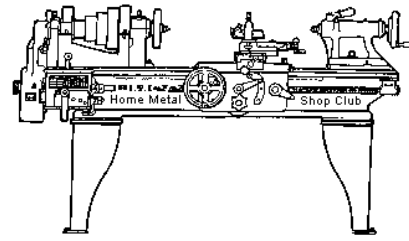




December 2010 Newsletter

Volume 15 - Number 12



<http://www.homemetalsclub.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 <i>Vance Burns</i>	Vice President <i>John Hoff</i>	Secretary <i>Martin Kennedy</i>	Treasurer <i>Emmett Carstens</i>	Librarian <i>Dan Harper</i>
Webmaster/Editor <i>Dick Kostelnicek</i>	Photographer <i>Jan Rowland</i>	CNC SIG <i>Dennis Cranston</i>	Casting SIG <i>Tom Moore</i>	Novice SIG <i>Rich Pichler</i>

About the Upcoming January 15 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. Due to a library administrative error, **we've had to move the January meeting to the third Saturday, on January 15th**. Visit our [website](#) for up-to-the-minute details.

Dan Harper will give a presentation on making a vise.

Recap of the December 11 General Meeting

By Martin Kennedy, with photos by Dick Kostelnicek



Thirty members and no guests attended the 12:00 noon meeting at the Parker Williams County Library. President *Vance Burns* led the meeting.

Club members were encouraged to join our Yahoo [Tinkering Group](#). The administrator, *Dennis Cranston*, mentioned that he carefully screens applicants. Anyone interested should mention his membership in this club or provide a strong reason for participation in an email to Dennis when asking to join.

The tailgate sale is still being planned for January, but a date and location has not yet been finalized.

HMSC member *Dennis Cranston* donated a book, Trustee From the Toolroom by Nevil Shute, to our library and encouraged others to give their duplicate or unwanted books. Thanks, Dennis!

President *Vance Burns* often receives emails from people wanting machining services. He refers them to our [member biography page](#). So, if you are interested in this sort of work, be sure to contact the [webmaster](#) and include your contact information there!

Because of interest in last month's article on Filing by Dean Williams, novice coordinator *Rich Pichler* wants to do a hands-on demonstration of filing techniques during the January Novice SIG's session. Rich asked for a volunteer to give the demonstration, and asked if anyone had a filing machine that they could bring in for the session.

Presentation



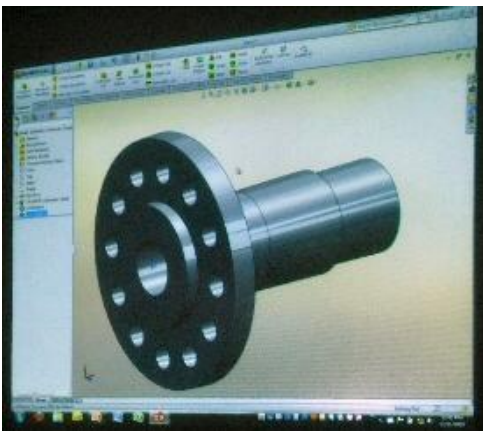
Stephen Moore gave a presentation on the SolidWorks CAD program, and spoke briefly on MasterCAM. Stephen is a degreed Industrial Engineer who works for [MLC CAD Systems](#) here in Houston.

Stephen began his career as a board draftsman, following in the footsteps of his father. He first used AutoCAD at the tender age of 14. Stephen became interested in 3D CAD after he spent an entire day revising a suite of AutoCAD drawings just to change a few dimensions.

SolidWorks

[Solidworks](#) has 21% of the CAD (Computer Aided Design) market, while Autodesk has about 31%, primarily with their 2D CAD product, AutoCAD. Several other products make up the remaining percentage. SolidWorks was founded in Massachusetts in 1995 by former Unix ProE CAD employees to take advantage of the Windows operating system. The company has since been acquired by Dassault Systemes.

The presentation began with videos of [Team Grave Digger](#), who participate in monster truck events. Monster trucks began as modified stock trucks, but have over the years morphed into completely custom designed vehicles. Team Grave Digger uses SolidWorks and MasterCAM to design the structure and parts for their trucks. The suspension and drive systems in these trucks experience massive loading during operation. In the videos, it was desired to redesign a wheel hub that was failing after hard landings. At that point in the presentation, Stephen stopped the video and made a hands-on demonstration of how SolidWorks could be used for the design and analysis of the part.



