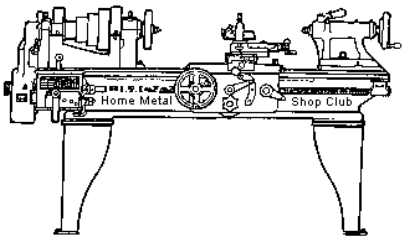
Home Metal Shop Club

April 2011
Newsletter

Volume 16 - Number 4



http://www.homemetalshopclub.org/

Since its founding by John Korman in 1996, The Home Metal Shop Club has brought together metal workers from all over the Southeast Texas area.

Our members' interests include Model Engineering, Casting, Blacksmithing, Gunsmithing, Sheet Metal Fabrication, Robotics, CNC, Welding, Metal Art, and others. Members always like to talk about their craft and shops. Shops range from full machine shops to those limited to a bench vise and hacksaw.

If you like to make things, run metal working machines, or just talk about tools, this is your place. Meetings generally consist of a presentation with Q&A, followed by ***show and tell*** where the members can share their work and experiences.

President	Vice President	Secretary	Treasurer	Librarian
Vance Burns	*John Hoff*	*Martin Kennedy*	*Emmett Carstens*	*Dan Harper*
Webmaster/Editor	**Photographer**	**CNC SIG**	**Casting SIG**	**Novice SIG**
Dick Kostelnicek	*Jan Rowland*	*Dennis Cranston*	*Tom Moore*	*Rich Pichler*

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About the Upcoming May 14 Meeting

General meetings are usually held on the second Saturday of each month at 12:00 noon in the meeting rooms of the Parker Williams County Library, 10851 Scarsdale Boulevard, Houston, TX 77089. This month's meeting will be held on May 14th. Visit our website for up-to-the-minute details.

Adam Burnett will give a presentation on Robotics.

Recap of the April 16 General Meeting

By Martin Kennedy, with photos by Jan Rowland

Thirty members attended the 12:00 noon meeting at the Parker Williams County Library. President *Vance Burns* led the meeting.

Presentation

Terry Ruppe with Arrow Controls gave a presentation on mill conversion / upgrading using Centroid CNC Controls. Terry has been working with CNC equipment for 30 years. Most of his business was fixing old machines. The problem he typically found was that the iron was still good, but the electronic controls were antiquated, started experiencing intermittent errors, and were difficult to keep running. About 25 years ago, he began working with Centroid, a company that produced more modern electronics that could be retrofitted on older machinery. He formed his current company, Arrow Controls, about 15 years ago. When Centroid first began, they produced a DOS based control program. It then was converted to Linux, and most recently has been upgraded to run under Windows 7.

Centroid controls have evolved over time, and they now make systems for high speed control of up to 8-axis machines. They also manufacture CNC mills up to 5 axis. A popular application for their equipment is cylinder head porting, as shown on their website.

Most of Terry's business is doing retrofits. Retrofits are done for three reasons: 1) The controls on an older machine are obsolete or unreliable; 2) On newer machines where the owner is not satisfied with the factory controls; and 3) Conversion of manual machines to CNC. Manual machine conversions are more expensive because conversion is labor intensive. Parts such as ball screws must be replaced, and new parts, such as custom built motor mounts, quill conversions, and limit switches must be added.

Older PC based operating systems incorporating ISA CNC controller cards become obsolete as they experience failures because boards employing ISA slots are no longer produced. To combat this, Centroid produces a stand-alone card that communicates with the host PC over a standard network port.

Some of the most important parts for an accurate CNC machine are high quality ball screws on the table. Stock Acme screws can't produce the accuracy needed for CNC. Terry uses machined ball screws, and not rolled ball screws, to get the necessary accuracy. He recommended a few sources for parts: Hiwin for ball screws and Elrod Machine for custom motor mounts.

Three types of control systems are used in CNC. At the low end are open loop stepper motors. In this type of system, the computer advances the stepper motor a given amount, and assumes that the table moves that amount. If the motor stalls, or encounters a stop, the computer has no way of knowing that the table did not move. Centroid does not support this type of system.

The next, and most prevalent, type of commercial control system is a closed loop system using a servo motor with an encoder mounted on the shaft of the motor. In this system, the

computer advances the servo motor, and monitors the pulses generated by the encoder to validate table movement.

The third type of system is a closed loop system that uses glass scales mounted on the table for feedback.

Centroid offers many interface boards for not only the servo controls, but also for tool changing, inputs, and specialized boards for particular machines, such as those employing Fanuc controls. They can provide a stand-alone control computer, or can tie in to your existing system.

A full machine conversion costs a bare minimum of $5,000 up to about $12,000, depending on whether the servo motors can be reused and if a dedicated operator interface and pendants are required.

Centroid now produces a low end system targeted towards hobbyists that costs about $2,000. A Mach3 interface is available. Recently, they began a subsidiary called Ajax specifically to produce a system for hobbyists. Their entry-level system is about $1,500.

The Centroid system can work with a digitizer. With the digitizer, the control system can find centers and corners automatically. It can also be used to digitize the surface of a part in 3D. Two models of the ruby tipped probe are available from Centroid. The standard model costs about $1,500. A newer version uses acoustic feedback and is much more accurate at high speeds. This version is about $2,500.

Terry then demonstrated the Centroid control system, going through many screens to highlight its capability.

Streaming videos are available on the website, featuring the system. A demo of the software is available, limited to a small number of lines of G code.

Show & Tell

Rich Pichler challenged the attendees to figure out how an inexpensive clamp from Harbor freight could be used as a spreader.

Martin Kennedy made a presentation on how a design for a lathe carriage stop evolved from a 2/3 scale model of a stop from a larger lathe, went through several versions in 3D CAD, employed peer input using eDrawings, and ultimately was built. The stop employs a micrometer adjustment, and can be outfitted with a dial indicator. Plans for the stop will be published in next month's newsletter.

Randy Jacobs recounted how he was using a 4" angle grinder when the wheel exploded and sent him to the hospital to have his fingers sewn back together. The injury was caused by over tightening the abrasive wheel on the angle grinder. This slightly crushed the wheel, which then failed when it came up to speed. Randy's accident reminded us all how important it is to use the appropriate safety gear and practices when using equipment.

Joe Scott had three devices made to fit onto a turret lathe. The first tool was for cutting inside o-ring grooves, and employed a cam action to engage and disengage the tool. The second was a Hardinge TBA 5/8 slide mount with an adjustment wheel. The third was a Hardinge T3 5/8 slide mount that held a cutting tool.

Jan Rowland made a poster board featuring some of his projects, and urged other member to bring in information on their projects.

Tom Moore recounted an interesting story of an old building in Trinity that he passed while headed to the Canton Engine Show. The building had been vacant for years, was being torn down, and he stopped by to look. It was full of 1920-1930 era machines, such as a punch press, shear, lathe, air compressors, an industrial press and a 24" pillar drill.

Problems and Solutions

A member was looking for a way to get a brass rod to exactly 0.2500 x 1 ¾" long. The rod he had was a few thousandths oversize. Many suggestions were offered, including using drill rod, stainless steel dowel pins, drill blanks, pin gauges, or just making and hardening a steel die and forcing the rods through with an arbor press.

Novice SIG Activities

Rich Pichler talked about different types of indexing plates, and demonstrated their use.

Articles

Death of a Company and Déjà Vu

By *Buster Wilson*

I always look over the classified ads but this recent one really caught my eye, not because of the equipment but -HPM Corp- . . . . how so ? My first industrial job in Ohio was for a company that worked under Sears Roebuck that made Roper ranges, Craftsman lawn mowers and some other items for Sears. It was almost a total in-house plant. By that I mean sheet and rolled steel came in and almost all the parts were stamped out in the press room with rows of all sizes of presses, parts were painted, heat treated, assembled and shipped to Sears stores most everywhere. What about HPM Corp ? Well, they were the maker of the high pressure injection aluminum die cast machines ranging from about 300 to 1,500 tons locking pressure to hold the die halves together. Chain saw parts, gear boxes, mower deck housings, BBQ grilles were all made from the molten aluminum and magnesium. Magnesium die casting was done in a separate building where the largest 1,200 and 1,500 ton presses were located. The HPM Castmaster machines were excellent. I worked with the aluminum and magnesium furnaces, salt bath heat treat, some inspection work before getting into Tool and Die Apprenticeship working on the injection dies and progressive stamping dies. I only got about two years into it before the company president arranged to have the facility moved out of state to his home state, and the doors were closed.

TWO DAY PUBLIC AUCTION!

