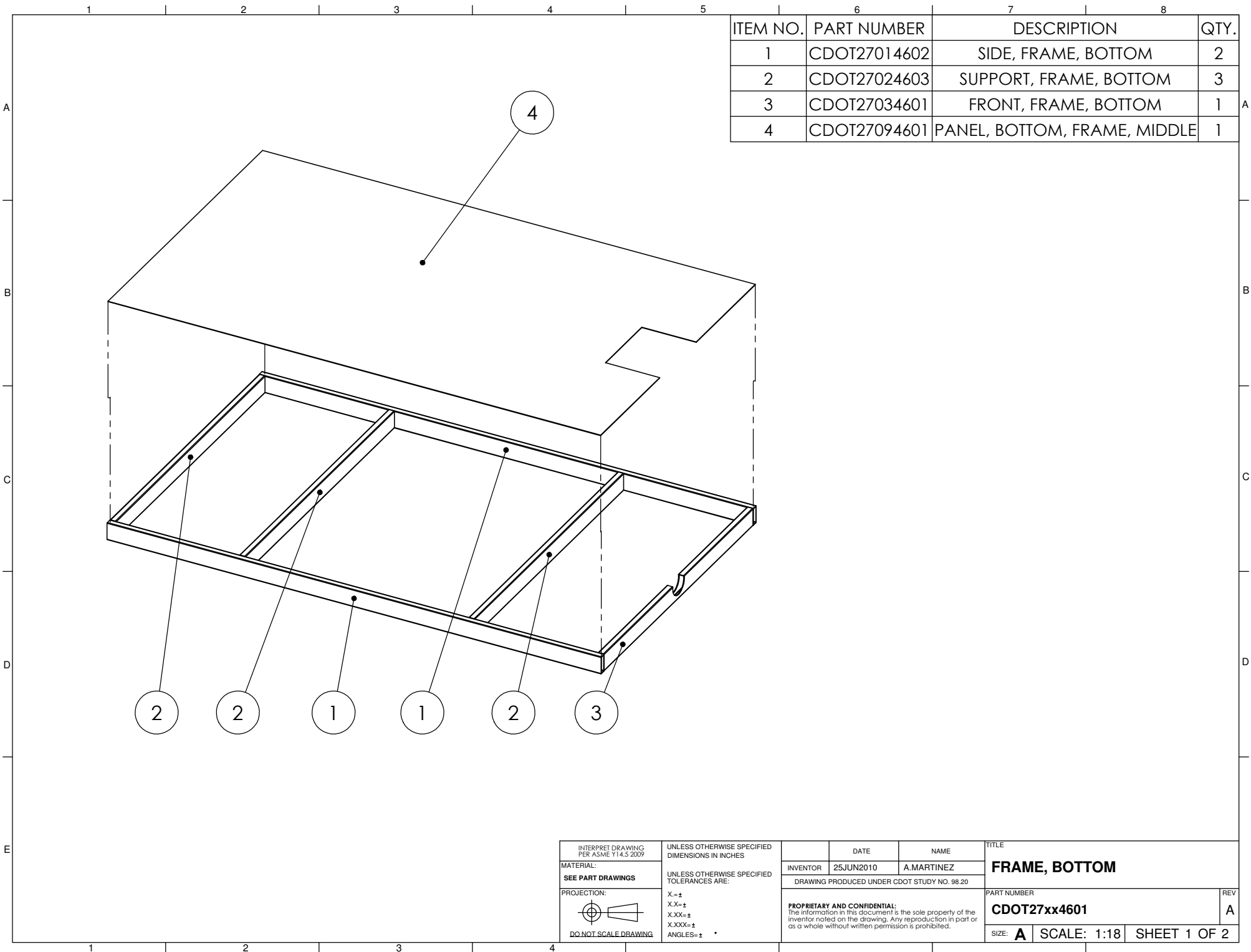
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL:  SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ				ASSEMBLY, FINAL
PROJECTION: 		X.=± X.X=± X.XX=± X.XXX=± ANGLES=± °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER		REV
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT27xx46		A
				SIZE: A		SCALE: 1:24		SHEET 1 OF 2		

NOTES:

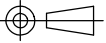
1. THE D-RING TIE DOWNS ARE FULLY WELDED TO THE FRAME.
2. THE HORIZONTAL D-RING TIE DOWN SITS FLUSH WITH THE BACK OF THE FRAME AND THE TOP OF THE FRAME.
3. THE VERTICAL D-RING TIE DOWNS SIT FLUSH WITH THE TOP OF THE MIDDLE FRAME.



TITLE		
ASSEMBLY, FINAL		
PART NUMBER		REV
CDOT27xx46		A
SIZE: A	SCALE: 1:16	SHEET 2 OF 2

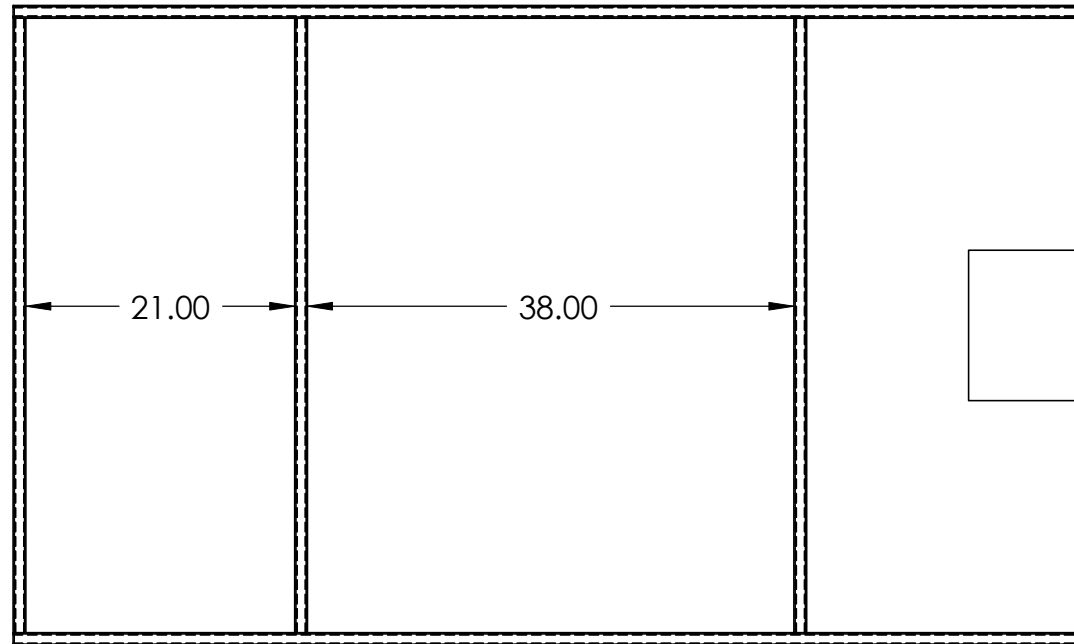


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27014602	SIDE, FRAME, BOTTOM	2
2	CDOT27024603	SUPPORT, FRAME, BOTTOM	3
3	CDOT27034601	FRONT, FRAME, BOTTOM	1
4	CDOT27094601	PANEL, BOTTOM, FRAME, MIDDLE	1

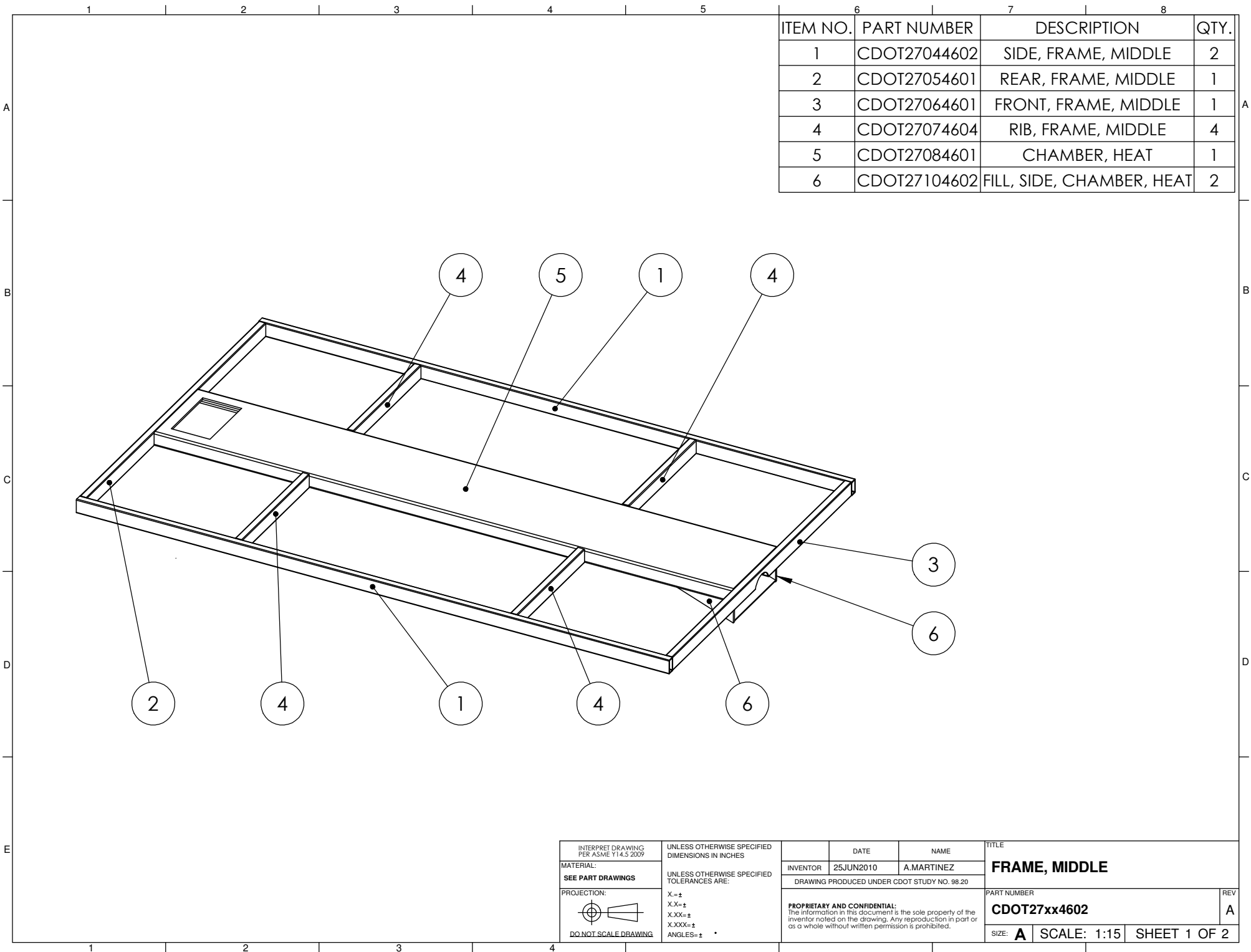
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR 25JUN2010 A.MARTINEZ	
PROJECTION: 		X.=± X.X.=± X.XX.=± X.XXX.=± ANGLES=± °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER CDOT27xx4601	
				SIZE: A	SCALE: 1:18
				SHEET 1 OF 2	
				REV A	

NOTES:

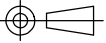
1. ALL JOINTS BETWEEN TUBING ARE FULLY WELDED.
2. THE PANEL IS NOT WELDED INTO PLACE UNTIL THE MIDDLE FRAME IS JOINED TO THE BOTTOM FRAME. CENTER THE PANEL ON TOP OF THE BOTTOM FRAME IN PREPARATION FOR THE MIDDLE FRAME. SEE FULL ASSEMBLY DRAWINGS FOR FURTHER INFORMATION.



TITLE		
FRAME, BOTTOM		
PART NUMBER		REV
CDOT27xx4601		A
SIZE: A	SCALE: 1:15	SHEET 2 OF 2



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27044602	SIDE, FRAME, MIDDLE	2
2	CDOT27054601	REAR, FRAME, MIDDLE	1
3	CDOT27064601	FRONT, FRAME, MIDDLE	1
4	CDOT27074604	RIB, FRAME, MIDDLE	4
5	CDOT27084601	CHAMBER, HEAT	1
6	CDOT27104602	FILL, SIDE, CHAMBER, HEAT	2

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR 25JUN2010 A.MARTINEZ	
PROJECTION: 		X.=± X.X.=± X.XX.=± X.XXX.=± ANGLES=± °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER	
				CDOT27xx4602	
				SIZE: A	REV A
				SCALE: 1:15	SHEET 1 OF 2

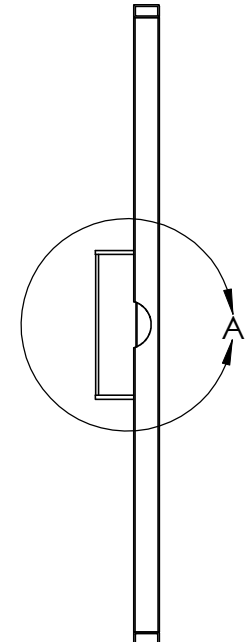
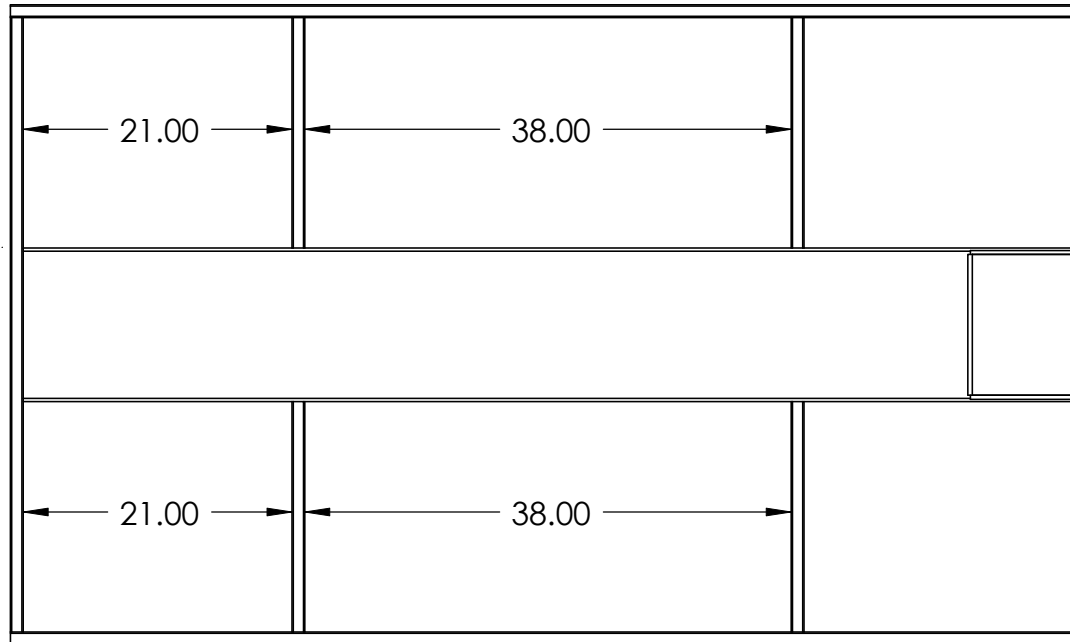
NOTES:

1. ALL JOINTS ARE FULLY WELDED.

THE HEAT CHAMBER SIDE FILL PIECES ARE ALIGNED WITH THE FRONT OF THE HEAT CHAMBER AND THE SIDES OF THE BENT DOWN FLAP.

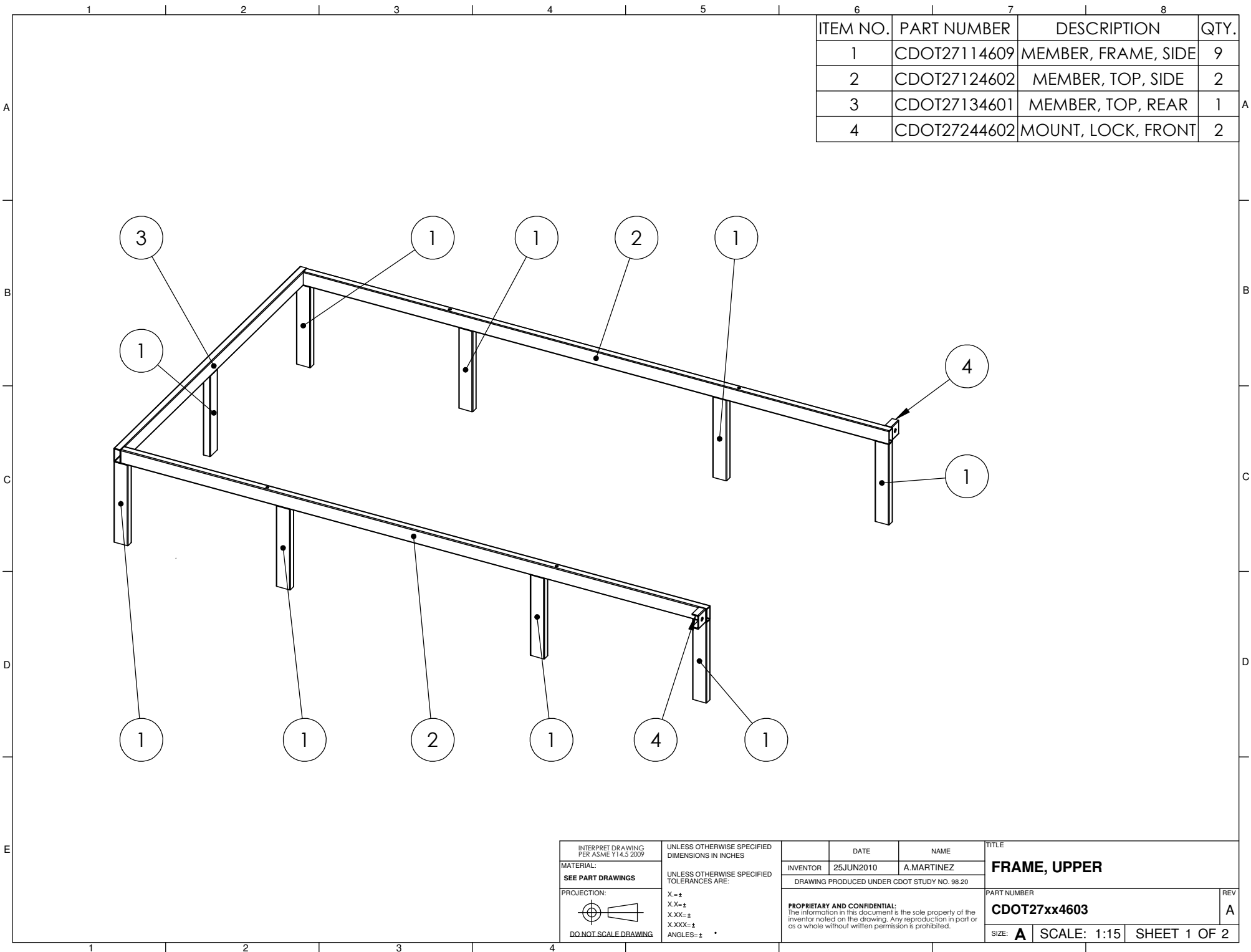


DETAIL A  
SCALE 1 : 8

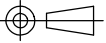


TITLE		
<b>FRAME, MIDDLE</b>		
PART NUMBER	REV	
<b>CDOT27xx4602</b>	<b>A</b>	
SIZE: <b>A</b>	SCALE: 1:15	SHEET 2 OF 2



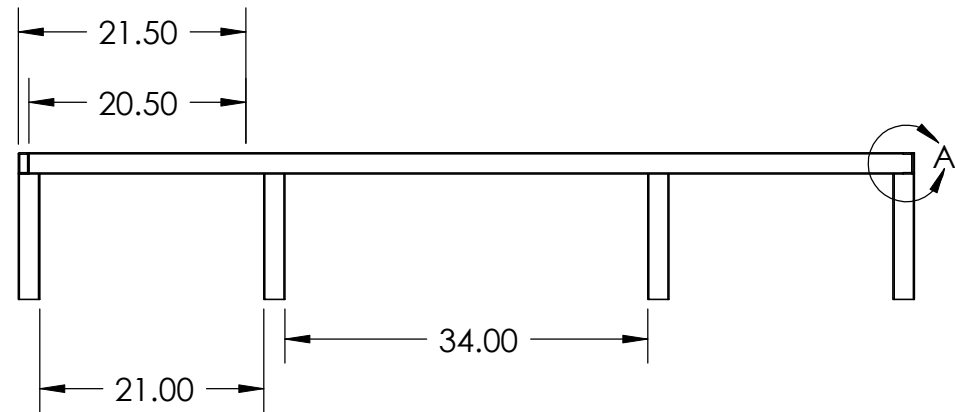
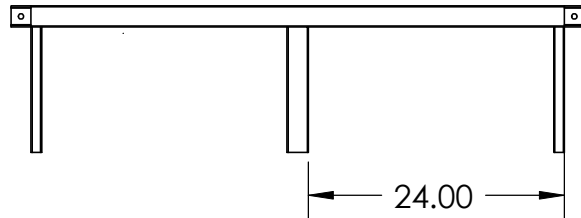
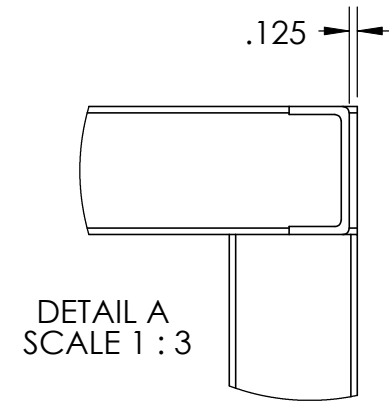


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27114609	MEMBER, FRAME, SIDE	9
2	CDOT27124602	MEMBER, TOP, SIDE	2
3	CDOT27134601	MEMBER, TOP, REAR	1
4	CDOT27244602	MOUNT, LOCK, FRONT	2

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR 25JUN2010 A.MARTINEZ	
PROJECTION: 		X=± X.X=± X.XX=± X.XXX=± ANGLES=±		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER	
				CDOT27xx4603	
				SIZE: A	REV A
				SCALE: 1:15	SHEET 1 OF 2

NOTES:

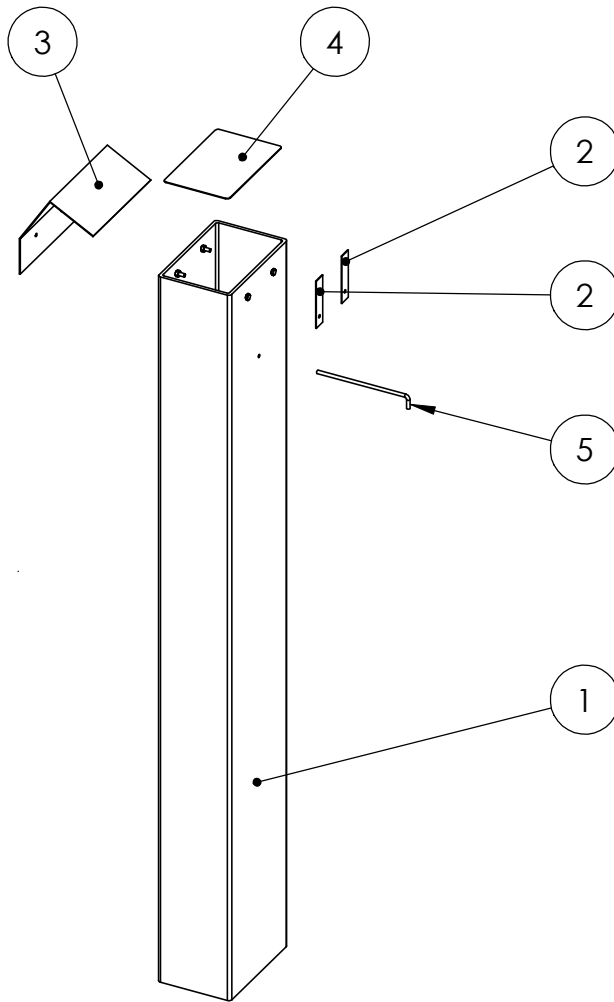
1. ALL JOINTS ARE FULLY WELDED
2. THE SIDE FRAME MEMBERS ARE POSITIONED SUCH THAT THE HOLES ARE 21.5" FROM EITHER END OF THE OVERALL FRAME. AS SUCH, THE SIDE FRAME MEMBER IS WELDED INTO THE FRAME WITH THE HOLE DRILLED AT 20.5" FACING THE FRAME BACK. THIS IS INDICATED ON THE DRAWING BY THE TWO MEASUREMENTS ABOVE THE SIDE FRAME MEMBER.



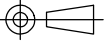
TITLE		
<b>FRAME, UPPER</b>		
PART NUMBER		REV
<b>CDOT27xx4603</b>		<b>A</b>
SIZE: <b>A</b>	SCALE: 1:18	SHEET 2 OF 2

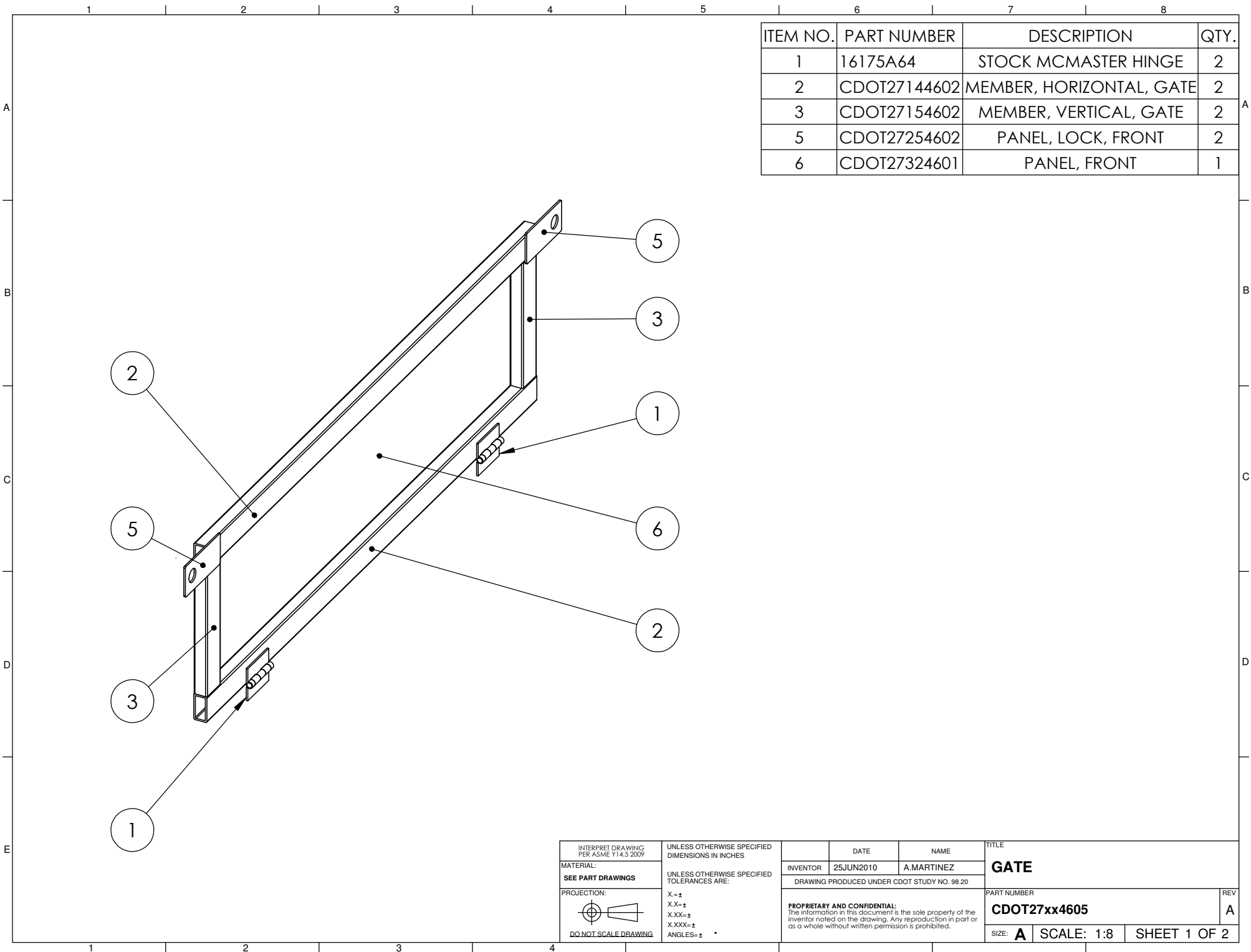
NOTES:

1. THE DAMPER SHAFT IS INSERTED THROUGH THE CHIMNEY, THEN THE DAMPER IS SET INTO THE CHIMNEY. TWO 1" WELDS HOLD THE DAMPER TO THE SHAFT, AND THE SHAFT IN PLACE.
2. THE TWO CHIMNEY TOP SUPPORTS ARE WELDED TO THE CHIMNEY TOP ONCE ALL THREE ARE BOLTED IN PLACE.

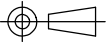


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27164601	CHIMNEY	1
2	CDOT27184602	SUPPORT, TOP, CHIMNEY	2
3	CDOT27174601	TOP, CHIMNEY	1
4	CDOT27194601	DAMPER, CHIMNEY	1
5	CDOT27204601	SHAFT, DAMPER, CHIMNEY	1
6	HFBOLT 0.25-20x1x0.75-N	BOLT, CHIMNEY TOP	4
7	HNUT 0.2500-20-D-N	NUT, CHIMNEY TOP	4

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ	
PROJECTION: 		X.=± X.X=± X.XX=± X.XXX=± ANGLES=±		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT27xx4604	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:14	
								SHEET 1 OF 1	

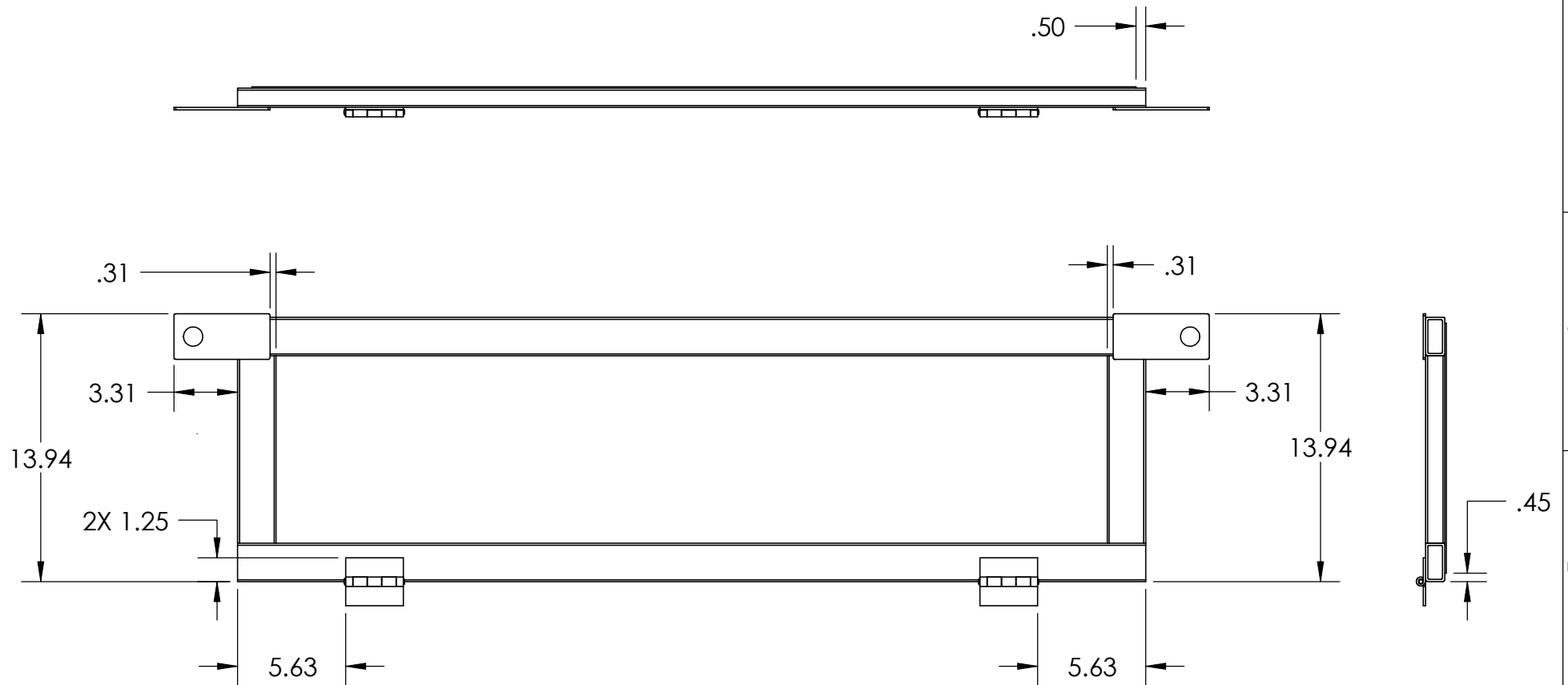


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	16175A64	STOCK MCMASTER HINGE	2
2	CDOT27144602	MEMBER, HORIZONTAL, GATE	2
3	CDOT27154602	MEMBER, VERTICAL, GATE	2
5	CDOT27254602	PANEL, LOCK, FRONT	2
6	CDOT27324601	PANEL, FRONT	1

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL:  SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ	
PROJECTION:  		X.=± X.X.=± X.XX.=± X.XXX.=± ANGLES=±		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER <b>CDOT27xx4605</b>					
				SIZE: <b>A</b>		SCALE: 1:8		SHEET 1 OF 2	
								REV <b>A</b>	

NOTES:

1. ALL JOINTS ARE FULLY WELDED, EXCLUDING THE REAR PANEL.
2. THE REAR PANEL IS WELDED TO THE FRAME FOR 1" EVERY 4", AND AROUND ALL CORNERS.

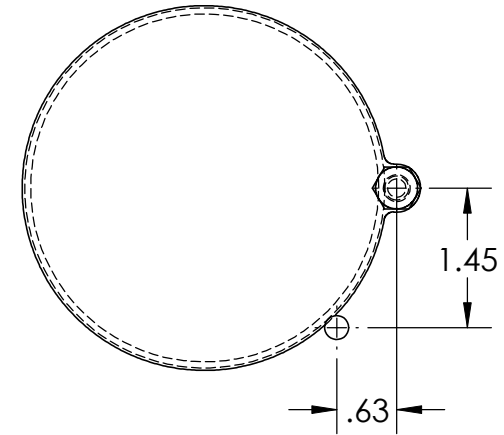
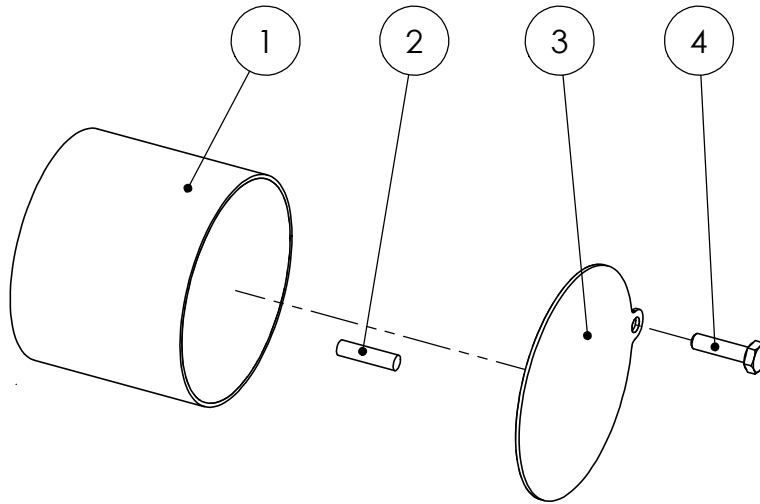



TITLE		
<b>GATE</b>		
PART NUMBER		REV
<b>CDOT27xx4605</b>		<b>A</b>
SIZE: <b>A</b>	SCALE: 1:8	SHEET 2 OF 2

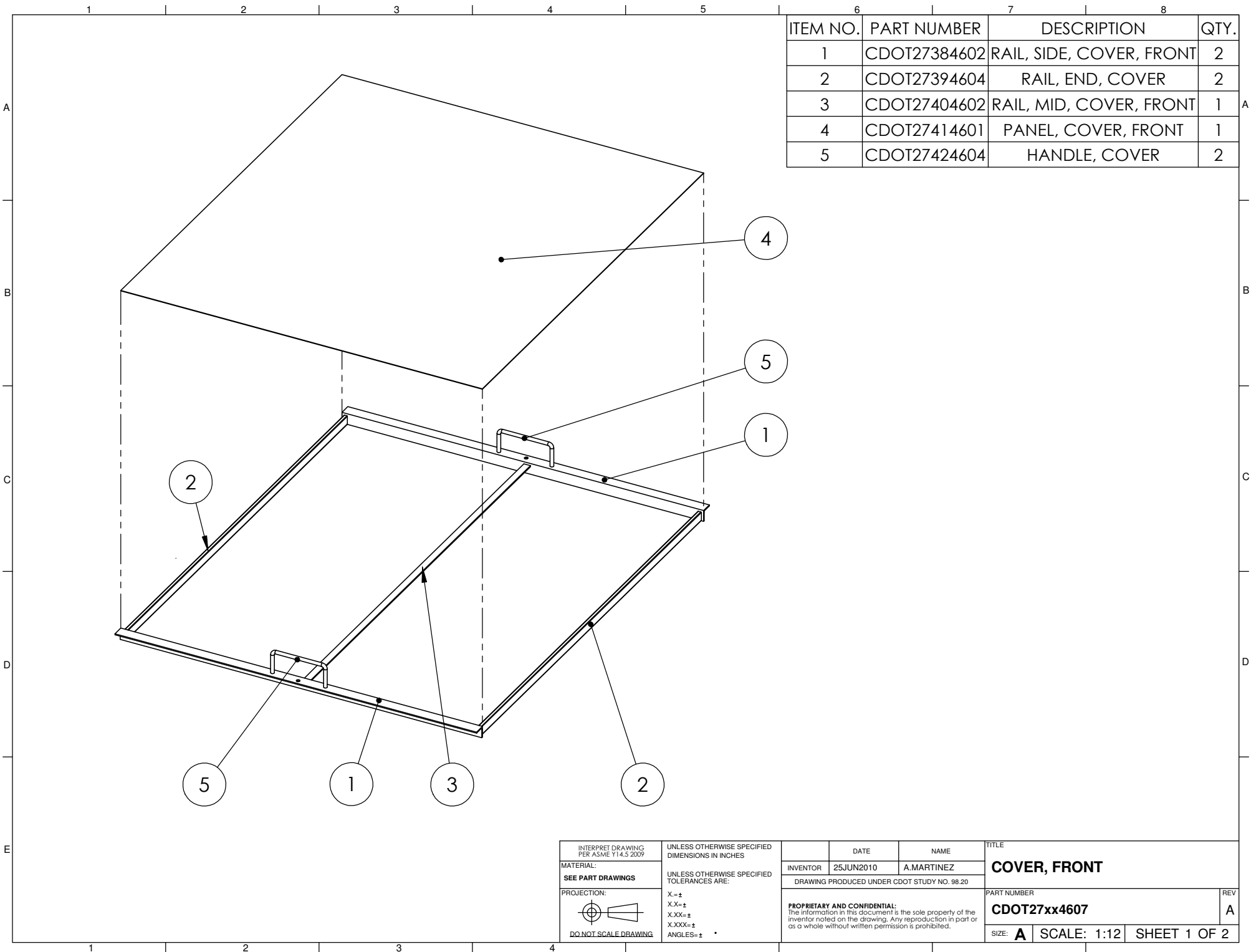
NOTES:

1. THE BOLT IS PLACED THROUGH THE COVER, THEN WELDED ONTO THE OUTSIDE OF THE ENTRY TUBE. THIS WILL ACT AS THE HINGE FOR THE COVER TO ROTATE ABOUT.
2. ONCE THE COVER IS WELDED ON, WELD THE STOP PIN ONTO THE OUTSIDE OF THE TUBE. THIS PIN WILL KEEP THE COVER FROM OPENING WITH GRAVITY.

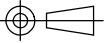
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27214601	ENTRY, CHAMBER, HEAT	1
2	CDOT27224601	STOP, ENTRY, CHAMBER, HEAT	1
3	CDOT27234601	COVER, ENTRY, CHAMBER, HEAT	1
4	HFBOLT 0.25-20x1x0.75-N	BOLT, HINGE	1



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ	
PROJECTION: 		X.=± X.X=± X.XX=± X.XXX=± ANGLES=±		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER				REV	
				CDOT27xx4606				A	
				SIZE: A		SCALE: 1:3		SHEET 1 OF 1	

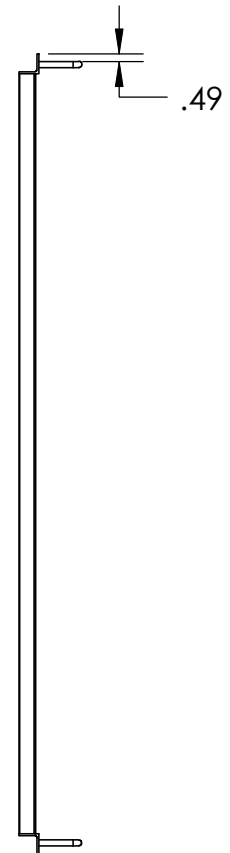
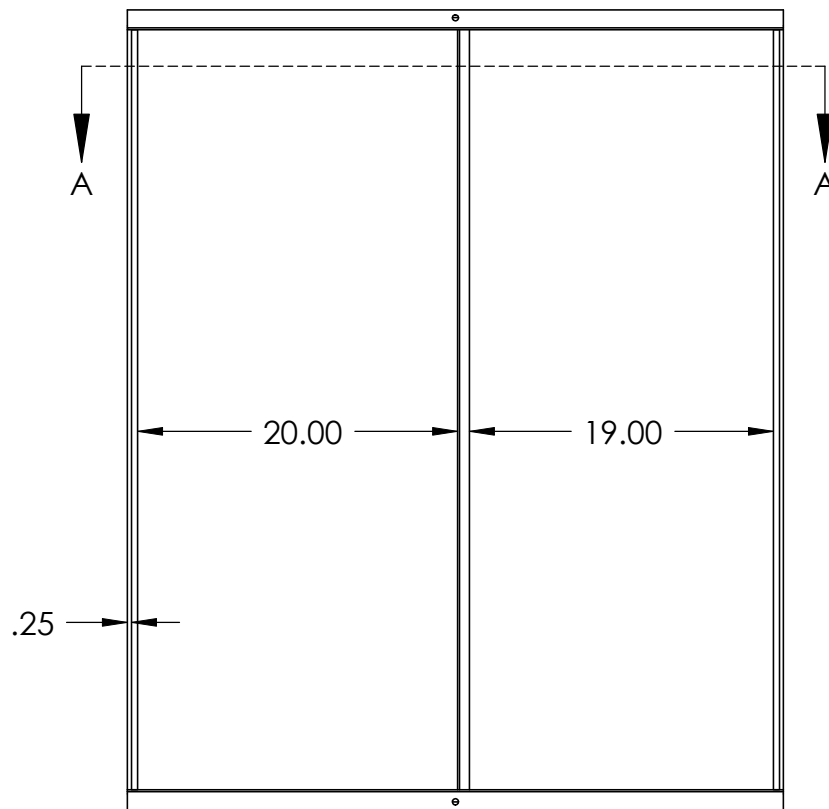
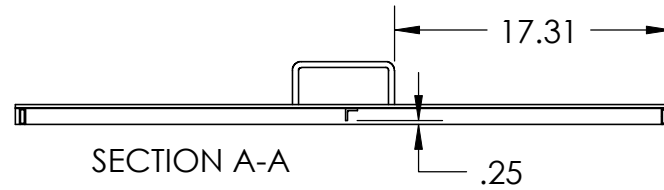


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27384602	RAIL, SIDE, COVER, FRONT	2
2	CDOT27394604	RAIL, END, COVER	2
3	CDOT27404602	RAIL, MID, COVER, FRONT	1
4	CDOT27414601	PANEL, COVER, FRONT	1
5	CDOT27424604	HANDLE, COVER	2

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		COVER, FRONT	
PROJECTION: 		X.=± X.X=± X.XX=± X.XXX=± ANGLES=± °		PART NUMBER CDOT27xx4607	
DO NOT SCALE DRAWING		INVENTOR 25JUN2010 A.MARTINEZ		DATE NAME	
		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		REVISION A	
		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A SCALE: 1:12 SHEET 1 OF 2	

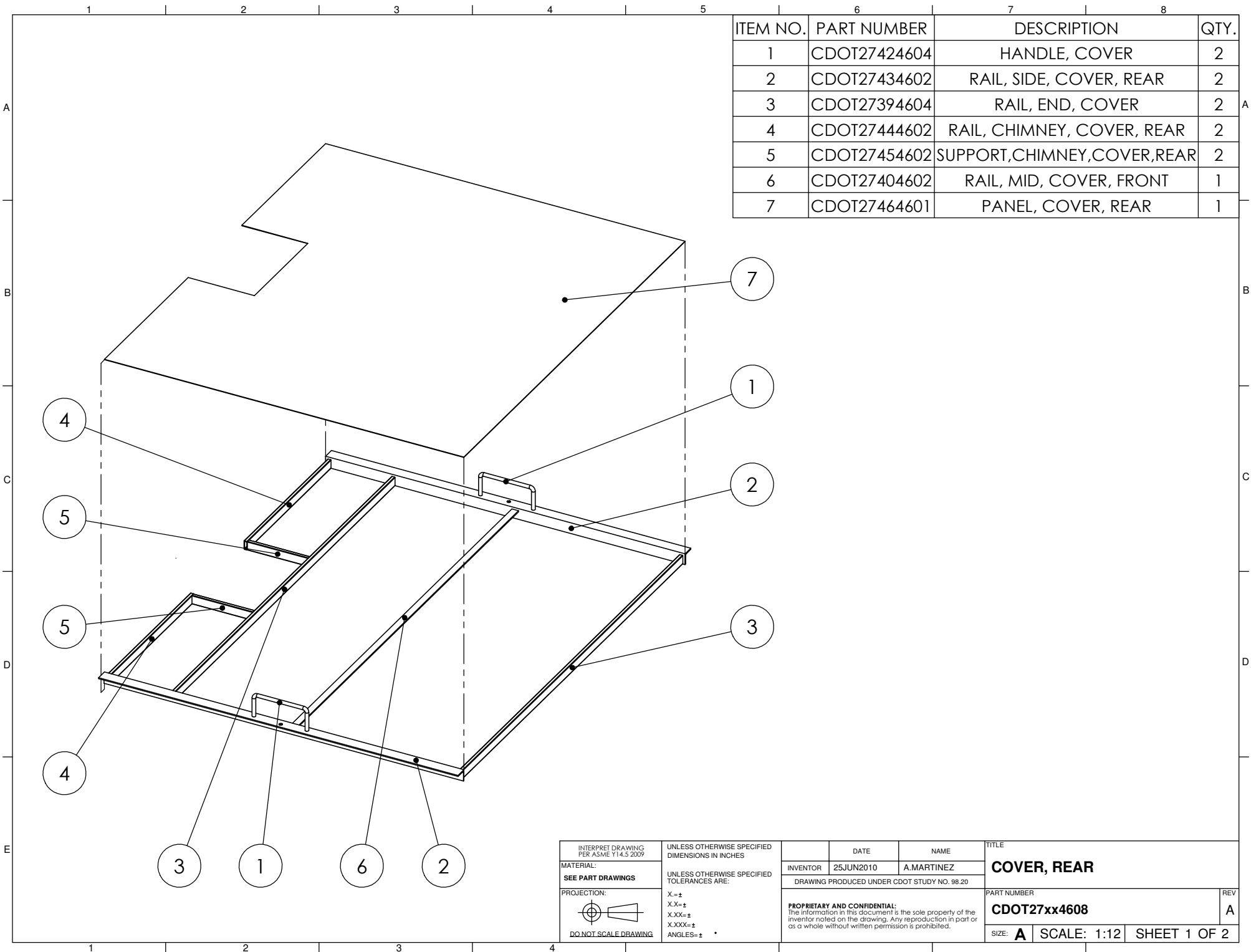
NOTES:

1. ALL JOINTS ARE FULLY WELDED, EXCLUDING THE PANEL.
2. THE PANEL IS FASTENED WITH 5 RIVETS, EQUALLY SPACED, INTO EACH OF THE MEMBERS THAT SPAN THE BOX.
3. THE DIMENSIONS SHOWN ON THE ONE HANDLE APPLY TO BOTH HANDLES.

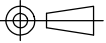


TITLE		
COVER, FRONT		
PART NUMBER	REV	
CDOT27xx4607	A	
SIZE: A	SCALE: 1:12	SHEET 2 OF 2



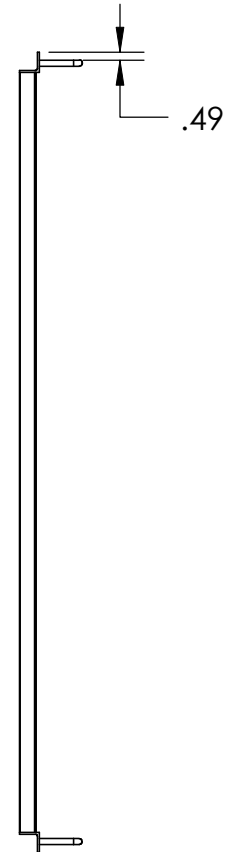
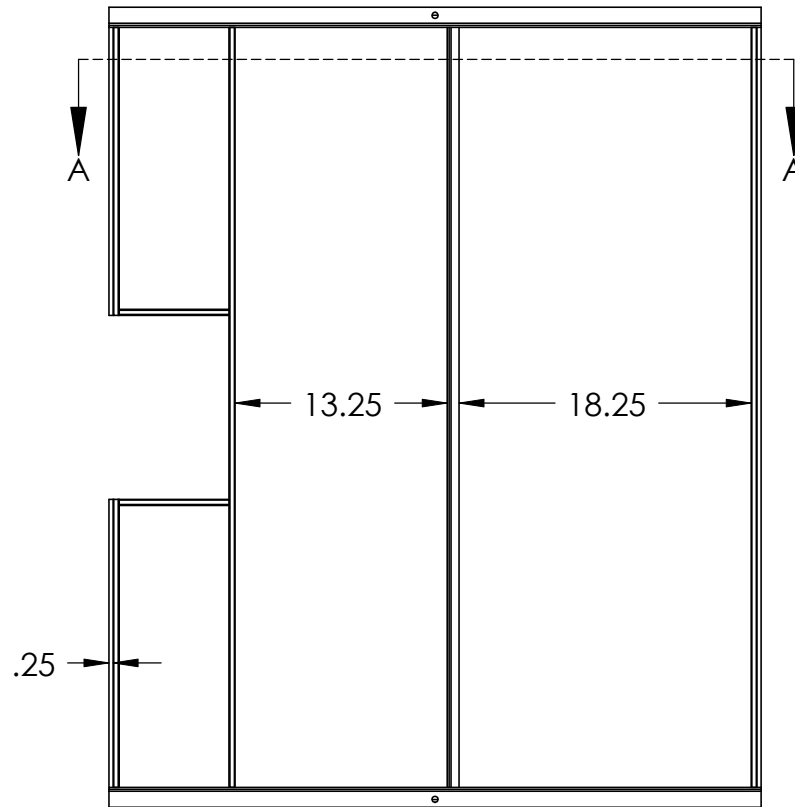
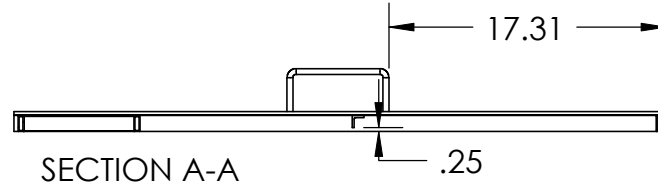


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT27424604	HANDLE, COVER	2
2	CDOT27434602	RAIL, SIDE, COVER, REAR	2
3	CDOT27394604	RAIL, END, COVER	2
4	CDOT27444602	RAIL, CHIMNEY, COVER, REAR	2
5	CDOT27454602	SUPPORT, CHIMNEY, COVER, REAR	2
6	CDOT27404602	RAIL, MID, COVER, FRONT	1
7	CDOT27464601	PANEL, COVER, REAR	1

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ	
PROJECTION: 		X.=± X.X=± X.XX=± X.XXX=± ANGLES=± °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT27xx4608	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:12	
						SHEET 1 OF 2		REV	
								A	

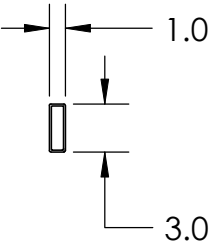
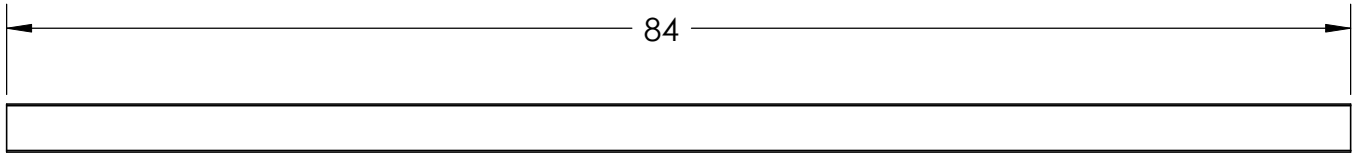
NOTES:

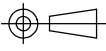
1. ALL JOINTS ARE FULLY WELDED, EXCLUDING THE PANEL.
2. THE PANEL IS FASTENED WITH 5 RIVETS, EQUALLY SPACED, INTO EACH OF THE MEMBERS THAT SPAN THE BOX.
3. THE DIMENSIONS SHOWN ON THE ONE HANDLE APPLY TO BOTH HANDLES.



TITLE		
COVER, REAR		
PART NUMBER		REV
CDOT27xx4608		A
SIZE: A	SCALE: 1:12	SHEET 2 OF 2

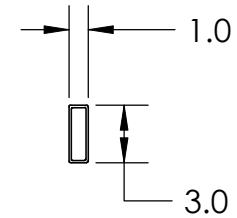
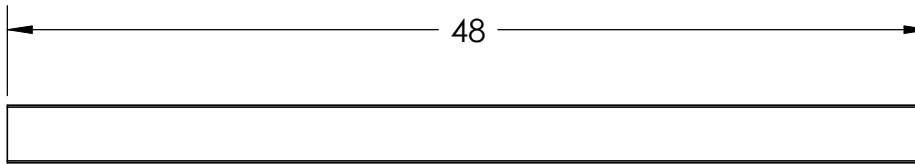
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL

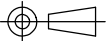


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE		
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	SIDE, FRAME, BOTTOM	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT27014602		REV A
				SIZE:	A	SCALE: 1:12	SHEET 1 OF 1	

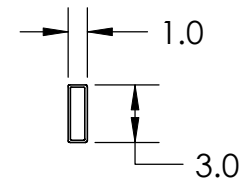
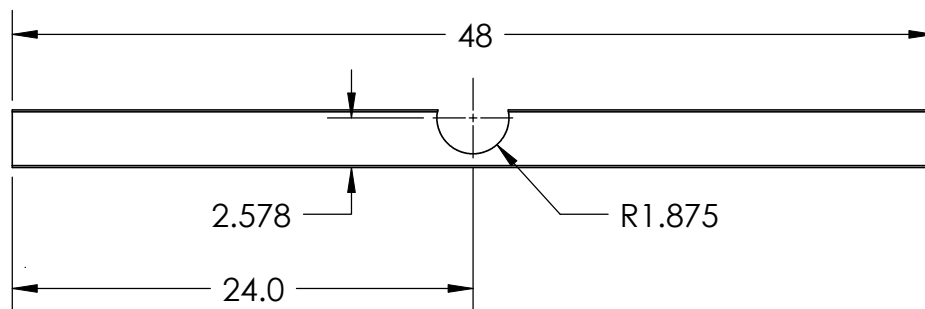
NOTES:

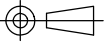
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL



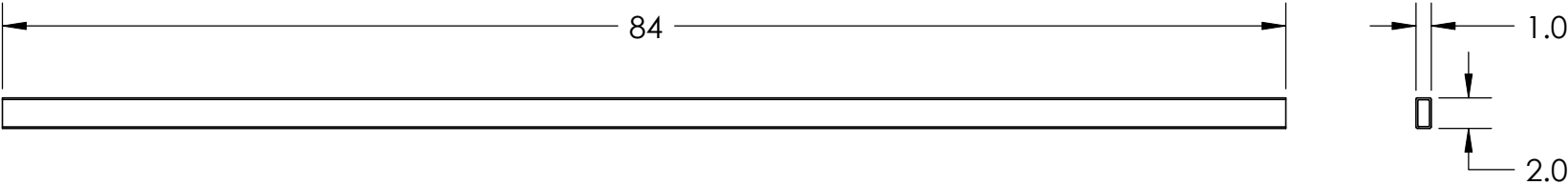
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		SUPPORT, FRAME, BOTTOM		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT27024603		REV A
				SIZE: A		SCALE: 1:10		SHEET 1 OF 1		

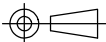
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL



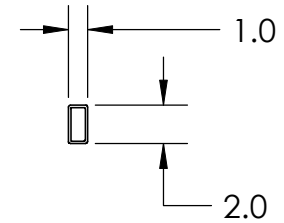
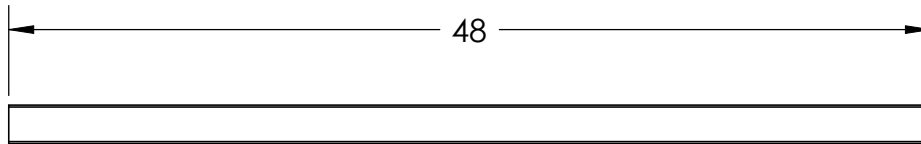
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	FRONT, FRAME, BOTTOM
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27034601		A	
				SIZE: A	SCALE: 1:10	SHEET 1 OF 1	


- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	SIDE, FRAME, MIDDLE
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27044602		SIZE: A	SCALE: 1:12 SHEET 1 OF 1
						REV	A

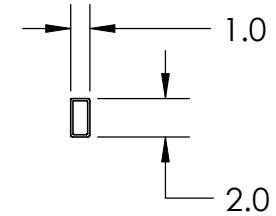
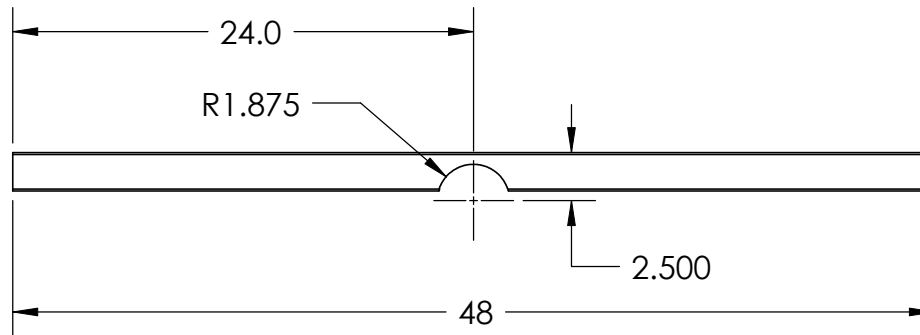
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL

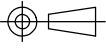


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	REAR, FRAME, MIDDLE
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			CDOT27054601
				SIZE: A			SCALE: 1:10
							SHEET 1 OF 1
							REV A

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL

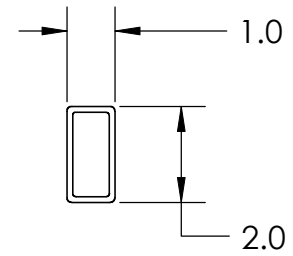
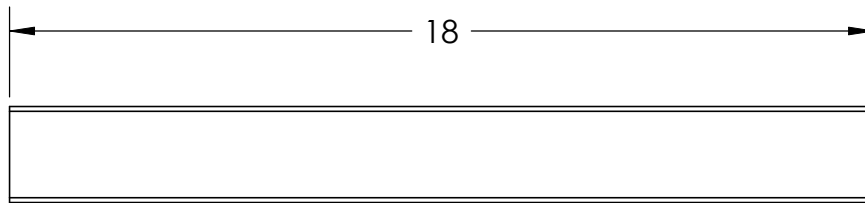


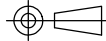
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		FRONT, FRAME, MIDDLE	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER	REV
								CDOT27064601	A
				SIZE: A		SCALE: 1:10		SHEET 1 OF 1	



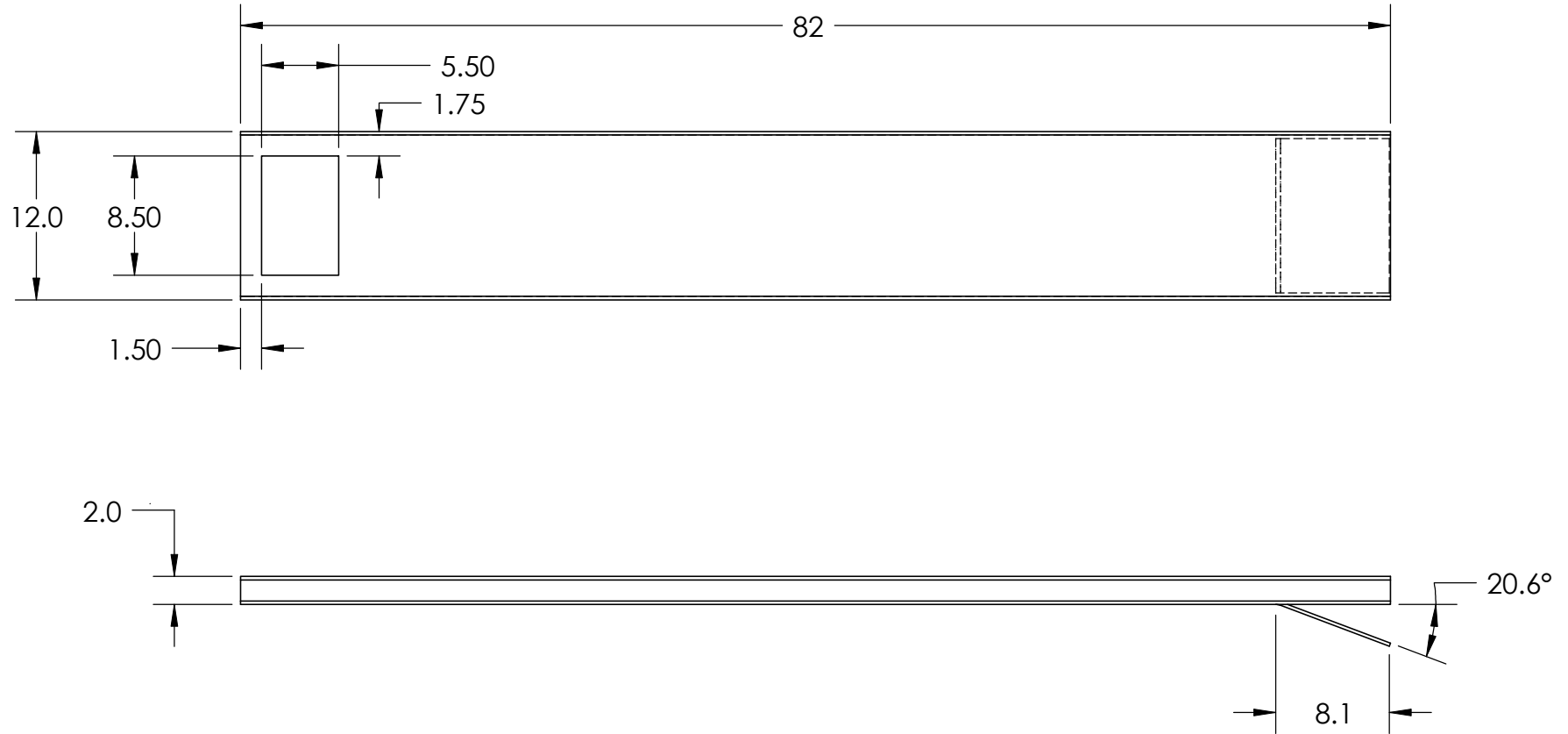
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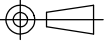
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		RIB, FRAME, MIDDLE		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT27074604		REV A
				SIZE: A		SCALE: 1:4		SHEET 1 OF 1		

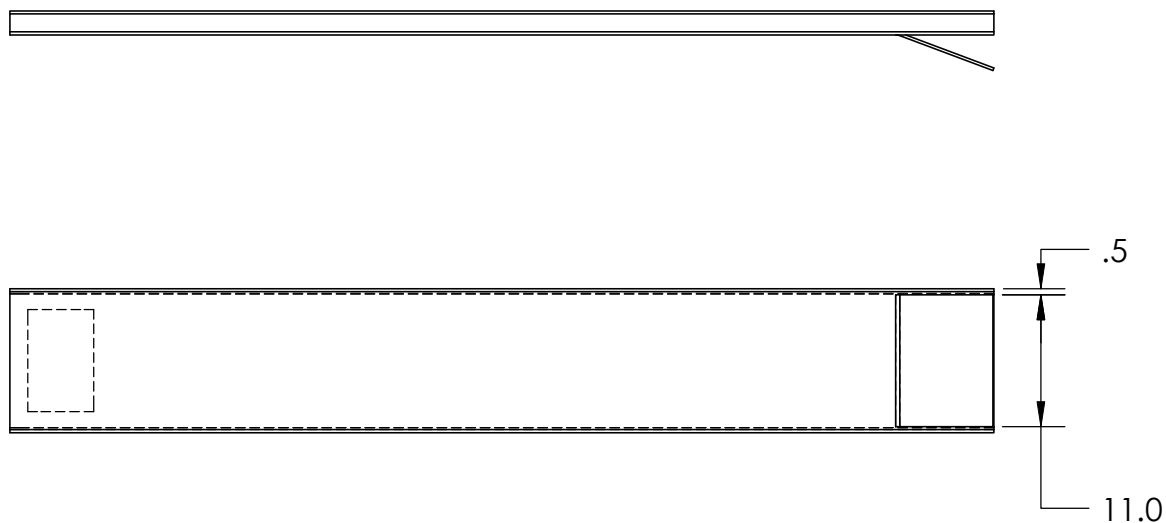
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD TUBING WITH A 0.25" WALL
  3. SEE SECOND SHEET FOR MANUFACTURE INSTRUCTIONS



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	CHAMBER, HEAT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27084601			REV A
				SIZE: A	SCALE: 1:12	SHEET 1 OF 2	

NOTES:

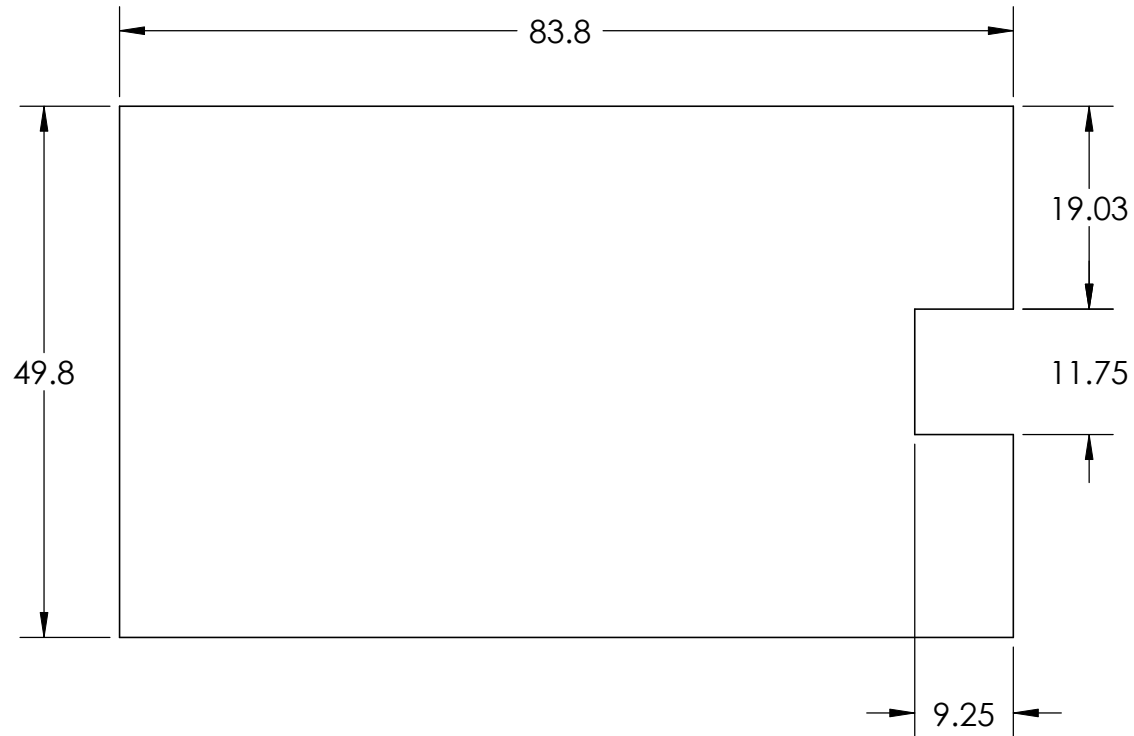
1. WHEN CUTTING THE TUBING FROM STOCK, KEEP AN ADDITIONAL 2" IN LENGTH FOR A TOTAL LENGTH OF 84".
2. CUT TWO SLITS ALONG THE BOTTOM OF THE TUBING ALONG THE LENGTH SO THAT THE BOTTOM OF THE TUBE CAN BE BENT DOWN. THE SLITS SHOULD BE 10.1" LONG TO ACCOUNT FOR THE EXTRA 2" IN LENGTH.
3. BEND THE FLAP DOWNWARD UNTIL THE DESIRED ANGLE IS OBTAINED.
4. CUT EXCESS MATERIAL FROM THE END WITH THE FLAP TO MEET THE ORIGINAL LENGTH AND DIMENSIONS SHOWN ON THE DRAWINGS.