INDUSTRIAL MACHINERY MANUFACTURER

By Order of the Court Appointed Receiver

HPM CORPORATION

820 WEST MARION ROAD · MOUNT GILEAD, OH 43338

TUES. & WED. MARCH 29 & 30 · 10:00 A.M. DAILY

Bid on site or bid via BidSpotter.com

LOT #1: THE INTELLECTUAL PROPERTIES OF HPM
EXTRUDER SCREW MACHINERY: Incl. Weingartner CNC 7-Axis Thread Whirler · Extruder Screw Mill · 150 T. Straightening Press · More
(2) MORI SEIKI CNC TURNING CENTERS: Mdl. MT4000B/4000 4-axis, 2003 · Mdl. MT2500SZ/1500 9 axis, 2002 · HUGE QUANTITY TOOLING
CNC VERT. TURNING CENTER: Mazak Megaturn A-16NM/C
(2) DBL. COL. MACHINING CENTERS: Ingersoll 124" x 885" Vanguard GMB-20X40/1, 2006
HORIZONTAL MACHINING CENTER: Mori Seiki NH5000 4-axis, 2002
CNC VERTICAL MACHINING CENTER: Cincinnati Milacron Sabre 1000 4 axis
CNC PLANER MILL: Betts/Futuremill Double Column, 120" x 350" table
PLANER TYPE HORIZONTAL BORING MILL: Gray 8"
PLANER MILL: Ingersoll 60" x 22' dbl. col. · CNC VERT. BORING MILL: Bullard 86"
46" BULLARD VTL · (4) CNC LATHES
(8) ENGINE LATHES: Up to 48" x 312"
(7) PLAIN CYLINDRICAL GRINDERS: Incl. Landis 29" x 216" Plain
(2) INTERNAL GRINDERS · (4) RADIAL ARM DRILLS: Up to 8' x 19"
PRESSBRAKES & SHEAR · BANDSAWS · Q.C. EQUIP. · 1000's OF M. R. O. ITEMS
(21) OVERHEAD BRIDGE CRANES: Up to 100 T. x 96' span
ROLLING STOCK · 100'S OF TONS OF RAW MATERIAL
(11) FORKLIFTS: Up to 33,000 lbs. cap., 1000'S OF PROPRIETARY AND PURCHASED PARTS FOR HPM INVENTORY

BUYER'S PREMIUM: 12% onsite · 15% webcast
INSPECTION: Monday, March 28, 9 am to 4 pm and each morning of sale.
PAYMENT TERMS: Cash, Cashiers Check, Wire Transfer OR Company Check with letter from bank guaranteeing payment to PMI.

For a free brochure call 713-691-4401
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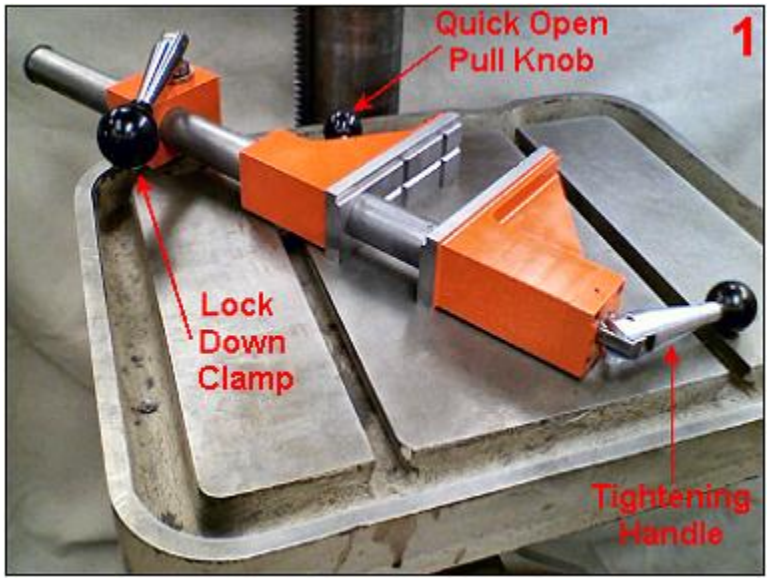
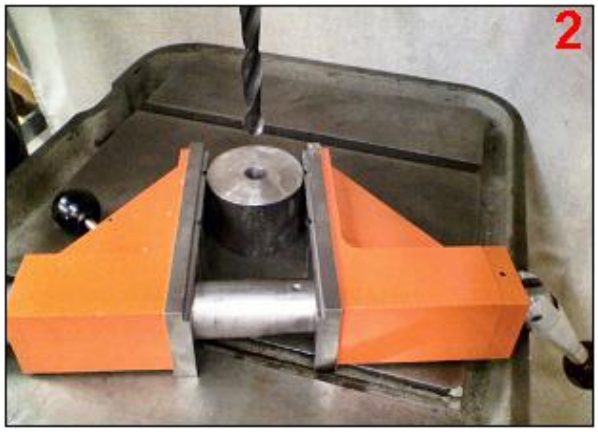
Now here's The Déjà Vu part. I too can feel for the people that lost their jobs at a 125 year old company that started in the early years making apple presses. A couple of years ago I looked on eBay and there were a few HPM machines for sale. Now, most of what you see is made in Asia. Some 25 years later, the NAFTA stuff came along, I watched two Pratt-Whitney 36" chuck CNC lathes that were part of my work center being loaded onto a Mexican flat bed trailer with bald tires going to Monterrey, Mexico. Here again was that same feeling that I had years before.

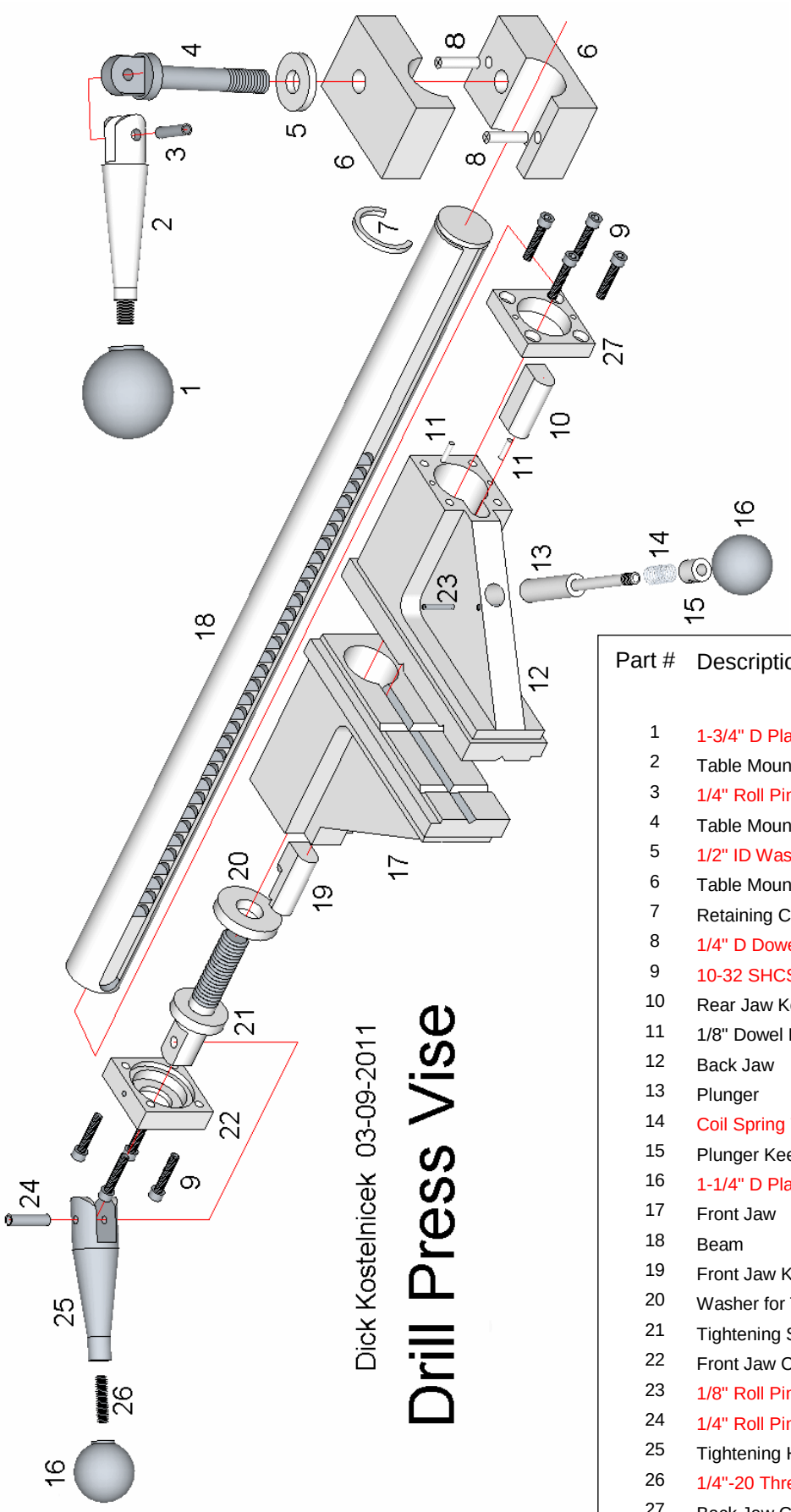
Unconventional Drill Press Vise

By *Dick Kostelnicek*



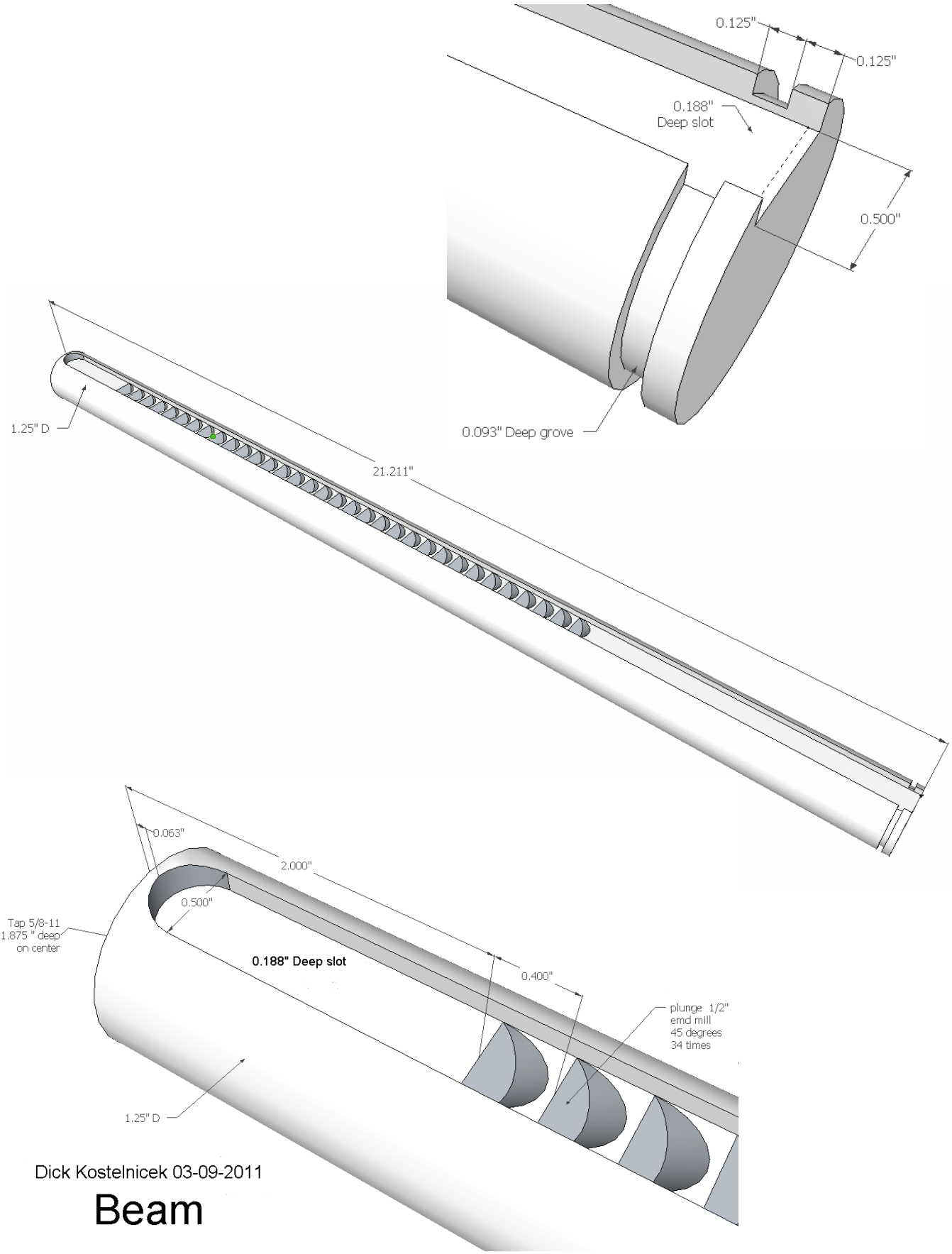
Here are my plans for an unconventional drill press vise. Its throat depth is 4½ inches and it opens to more than 12 inches. The vise can be used in the horizontal or vertical position (photos 2, 3). The end of the vise's beam is attached and locks to a corner of the drill press table via a ball-handled lock down clamp (photo 1) that prevents the drill bit from grabbing and spinning the held work. The method of attaching the clamp depends on the table design and is left to you to provide a suitable grip (photo 4, 5). When the vise is not in use, it can be parked completely off of the drill press table (photo 6). Pulling a ball knob located in the rear jaw (photo 1), allows the vise to be quickly opened to the desired width. As the jaws are pushed close, a ratcheting plunger provides stops in 0.4 inch incremental steps. The screw travel provided by the tightening handle (photo 1) is ½ inch, which adequately spans each ratcheted step. There are both vertical and horizontal V-grooves on both jaw faces to accommodate round work. Along the top of each jaw's face is a square recess that holds rectangular flats or long stock in an elevated position above both the clamp's beam and the drill press table, thereby allowing drill through applications. The vise is machined mostly from mild steel except for two brass keys and some standard hardware. 3D dimensioned drawings and a bill of materials are shown below.

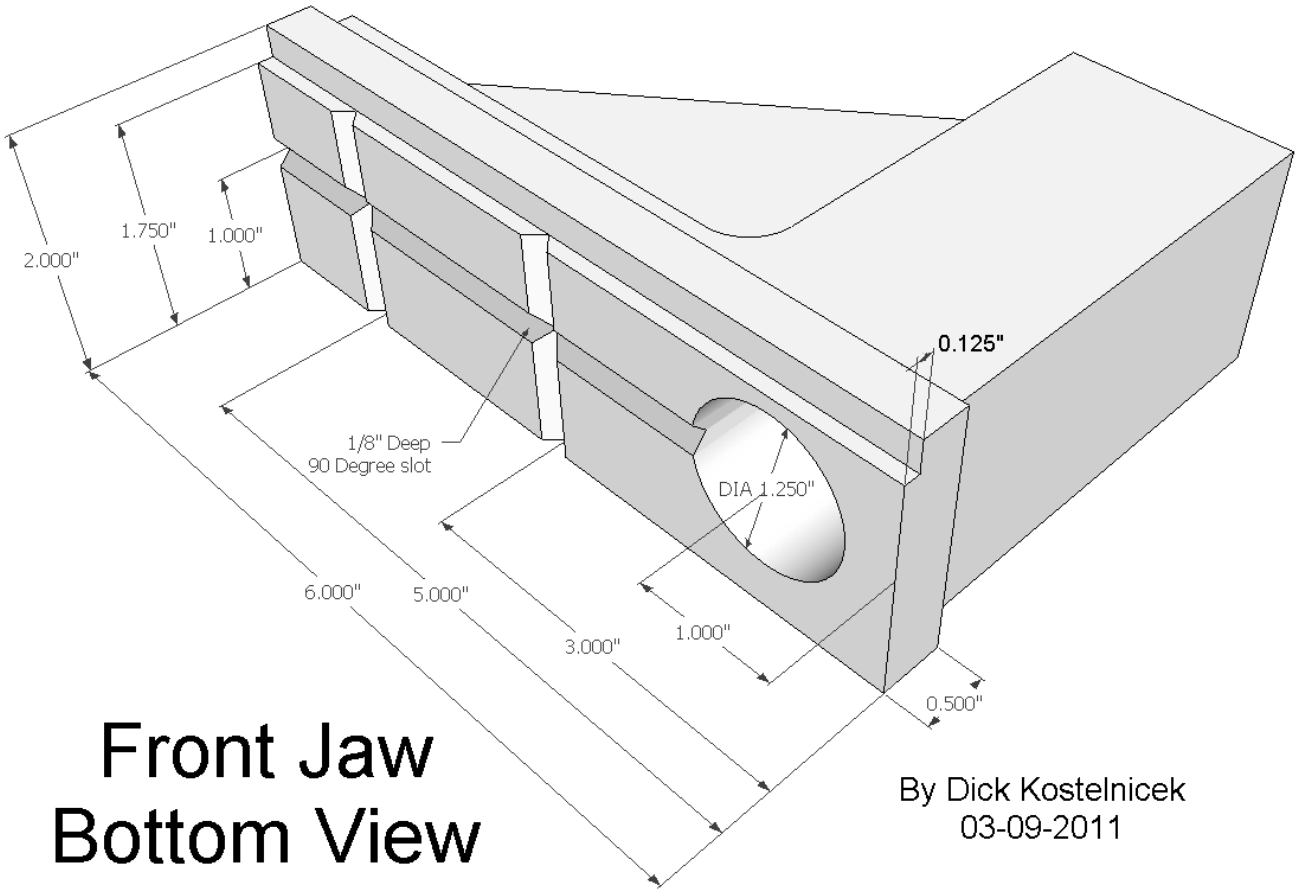




Part #	Description	Required
1	1-3/4" D Plastic Ball 3/8"-16 ID Thread	1
2	Table Mount Handle	1
3	1/4" Roll Pin 7/8" Long	1
4	Table Mount Hold Down Bolt	1
5	1/2" ID Washer	1
6	Table Mount Clamp	2
7	Retaining Clip	1
8	1/4" D Dowel Pin 7/8" Long	2
9	10-32 SHCS 3/4" Long	8
10	Rear Jaw Key, Brass	1
11	1/8" Dowel Pin 1/2" Long	2
12	Back Jaw	1
13	Plunger	1
14	Coil Spring 7/16 OD, Length as Required	1
15	Plunger Keeper	1
16	1-1/4" D Plastic Ball 1/4"-20 ID Thread	2
17	Front Jaw	1
18	Beam	1
19	Front Jaw Key, Brass	1
20	Washer for Tightening Screw	1
21	Tightening Screw	1
22	Front Jaw Cover	1
23	1/8" Roll Pin 1/2" long	1
24	1/4" Roll Pin 1" Long	1
25	Tightening Handle	2
26	1/4"-20 Threaded Rod 1" Long	1
27	Back Jaw Cover	1