TITLE		
CHAMBER, HEAT		
PART NUMBER		REV
CDOT27084601		A
SIZE: A	SCALE: 1:12	SHEET 2 OF 2

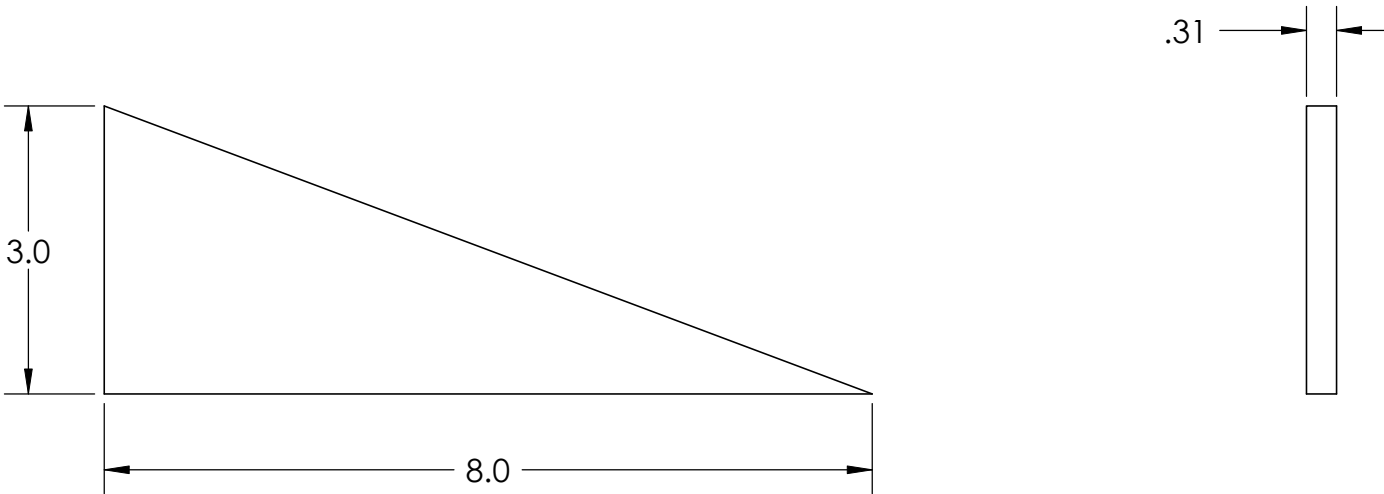
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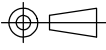
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 14GA THICKNESS



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		PANEL, BOTTOM, FRAME, MIDDLE	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT27094601			REV A
				SIZE: A		SCALE: 1:18		SHEET 1 OF 1	

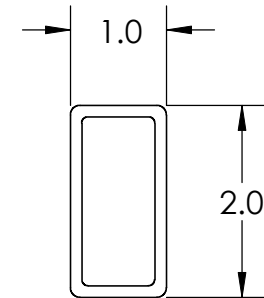
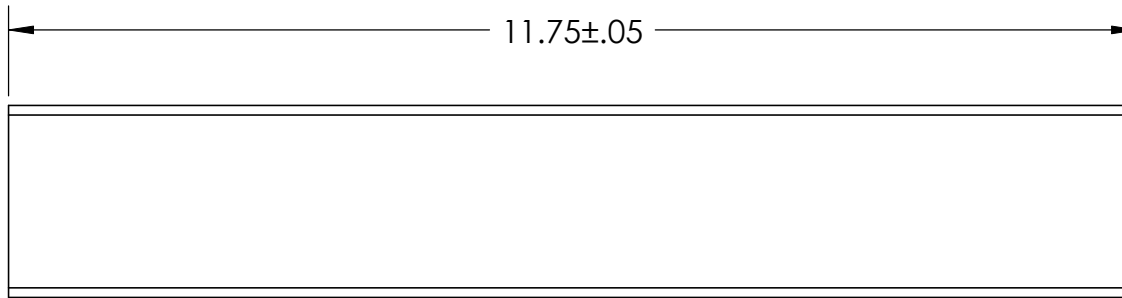
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

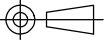


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		FILL, SIDE, CHAMBER, HEAT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				SIZE: A		SCALE: 1:2		SHEET 1 OF 1	

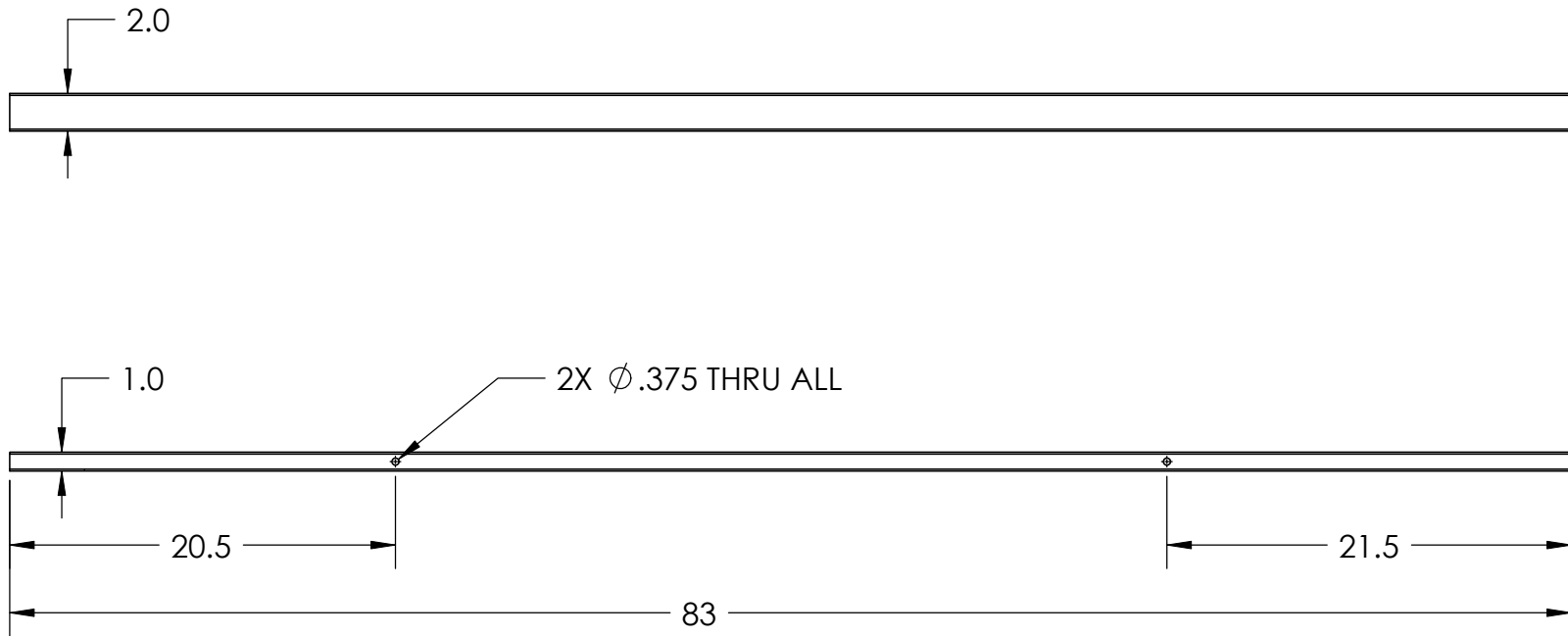
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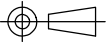
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	MEMBER, FRAME, SIDE
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27114609		A	
				SIZE: <b>A</b>	SCALE: 1:2	SHEET 1 OF 1	

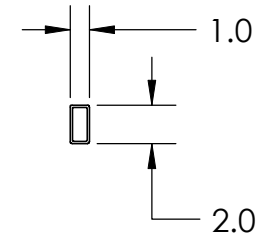
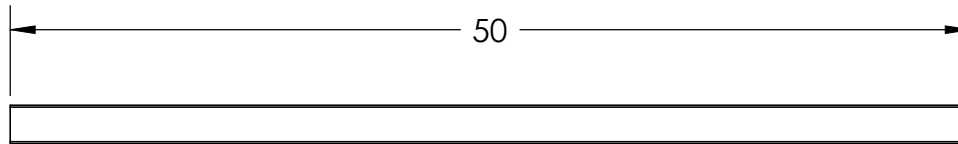
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL

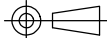


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		MEMBER, TOP, SIDE		
PROJECTION: 		X.=± 0.3 X.X=± 0.01 X.XX=± 0.008 X.XXX=± 0.005 ANGLES=± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT27124602		REV A
				SIZE: A		SCALE: 1:10		SHEET 1 OF 1		

NOTES:

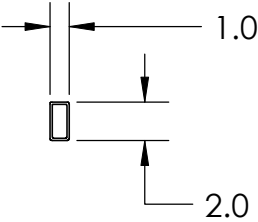
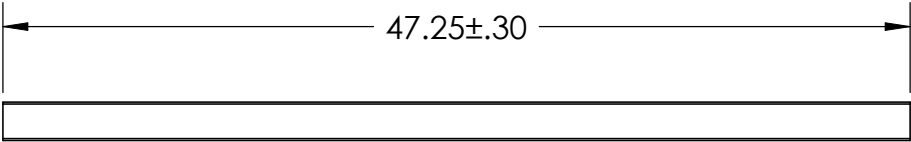
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL

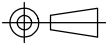


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		MEMBER, TOP, REAR	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT27134601		REV A	
						SIZE: A		SCALE: 1:10	
								SHEET 1 OF 1	

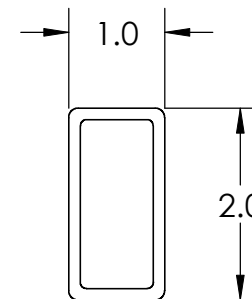
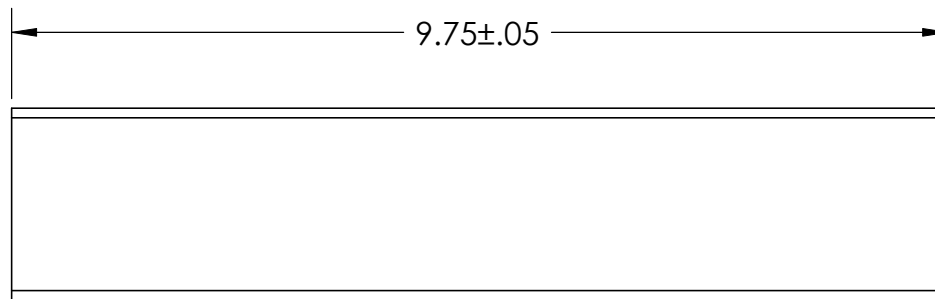


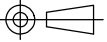
- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		MEMBER, HORIZONTAL, GATE	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				SIZE: A		SCALE: 1:10		SHEET 1 OF 1	
								REV A	

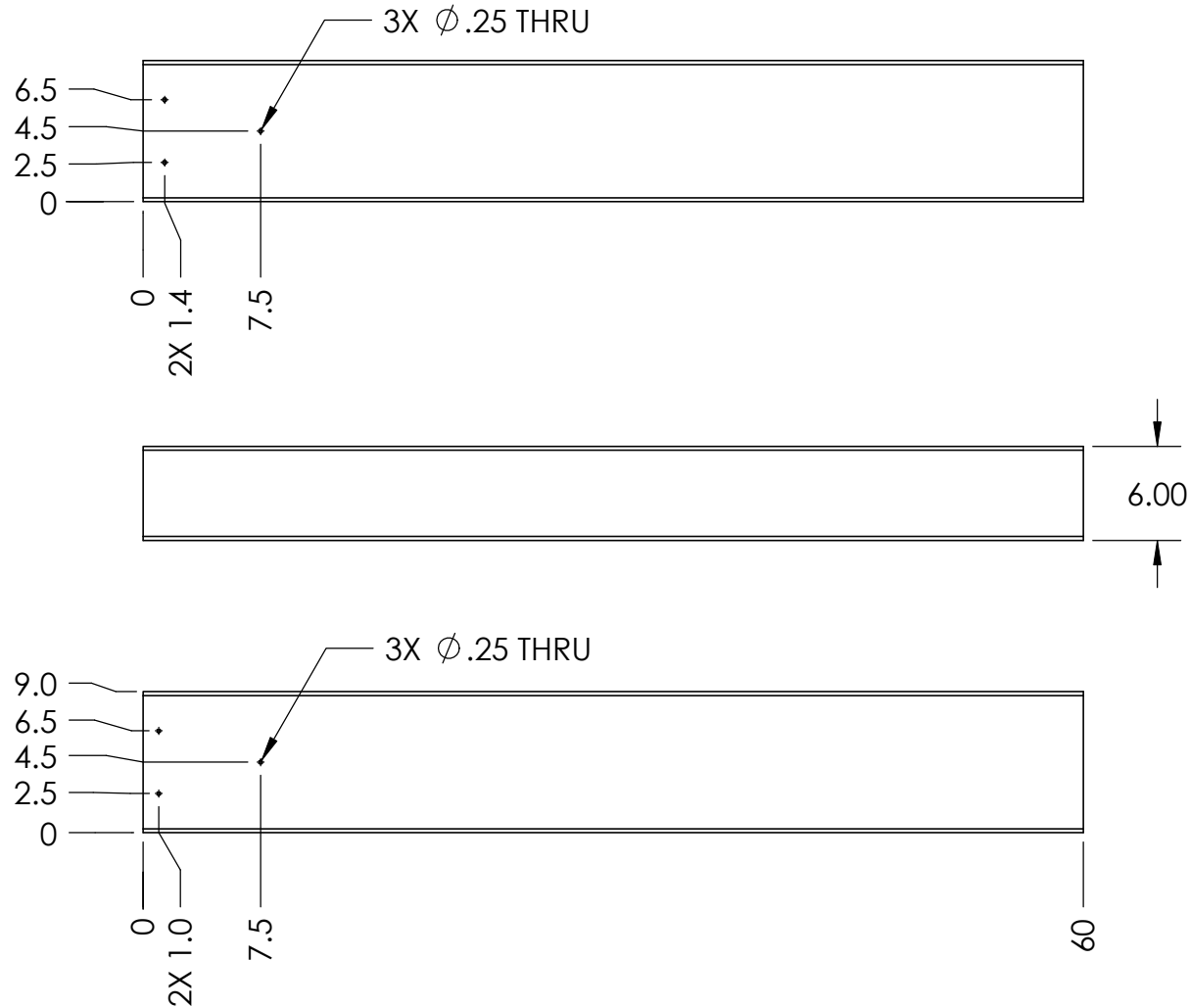
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD TUBING WITH AN 11GA WALL

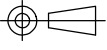


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	MEMBER, VERTICAL, GATE
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27154602		SIZE: A	A
				SCALE: 1:2		SHEET 1 OF 1	

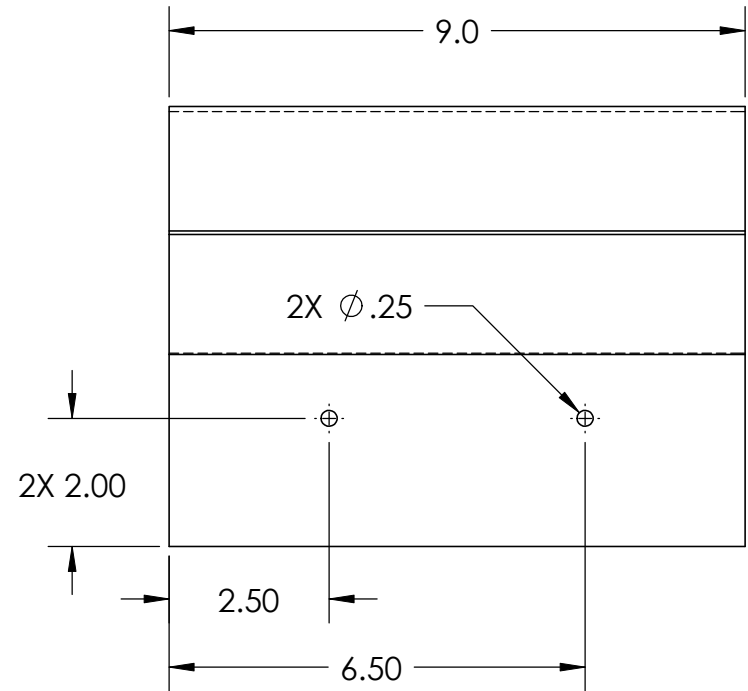
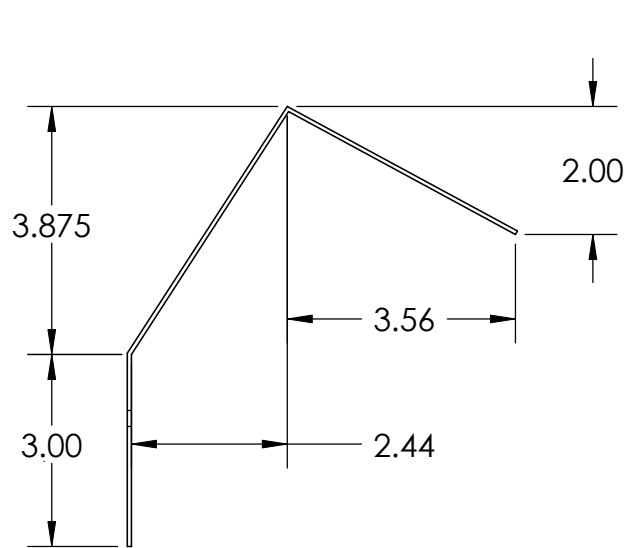
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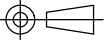
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING WITH A 0.25" WALL



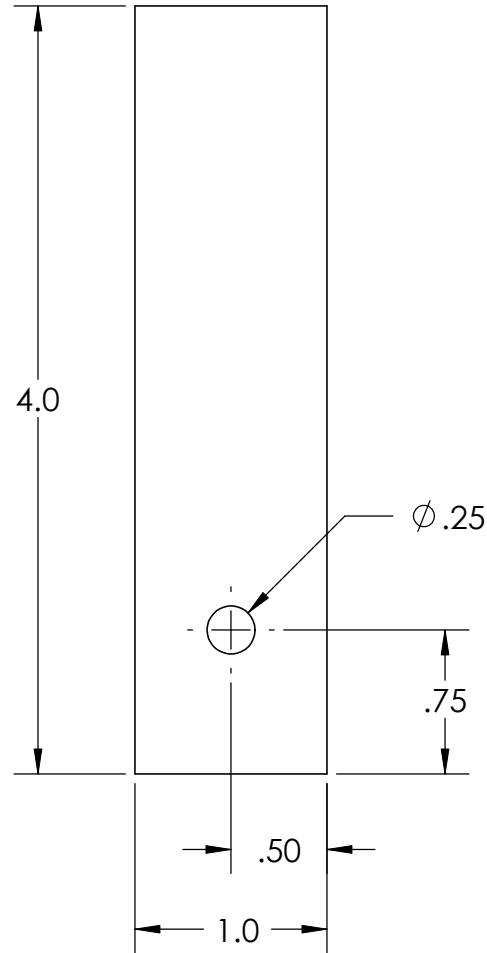
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	CHIMNEY			
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER		REV
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT27164601		A
				SIZE: A		SCALE: 1:12		SHEET 1 OF 1		

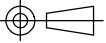
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 16GA THICKNESS



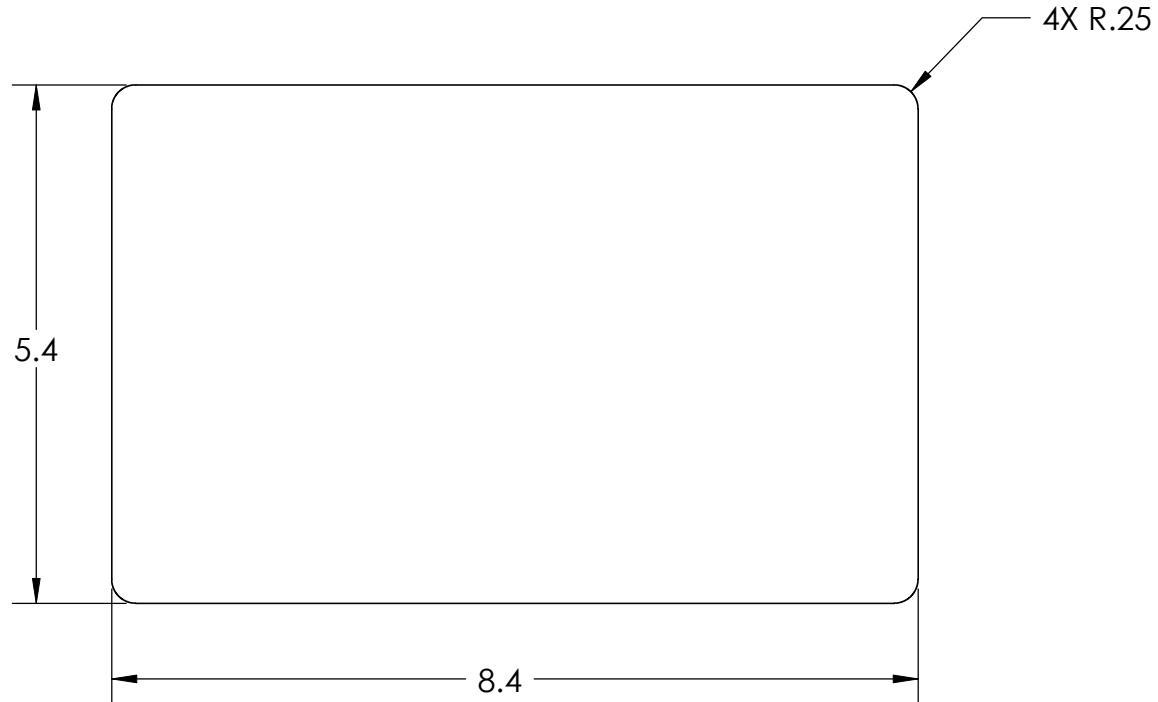
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	TOP, CHIMNEY
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27174601		A	
				SIZE: A	SCALE: 1:3	SHEET 1 OF 1	

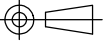
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 16GA THICKNESS



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	SUPPORT, TOP, CHIMNEY
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27184602		A	
				SIZE: A	SCALE: 1:1	SHEET 1 OF 1	

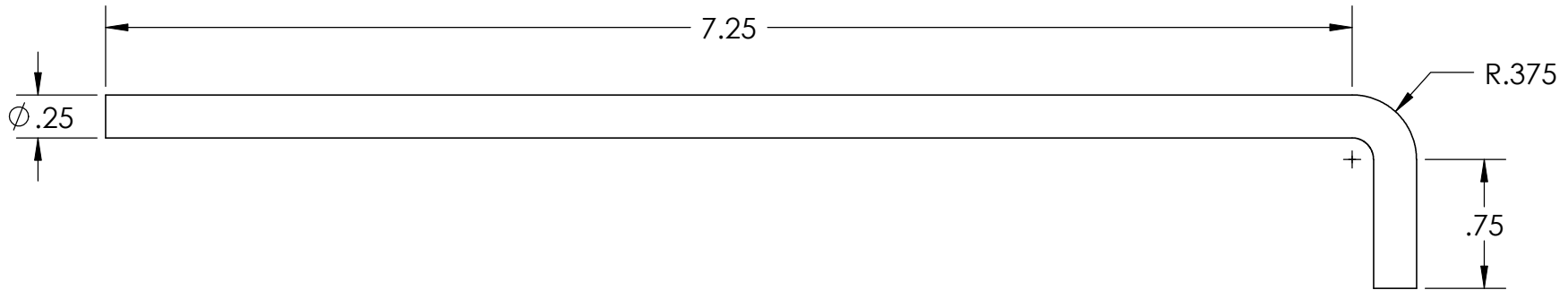
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 16GA THICKNESS




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	DAMPER, CHIMNEY
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27194601		SIZE: A	A
				SCALE: 1:2		SHEET 1 OF 1	

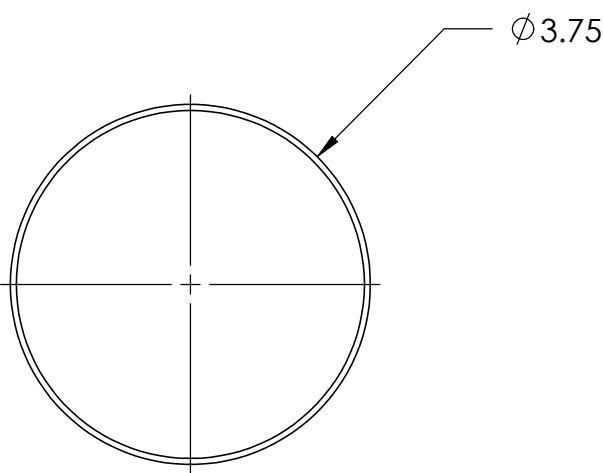
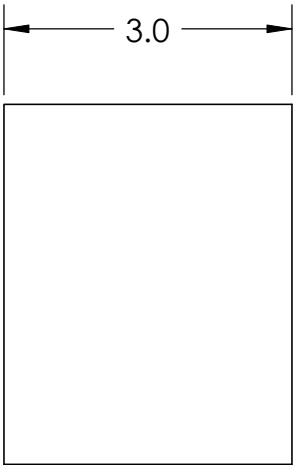
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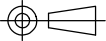
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL ROD



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: <b>STEEL ROD</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	<b>SHAFT, DAMPER, CHIMNEY</b>
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			PART NUMBER <b>CDOT27204601</b>		REV <b>A</b>
				SIZE: <b>A</b>	SCALE: 1:1	SHEET 1 OF 1	

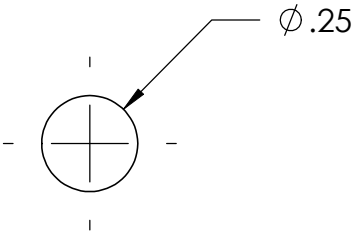
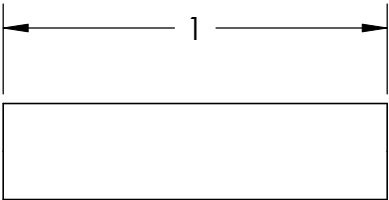
- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD TUBING WITH A 16GA WALL

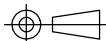


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		ENTRY, CHAMBER, HEAT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER CDOT27214601				REV A	
				SIZE: A		SCALE: 1:2		SHEET 1 OF 1	



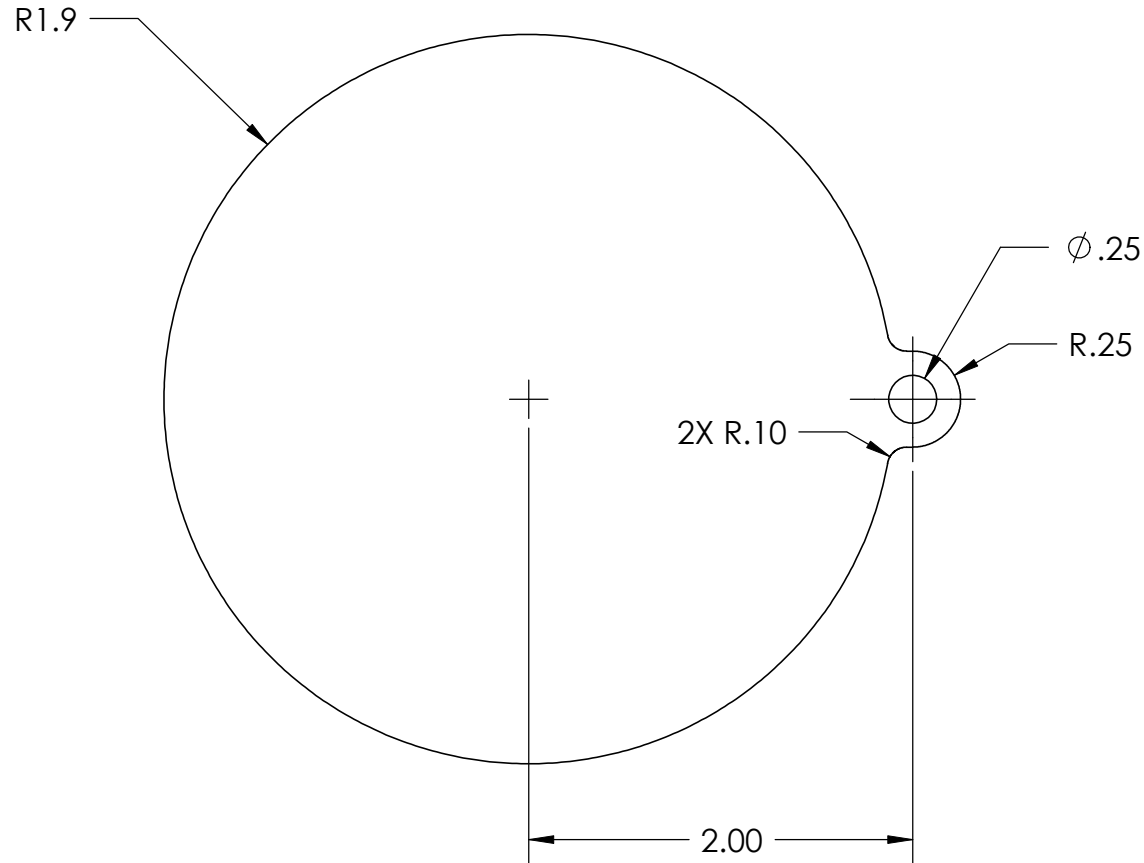
- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD STEEL ROD

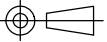


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STANDARD STEEL ROD		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		STOP, ENTRY, CHAMBER, HEAT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER		CDOT27224601		REV A	
				SIZE: A		SCALE: 2:1		SHEET 1 OF 1	

NOTES:

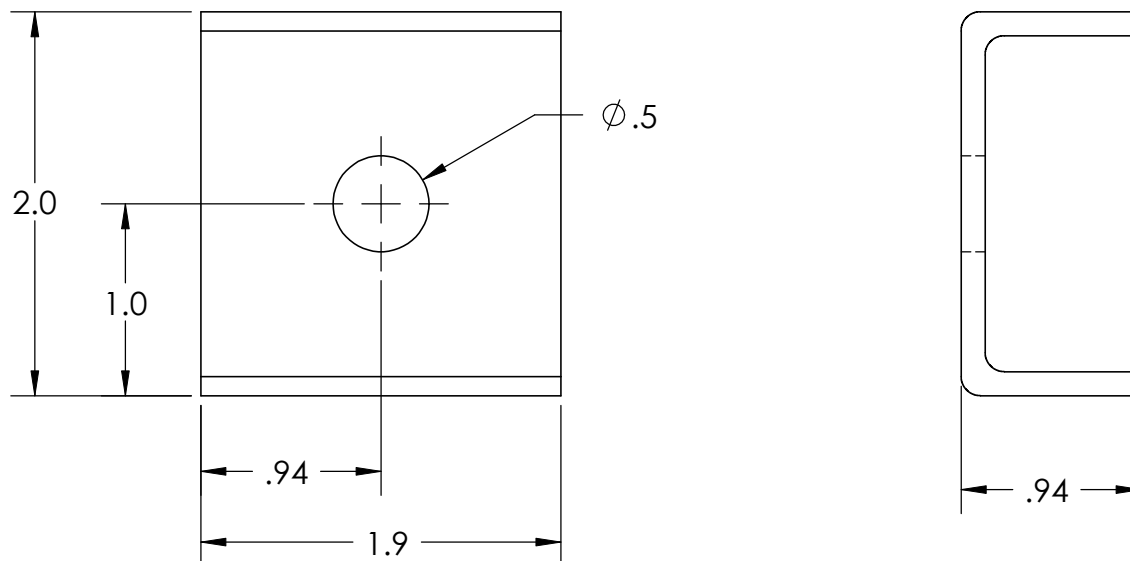
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 16GA THICKNESS

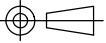


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	COVER, ENTRY, CHAMBER, HEAT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27234601		A	
				SIZE: A	SCALE: 1:1	SHEET 1 OF 1	

NOTES:

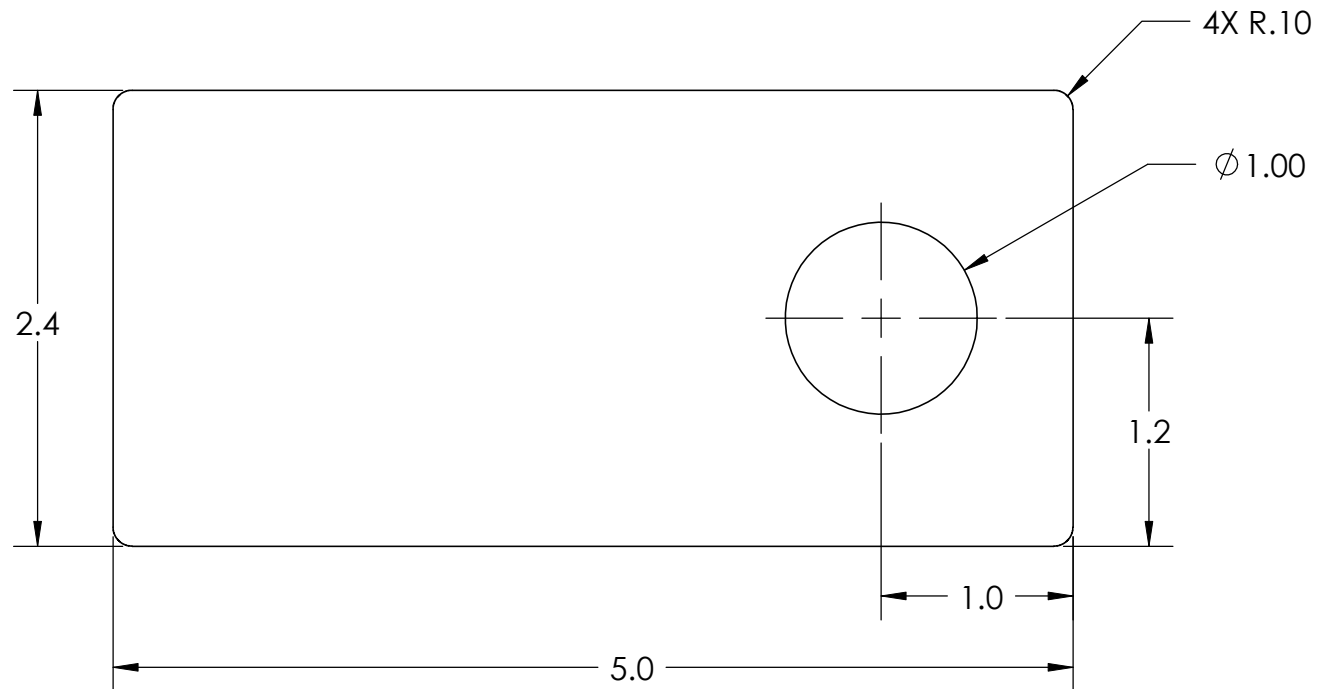
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL U-CHANNEL WITH 1/8" WALL THICKNESS

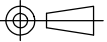


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL U-CHANNEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	MOUNT, LOCK, FRONT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27244602		SIZE: A	A
				SCALE: 1:1		SHEET 1 OF 1	

NOTES:

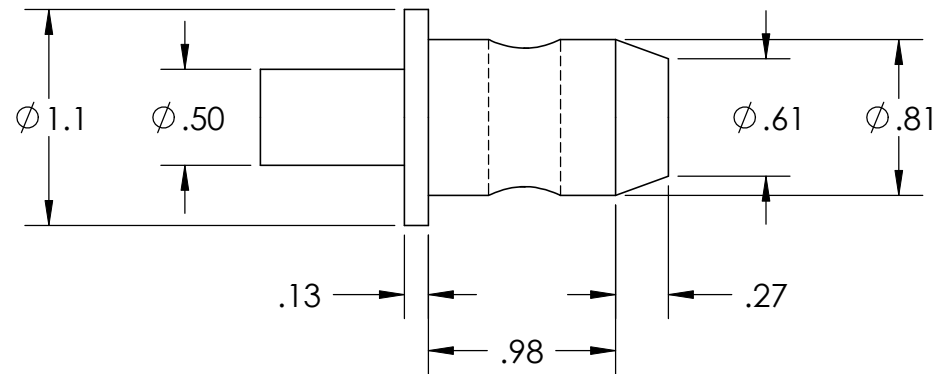
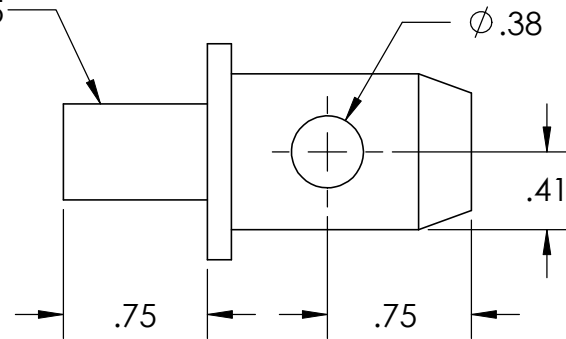
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 1/8" THICKNESS

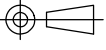


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL SHEET		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	PANEL, LOCK, FRONT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27254602		A	
				SIZE: A	SCALE: 1:1	SHEET 1 OF 1	

NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

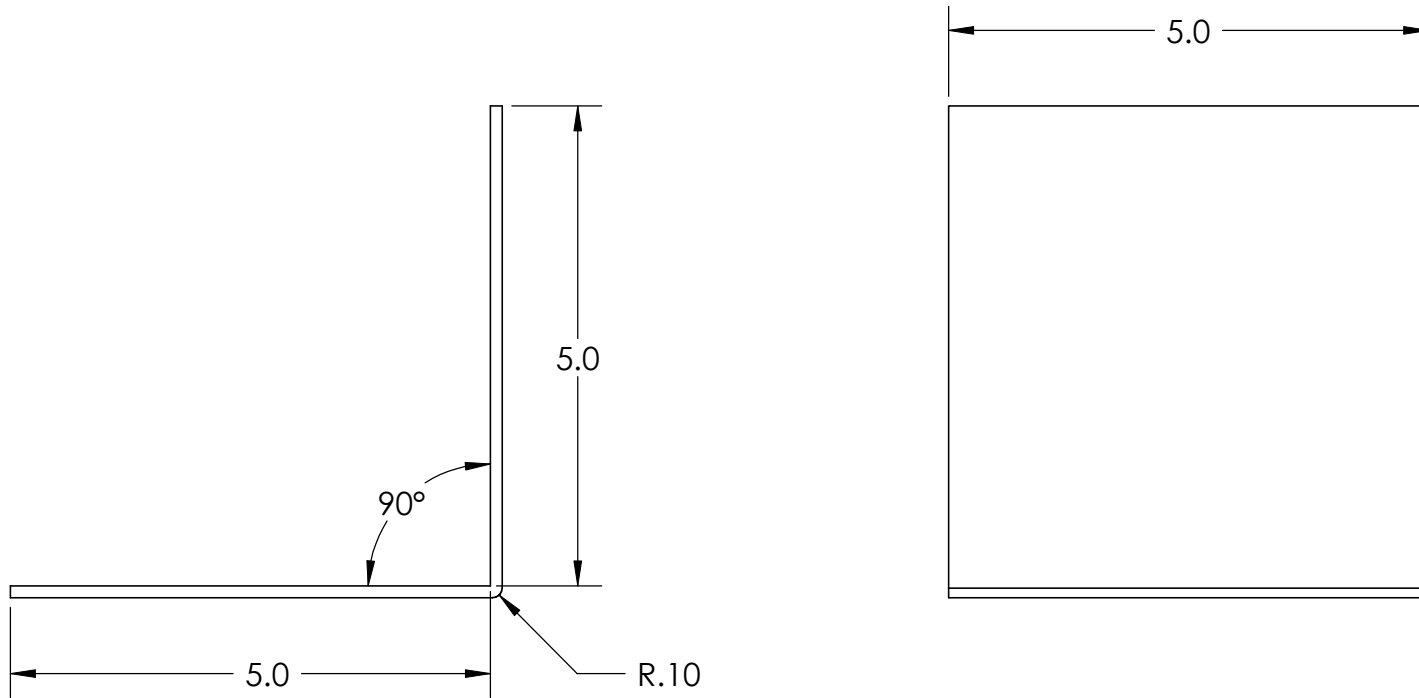
THREADED 1/2-13 UNC x 0.75

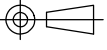


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT27264602	
				SIZE: A		SCALE: 1:1		SHEET 1 OF 1	
								REV	
								A	

NOTES:

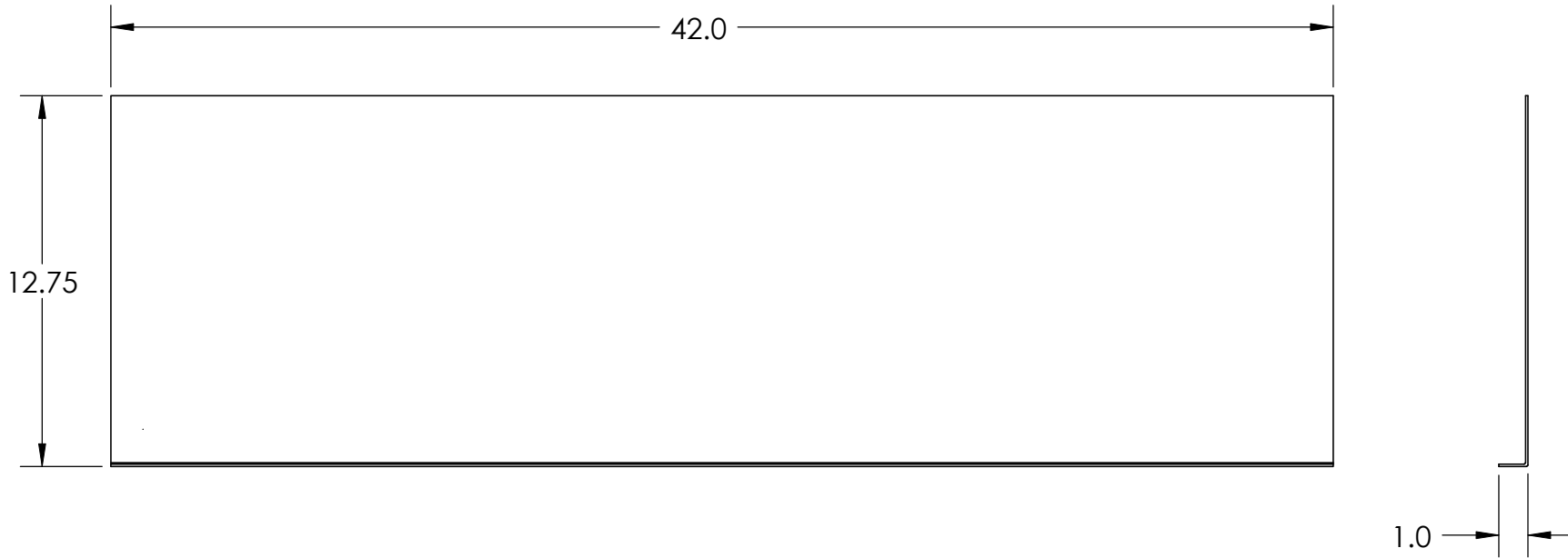
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 1/8" THICKNESS




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	END PLATE, CORNER
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27274604		A	
		SIZE: A		SCALE: 1:2		SHEET 1 OF 1	

NOTES:

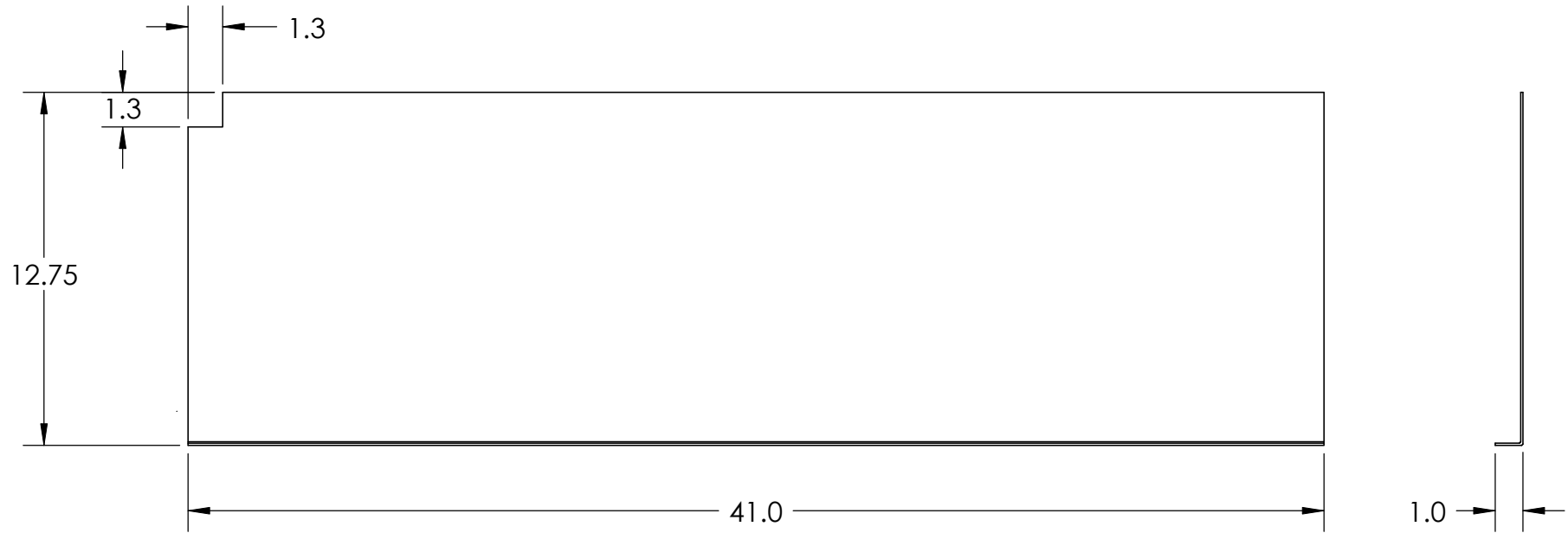
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 14GA THICKNESS




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>PANEL, SIDE, FRONT</b>	
MATERIAL: <b>STANDARD SHEET STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ			
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
<b>DO NOT SCALE DRAWING</b>		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT27284602</b>		REV <b>A</b>	
				SIZE: <b>A</b>		SCALE: 1:6		SHEET 1 OF 1	

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 14GA THICKNESS

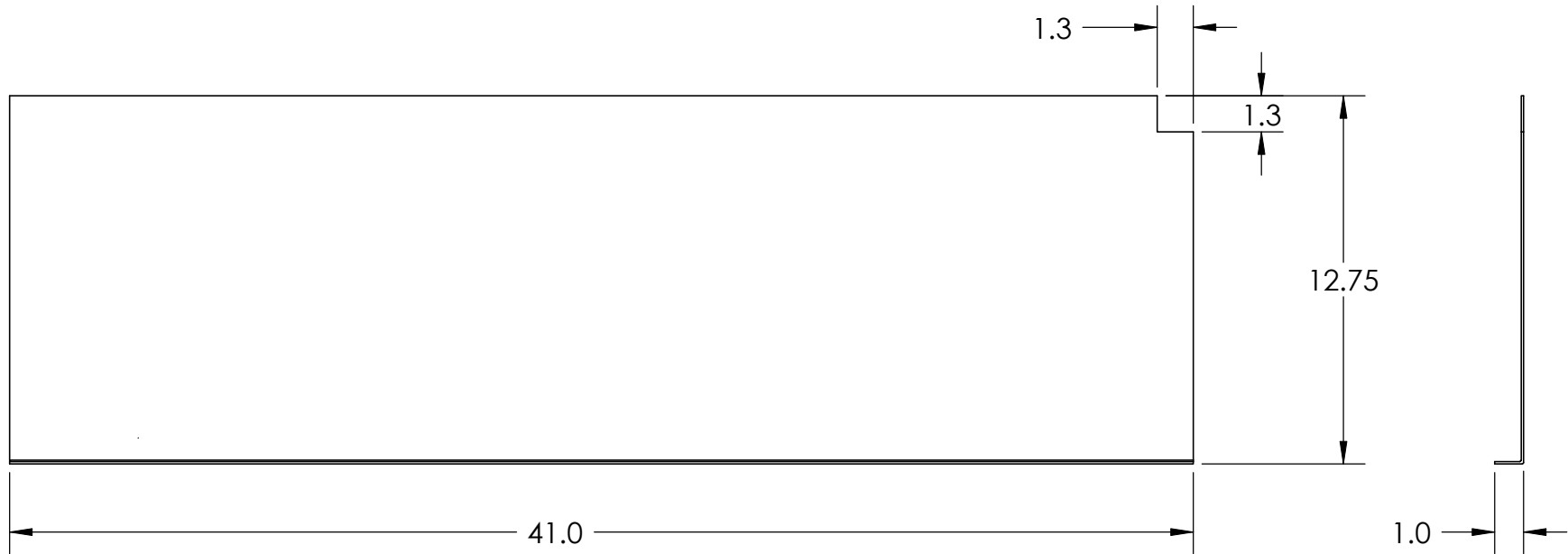


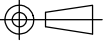
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		PANEL, SIDE, REAR, RIGHT		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT27294601		REV A
				SIZE: A		SCALE: 1:6		SHEET 1 OF 1		



NOTES:

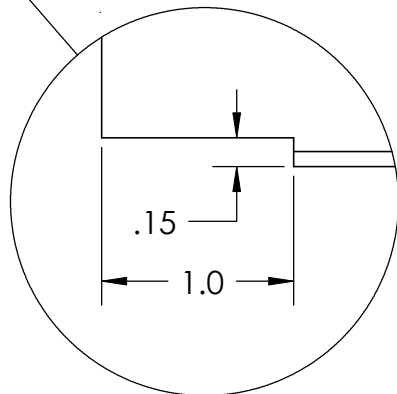
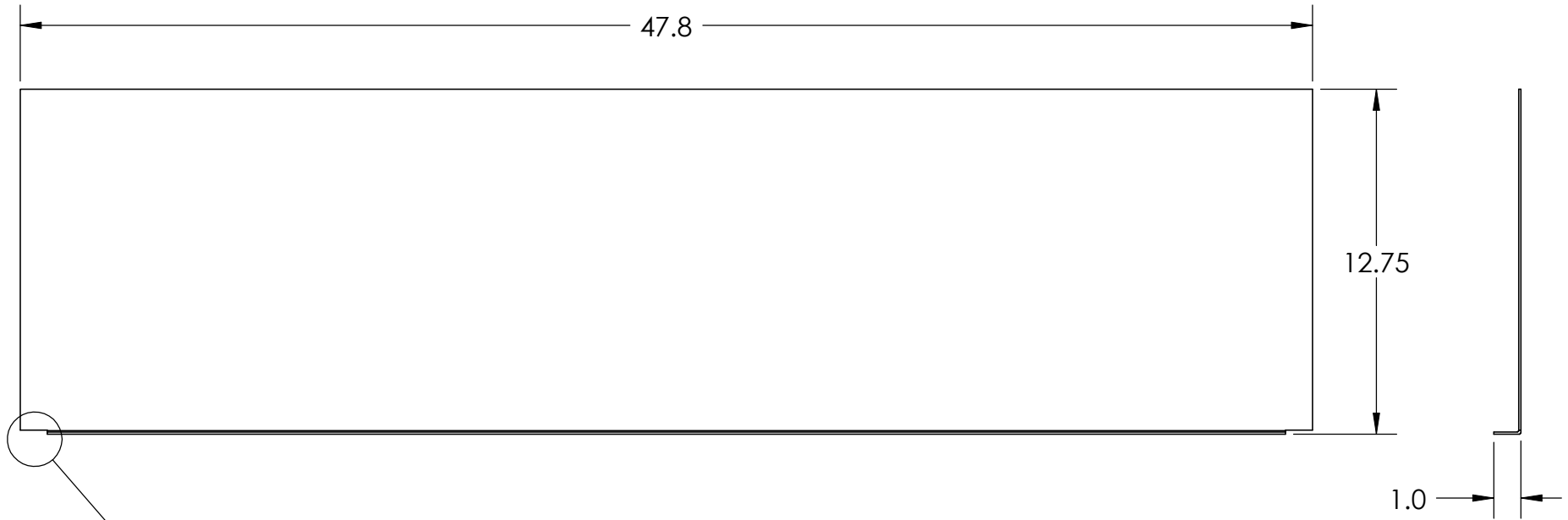
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 14GA THICKNESS




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	PANEL, SIDE, REAR, LEFT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27304601		A	
				SIZE:	A	SCALE: 1:6	SHEET 1 OF 1

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 14GA THICKNESS
3. MEASUREMENTS ON DETAIL A APPLY TO BOTH ENDS OF THE 1" FLANGE

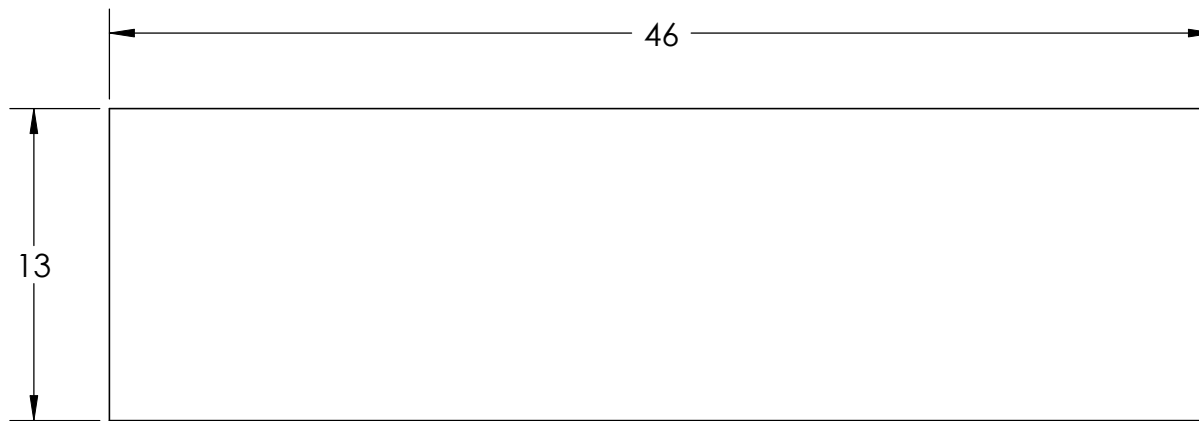


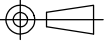
DETAIL A  
SCALE 1 : 1

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>PANEL, BACK</b>			
MATERIAL: <b>STANDARD SHEET STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ					
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER  <b>CDOT27314601</b>		REV  <b>A</b>	
<b>DO NOT SCALE DRAWING</b>				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				SIZE: <b>A</b>		SCALE: 1:6	SHEET 1 OF 1

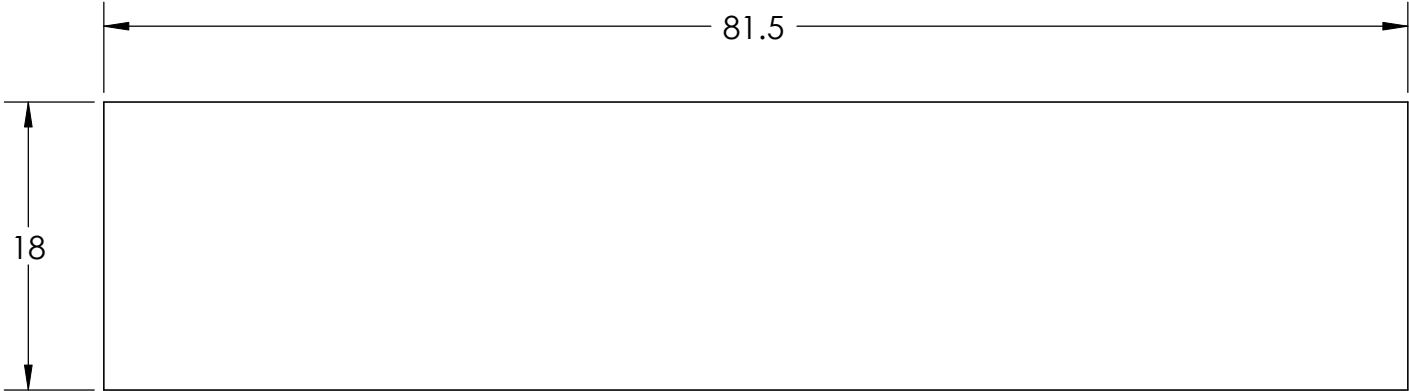
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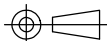
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 14GA THICKNESS



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	PANEL, FRONT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27324601		A	
				SIZE:	A	SCALE: 1:8	SHEET 1 OF 1

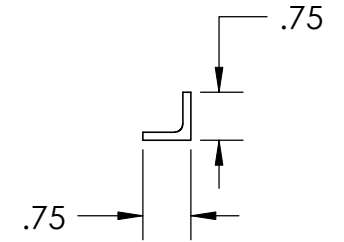
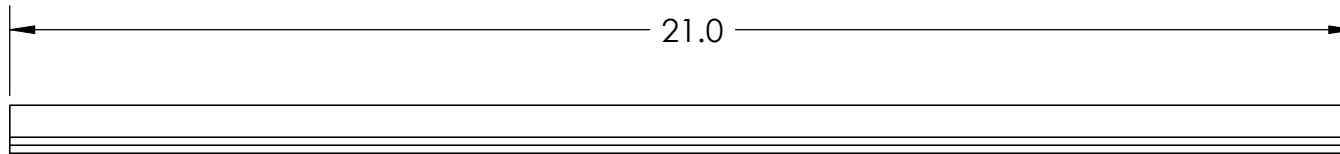
- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 14GA THICKNESS




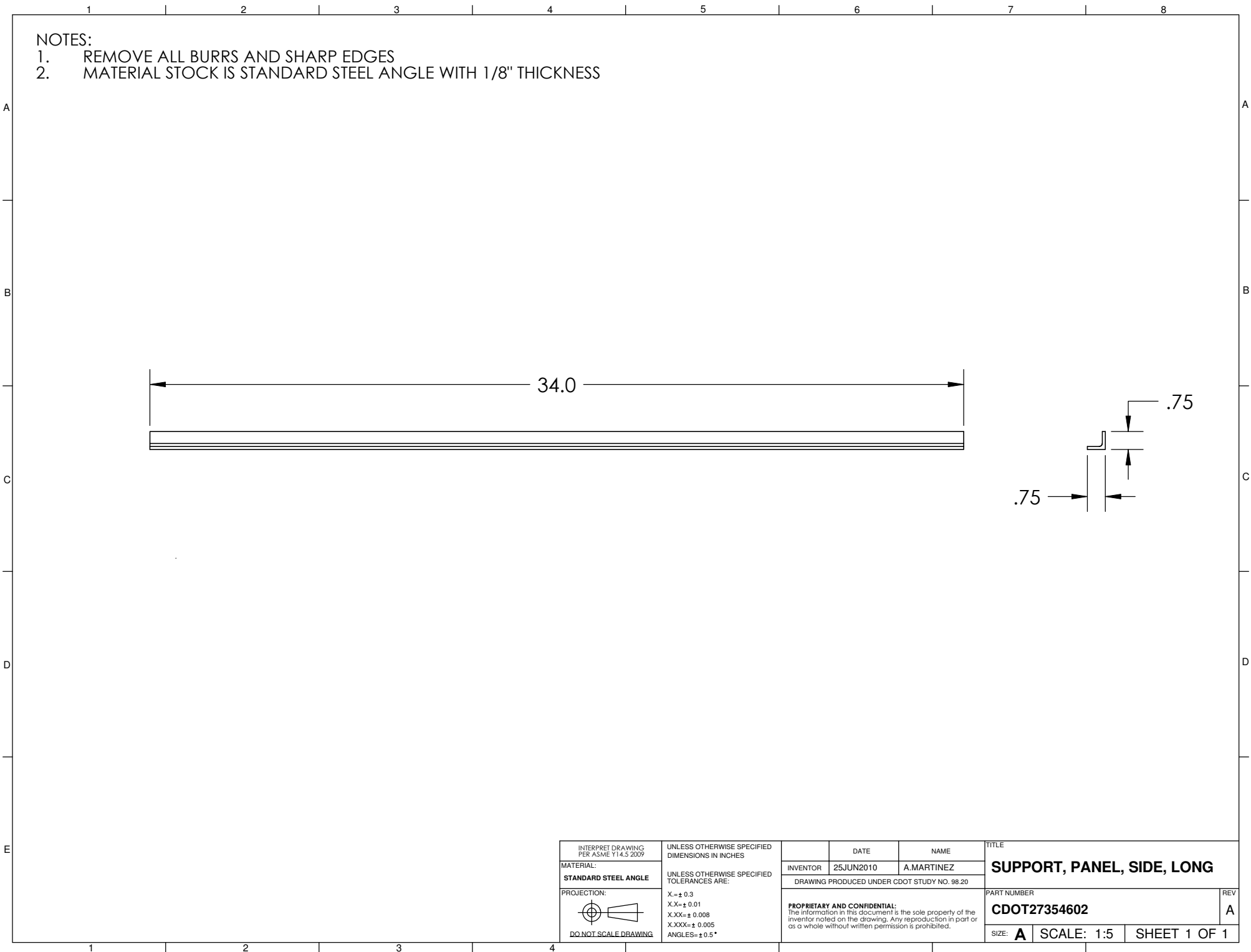
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ		PANEL, TOP, FRAME, MIDDLE	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER				REV	
				CDOT27334602				A	
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NOTES:

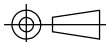
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL ANGLE WITH 1/8" THICKNESS



INTERPRET DRAWING: PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STANDARD STEEL ANGLE		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER CDOT27344604		REV A
				SIZE: A		SCALE: 1:3		SHEET 1 OF 1		

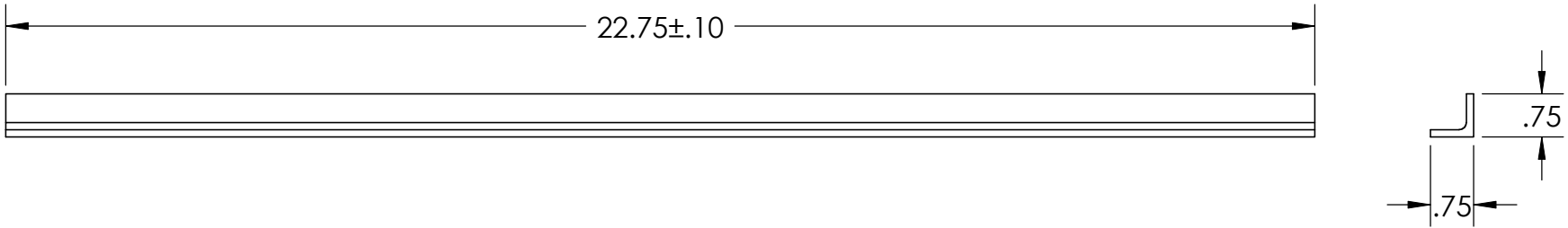


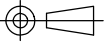
- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD STEEL ANGLE WITH 1/8" THICKNESS

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE			
MATERIAL: STANDARD STEEL ANGLE		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ		SUPPORT, PANEL, SIDE, LONG	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20							
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER		CDOT27354602				REV A	
				SIZE: A		SCALE: 1:5		SHEET 1 OF 1			

NOTES:

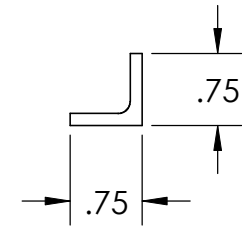
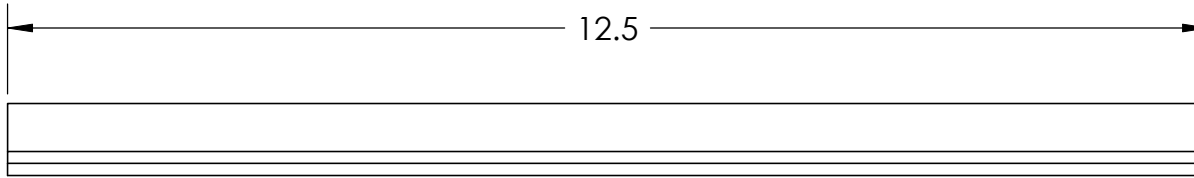
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL ANGLE WITH 1/8" THICKNESS

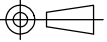


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL ANGLE		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	SUPPORT, PANEL, REAR
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27364602		SIZE: A	A
				SCALE: 1:3		SHEET 1 OF 1	

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL ANGLE WITH 1/8" THICKNESS

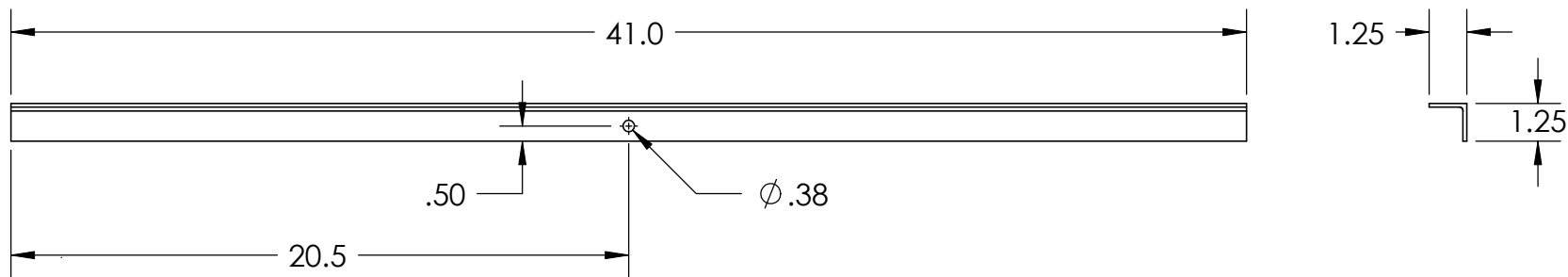


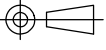
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL ANGLE		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	SUPPORT, PANEL, REAR, INNER
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27374602		SIZE: A	A
				SCALE: 1:2		SHEET 1 OF 1	



NOTES:

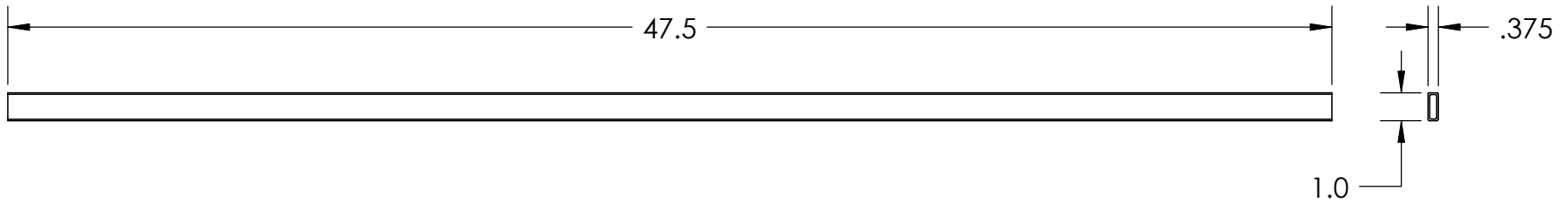
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL ANGLE WITH 1/8" THICKNESS

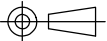


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL ANGLE		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	RAIL, SIDE, COVER, FRONT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.05 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27384602		SIZE: A	A
				SCALE: 1:6		SHEET 1 OF 1	

NOTES:

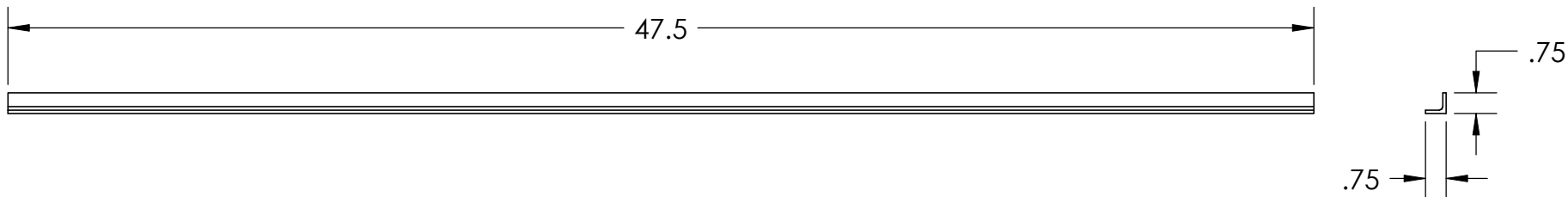
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING WITH A 16GA WALL

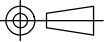


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MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		25JUN2010		A.MARTINEZ	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER <b>CDOT27394604</b>					
				REV <b>A</b>					
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NOTES:

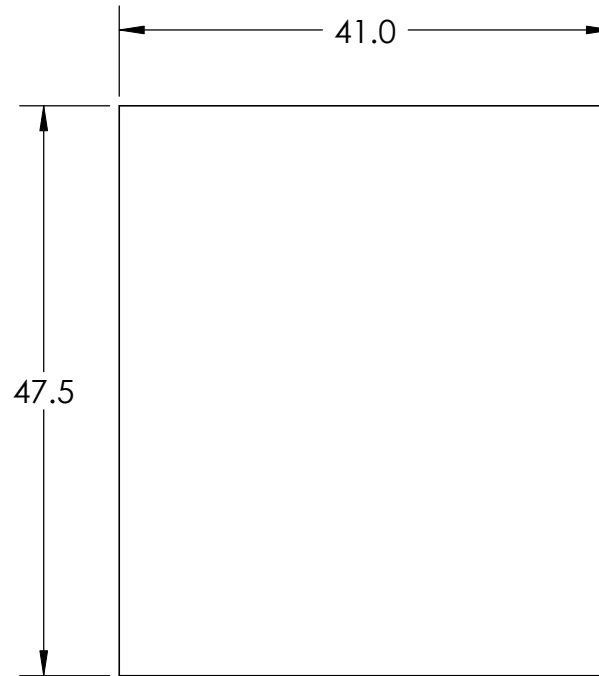
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2. MATERIAL STOCK IS STANDARD STEEL ANGLE WITH 1/8" THICKNESS

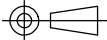


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MATERIAL: STANDARD STEEL ANGLE		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	RAIL, MID, COVER, FRONT
PROJECTION: 		X.= ± 0.3 X.X.= ± 0.01 X.XX.= ± 0.008 X.XXX.= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27404602		A	
				SIZE: A	SCALE: 1:6	SHEET 1 OF 1	

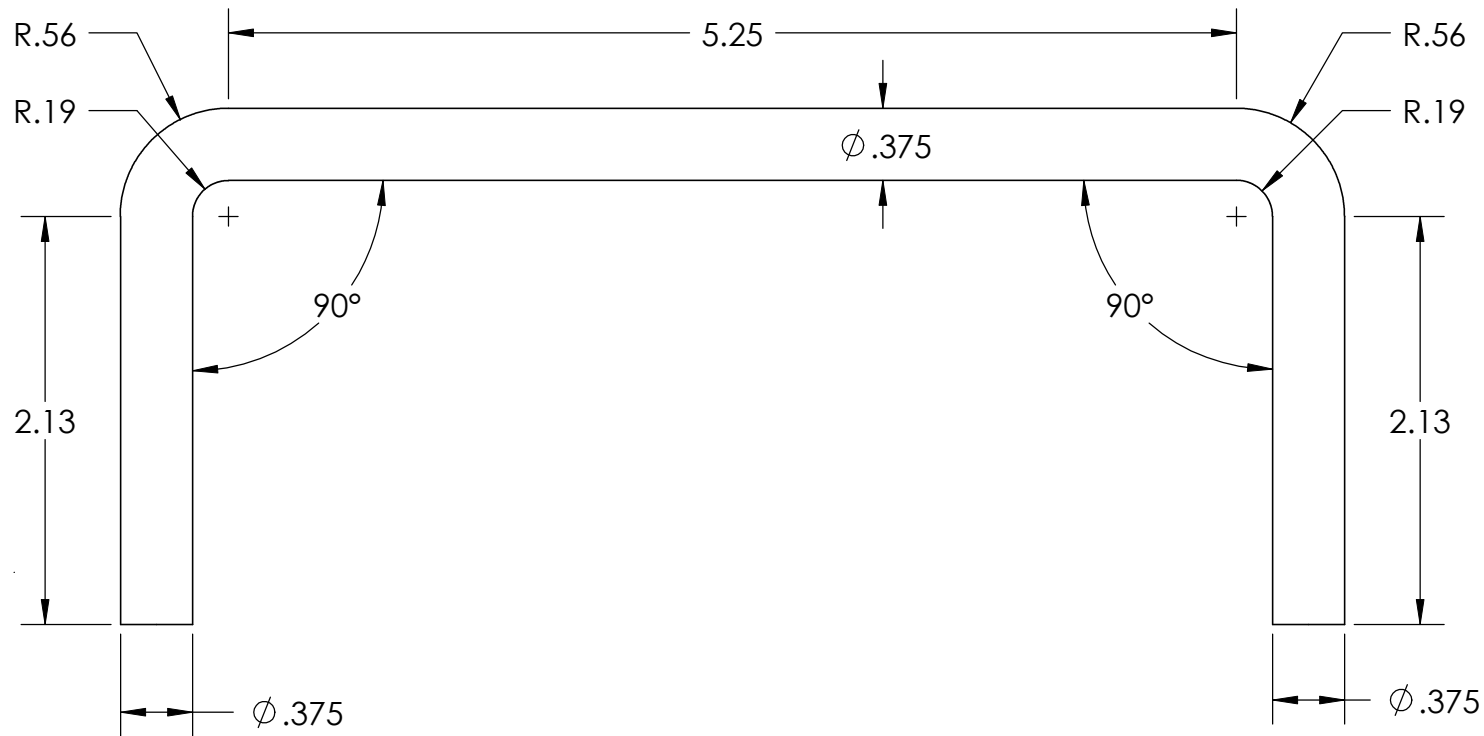
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1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 18GA THICKNESS



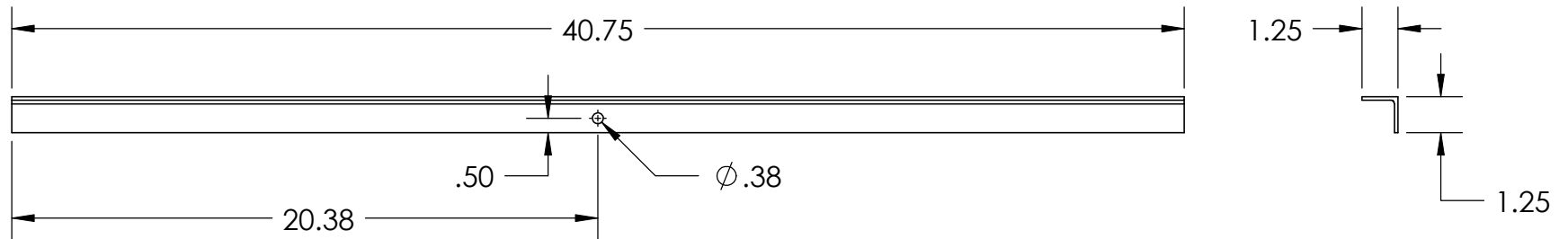
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MATERIAL: STANDARD SHEET STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	PANEL, COVER, FRONT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27414601		A	
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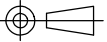
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1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>HANDLE, COVER</b>		
MATERIAL: <b>STANDARD STEEL ROD</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ				
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.02 X.XXX= ± 0.005 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER <b>CDOT27424604</b>		REV <b>A</b>
<u>DO NOT SCALE DRAWING</u>				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				SIZE: <b>A</b>	SCALE: 1:1	SHEET 1 OF 1

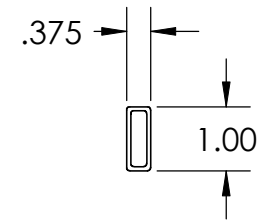
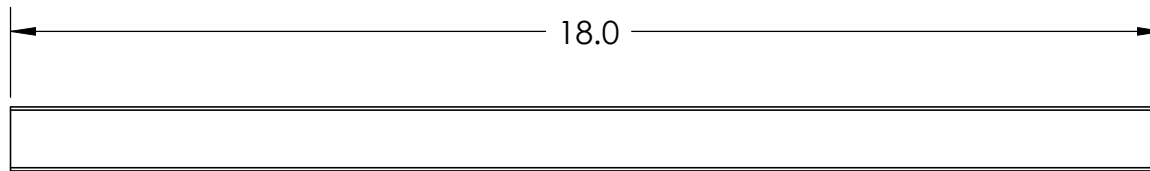
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD STEEL ANGLE WITH 1/8" THICKNESS

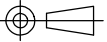


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MATERIAL: STANDARD STEEL ANGLE		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	RAIL, SIDE, COVER, REAR
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27434602		SIZE: A	A
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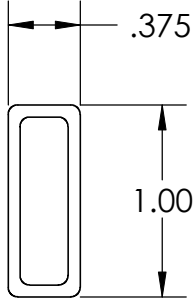
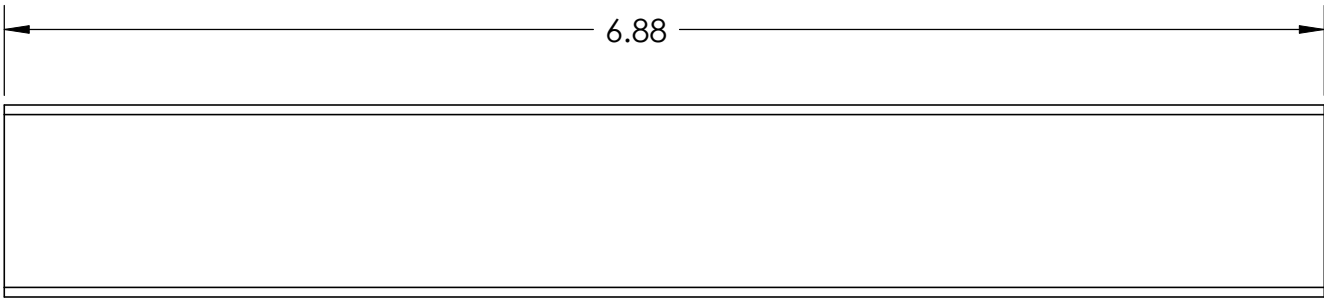
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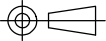
1. REMOVE ALL BURRS AND SHARP EDGES
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INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STANDARD STEEL TUBING		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	RAIL, CHIMNEY, COVER, REAR
PROJECTION: 		X.= ± 0.3 X.X= ± 0.05 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT27444602		SIZE: A	A
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- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD STEEL TUBING WITH A 16GA WALL

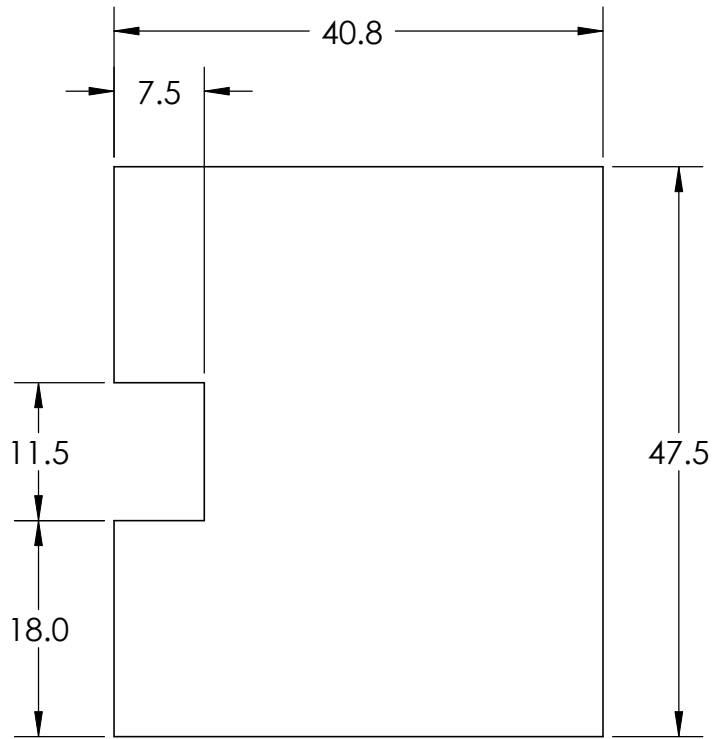


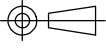
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DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER		CDOT27454602		REV A	
				SIZE: A		SCALE: 1:1		SHEET 1 OF 1	



NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD SHEET STEEL WITH 18GA THICKNESS



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>PANEL, COVER, REAR</b>	
MATERIAL: <b>STANDARD SHEET STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	25JUN2010	A.MARTINEZ	DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.008 X.XXX= ± 0.005 ANGLES= ± 0.5 °		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
DO NOT SCALE DRAWING							PART NUMBER <b>CDOT27464601</b>		REV <b>A</b>
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## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Slide-in Heat Box

**Innovator(s):** Anthony Martinez

**Summary:** Patents and products were found that perform the same task. These typically included a heat source with control. One of the devices was similar enough that the novelty of this device is in question.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: asphalt & hot, asphalt & box, asphalt & patcher, asphalt & hot, asphalt & hot box, asphalt & reheat

Field of search: Title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |   |
|-------------|------|---|
| • 4,196,827 | 1980 | Portable Machine for Transporting Heated Asphalt Products for Use in Repairing Asphalt Pavement |
| • 4,198,177 | 1980 | Method and Apparatus for Repair of Asphalt Surfaces   |
| • 4,423,980 | 1984 | Truck Mounted Apparatus for Repairing Asphalt   |
| • 4,511,284 | 1985 | Pothole Patcher   |
| • 4,661,684 | 1987 | Asphalt Heating System  |

- 4,695,186     1987   Asphalt Handling Apparatus
- 4,820,078     1989   Apparatus for Road Surface Repair with Fiber Reinforces Asphalt
- 4,944,632     1990   Device for Dispensing Asphalt Repair Materials
- 5,232,306     1993   Crack Filling Vehicle
- 5,263,790     1993   Vehicle for Filling Potholes
- 5,419,654     1995   Vehicle for Road Repair and the Like
- 5,988,935     1999   Asphalt Repair Apparatus with Dry Radiant Heat Source

## **2. Existing Product Search**

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://store.asphaltkingdom.com/Hot-Asphalt-Box-p/ak4000.htm>
- b. <http://www.spauldingmfg.com/hotpatcher.php?gclid=CPikqfOKkqICFQtKgwodNzQMbw>
- c. <http://www.asphaltheat.com/HotBoxUnits.htm>
- d. <http://www.asphaltheater.com/index.php/products/77>

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### **1) Evaluation of Novelty**

An examination of the information presented above reveals prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s). Accordingly, based on the above information, the submitted device would not appear to meet the USPTO requirement of novelty.