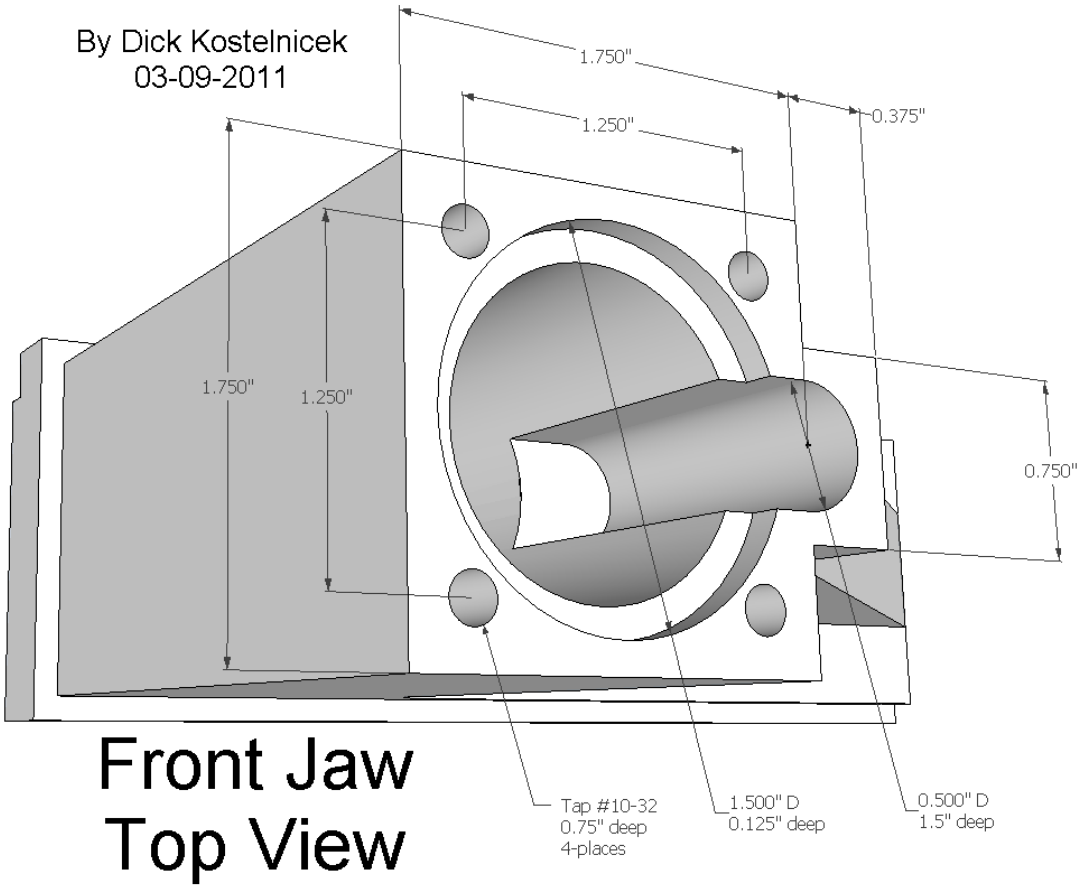
Standard Hardware Items


0.125"
0.125"
0.188"
Deep slot
0.500"
0.093" Deep grove
1.25" D
21.211"
0.063"
2.000"
0.500"
Tap 5/8-11
1.875 " deep
on center
0.188" Deep slot
0.400"
plunge 1/2"
emd mill
45 degrees
34 times
1.25" D
Dick Kostelnicek 03-09-2011
Beam

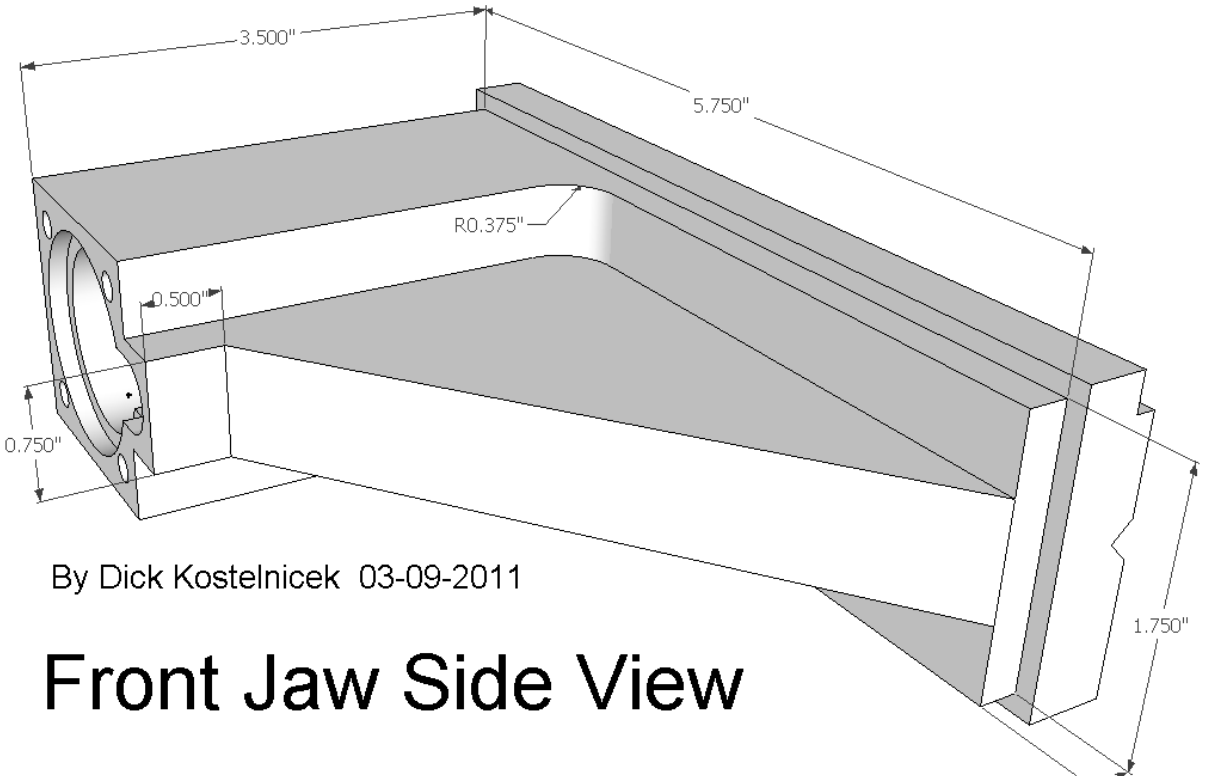


Front Jaw Bottom View

By Dick Kostelnicek
03-09-2011



Front Jaw Top View



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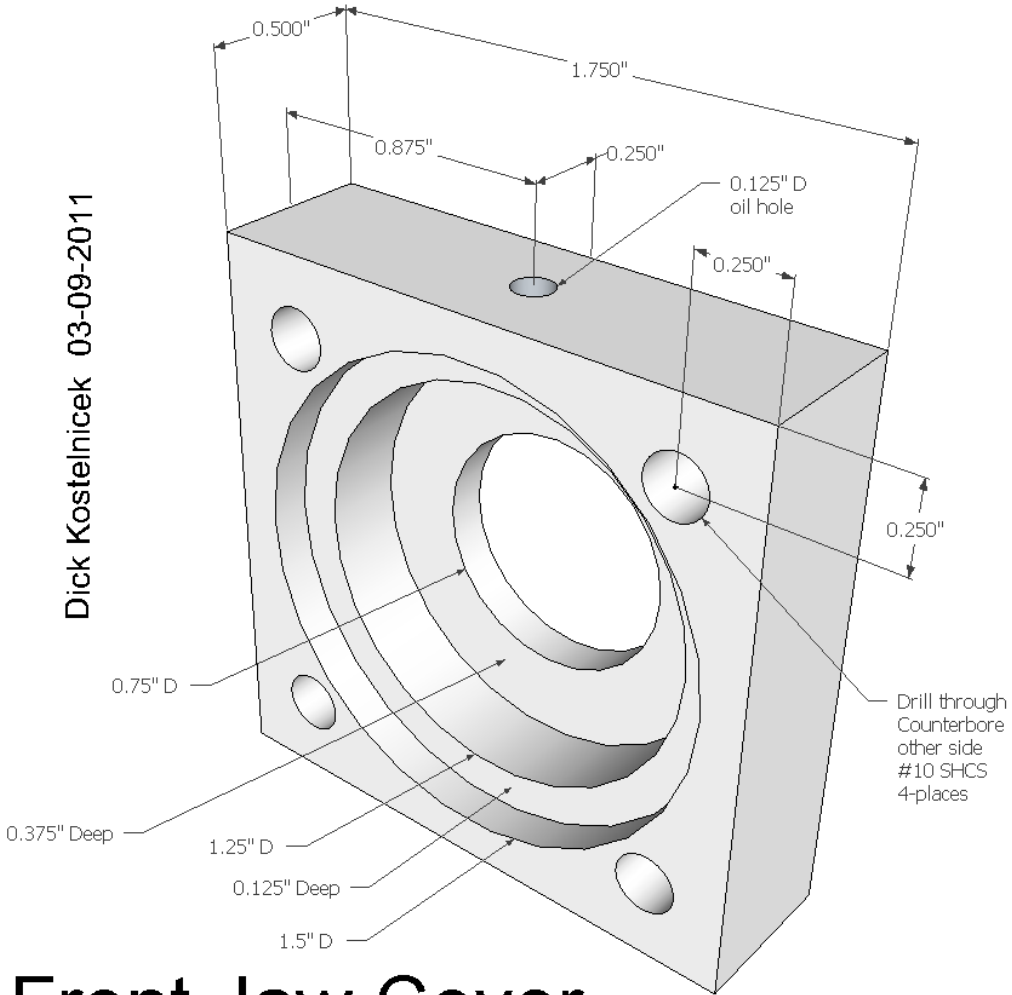
Front Jaw Side View



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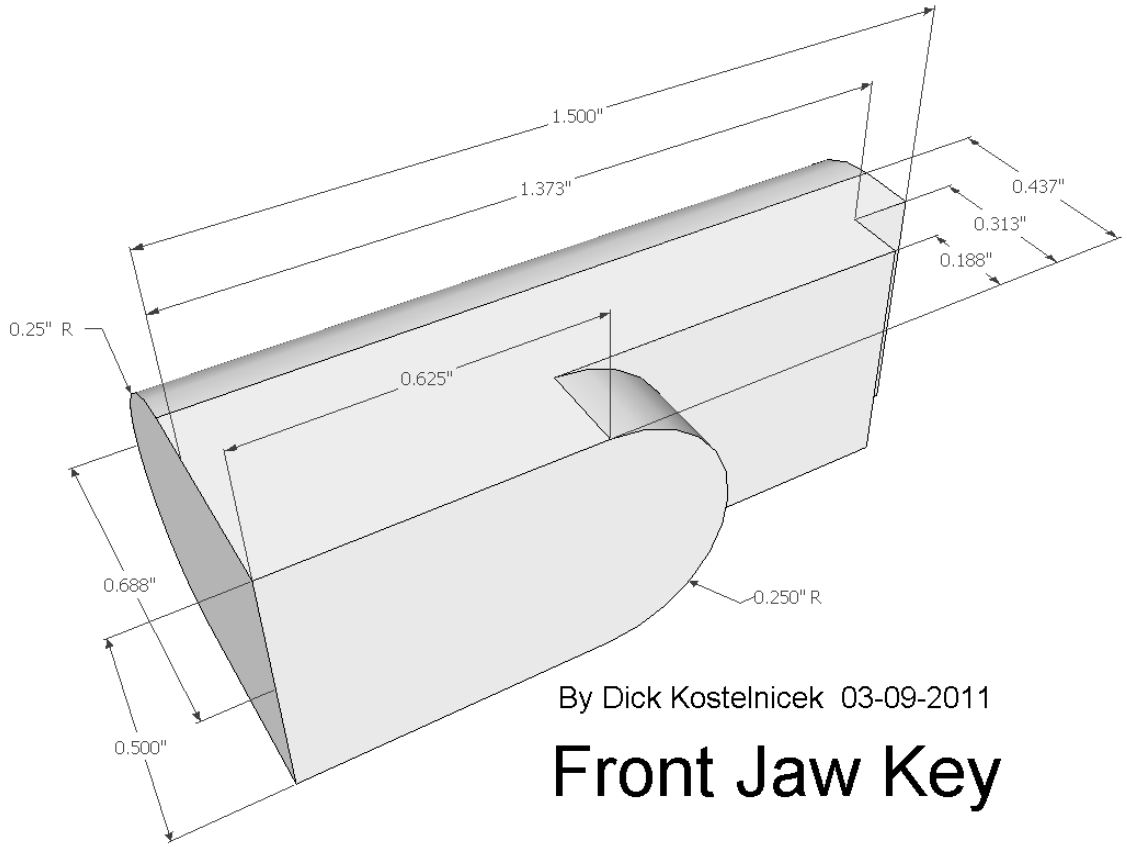
Front Jaw Cover



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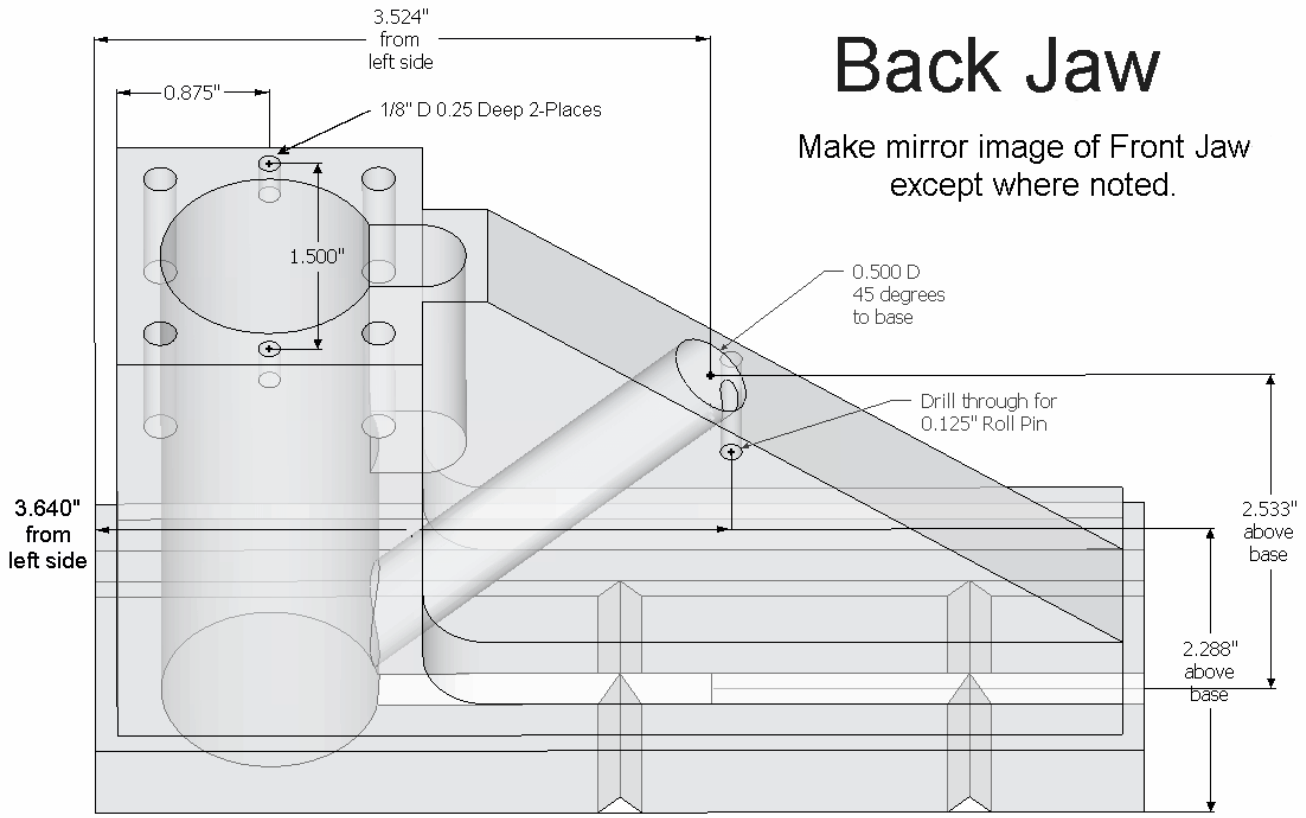
Front Jaw Key



Back Jaw

Make mirror image of Front Jaw
except where noted.