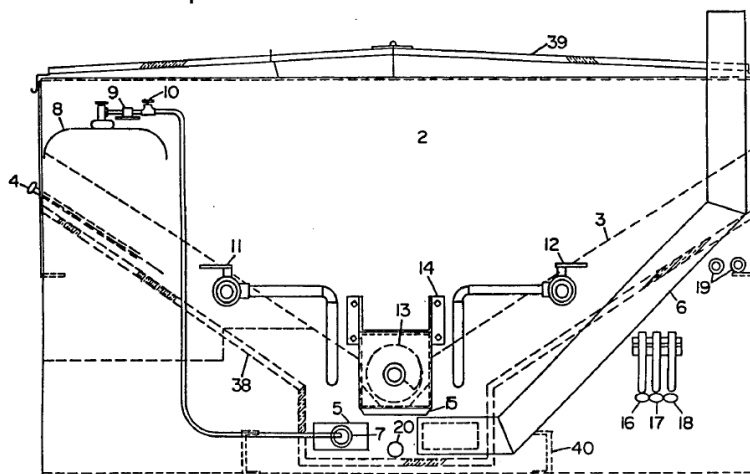
- a. <http://store.asphaltkingdom.com/Hot-Asphalt-Box-p/ak4000.htm>  
The AK4000 3 Ton Hot Box is heated by propane torches and has two exhaust outlets.



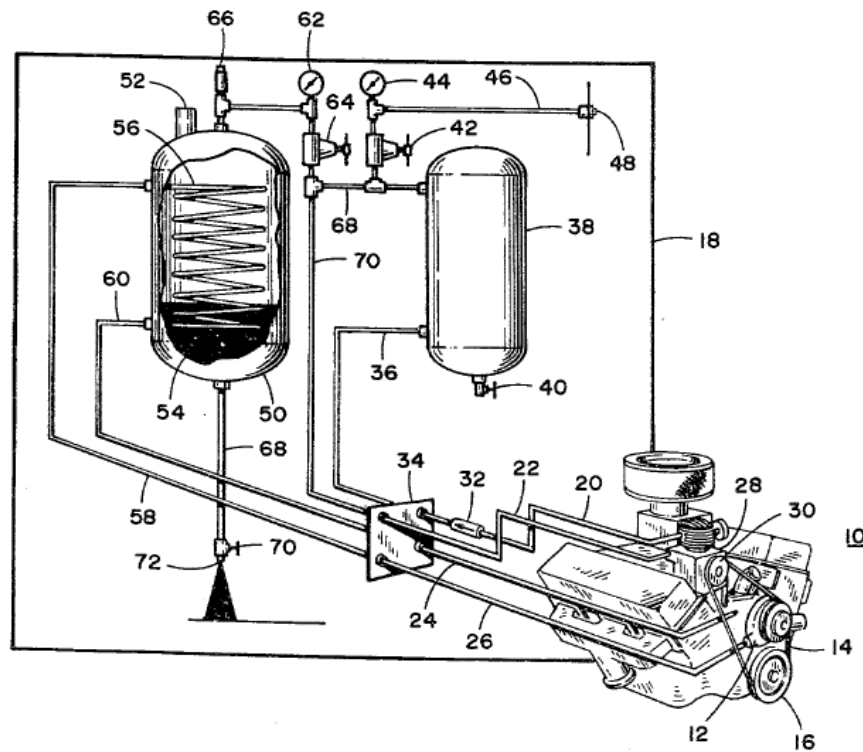
## 2) Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

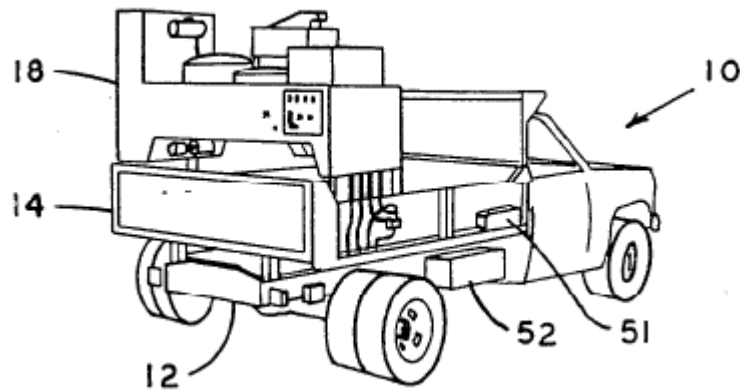
- a. 4,196,827 - Portable Machine for Transporting Heated Asphalt Products for Use in Repairing Asphalt Pavement  
This device uses a box to keep the asphalt mix warm but the heating method is more complicated.



- b. 4,198,177 - Method and Apparatus for Repair of Asphalt Surfaces  
This device uses a vessel to keep the asphalt mist warm but the heating method is more complicated.

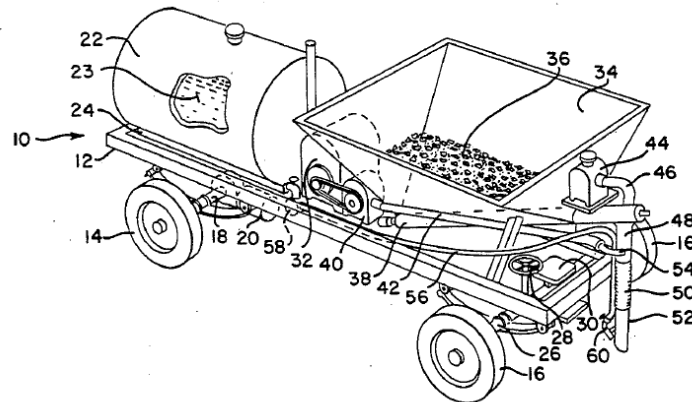


- c. 4,423,980 - Truck Mounted Apparatus for Repairing Asphalt  
This device uses a box to keep the emulsion warm but it is warmed by the heat from the truck engine.



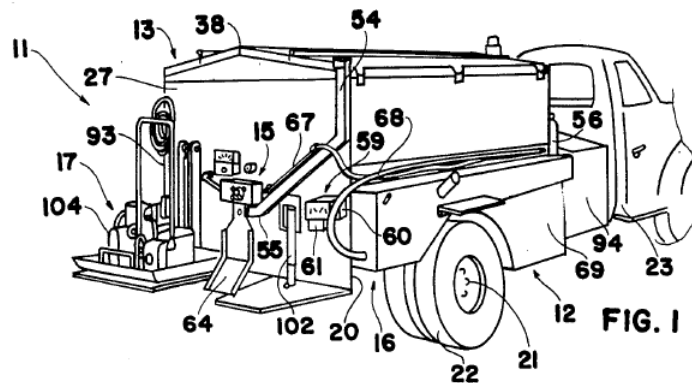
d. 4,511,284 - Pothole Patcher

This device keeps the asphalt warm using a "fire box" under the asphalt hopper.



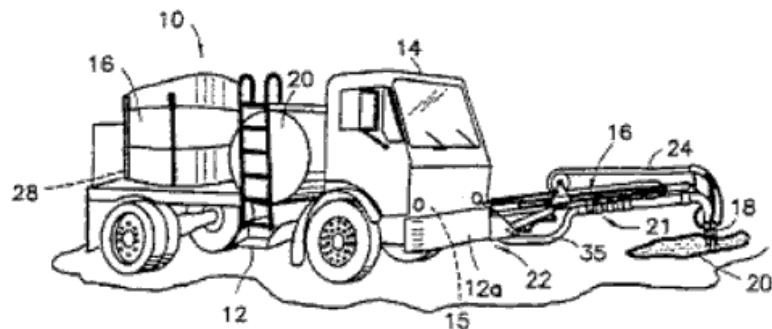
e. 4,695,186 - Asphalt Handling Apparatus

This device has a box for the asphalt that opens from the top. The asphalt is heated with a gas burner from below. It also has an exhaust stack.

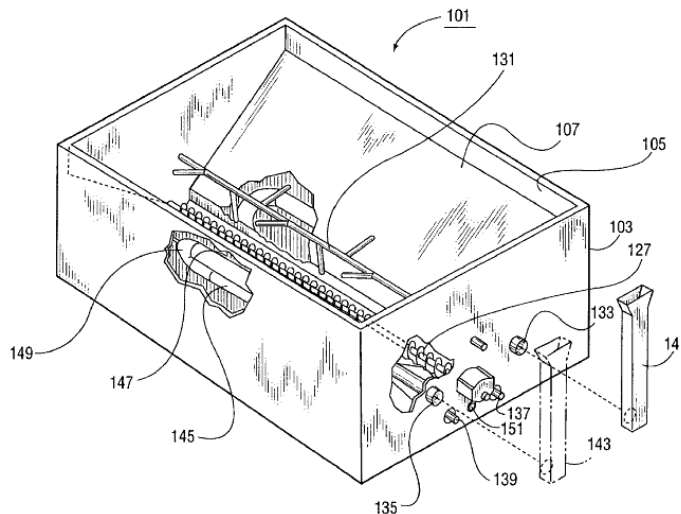


f. 5,419,654 - Vehicle for Road Repair and the Like

This device holds the asphalt in a tank where it is heated by thermostatically controlled heater elements.



- g. 5,988,935 - Asphalt Repair Apparatus with Dry Radiant Heat Source  
This device holds the asphalt in a hopper which is heated from below by a dry radiant heat source.



- h. <http://www.asphaltheater.com/index.php/products/77>  
Heat Design Equipment – 2 Ton Asphalt Reclaimer – opens from top, infrared heaters to keep asphalt warm, can be put on a truck.



### 3) Usefulness

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

The heat box is a unit that heats cold mix asphalt to make it more pliable. The asphalt bonds to the road better when the mix is heated. The heat box keeps the mix warm for up to four hours. This eliminates the need for the maintenance crew to climb on and off the truck to break up cold mix into chunks. Use of this device makes the task of filling cracks with asphalt easier, quicker and safer by getting the workers off the highway sooner.

#### **4) Public Disclosure**

According to the innovator, this device was first fabricated and has been in use since February 2008 by crews in the Lincoln and Mary areas. It is the original design without modifications.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.



## Device Costs and Benefits

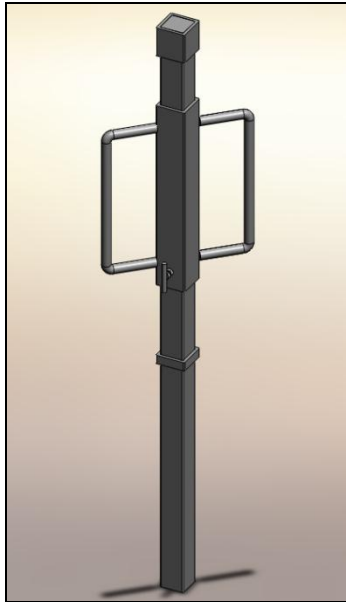
**Submission number:** 28

**Title of the Innovation:** Slide Post Pounder

**Innovator(s):** Anthony Martinez

### Device Description

The slide post pounder allows for easy installation of posts that are commonly hammered or otherwise pounded into the ground. This is a highly safe tool, removing the worry of hammered fingers and reducing the required workers from two to one.



#### 1. Usefulness

- This device has a four foot long center section with a sixteen inch slide hammer. The long center section prevents the post from buckling when forced into the ground which helps prevent operator injury. It also keeps the device from slipping off the post when pounding the post into the ground.

#### 2. Ease of use

- This device is used in the same manner as any other slide hammer pounder.

### Manufacturability

This device is constructed of seven machined and/or welded parts. The parts are simple and do not have features that are difficult to manufacture.

## **Potential for Widespread Application**

1. Time to train operator
  - It would take about ten minutes to train an operator to use this device.
2. Reduction in time
  - The device doesn't need to be removed to check if the post has been driven into the ground to the correct depth.
  - It is also designed to be used with a loader.
  - This device would save about 30 minutes overall. The device is the correct length so that when its bottom is touching the ground the post is inserted in the ground the correct depth. Due to this feature the operator does not have to keep removing the device to measure the length of the post to check for correct insertion depth.
3. Improvement in quality
  - All posts are driven to the same depth based on the four foot length of the device.
4. Expected annual usage
  - This device could be used all year.
5. Units required
  - One device is required per patrol.
6. Use in other states
  - All states that install posts could benefit from this device.

## **Safety**

1. Improvement in safety
  - The four foot long center section prevents buckling of the post and keeps the device from slipping off the post. The lock on the slide hammer prevents movement of the slide hammer when the pounder is being put on or taken off of the post.
2. Safety concerns due to use or misuse of the device
  - Could get fingers caught between the top or bottom of the hammer slider.
  - Catching the bottom of the pounder on the top of the post can make it pivot and fall on the operator. The probability that this will occur is reduced with this device because it is longer than similar devices.
  - This device is intentionally heavy and can hurt an operator when dropped.
3. Safety concerns due to failure of the device
  - There are no identifiable concerns due to failure of the device.

## **Availability of Similar Equipment for Purchase**

The prior art search found that similar products are available for purchase but they are shorter in length.

**Patent Information**

(complete information provided in Preliminary Patentability Assessment)

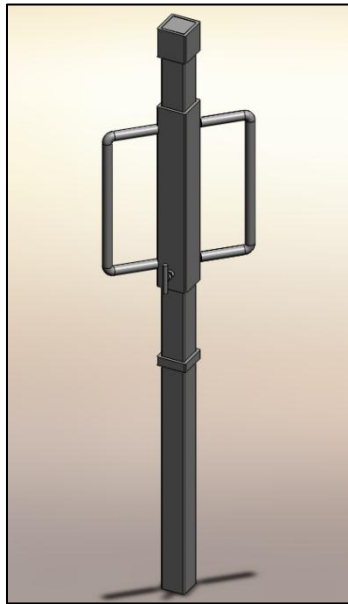
**1. Patentability**

- This device may be considered useful but may not be considered novel or non-obvious depending on the Patent Examiner's evaluation.
- According to the innovator, this innovation was publicly disclosed in its current form in May, 2008.

**2. Patent infringement**

- There are many products on the market that do this same task. The four foot length of this device offers many advantages as noted above but a change in length may not make it novel for patenting purposes.

## Slide Post Pounder User Manual

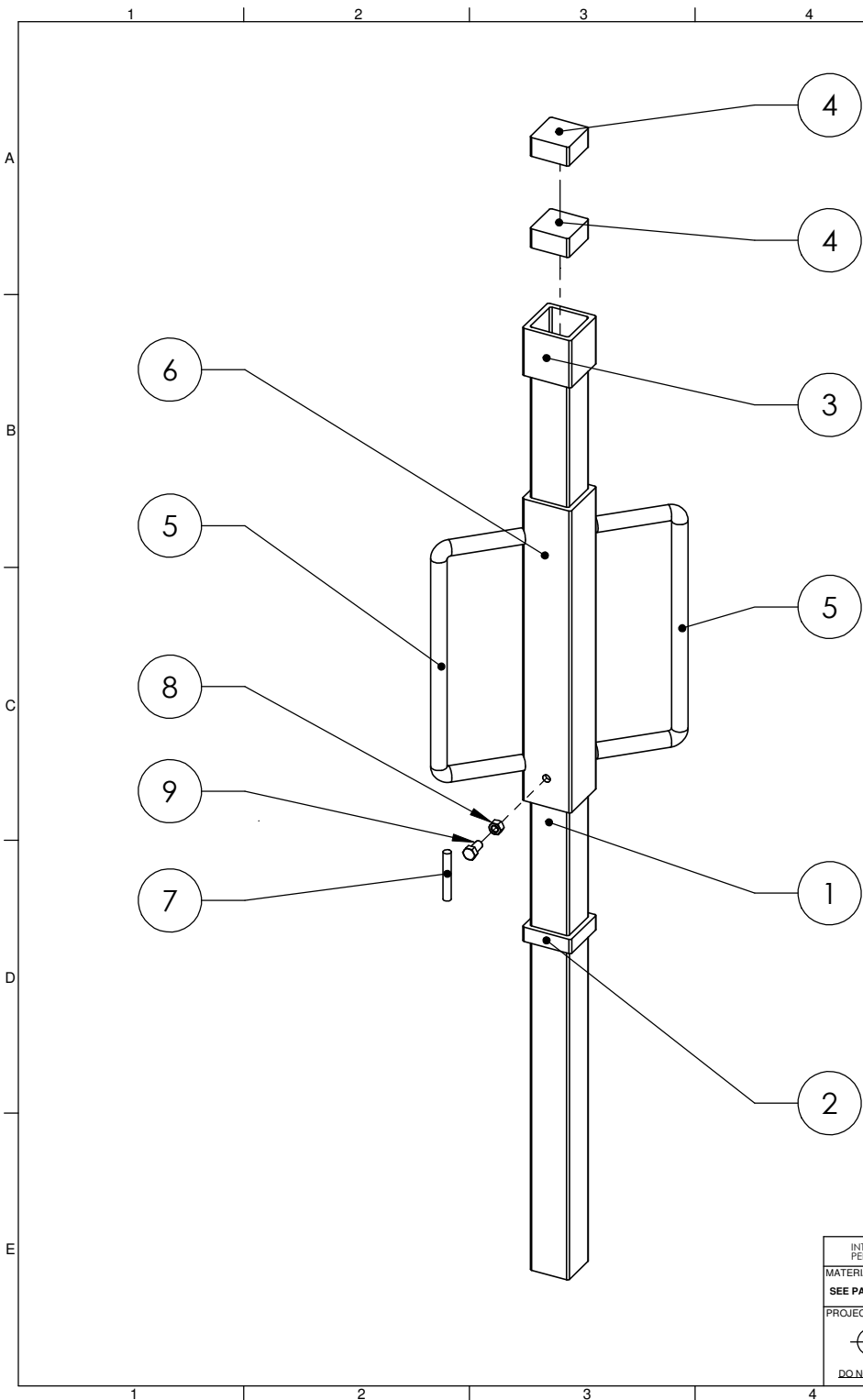


### Device Description

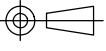
The slide post pounder allows for easy installation of posts that are commonly hammered or otherwise pounded into the ground. This is a highly safe tool, removing the worry of hammered fingers and reducing the required workers from two to one.

### Operating Instructions

1. Place the bottom of the post in the desired location, and hand press it into the ground to create a starting point.
2. Lock the slide hammer by twisting the lock, and place the post pounder over the post.
3. Unlock the slide hammer, and lift to the maximum height.
4. Quickly slam the slide hammer down and repeat until the post is either fully seated into the ground or the post will no longer move. The post is fully seated once the bottom of the post pounder reaches the ground, leaving 4 feet of the post exposed.
5. If the post is not fully seated once it stops, a loader can be used to press down on the top of the post pounder to complete the seating.
6. Once the post is fully seated, lock the slide hammer, and remove the post pounder.

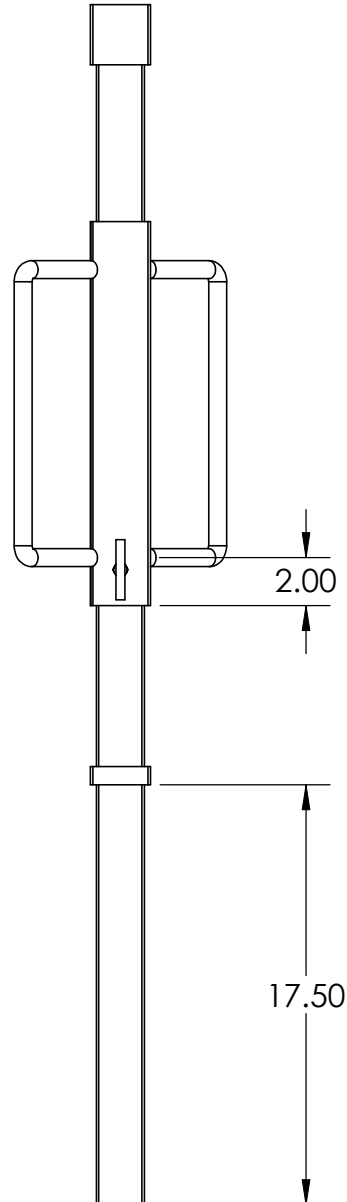


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
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2	CDOT28020701	STOP, LOWER	1
3	CDOT28030701	STOP, UPPER	1
4	CDOT28040702	WEIGHT, STOP, UPPER	2
5	CDOT28050702	HANDLE, HAMMER	2
6	CDOT28060701	SLIDE, HAMMER	1
7	CDOT28070701	HANDLE, LOCK	1
8	HNUT 0.3750-16-D-N	STANDARD NUT	1
9	HBOLT 0.3750-16x0.75x0.75-N	STANDARD BOLT	1

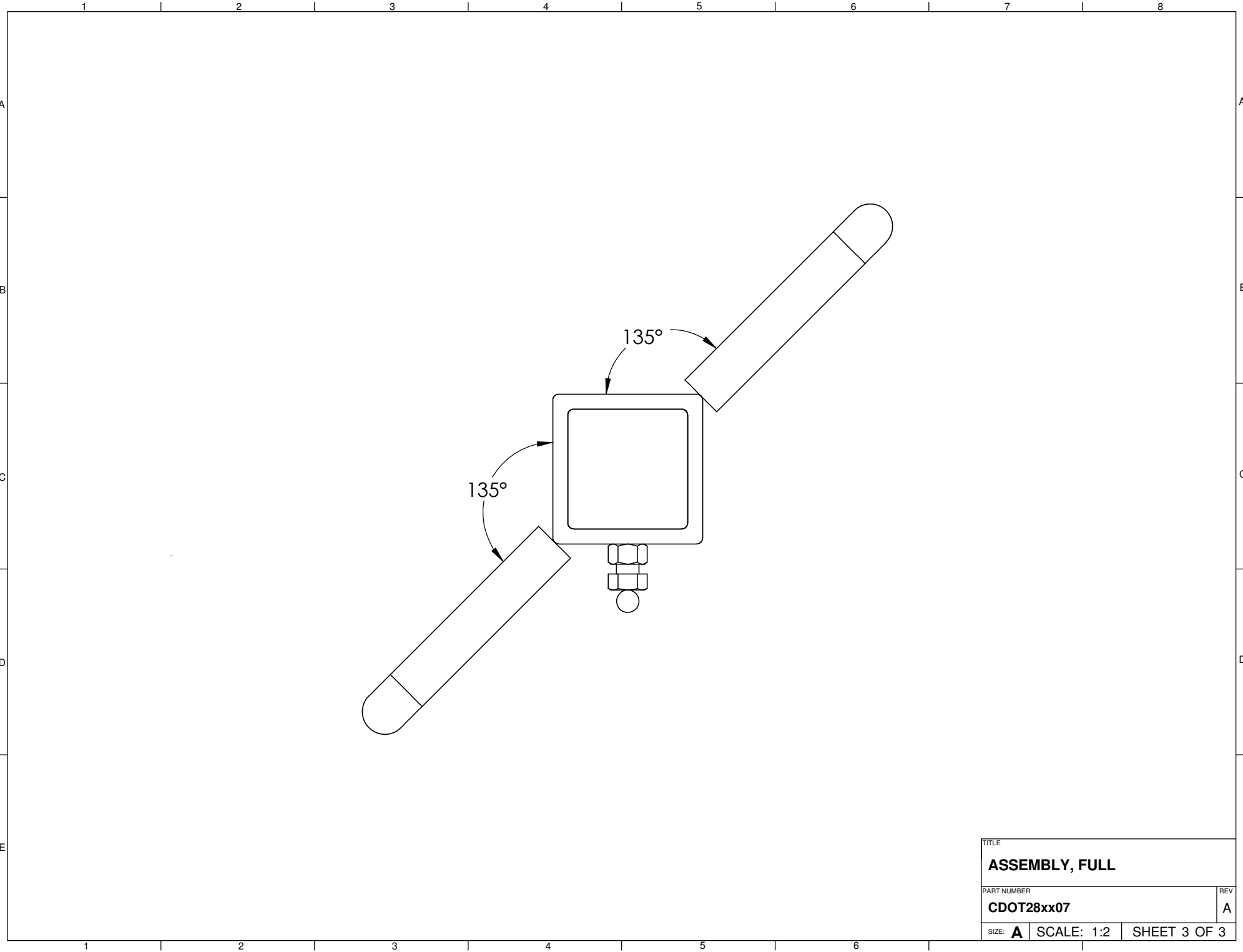
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MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER CDOT28xx07		REV A	
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						SHEET 1 OF 3			

NOTES:

1. ALL JOINTS ARE FULLY WELDED, EXCLUDING BETWEEN THE HAMMER SLIDE AND THE JOINT BETWEEN THE BOLT AND THE NUT.
2. THE WEIGHTS ARE WELDED INSIDE THE UPPER STOP.

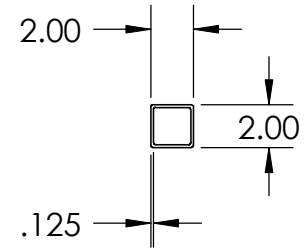
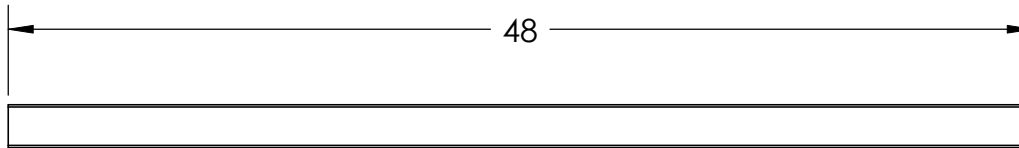


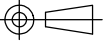
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ASSEMBLY, FULL		
PART NUMBER		REV
CDOT28xx07		A
SIZE: A	SCALE: 1:8	SHEET 2 OF 3



NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING

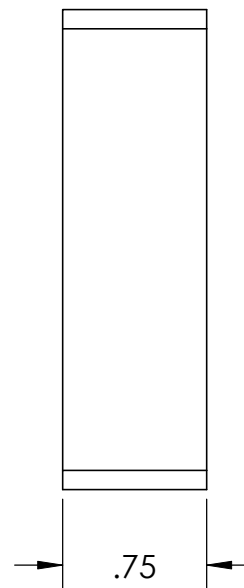
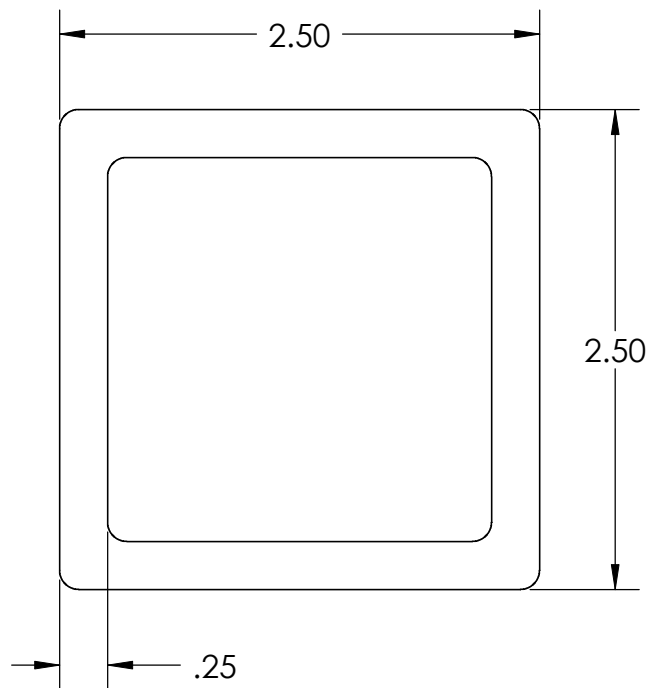



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	28JUN2010	A.MARTINEZ	POST, MAIN
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT28010701		SIZE: A	A
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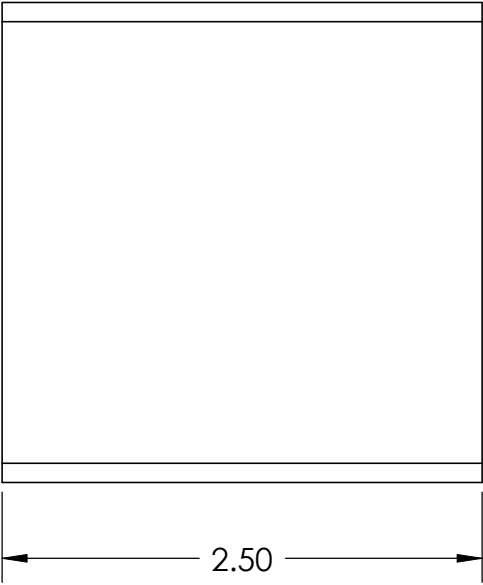
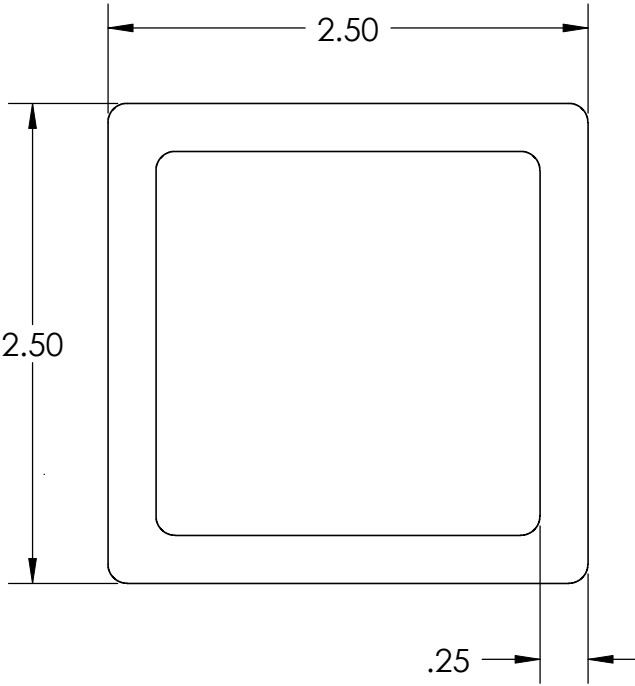
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1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		28JUN2010		A.MARTINEZ	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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								REV A	

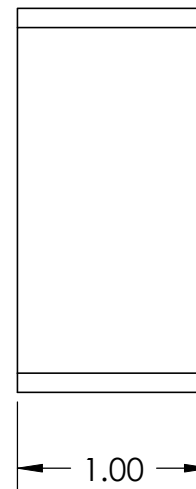
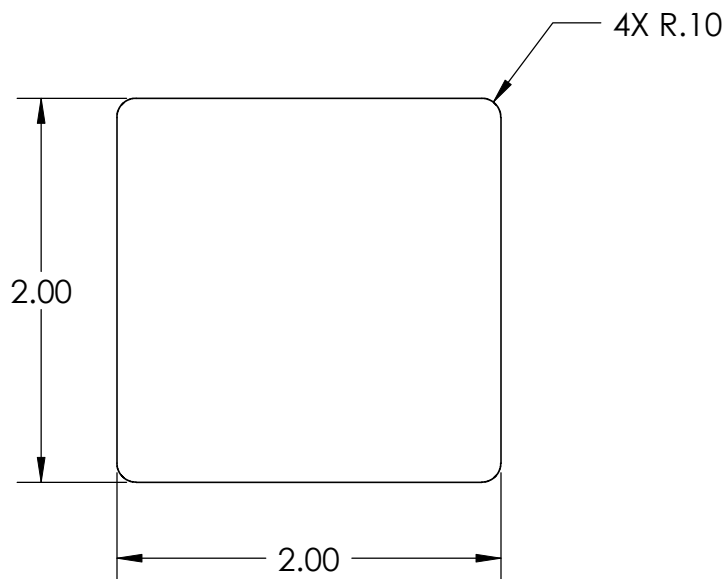
- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD STEEL TUBING

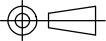


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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	28JUN2010	A.MARTINEZ		STOP, UPPER		
PROJECTION: 		X.= ± 0.3 X.X.= ± 0.1 X.XX.= ± 0.05 X.XXX.= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						
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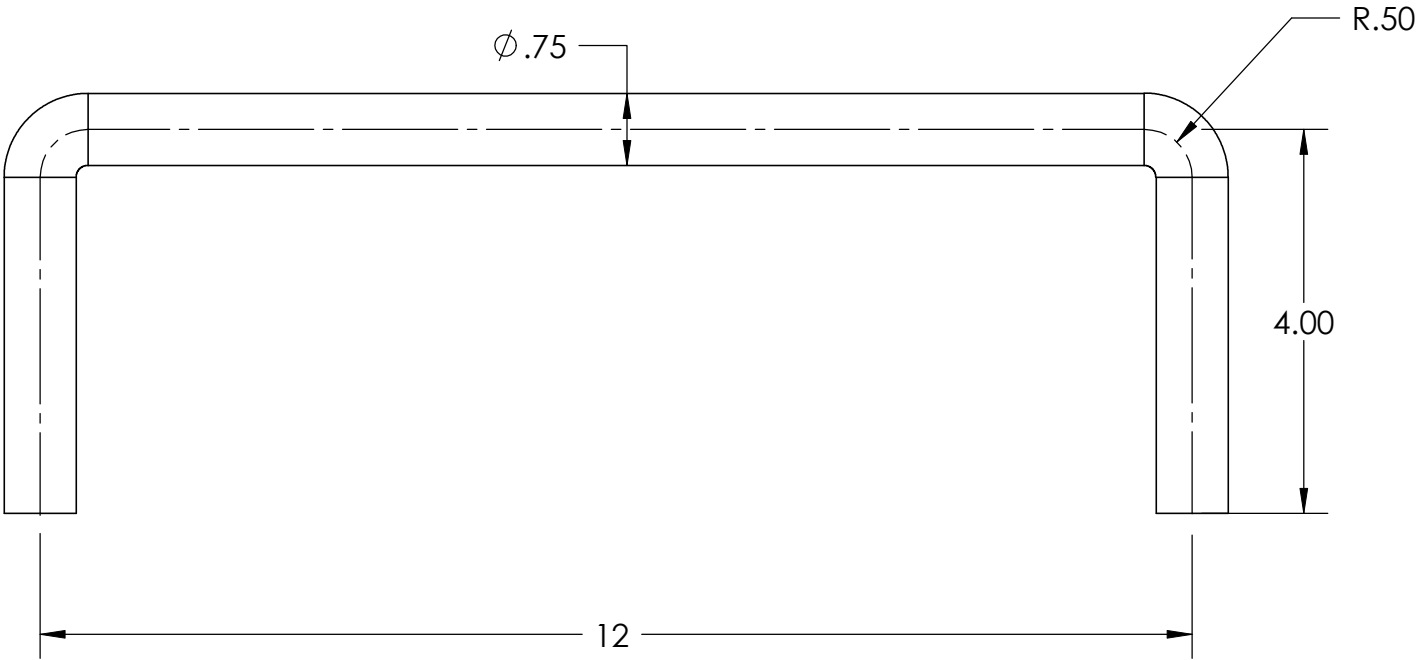
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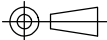
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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		28JUN2010		A.MARTINEZ	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				WEIGHT, STOP, UPPER	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER		REV	
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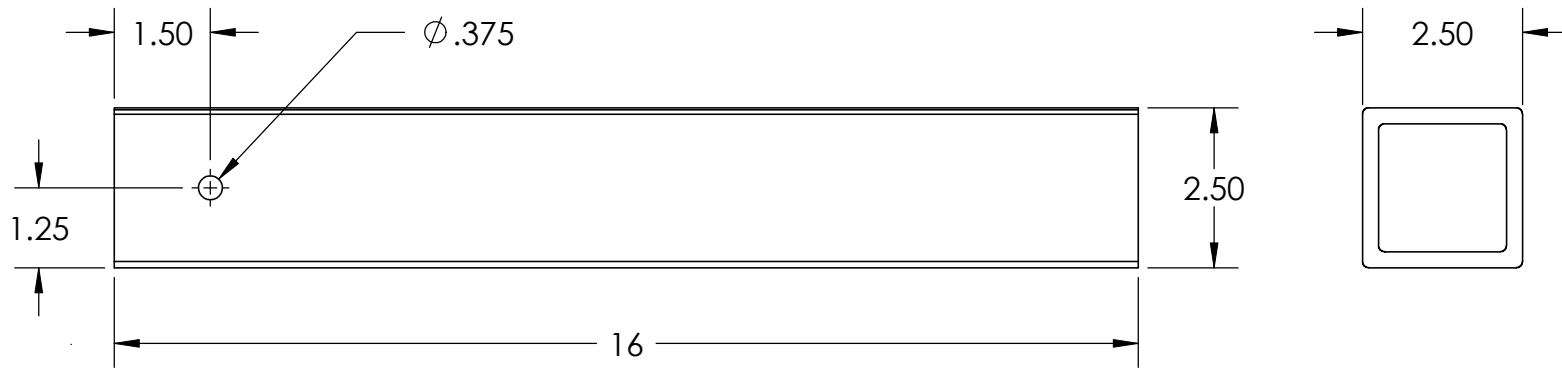
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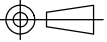


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	28JUN2010	A.MARTINEZ	HANDLE, HAMMER
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT28050702		A	
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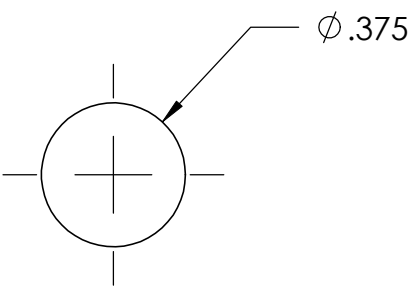
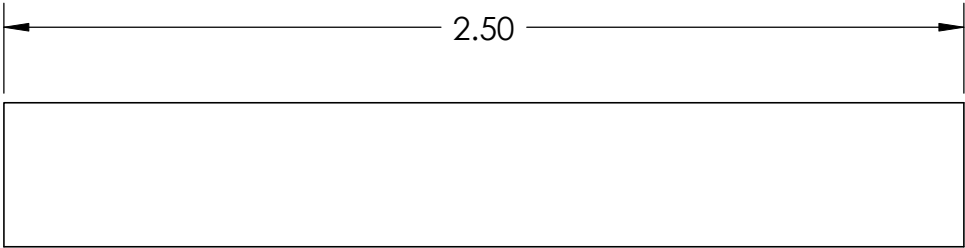
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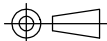
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	28JUN2010	A.MARTINEZ	<b>SLIDE, HAMMER</b>
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT28060701		SIZE: <b>A</b>	A
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		28JUN2010		A.MARTINEZ	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER	
								CDOT28070701	
				SIZE: A		SCALE: 2:1		SHEET 1 OF 1	
								REV A	

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** 4 Foot Slide Post Pounder

**Innovator(s):** Anthony Martinez

**Summary:** There are many products on the market that do this same task. The advantage of this device is that the center section is four feet long thereby preventing buckling of the post when pounded into the ground, preventing the device from slipping off the post when in use, and driving each post to a four foot height above ground. This is clearly an advantage but a change in length does not make it novel for patenting purposes.

### Prior Art Search

#### 1. Patent Search

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: post & pounder, post & driver

Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |                             |
|-------------|------|-----------------------------|
| • 3,712,389 | 1973 | Post Driver                 |
| • 4,252,472 | 1981 | Fixing Posts in the Ground  |
| • 4,971,479 | 1990 | Post Driver                 |
| • 5,020,615 | 1991 | Post Driver and Methodology |

- 5,042,591     1991    “T” Post Puller-Pounder
- 5,085,281     1992    Slide Hammer Apparatus
- 7,111,690     2006    Manual Slide Post Driver and Extractor for “T”-Type Metal or Fiberglass or Plastic Posts

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- [http://www.northerntool.com/shop/tools/product\\_200322188\\_200322188](http://www.northerntool.com/shop/tools/product_200322188_200322188)
- [http://www.bjmanufacturing.com/misc\\_.htm](http://www.bjmanufacturing.com/misc_.htm)
- <http://www.fencepostdriver.net/>
- <http://www.signsdirect.com/Home/Manual-Post-Drivers>
- [http://farm-and-pet.hardwarestore.com/112-622-fence-tools-and-parts/steel-post-driver-with-handle-610954.aspx?utm\\_source=nextag&utm\\_medium=cpc&utm\\_term=610954&utm\\_campaign=nextag](http://farm-and-pet.hardwarestore.com/112-622-fence-tools-and-parts/steel-post-driver-with-handle-610954.aspx?utm_source=nextag&utm_medium=cpc&utm_term=610954&utm_campaign=nextag)
- <http://www.mastergardening.com/dee-8035.html>
- [http://farm-and-pet.hardwarestore.com/112-622-fence-tools-and-parts/post-driver-515501.aspx?utm\\_source=nextag&utm\\_medium=cpc&utm\\_term=515501&utm\\_campaign=nextag](http://farm-and-pet.hardwarestore.com/112-622-fence-tools-and-parts/post-driver-515501.aspx?utm_source=nextag&utm_medium=cpc&utm_term=515501&utm_campaign=nextag)
- <http://www.northerntool.com/shop/tools/NTESearch?storeId=6970&N=0&Ntk=All&Ntt=post+driver&Nty=1&D=post+driver&Ntx=mode+matchallpartial&Dx=mode+matchallpartial>
- [http://www.municipalsigns.com/mm5/merchant.mvc?Screen=PROD&Store\\_Code=MSSC&Product\\_Code=POSTDRIVER&Category\\_Code=](http://www.municipalsigns.com/mm5/merchant.mvc?Screen=PROD&Store_Code=MSSC&Product_Code=POSTDRIVER&Category_Code=)

## ***Evaluation of Innovation***

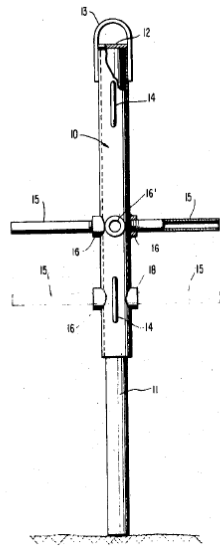
An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

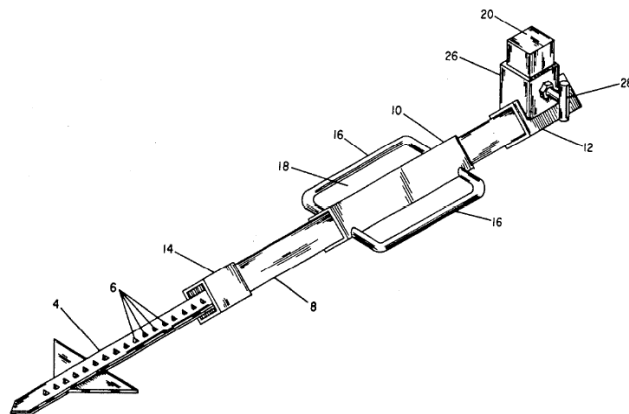
An examination of the information presented above does reveal prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).



a. 3,712,389 Post Driver



b. 5,042,591 "T" Post Puller-Pounder



c. [http://www.bjmanufacturing.com/misc\\_.htm](http://www.bjmanufacturing.com/misc_.htm)



## 2. Evaluation of non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

- a. [http://www.northerntool.com/shop/tools/product\\_200322188\\_200322188](http://www.northerntool.com/shop/tools/product_200322188_200322188)  
This device is similar except that it is cylindrical, doesn't have stops or lock and isn't the same length.



- b. [http://www.municipalsigns.com/mm5/merchant.mvc?Screen=PROD&Store\\_Code=MSSC&Product\\_Code=POSTDRIVER&Category\\_Code=](http://www.municipalsigns.com/mm5/merchant.mvc?Screen=PROD&Store_Code=MSSC&Product_Code=POSTDRIVER&Category_Code=)  
This device has extended handles to limit the depth the post can be driven.



### **3. Usefulness**

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

This device has a four foot long center section with a sixteen inch slide hammer. The long center section prevents the post from buckling when forced into the ground which helps prevent operator injury. The long extension keeps the device from slipping off the post when pounding the post into the ground.

### **4. Public Disclosure**

According to the innovator, this device was first built and used in May 2008. The Lincoln crew uses this device. Information regarding this device has only been shared with the Lincoln crew. The device in use is the original design.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

**Submission number:** 29

**Title of the Innovation:** Hydraulic Post Remover

**Innovator(s):** Anthony Martinez

### Device Description

The hydraulic delineation post remover is designed to pull posts of all sizes from the ground. Minimal worker effort is required to remove even large size posts with the pulling accomplished by a 4-ton crane ram.



#### 1. Usefulness

- This device removes twisted or broken delineation posts from the ground and allows reuse of the hole for a new post. It saves the crews from back injuries because they do not have to manually pull on the post. The device includes dolly wheels so that the crew can roll the device instead of carrying it.

#### 2. Ease of use

- This device is easy to use.

## **Manufacturability**

This device is constructed of fourteen machined and/or welded parts. The parts are simple and do not have features that are difficult to manufacture.

## **Potential for Widespread Application**

1. Time to train operator
  - It would take about five minutes to train an operator to use this device.
2. Reduction in time to complete task
  - This is a much faster method of removing posts.
  - It would save about 20 minutes for every post removed.
3. Improvement in quality
  - This device is made of stronger materials than similar products.
  - It allows the same post hole to be reused.
4. Expected annual usage
  - This device could be used 12 months of the year.
  - It would be used about 40 hours per month.
5. Units required
  - One device is required for each patrol.
6. Use in other states
  - All states that need to remove posts would benefit from this device.

## **Safety**

1. Improvement in safety
  - This device prevents injuries because it removes the post without any physical effort on the part of the operator.
  - The job of removing a post is safer because the road crew does not have to dig out the old post.
2. Safety concerns due to use or misuse of the device
  - Tipping if the device is set on uneven ground.
3. Safety concerns due to failure of the device
  - If the chain breaks then it could swing around and hit the operator.
  - If any of the welds break then the broken portion could hit the operator.
  - The jack could be overloaded.

## **Availability of Similar Equipment for Purchase**

The prior art search found many products on the market that perform the same task.

## **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

### **1. Patentability**

- This device may be considered novel and useful but may not be considered as non-obvious depending on the Patent Examiner's evaluation
- According to the innovator, this innovation was publicly disclosed in its current form in January, 2010.

### **2. Patent infringement**

- Many products and patents for devices were found that were intended for removal of posts from the ground. For grabbing the post most of the devices use a chain or a bar with a hole in it. As the device moves up the chain or bar tighten on the post thereby grabbing the post. Each device has a different lifting mechanism with a variety of actuation means (e.g. manual, hydraulic, motor, etc.). None of the patents or products was identical to this device so they are listed in the category of non-obviousness.

## Hydraulic Delineation Post Remover User Manual



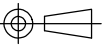
### Device Description

The hydraulic delineation post remover is designed to pull posts of all sizes from the ground. Minimal worker effort is required to remove even large size posts with the pulling accomplished by a 4-ton crane ram.

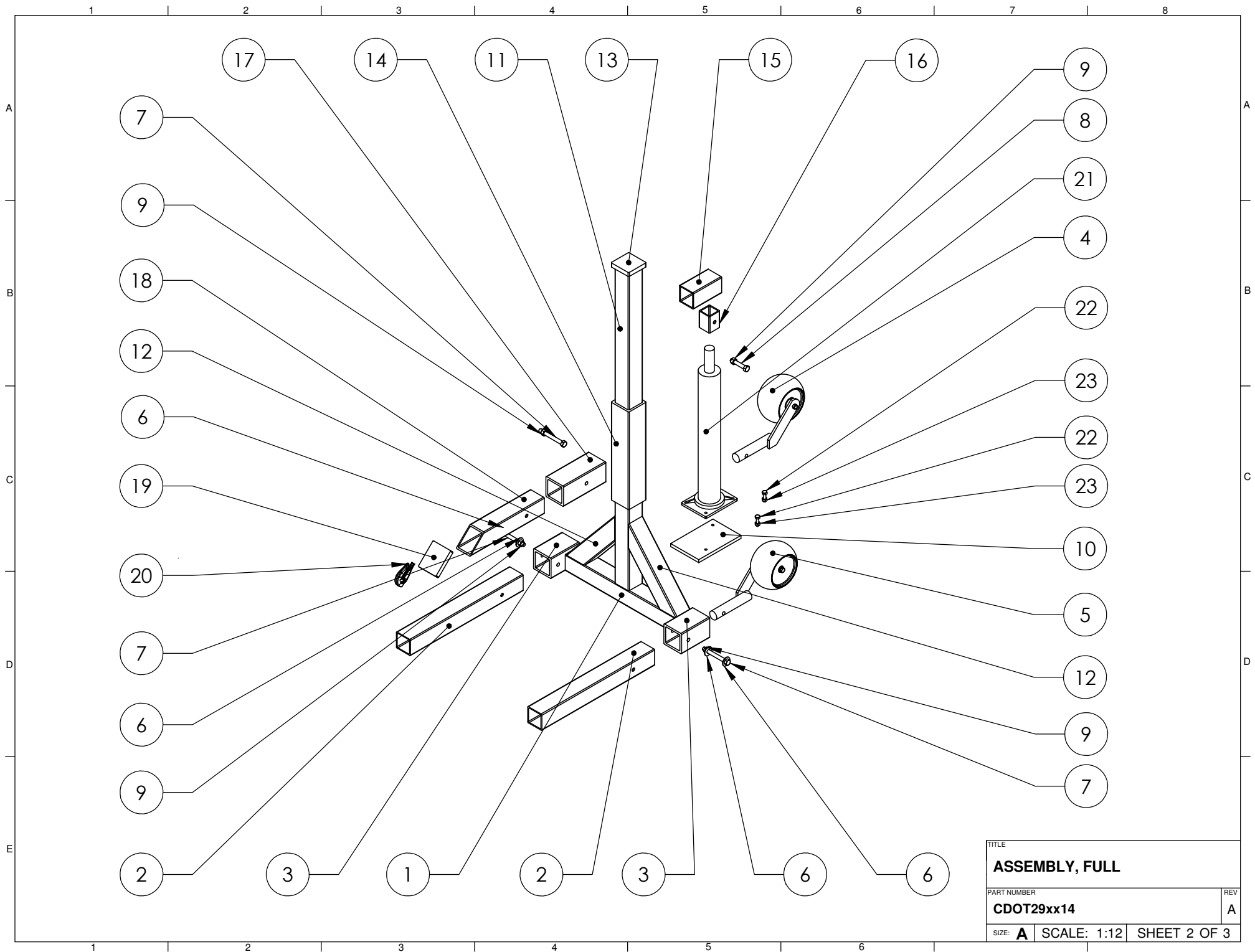
### Operating Instructions

1. Place the post remover around the post to be pulled, with the post in between the legs on the post remover.
2. Release the valve on the hydraulic ram to lower it to the minimum height.
3. Close the hydraulic ram fully.
4. Wrap a chain around the post such that it will not slide up or down with application of force from the remover.
5. Attach the other end of the chain to the hook on the post remover.
6. Slowly pump the hydraulic ram, raising the pulling bar. Continue until the post has been removed from the ground.
7. Remove the chain from the post remover.
8. Remove the chain from the removed post.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT29031401	MEMBER, BASE	1
2	CDOT29011402	LEG, BASE	2
3	CDOT29021402	MOUNT, LEG, BASE	2
4	STOCK01	WHEEL, STOCK	1
5	STOCK02	WHEEL, STOCK	1
6	Regular FW 0.375	WASHER, FLAT	4
7	HBOLT 0.3750-16x3.25x1-N	STANDARD BOLT	3
8	HBOLT 0.3750-16x2x1-N	STANDARD BOLT	1
9	HNUT 0.3750-16-D-N	STANDARD NUT	4
10	CDOT29041401	PLATE, MOUNTING, JACK	1
11	CDOT29051401	POST, VERTICAL	1
12	CDOT29061402	SUPPORT, POST, VERTICAL	2
13	CDOT29071401	CAP, POST, VERTICAL	1
14	CDOT29081401	SLIDE, VERTICAL	1
15	CDOT29091401	ARM, MOUNT, JACK	1
16	CDOT29101401	MOUNT, JACK, UPPER	1
17	CDOT29111401	MOUNT, ARM, PULLING	1
18	CDOT29121401	ARM, PULLING	1
19	CDOT29131401	CAP, ARM, PULLING	1
20	CDOT29141401	HOOK, GRAB	1
21	STOCK03	RAM, NAPA 520-6004A	1
22	HBOLT 0.2500-20x1x0.75-N	STANDARD BOLT	2
23	HNUT 0.2500-20-D-N	STANDARD NUT	2

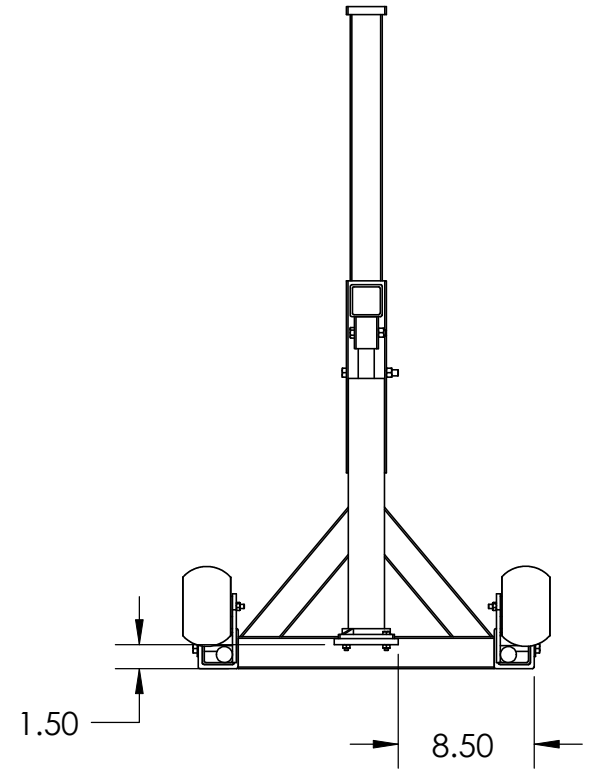
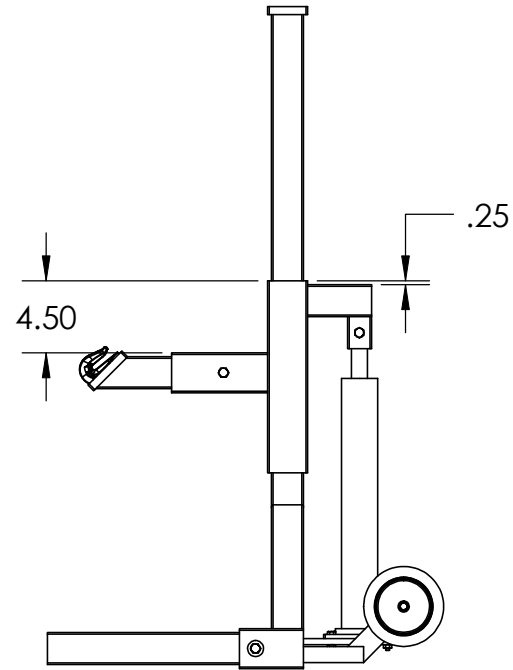
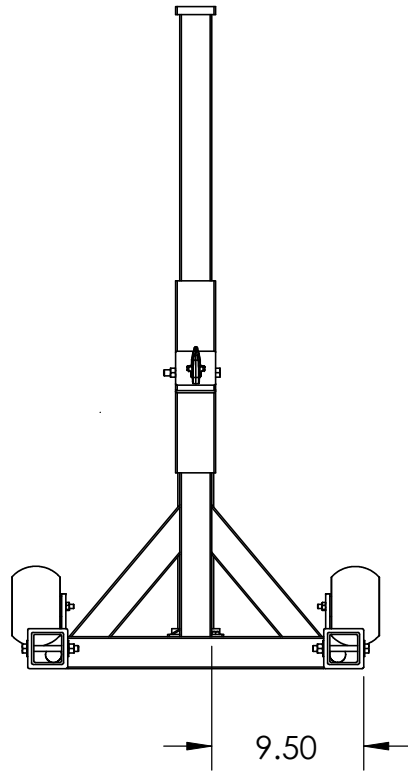
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MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		A.MARTINEZ		ASSEMBLY, FULL	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		REV	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT29xx14		A	
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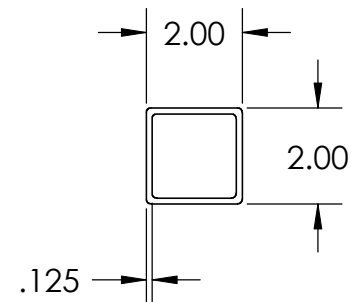
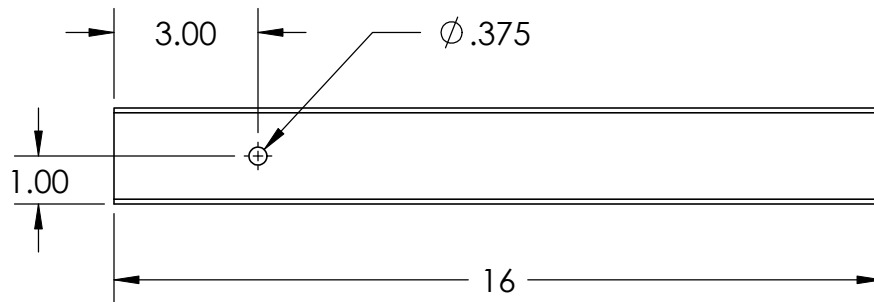
NOTES:

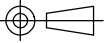
1. ALL JOINTS THAT ARE NOT BOLTED ARE FULLY WELDED,  
EXCLUDING THE VERTICAL SLIDE WHICH IS NOT AFFIXED  
IN ANY WAY TO THE VERTICAL POST.