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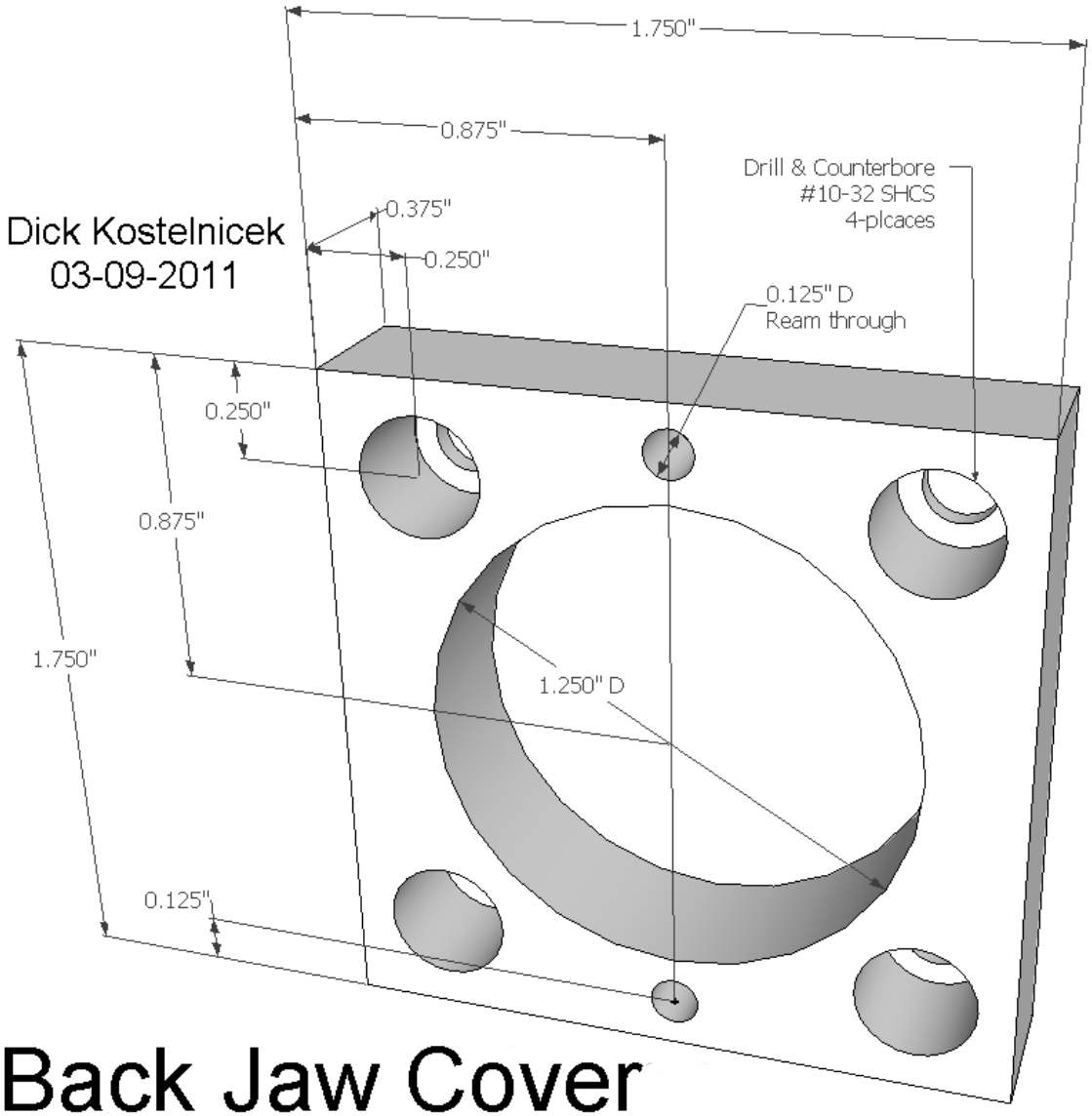
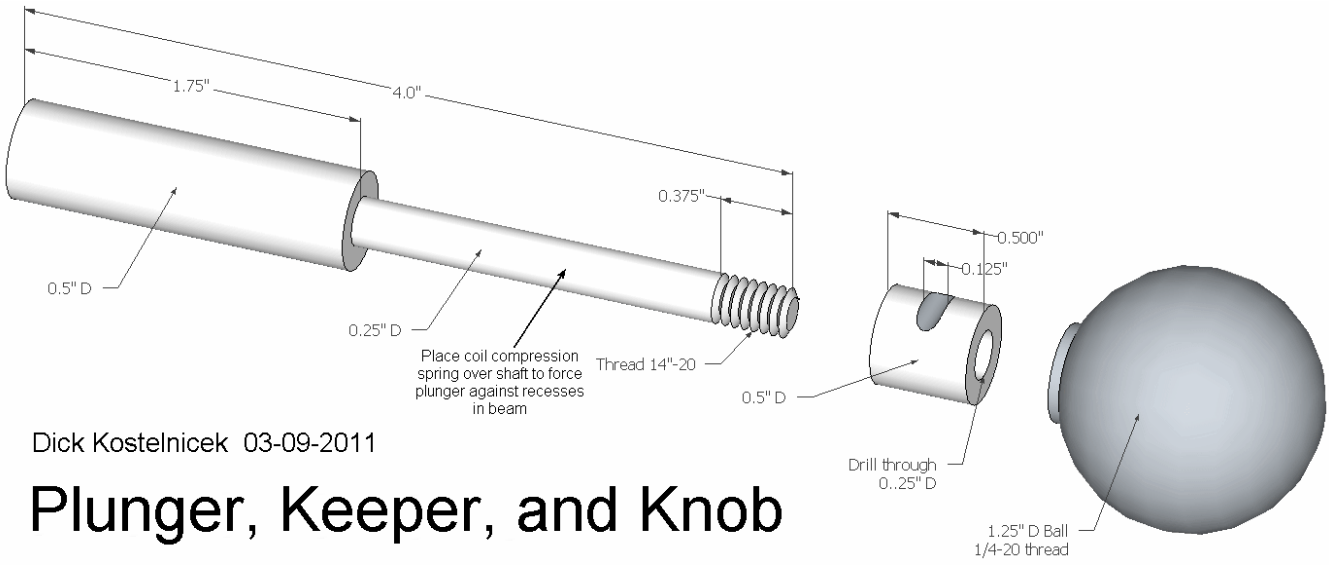
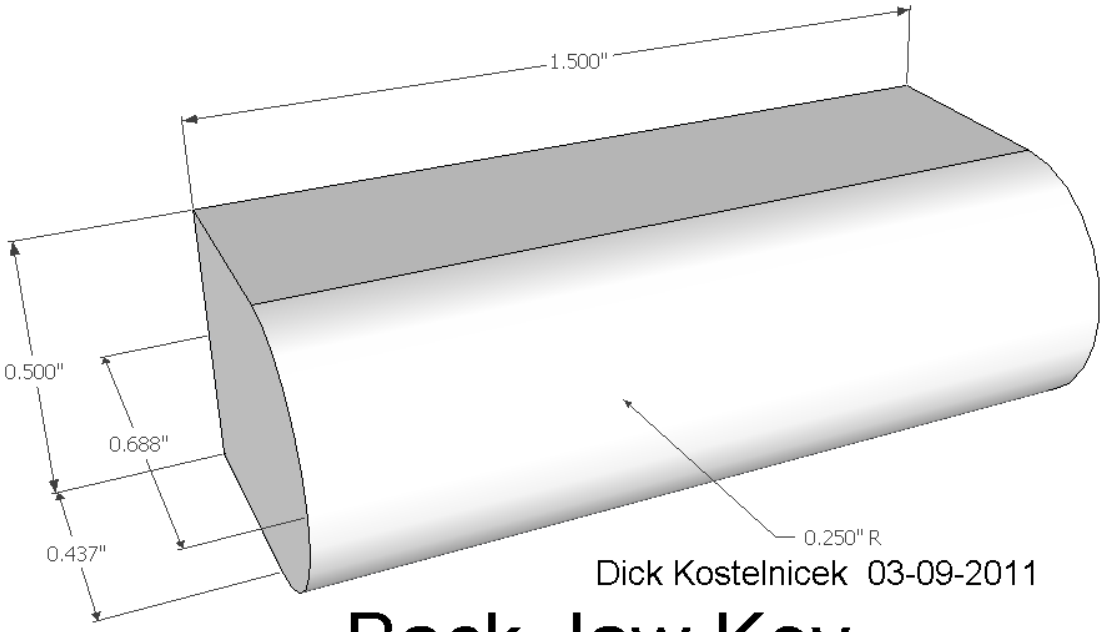


Back Jaw Cover



Plunger, Keeper, and Knob



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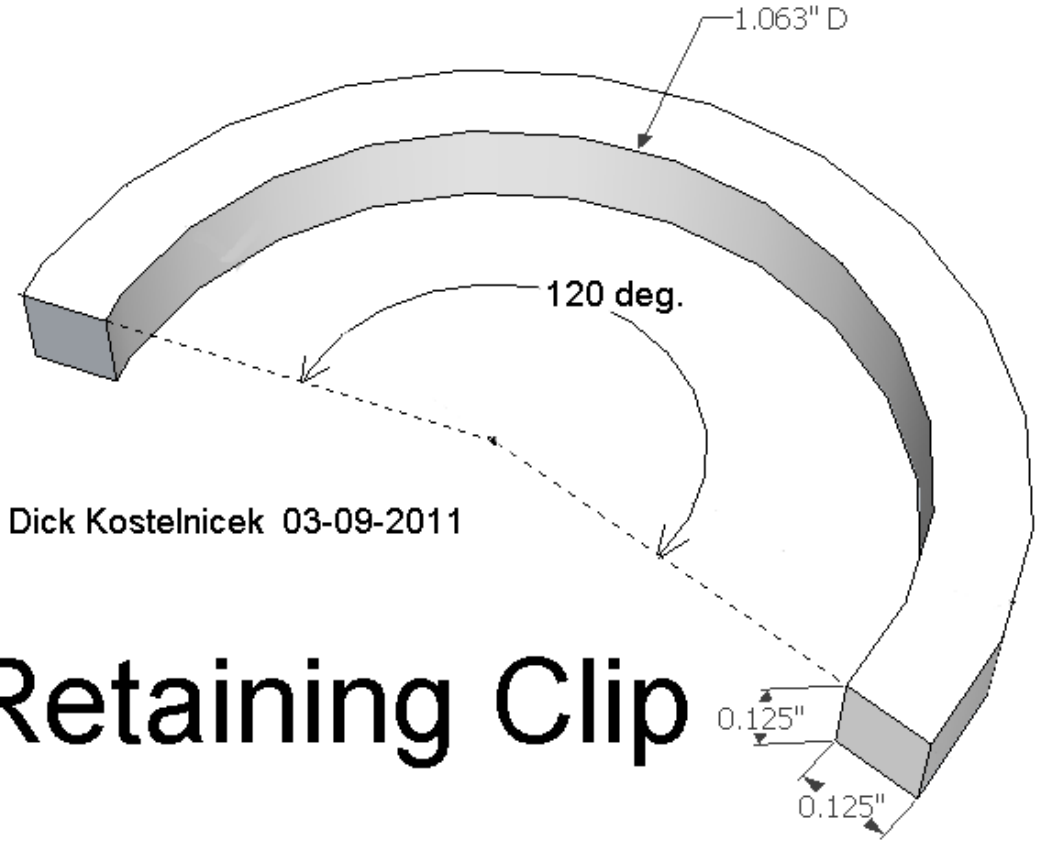
Back Jaw Key