TITLE		
ASSEMBLY, FULL		
PART NUMBER		REV
CDOT29xx14		A
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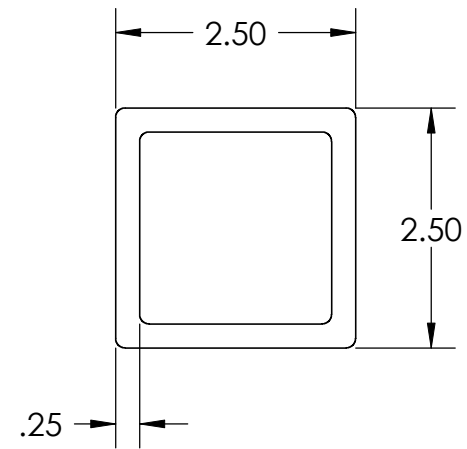
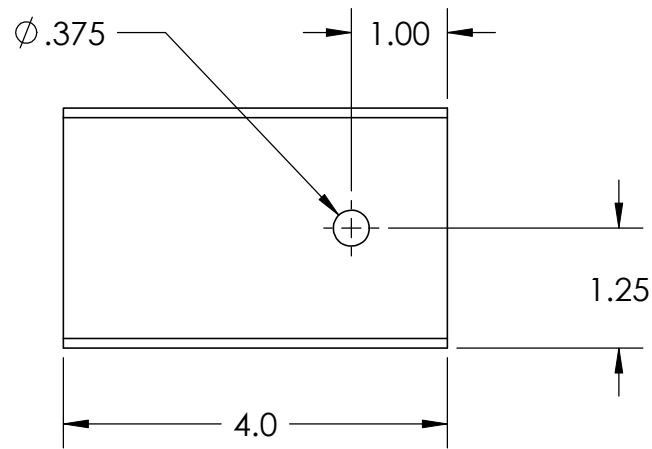
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD STEEL TUBING




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ	LEG, BASE
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT29011402		A	
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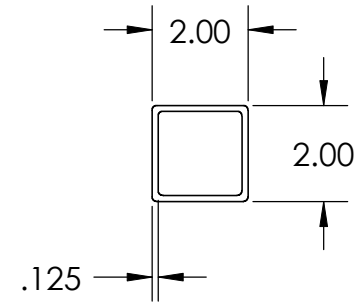
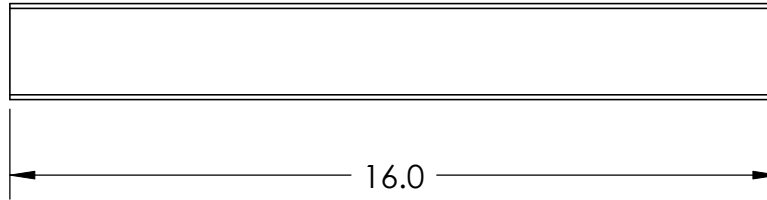
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING

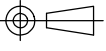


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR 06JUN2010		A.MARTINEZ		MOUNT, LEG, BASE		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER		REV
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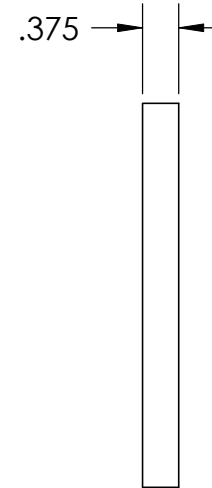
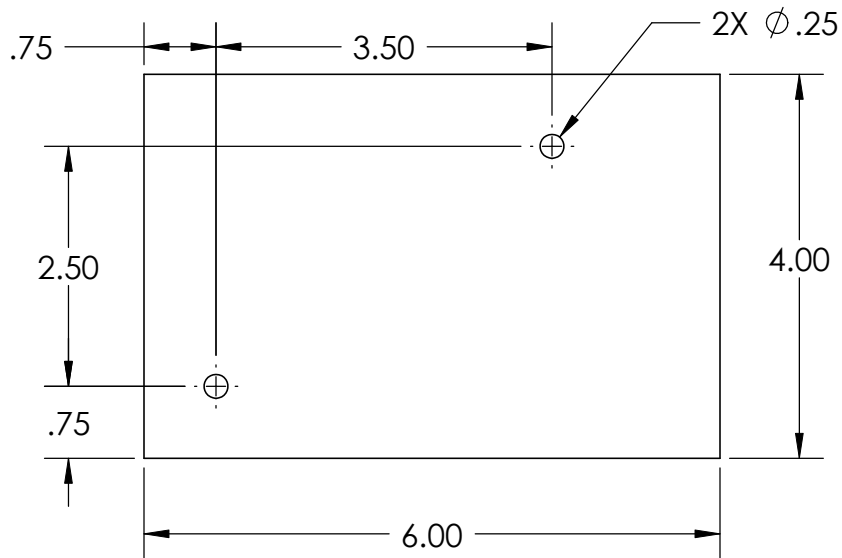
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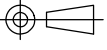
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ	<b>MEMBER, BASE</b>
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT29031401		A	
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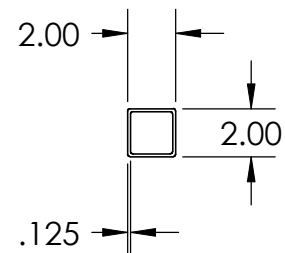
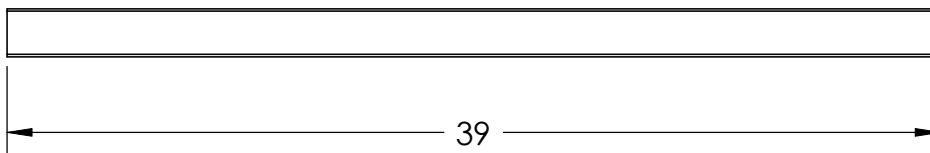
NOTES:  
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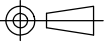


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ	PLATE, MOUNTING, JACK
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT29041401		A	
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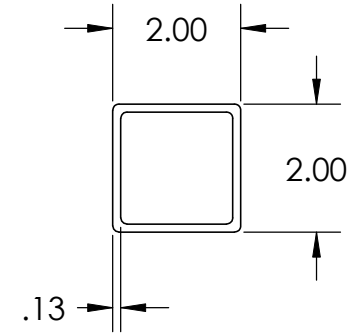
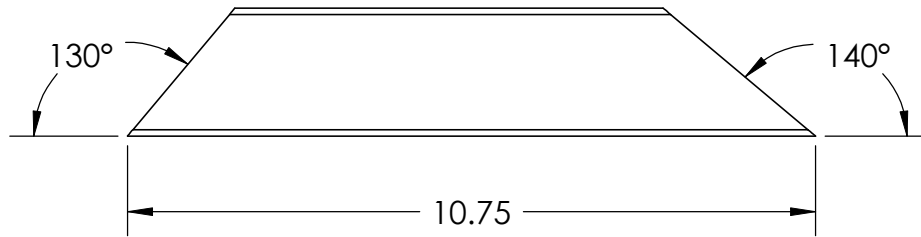
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ	POST, VERTICAL
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT29051401		A	
SIZE: A		SCALE: 1:8		SHEET 1 OF 1			

NOTES:

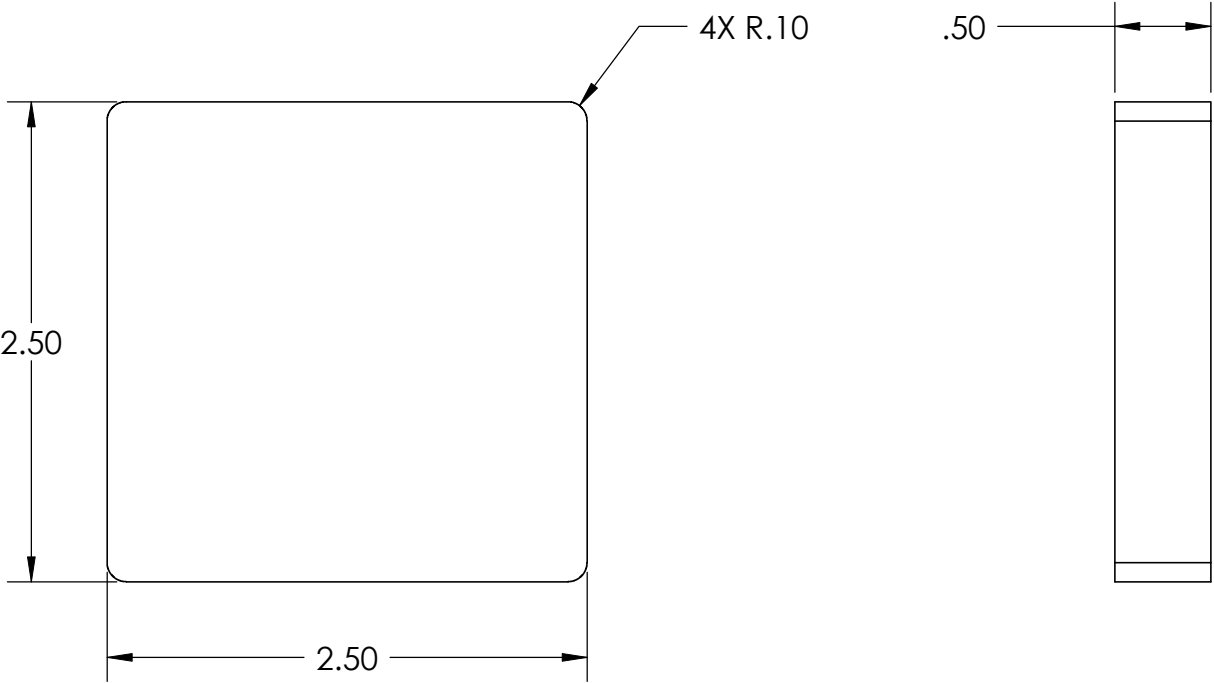
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING

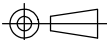


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		06JUN2010		A.MARTINEZ	
PROJECTION: 		X.= ± 0.3 X.X.= ± 0.1 X.XX.= ± 0.05 X.XXX.= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER	
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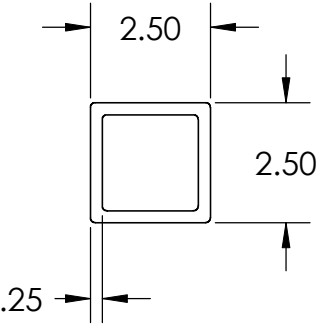
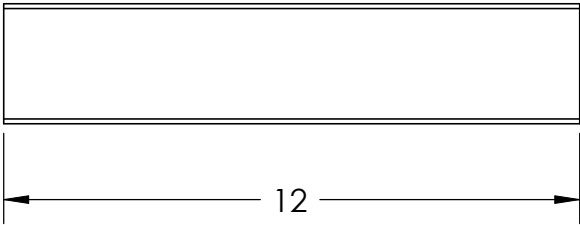


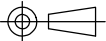
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ		CAP, POST, VERTICAL		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT29071401		REV A
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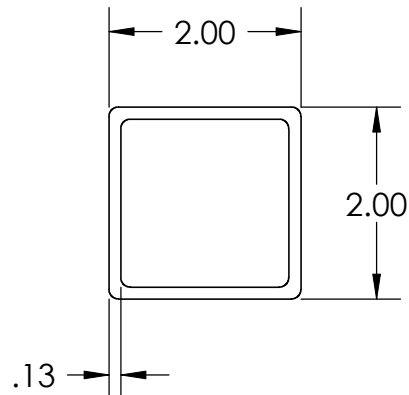
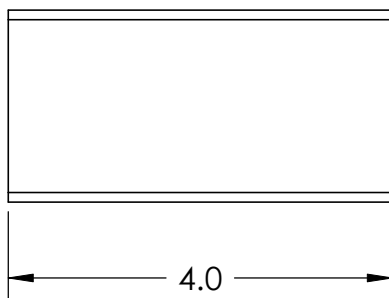
- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD STEEL TUBING

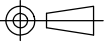


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ		SLIDE, VERTICAL		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT29081401		REV A
				SIZE: A		SCALE: 1:4		SHEET 1 OF 1		

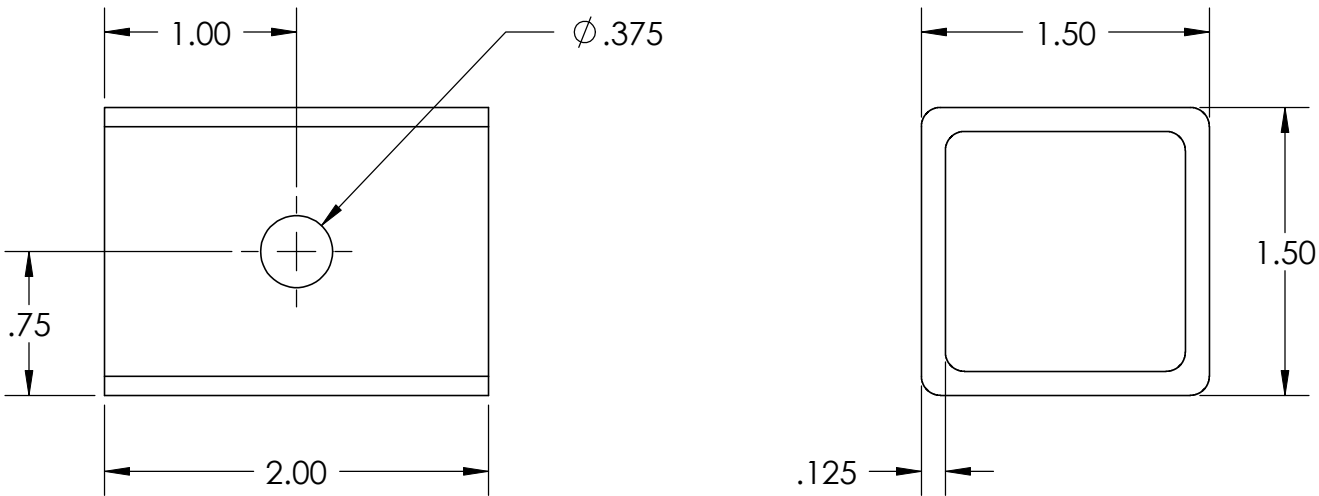
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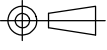
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING



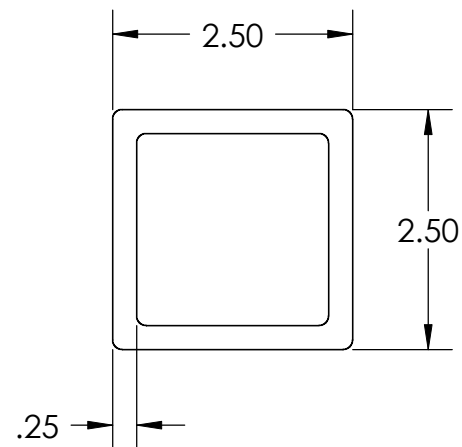
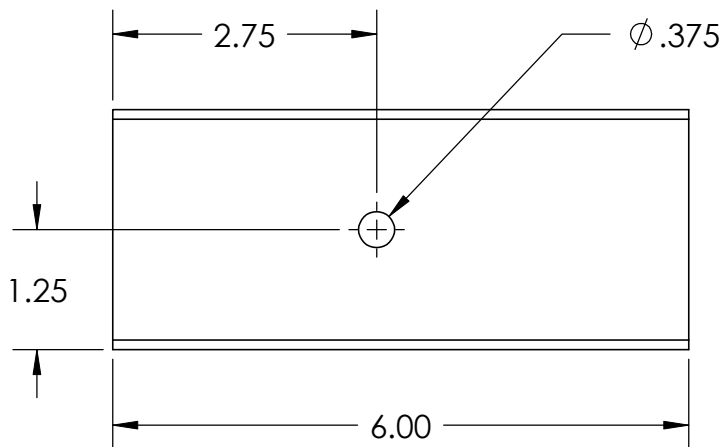
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ	<b>ARM, MOUNT, JACK</b>
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT29091401		A	
				SIZE: <b>A</b>		SCALE: 1:2	SHEET 1 OF 1

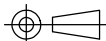
- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD STEEL TUBING



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		06JUN2010		A.MARTINEZ	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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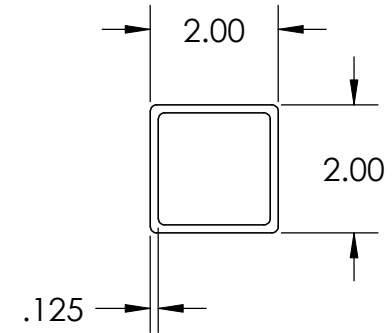
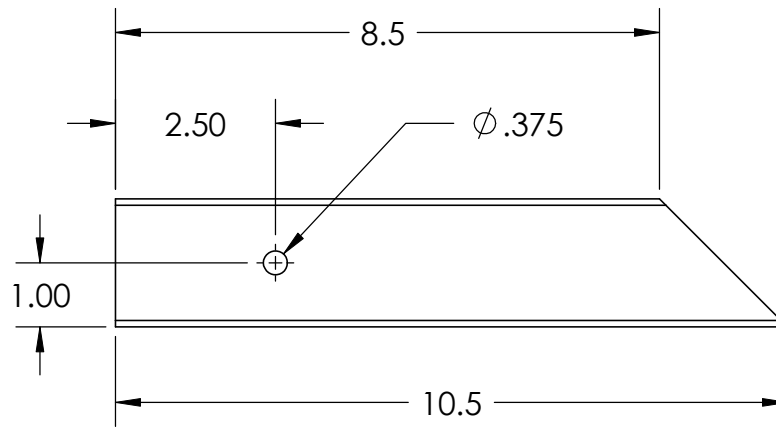
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD STEEL TUBING




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		06JUN2010		A.MARTINEZ	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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								REV A	

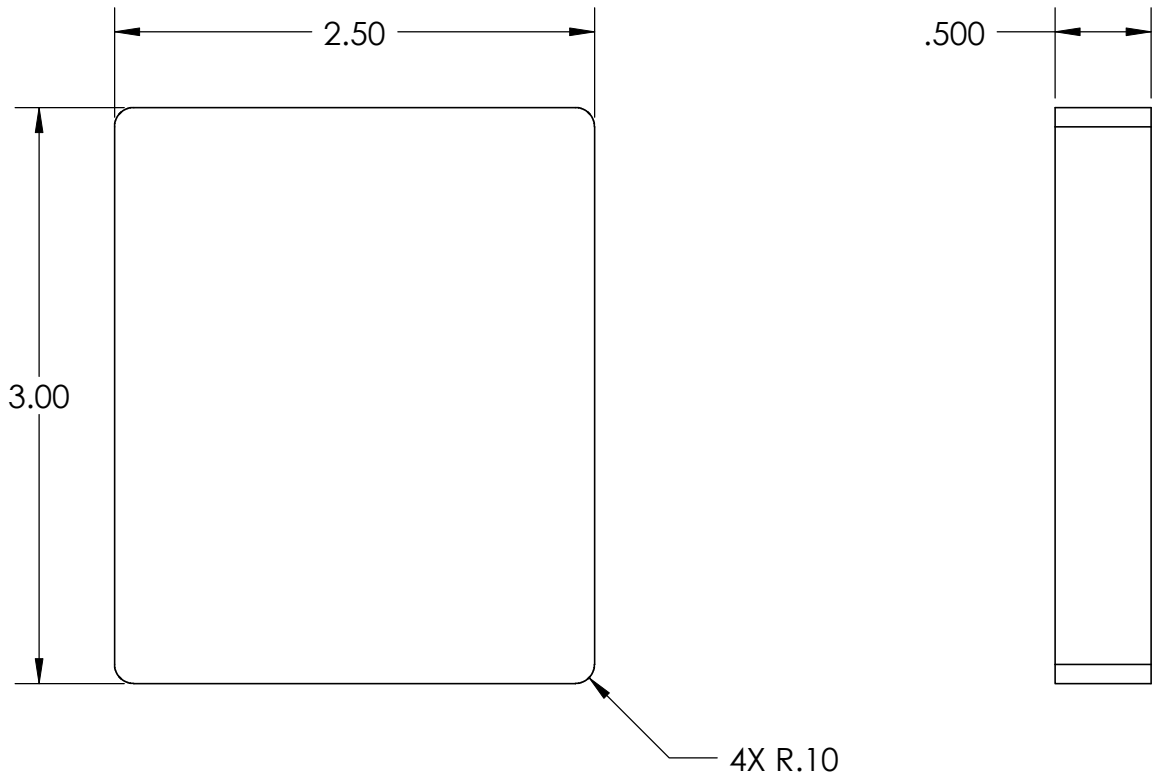
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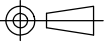
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD STEEL TUBING



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR 06JUN2010		A.MARTINEZ		ARM, PULLING	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		PART NUMBER		REV	
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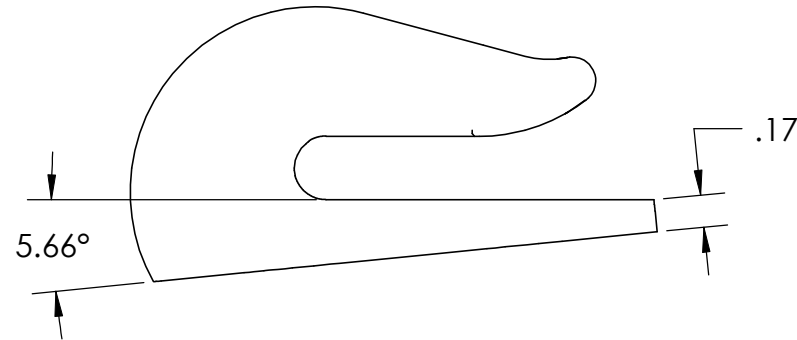
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

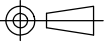


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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ	CAP, ARM, PULLING
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT29131401		SIZE: A	A
				SCALE: 1:1		SHEET 1 OF 1	

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. HOOK IS CUT FROM STANDARD 2" GRAB HOOK FOR 0.25" CHAIN



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	06JUN2010	A.MARTINEZ	<b>HOOK, GRAB</b>
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT29141401		A	
				SIZE: <b>A</b>	SCALE: 1:1	SHEET 1 OF 1	



## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Hydraulic Delineation Post Remover

**Innovator(s):** Anthony Martinez

**Summary:** Many patents for device and products were found that were intended for removal of posts from the ground. For grabbing the post most of the devices use a chain or a bar with a hole in it. As the device moves up the chain or bar tighten on the post thereby grabbing the post. Each device has a different lifting mechanism with a variety of actuation means (e.g. manual, hydraulic, motor, etc). None of the patents or products were identical to this device so they are listed in the category of non-obviousness.

### ***Prior Art Search***

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: post & puller, post & remover, delineation & puller

Field of search: Title

#### **Patent Number Title of Invention**

- 3,779,516 Post puller
- 3,815,875 Portable Stake Remover

- 3,991,976 Implement for driving and removing fence posts
- 4,026,522 Post Pulling Apparatus
- 4,161,310 Metal Fence Post Puller
- 4,226,402 Post Puller
- 4,250,769 Pivoted adjustable lever with grab link
- 4,256,286 Post Pulling Device
- 4,422,621 Fence Post Puller
- 4,706,935 Post Puller
- 4,721,335 Puller for fence posts or the like
- 4,726,565 Post Puller
- 4,738,433 Post Puller
- 4,750,711 Post Puller
- 4,792,120 Post removing device
- 4,804,165 Stake pulling apparatus
- 4,846,445 Hydraulic fence post puller
- 5,009,394 Metal fence post extractor
- 5,011,117 Post Puller
- 5,022,632 Post pulling apparatus with interchangeable working heads for pulling different types of posts
- 5,042,591 "T" post puller-pounder
- 5,052,659 Stake puller
- 5,100,104 Implement for removing a fence post or the like
- 5,161,781 Tool assembly for use in pulling fence posts
- 5,186,437 Post puller including concrete base pulling means
- 5,211,374 Post Puller
- 5,219,438 Post Puller
- 5,224,687 Fence Post Extractor
- 5,242,152 Post Puller
- 5,261,642 Steel Post Puller
- 5,368,277 Device for removing metal fence posts
- 5,464,192 High Speed Manual Post Puller
- 5,499,795 Post Remover
- 5,597,151 Stake puller with stake supporting back plate
- 5,604,946 Multi-purpose fence building tool
- 5,681,030 Device for pulling fence posts
- 5,713,559 Method and apparatus for installing and removing posts and for lifting heavy objects
- 5,794,918 Fence Post Puller Apparatus
- 5,833,215 Combination metal and wood post removing device
- 5,855,358 Framework Removal Tool
- 5,934,649 Hand operated post and pole extraction device
- 6,056,271 Post Puller
- 6,131,884 Tool for extraction of stakes
- 6,302,376 Self-translating Stake Puller

- 6,302,377 Post pulling apparatus
- 6,352,242 Post Removal Device
- 6,367,779 Post pulling mechanism
- 6,382,594 Post puller
- 6,398,188 Post puller
- 6,527,250 Device for pulling a planted post from the ground
- 6,641,347 Pole extractor
- 6,669,172 Post puller
- 6,857,619 Post puller system
- 7,059,587 Post puller
- 7,125,000 Post puller
- 7,185,880 T-post puller claw
- 7,290,754 T-post puller
- 7,431,266 Post puller
- 7,699,288 Delineator extraction system

## 2. Existing product search

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.seton.com/post-puller-89639.html>
- b. [http://www.tapconet.com/store/product/3d2ef2e3-841d-436b-b91d-c80f52db8345/Carsonite\\_Post\\_Puller.aspx](http://www.tapconet.com/store/product/3d2ef2e3-841d-436b-b91d-c80f52db8345/Carsonite_Post_Puller.aspx)
- c. <http://www.hi-lift.com/post-popper/index.html>
- d. <http://www.hardwareandtools.com/Post-PullR-Post-Pull-r-PP100-by-Maasdam-Dead-On-Pull-R-9584459.html>
- e. <http://www.hooverfence.com/tools/post-popper.htm>
- f. <http://www.bigredpostpuller.com/>
- g. <http://www.amazon.com/Northern-Tool-Equipment-Tuggy-Puller/dp/B0000AX74X>
- h. [http://www.amazon.com/gp/product/B000DCN8SQ/ref=pd\\_lpo\\_k2\\_dp\\_sr\\_1?pf\\_rd\\_p=486539851&pf\\_rd\\_s=lpo-top-stripe-1&pf\\_rd\\_t=201&pf\\_rd\\_i=B0000AX74X&pf\\_rd\\_m=ATVPDKIKX0DER&pf\\_rd\\_r=1HTCSS6XQCSEZE2RQBBQ](http://www.amazon.com/gp/product/B000DCN8SQ/ref=pd_lpo_k2_dp_sr_1?pf_rd_p=486539851&pf_rd_s=lpo-top-stripe-1&pf_rd_t=201&pf_rd_i=B0000AX74X&pf_rd_m=ATVPDKIKX0DER&pf_rd_r=1HTCSS6XQCSEZE2RQBBQ)

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

## 1. Evaluation of Novelty

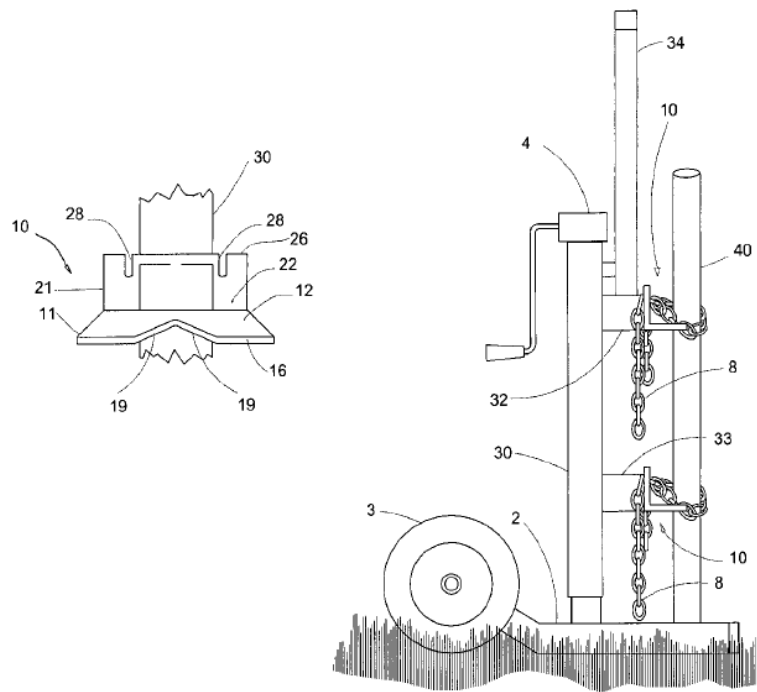
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s). Accordingly, based on the above information, the submitted device would appear to meet the USPTO requirement of novelty.

## 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

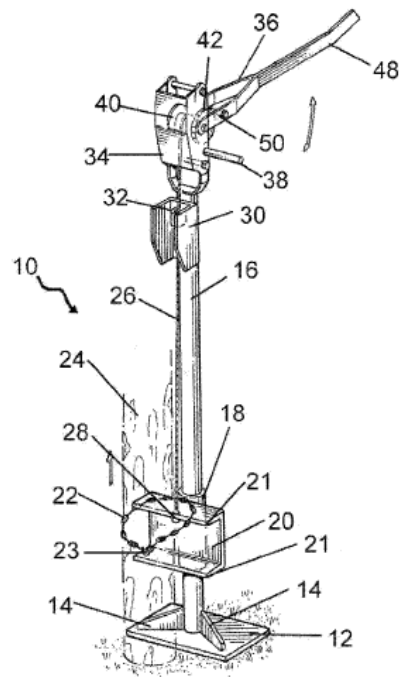
### a. 7,431,266 – Post puller

This device has a lifting mechanism, a side bar and a method of attaching to the post.



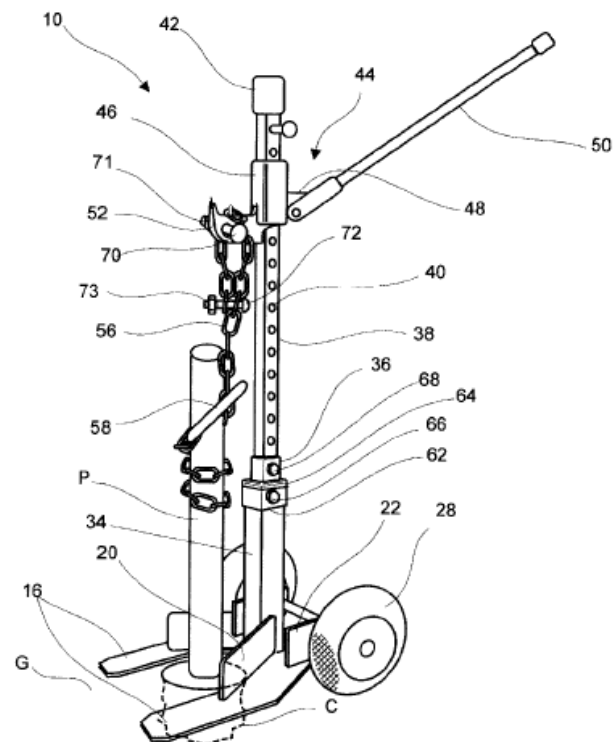
b. 7,125,000 – Post puller

This device has a lifting mechanism, a side bar and a method of attaching to the post.



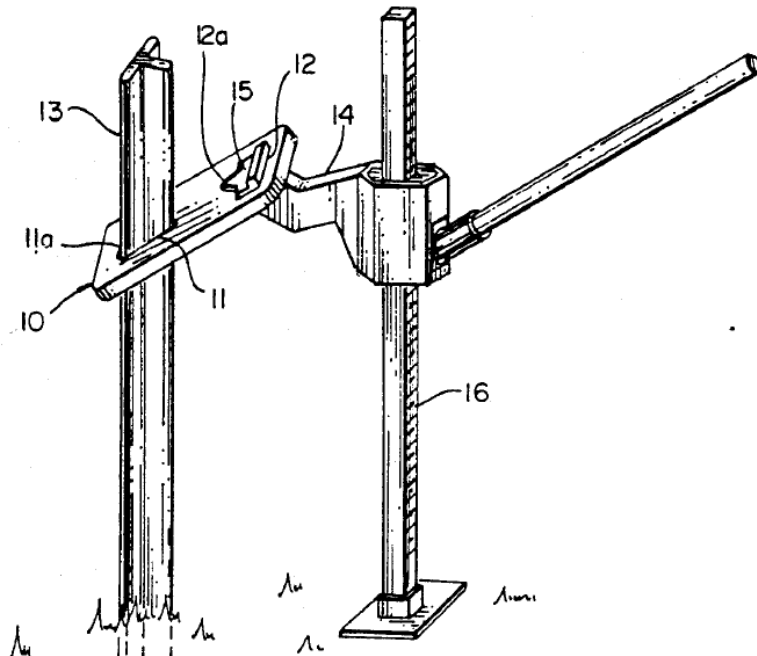
c. 6,527,250 – Device for pulling a planted post from the ground

This device has a lifting mechanism, a side bar and a method of attaching to the post.



d. 5,224,687 – Fence Post Extractor

This device uses a manual jack to move the side up in a vertical motion.



**3. Usefulness**

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

This device removes twisted or broken delineation posts from the ground and allows reuse of the hole for a new post. It saves the crews from back injuries because they do not have to manually pull on the post. The device includes dolly wheels so that the crew can roll the device instead of carrying it.

**4. Public Disclosure**

According to the innovator, this device was first fabricated in January 2010. This is the original version of the device and no modifications have been made. The device or information regarding the device has been shared with members of the Lincoln crew. This is the original version of the device and no modifications have been made.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

**Submission number:** 32

**Title of the Innovation:** Guardrail Post Puller

**Innovator(s):** Michael (Jerry) Trant

### Device Description

The guardrail post puller is designed to remove guardrail posts from the ground without requiring large equipment and reducing the required footprint and manpower.



#### 1. Usefulness

- This device is a metal stand that is placed over the metal sleeve of a wooden guardrail post providing easy and safe extraction of broken guardrail posts. This device is especially useful for areas that do not provide enough of a shoulder for heavy equipment access. This post puller can be operated by one person.

#### 2. Ease of use

- This device is easy to use.

## **Manufacturability**

This device is constructed of ten machined and/or welded parts. The parts are simple and do not have features that are difficult to manufacture.

## **Potential for Widespread Application**

1. Time to train operator
  - It would take about 20 minutes to train an operator to use this device.
2. Reduction in time to complete task
  - This device is operated by one person and does not require setting up traffic control required when heavy equipment blocks the road.
  - It would save about 20 man hours per job.
3. Improvement in quality
  - When the post is extracted using this device the post sleeve remains intact and undisturbed so can be reused.
4. Expected annual usage
  - This device could be used all year long and would be used whenever a guardrail got hit.
5. Units required
  - One post puller is required for each TMIII area.
6. Use in other states
  - All states that do post pulling would benefit from this device.

## **Safety**

1. Improvement in safety
  - Using this device instead of heavy equipment to remove the post eliminates the need for obstruction of the road and traffic control. It is well suited for unsafe terrain whereas heavy equipment is not.
2. Safety concerns due to use or misuse of the device
  - Splinters from drilling and handling the broken mounting post.
  - Possible danger using drill to bore holes into broken mounting post.
  - Getting fingers pinched between bottom of device and ground or support wood.
  - Getting fingers pinched in hydraulic lift handle hinge.
3. Safety concerns due to failure of the device
  - Chain could suddenly snap in tension and small pieces could go flying.
  - Hydraulic lift could fail and act as a hammer on any body parts that could be underneath.

## **Availability of similar equipment for purchase**

The prior art search found many products that perform the same task.



## **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

### **1. Patentability**

- This device may be considered novel and useful but may not be considered non-obvious depending on the Patent Examiner's evaluation.
- This innovation has been publicly disclosed; however, the innovator is unclear regarding the date and duration of public disclosure.

### **2. Patent infringement**

- Many patents for device and products were found that were intended for removal of posts from the ground. For grabbing the post most of the devices use a chain or a bar with a hole in it. As the device moves up the chain or bar tighten on the post thereby grabbing the post. Each device has a different lifting mechanism with a variety of actuation means (e.g. manual, hydraulic, motor, etc). None of the patents or products was identical to this device so they are listed in the category of non-obviousness.

## Guardrail Post Puller User Manual



### Device Description

The guardrail post puller is designed to remove guardrail posts from the ground without requiring large equipment and reducing the required footprint and manpower.

### Operating Instructions

1. Drill two holes into the post to be pulled, each 0.5 inch in diameter. Angle the holes slightly away from the center of the post.



2. Screw the 0.625 inch lag bolts with welded shackles into the holes.

Innovator(s): Michael Trant

3. Place the post puller over the post and seat firmly against the ground. Use additional wood pieces to level the base of the post puller if needed.
4. Lower the bottle jack on the top of the device as much as possible.
5. Connect a clevis grab hook to a 2 inch link chain.
6. Link the grab hook on the chain into one of the bolt welded shackles.



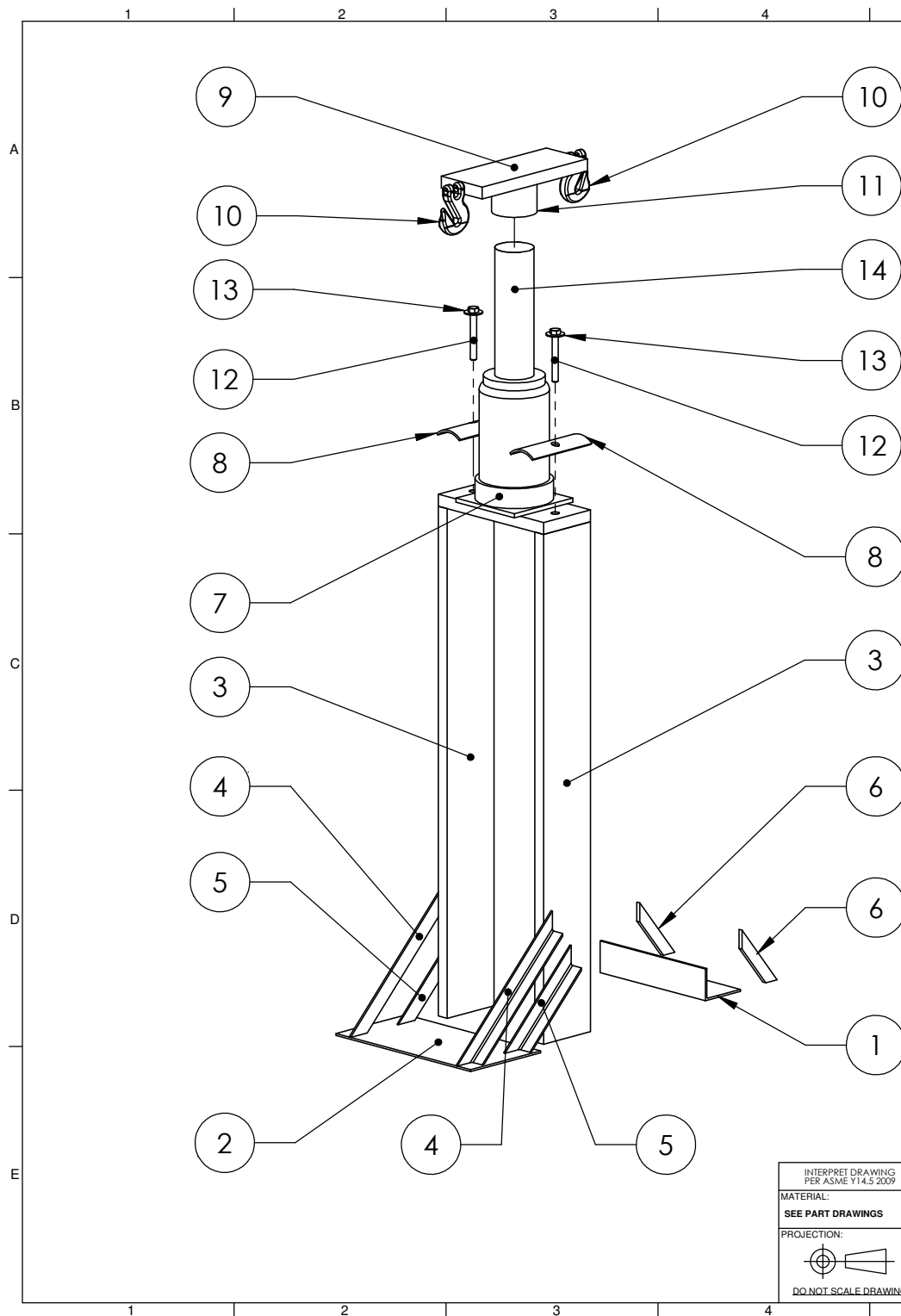
7. Link the other end of the chain into one of the grab hooks welded to the bottle jack, removing as much slack in the chain as possible.
8. Repeat steps 5-7 for the other shackle / grab hook.
9. Raise the bottle jack, tensioning the chains, and pulling the post from the ground.



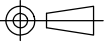
10. If the jack reaches its maximum height but the post is still firmly in the ground, lower the bottle jack, and remove the chain slack at the grab hooks welded to the jack.
11. When the post is fully removed from the ground, lower the bottle jack, and disconnect all of the chains from the post puller and post.



12. Remove the bolt welded shackles from the removed post.

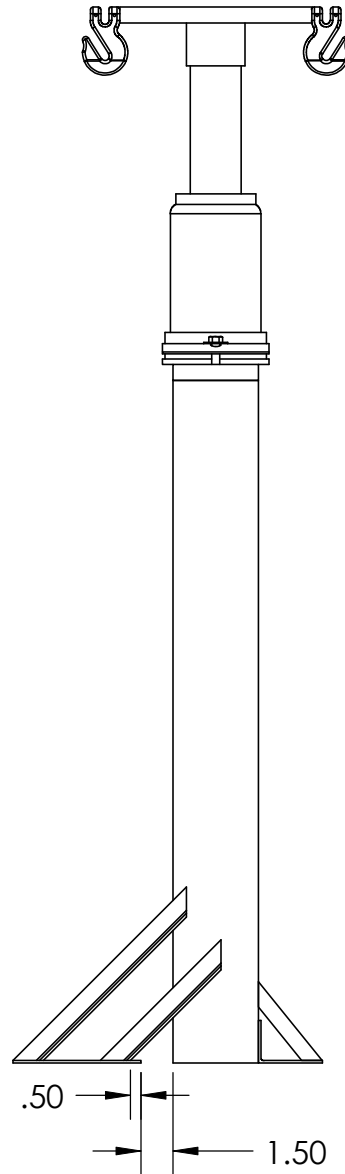


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2	CDOT32021001	PLATE, BASE, FRONT	1
3	CDOT32031002	POST, VERTICAL	2
4	CDOT32041002	SUPPORT, BASE, FRONT	2
5	CDOT32051002	SUPPORT, BASE, MIDDLE	2
6	CDOT32061002	SUPPORT, BASE, REAR	2
7	CDOT32071001	PLATE, TOP	1
8	CDOT32081002	HOLDER, JACK, BOTTLE	2
9	CDOT32091001	PLATE, PULLING	1
10	STOCK01	HOOK, GRAB	2
11	CDOT32101001	TUBE, MOUNTING, JACK	1
12	HBOLT 0.3750-16x3x3-N	STANDARD BOLT	2
13	Selected Wide FW 0.375	STANDARD WASHER	2
14	STOCK02	JACK, DAYTON, 20 TON	1

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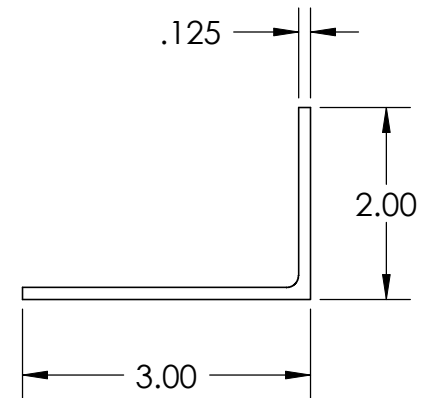
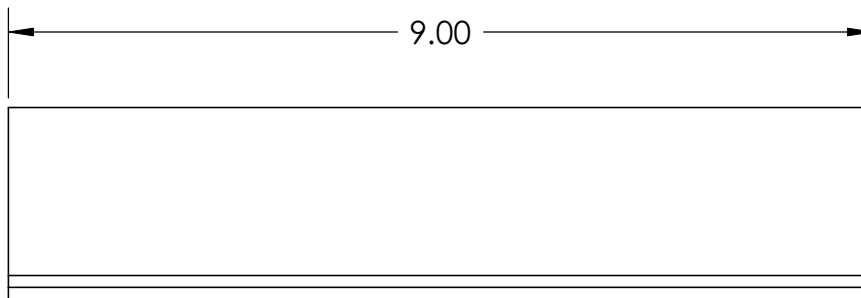
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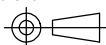
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2. THE JACK MOUNTING TUBE SLIDES OVER THE BOTTLE JACK AND IS NOT WELDED
3. THE 20 TON DAYTON JACK IS HELD ONTO THE FRAME WITH THE BOTTLE JACK HOLDERS AND IS NOT WELDED
4. THE BOLTS SCREWED INTO THE POST TO BE PULLED CONSIST OF A 5/8" LAG SCREW 8" IN LENGTH WITH AN ANCHOR SHACKLE WELDED TO THE HEX HEAD.



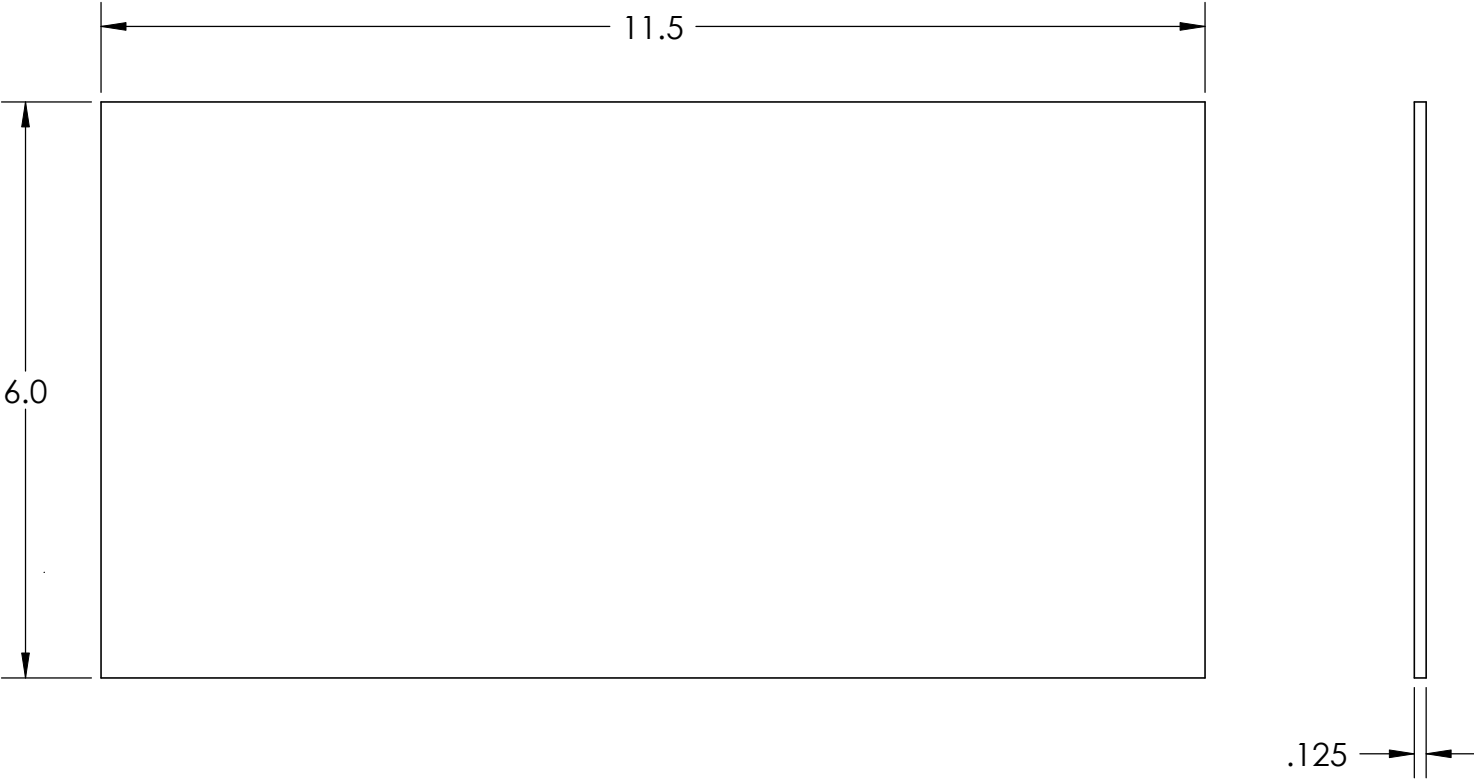
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ASSEMBLY, FULL		
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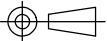
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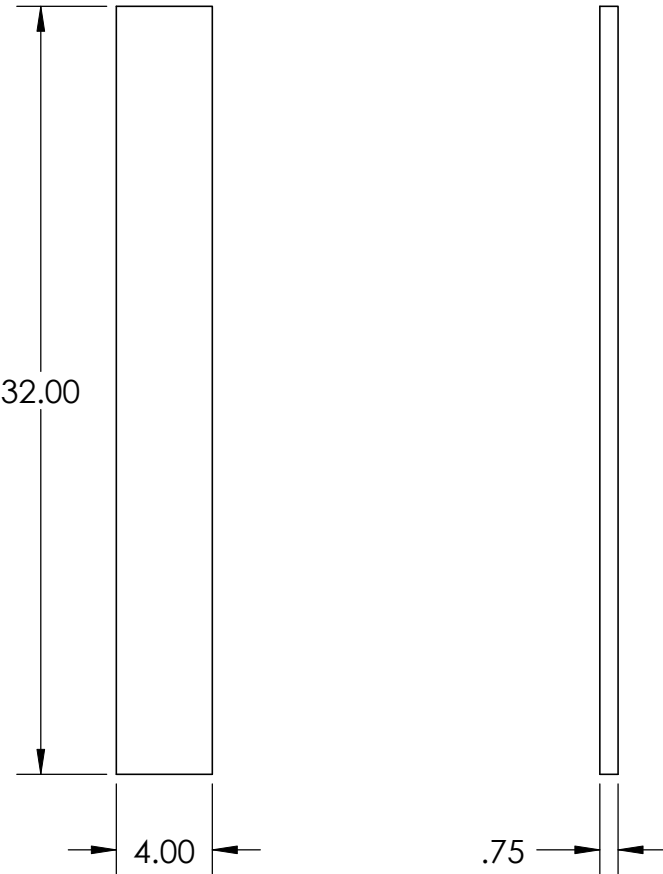
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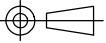


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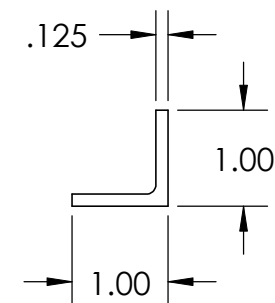
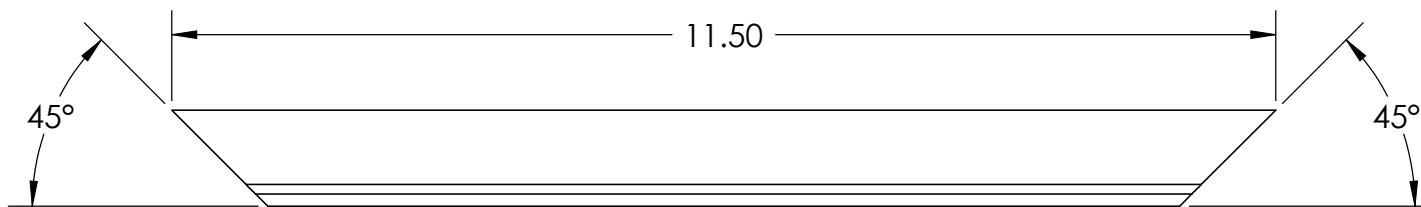
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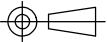


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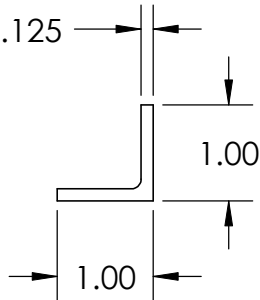
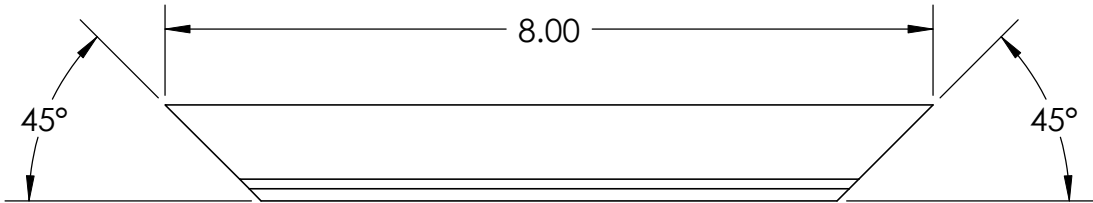
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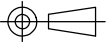
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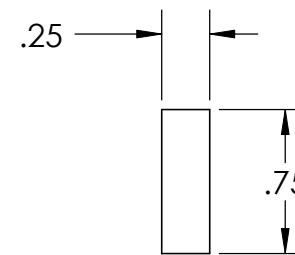
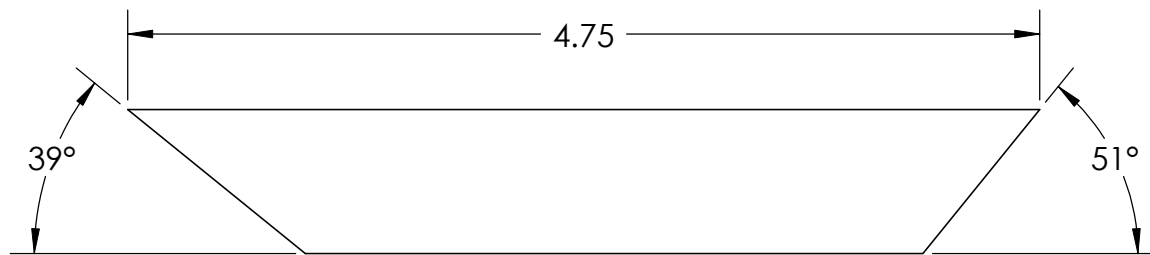
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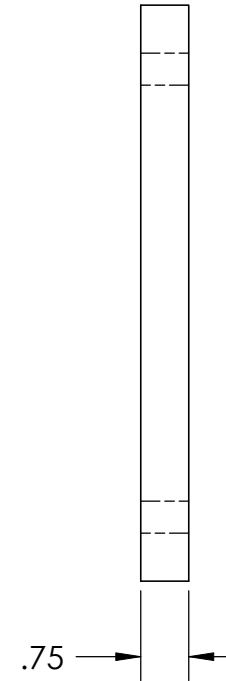
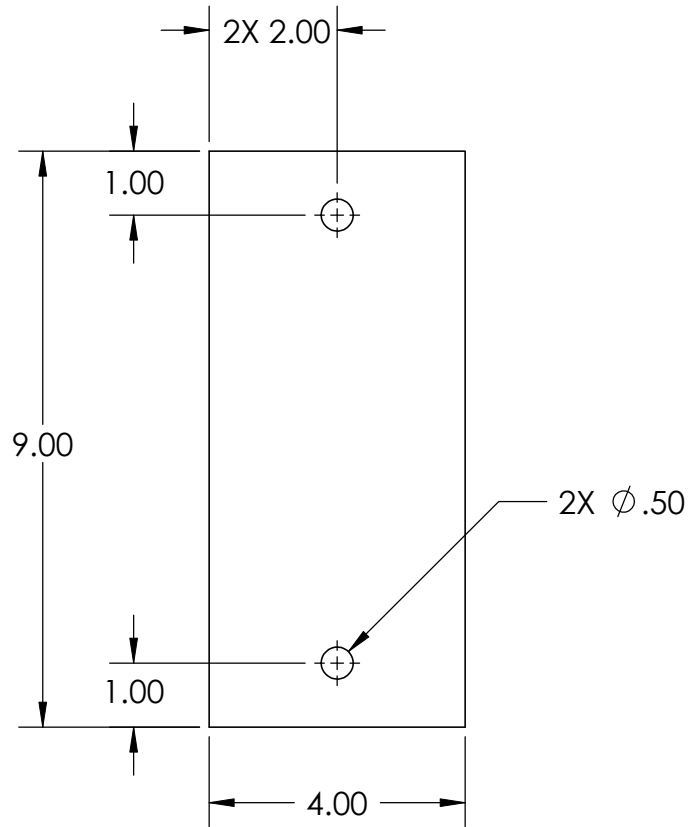
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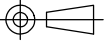


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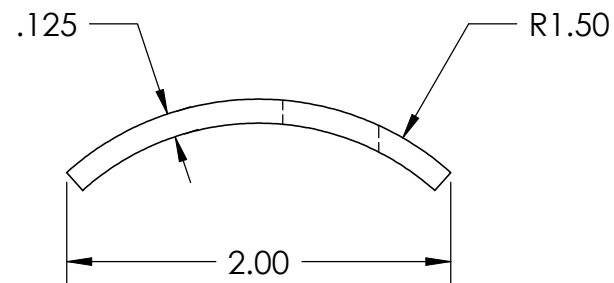
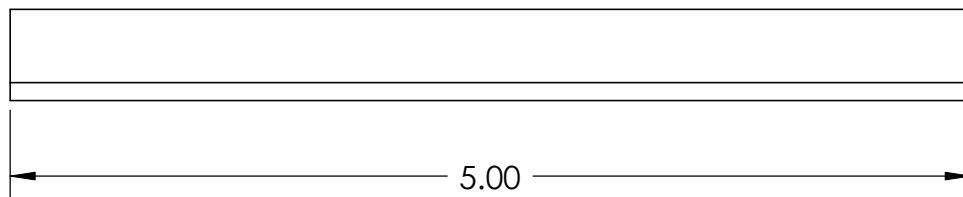
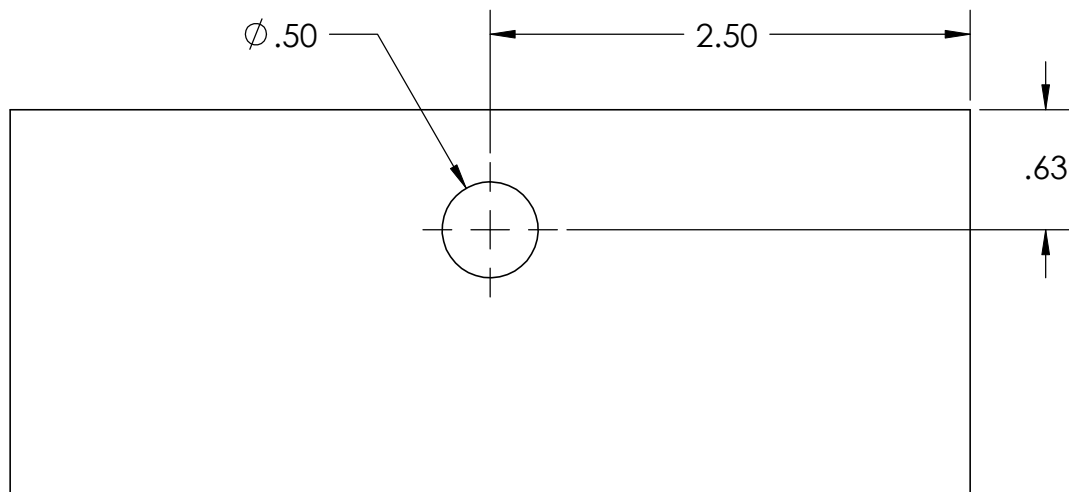
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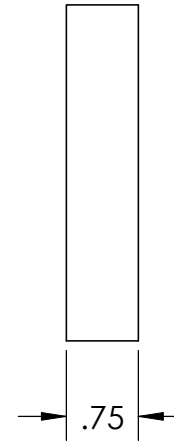
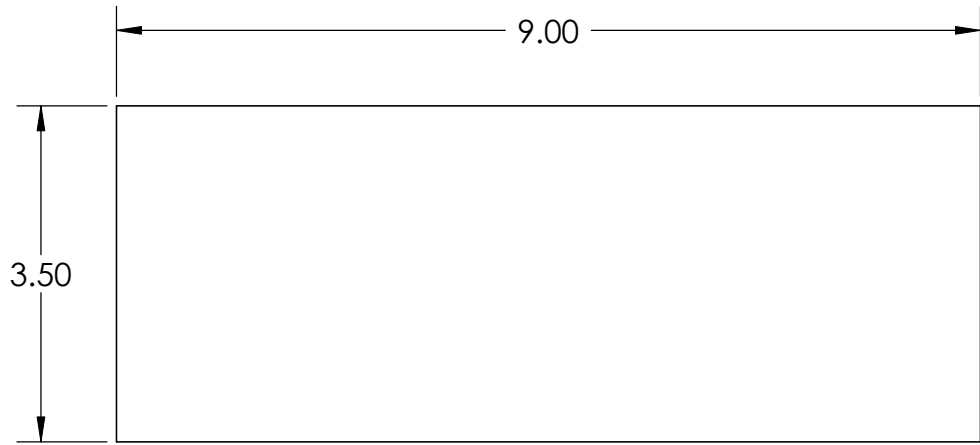
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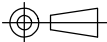


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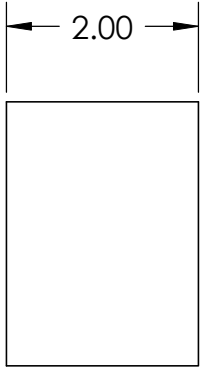
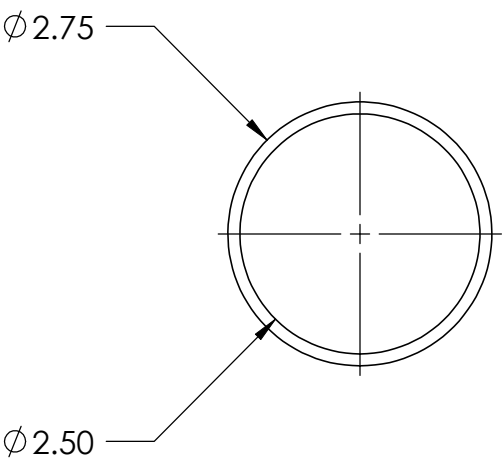
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PROJECTION: 		X.= ± 0.3 X.X.= ± 0.1 X.XX.= ± 0.05 X.XXX.= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			CDOT32091001
				SIZE: A			SCALE: 1:2
							SHEET 1 OF 1
							REV A

NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	20JUL2010	M. TRANT		TUBE, MOUNTING, JACK	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER		REV			
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				SIZE: A		SCALE: 1:2		SHEET 1 OF 1	



## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Guardrail Post Puller

**Innovator(s):** Michael Trant

**Summary:** Many patents for device and products were found that were intended for removal of posts from the ground. For grabbing the post most of the devices use a chain or a bar with a hole in it. As the device moves up the chain or bar tighten on the post thereby grabbing the post. Each device has a different lifting mechanism with a variety of actuation means (e.g. manual, hydraulic, motor, etc). None of the patents or products were identical to this device so they are listed in the category of non-obviousness.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: post & puller, post & remover, delineation & puller, fence & remover, guardrail post & puller, guard rail & puller  
Field of search: Title

#### **Patent Number Title of Invention**

- 3,779,516 Post puller
- 3,815,875 Portable Stake Remover

- 3,991,976 Implement for driving and removing fence posts
- 4,026,522 Post Pulling Apparatus
- 4,161,310 Metal Fence Post Puller
- 4,226,402 Post Puller
- 4,250,769 Pivoted adjustable lever with grab link
- 4,256,286 Post Pulling Device
- 4,422,621 Fence Post Puller
- 4,706,935 Post Puller
- 4,721,335 Puller for fence posts or the like
- 4,726,565 Post Puller
- 4,738,433 Post Puller
- 4,750,711 Post Puller
- 4,792,120 Post removing device
- 4,804,165 Stake pulling apparatus
- 4,846,445 Hydraulic fence post puller
- 5,009,394 Metal fence post extractor
- 5,011,117 Post Puller
- 5,022,632 Post pulling apparatus with interchangeable working heads for pulling different types of posts
- 5,042,591 "T" post puller-pounder
- 5,052,659 Stake puller
- 5,100,104 Implement for removing a fence post or the like
- 5,161,781 Tool assembly for use in pulling fence posts
- 5,186,437 Post puller including concrete base pulling means
- 5,211,374 Post Puller
- 5,219,438 Post Puller
- 5,224,687 Fence Post Extractor
- 5,242,152 Post Puller
- 5,261,642 Steel Post Puller
- 5,368,277 Device for removing metal fence posts
- 5,464,192 High Speed Manual Post Puller
- 5,499,795 Post Remover
- 5,597,151 Stake puller with stake supporting back plate
- 5,604,946 Multi-purpose fence building tool
- 5,681,030 Device for pulling fence posts
- 5,713,559 Method and apparatus for installing and removing posts and for lifting heavy objects
- 5,794,918 Fence Post Puller Apparatus
- 5,833,215 Combination metal and wood post removing device
- 5,855,358 Framework Removal Tool
- 5,934,649 Hand operated post and pole extraction device
- 6,056,271 Post Puller
- 6,131,884 Tool for extraction of stakes
- 6,302,376 Self-translating Stake Puller

- 6,302,377 Post pulling apparatus
- 6,352,242 Post Removal Device
- 6,367,779 Post pulling mechanism
- 6,382,594 Post puller
- 6,398,188 Post puller
- 6,527,250 Device for pulling a planted post from the ground
- 6,641,347 Pole extractor
- 6,669,172 Post puller
- 6,857,619 Post puller system
- 7,059,587 Post puller
- 7,125,000 Post puller
- 7,185,880 T-post puller claw
- 7,290,754 T-post puller
- 7,431,266 Post puller
- 7,699,288 Delineator extraction system

## 2. Existing product search

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.postpullers.com/>
- b. <http://www.bigredpostpuller.com/>
- c. <http://www.airpostdrivers.com/post-pullers.htm>
- d. <http://www.hooverfence.com/catalog/hardware/oz-post/puller.htm>

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

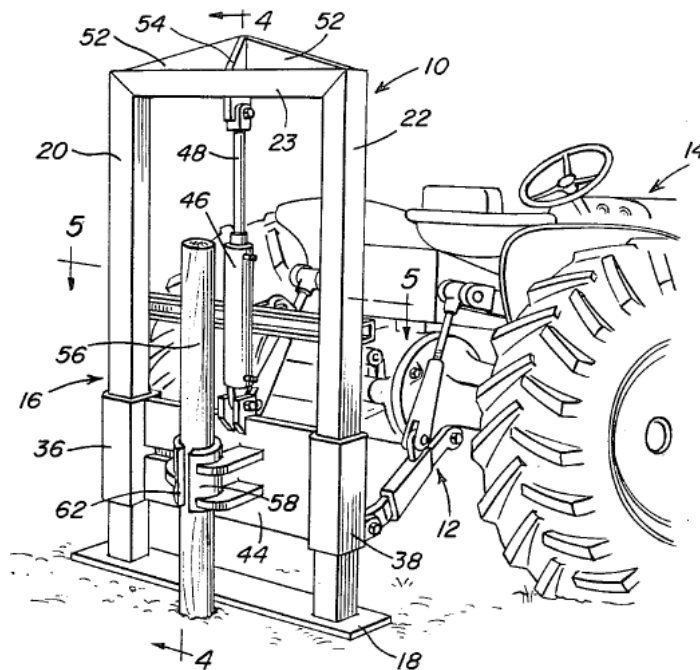
An examination of the information presented above does not reveal prior art item(s) that are identical to the device embodied in the innovator's description and drawing(s).

### 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

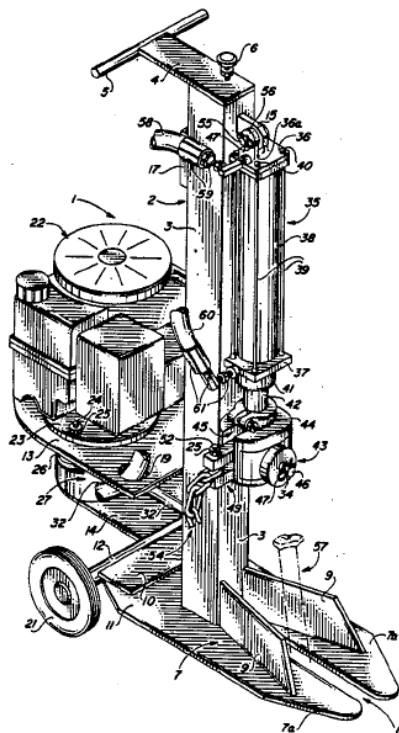
a. 4,256,286 Post Pulling Device

This device uses an overhead hydraulic cylinder to pull the post out of the ground.



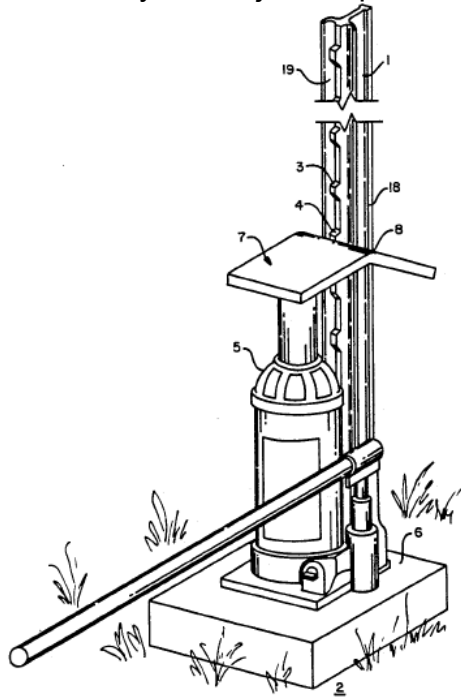
b. 4,804,165 Stake pulling apparatus

This device uses a box frame with a hydraulic cylinder mounted overhead to pull the stake out of the ground.



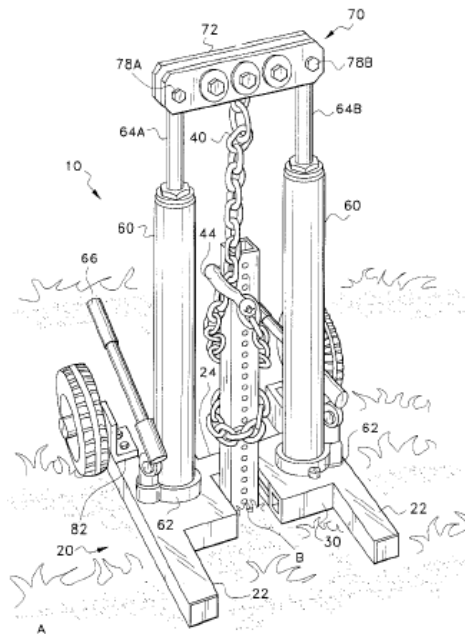
c. 5,009,394 Metal fence post extractor

This device uses a hydraulic jack to pull the post.



d. 6,398,188 Post puller

This device uses an H-frame with a vertical hydraulic actuator to pull the post.



- e. <http://www.airpostdrivers.com/post-pullers.htm>  
This device uses a hydraulic cylinder to pull the post.



- f. <http://www.hooverfence.com/catalog/hardware/oz-post/puller.htm>  
This device has a similar structure.



### **3. Usefulness**

Based solely on the following statement by the innovator, this device appears to meet the criteria for usefulness.

This device is a metal stand that is placed over the metal sleeve of a wooden guardrail post providing easy and safe extraction of broken guardrail posts. This device is especially useful for areas that do not provide enough of a shoulder for heavy equipment access. This post puller can be operated by one person.

### **4. Public Disclosure**

According to the innovator, this device has been shown at the monthly safety meetings and nine patrols have seen the design. The date that this device was first built was not given. Nobody else has used this device but other patrols have asked for the design so that they could make one. The design of this device is the original design without modifications.

Information regarding this device has been shared with others which may be considered public disclosure depending on the circumstances in which the information was shared.

## Device Costs and Benefits

**Submission number:** 34

**Title of the Innovation:** Lever Post Puller

**Innovator(s):** Mickey Madalino

### Device Description

The lever post puller is designed to assist in removing various posts from the ground using only mechanical advantage.



1. Usefulness
  - This device pulls delineation posts out with ease and it also works great on T-post and mangled delineator posts. It weighs around 15 pounds and also has a removable extension.
2. Ease of use
  - This device is easy to use.

### Manufacturability

This device is constructed of seven machined and welded parts. The parts are simple and do not have features that are difficult to manufacture.

### Potential for Widespread Application

1. Time to train operator
  - It would take about 20 minutes to train an operator to use this device.



2. Reduction in time to complete task
  - This device is operated by one person and does not require setting up traffic control required when heavy equipment blocks the road.
3. Improvement in quality
  - When the post is extracted using this device the post sleeve remains intact and undisturbed so can be reused.
4. Expected annual usage
  - This device could be used all year long.
5. Units required
  - One post puller is required for each area.
6. Use in other states
  - All states that do post pulling would benefit from this device.

### **Safety**

1. Improvement in safety
  - Using this device instead of heavy equipment to remove the post eliminates the need for obstruction of the road and traffic control. It is well suited for unsafe terrain whereas heavy equipment is not.
2. Safety concerns due to use or misuse of the device
  - If the base of the device is on a surface that is not stable or is slanted then the device could slide when it is loaded.
3. Safety concerns due to failure of the device
  - If the chain breaks then it could swing around and hit the operator.
  - If any of the welds break then the broken portion could hit the operator.

### **Availability of Similar Equipment for Purchase**

The prior art search found many products that perform the same task.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered useful but may not be considered novel or non-obvious depending on the Patent Examiner's evaluation.
2. Patent infringement
  - Many patents for device and products were found that were intended for removal of posts from the ground. For grabbing the post most of the devices use a chain or a bar with a hole in it. As the device moves up the chain or bar tighten on the post thereby grabbing the post. Each device has a different lifting mechanism with a variety of actuation means (e.g. manual, hydraulic, motor, etc). None of the patents or products was identical to this device so they are listed in the category of non-obviousness.

## Lever Post Puller User Manual

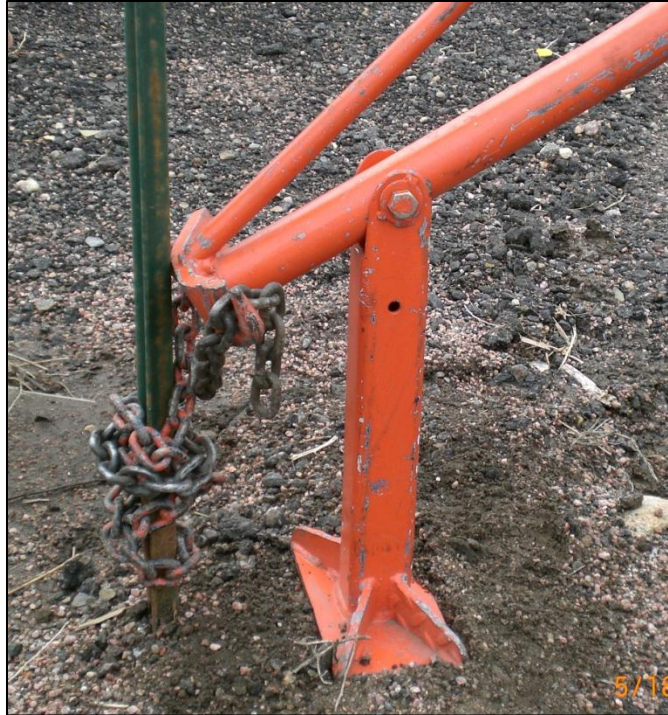


### Device Description

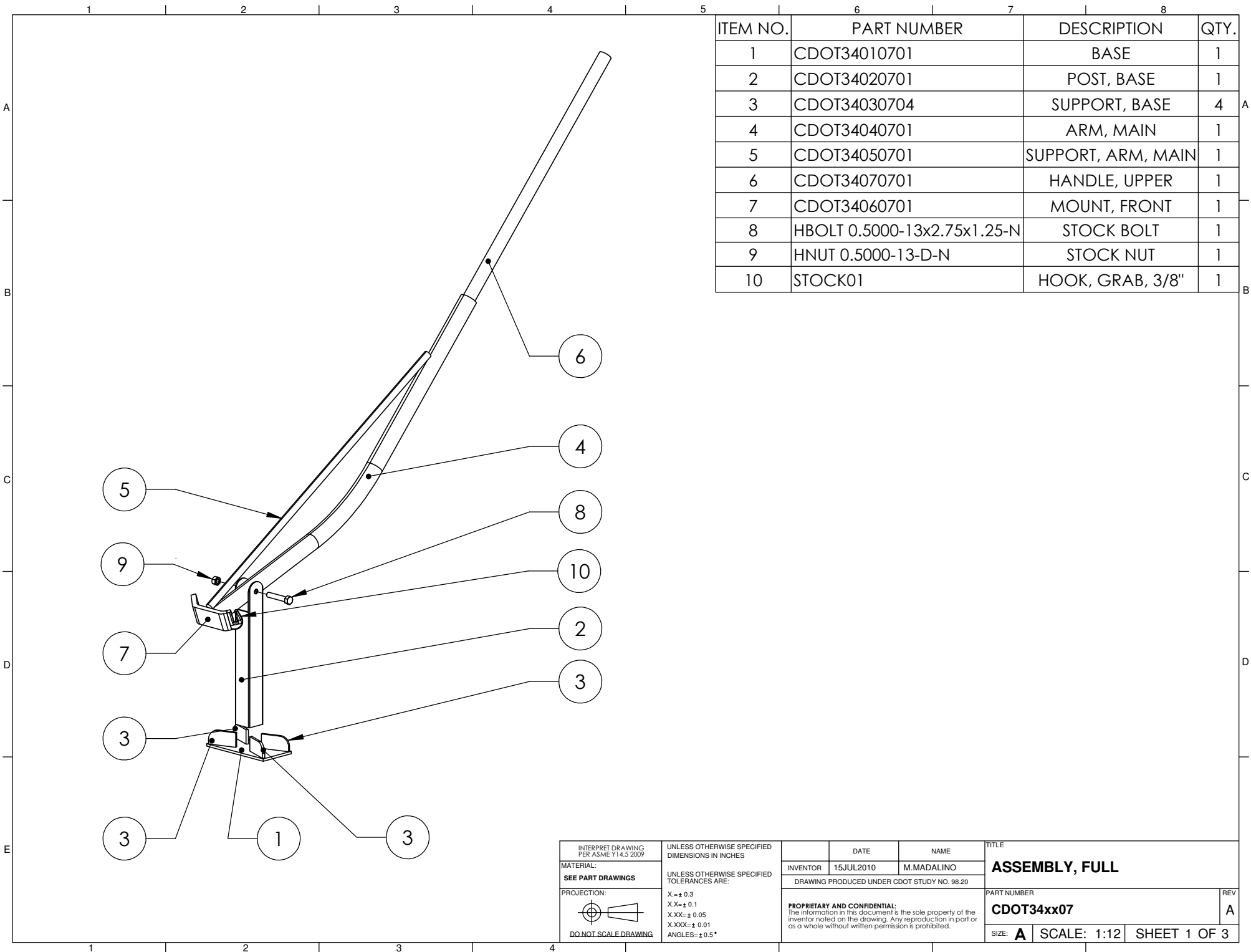
The lever post puller is designed to assist in removing various posts from the ground using only mechanical advantage.

### Operating Instructions

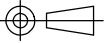
1. If the upper handle is in the main arm, remove it before beginning.
2. Place the post puller base approximately 4 inches from the base of the post.
3. Tilt the post puller handle up as far as possible so that the front of the puller is as close to the ground as possible.
4. Take the chain from the end welded to the puller, and wrap it around the post multiple times to ensure the chain will grip the post.
5. Place the other end of the chain through the hook on the front of the puller.



6. Insert the upper handle into the main arm.
7. Press down on the upper handle to remove the post from the ground. If the handle cannot be pressed down any further but the post is still in the ground, disconnect and re-wrap the chain around the post, following steps 2 – 5.