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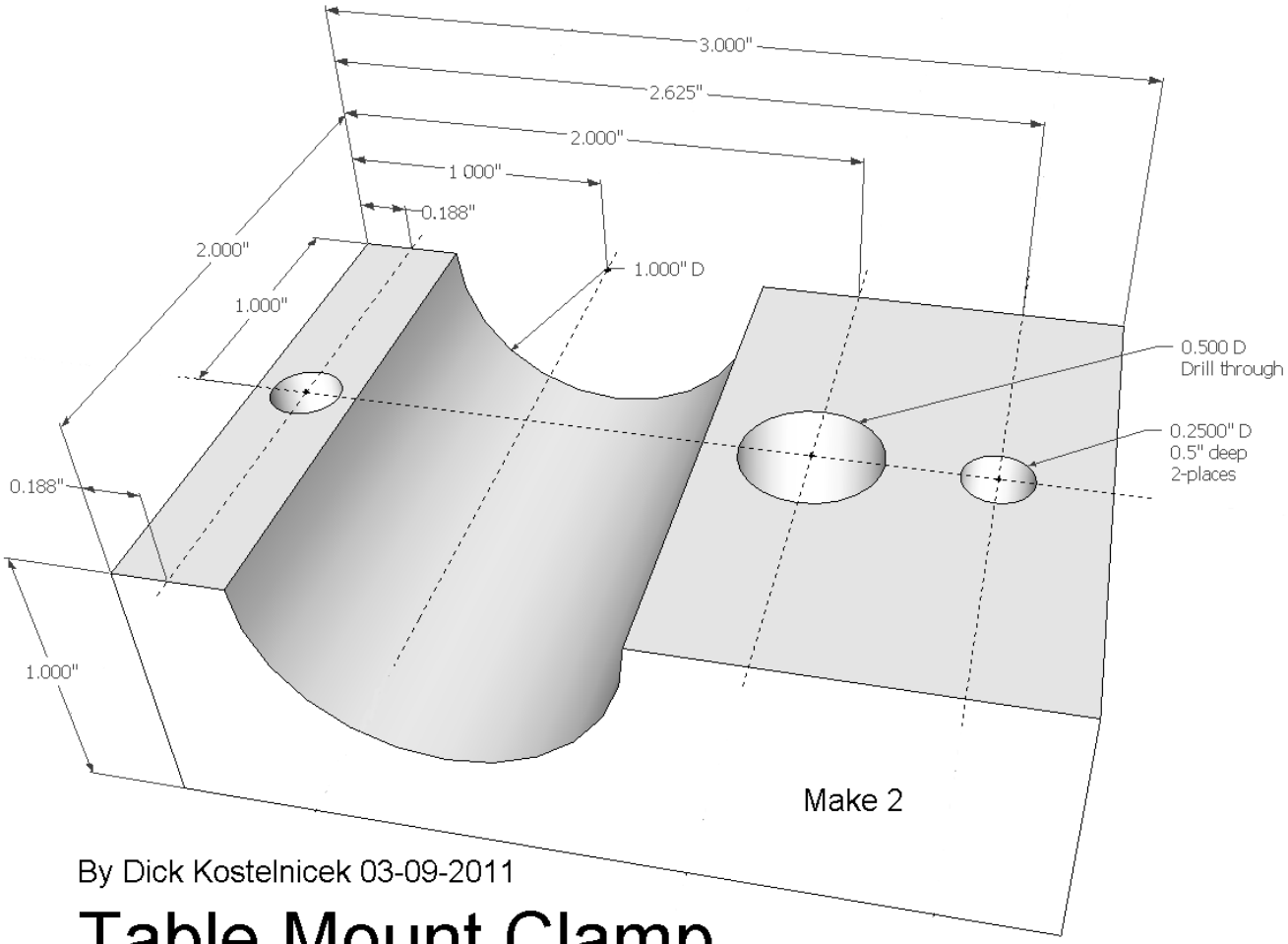
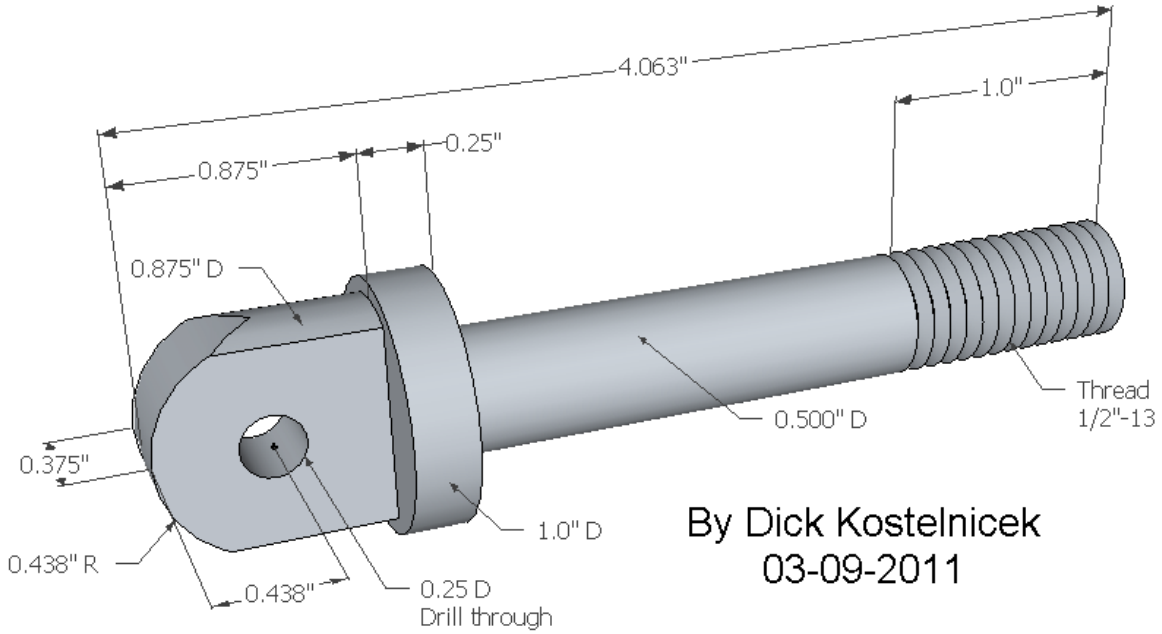
Retaining Clip