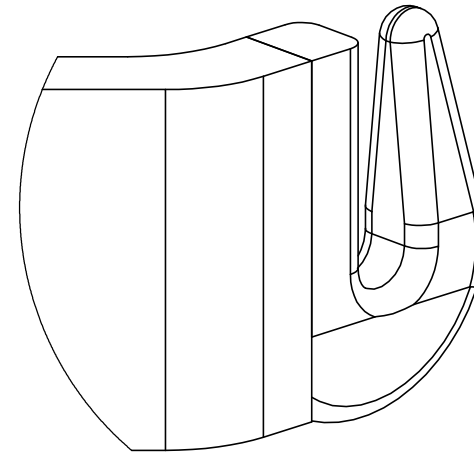
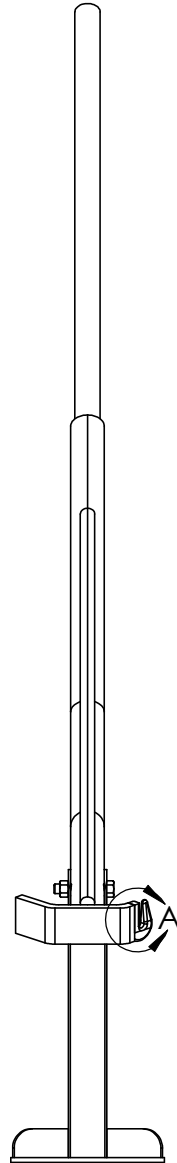


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2	CDOT34020701	POST, BASE	1
3	CDOT34030704	SUPPORT, BASE	4
4	CDOT34040701	ARM, MAIN	1
5	CDOT34050701	SUPPORT, ARM, MAIN	1
6	CDOT34070701	HANDLE, UPPER	1
7	CDOT34060701	MOUNT, FRONT	1
8	HBOLT 0.5000-13x2.75x1.25-N	STOCK BOLT	1
9	HNUT 0.5000-13-D-N	STOCK NUT	1
10	STOCK01	HOOK, GRAB, 3/8"	1

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE 15JUL2010		NAME M.MADALINO		TITLE ASSEMBLY, FULL	
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DO NOT SCALE DRAWING						SHEET 1 OF 3			

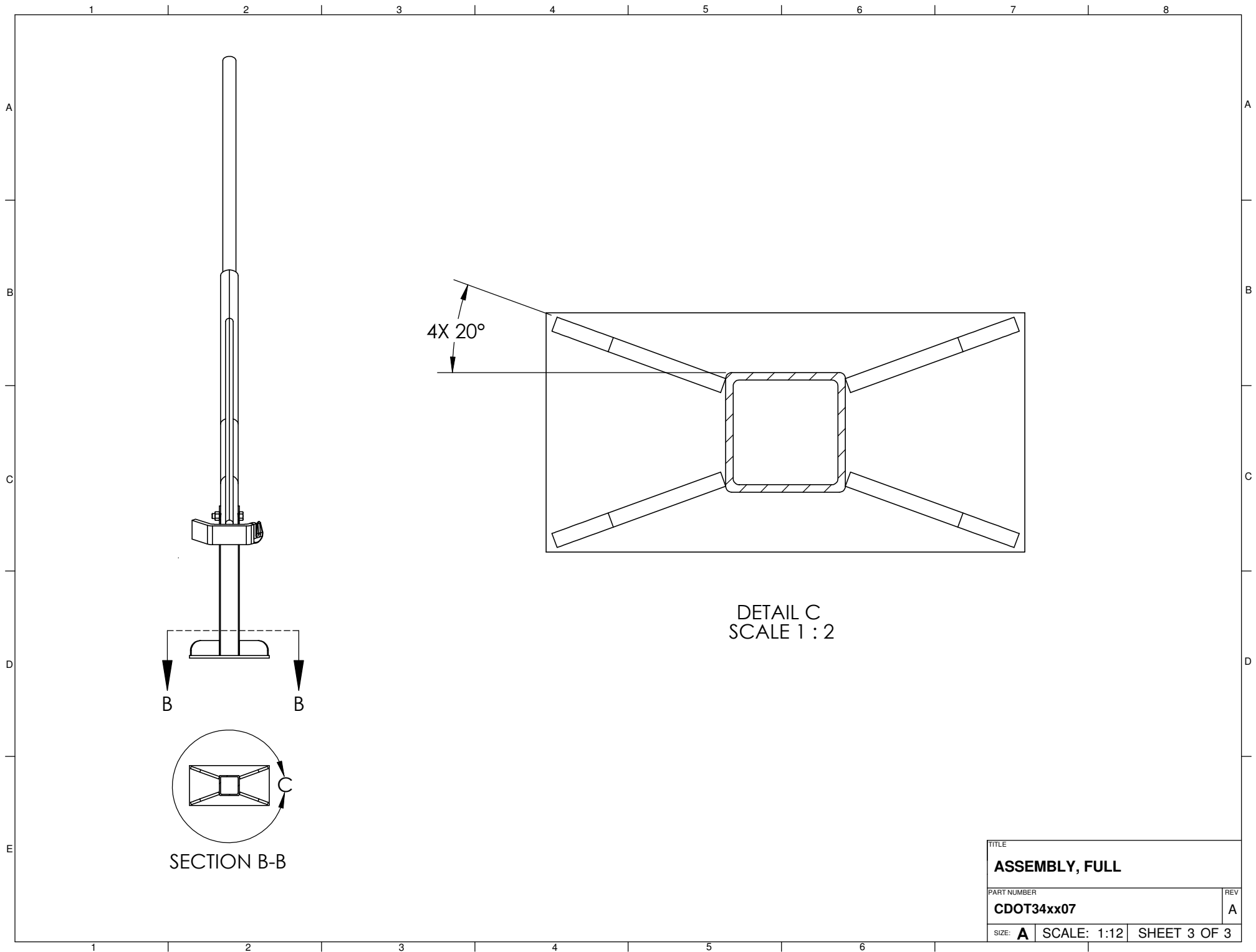
NOTES:

1. ALL JOINTS ARE FULLY WELDED UNLESS OTHERWISE NOTED
2. THE UPPER HANDLE RESTS IN THE MAIN ARM AND IS REMOVABLE FOR STORAGE
3. THE MAIN ARM IS BOLTED TO THE BASE POST
4. THE GRAB HOOK IS A STANDARD GRAB HOOK FOR A 3/8" CHAIN THAT IS CUT TO FIT ON THE END OF THE FRONT MOUNT
5. A 3/8" CHAIN IS WELDED AT ONE END TO THE FRONT OF THE FRONT MOUNT
6. IF NECESSARY, A WORM DRIVE CLAMP CAN BE PLACED ON THE UPPER HANDLE TO STOPOVER INSERTION INTO THE MAIN ARM



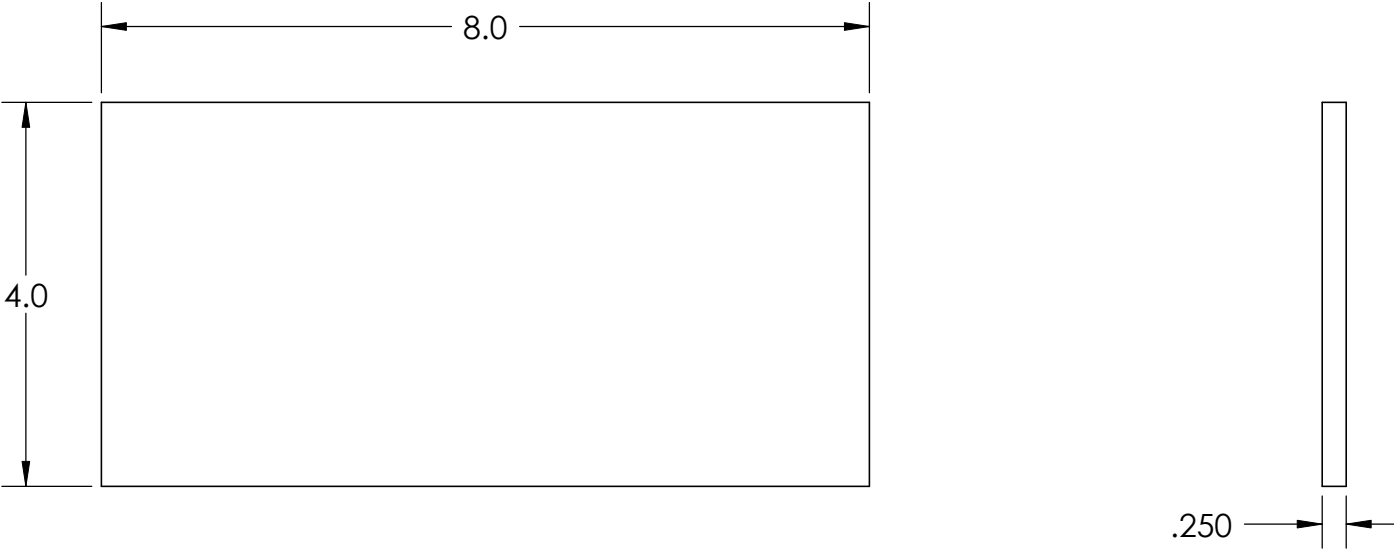
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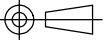
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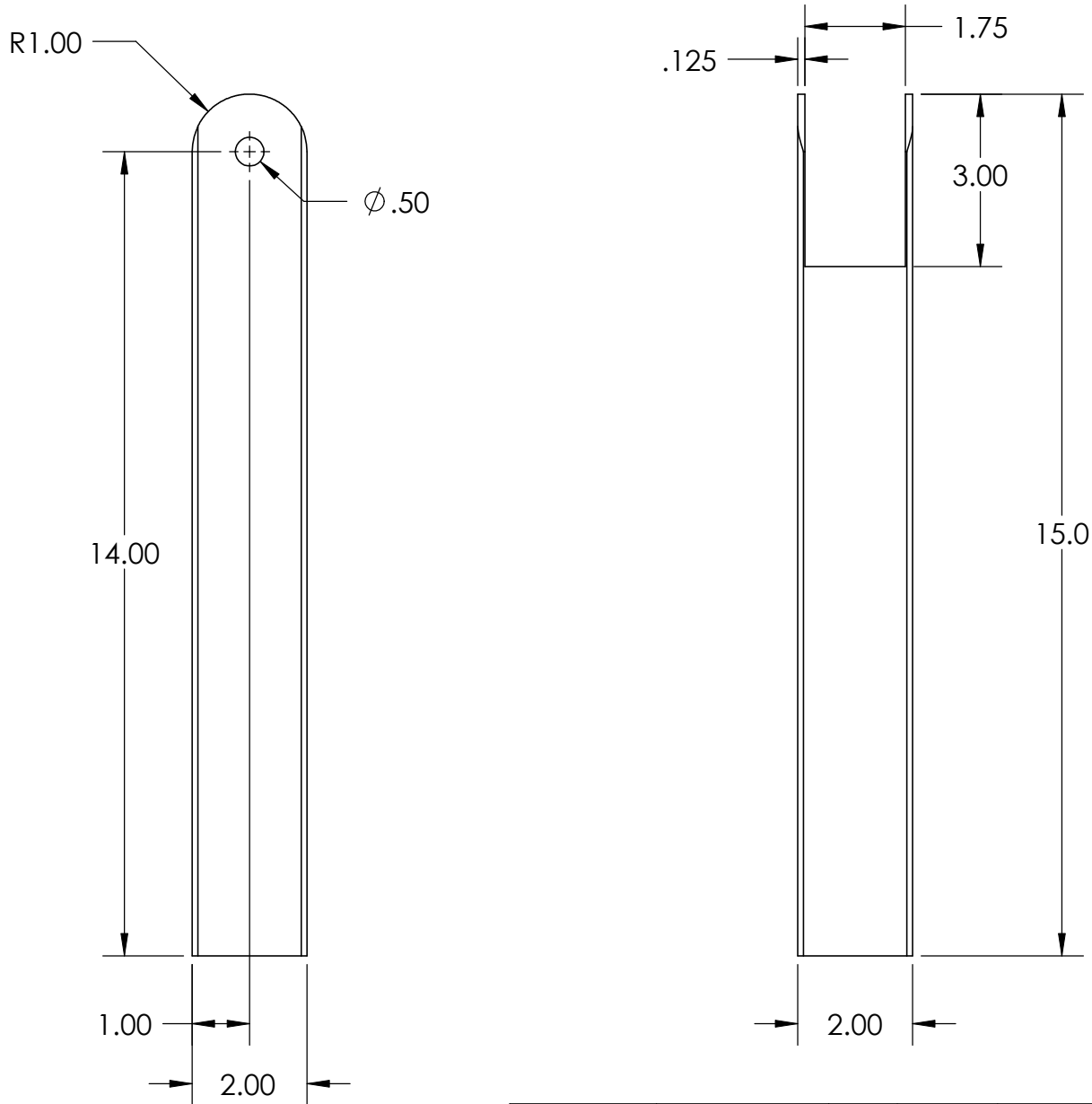
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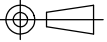
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



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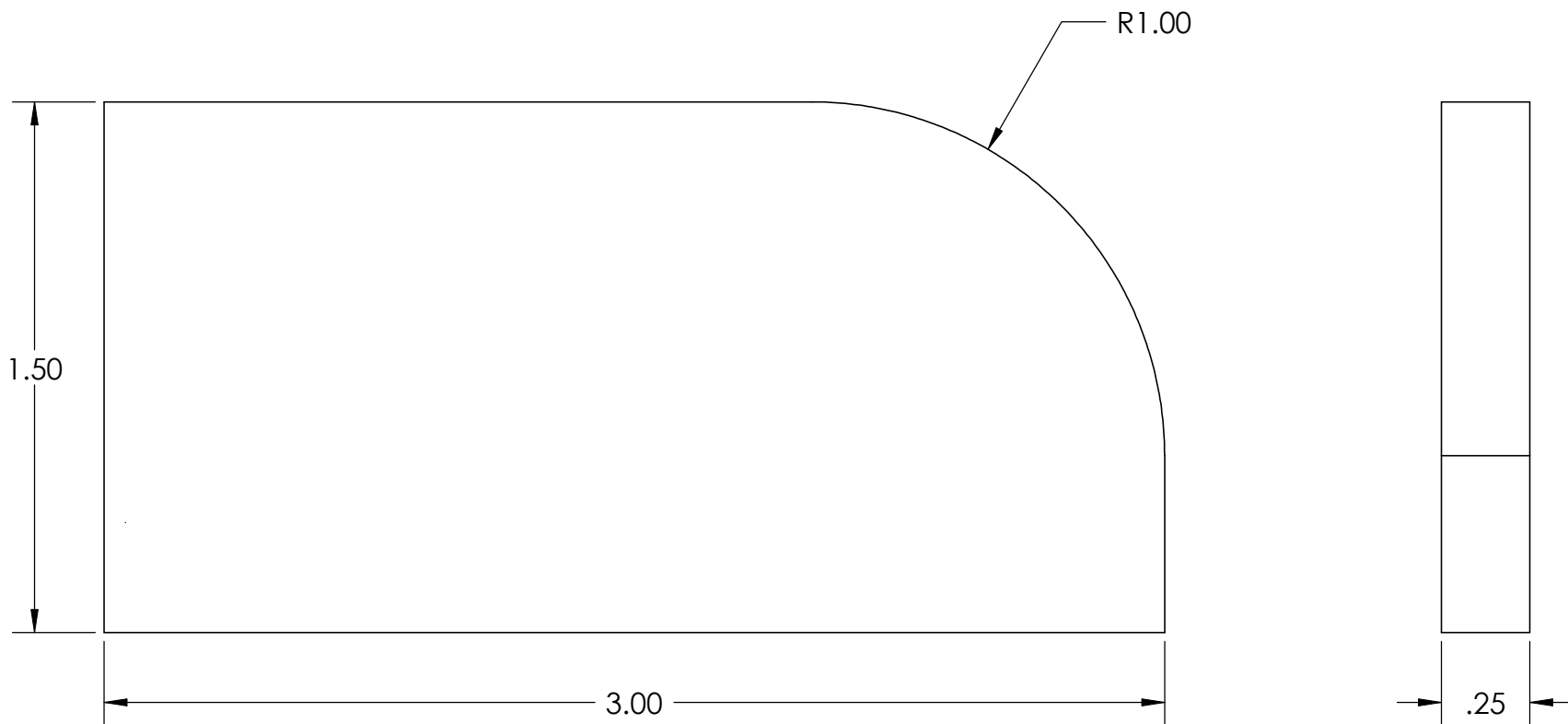


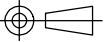
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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
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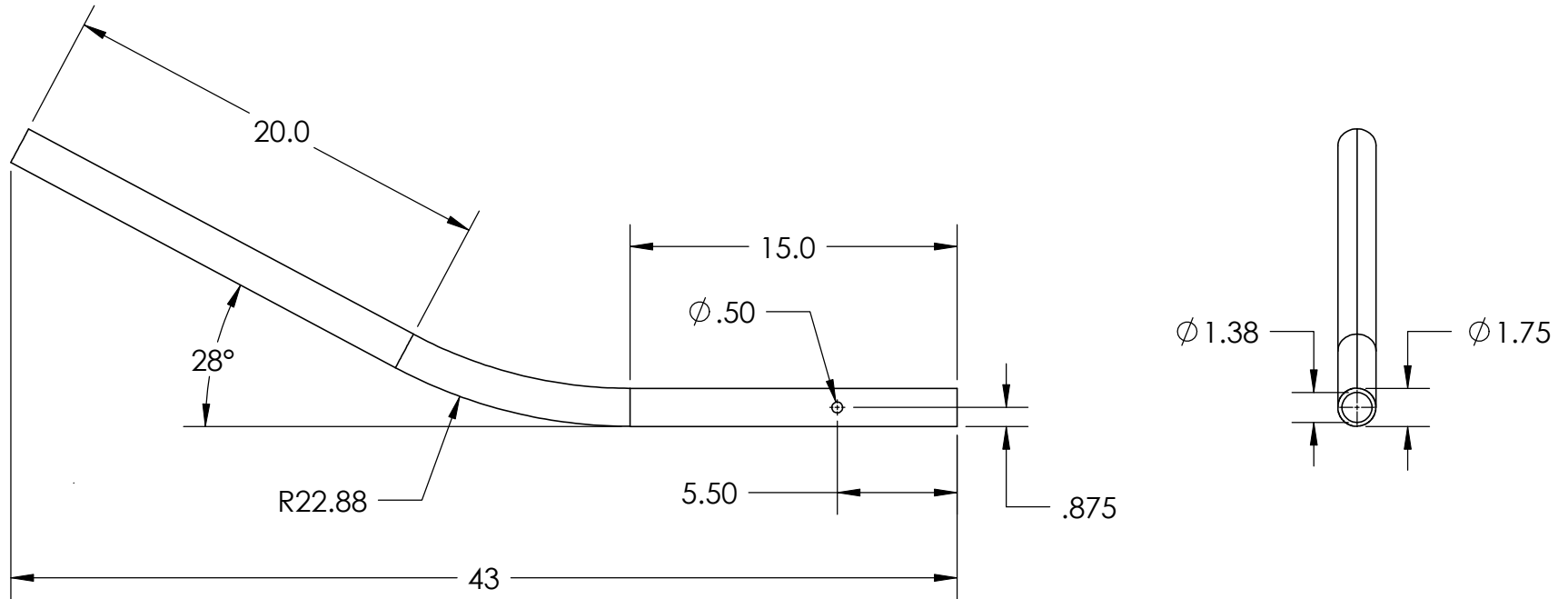
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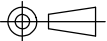
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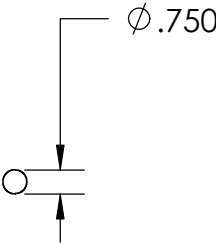
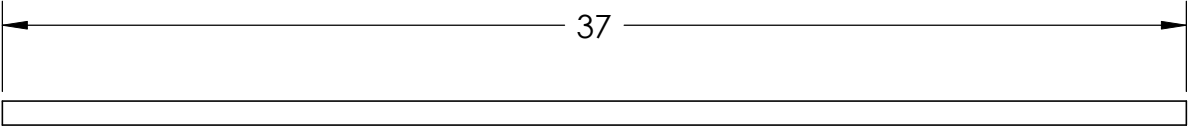
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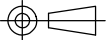
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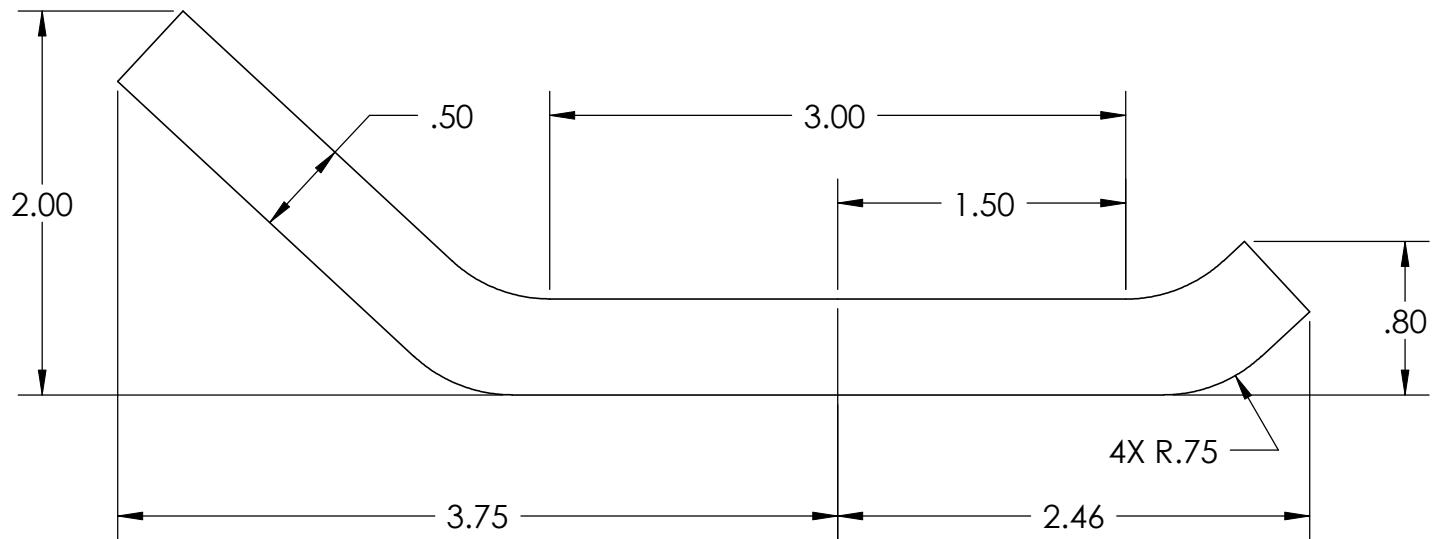
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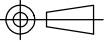
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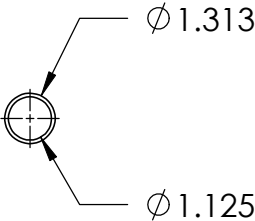
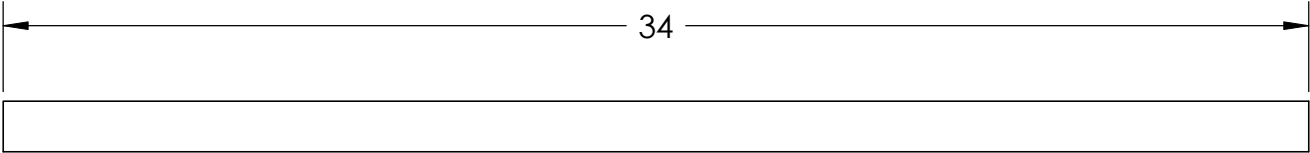
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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	
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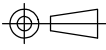
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MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		15JUL2010		M.MADALINO	
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		15JUL2010		M.MADALINO	
PROJECTION: 		X.= ± 0.3 X.X.= ± 0.1 X.XX.= ± 0.05 X.XXX.= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER	
								CDOT34070701	
				SIZE: A		SCALE: 1:5		SHEET 1 OF 1	

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Lever Post Puller

**Innovator(s):** Mickey Madalino

**Summary:** Many patents for device and products were found that were intended for removal of posts from the ground. For grabbing the post most of the devices use a chain or a bar with a hole in it. As the device moves up the chain or bar tighten on the post thereby grabbing the post. Each device has a different lifting mechanism with a variety of actuation means (e.g. manual, hydraulic, motor, etc). Some of the patents or products were identical to this device so they are listed in the category of novelty.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: post & puller, post & remover, delineation & puller

Field of search: Title

#### **Patent Number Title of Invention**

- 3,779,516 Post puller
- 3,815,875 Portable Stake Remover

- 3,991,976 Implement for driving and removing fence posts
- 4,026,522 Post Pulling Apparatus
- 4,161,310 Metal Fence Post Puller
- 4,226,402 Post Puller
- 4,250,769 Pivoted adjustable lever with grab link
- 4,256,286 Post Pulling Device
- 4,422,621 Fence Post Puller
- 4,706,935 Post Puller
- 4,721,335 Puller for fence posts or the like
- 4,726,565 Post Puller
- 4,738,433 Post Puller
- 4,750,711 Post Puller
- 4,792,120 Post removing device
- 4,804,165 Stake pulling apparatus
- 4,846,445 Hydraulic fence post puller
- 5,009,394 Metal fence post extractor
- 5,011,117 Post Puller
- 5,022,632 Post pulling apparatus with interchangeable working heads for pulling different types of posts
- 5,042,591 "T" post puller-pounder
- 5,052,659 Stake puller
- 5,100,104 Implement for removing a fence post or the like
- 5,161,781 Tool assembly for use in pulling fence posts
- 5,186,437 Post puller including concrete base pulling means
- 5,211,374 Post Puller
- 5,219,438 Post Puller
- 5,224,687 Fence Post Extractor
- 5,242,152 Post Puller
- 5,261,642 Steel Post Puller
- 5,368,277 Device for removing metal fence posts
- 5,464,192 High Speed Manual Post Puller
- 5,499,795 Post Remover
- 5,597,151 Stake puller with stake supporting back plate
- 5,604,946 Multi-purpose fence building tool
- 5,681,030 Device for pulling fence posts
- 5,713,559 Method and apparatus for installing and removing posts and for lifting heavy objects
- 5,794,918 Fence Post Puller Apparatus
- 5,833,215 Combination metal and wood post removing device
- 5,855,358 Framework Removal Tool
- 5,934,649 Hand operated post and pole extraction device
- 6,056,271 Post Puller
- 6,131,884 Tool for extraction of stakes
- 6,302,376 Self-translating Stake Puller

- 6,302,377 Post pulling apparatus
- 6,352,242 Post Removal Device
- 6,367,779 Post pulling mechanism
- 6,382,594 Post puller
- 6,398,188 Post puller
- 6,527,250 Device for pulling a planted post from the ground
- 6,641,347 Pole extractor
- 6,669,172 Post puller
- 6,857,619 Post puller system
- 7,059,587 Post puller
- 7,125,000 Post puller
- 7,185,880 T-post puller claw
- 7,290,754 T-post puller
- 7,431,266 Post puller
- 7,699,288 Delineator extraction system

## 2. Existing product search

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.seton.com/post-puller-89639.html>
- b. [http://www.tapconet.com/store/product/3d2ef2e3-841d-436b-b91d-c80f52db8345/Carsonite\\_Post\\_Puller.aspx](http://www.tapconet.com/store/product/3d2ef2e3-841d-436b-b91d-c80f52db8345/Carsonite_Post_Puller.aspx)
- c. <http://www.hi-lift.com/post-popper/index.html>
- d. <http://www.hardwareandtools.com/Post-PullR-Post-Pull-r-PP100-by-Maasdam-Dead-On-Pull-R-9584459.html>
- e. <http://www.hooverfence.com/tools/post-popper.htm>
- f. <http://www.bigredpostpuller.com/>
- g. <http://www.amazon.com/Northern-Tool-Equipment-Tuggy-Puller/dp/B0000AX74X>
- h. [http://www.amazon.com/gp/product/B000DCN8SQ/ref=pd\\_lpo\\_k2\\_dp\\_sr\\_1?pf\\_rd\\_p=486539851&pf\\_rd\\_s=lpo-top-stripe-1&pf\\_rd\\_t=201&pf\\_rd\\_i=B0000AX74X&pf\\_rd\\_m=ATVPDKIKX0DER&pf\\_rd\\_r=1HTCSS6XQCSEZE2RQBBQ](http://www.amazon.com/gp/product/B000DCN8SQ/ref=pd_lpo_k2_dp_sr_1?pf_rd_p=486539851&pf_rd_s=lpo-top-stripe-1&pf_rd_t=201&pf_rd_i=B0000AX74X&pf_rd_m=ATVPDKIKX0DER&pf_rd_r=1HTCSS6XQCSEZE2RQBBQ)

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references a Patent Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

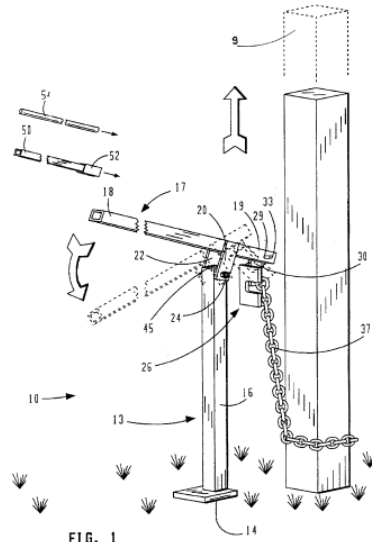


## 1. Evaluation of Novelty

An examination of the information presented above does reveal prior art item(s) that are identical to the device embodied in the innovator's description and drawing(s). The following patents from the list above are similar enough to the innovators device that novelty is in question:

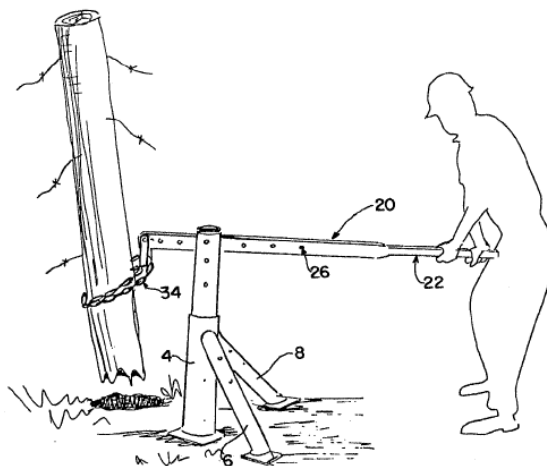
- a. 5,713,559 - Method and apparatus for installing and removing posts and for lifting heavy objects

This device uses a pivoting arm and uses a chain for grabbing the post.



- b. 4,250,769 - Pivoted adjustable lever with grab link

This device uses a pivoting arm and uses a chain for grabbing the post.



- c. <http://www.seton.com/post-puller-89639.html>



- d. <http://www.hi-lift.com/post-popper/index.html>



- e. [http://www.amazon.com/gp/product/B000DCN8SQ/ref=pd\\_lpo\\_k2\\_dp\\_sr\\_1?pf\\_rd\\_p=486539851&pf\\_rd\\_s=lpo-top-stripe1&pf\\_rd\\_t=201&pf\\_rd\\_i=B0000AX74X&pf\\_rd\\_m=ATVPDKIKX0DER&pf\\_rd\\_r=1HTCSS6XQCSEZE2RQBBQ](http://www.amazon.com/gp/product/B000DCN8SQ/ref=pd_lpo_k2_dp_sr_1?pf_rd_p=486539851&pf_rd_s=lpo-top-stripe1&pf_rd_t=201&pf_rd_i=B0000AX74X&pf_rd_m=ATVPDKIKX0DER&pf_rd_r=1HTCSS6XQCSEZE2RQBBQ)

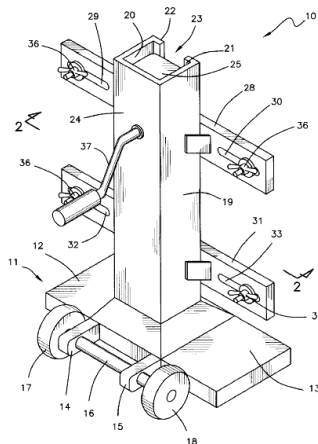


## 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

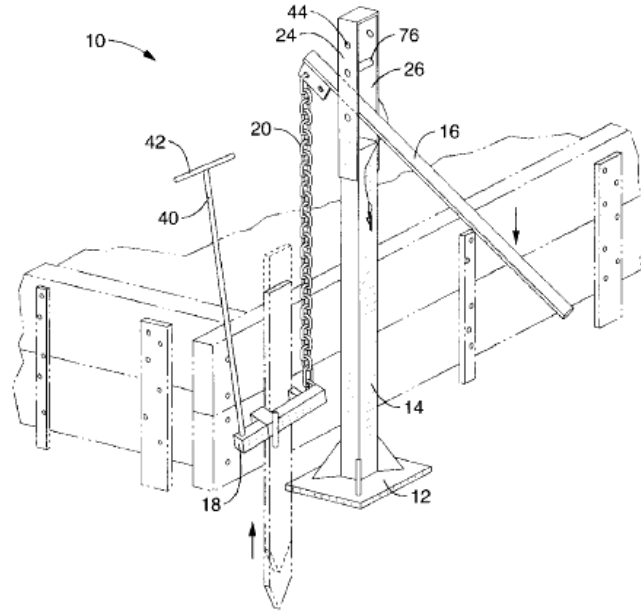
- a. 6,302,377 – Post pulling apparatus

This device has a stake engaging mechanism that when tilted grabs the stake.



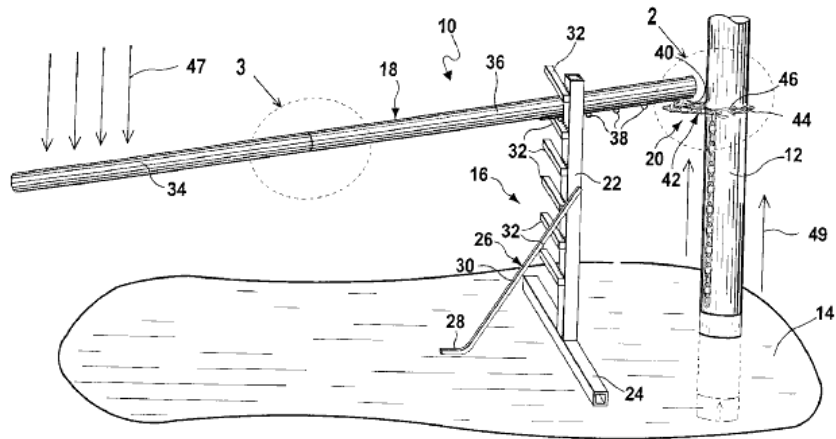
b. 6,131,884 – Tool for extraction of stakes

This device uses a pivoting actuator and a post clamping device.

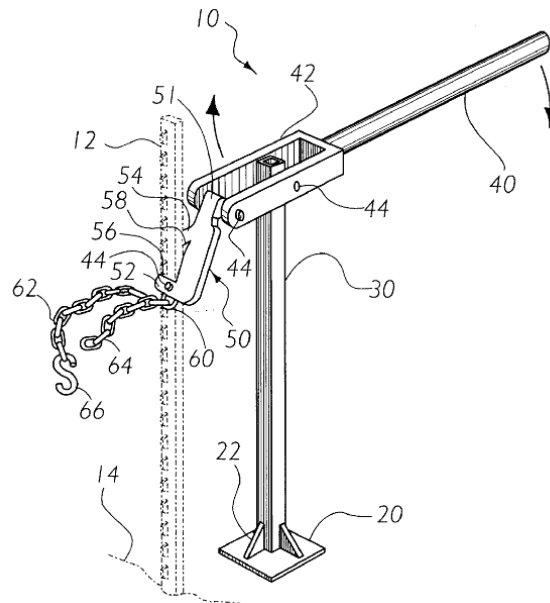


c. 5,934,649 - Hand operated post and pole extraction device

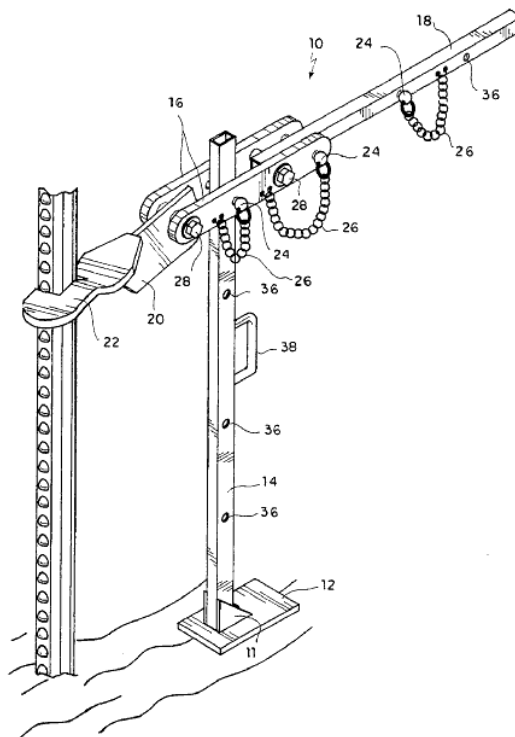
This device uses a pivoting arm and a chain for grabbing the post.



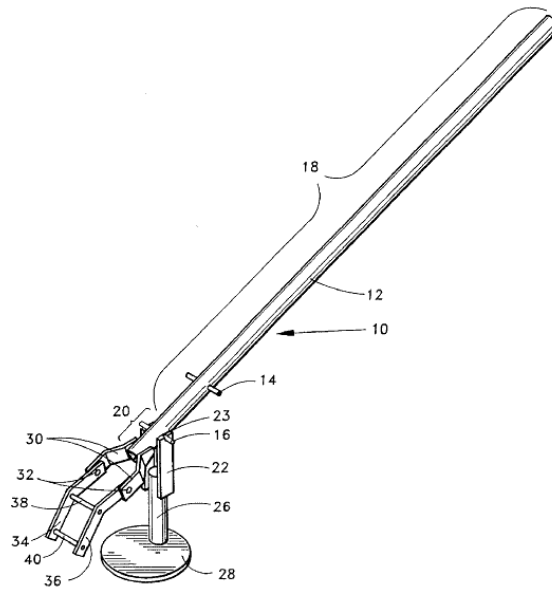
- d. 5,833,215 - Combination metal and wood post removing device  
This device uses a pivoting arm and a post grabbing device that grabs the post when tilted.



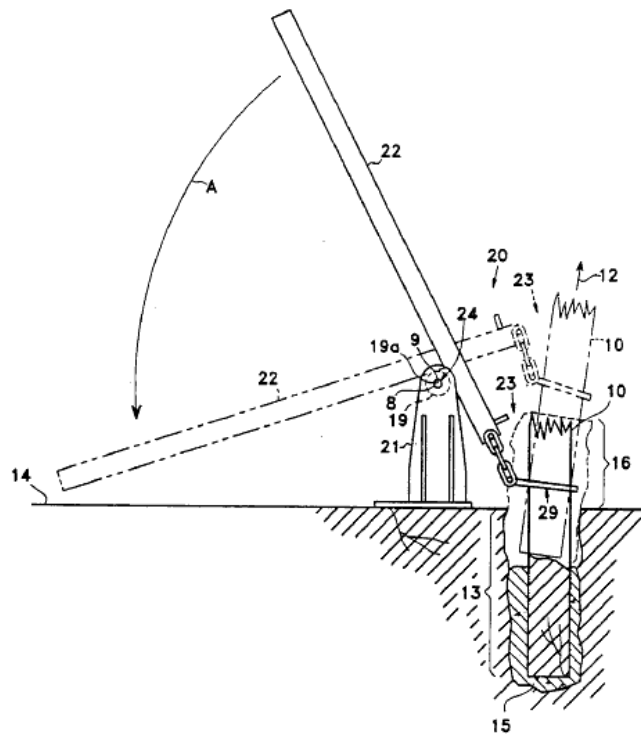
- e. 5,499,795 – Post Remover  
This device uses a pivoting arm.



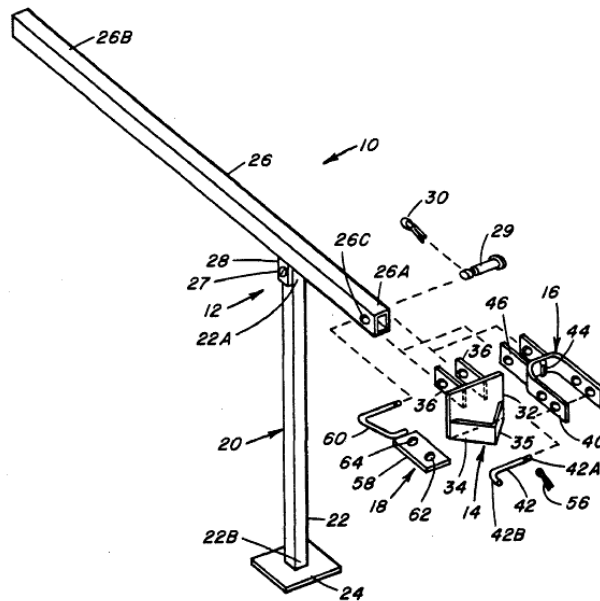
- f. 5,464,192 – High Speed Manual Post Puller  
This device uses a pivoting arm.



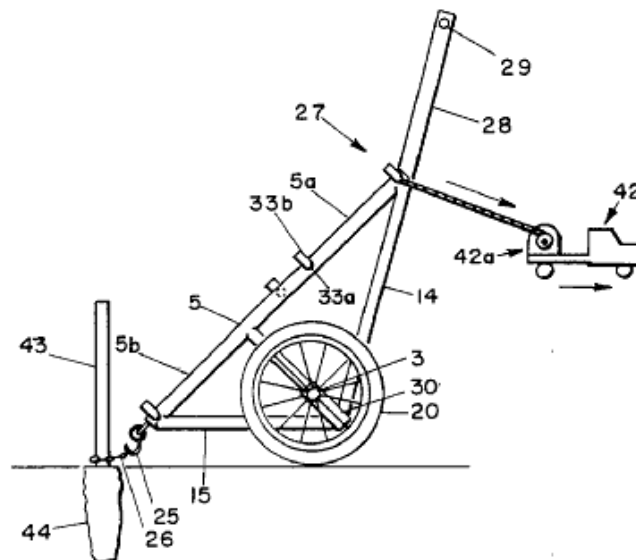
- g. 5,186,437 - Post puller including concrete base pulling means  
This device uses a pivoting arm.



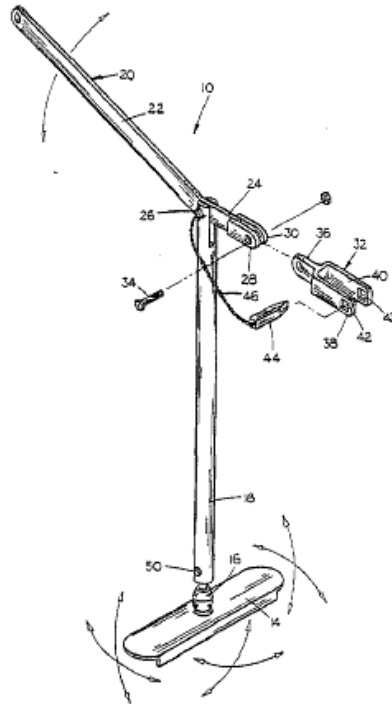
- h. 5,022,632 - Post pulling apparatus with interchangeable working heads for pulling different types of posts  
This device uses a pivoting arm.



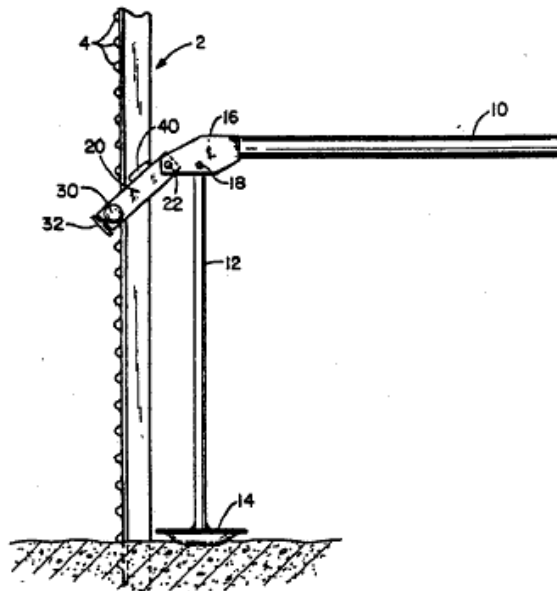
- i. 4,750,711 – Post Puller  
This device uses a pivoting arm and chain attached to the post.



- j. 4,738,433 – Post Puller  
This device uses a pivoting arm.

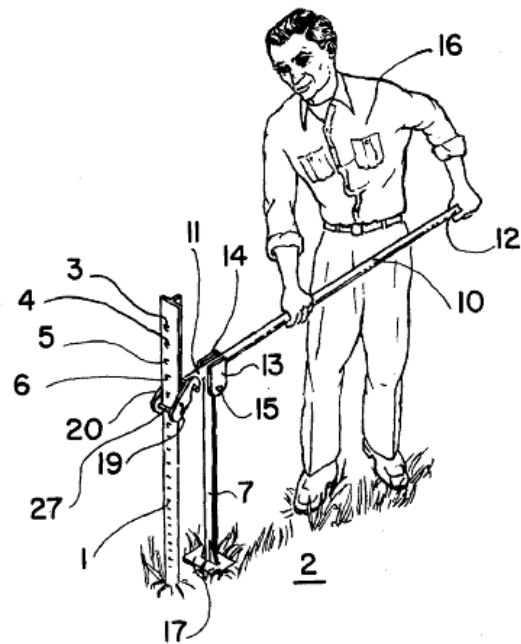


- k. 4,726,565 – Post Puller  
This device uses a pivoting arm.

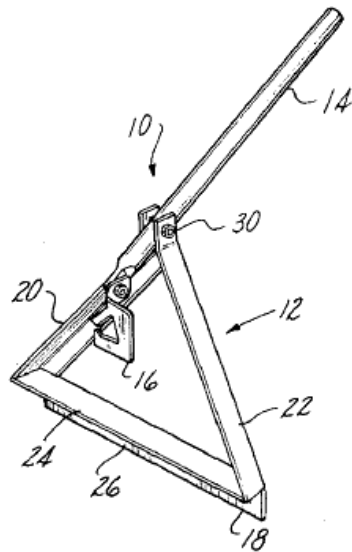




- I. 4,161,310 – Metal Fence Post Puller  
This device uses a pivoting arm.



- m. 3,815,875 - Portable Stake Remover  
This device uses a pivoting arm.



### **3. Usefulness**

Based solely on the information provided by the innovator, this device appears to meet the criteria for usefulness.

The innovator did not provide a statement regarding the usefulness of this device. From the pictures and email that were provided by the innovator this device pulls delineation posts out with ease and it also works great on T-post and mangled delineator posts. It weighs around 15 pounds and also has a removable extension.

### **4. Public Disclosure**

Information regarding public disclosure was not provided by the innovator.

## **APPENDIX B**

### **INCOMPLETE PREPARED DOCUMENTS BY SUBMISSION NUMBER**

Four documents were prepared by the CSM research team. They are:

- Device Costs and Benefits
- User Manual
- Mechanical Drawing Package
- Preliminary Patentability Assessment

This appendix contains some of these documents arranged by submission number for the devices for which there was insufficient information to complete all of the documents.

<b>No.</b>	<b>Device</b>	<b>Page No.</b>
1	Traffic Controller	384
15	Husting Plow Slide	441
17	Post Puller	449
18	Metal Squeegee	463
19	Folding Road Closure Gate	478
20	Portable Arrow Board	501
23	Hot Seal/Crack Seal Cup	520

## Device Costs and Benefits

**Submission number:** 1

**Title of the Innovation:** Traffic Control Trailer

**Innovator(s):** Joe McQuiston, Trevor Allen

### Device Description

The traffic control trailer is designed to be a self-sustaining traffic control and marking storage device. With the ability to display and power a 12V Wanco® arrow board and store other needed traffic control items, the trailer decreases the number of needed vehicles on scene and increases site safety.



#### 1. Usefulness

- This device eliminates the need for multiple pieces of equipment when setting up lane closures. It allows the sign package to be open and reduces the time on the road side.

#### 2. Ease of use

- Signs and stands are accessible from both sides. It stores most of the equipment for traffic control on the trailer which frees up the truck for cone placement. The power plant can light the sign board allowing use in the dark.

### Manufacturability

This device is constructed of 32 machined and/or welded parts. The parts are simple and do not have any features that are difficult to manufacture.

## **Potential for Widespread Application**

1. Time to train operator
  - It takes one outing with the trailer or one hour to understand how to use it.
2. Reduction in time to complete task
  - This device can save up to several hours on a job because the equipment is more accessible and can be set up quickly.
3. Improvement in quality
  - This device does not have an effect on the quality of the task.
4. Expected annual usage
  - This device can be used year round.
  - Typical usage would be 30-40 hours per month.
5. Units required
  - One device per road crew.
6. Use in other states
  - All states that need to perform lane closures would benefit from this device.

## **Safety**

1. Improvement in safety
  - This device reduces the time spent on the road.
  - It creates better visibility.
  - It eliminates equipment in the work zone.
  - It acts as a stronger buffer between the crew and traffic.
2. Safety concerns due to use or misuse of the device
  - Fingers could get caught in gearing on winch.
  - Body appendages could get pinched in gate.
  - Could get fingers caught in the outrigger cranks.
3. Safety concerns due to failure of the device
  - Winch cable could break.
  - Attachment plate for winch cable could break.
  - Pin on support bar could fail.
  - Wind loads should be considered for worst case loading scenario.
  - Cooling fins on inverter indicate need for air flow and inverter is enclosed in plastic tool box. This is a concern for overheating of inverter and overheating of plastic box.
  - Inverter could get wet and short if box is left open and it is raining.
  - Workers could get cut on sharp edges of sheet metal parts. These edges should be deburred or folded over.

## **Availability of Similar Equipment for Purchase**

The prior art search found a similar device that is available for purchase.

**Patent Information**

(complete information provided in Preliminary Patentability Assessment)

**1. Patentability**

- This device may be considered useful but may not be considered novel or non-obvious depending on the Patent Examiner's evaluation.
- According to the innovator, this innovation was publicly disclosed in its current form in 2007.

**2. Patent infringement**

- A very similar device was found which may mean that this device could create patent infringement.

## Traffic Control Trailer User Manual



### Device Description

The traffic control trailer is designed to be a self-sustaining traffic control and marking storage device. With the ability to display and power a 12V Wanco® arrow board and store other needed traffic control items, the trailer decreases the number of needed vehicles on scene and increases site safety.

### Operating Instructions (Setup)

1. Park the traffic control trailer where you need to display the lighted arrow board. Make sure that the sign will face oncoming traffic when raised. This means that the towing vehicle will be facing the same direction as the flow of traffic.
2. Remove any needed traffic signs from the back of the trailer and place as necessary.
3. Remove the bolt from both front leg mounts on the trailer, rotate the leg vertical, then replace the bolt through the leg mount and the telescoping leg.
4. Lower the telescoping leg until the trailer is supported, then remove the towing vehicle from the trailer.
5. Remove the pin which locks the arrow board in place.
6. Turn the hand winch, raising the arrow board vertical.
7. Replace the pin, locking the arrow board vertical.
8. Start the gasoline generator, and set the sign board to the necessary flashing pattern.

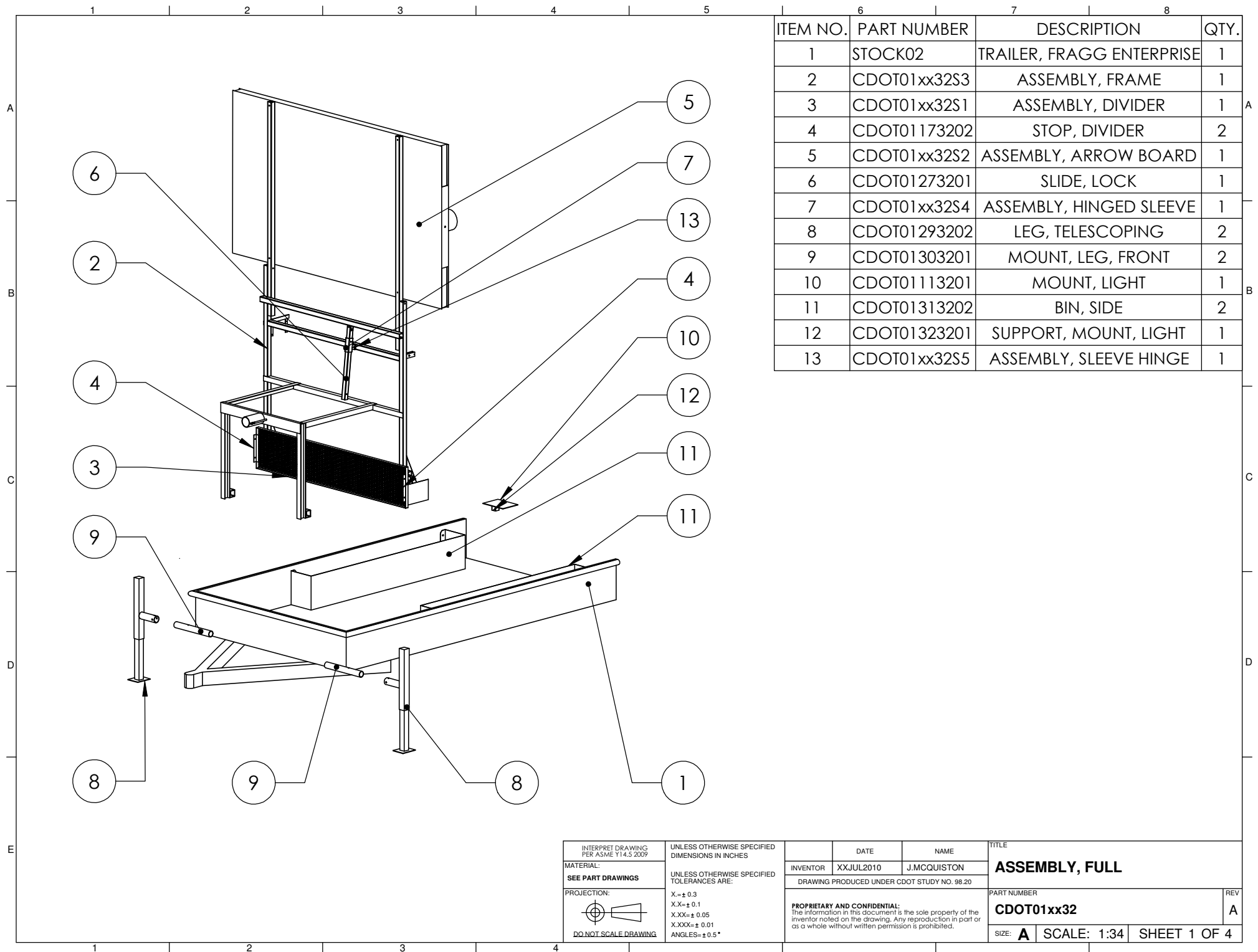


9. During use, the generator operation can be checked from a distance. If the yellow strobe light mounted to the rear of the trailer is still flashing, then the generator is still operating. If it is not flashing, then more gasoline needs to be added to the generator to re-power the strobe light and the lighted arrow board.

#### Operating Instructions (Leaving the Site)

1. Turn off the sign and stop the generator.
2. Remove the pin which is locking the arrow board in place.
3. Release the hand winch, lowering the arrow board to the horizontal position.
4. Replace the pin, locking the arrow board horizontal.
5. Attach the trailer to the towing vehicle.
6. Retract the telescoping legs, placing the trailer weight onto the vehicle.
7. Remove the bolt from the front legs on the trailer, turn the legs horizontal, then replace the bolt to lock the legs horizontal.
8. Replace any traffic signs removed from the trailer upon arrival at the site.

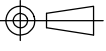




ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	STOCK02	TRAILER, FRAGG ENTERPRISE	1
2	CDOT01xx32S3	ASSEMBLY, FRAME	1
3	CDOT01xx32S1	ASSEMBLY, DIVIDER	1
4	CDOT01173202	STOP, DIVIDER	2
5	CDOT01xx32S2	ASSEMBLY, ARROW BOARD	1
6	CDOT01273201	SLIDE, LOCK	1
7	CDOT01xx32S4	ASSEMBLY, HINGED SLEEVE	1
8	CDOT01293202	LEG, TELESCOPING	2
9	CDOT01303201	MOUNT, LEG, FRONT	2
10	CDOT01113201	MOUNT, LIGHT	1
11	CDOT01313202	BIN, SIDE	2
12	CDOT01323201	SUPPORT, MOUNT, LIGHT	1
13	CDOT01xx32S5	ASSEMBLY, SLEEVE HINGE	1

INTERPRET DRAWING  
PER ASME Y14.5 2009

MATERIAL:  
SEE PART DRAWINGS

PROJECTION:  
  
DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS IN INCHES

UNLESS OTHERWISE SPECIFIED  
TOLERANCES ARE:

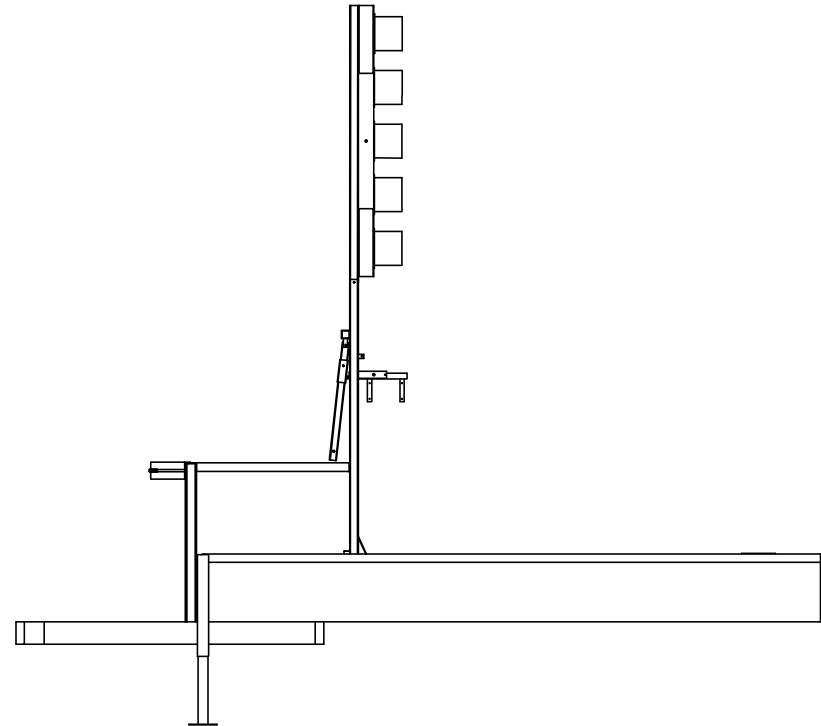
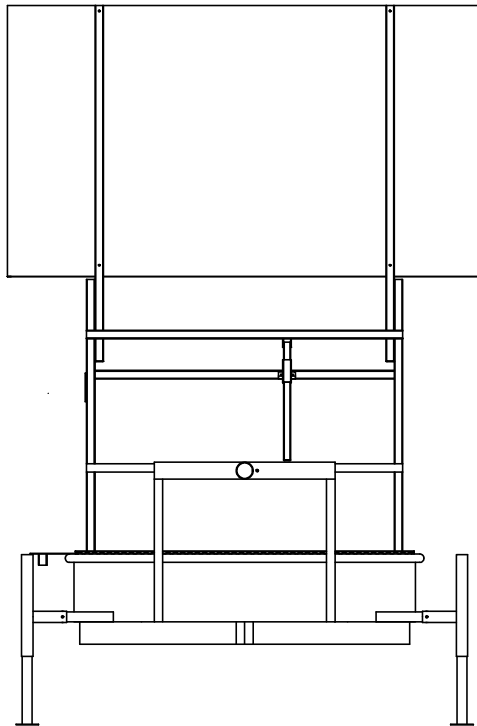
X.=± 0.3  
X.X=± 0.1  
X.XX=± 0.05  
X.XXX=± 0.01  
ANGLES=± 0.5°

	DATE	NAME	TITLE
INVENTOR	XXJUL2010	J.MCQUISTON	ASSEMBLY, FULL
DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			
PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			

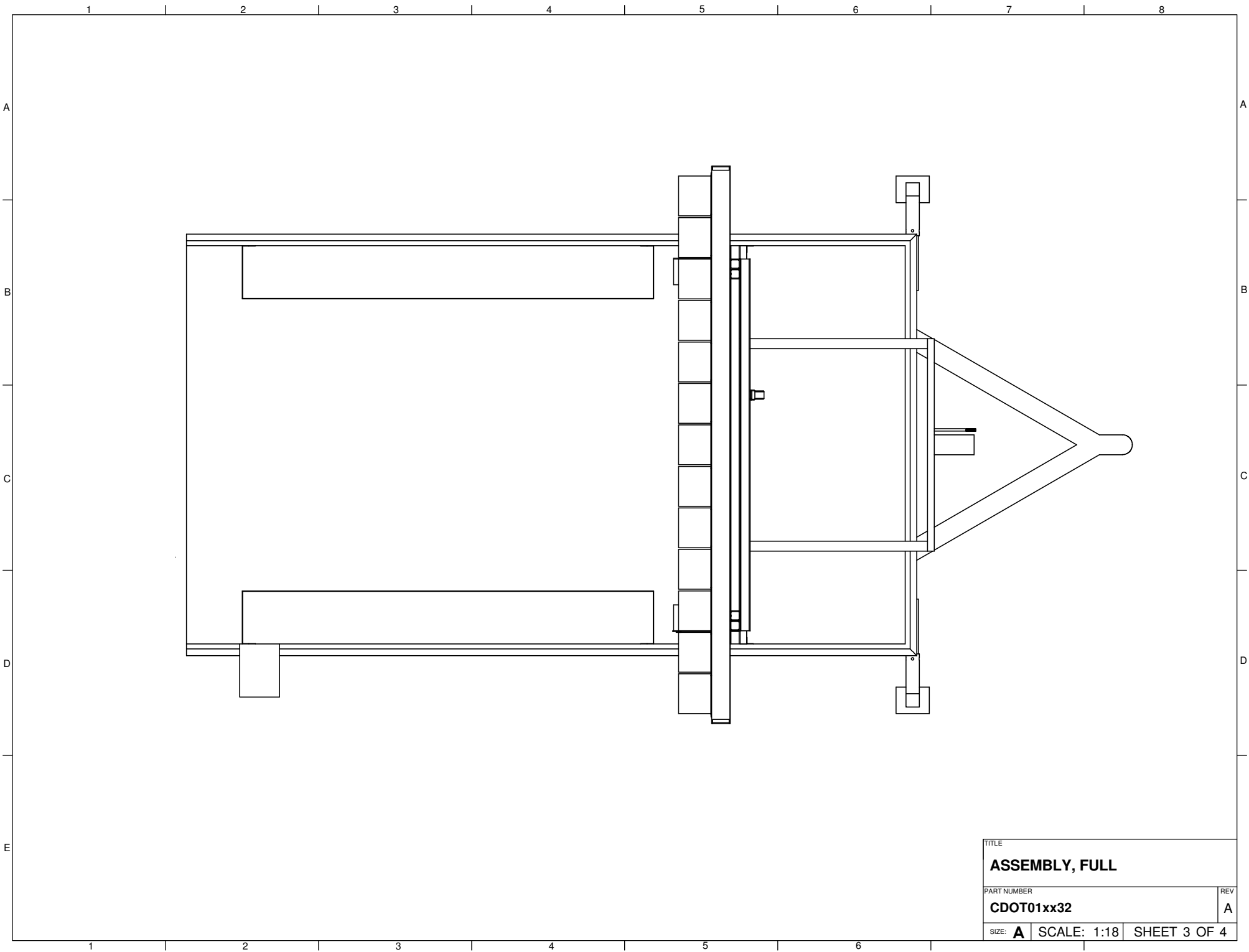
PART NUMBER	REV
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SIZE: A	SCALE: 1:34
SHEET 1 OF 4	

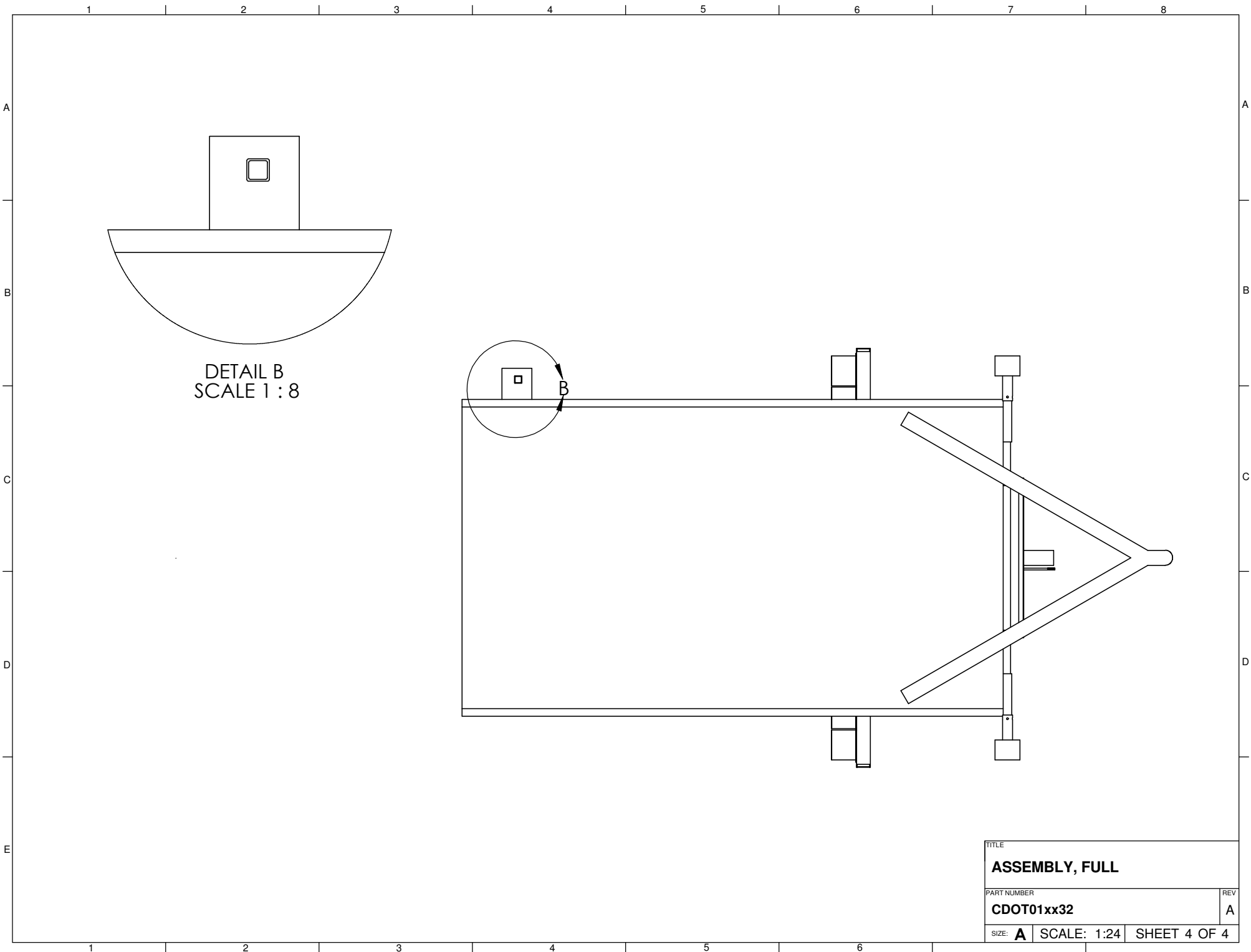
# NOTES:

1. ALL JOINTS ARE FULLY WELDED UNLESS OTHERWISE NOTED
2. THE ARROW BOARD ASSEMBLY IS BOLTED TO THE FRAME ASSEMBLY
3. THE LOCK SLIDE IS BOLTED TO THE ARROW BOARD ASSEMBLY
4. THE LOCK SLIDE PASSES THROUGH THE HINGED SLEEVE ASSEMBLY FREELY
5. THE HINGED SLEEVE ASSEMBLY IS BOLTED TO THE SLEEVE HINGE ASSEMBLY
6. THE SLEEVE HINGE ASSEMBLY IS BOLTED TO THE FRAME ASSEMBLY
7. THE FRONT OF THE FRAME ASSEMBLY IS WELDED TO THE COUPLER ARMS
8. THE FRAME MOUNTING PLATES IN THE FRAME ASSEMBLY ARE BOLTED TO THE DECK OF THE TRAILER
9. THE TELESOPING LEGS MOVE FREELY ON THE FRONT LEG MOUNTS
10. THE DIVIDER ASSEMBLY IS HELD IN PLACE BY THE DIVIDER STOPS WHICH ARE BOLTED THROUGH THE TRAILER SIDE
11. THE SIDE BINS ARE BOLTED THROUGH THE TRAILER SIDES USING THE TOP HOLES ONLY

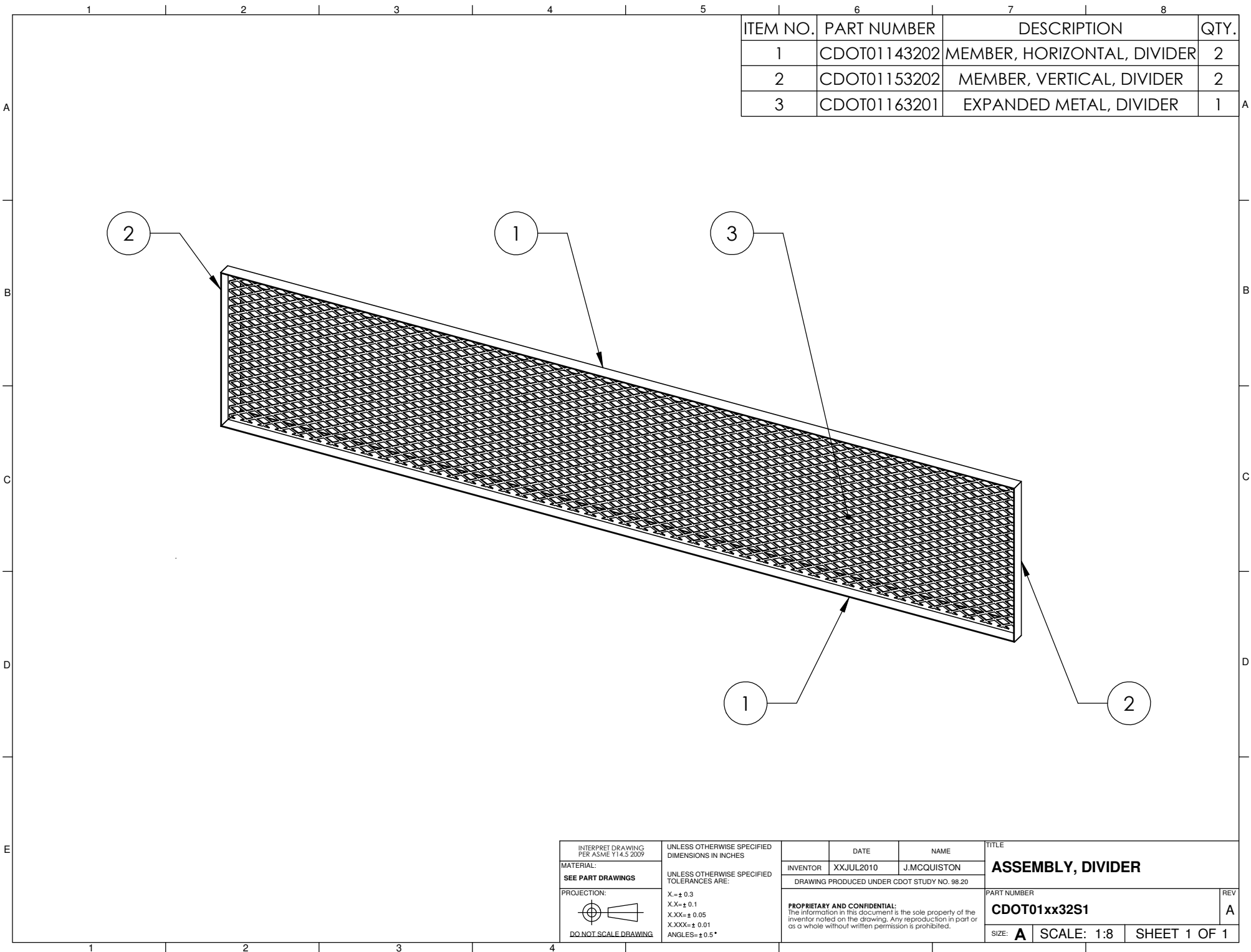


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ASSEMBLY, FULL		
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SIZE: A	SCALE: 1:34	SHEET 2 OF 4

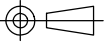


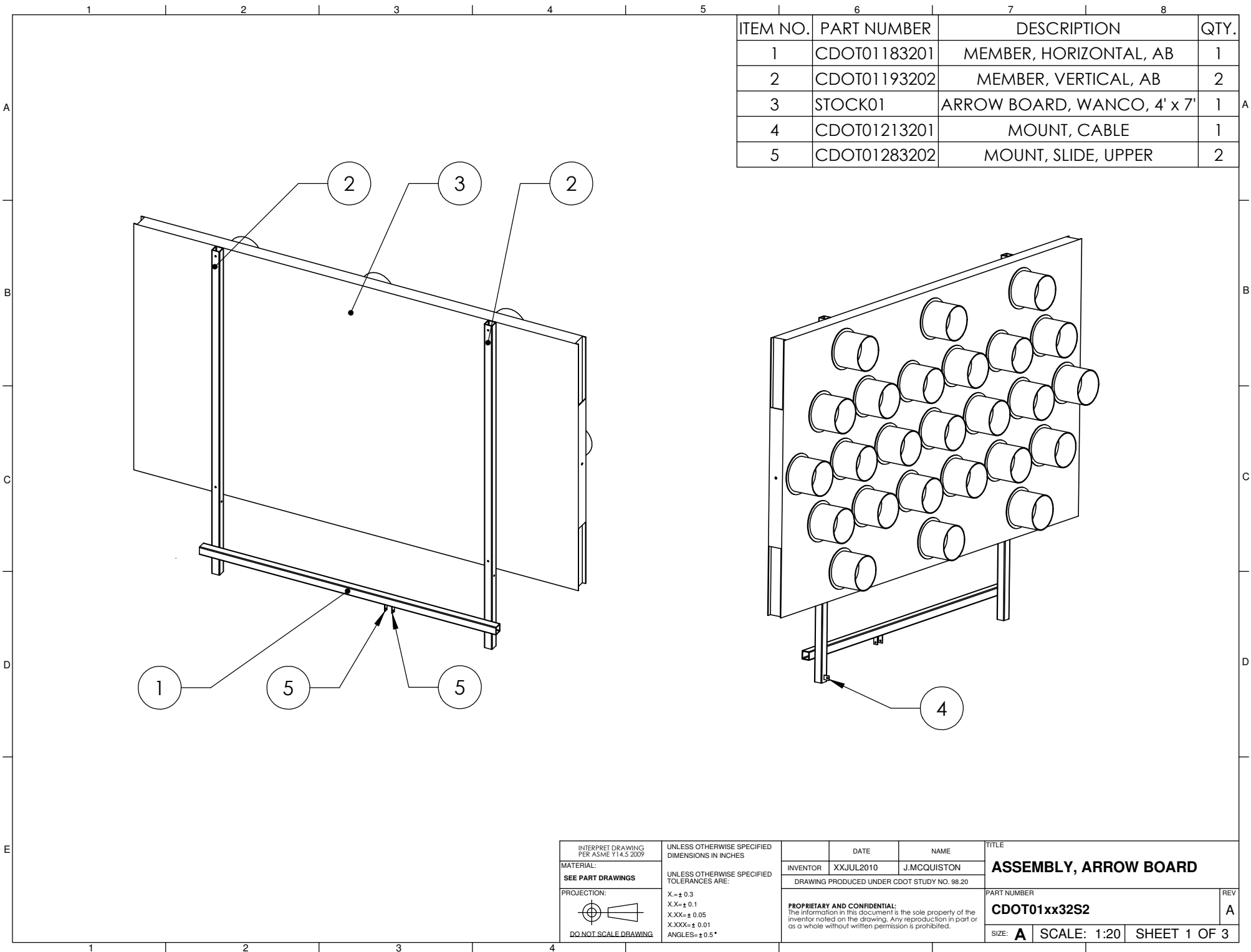


TITLE		
ASSEMBLY, FULL		
PART NUMBER	REV	
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SIZE: A	SCALE: 1:24	SHEET 4 OF 4

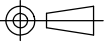


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT01143202	MEMBER, HORIZONTAL, DIVIDER	2
2	CDOT01153202	MEMBER, VERTICAL, DIVIDER	2
3	CDOT01163201	EXPANDED METAL, DIVIDER	1