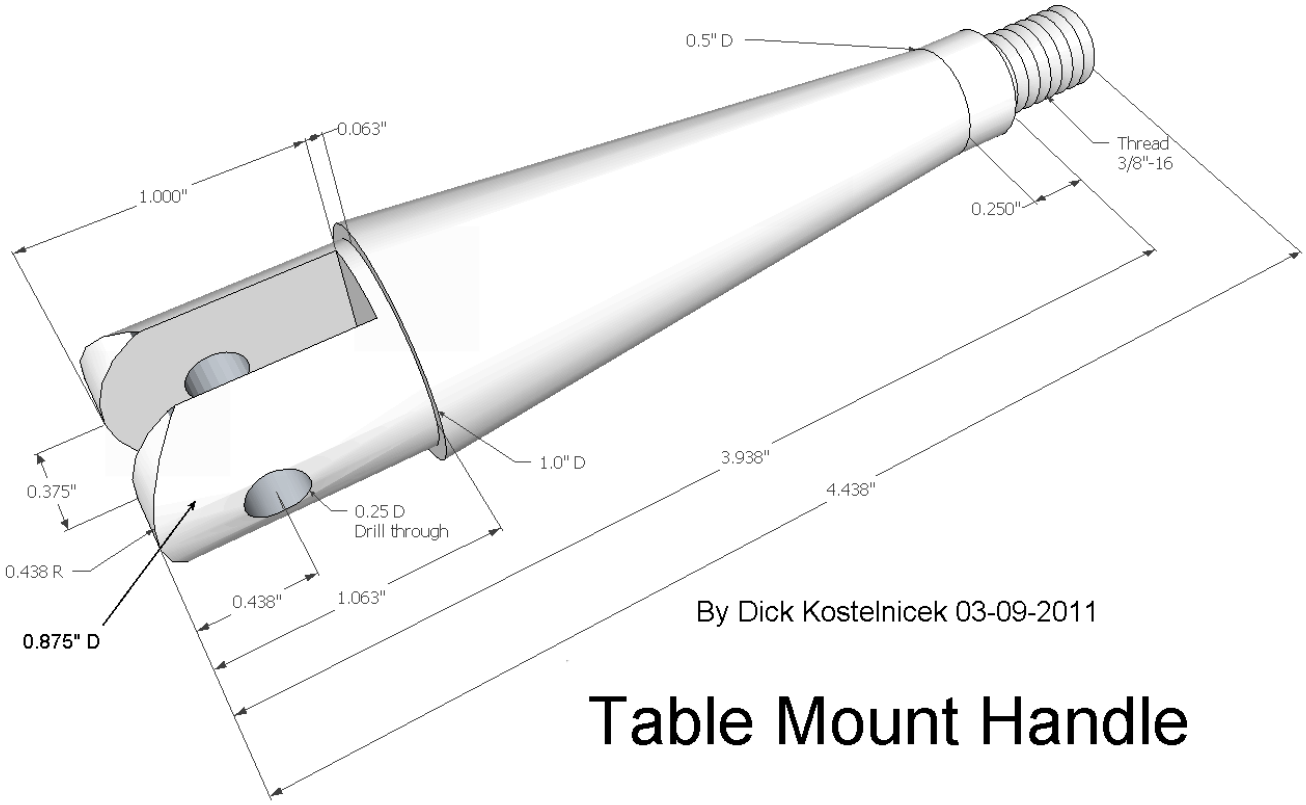
By Dick Kostelnicek 03-09-2011

Table Mount Clamp



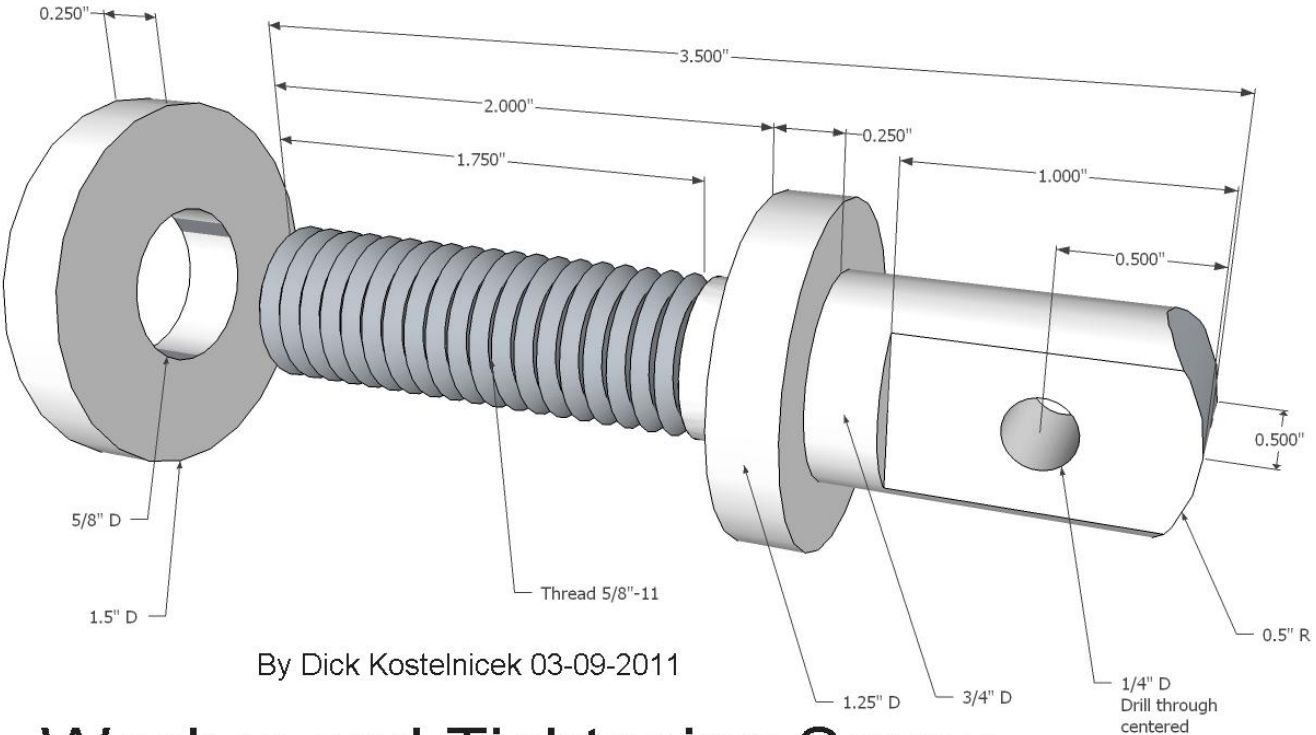
By Dick Kostelnicek
03-09-2011

Table Mount Hold Down Bolt



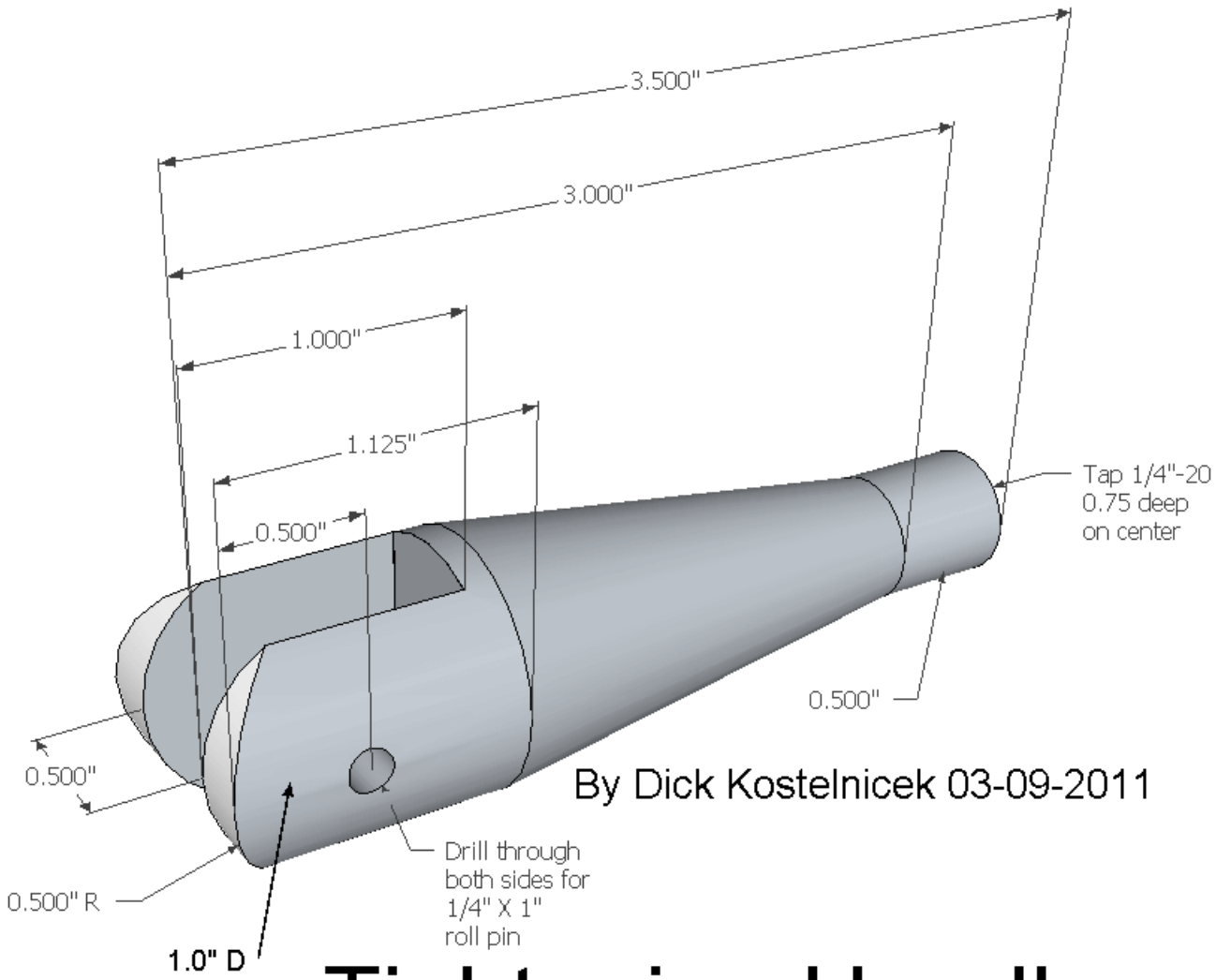
By Dick Kostelnicek 03-09-2011

Table Mount Handle



By Dick Kostelnicek 03-09-2011

Washer and Tightening Screw



Tightening Handle