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJUL2010		J.MCQUISTON	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT01xx32S1	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:8		SHEET 1 OF 1	
								REV A	

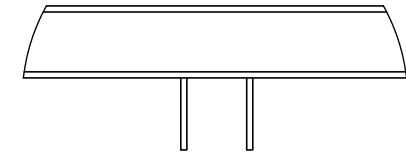
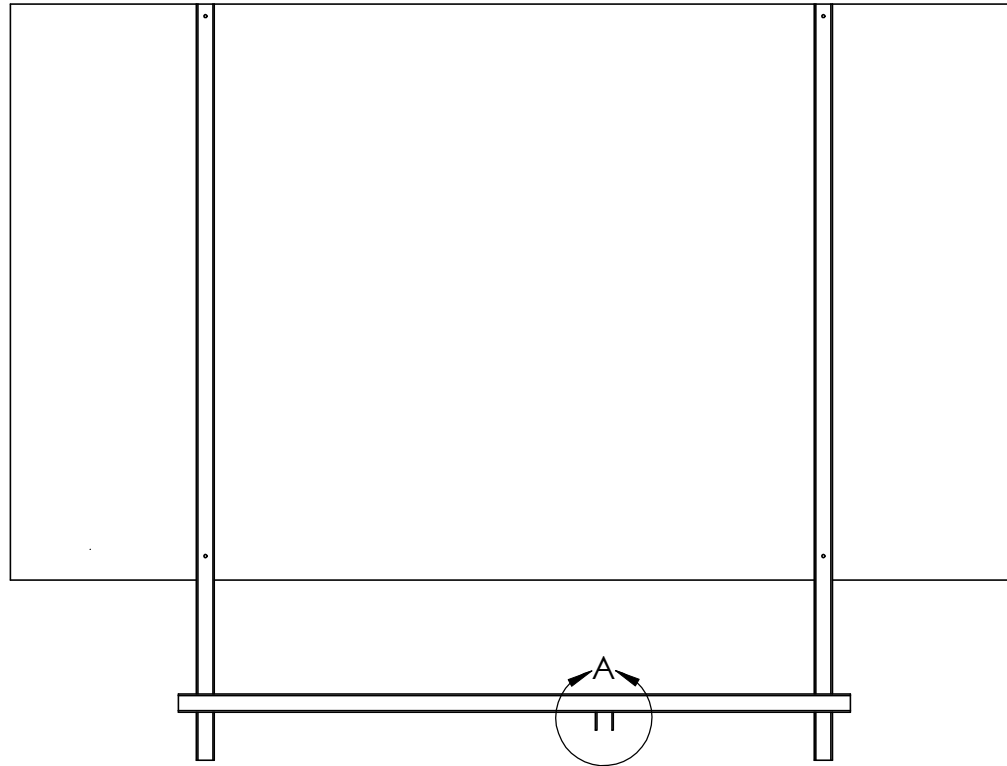


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT01183201	MEMBER, HORIZONTAL, AB	1
2	CDOT01193202	MEMBER, VERTICAL, AB	2
3	STOCK01	ARROW BOARD, WANCO, 4' x 7'	1
4	CDOT01213201	MOUNT, CABLE	1
5	CDOT01283202	MOUNT, SLIDE, UPPER	2

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJUL2010		J.MCQUISTON	
PROJECTION: 		X.=± 0.3 X.X=± 0.1 X.XX=± 0.05 X.XXX=± 0.01 ANGLES=± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT01xx32S2	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:20	
						SHEET 1 OF 3		REV A	

NOTES:

1. ALL METAL PARTS ARE WELDED TOGETHER
2. THE WANCO ARROW BOARD IS BOLTED TO THE FRAME

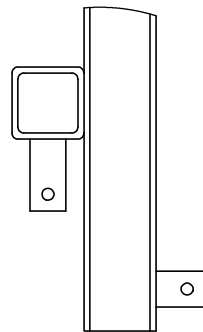
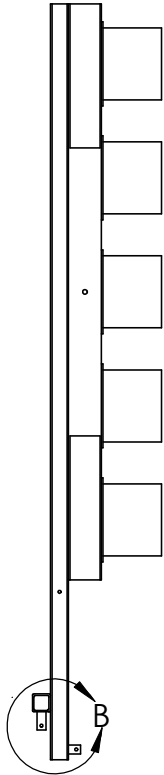


DETAIL A  
SCALE 1 : 4

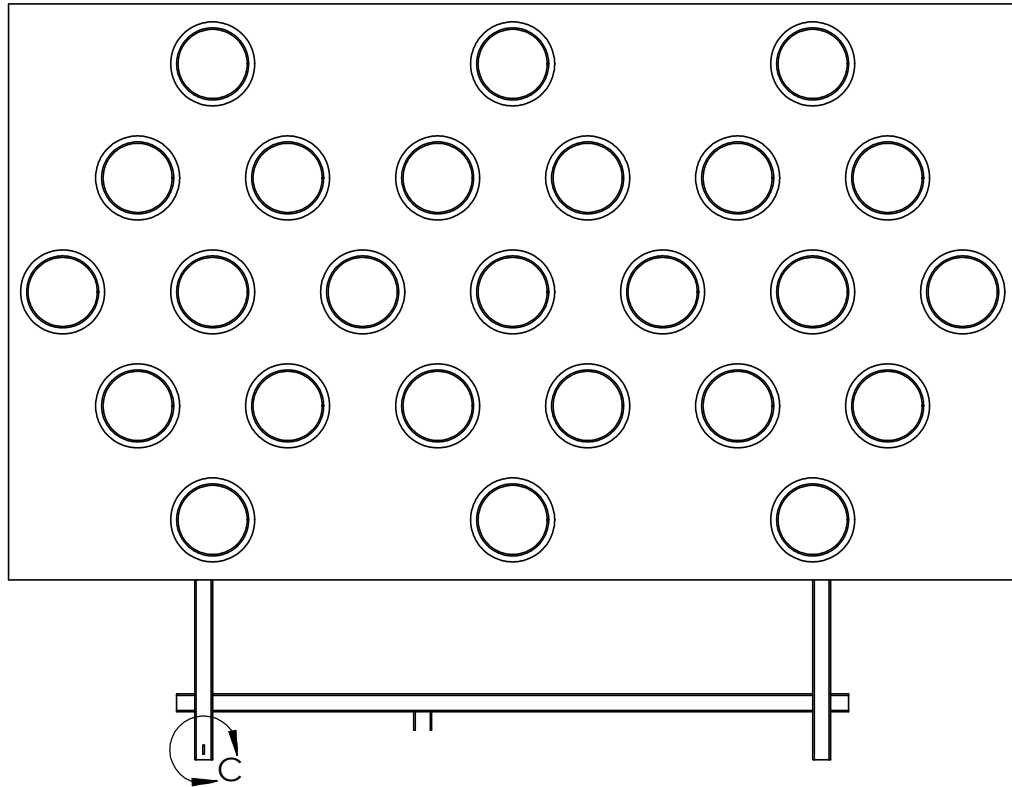
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<b>ASSEMBLY, ARROW BOARD</b>		
PART NUMBER		REV
<b>CDOT01xx32S2</b>		<b>A</b>
SIZE: <b>A</b>	SCALE: 1:16	SHEET 2 OF 3

NOTES:

1. ALL METAL PARTS ARE WELDED TOGETHER
2. THE WANCO ARROW BOARD IS BOLTED TO THE FRAME



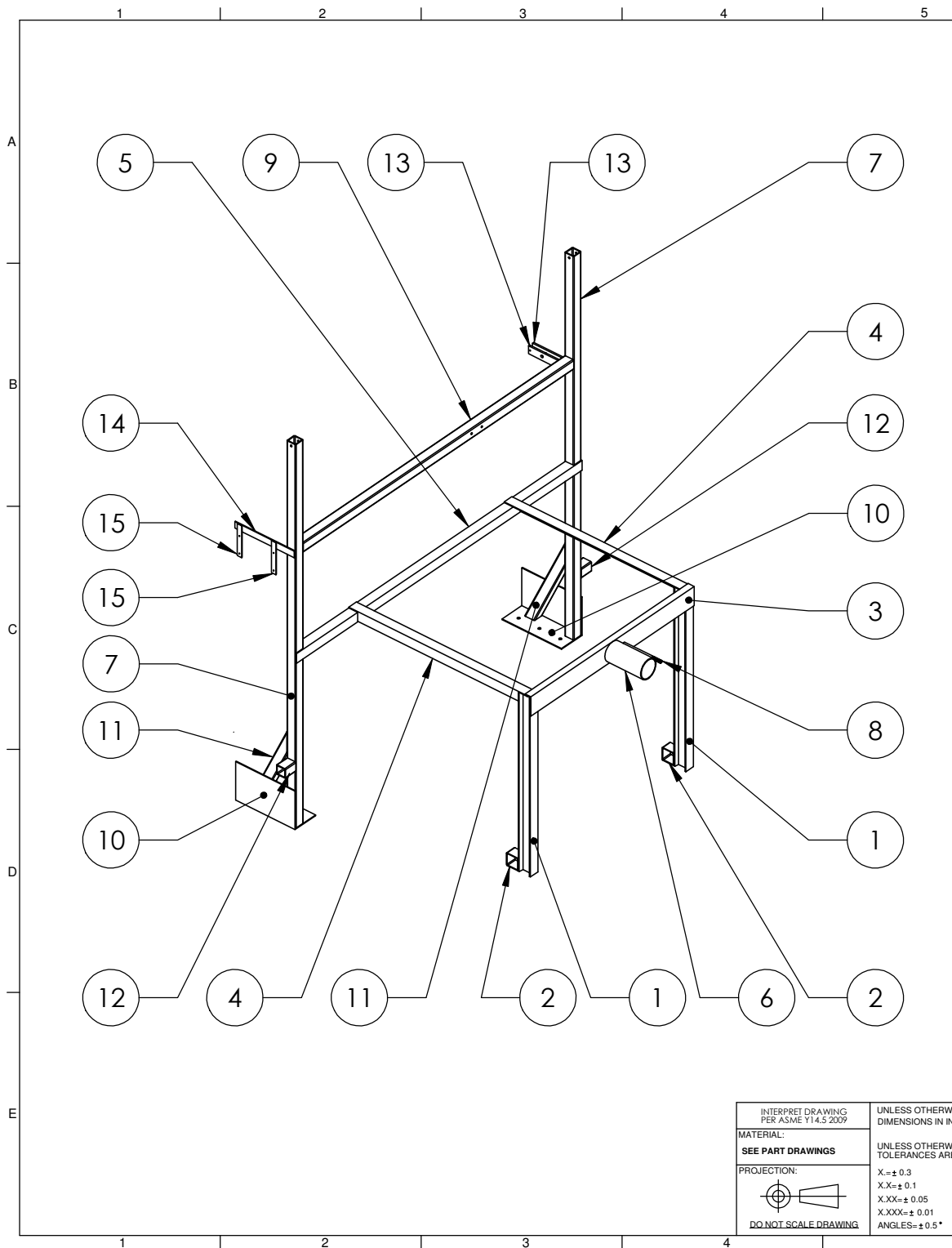
DETAIL B  
SCALE 1 : 4



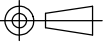
DETAIL C  
SCALE 1 : 4

TITLE		
<b>ASSEMBLY, ARROW BOARD</b>		
PART NUMBER		REV
<b>CDOT01xx32S2</b>		<b>A</b>
SIZE: <b>A</b>	SCALE: 1:16	SHEET 3 OF 3

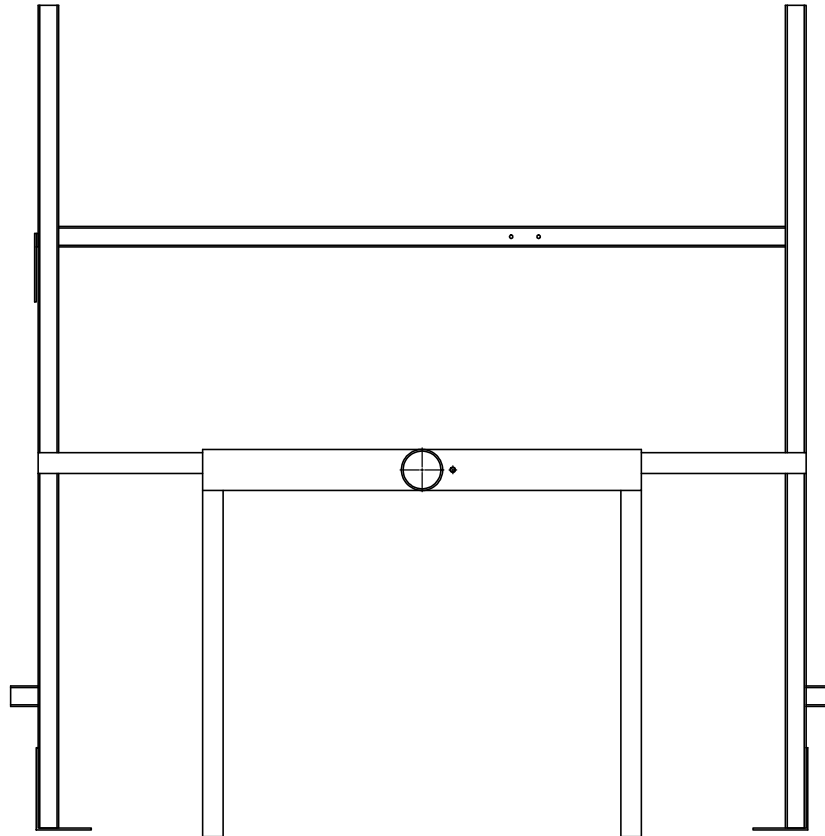




ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT01013202	MEMBER, VERTICAL, FRONT	2
2	CDOT01023202	SPACER, MEMBER, FRONT	2
3	CDOT01033201	MEMBER, CROSS, FRONT	1
4	CDOT01043202	MEMBER, HORIZONTAL, FRONT	2
5	CDOT01073201	MEMBER, CROSS, MIDDLE	1
6	CDOT01053201	SUPPORT, WHEEL	1
7	CDOT01093202	MEMBER, VERTICAL	2
8	CDOT01063201	POST, LOCK, WHEEL	1
9	CDOT01083201	MEMBER, CROSS, UPPER	1
10	CDOT01133202	PLATE, MOUNTING, FRAME	2
11	CDOT01123202	SUPPORT, MEMBER, VERTICAL	2
12	CDOT01103202	SPACER, SIDE, FRAME	2
13	CDOT01203202	MOUNT, PULLEY, CABLE	2
14	CDOT01223201	MOUNT, FRAME, CONTROL	1
15	CDOT01233202	MOUNT, BOX, CONTROL	2

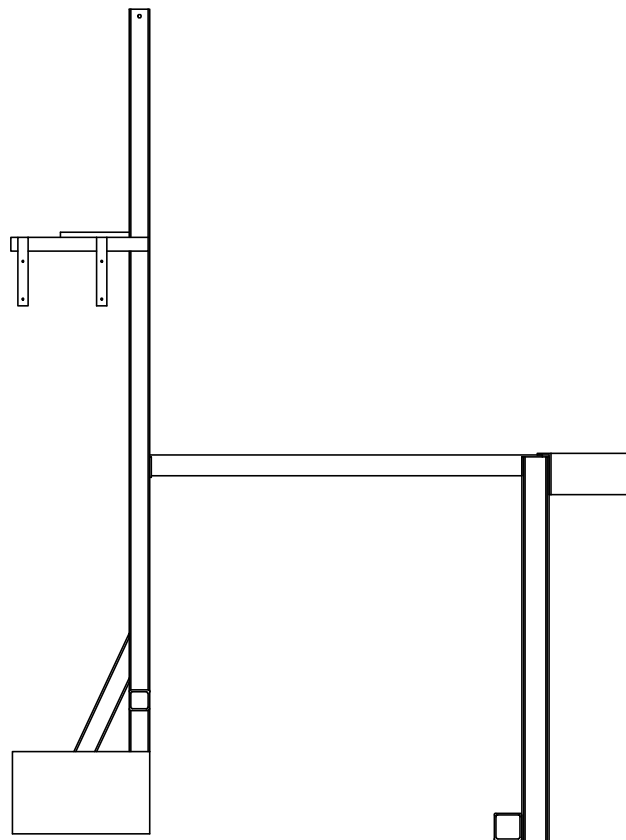
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJUL2010		J.MCQUISTON	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT01xx32S3	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:20		SHEET 1 OF 5	
								REV A	

NOTES:  
1. ALL JOINTS ARE FULLY WELDED



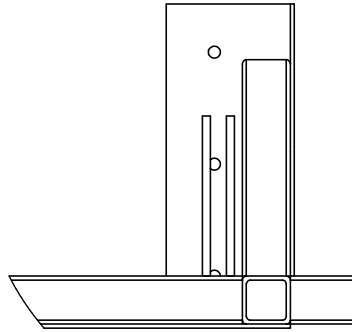
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ASSEMBLY, FRAME		
PART NUMBER		REV
CDOT01xx32S3		A
SIZE: A	SCALE: 1:14	SHEET 2 OF 5

NOTES:  
1. ALL JOINTS ARE FULLY WELDED

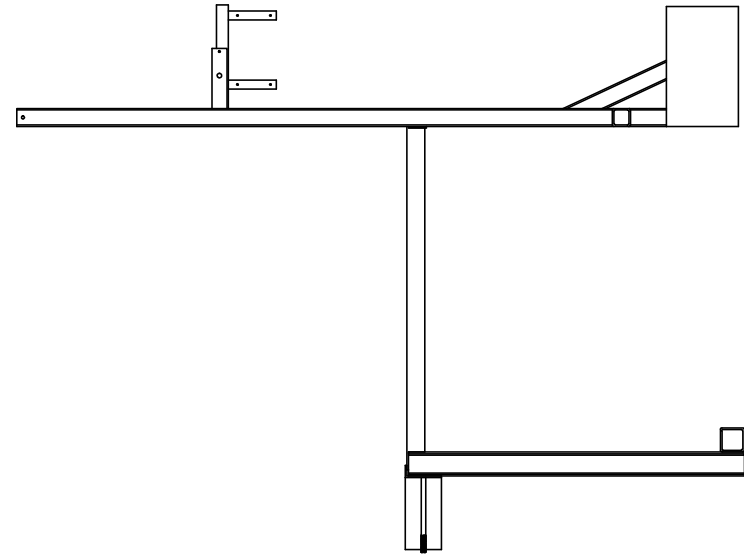
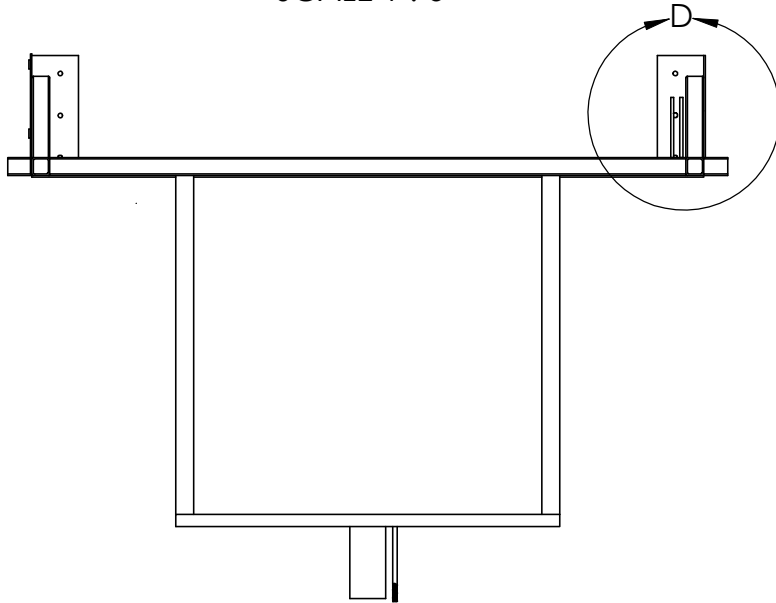


TITLE		
ASSEMBLY, FRAME		
PART NUMBER		REV
CDOT01xx32S3		A
SIZE: A	SCALE: 1:14	SHEET 3 OF 5

NOTES:  
1. ALL JOINTS ARE FULLY WELDED



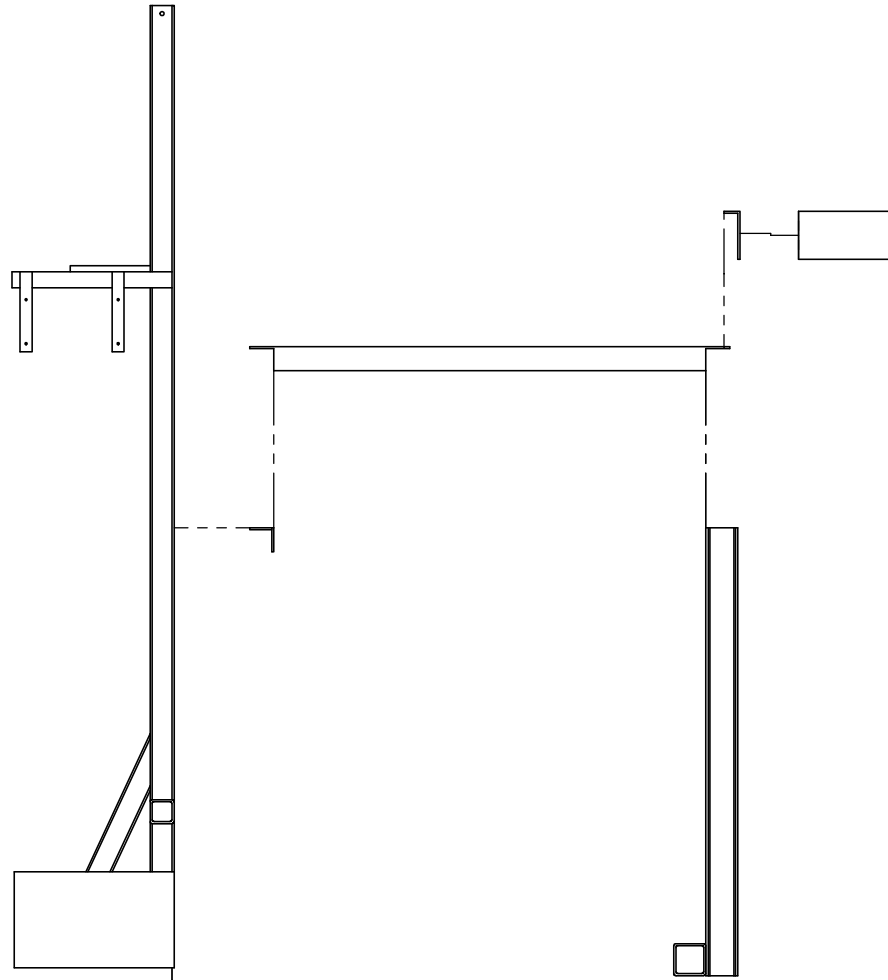
DETAIL D  
SCALE 1 : 6



TITLE		
ASSEMBLY, FRAME		
PART NUMBER		REV
CDOT01xx32S3		A
SIZE: A	SCALE: 1:16	SHEET 4 OF 5

NOTES:

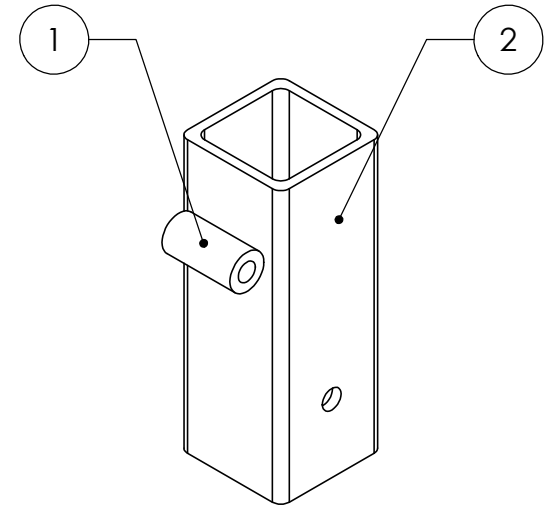
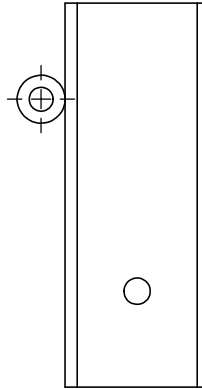
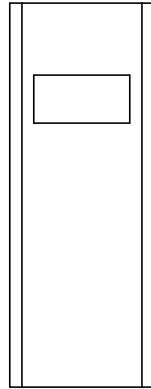
1. ALL JOINTS ARE FULLY WELDED
2. THE FRONT HORIZONTAL MEMBER (B.O.M. ITEM 4) IS WELDED BETWEEN THE FRONT CROSS MEMBER (B.O.M. ITEM 3) AND THE FRONT VERTICAL MEMBER (B.O.M. ITEM 1).

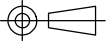


TITLE		
ASSEMBLY, FRAME		
PART NUMBER		REV
CDOT01xx32S3		A
SIZE: A	SCALE: 1:12	SHEET 5 OF 5

NOTES:  
1. ALL JOINTS ARE FULLY WELDED

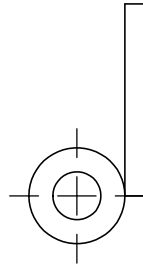
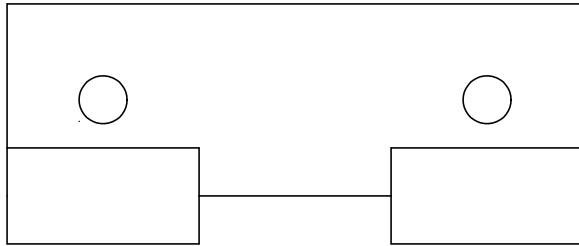
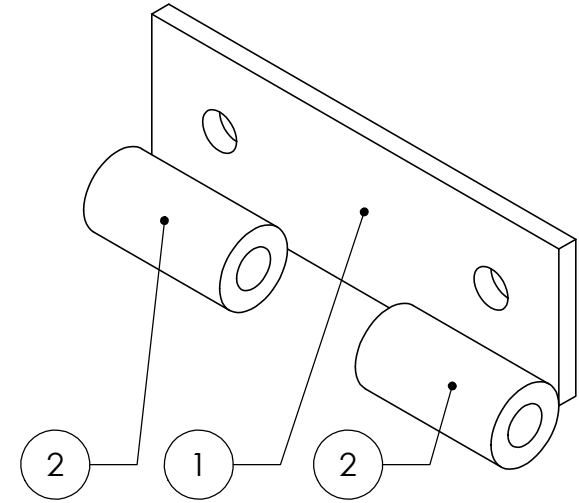
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT01253203	HINGE, LOCK, AB	1
2	CDOT01263201	SLEEVE, LOCK, AB	1

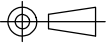


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>ASSEMBLY, HINGED SLEEVE</b>	
MATERIAL: <b>SEE PART DRAWINGS</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON	DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		
PROJECTION: 		X.= ± 0.3 X.X.= ± 0.1 X.XX.= ± 0.05 X.XXX.= ± 0.01 ANGLES= ± 0.5 °		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
<b>DO NOT SCALE DRAWING</b>							SIZE: <b>A</b>	SCALE: 1:2	SHEET 1 OF 1

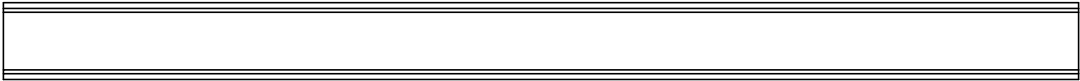
NOTES:  
1. ALL JOINTS ARE WELDED

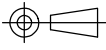
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT01243201	PLATE, BASE, LOCK, AB	1
2	CDOT01253203	HINGE, LOCK, AB	2



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>SEE PART DRAWINGS</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJUL2010		J.MCQUISTON	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		REV	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT01xx32S5		A	
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								SHEET 1 OF 1	

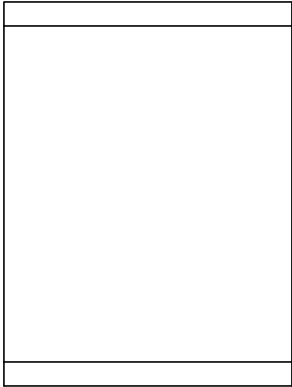
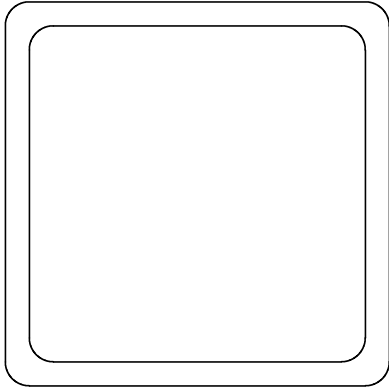
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

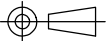


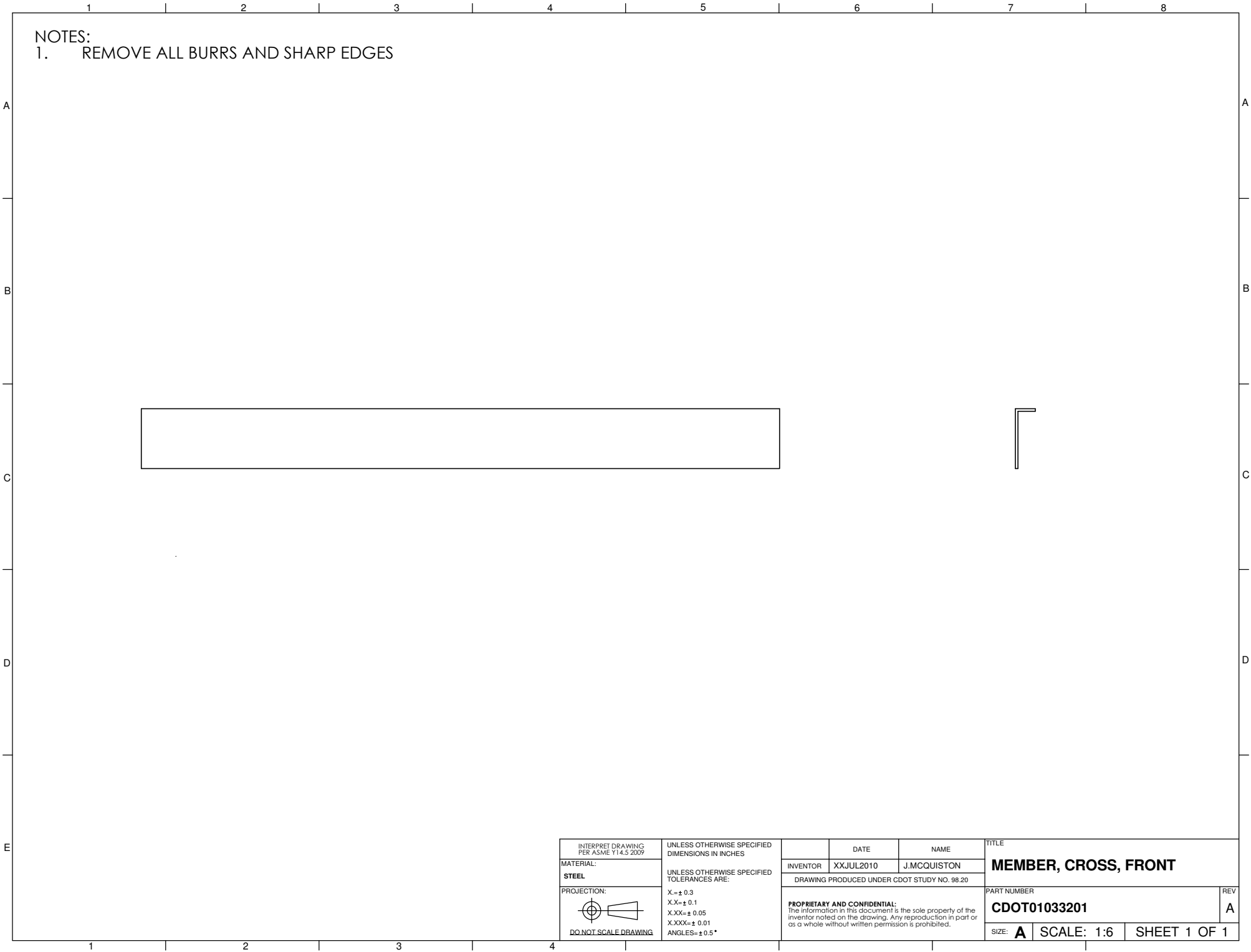
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		MEMBER, VERTICAL, FRONT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				SIZE: A		SCALE: 1:5		SHEET 1 OF 1	
								REV	A



NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

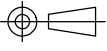


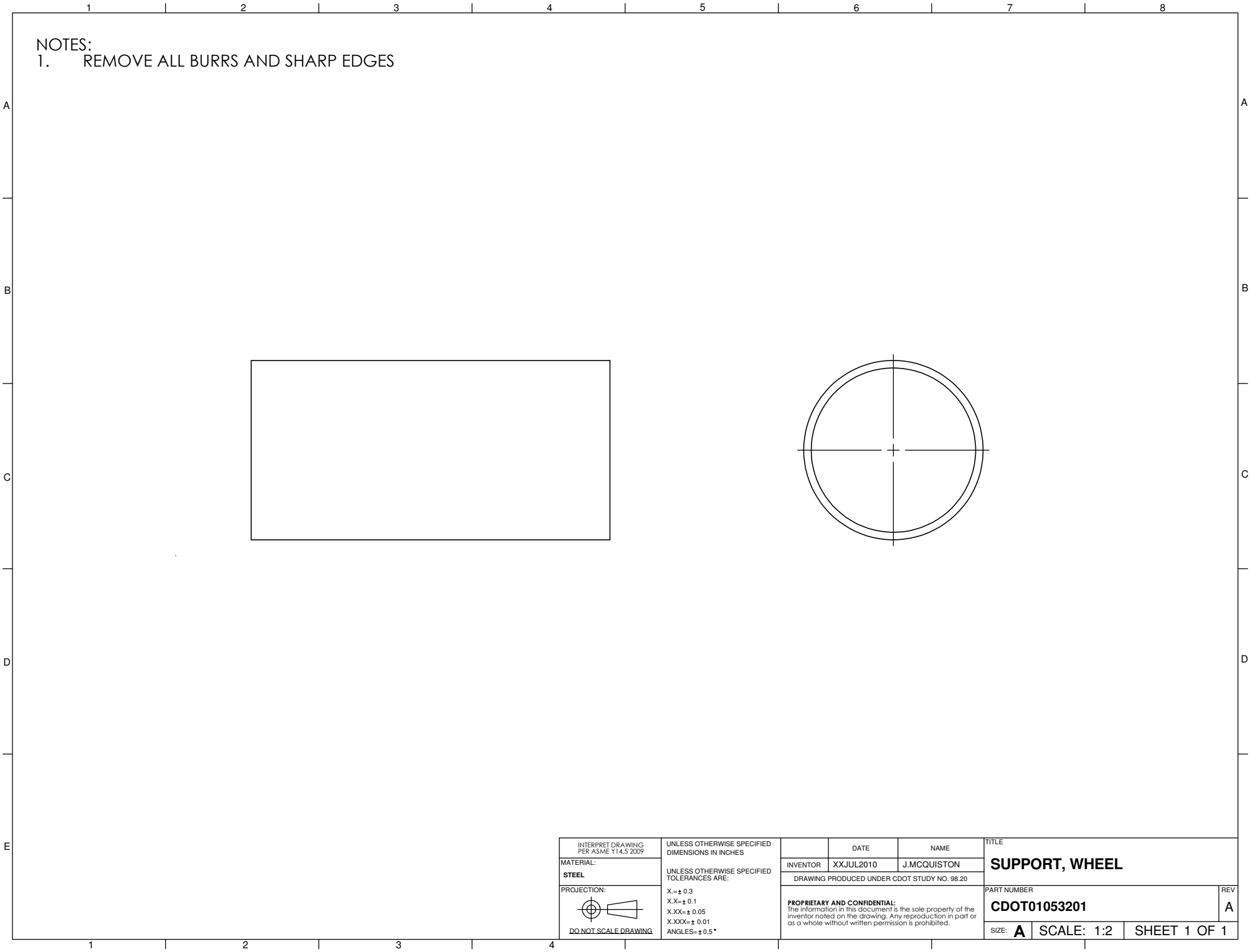
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>SPACER, MEMBER, FRONT</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER		REV			
				CDOT01023202		A			
				SIZE: <b>A</b>		SCALE: 1:1		SHEET 1 OF 1	



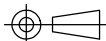
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>MEMBER, HORIZONTAL, FRONT</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT01043202</b>		REV <b>A</b>	
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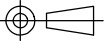
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		SUPPORT, WHEEL	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				SIZE: A		SCALE: 1:2		SHEET 1 OF 1	

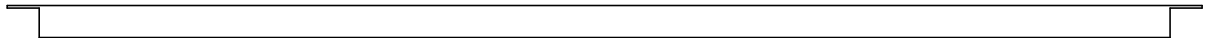
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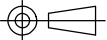
1. REMOVE ALL BURRS AND SHARP EDGES
2. THREADING IS XX" - XX



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>POST, LOCK, WHEEL</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT01063201		REV A	
				SIZE: <b>A</b>		SCALE: 1:1		SHEET 1 OF 1	

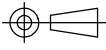
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



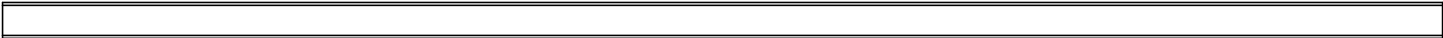
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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON	MEMBER, CROSS, MIDDLE
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT01073201		SIZE: A	A
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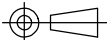

NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		MEMBER, CROSS, UPPER	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				SIZE: A		SCALE: 1:8		SHEET 1 OF 1	
								REV A	

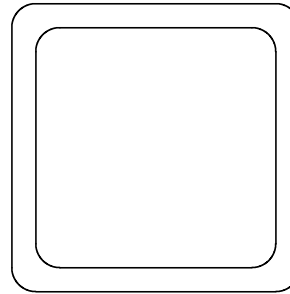
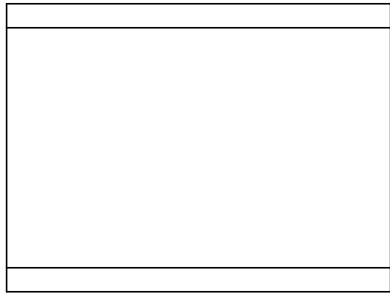
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

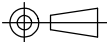


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:  X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		INVENTOR	XXJUL2010	J.MCQUISTON			
PROJECTION: 				DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
 DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER	REV
								CDOT01093202	A
				SIZE:	A	SCALE:	1:8	SHEET 1 OF 1	

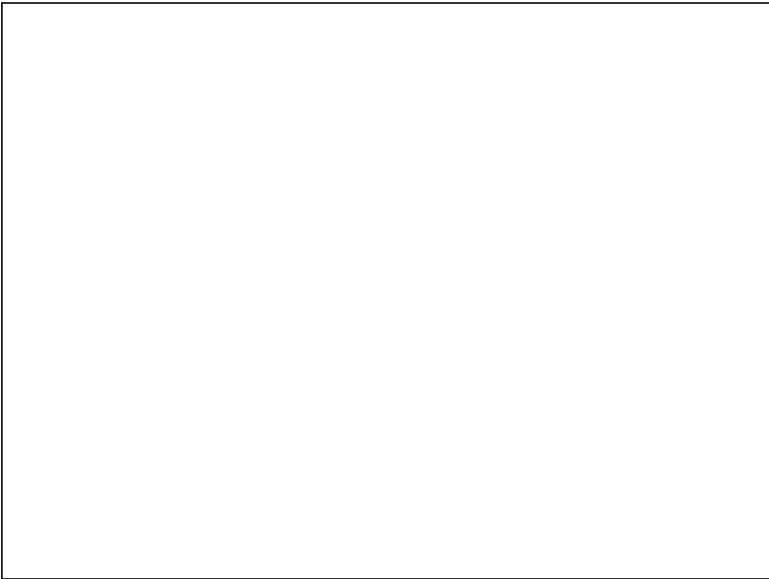


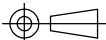
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



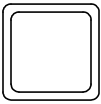
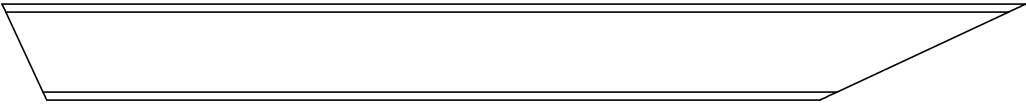
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		SPACER, SIDE, FRAME		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER		REV
								CDOT01103202		A
						SIZE: A		SCALE: 1:1	SHEET 1 OF 1	

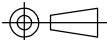
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



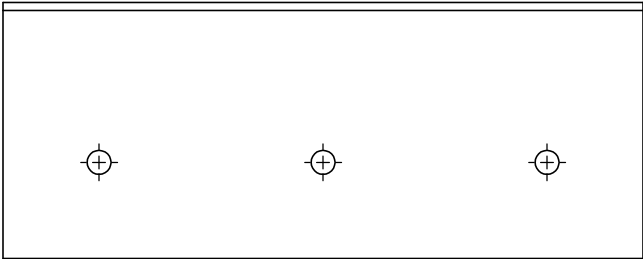
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		MOUNT, LIGHT	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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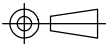
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



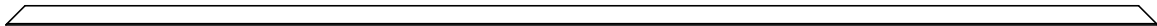
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		SUPPORT, MEMBER, VERTICAL	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER		CDOT01123202		REV A	
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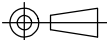
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

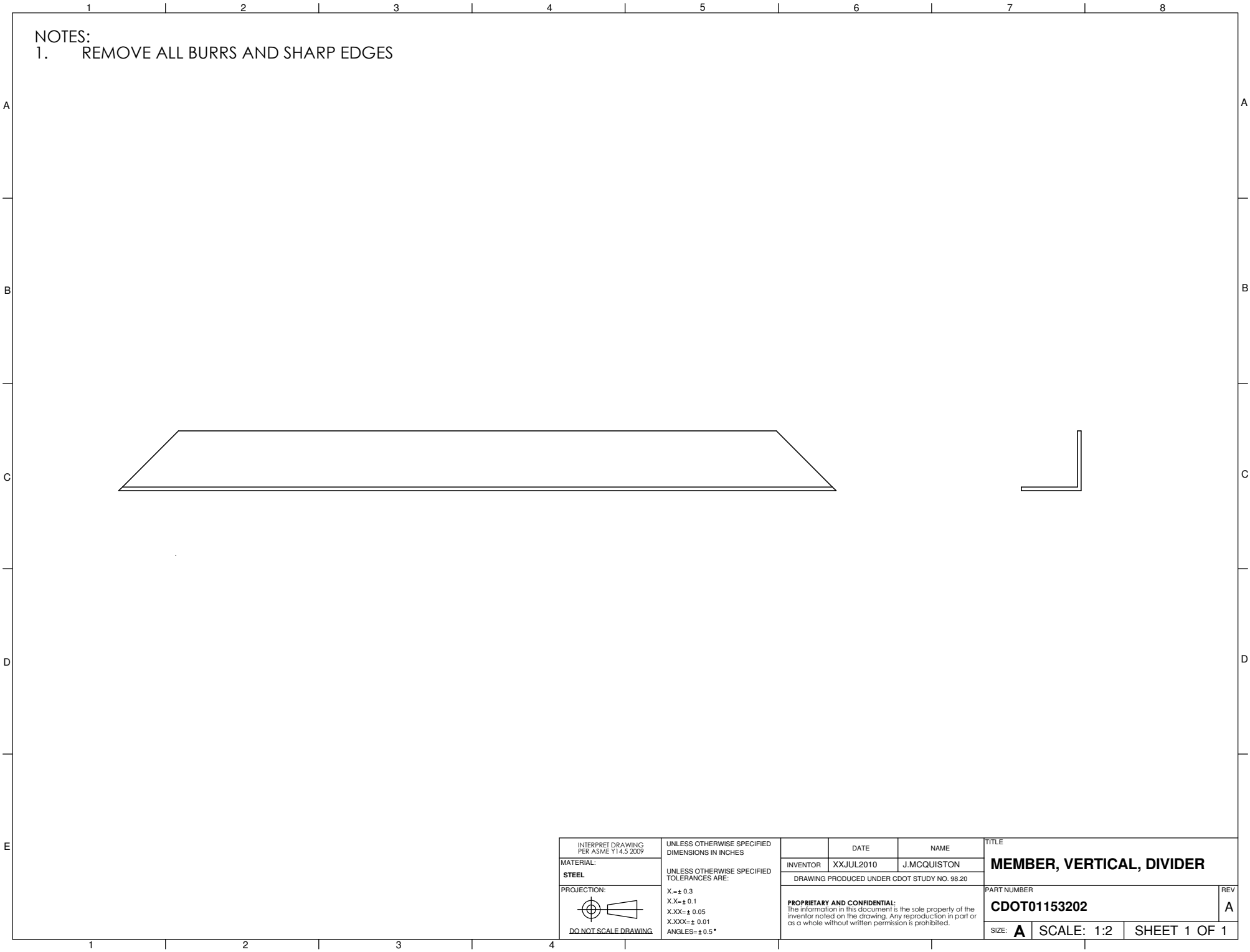


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		PLATE, MOUNTING, FRAME	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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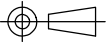
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



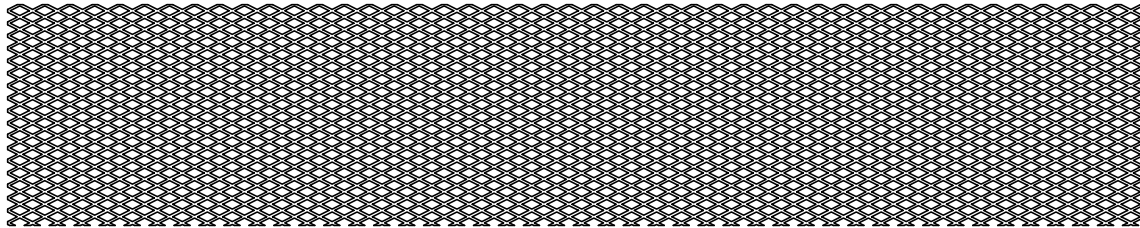
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE				
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		MEMBER, HORIZONTAL, DIVIDER				
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20								
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						PART NUMBER CDOT01143202		REV A
				SIZE: A				SCALE: 1:10		SHEET 1 OF 1		

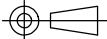


NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

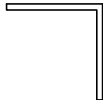
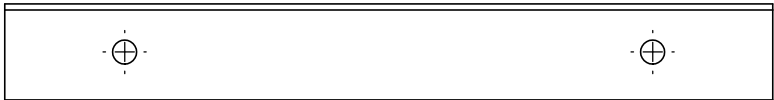
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>MEMBER, VERTICAL, DIVIDER</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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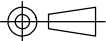
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL IS STANDARD EXPANDED METAL WITH 1" X 0.5" DIAMOND SIZE



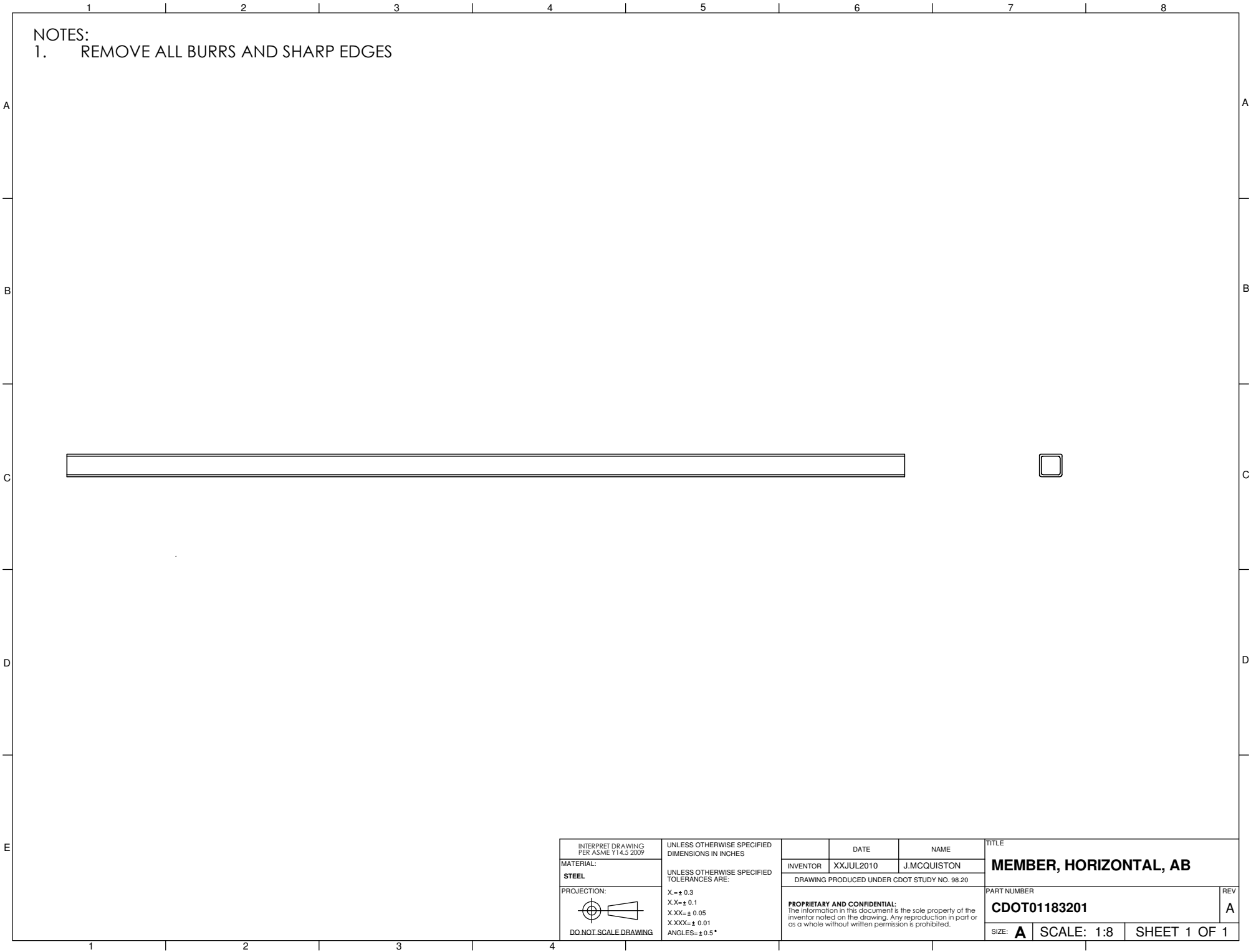
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>EXPANDED METAL, DIVIDER</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT01163201		REV A	
				SIZE: <b>A</b>	SCALE: 1:10		SHEET 1 OF 1		

NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>STOP, DIVIDER</b>		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT01173202</b>		REV <b>A</b>
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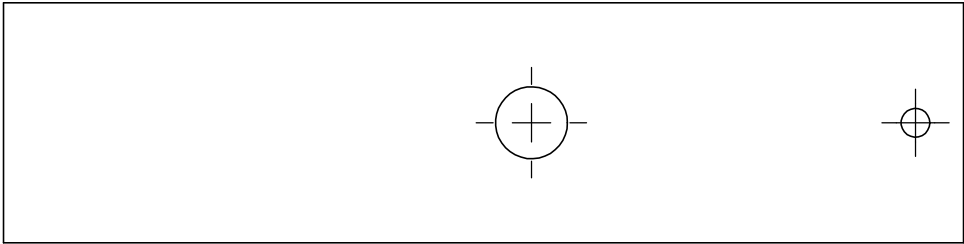



NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



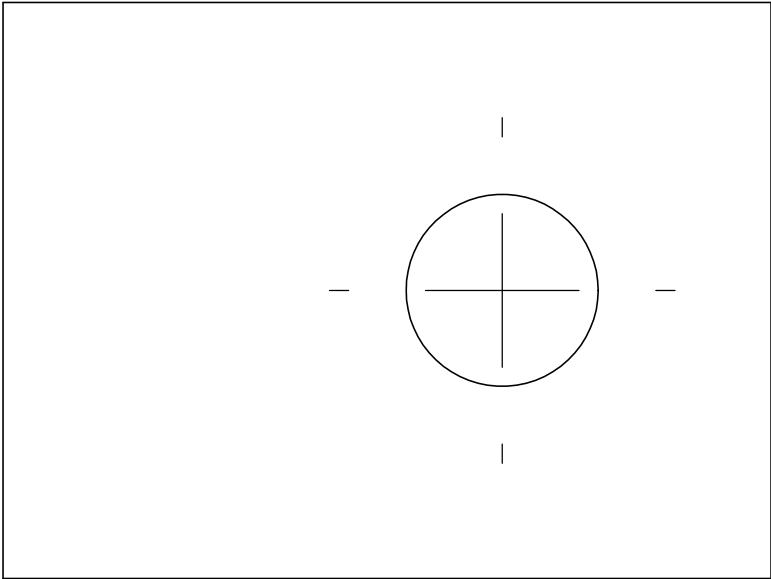
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		MEMBER, VERTICAL, AB	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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								REV A	

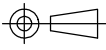
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

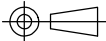


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>MOUNT, PULLEY, CABLE</b>		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT01203202</b>		REV <b>A</b>
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

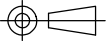


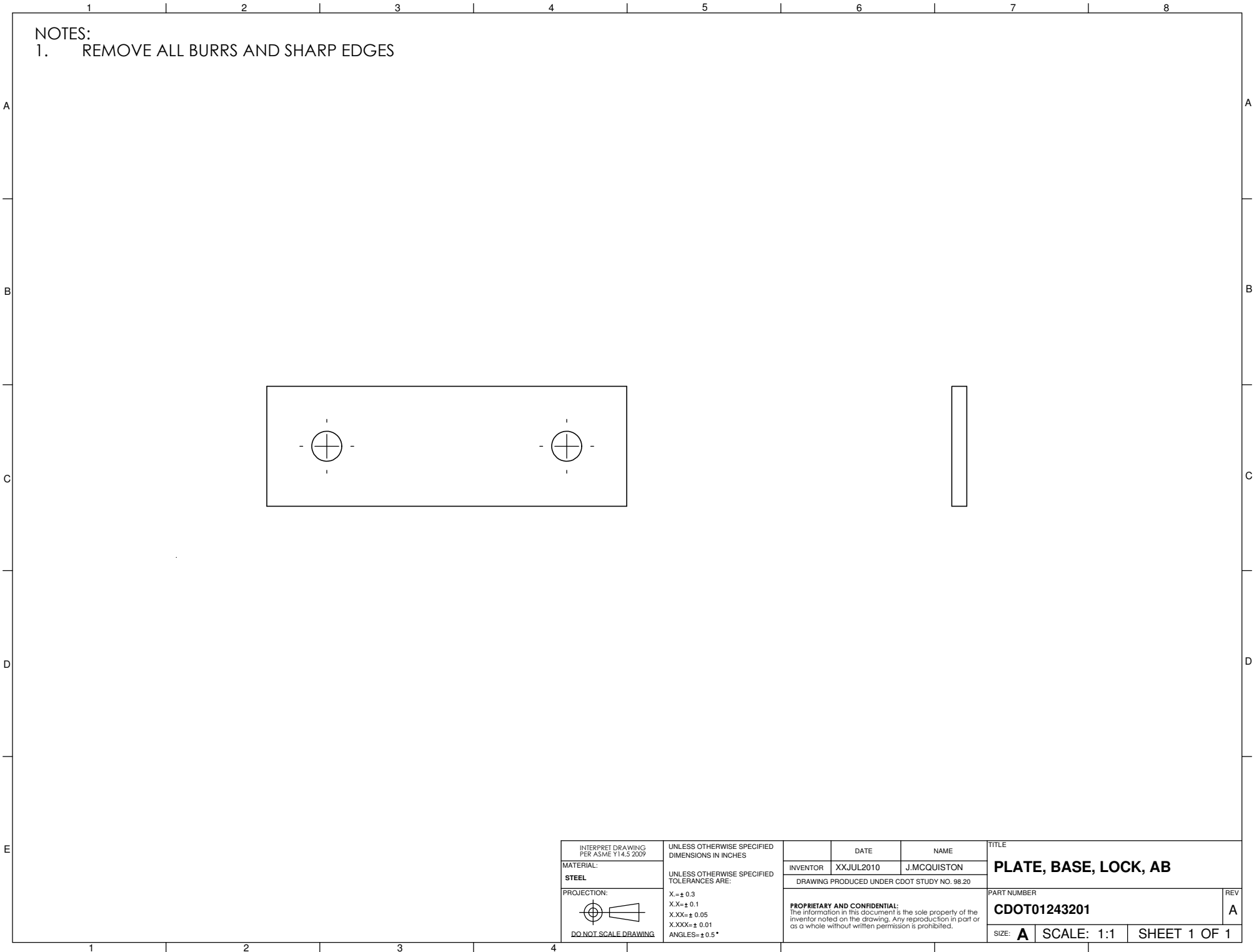
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		MOUNT, CABLE	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER		CDOT01213201		REV	A
				SIZE: A		SCALE: 4:1		SHEET 1 OF 1	

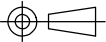
1				2				3				4				5				6				7				8																																																																																			
NOTES: 1. REMOVE ALL BURRS AND SHARP EDGES																																																																																																															
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<div><div>INTERPRET DRAWING PER ASME Y14.5 2009</div><div>MATERIAL: STEEL</div><div>PROJECTION: </div><div>DO NOT SCALE DRAWING</div></div>														<div>UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES</div> <div>UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:</div> <div>X=± 0.3 X.X=± 0.1 X.XX=± 0.05 X.XXX=± 0.01 ANGLES=± 0.5°</div>														<div></div> <div>DATE XXJUL2010</div> <div>NAME J.MCQUISTON</div> <div>DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20</div> <div>PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.</div>										<div>TITLE MOUNT, FRAME, CONTROL</div> <div>PART NUMBER CDOT01223201</div> <div>SIZE: A</div>				<div>REV A</div> <div>SHEET 1 OF 1</div>																																																																					
1														2														3														4														5														6														7														8													

NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

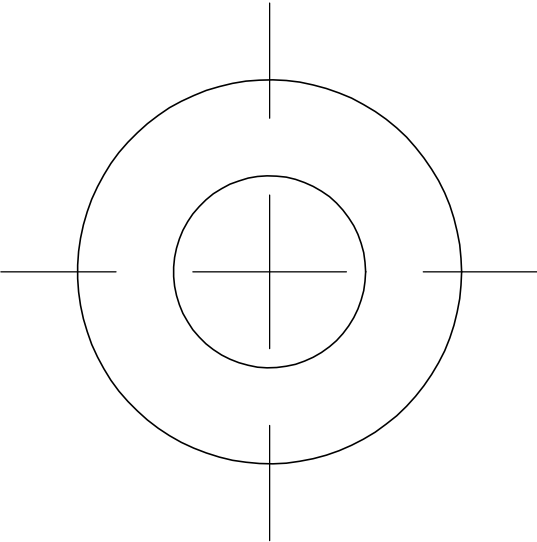
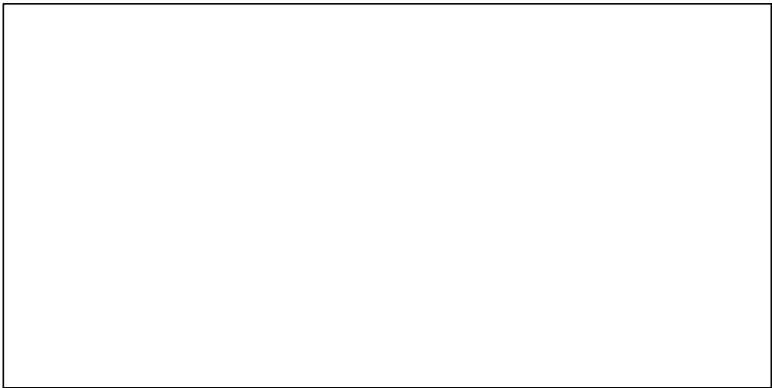


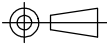
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>MOUNT, BOX, CONTROL</b>		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER		REV <b>A</b>
								<b>CDOT01233202</b>		
				SIZE: <b>A</b>		SCALE: 1:1		SHEET 1 OF 1		



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>PLATE, BASE, LOCK, AB</b>		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT01243201</b>		REV <b>A</b>
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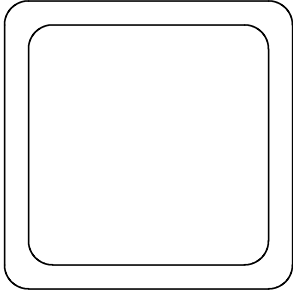
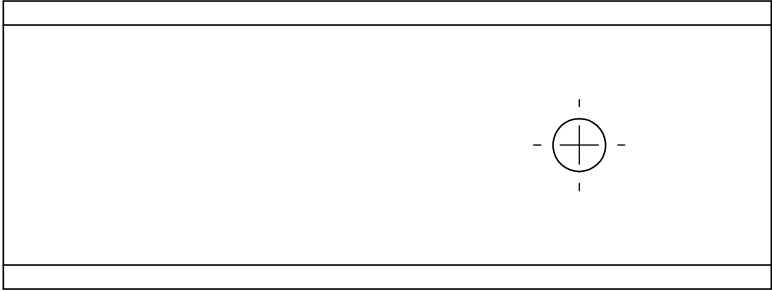
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

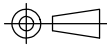


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		HINGE, LOCK, AB	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			PART NUMBER CDOT01253203				REV A
				SIZE: A		SCALE: 4:1		SHEET 1 OF 1	

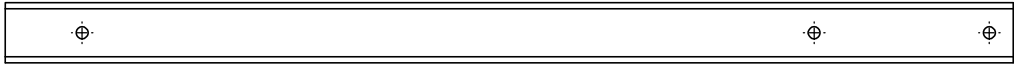


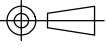
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



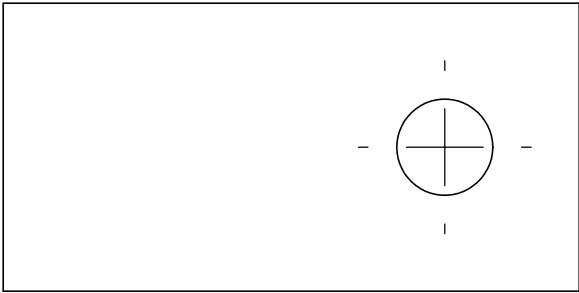
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>SLEEVE, LOCK, AB</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT01263201</b>		REV <b>A</b>	
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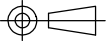
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		SLIDE, LOCK		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.						
				PART NUMBER CDOT01273201						REV A
				SIZE: A		SCALE: 1:4		SHEET 1 OF 1		

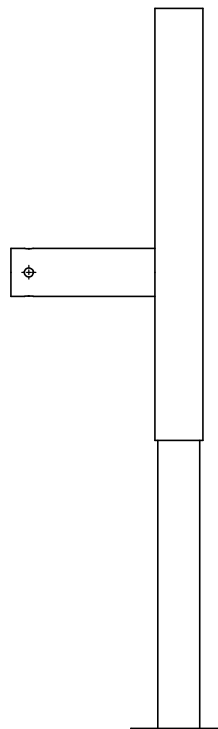
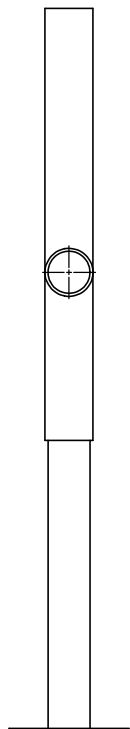
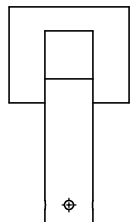
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES




INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		MOUNT, SLIDE, UPPER		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT01283202		REV A
								SIZE: A	SCALE: 2:1	SHEET 1 OF 1

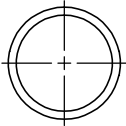
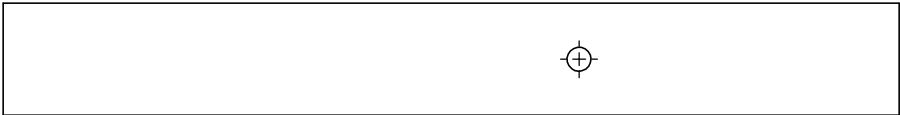
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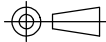
1. REMOVE ALL BURRS AND SHARP EDGES
2. DRILLED PIPE IS WELDED TO STOCK CRANK TELESCOPING TRAILER SUPPORT LEG



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE  <b>LEG, TELESCOPING</b>		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON				
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			PART NUMBER  <b>CDOT01293202</b>					REV  <b>A</b>
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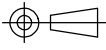
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



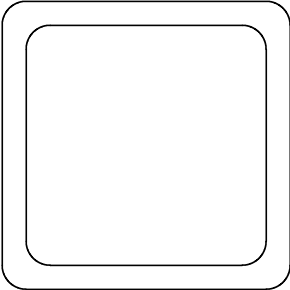
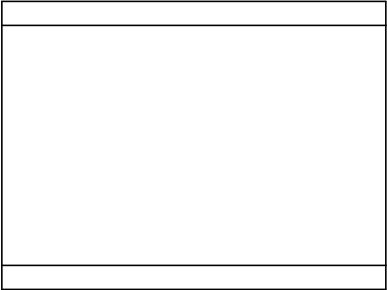
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>MOUNT, LEG, FRONT</b>		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT01303201</b>		REV <b>A</b>
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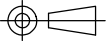
NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		BIN, SIDE	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT01313202			REV A
				SIZE: A		SCALE: 1:12		SHEET 1 OF 1	

NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	J.MCQUISTON		<b>SUPPORT, MOUNT, LIGHT</b>		
PROJECTION: 		X.= ± 0.3 X.X.= ± 0.1 X.XX.= ± 0.05 X.XXX.= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT01323201</b>		REV <b>A</b>
				SIZE: <b>A</b>		SCALE: 1:1		SHEET 1 OF 1		

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Traffic Control Trailer

**Innovator(s):** Trevor Allen, Joe McQuiston

**Summary:** The prior art search found a patent whose device was so similar to this device may not be considered novel.

### Prior Art Search

#### 1. Patent Search

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: arrow & board, traffic & trailer, traffic & sign, sign & package

Field of search: title

Patent Number	Year	Title of Invention
• 5,257,020	1993	Variable message traffic signaling trailer
• 4,992,788	1991	Traffic control trailer system
• 4,706,087	1987	Portable Traffic Signal
• 4,616,225	1986	Portable traffic control signal device
• 4,593,265	1986	Portable Traffic Control Apparatus
• 4,543,905	1985	Portable traffic signaling apparatus and methods therefore



- 4,152,854     1979   Foldable Safety Sign
- 4,087,785     1978   Portable Display Equipment
- 4,077,144     1978   Trailer Warning Panel Assembly
- 3,883,846     1975   Advance warning traffic direction control system for use at selected roadway sites
- 3,852,902     1974   Portable Sign Construction
- 3,798,814     1974   Portable Sign
- 3,729,706     1973   Portable Traffic Control System With Television Monitoring
- 3,702,033     1972   Display Device
- 3,579,880     1971   Carousel Sign

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.centrevilletrailer.com/customTrailers/customTrailers.htm>
- b. <http://www.teamfenex.com/arrowboards.asp>
- c. [http://www.wanco.com/products/products.php?type\\_id=10](http://www.wanco.com/products/products.php?type_id=10)
- d. [http://nationalsignalinc.net/?page\\_id=9](http://nationalsignalinc.net/?page_id=9)

## ***Evaluation of Innovation***

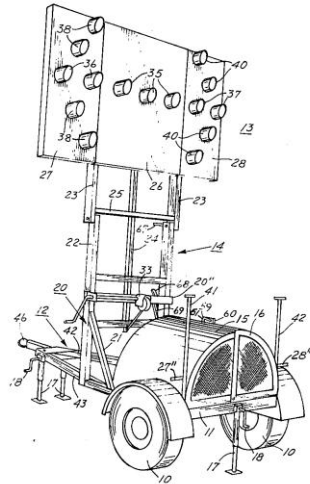
An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references an Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

An examination of the information presented above does reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

a. 4,087,785 - Portable Display Equipment

This device includes a lift mechanism to raise the message board into the vertical position and it includes a generator. It does not include room for storage.

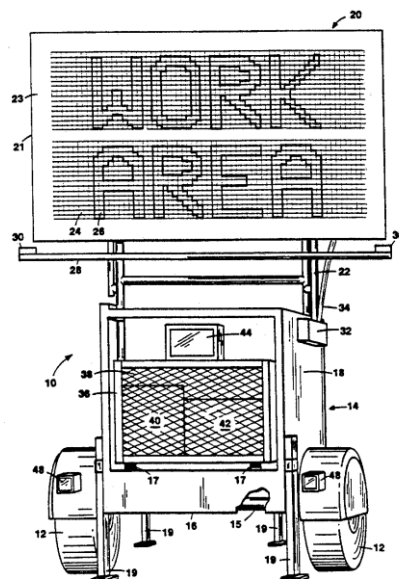


## 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

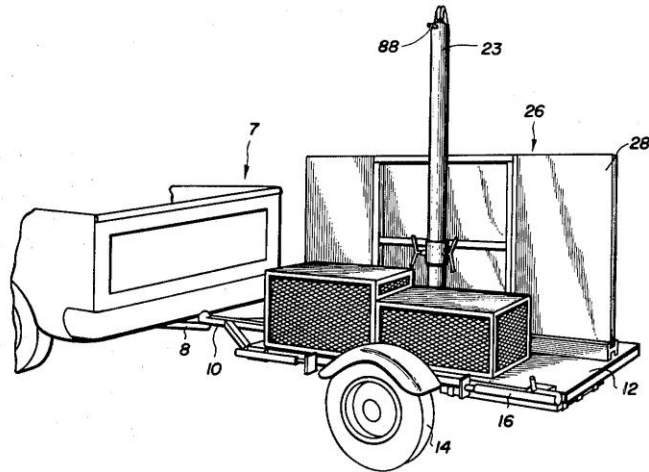
a. 5,257,020 - Variable message traffic signaling trailer

This device includes a lift mechanism to raise the message board into the vertical position and it includes a generator. It does not include room for storage.

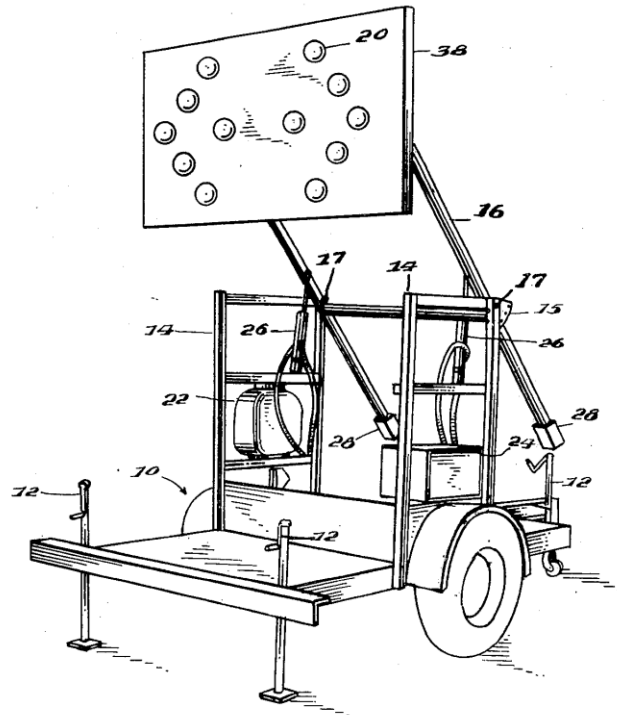


b. 4,077,144 - Trailer Warning Panel Assembly

This device includes a lift mechanism to raise the message board into the vertical position and it includes a generator. It does not include room for storage.



c. 3,883,846 - Advance warning traffic direction control system for use at selected roadway sites



- d. <http://www.teamfenex.com/arrowboards.asp>



### 3. Usefulness

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

This device an arrow board, portable power supply, signs and bases storage on an 8' x 10' trailer freeing up truck for other traffic control items such as cones.

### 4. Public disclosure

This device was invented in 2007 and the first prototype was built in 2008. The patrol had input to the design. The area has purchased four trailers for other patrols to copy the original.

Information regarding the device has been shared with the region. Modifications have been made to the device.

## Device Costs and Benefits

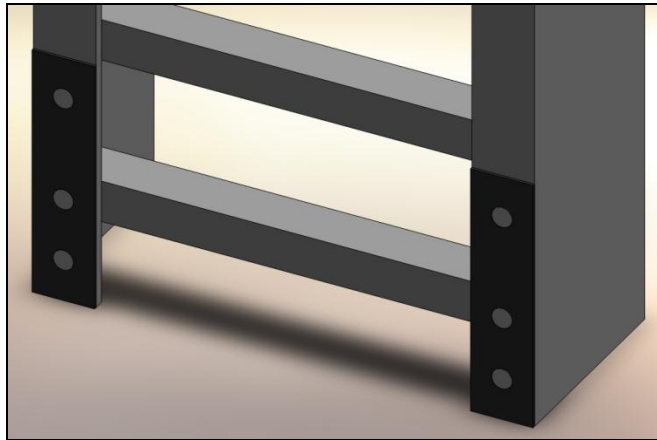
**Submission number:** 15

**Title of the Innovation:** Husting Plow Slide

**Innovator(s):** John Sieck, Stan Garrett, Charlie Kesterson

### Device Description

The Husting plow slides are designed to prevent binding between parts in a Husting hitch that commonly occurs during lowering of the plow. A low cost and simple installation, the slides have proven to be effective on multiple truck models.



#### 1. Usefulness

- The addition of this slide plate to the Husting plow has solved the problem of the plow getting stuck in the up position. This eliminates the need for the plow driver to pull to the side of the road, get out of the truck, and apply grease to the slide which only worked sometimes.

#### 2. Ease of use

- This slide is integrated into the hitch so that it does not require any extra steps to make it work.

### Manufacturability

This device is constructed of one machined part. The part is simple and does not have any features that are difficult to manufacture.

### Potential for Widespread Application

#### 1. Time to train operator

- This device does not require training since it is integrated into the hitch.

2. Reduction in time to complete task
  - This reduces the time to get the plow to lower when it is stuck in the up position. This can be about fifteen hours per season.
3. Improvement in quality
  - The quality of plowing is not affected by this device.
4. Expected annual usage
  - This device is installed on the hitch all year round but the plows are used during the snowy months, which are approximately five or six months a year.
5. Units required
  - A pair of slide plates is required for each Husting hitch.
6. Use in other states
  - All states with Husting hitch snow plows would benefit from this device.

## **Safety**

1. Improvement in safety
  - This device eliminates the need for the plow driver to get out of their truck when the plow gets stuck.
  - It also eliminates injuries that may occur while trying to get the plow unstuck.
2. Safety concerns due to use or misuse of the device
  - There are no identifiable concerns due to use or misuse of the device.
3. Safety concerns due to failure of the device
  - When the hard plastic slide wears, the heads of the elevator bucket bolts will be exposed and will rub on the hitch.

## **Availability of Similar Equipment for Purchase**

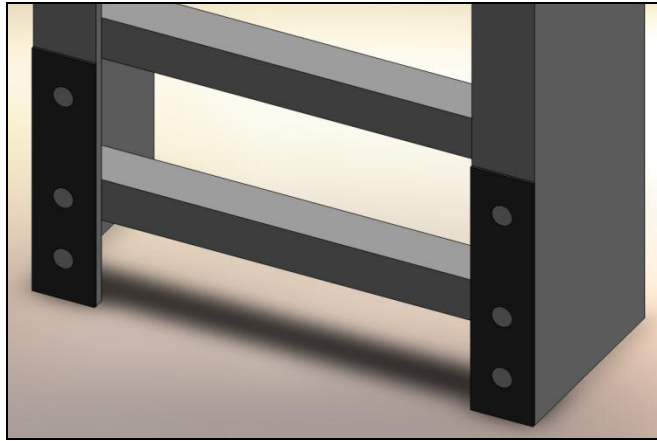
The prior art search did not find a similar product available for purchase.

## **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious depending on the Patent Examiner's evaluation.
  - According to the innovator, this innovation was publicly disclosed in its current form in November, 2004.
2. Patent infringement
  - It is common practice to use a low friction material to reduce binding of two objects moving in linear motion relative to each other. The prior art search found devices that use this technique so the non-obviousness of this device is in question.

## Husting Plow Slides User Manual

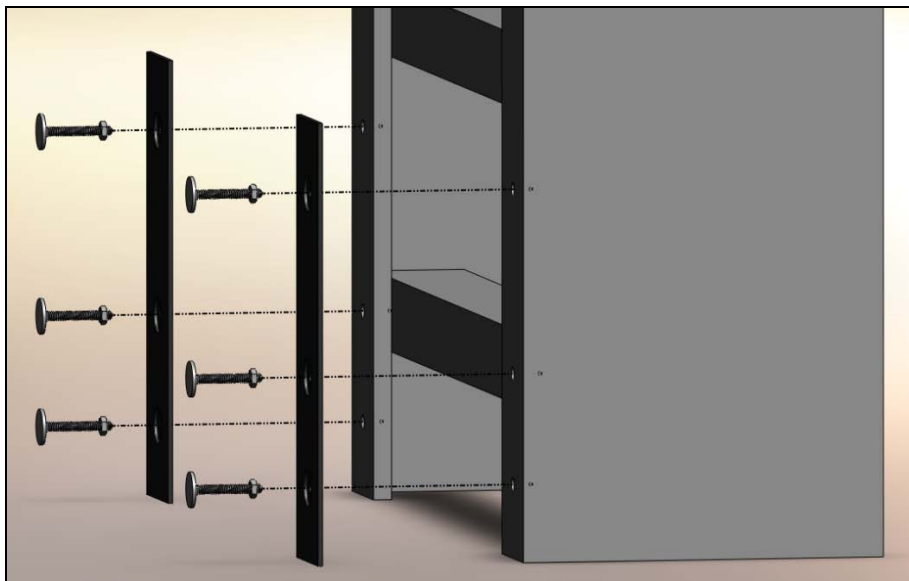


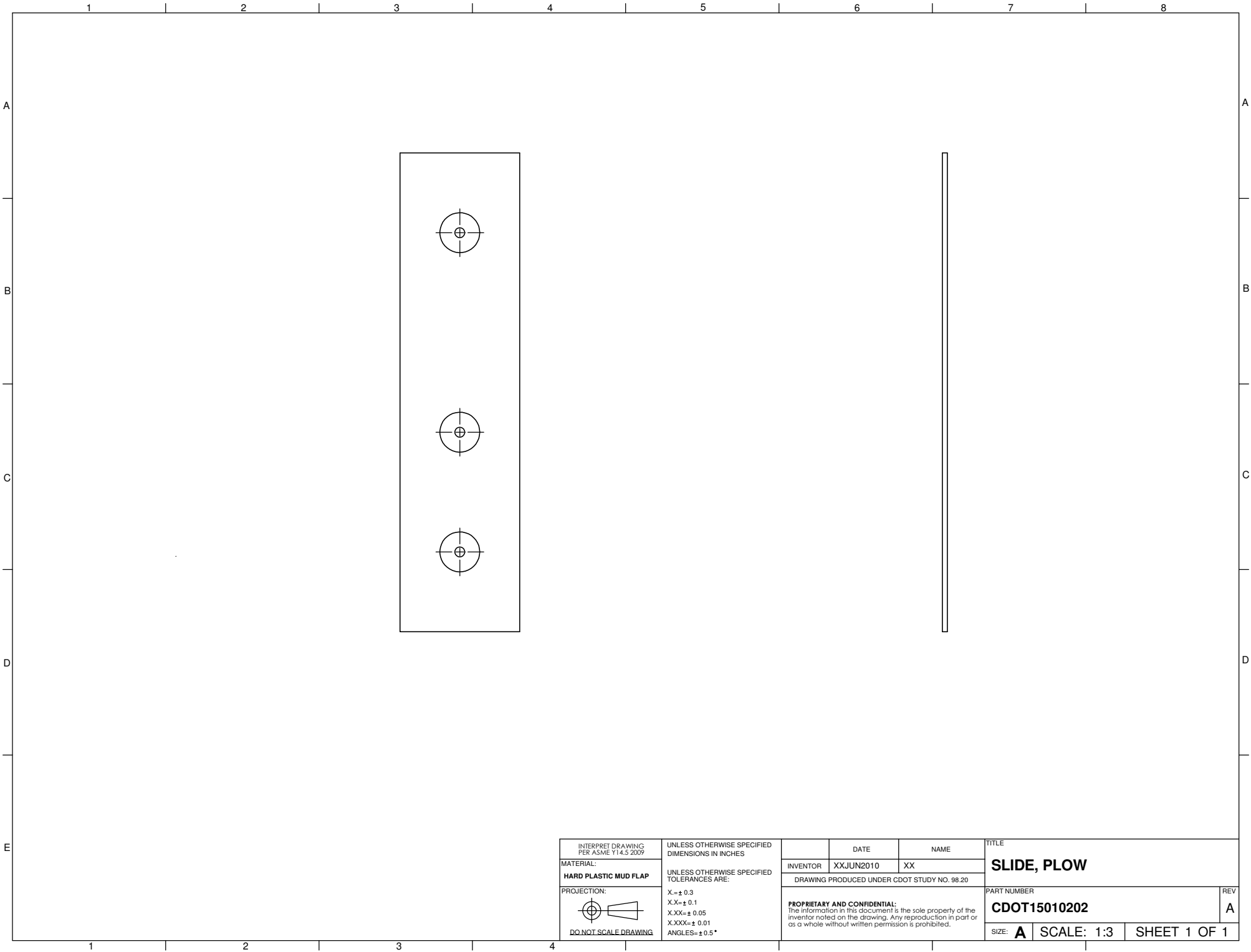
### Device Description

The Husting plow slides are designed to prevent binding between parts in a Husting hitch that commonly occurs during lowering of the plow. A low cost and simple installation, the slides have proven to be effective on multiple truck models.

### Installation Instructions

1. Drill the Husting hitch on the truck to the specifications given in the slide drawings.
2. Line up one of the slides with the holes on the hitch, ensuring that the counterbore on the slide faces away from the truck hitch.
3. Bolt the slide to the hitch using 2 inch long square-necked 0.25 inch diameter elevator bolts.
4. Repeat steps 2 and 3 for the other side of the hitch.







## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Husting Plow Slide

**Innovator(s):** John Sieck, Stan Garrett, Charlie Kesterson

**Summary:** It is common practice to use a low friction material to reduce binding of two objects moving in linear motion relative to each other. The prior art search found devices that use this technique so the non-obviousness of this device is in question.

### Prior Art Search

#### 1. Patent Search

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: insert & bearing, wear & resistant

Field of search: title

Patent Number	Year	Title of Invention
5,356,100	1994	Sliding Fit Operating Table Stabilizing Post and Rack
4,738,081	1988	Automatic packaging machines with wear resistant parts
4,114,945	1978	Guide Shoes
3,885,837	1975	Linear bearing having replaceable insert

3,582,157

1971 Bearing Assembly Having An Interference-Fit Bearing Surface Of Synthetic Resin Material

## 2. Existing Product Search

Similar products were not found using [www.google.com](http://www.google.com)

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references an Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

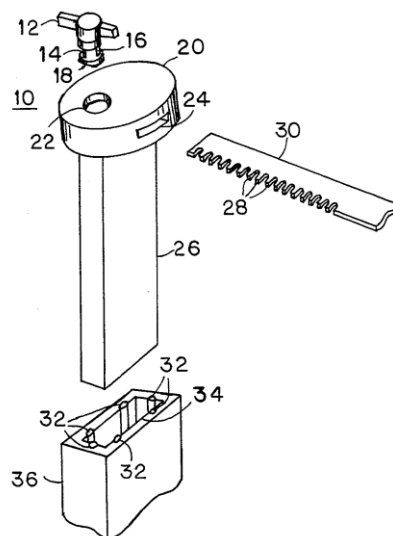
### 1. Evaluation of Novelty

An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

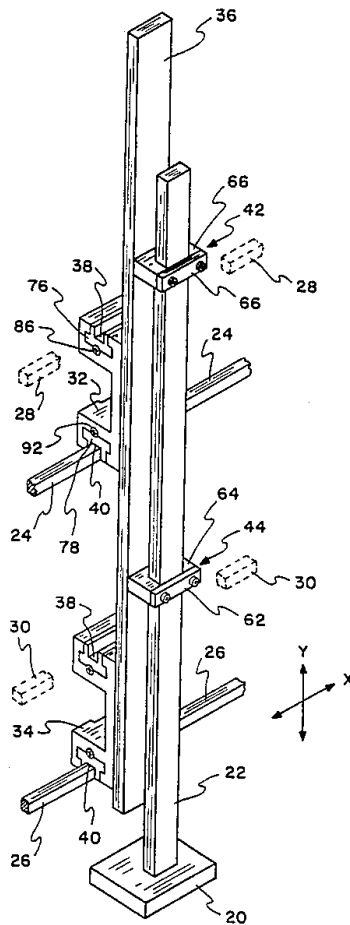
### 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

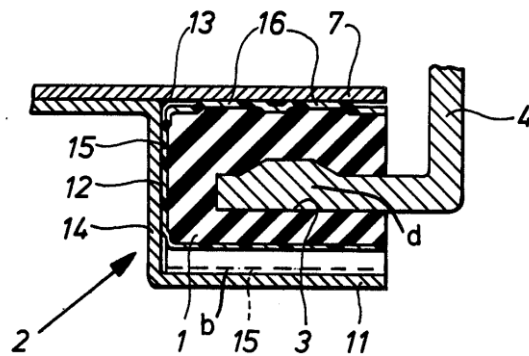
- a. 5,356,100 - Sliding Fit Operating Table Stabilizing Post and Rack  
A low friction material was added to a sliding interface to reduce binding during linear motion.



- b. 4,738,081 - Automatic packaging machines with wear resistant parts  
A low friction material was added to a sliding interface to reduce binding during linear motion.



- c. 4,114,945 - Guide Shoes  
A low friction material was added to a sliding interface to reduce binding during linear motion.



### **3. Usefulness**

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

This device was added to the Husting plow slide in order to prevent it from getting stuck in the up position.

### **4. Public disclosure**

According to the innovator, this device was first used in November 2004.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

**Submission number:** 17

**Title of the Innovation:** Post Puller

**Innovator(s):** Stan Garrett

### Device Description

The post puller is a simple device that attaches with a chain to any loader bucket. The puller easily bites into non-flat posts up to a few inches in cross-section, allowing them to be pulled from the ground.



#### 1. Usefulness

- This device is a simple method of grabbing a post. As the chain is lifted the puller grabs onto any shape of post. This is an improvement over wrapping a chain around the post because you can't get pinched.

#### 2. Ease of use

- The puller is positioned so that the post is within the slot opening. Then the chain is lifted.

### Manufacturability

This device is constructed of two machined and/or welded parts. The parts are simple and do not have any features that are difficult to manufacture.

### **Potential for Widespread Application**

1. Time to train operator
  - It takes less than five minutes to train an operator to use this device.
2. Reduction in time to complete task
  - This device can result in a 60-70% reduction in the time it takes to attach the puller to the post.
3. Improvement in quality
  - The quality of the post pulling task is not affected by this device.
4. Expected annual usage
  - This device is used during the non-snowy months of the year.
  - It would be in continuous use during post pulling operations.
5. Units required
  - One device for each patrol is required.
6. Use in other states
  - All states that do post pulling operations would benefit from this device.

### **Safety**

1. Improvement in safety
  - It is less likely that fingers will be pinched or caught when this device is used to grab to the post.
2. Safety concerns due to use or misuse of the device
  - If an operator places their fingers between the chain and puller they could be injured.
  - If the device breaks free of the post there is the possibility that it could swing around and hit the operator
3. Safety concerns due to failure of the device
  - The device could bend or break if a post was difficult to remove due to frozen ground. If it bent the device, it would need to be replaced. If the device broke, then the remaining piece on the chain could swing around and the broken piece could become potential shrapnel.

### **Availability of Similar Equipment for Purchase**

The prior art search found an almost identical device available for purchase.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered useful but may not be considered novel or non-obvious depending on the Patent Examiner's evaluation.
  - Public disclosure may be considered to have occurred in 2005.

## 2. Patent infringement

- An almost identical device is commercially available. In addition patents were found for devices that use the same principle for grabbing the post. This device may infringe on these patents.

## **Post Puller User Manual**



### Device Description

The post puller is a simple device that attaches with a chain to any loader bucket. The puller easily bites into non-flat posts up to a few inches in cross-section, allowing them to be pulled from the ground.

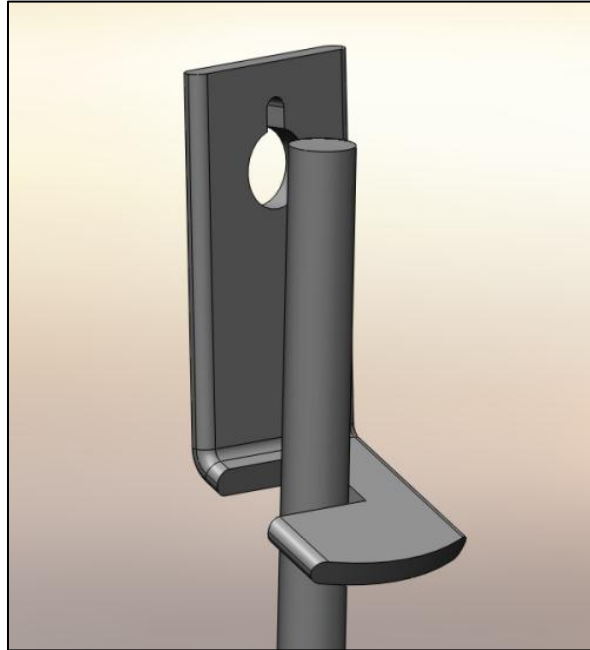
### Installation Instructions

1. Ensure that the chain welded to the post puller is untangled.
2. Connect the chain to a loader bucket, allowing approximately 12 inches of chain between the loader bucket and the post puller.

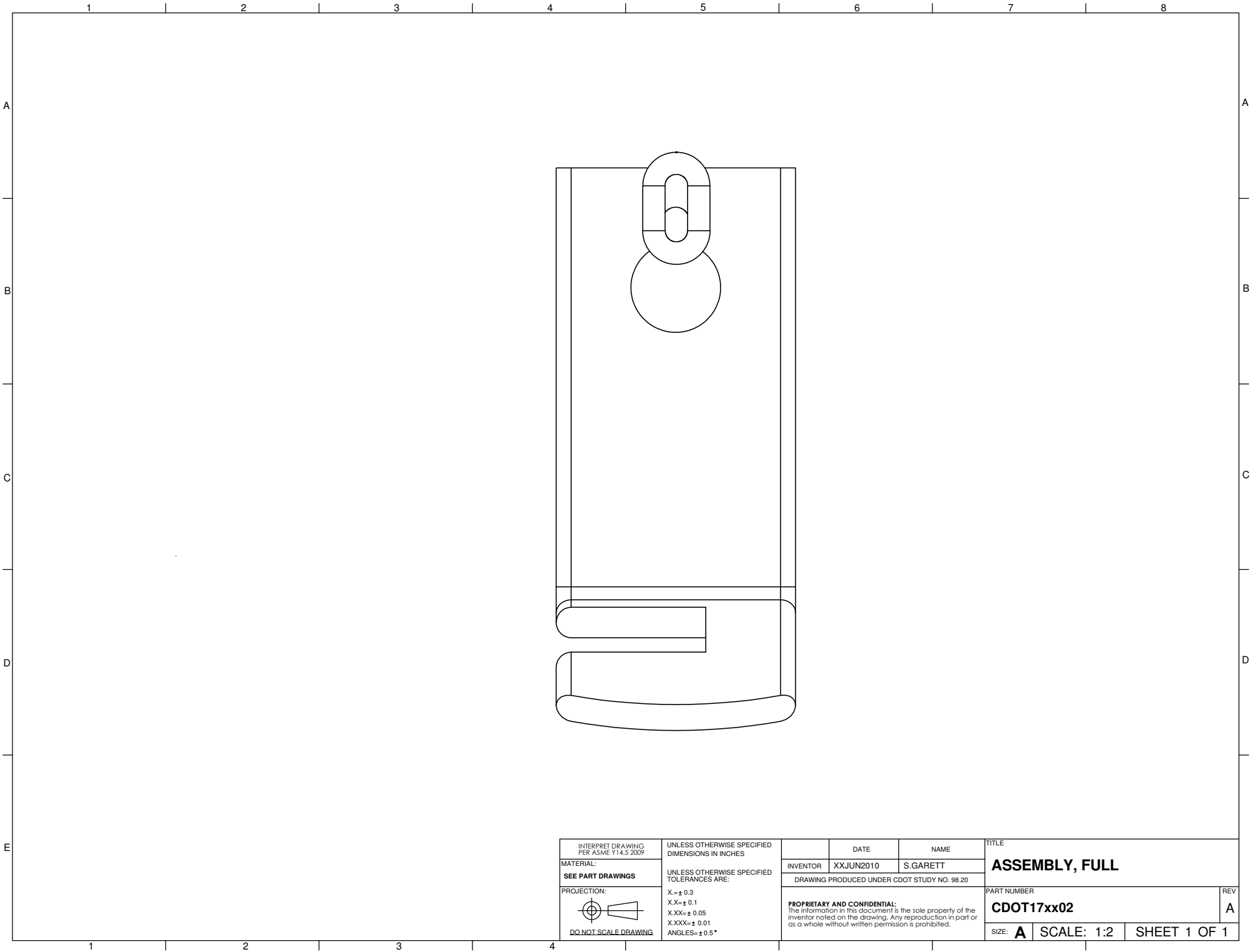


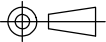
### Operating Instructions

1. Move the loader bucket as close to the post to be pulled as possible.
2. Lower the bucket to the ground, or as low as the post will allow.
3. Place the post into the puller, and push the puller down the post as far as the chain will allow. Reducing the slack in the chain will increase the effectiveness of the puller and increase the immediate bite into the post.

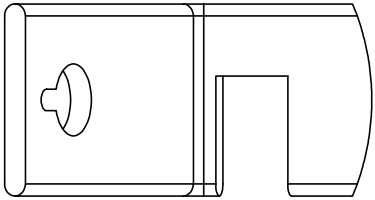


4. Lift the loader bucket slowly, allowing the puller to bite into the post.
5. Continue to lift until the post is removed from the ground.
6. Lower the bucket back to the starting position, then remove the post from the puller.

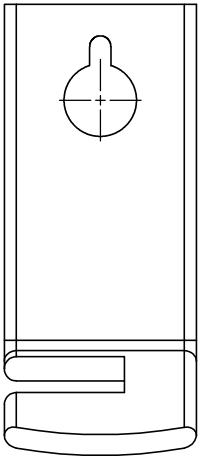
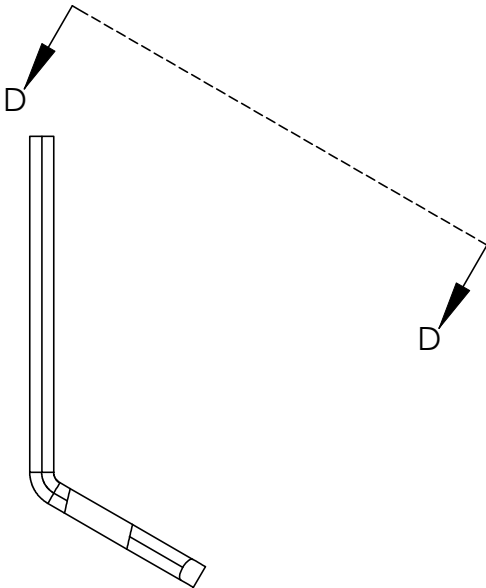


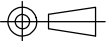
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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT17xx02	A
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

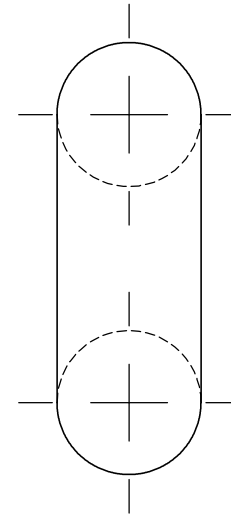
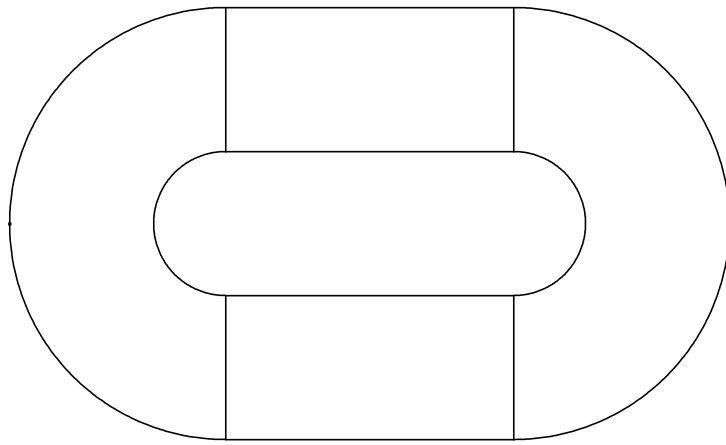


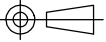
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



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## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Post Puller

**Innovator(s):** Stan Garrett

**Summary:** An almost identical device is commercially available. In addition patents were found for devices that use the same principle for grabbing the post. This device may infringe on these patents.

### ***Prior Art Search***

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: post & puller, post & remover, delineation & puller

Field of search: Title

#### **Patent Number Title of Invention**

- 3,779,516 Post puller
- 3,815,875 Portable Stake Remover
- 3,991,976 Implement for driving and removing fence posts
- 4,026,522 Post Pulling Apparatus
- 4,161,310 Metal Fence Post Puller

- 4,226,402 Post Puller
- 4,250,769 Pivoted adjustable lever with grab link
- 4,256,286 Post Pulling Device
- 4,422,621 Fence Post Puller
- 4,706,935 Post Puller
- 4,721,335 Puller for fence posts or the like
- 4,726,565 Post Puller
- 4,738,433 Post Puller
- 4,750,711 Post Puller
- 4,792,120 Post removing device
- 4,804,165 Stake pulling apparatus
- 4,846,445 Hydraulic fence post puller
- 5,009,394 Metal fence post extractor
- 5,011,117 Post Puller
- 5,022,632 Post pulling apparatus with interchangeable working heads for pulling different types of posts
- 5,042,591 "T" post puller-pounder
- 5,052,659 Stake puller
- 5,100,104 Implement for removing a fence post or the like
- 5,161,781 Tool assembly for use in pulling fence posts
- 5,186,437 Post puller including concrete base pulling means
- 5,211,374 Post Puller
- 5,219,438 Post Puller
- 5,244,687 Fence Post Extractor
- 5,242,152 Post Puller
- 5,261,642 Steel Post Puller
- 5,368,277 Device for removing metal fence posts
- 5,464,192 High Speed Manual Post Puller
- 5,499,795 Post Remover
- 5,597,151 Stake puller with stake supporting back plate
- 5,604,946 Multi-purpose fence building tool
- 5,681,030 Device for pulling fence posts
- 5,713,559 Method and apparatus for installing and removing posts and for lifting heavy objects
- 5,794,918 Fence Post Puller Apparatus
- 5,833,215 Combination metal and wood post removing device
- 5,855,358 Framework Removal Tool
- 5,934,649 Hand operated post and pole extraction device
- 6,056,271 Post Puller
- 6,131,884 Tool for extraction of stakes
- 6,302,376 Self-translating Stake Puller
- 6,302,377 Post pulling apparatus
- 6,352,242 Post Removal Device
- 6,367,779 Post pulling mechanism

- 6,382,594 Post puller
- 6,398,188 Post puller
- 6,527,250 Device for pulling a planted post from the ground
- 6,641,347 Pole extractor
- 6,669,172 Post puller
- 6,857,619 Post puller system
- 7,059,587 Post puller
- 7,125,000 Post puller
- 7,185,880 T-post puller claw
- 7,290,754 T-post puller
- 7,431,266 Post puller
- 7,699,288 Delineator extraction system

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.seton.com/post-puller-89639.html>
- b. [http://www.tapconet.com/store/product/3d2ef2e3-841d-436b-b91d-c80f52db8345/Carsonite\\_Post\\_Puller.aspx](http://www.tapconet.com/store/product/3d2ef2e3-841d-436b-b91d-c80f52db8345/Carsonite_Post_Puller.aspx)
- c. <http://www.hi-lift.com/post-popper/index.html>
- d. <http://www.hardwareandtools.com/Post-PullR-Post-Pull-r-PP100-by-Maasdam-Dead-On-Pull-R-9584459.html>
- e. <http://www.hooverfence.com/tools/post-popper.htm>
- f. <http://www.bigredpostpuller.com/>
- g. <http://www.amazon.com/Northern-Tool-Equipment-Tuggy-Puller/dp/B0000AX74X>
- h. [http://www.amazon.com/gp/product/B000DCN8SQ/ref=pd\\_lpo\\_k2\\_dp\\_sr\\_1?pf\\_rd\\_p=486539851&pf\\_rd\\_s=lpo-top-stripe-1&pf\\_rd\\_t=201&pf\\_rd\\_i=B0000AX74X&pf\\_rd\\_m=ATVPDKIKX0DER&pf\\_rd\\_r=1HTCSS6XQCSEZE2RQBBQ](http://www.amazon.com/gp/product/B000DCN8SQ/ref=pd_lpo_k2_dp_sr_1?pf_rd_p=486539851&pf_rd_s=lpo-top-stripe-1&pf_rd_t=201&pf_rd_i=B0000AX74X&pf_rd_m=ATVPDKIKX0DER&pf_rd_r=1HTCSS6XQCSEZE2RQBBQ)
- i. <http://www.dutton-lainson.com/proddetail.php?prod=20160&qclid=COBUypvmxaMCFRN6gwodRD9SYw>

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references an Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

An examination of the information presented above does reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

- a. <http://www.dutton-lainson.com/proddetail.php?prod=20160&gclid=COBUypvmxaMCFRN6gwodRD9SYw>

This device is identical in structure

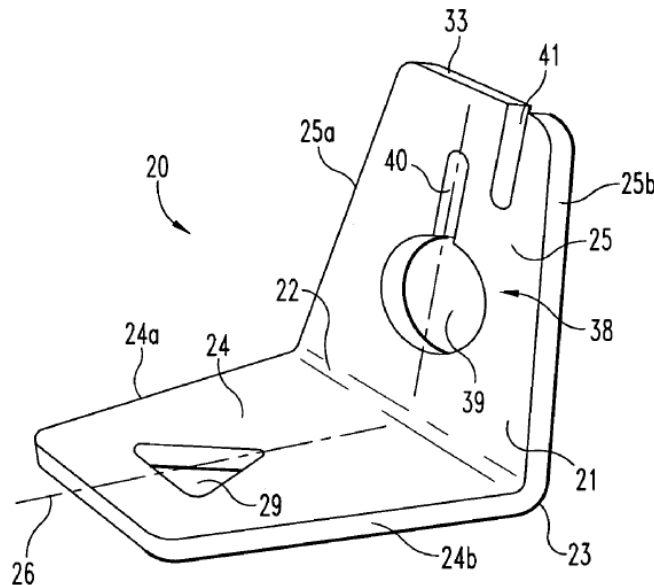


## 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

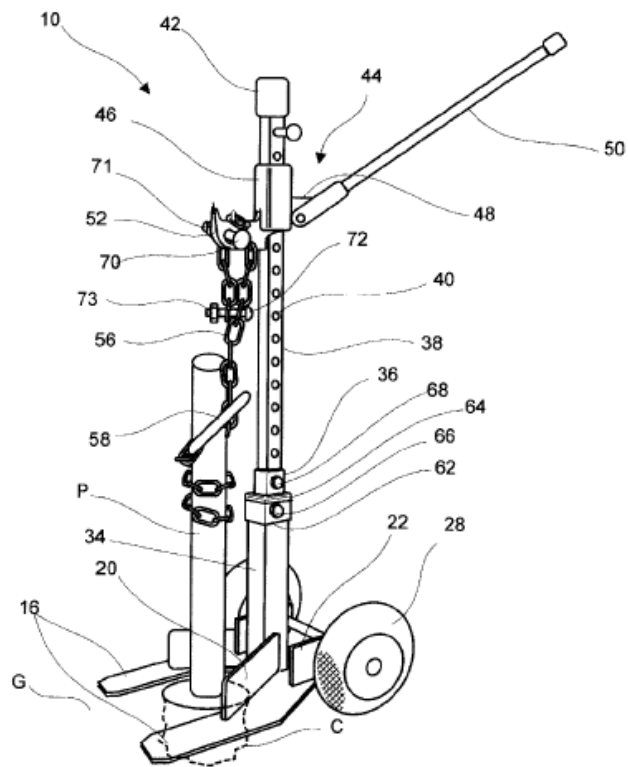
- a. 7,185,880 – T-post puller claw

A chain is attached to one end of the angled claw. A hole for the post is in the other end. As the chain is lifted the claw pivots and grabs the post.

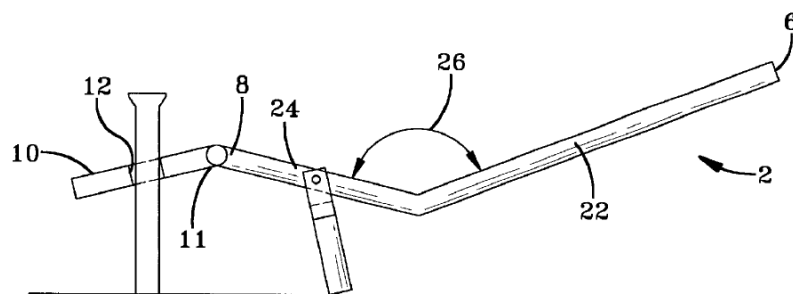




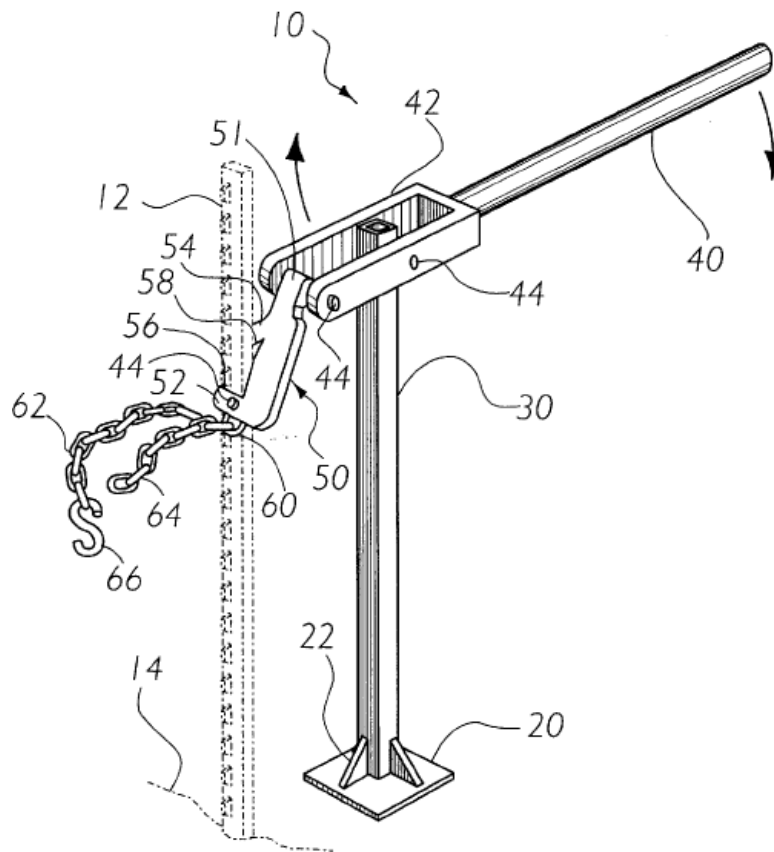
- b. 6,527,250 – Device for pulling a planted post from the ground  
The clamping portion of this device pivots when pulled up by its connection chain thereby grabbing the post.



- c. 6,302,377 – Post pulling apparatus  
This device has a stake engaging mechanism that when tilted grabs the stake.



- d. 5,833,215 - Combination metal and wood post removing device  
This device has a stake engaging mechanism that when tilted grabs the stake.



### 3. Usefulness

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

The innovator stated that he built this device because a faster device was needed to pull up miles of fence that was below state standards without having to pull off all the wire and re-hook the wire.

### 4. Public Disclosure

The innovator stated that this device was first fabricated and used in 2005. This is the original version of the innovation and no modifications have been made. The invention or information regarding the invention has been shared with 20 people.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

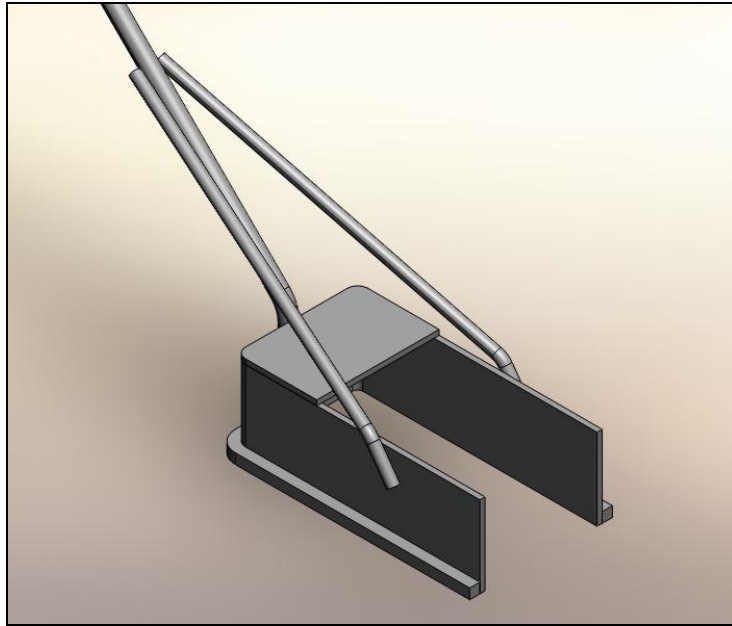
**Submission number:** 18

**Title of the Innovation:** Metal Squeegee

**Innovator(s):** Stan Garrett

### Device Description

The metal squeegee is designed to aid in sealing cracks in the road when applying hot tar.



#### 1. Usefulness

- This device takes hot tar and makes a two inch wide layer on the surface of the road. It is faster and more efficient than a tar buggy.

#### 2. Ease of use

- This device is a better height for most people since the tar buggies tend to be too short. It is faster than the tar buggy since you don't have to stop to reheat or refill a tank for tar.

### Manufacturability

This device is constructed of five machined and/or welded parts. The parts are simple and do not have any features that are difficult to manufacture.

### Potential for Widespread Application

#### 1. Time to train operator

- It takes less than five minutes to train an operator to use this device.

2. Reduction in time to complete task
  - There is a 50% reduction in the time it takes to spread tar on the road.
3. Improvement in quality
  - This device does not have an effect on the quality of the crack tarring job.
4. Expected annual usage
  - It is expected that this device would be used four or five months during the year.
  - It may be used all day long when in use.
5. Units required
  - One device is required for every patrol.
6. Use in other states
  - All states that tar cracks in the roads would benefit from this device.

### **Safety**

1. Improvement in safety
  - This device causes less strain on the back since it is a more ergonomic height for most people.
2. Safety concerns due to use or misuse of the device
  - There are concerns with worker contact with hot tar.
  - If the weather is cold, it could stick to the road surface and the operator could be struck when trying to push the device.
  - Failure due to using the device for an unintended purpose.
3. Safety concerns due to failure of the device
  - There are no identifiable concerns due to use or misuse of the device.

### **Availability of similar equipment for purchase**

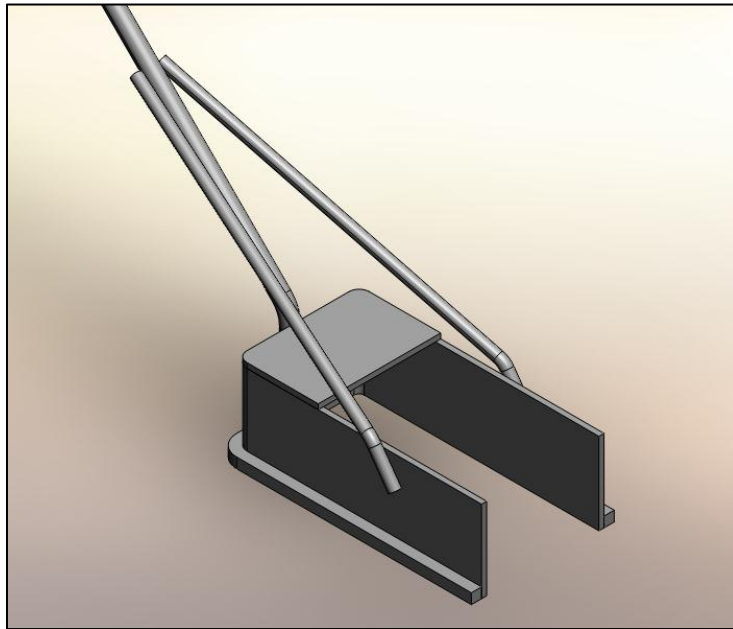
The prior art search did not find similar equipment that was available for purchase.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious depending on the Patent Examiner's evaluation.
  - According to the innovator, this innovation was publicly disclosed in its current form in 2004.
2. Patent infringement
  - Patents were found for devices with integrated spreaders. But no prior art was found for a stand-alone spreader. The non-obviousness of this device is in question.

## Metal Squeegee User Manual

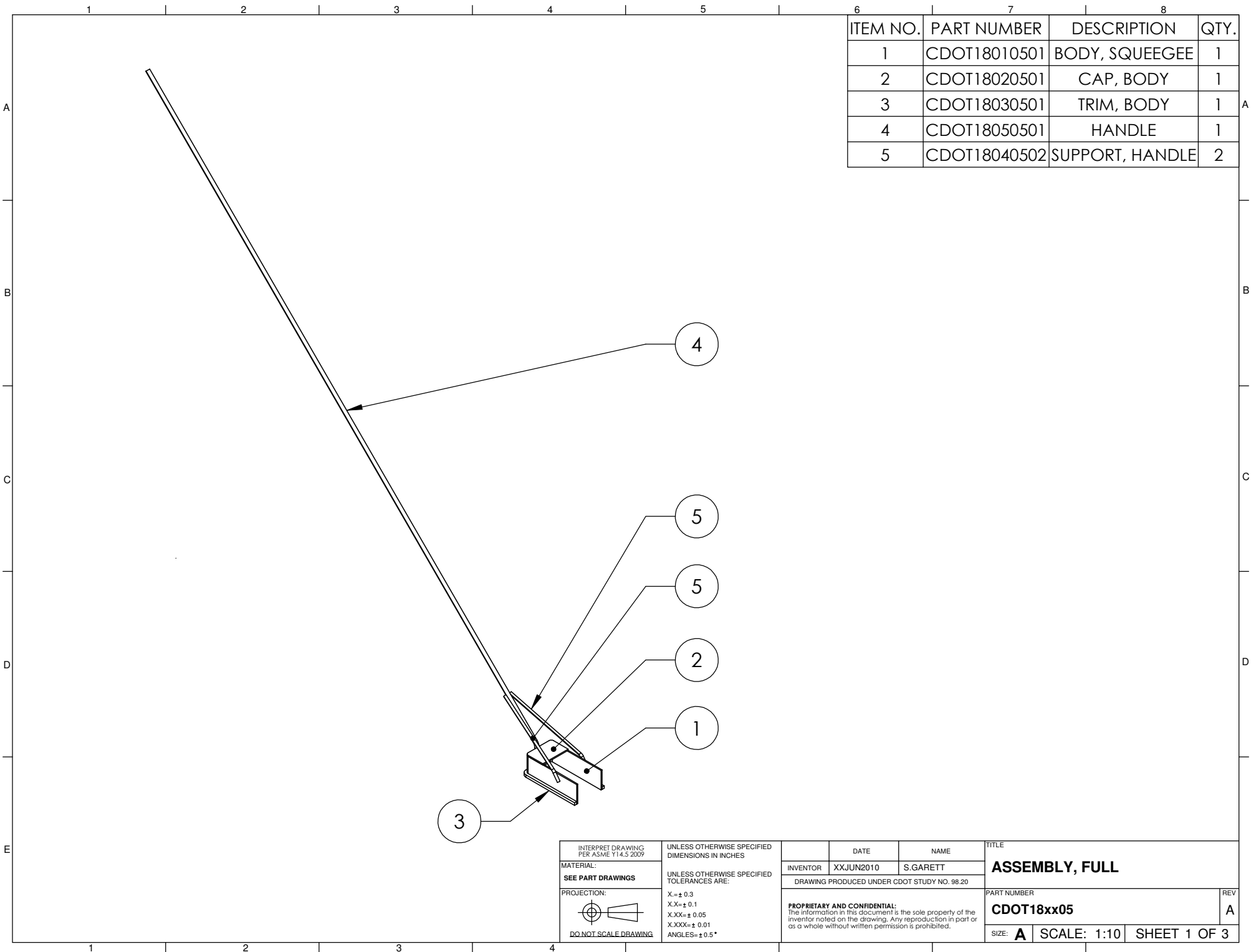


### Device Description

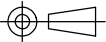
The metal squeegee is designed to aid in sealing cracks in the road when applying hot tar.

### Operating Instructions

1. Place the squeegee over the start of the crack or the start of where the crack needs to be sealed.
2. Pour the hot tar into the squeegee, limiting the quantity to ensure that the tar does not overflow the sides of the squeegee.
3. Firmly pressing the squeegee against the ground, move the squeegee forward slowly, filling the crack as you progress. Increase downward pressure to reduce the quantity of tar being laid, or decrease downward pressure to increase the quantity of tar.
4. Stop and refill the squeegee as needed.
5. When completed, remove any excess tar from the squeegee and the road.

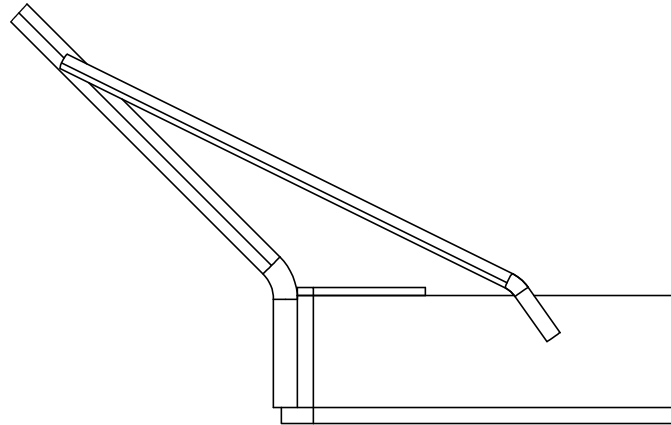


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3	CDOT18030501	TRIM, BODY	1
4	CDOT18050501	HANDLE	1
5	CDOT18040502	SUPPORT, HANDLE	2

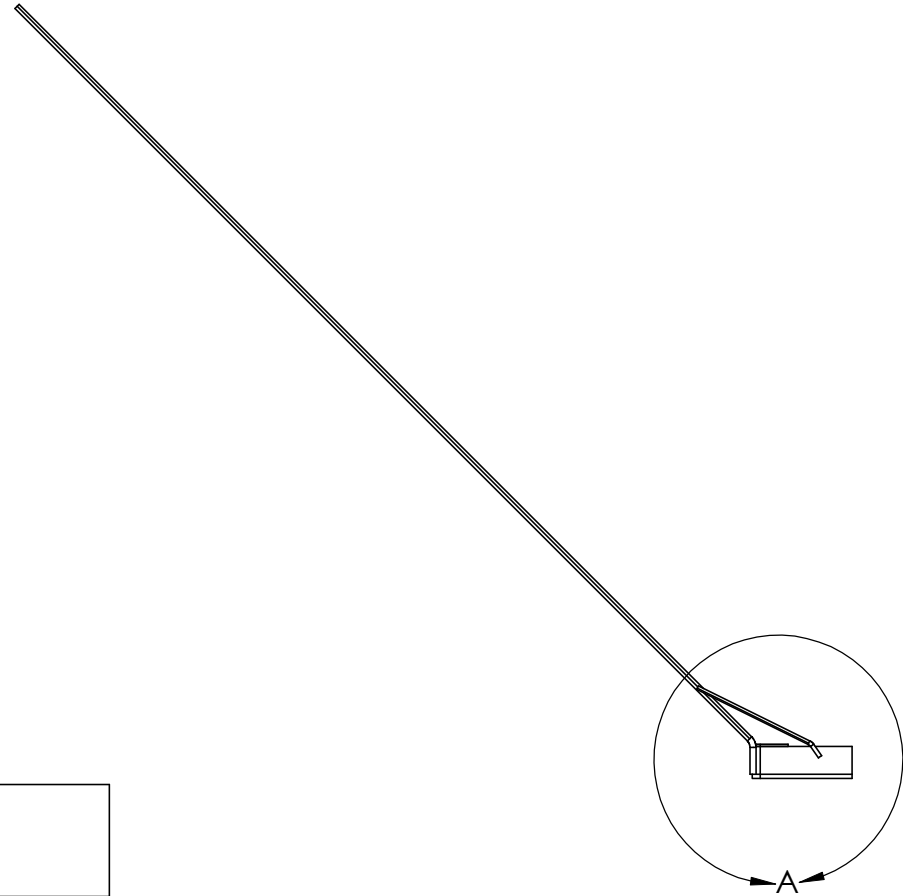
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DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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NOTES:

1. ALL JOINTS ARE FULLY WELDED, EXCLUDING BETWEEN THE BODY AND THE BODY TRIM. THIS JOINT IS WELDED FOR 1" WITH 1" SPACING BETWEEN WELDS. ALL CORNERS ARE ALSO FULLY WELDED.



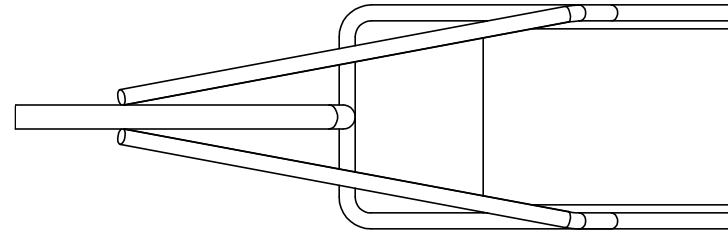
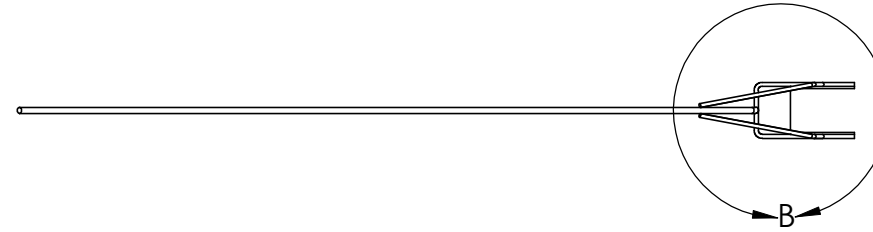
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NOTES:

1. ALL JOINTS ARE FULLY WELDED, EXCLUDING BETWEEN THE BODY AND THE BODY TRIM. THIS JOINT IS WELDED FOR 1" WITH 1" SPACING BETWEEN WELDS. ALL CORNERS ARE ALSO FULLY WELDED.

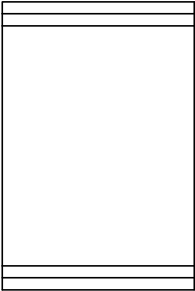
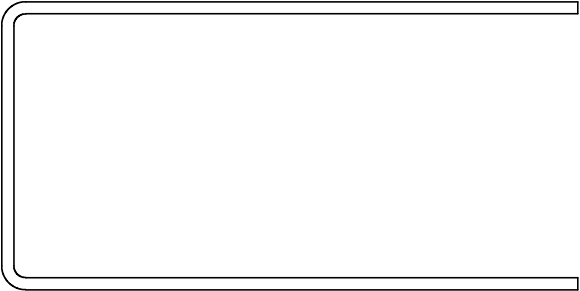


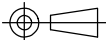
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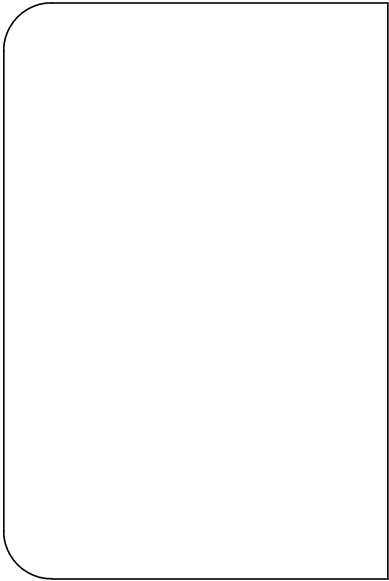


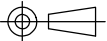
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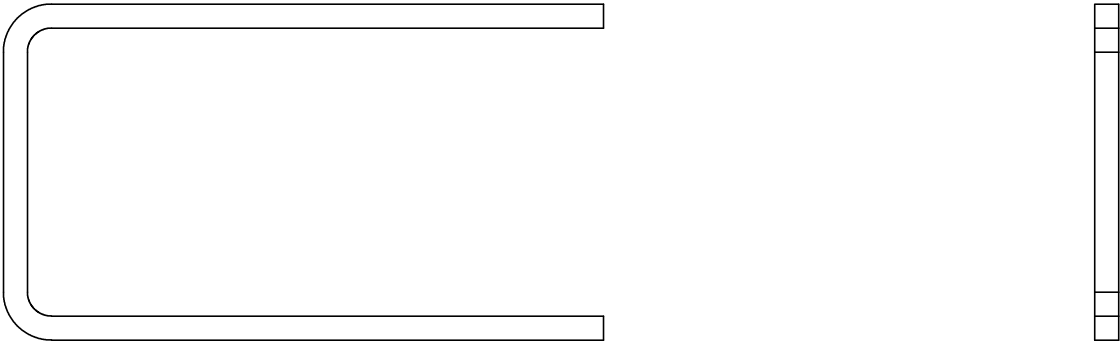
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PROJECTION: 		X.= ± 0.3 X.X.= ± 0.1 X.XX.= ± 0.05 X.XXX.= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
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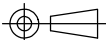
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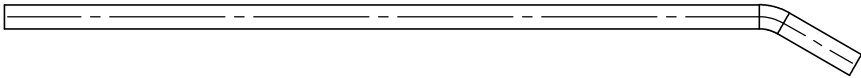
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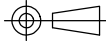
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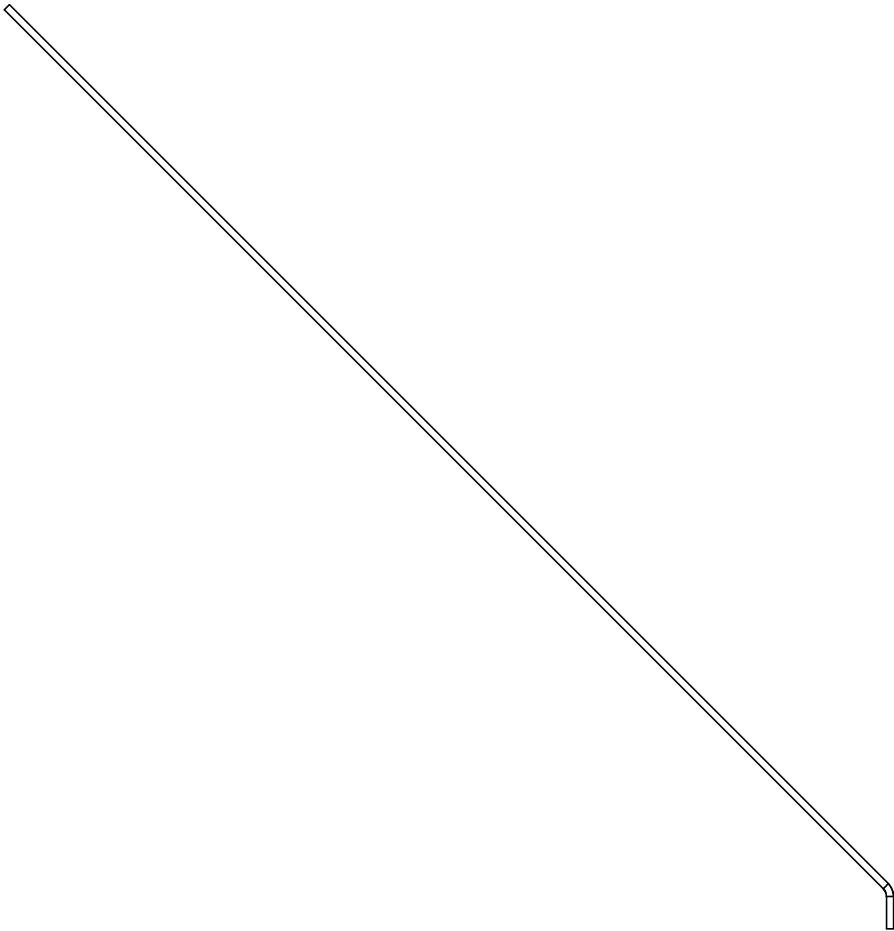
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1. REMOVE ALL BURRS AND SHARP EDGES



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	S.GARETT		HANDLE	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20			PART NUMBER		REV
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.			CDOT18050501		A
				SIZE: A		SCALE: 1:10		SHEET 1 OF 1	

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Metal Squeegee

**Innovator(s):** Stan Garrett

**Summary:** Patents were found for devices with integrated spreaders. But no prior art was found for a stand-alone spreader. The non-obviousness of this device is in question.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: seal & cup, seal & crack, spread & wand, spread & tar, wand & tar, squeegee & tar, squeegee & metal, screed & tar, bander & tar, bander & crack, screed & crack

Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |   |
|-------------|------|---|
| • 4,397,581 | 1983 | Groover, Trowel and Bull Float Combination              |
| • 4,492,490 | 1985 | Road Repair Spreader                                    |
| • 4,603,999 | 1986 | Apparatus for Mixing and Spreading Coatings on Surfaces |
| • 4,702,642 | 1987 | Extensible Screed Assembly for a Bituminous Paver       |
| • 4,865,487 | 1989 | Screed for Asphalt Paver                                |

- 4,900,185 1990 Asphalt Spreader
- 5,232,306 1993 Crackfilling Vehicle

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- <http://store.asphaltkingdom.com/AK4-Asphalt-Crack-Sealing-Machine-p/ak4.htm>
- <http://store.asphaltkingdom.com/Asphalt-Crack-Bander-The-AK5-p/ak5cb.htm>

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references an Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

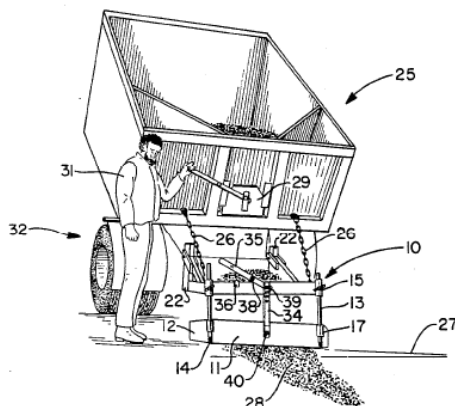
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

### 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

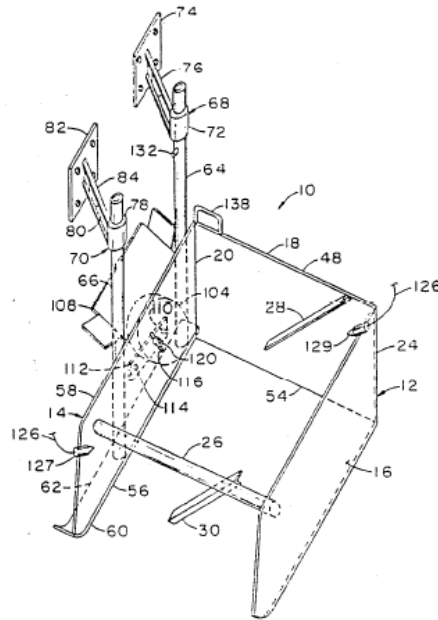
- 4,492,490 Road Repair Spreader

This device has a spreader that fills the hole with repair material and smoothes the material



b. 4,900,185 Asphalt Spreader

This device uses a three sided spreader box that is filled with material as needed



c. <http://store.asphaltkingdom.com/AK4-Asphalt-Crack-Sealing-Machine-p/ak4.htm>

This device has a screed that spreads the crack filling material





- d. <http://store.asphaltkingdom.com/Asphalt-Crack-Bander-The-AK5-p/ak5cb.htm>

This device has a screed that spreads the crack filling material



### 3. Usefulness

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

This device takes hot tar put on the road and spreads it to make a two inch thin layer on the surface of the road. It makes the job of pouring cracks faster and safer.

### 4. Public Disclosure

This device was first invented in 2004 or 2005 and was built and used at that time. Other CDOT employees have used this device. Information regarding this device has been shared with everyone who has asked about it. The device in use is the original design.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

**Submission number:** 19

**Title of the Innovation:** Folding Road Closure Gate

**Innovator(s):** Vince Estreich

### Device Description

The folding road closure gate is a design which modifies an existing road closure gate so that it is easier to move into and out of position. It also allows a gate that is designed to block two lanes to be modified so that it blocks only one lane.



#### 1. Usefulness

- This gate makes it easy to lift and lower the gate, particularly in high wind.
- The gate can be folded in half so that authorized vehicles can be allowed to pass without opening all of the lanes.

#### 2. Ease of use

- The folding feature of the gate makes it easier to raise and lower.

### Manufacturability

This device is constructed of twelve machined and/or welded parts. The parts are simple and do not have any features that are difficult to manufacture.

### Potential for Widespread Application

#### 1. Time to train operator

- It would take one hour to train an operator to use this gate.

#### 2. Reduction in time to complete task

- This gate saves time during raising and lowering.

3. Improvement in quality
  - The gate does not affect the quality of road closure.
4. Expected annual usage
  - The gate is installed for year round use for any type of road closure.
5. Units required
  - One gate modification package for every road closure gate.
6. Use in other states
  - All states with road closure gates would benefit from this device.

### **Safety**

1. Improvement in safety
  - The gate has reduced length when raising and lowering.
  - The winch makes it easy to raise and lower without manual effort.
  - The gate does not need to be completely raised and lowered if only one lane needs to be opened to allow a vehicle to pass.
2. Safety concerns due to use or misuse of the device
  - The gate could fall into traffic or break free under wind loading if improperly secured in the raised position.
  - Fingers may be pinched in the hinge when opening or closing the gate to or from the full length.
3. Safety concerns due to failure of the device
  - The gate could snap at the hinge when open under wind loading and improperly block traffic.
  - The gate could suddenly fall if the winch cable were to fail during raising or lowering of the gate.

### **Availability of Similar Equipment for Purchase**

The prior art search did not find similar gates that are available for purchase.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered useful but may not be considered novel or non-obvious depending on the Patent Examiner's evaluation.
  - According to the innovator, this innovation was publicly disclosed in its current form in 2009.
2. Patent infringement
  - Several patents were found that had a gate that was hinged in the middle so that the gate could be folded in half. The novelty and non-obviousness of this device are in question.

## Folding Road Closure Gate User Manual

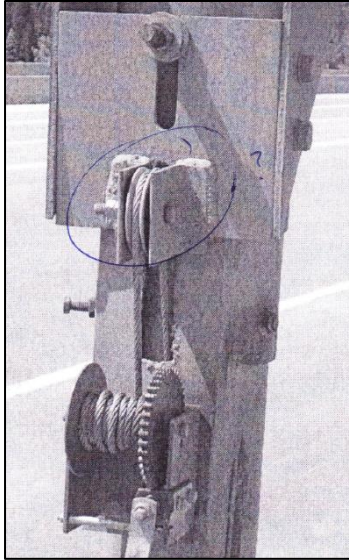


### Device Description

The folding road closure gate is a design which modifies an existing road closure gate so that it is easier to move into and out of position. It also allows a gate that is designed to block two lanes to be modified so that it blocks only one lane.

### Installation Instructions

1. Modify the existing gate to match the drawings for the folding gate.
2. Weld the pulley mounting brackets to the gate pivot mount.
3. Install the hinge components and the pulley.
4. Weld the existing winch cable to the backside of the hole cut into the pivot sleeve.
5. Wind the remaining cable over the pulley and onto the winch.

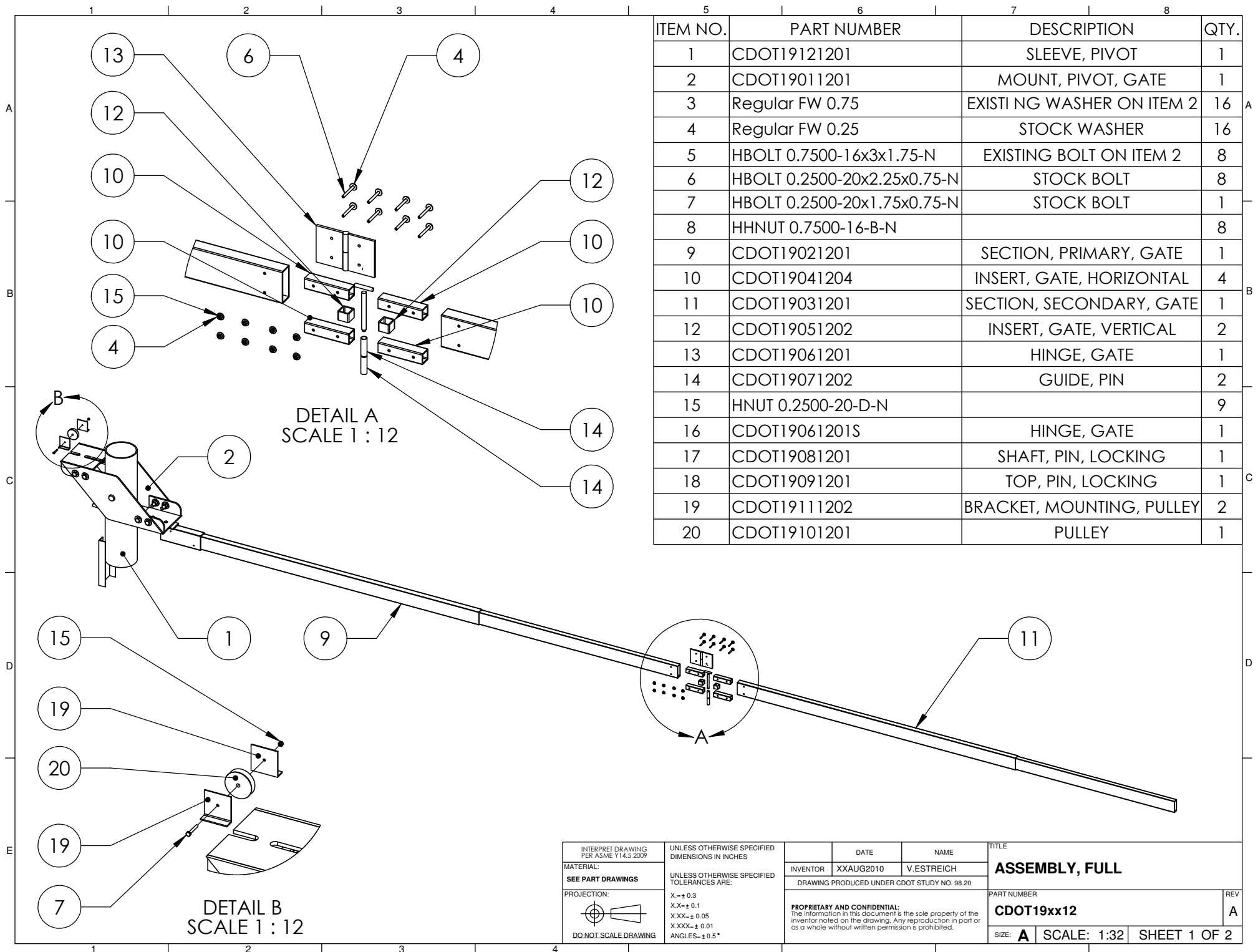


#### Operating Instructions (Lowering)

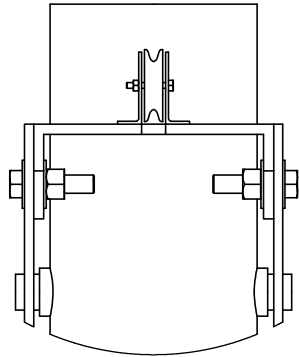
1. Release the nut on the bolt that holds the gate in the upright position.
2. Turn the hand crank, lowering the gate to the horizontal position.
3. If the full width of the road needs blocking off, open the gate fully at the hinge, and place the locking pin through the pin guides.

#### Operating Instructions (Raising)

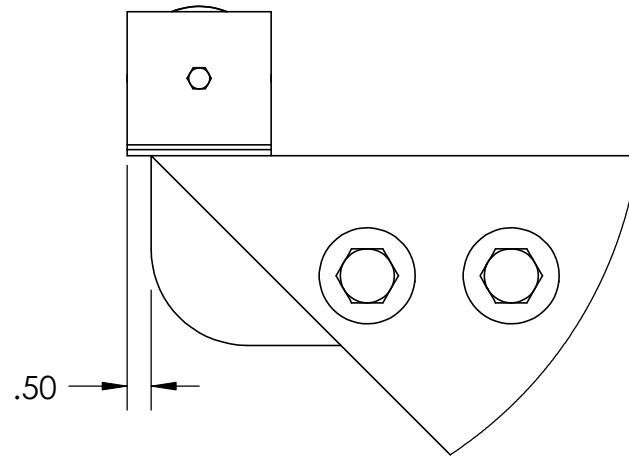
1. If the gate is fully open, remove the locking pin from the pin guides.
2. Turn the hand crank, raising the gate to the vertical position. Make sure that the gate sits in between the gate supports along the height of the post.
3. Place and tighten the nut on the bolt which locks the gate in the upright position.



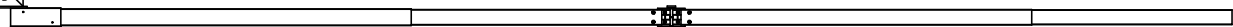
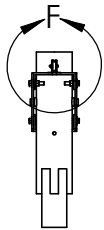
NOTES:  
1. THE PULLEY MOUNTING BRACKETS ARE WELDED TO THE GATE PIVOT MOUNT



DETAIL F  
SCALE 1 : 8



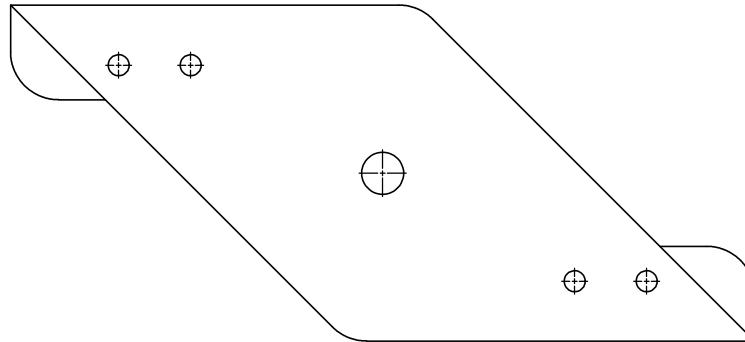
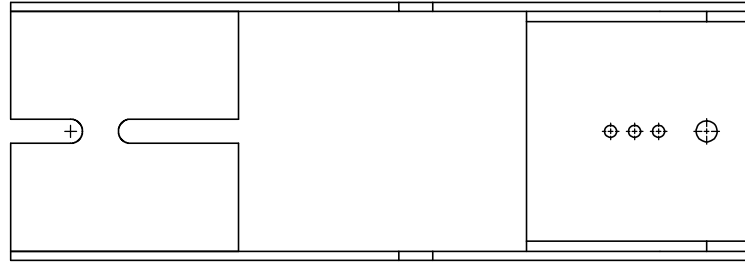
DETAIL C  
SCALE 1 : 4

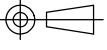


TITLE		
ASSEMBLY, FULL		
PART NUMBER		REV
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NOTES:

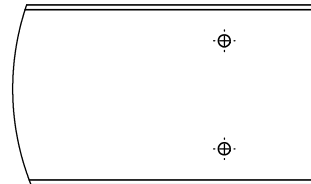
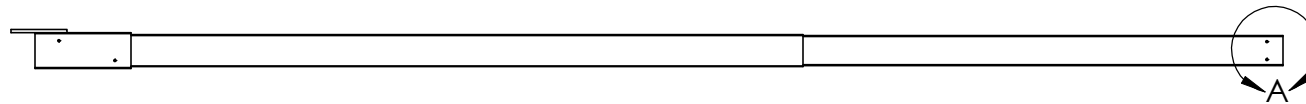
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2. PART IS MODIFIED FROM STANDARD BASED ON CDOT STANDARD PLAN NO. M-607-15



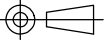
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						SHEET 1 OF 1			



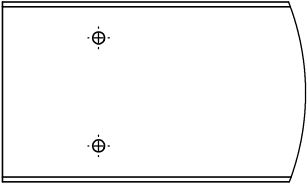
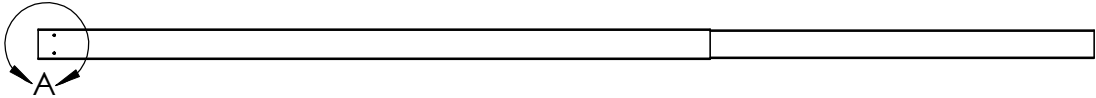
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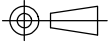
DETAIL A  
SCALE 1 : 4

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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT19021201		SIZE: A	A
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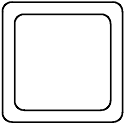
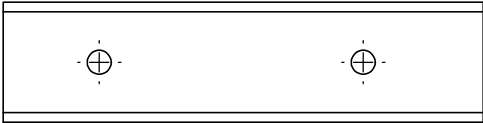
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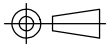


DETAIL A  
SCALE 1 : 4

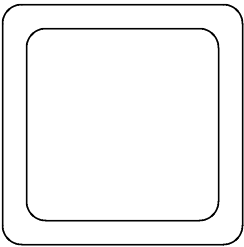
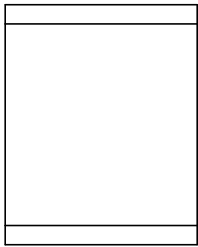
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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT19031201	A
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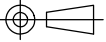
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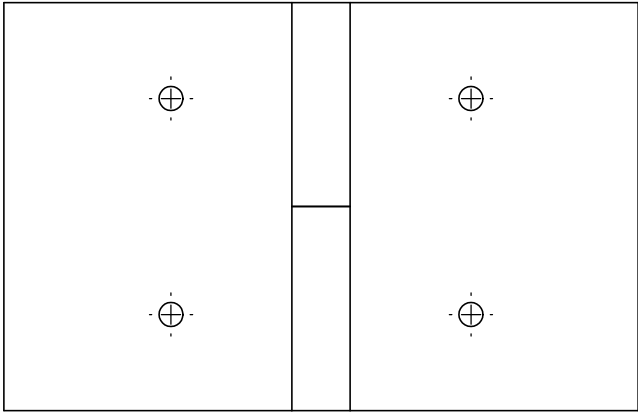
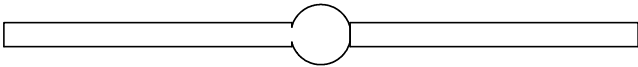
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DO NOT SCALE DRAWING		<b>PROPRIETARY AND CONFIDENTIAL:</b> The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.							


NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES



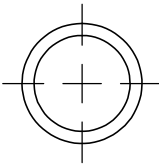
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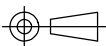
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1. REMOVE ALL BURRS AND SHARP EDGES
  2. HINGE IS STANDARD SURFACE MOUNT BUTT HINGE WITH CUSTOM DRILLED HOLES



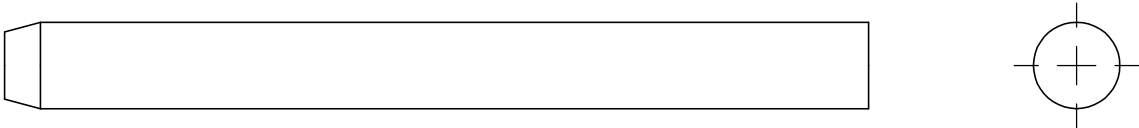
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MATERIAL:  SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJUL2010		V.ESTREICH	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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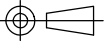
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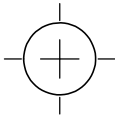
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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
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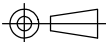
NOTES:  
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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	V.ESTREICH	SHAFT, PIN, LOCKING
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
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NOTES:  
1. REMOVE ALL BURRS AND SHARP EDGES

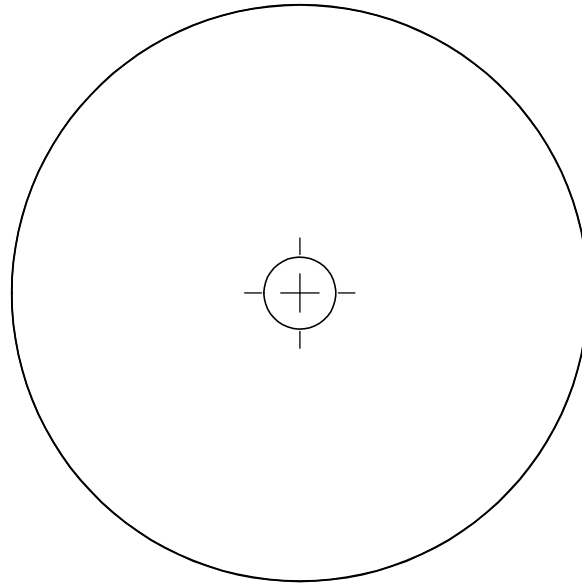


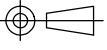
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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
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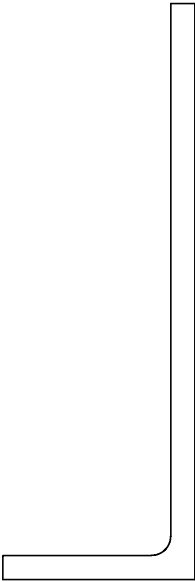
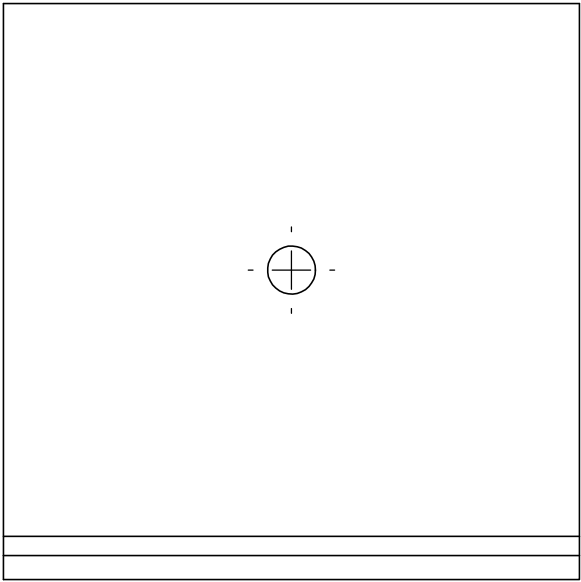
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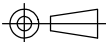
1. REMOVE ALL BURRS AND SHARP EDGES
2. PULLEY IS DESIGNED TO WORK WITH XX" DIAMETER WIRE ROPE



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		V.ESTREICH		<b>PULLEY</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		REV	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT19101201		A	
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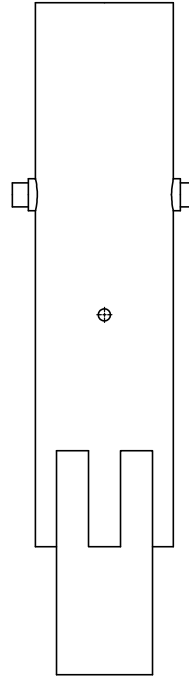
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1. REMOVE ALL BURRS AND SHARP EDGES

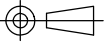


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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	V.ESTREICH	BRACKET, MOUNTING, PULLEY
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT19111202	A
				SIZE:	A	SCALE: 1:1	SHEET 1 OF 1

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. PART IS MODIFIED FROM STANDARD BASED ON CDOT STANDARD PLAN NO. M-607-15



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUL2010	V.ESTREICH		<b>SLEEVE, PIVOT</b>	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT19121201		REV A	
				SIZE: <b>A</b>		SCALE: 1:12		SHEET 1 OF 1	

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Folding Road Closure Gate

**Innovator(s):** Vincent Estreich

**Summary:** Several patents were found that had a gate that was hinged in the middle so that the gate could be folded in half. The novelty and non-obviousness of this device are in question.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: folding & gate, road & closure, traffic & gate, railroad & gate

Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |                                 |
|-------------|------|---------------------------------|
| • 3,839,826 | 1974 | Power Or Manually Operable Gate |
| • 4,270,312 | 1981 | Gate Assembly                   |
| • 4,289,189 | 1981 | Folding Gate                    |
| • 4,419,088 | 1983 | Gate Folding Apparatus          |
| • 4,470,221 | 1984 | Gate assembly                   |
| • 4,481,737 | 1984 | Pivoting Gate                   |
| • 4,574,862 | 1986 | Folding Gate                    |

- 4,531,325 1985 Hinged vehicle gate arm
- 4,655,002 1987 Railroad crossing warning gate
- 4,986,031 1991 Gate Assembly
- 5,351,440 1994 Vertical Lift Device
- 5,551,796 1996 Moveable barrier
- 5,653,058 1997 Railroad gate arm swivel adapter spring assembly
- 6,485,224 2002 Traffic barrier apparatus with gate

## 2. Existing Product Search

No similar products available for purchase were found during the search.

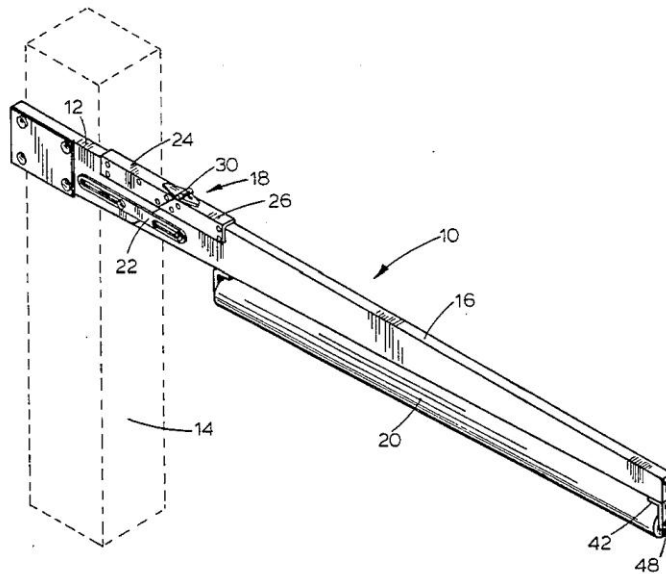
## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references an Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

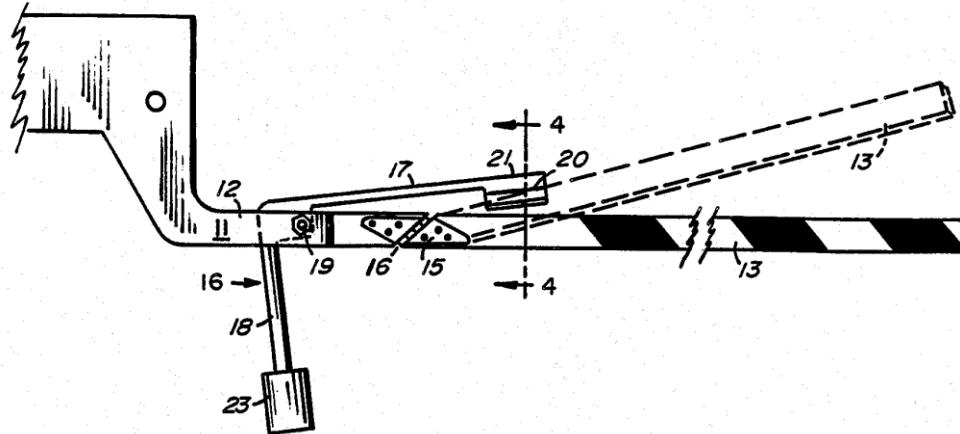
### 1. Evaluation of Novelty

An examination of the information presented above does reveal prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

#### a. 4,531,325 – Hinged Vehicle Arm Gate



b. 4,655,002 – Railroad Crossing Warning Gate

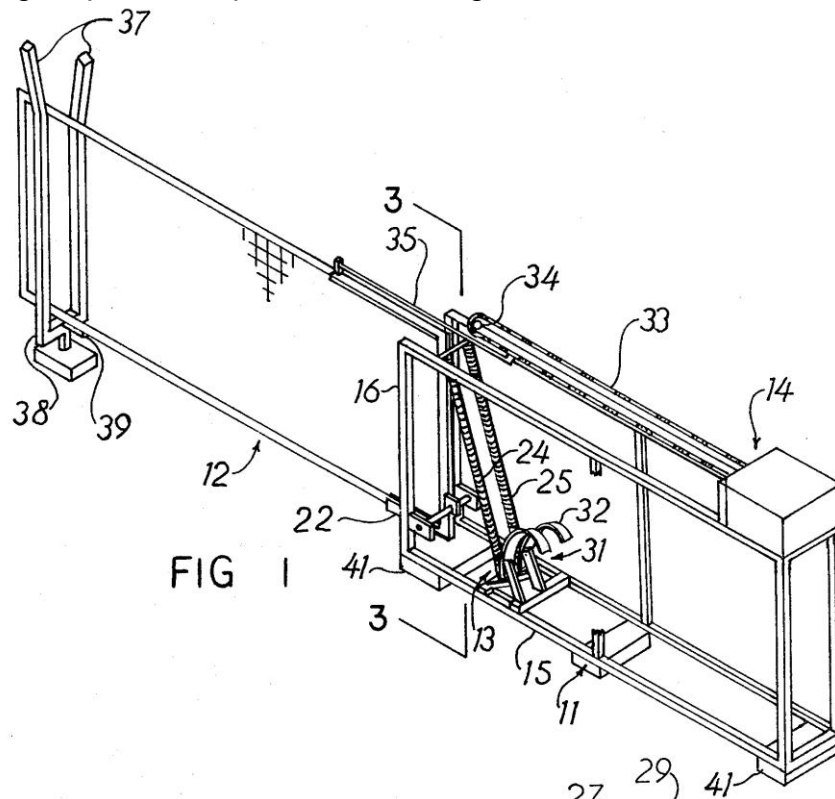


**2. Evaluation of Non-obviousness**

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

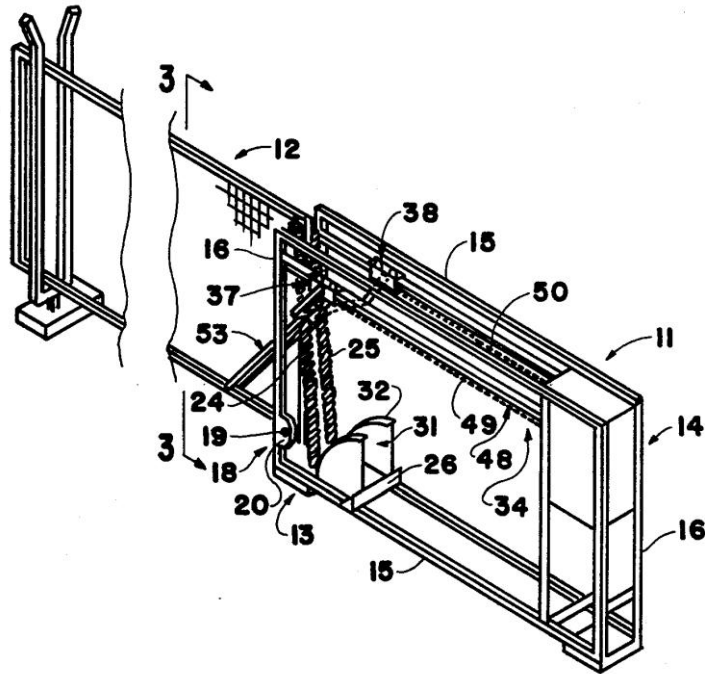
a. 4,270,312 – Gate Assembly

This gate pivots to open but it not hinged in the middle.



b. 4,470,221- Gate Assembly

This gate pivots to open but is not hinged in the middle.



c. 4,481,737 – Pivoting Gate

This gate open by pivoting at its base but it is not hinged in the middle.

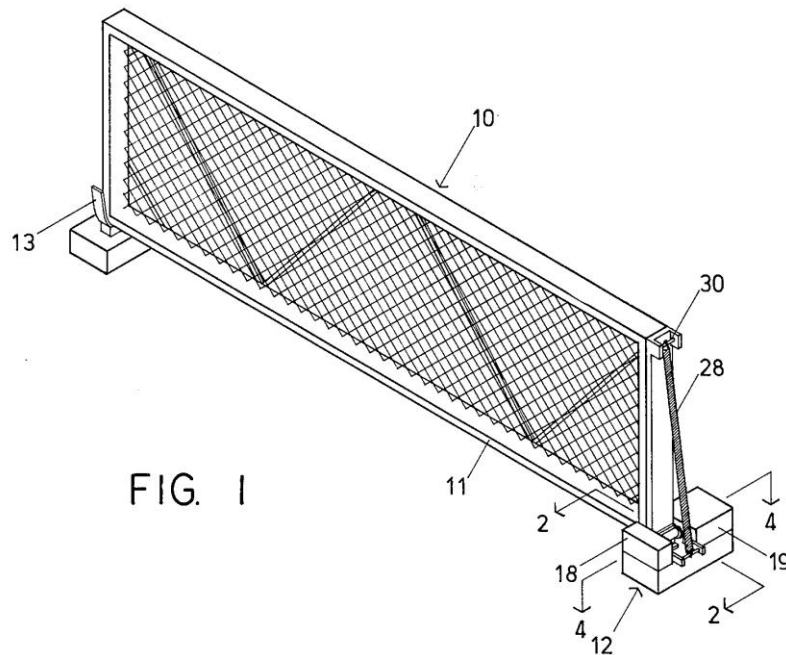
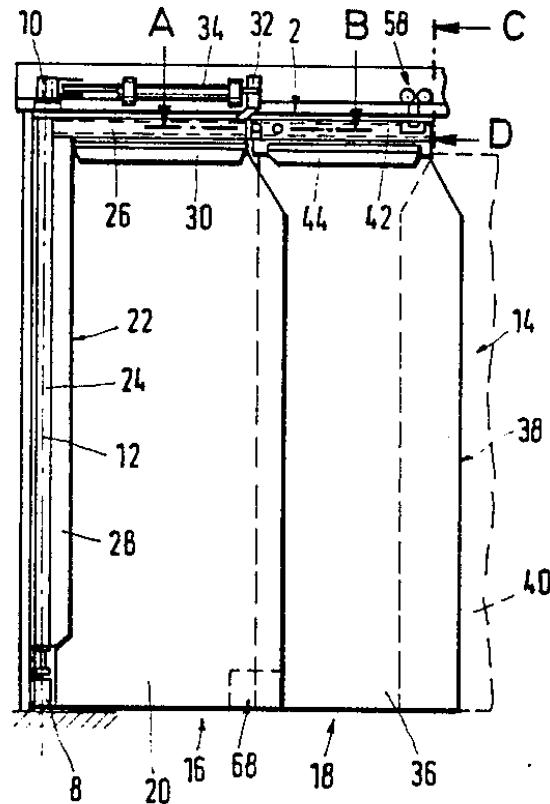


FIG. 1

d. 4,574,862 – Folding Gate

This gate folds in the middle but about a vertical axis not a horizontal axis.



**3. Usefulness**

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

The road closure gate is hinged in the middle. The outboard half can be folded using a pulley system and a winch allowing authorized vehicles through without raising the entire gate. This also allows easier raising of the gate in high wind conditions.

**4. Public Disclosure**

This device was built in the winter for 2009/10. It has been built and the information has been shared with supervisors and safety office.

This device has been used by others which may be considered public disclosure depending on circumstance of use.



## Device Costs and Benefits

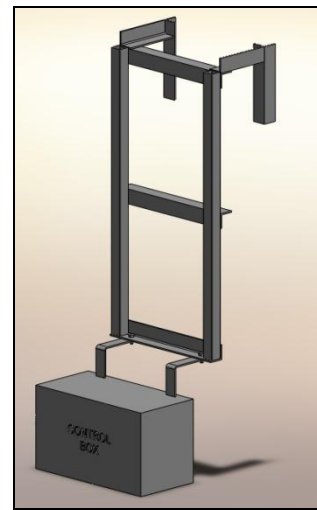
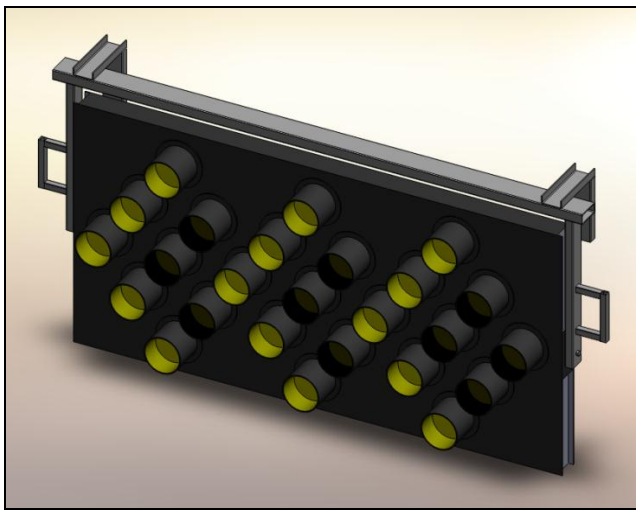
**Submission number:** 20

**Title of the Innovation:** Portable Arrow Board

**Innovator(s):** Steven Intermill

### Device Description

The portable arrow board is a standard 25 light arrow board that is able to hang on the back of work vehicles, reducing the needed vehicle count and increasing site safety.



1. Usefulness
  - This device allows an arrow board to be mounted on any truck or trailer with 12V.
2. Ease of use
  - This device just hangs from the side of a truck so doesn't require special mounting.

### Manufacturability

This device is constructed of ten machined and/or welded parts. The parts are simple and do not have any features that are difficult to manufacture.

### Potential for Widespread Application

1. Time to train operator
  - It would take about 10 minutes to train an operator to use this device.
2. Reduction in time to complete task
  - It takes less time to set up this style of arrow board than a larger trailer mount arrow board.

3. Improvement in quality
  - This device does not affect the quality of the task.
4. Expected annual usage
  - This device can be used year round.
5. Units required
  - One device per truck is required.
6. Use in other states
  - Any states that use arrow boards could use this device.

### **Safety**

1. Improvement in safety
  - This device can be set up so quickly that it reduces the time the operator spends on the road thereby improving safety.
2. Safety concerns due to use or misuse of the device
  - If the board pivots then fingers could get caught between the board and the frame of the board.
  - Could pinch fingers when installing on the truck if not using handles provided.
3. Safety concerns due to failure of the device
  - If the frame breaks it will fall off the truck.

### **Availability of Similar Equipment for Purchase**

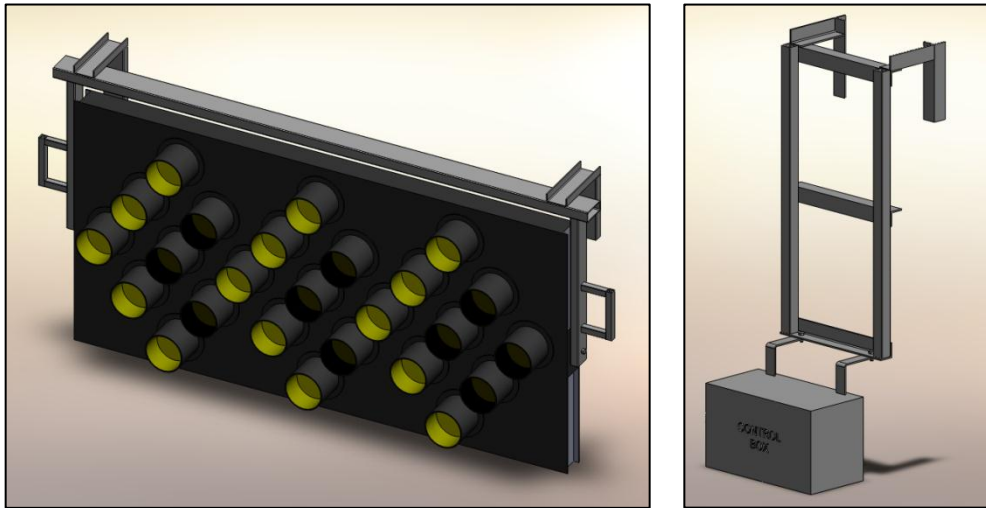
The prior art search did not find similar equipment available for purchase.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel, non-obvious, and useful depending on the Patent Examiner's evaluation.
  - According to the innovator, this innovation was publicly disclosed in its current form in 2009.
2. Patent infringement
  - The prior art search did not find a similar device.

## Portable Arrow Board User Manual



### Device Description

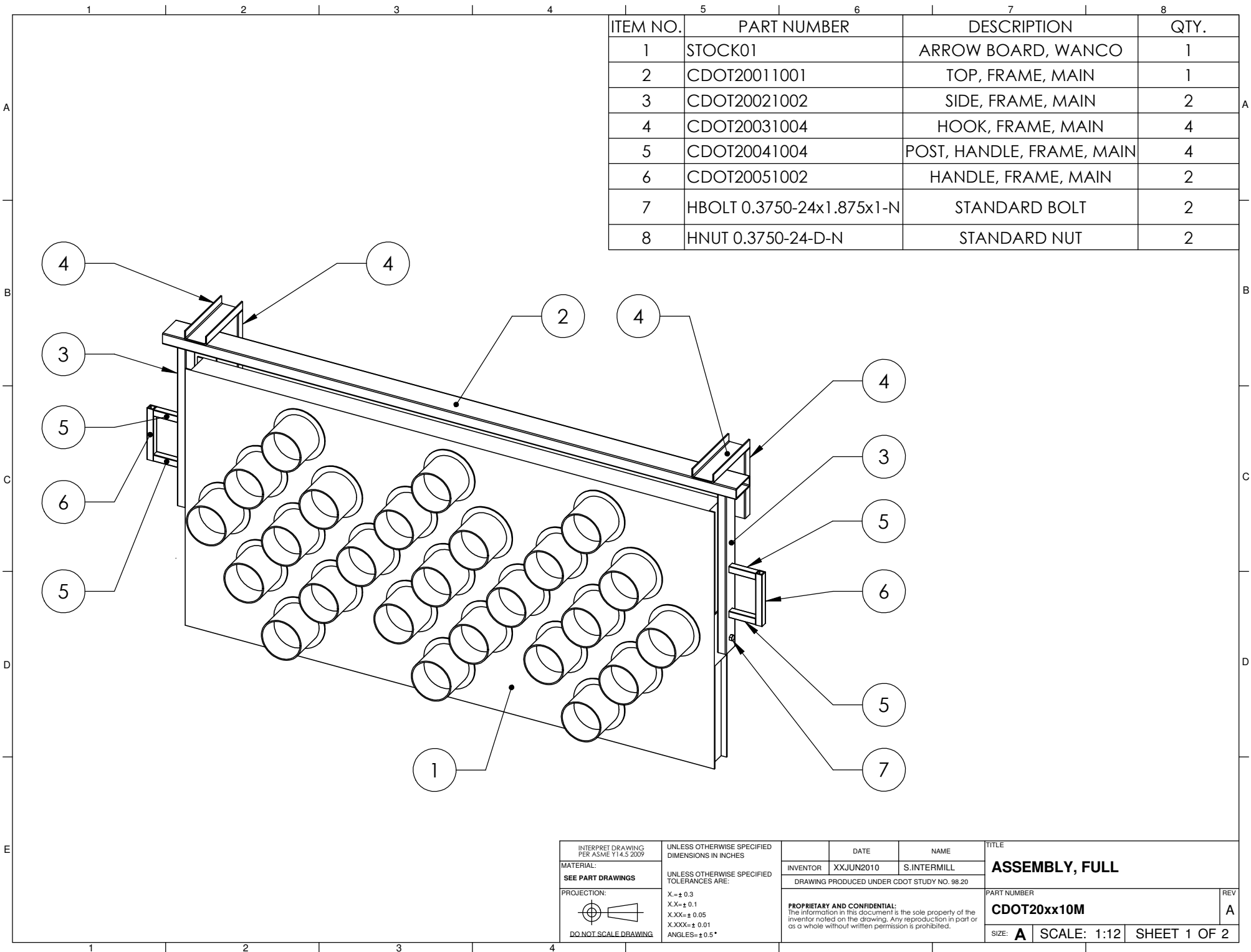
The portable arrow board is a standard 25 light arrow board that is able to hang on the back of work vehicles, reducing the needed vehicle count and increasing site safety.

### Installation Instructions

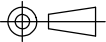
1. Using the handles on the side of the arrow board frame, lift the arrow board above the side of the vehicle which the sign is being mounted on.
2. Place the two hooks on the top of the frame over the rear gate on the vehicle. Larger vehicles are best suited to this as they have a gate larger than the arrow board.
3. Using the control box, lift the control box frame.
4. Place the two hooks on the control box frame over the side of the vehicle.
5. Connect the wiring from the control box to the arrow board and from the 12V power supply to the control box.

### Operating Instructions

1. Operate the portable arrow board frame in the same manner as the trailer mounted arrow board.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	STOCK01	ARROW BOARD, WANCO	1
2	CDOT20011001	TOP, FRAME, MAIN	1
3	CDOT20021002	SIDE, FRAME, MAIN	2
4	CDOT20031004	HOOK, FRAME, MAIN	4
5	CDOT20041004	POST, HANDLE, FRAME, MAIN	4
6	CDOT20051002	HANDLE, FRAME, MAIN	2
7	HBOLT 0.3750-24x1.875x1-N	STANDARD BOLT	2
8	HNUT 0.3750-24-D-N	STANDARD NUT	2

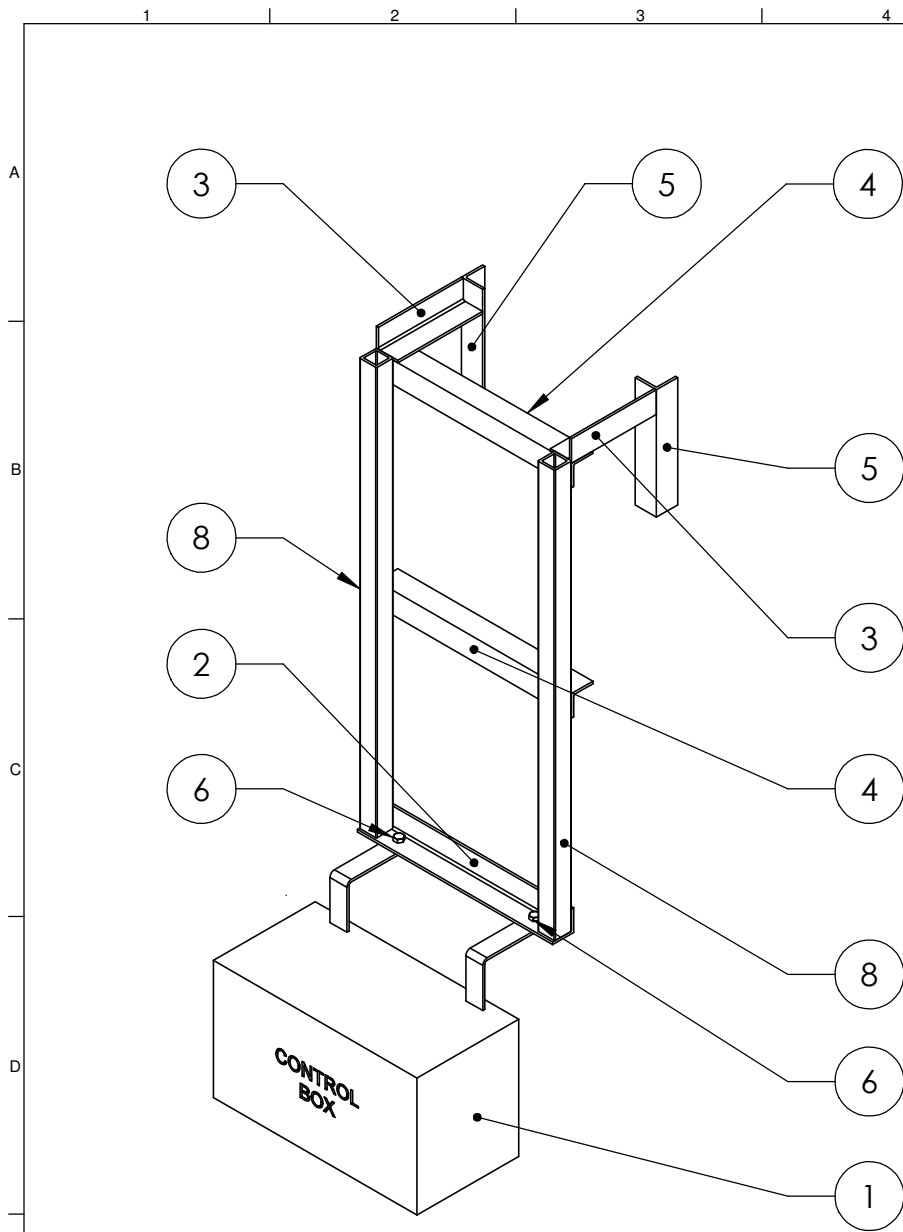
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MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJUN2010		S.INTERMILL	
PROJECTION: 		X.=± 0.3 X.X=± 0.1 X.XX=± 0.05 X.XXX=± 0.01 ANGLES=± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT20xx10M	
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:12	
						SHEET 1 OF 2		REV	
								A	

NOTES:

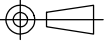
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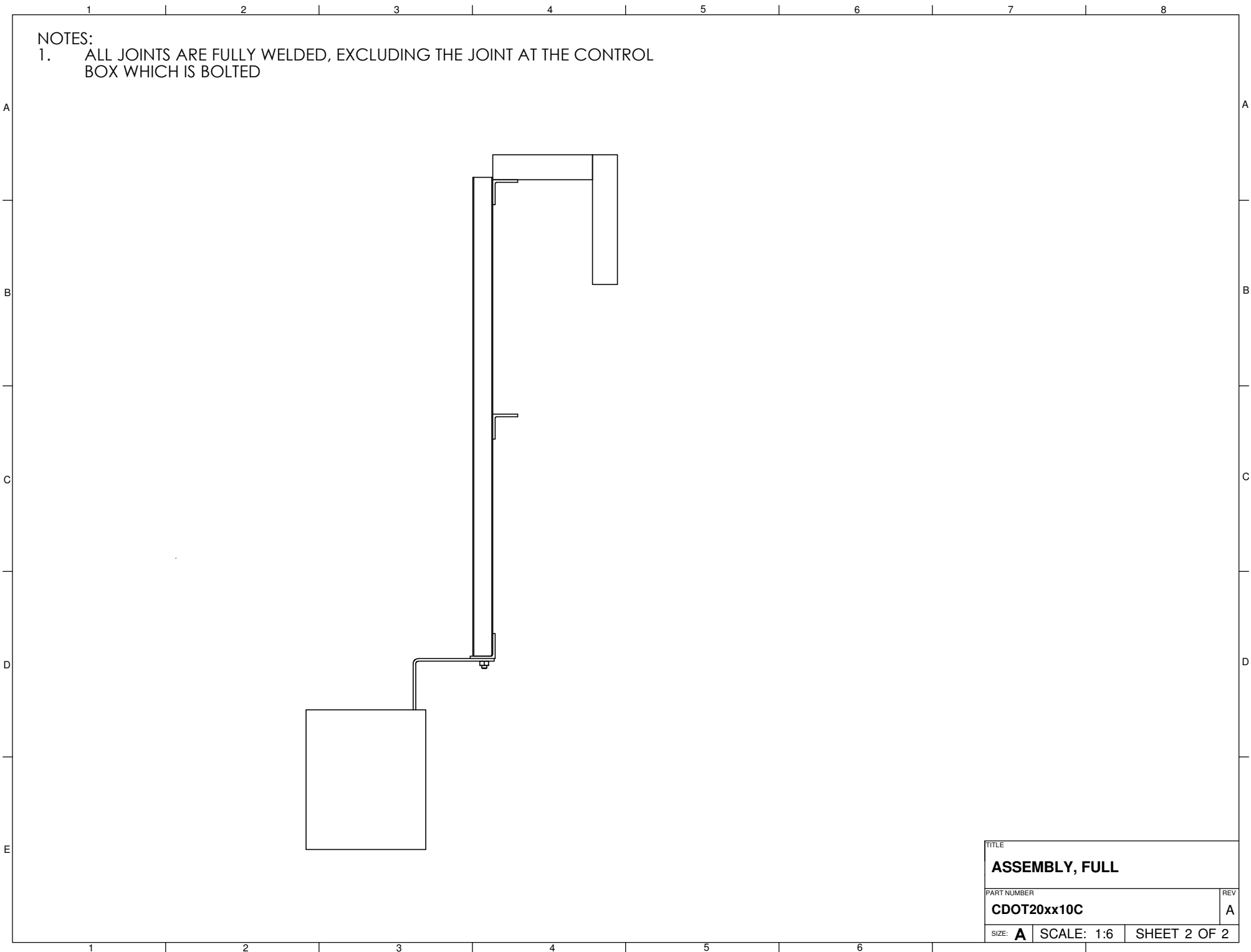


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ASSEMBLY, FULL		
PART NUMBER		REV
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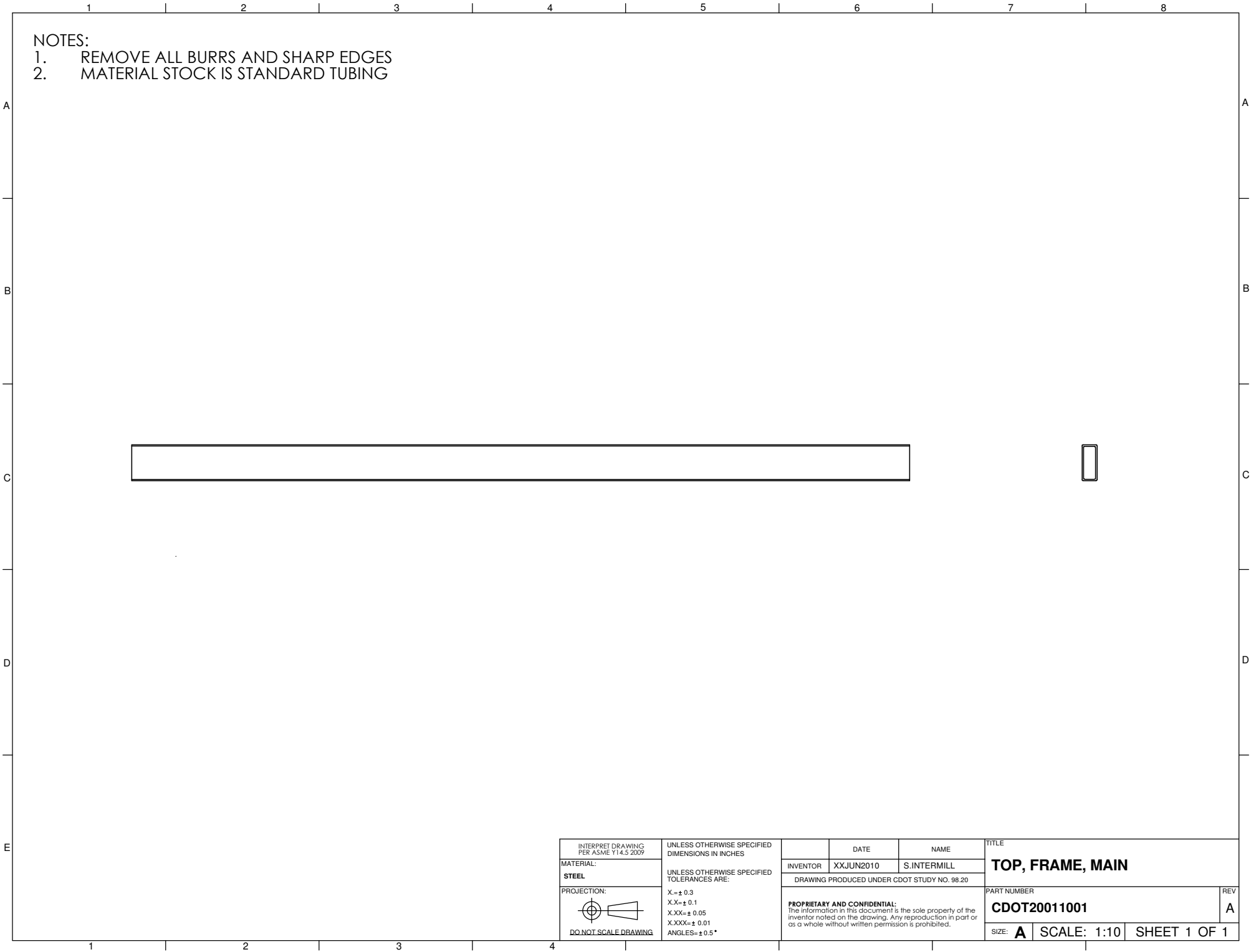


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	STOCK02	BOX, CONTROL	1
2	CDOT20061001	MOUNT, FRAME, CONTROL	1
3	CDOT20081002	TOP, HOOK, FRAME, CONTROL	2
4	CDOT20071002	HORIZONTAL, FRAME, CONTROL	2
5	CDOT20091002	EDGE, HOOK, FRAME, CONTROL	2
6	HBOLT 0.2500-20x0.625x0.625-N	STANDARD BOLT	2
7	HNUT 0.2500-20-D-N	STANDARD NUT	2
8	CDOT20101002	POST, FRAME, CONTROL	2

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		XXJUN2010		S.INTERMILL	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER		CDOT20xx10C	
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:8		SHEET 1 OF 2	
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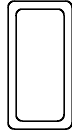
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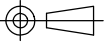




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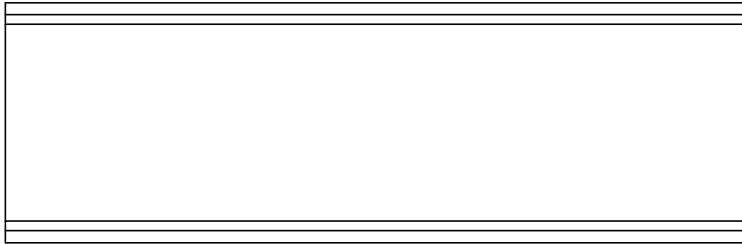
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2. MATERIAL STOCK IS STANDARD TUBING

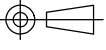


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE XXJUN2010		NAME S.INTERMILL		TITLE SIDE, FRAME, MAIN	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	
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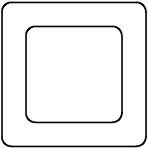
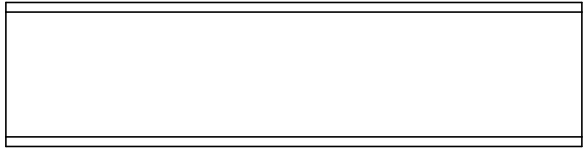
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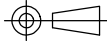
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2. MATERIAL STOCK IS STANDARD C-CHANNEL



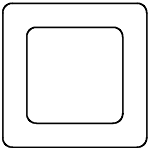
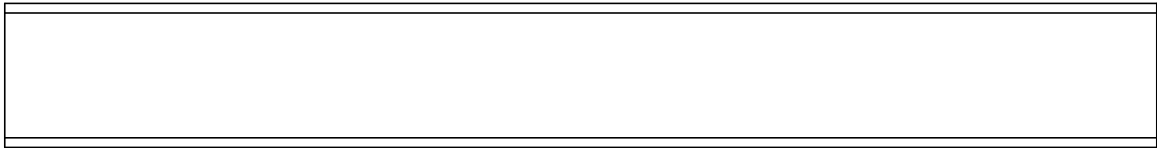
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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER CDOT20031004		REV A			
PROJECTION: 		DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		SIZE: A		SCALE: 1:2		SHEET 1 OF 1	

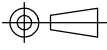
- NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
  2. MATERIAL STOCK IS STANDARD TUBING

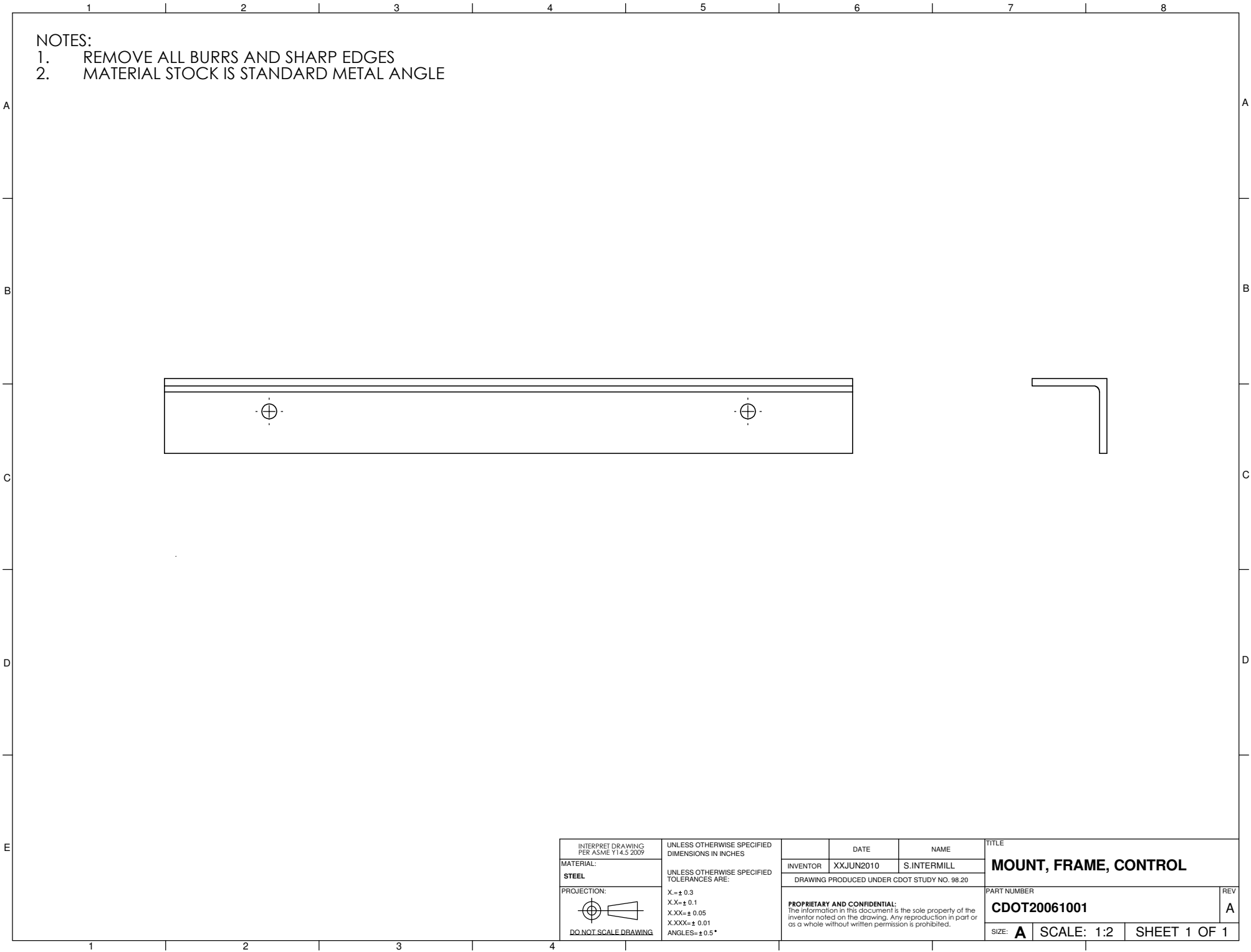


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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	S.INTERMILL		POST, HANDLE, FRAME, MAIN	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
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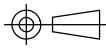
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- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD TUBING



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PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER				REV	
				CDOT20051002				A	
				SIZE: A		SCALE: 1:1		SHEET 1 OF 1	



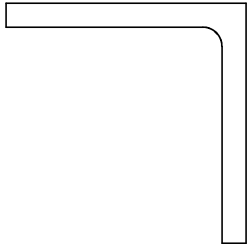
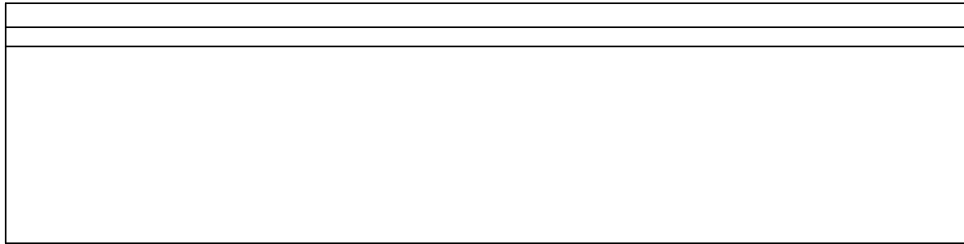
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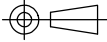
INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	S.INTERMILL		MOUNT, FRAME, CONTROL	
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20					
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.					
				PART NUMBER		REV			
				CDOT20061001		A			
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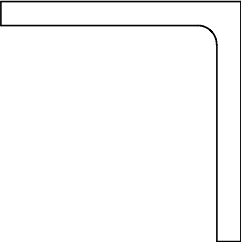
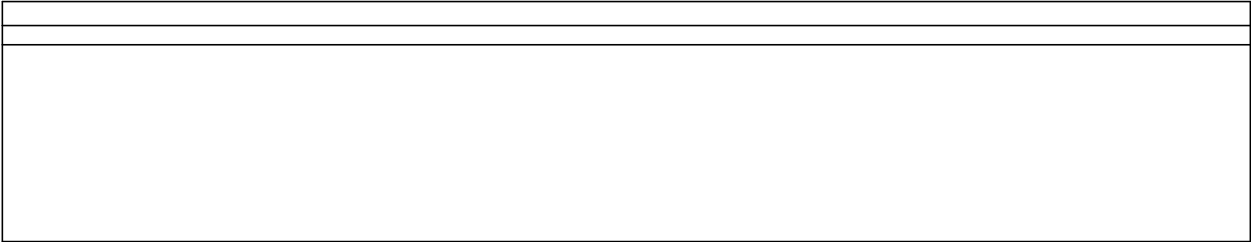
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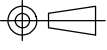
1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD METAL ANGLE



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE	NAME	TITLE	
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	S.INTERMILL	TOP, HOOK, FRAME, CONTROL
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT20081002	A
				SIZE:	A	SCALE: 1:1	SHEET 1 OF 1

- NOTES:
- 1. REMOVE ALL BURRS AND SHARP EDGES
  - 2. MATERIAL STOCK IS STANDARD METAL ANGLE



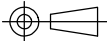
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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	S.INTERMILL	EDGE, HOOK, FRAME, CONTROL
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT20091002		SIZE: A	A
				SCALE: 1:1		SHEET 1 OF 1	



NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	S.INTERMILL		POST, FRAME, CONTROL		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER		REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT20101002				A
				SIZE:	A	SCALE: 1:4		SHEET 1 OF 1		

## Preliminary Patentability Assessment

The term *preliminary patentability assessment* as used in this document refers to the Study 98.20 research team's evaluation of the novelty and non-obviousness of each invention submitted by CDOT personnel in view of prior art relevant to each of the inventions. The Study 98.20 research team's review of prior art is not intended to be an exhaustive search of all possible relevant prior art, nor is this *preliminary patentability assessment* intended to substitute for a legal opinion regarding the patentability of any of these inventions. Only a patent attorney or patent agent can provide a legal opinion regarding patentability. None of the Study 98.20 research team members is a patent attorney or patent agent.

**Title of the Innovation:** Portable Arrow Board

**Innovator(s):** Steven Intermill

**Summary:** The prior art search did not find a similar device.

### ***Prior Art Search***

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: arrow & board, traffic & trailer, traffic & sign, sign & package, truck & traffic sign  
Field of search: title

<b>Patent Number</b>	<b>Year</b>	<b>Title of Invention</b>
6,839,996	2007	Traffic Sign Device
5,488,792	1996	Mobile Traffic Warning Sign
5,375,554	1994	Rocking road emergency warning sign
4,593,265	1986	Portable Traffic Control Apparatus
3,958,350	1976	Sign board for truck trailers, semi-trailers and shipping containers

## **2. Existing Product Search**

Similar products were found using [www.google.com](http://www.google.com)

- a. <http://www.centrevilletrailer.com/customTrailers/customTrailers.htm>
- b. <http://www.teamfenex.com/arrowboards.asp>
- c. [http://www.wanco.com/products/products.php?type\\_id=10](http://www.wanco.com/products/products.php?type_id=10)
- d. [http://nationalsignalinc.net/?page\\_id=9](http://nationalsignalinc.net/?page_id=9)

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references an Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### **1. Evaluation of Novelty**

An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

### **2. Evaluation of Non-obviousness**

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

- a. *No patents were identified that bear sufficient similarities to the submitted innovation.*

### **3. Usefulness**

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

This device is an arrow board that can be hung over the side of a truck.

### **4. Public Disclosure**

This device was first built and used in 2009. Other CDOT employees have used this device in 12 locations. Information regarding this device has been shared with approximately 45 people. No modifications have been made to the original device.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.

## Device Costs and Benefits

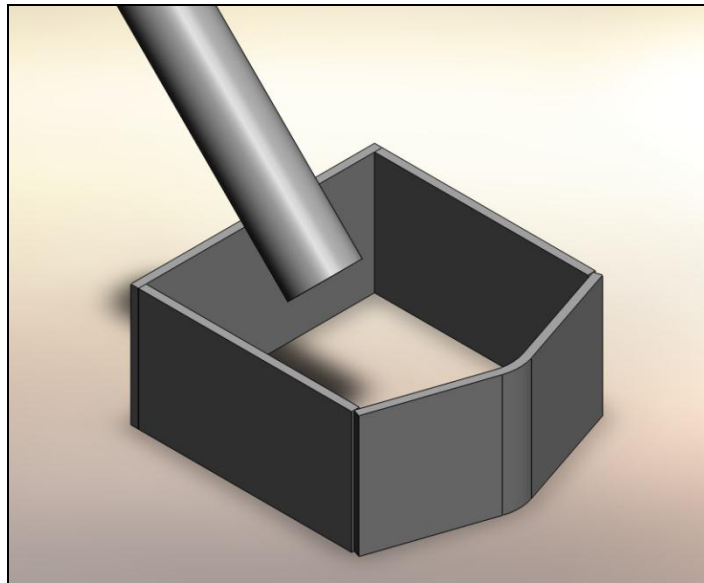
**Submission number:** 23

**Title of the Innovation:** Hot Seal/Crack Seal Cup

**Innovator(s):** Nathan Torrez

### Device Description

The hot seal crack seal cup is designed to aid in sealing cracks when applying hot tar.



1. Usefulness
  - This device contains the sealing material and channels it into the crack.
  - The cup levels the sealant off to the level of the pavement.
  - It smooths out the surface of the sealant.
2. Ease of use
  - This device makes crack sealing a one step process because a squeegee is not needed after the sealant is guided into the crack by the cup.

### Manufacturability

This device is constructed of four machined and/or welded parts. The parts are simple and do not have any features that are difficult to manufacture.

### Potential for Widespread Application

1. Time to train operator

- It takes less than five minutes to train an operator to use this device.
- 2. Reduction in time to complete task
  - This device turns a three person job into a one person job.
- 3. Improvement in quality
  - The crack sealant is guided into the crack more efficiently thereby using less sealant.
  - The sealant is smoothed evenly by the device.
- 4. Expected annual usage
  - This device would typically be used 3-5 months each year.
- 5. Units required
  - One device per patrol is required.
- 6. Use in other states
  - All states that seal crack would benefit from this device.

### **Safety**

1. Improvement in safety
  - Because less people are required for the crack sealing task then less people are exposed to the risk of getting hurt from the hot tar.
2. Safety concerns due to use or misuse of the device
  - Concerns with contact with hot tar.
3. Safety concerns due to failure of the device
  - There are no identifiable concerns due to failure of the device.

### **Availability of Similar Equipment for Purchase**

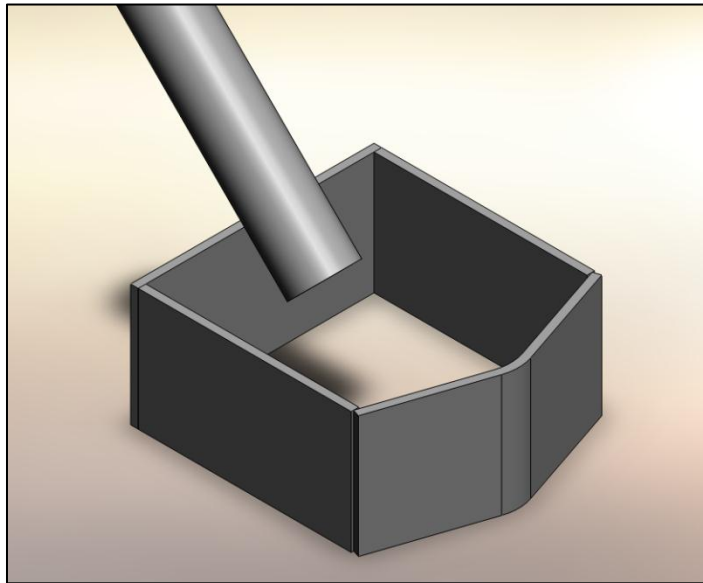
The prior art search did not find similar equipment available for purchase.

### **Patent Information**

(complete information provided in Preliminary Patentability Assessment)

1. Patentability
  - This device may be considered novel and useful but may not be considered non-obvious depending on the Patent Examiner's evaluation.
  - According to the innovator, this innovation was publicly disclosed in its current form in the Fall of 2008.
2. Patent infringement
  - Patents were found for devices with integrated spreaders. But no prior art was found for a stand-alone spreader. The non-obviousness of this device is in question.

## Hot Seal Crack Seal Cup User Manual

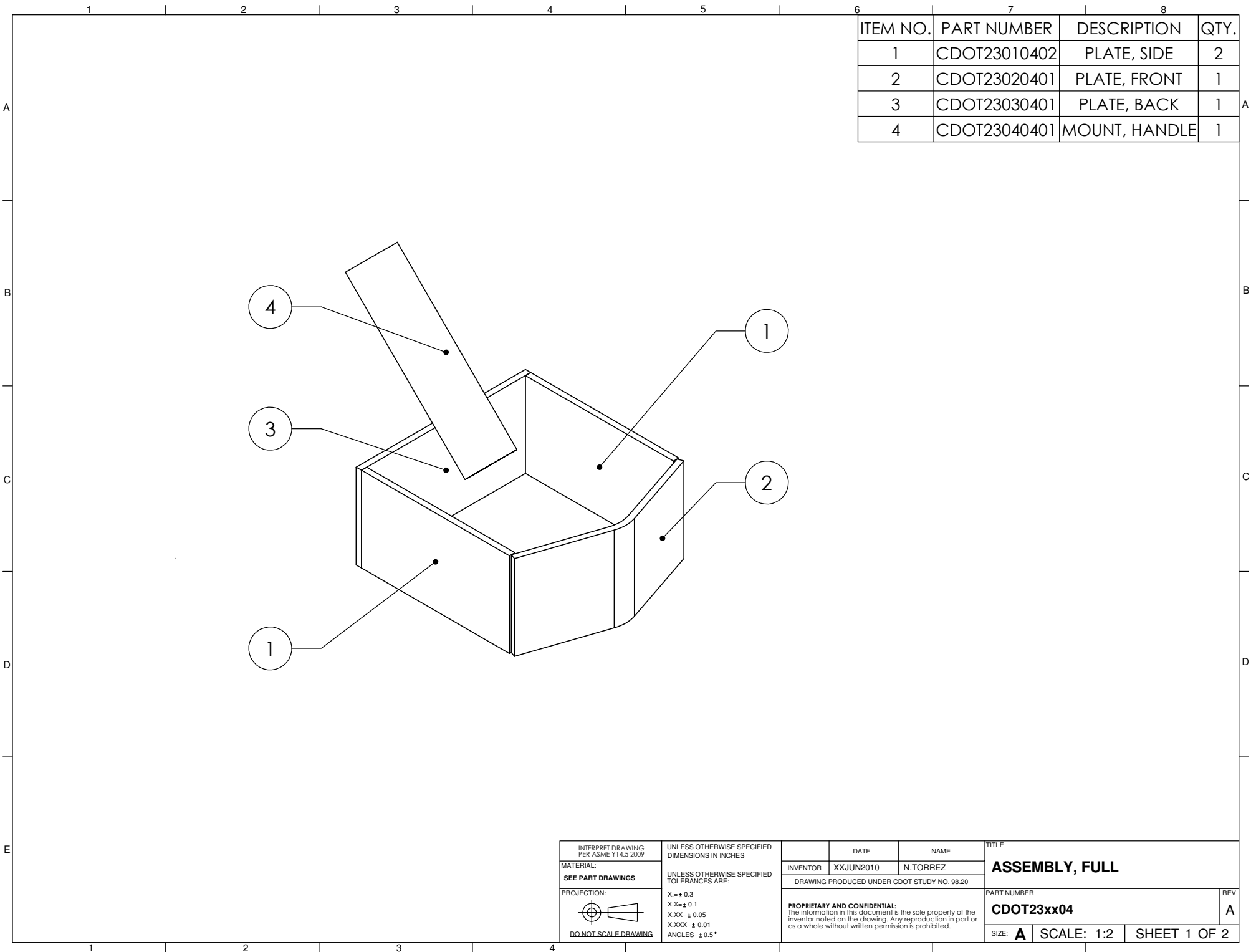


### Device Description

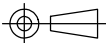
The hot seal crack seal cup is designed to aid in sealing cracks when applying hot tar.

### Operating Instructions

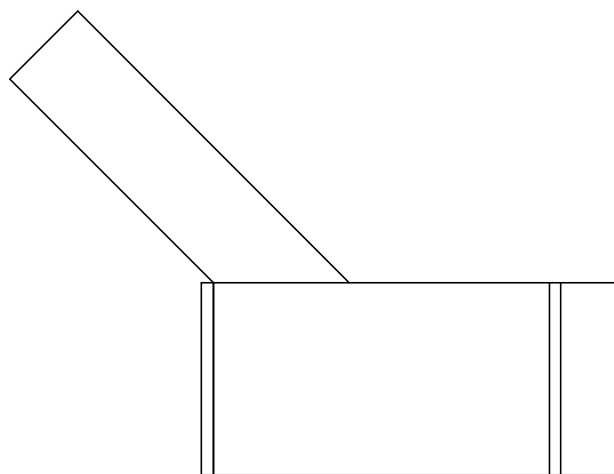
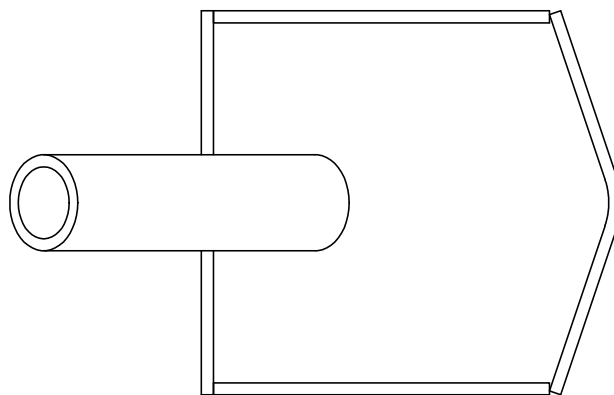
1. Place the seal cup over the start of the crack or the start of where the crack needs to be sealed.
2. Pour the hot tar into the seal cup, limiting the quantity to ensure that the tar does not overflow the sides of the seal cup.
3. Firmly pressing the seal cup against the ground, move the seal cup forward slowly, filling the crack as you progress. Increase downward pressure to reduce the quantity of tar being laid, or decrease downward pressure to increase the quantity of tar.
4. Stop and refill the seal cup as needed.
5. When completed, remove any excess tar from the seal cup and the road.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CDOT23010402	PLATE, SIDE	2
2	CDOT23020401	PLATE, FRONT	1
3	CDOT23030401	PLATE, BACK	1
4	CDOT23040401	MOUNT, HANDLE	1

INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL:  SEE PART DRAWINGS		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	N.TORREZ		ASSEMBLY, FULL		
PROJECTION:  		X.= ± 0.3 X.X= ± 0.1 X.XX= ± 0.05 X.XXX= ± 0.01 ANGLES= ± 0.5 °		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER <b>CDOT23xx04</b>		REV <b>A</b>
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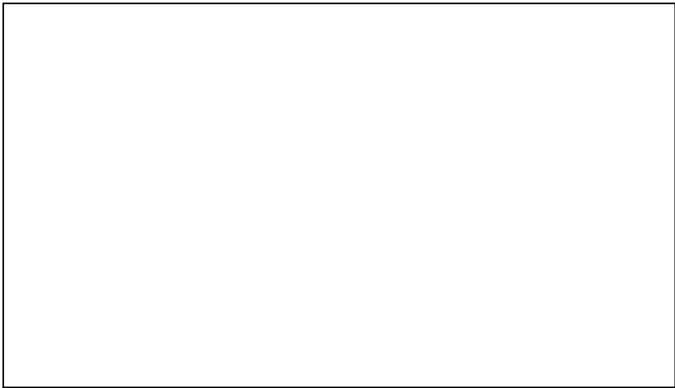
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1. ALL JOINTS ARE FULLY WELDED

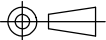


TITLE		
ASSEMBLY, FULL		
PART NUMBER		REV
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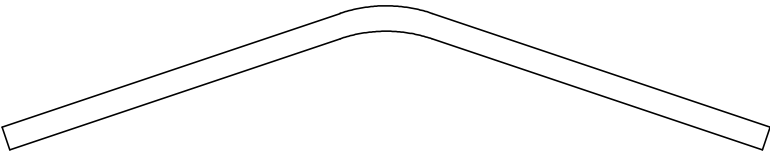
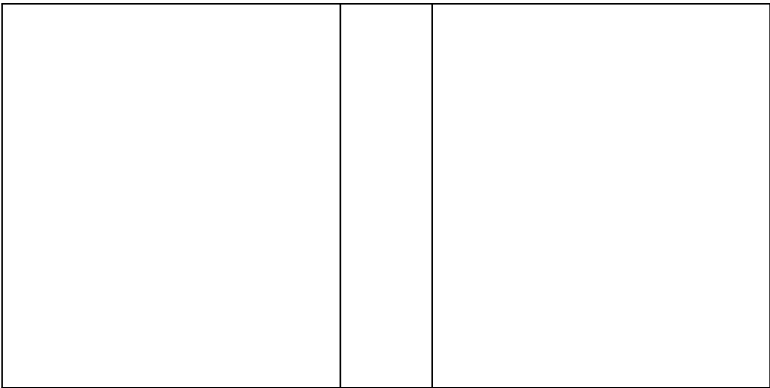


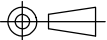
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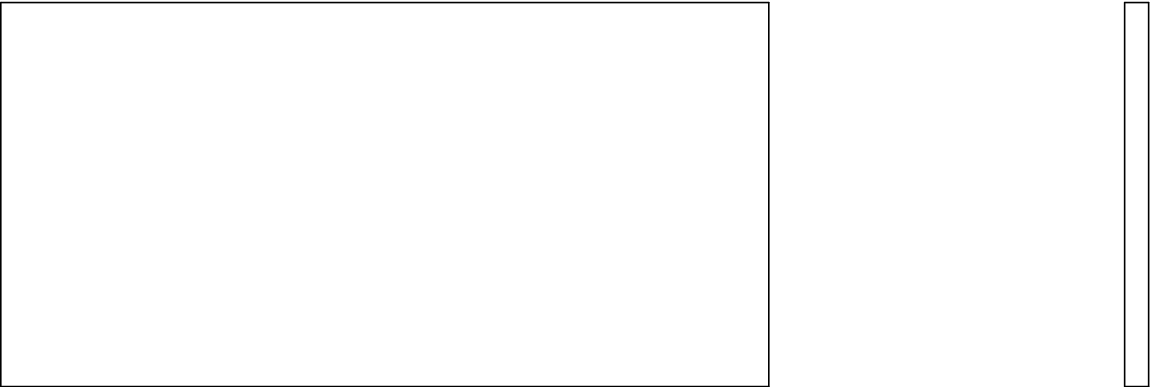
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PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.005 X.XXX= ± 0.002 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER		REV
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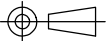
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MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	N.TORREZ	PLATE, FRONT
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.005 X.XXX= ± 0.002 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20		PART NUMBER	REV
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.		CDOT23020401	A
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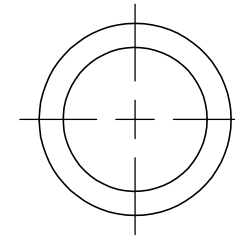
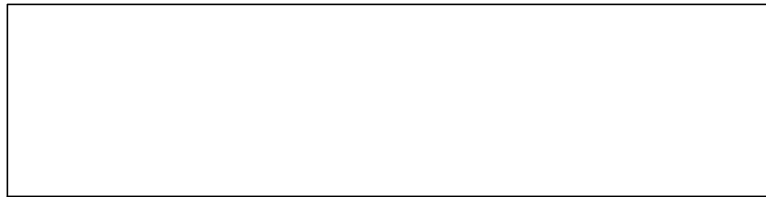
NOTES:  
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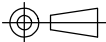


INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: STEEL		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	N.TORREZ		PLATE, BACK		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.005 X.XXX= ± 0.002 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20						
DO NOT SCALE DRAWING				PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				PART NUMBER CDOT23030401		REV A
				SIZE: A		SCALE: 1:1		SHEET 1 OF 1		

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. MATERIAL STOCK IS STANDARD TUBING WITH NPT THREADING ON ENDS



INTERPRET DRAWING PER ASME Y14.5 2009		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES		DATE		NAME		TITLE		
MATERIAL: <b>STEEL</b>		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		INVENTOR	XXJUN2010	N.TORREZ		<b>MOUNT, HANDLE</b>		
PROJECTION: 		X.= ± 0.3 X.X= ± 0.01 X.XX= ± 0.005 X.XXX= ± 0.002 ANGLES= ± 0.5°		DRAWING PRODUCED UNDER CDOT STUDY NO. 98.20				PART NUMBER		REV
DO NOT SCALE DRAWING		PROPRIETARY AND CONFIDENTIAL: The information in this document is the sole property of the inventor noted on the drawing. Any reproduction in part or as a whole without written permission is prohibited.				CDOT23040401		A		
				SIZE: <b>A</b>		SCALE: 1:1		SHEET 1 OF 1		

## Preliminary Patentability Assessment

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**Title of the Innovation:** Hot Seal/Crack Seal Cup

**Innovator(s):** Nathan Torrez

**Summary:** Patents were found for devices with integrated spreaders. But no prior art was found for a stand-alone spreader. The non-obviousness of this device is in question.

### **Prior Art Search**

#### **1. Patent Search**

The following is a list of U.S. patents that was generated through a search limited to the USPTO ([www.uspto.gov](http://www.uspto.gov)) search engine. This search includes only U.S. patents issued since 1976. Published patent applications were not searched. All patents cited in the "References cited" section were also reviewed.

Because the claims that may be included in a future patent application filed on this innovation have not yet been determined, the precise *claimed invention* is not known at this time. The following list of patents was generated using the keywords provided below based on a description of the innovation and drawings provided by the submitter.

Keywords used in the search: seal & cup, seal & crack, spread & wand, spread & tar, wand & tar, squeegee & tar, squeegee & metal, screed & tar, bander & tar, bander & crack, screed & crack

Field of search: title

Patent Number	Year	Title of Invention
---------------	------	--------------------

- |             |      |   |
|-------------|------|---|
| • 4,397,581 | 1983 | Groover, Trowel and Bull Float Combination              |
| • 4,492,490 | 1985 | Road Repair Spreader                                    |
| • 4,603,999 | 1986 | Apparatus for Mixing and Spreading Coatings on Surfaces |
| • 4,702,642 | 1987 | Extensible Screed Assembly for a Bituminous Paver       |
| • 4,865,487 | 1989 | Screed for Asphalt Paver                                |

- 4,900,185     1990   Asphalt Spreader
- 5,232,306     1993   Crackfilling Vehicle

## 2. Existing Product Search

Similar products were found using [www.google.com](http://www.google.com)

- <http://store.asphaltkingdom.com/AK4-Asphalt-Crack-Sealing-Machine-p/ak4.htm>
- <http://store.asphaltkingdom.com/Asphalt-Crack-Bander-The-AK5-p/ak5cb.htm>

## ***Evaluation of Innovation***

An evaluation of novelty and non-obviousness is provided below based on the above list of prior art. However, it is not possible to fully anticipate what prior art references an Examiner will use to argue non-patentability in terms of novelty and non-obviousness issues. Accordingly, a patent applicant must wait until the Patent Examiner has issued an Office Action before the ultimate novelty and non-obviousness issues raised by the Examiner are known.

### 1. Evaluation of Novelty

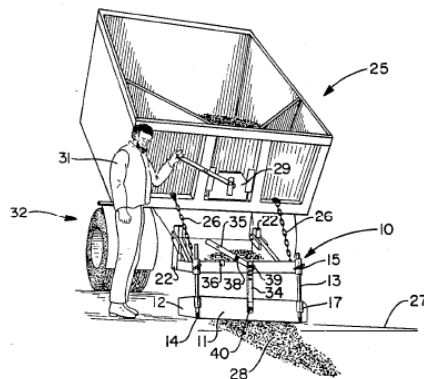
An examination of the information presented above does not reveal any prior art item(s) that is/are identical to the device embodied in the innovator's description and drawing(s).

### 2. Evaluation of Non-obviousness

Generally, the issue of obviousness arises when the Examiner alleges that it would have been obvious to combine two or more prior-art items to arrive at the invention in question. The following patents from the list above bear sufficient similarities to the submitted innovation that they could be the basis for arguments of obviousness of the innovation:

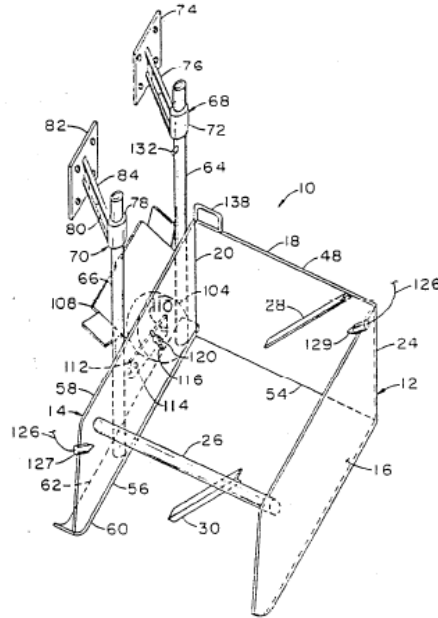
- 4,492,490     Road Repair Spreader

This device has a spreader that fills the hole with repair material and smoothes the material



b. 4,900,185 Asphalt Spreader

This device uses a three sided spreader box that is filled with material as needed



c. <http://store.asphaltkingdom.com/AK4-Asphalt-Crack-Sealing-Machine-p/ak4.htm>

This device has a screed that spreads the crack filling material



- d. <http://store.asphaltkingdom.com/Asphalt-Crack-Bander-The-AK5-p/ak5cb.htm>

This device has a screed that spreads the crack filling material



### 3. Usefulness

Based on the statement by the innovator, this device appears to meet the criteria for usefulness.

This device takes hot tar put on the road and spreads it on the surface of the road. It makes the job of pouring cracks faster and safer.

### 4. Public Disclosure

This device was first invented in Fall of 2008 and was built and used at that time. Members of Patrol 4110 use this device in crack sealing operations. The device in use is the original design.

This device has been used by others which may be considered public disclosure depending on the circumstances of use.