First, he built up the hub in 3D in SolidWorks. Once the hub was constructed, elements such as bolt holes, splines, threading, filleting and chamfering were added. SolidWorks has powerful capabilities that make this relatively easy. The hub was pulled into the FEA (Finite Element Analysis) module in solidworks. Loads and constraints were applied to the hub, and the program showed the resulting stress and deflection to the hub, as well as the design factor of safety. Some optimization was made to the original design, and the FEA was rerun to investigate the effect of the changes.

At that point, Stephen quickly made 2D drawings of the part by dragging and dropping views of the hub onto a blank page, and demonstrated how easy it was to import dimensions. The 2D drawings were completely integrated into the part design, and changes made to the drawings were automatically propagated to the original parts.

The ability to provide drawings to others who do not have SolidWorks through the use of the eDrawing viewer was shown. The eDrawing viewer, which supports SolidWorks, AutoCAD, and other file types, can be obtained for free from [this website](#). It was noted that a similar product called [DWGgateway](#) was available for just AutoCAD drawings.

SolidWorks is a full-featured industrial program, and as such costs in the \$4-8,000 range, depending on the options selected. The presentation was made using the lower cost basic package. Adding a yearly service agreement for updates and support is recommended but not required.

MasterCAM

Stephen showed a short video of how MasterCAM for SolidWorks was integrated into Solidworks. MasterCAM (Computer Aided Manufacturing) generates G-code toolpaths to drive CNC equipment. The advantage to this integrated product was that any changes made to the original part instantly updates the toolpaths, and thus the G-code generated by MasterCAM.

Like SolidWorks, MasterCAM is a full-featured industrial program, and as such costs in the \$4,000 range for the stand-alone version (which includes its own 3D drafting program), and in the \$1,500 range for the SolidWorks add-in.

DraftSight

In answer to a question, it was mentioned that a free program called [DraftSight](#) had been produced by Dassault Systemes. DraftSight is an AutoCAD compatible 2D drafting program that can edit, load and save AutoCAD .dwg files.

Show & Tell

Two videos, made by and starring club members *Joe Williams* and *Martin Kennedy*, on [sharpening mills](#) and [tapping holes](#) with a Tapmatic were shown. If you'd like to make a video and need help or even a videographer with a video camera, please contact President Vance Burns.



Joe Williams had an unusual lathe-centering indicator (Brown & Sharpe #736, similar to Starrett #65) that can be used to center stock in a 4-jaw chuck. The pointed end of the thin rod is put into a punched center on the stock, while the holder is clamped to the tool-post. The gimbaled assembly allows the thin rod to wiggle if the item is not centered as it is turned by hand.

In his presentation last month, *Mike Hancock* talked about physical vapor deposition. Since that time, he made an example of a thin film of copper deposited on a glass slide, which he passed around.

Dick Kostelnicek showed a variable angle / sweep fly cutter that he designed and constructed. It was beautifully made and Parkerized. The parts that are bare metal were painted with a layout die such as Dykem which is not water soluble. After Parkerizing the dye was removed with acetone. See the article [Adjustable Sweep Fly Cutter with R8 Shank](#) below for construction drawings.

Martin Kennedy showed an inexpensive RPM indicator that he obtained on eBay. The postage from China was three times the cost of the device, and it was still less than \$10 total!

Mike Winkler built a small single-ball bearing live center for his lathe, which is shown disassembled in the photograph at the right.



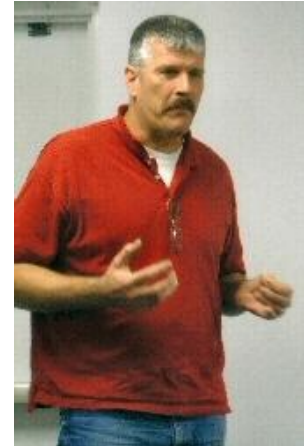
Joe Scott demonstrated his extensive knowledge of guns by speaking at length about the manufacture and repair of [16" Naval guns](#). He had several vintage drawings and books that he used to illustrate his talk. These guns can propel a 2,700 pound shell as far as 26 miles using 660 lbs of powder! With this kind of abuse, they will last only about 200-300 shots before they must be remanufactured. Joe also had some pictures of the [USS Oklahoma battleship being salvaged](#) by rolling and up righting it using winches at Pearl Harbor.



Ed Gladkowski created a tailstock device that allowed him to securely hold and thread S/S 3/32-44 screws (left photo). A point is cut at the end of the screw, and that point is pressed into a small

indention in the vertical brass rod at the left of the picture. The horizontal offset between the tailstock and the brass rod allows room for the cross slide.

John Elliot (right photo) gave a short talk on [amorphous metal](#). He mentioned how ball bearings will [bounce on it](#) for a long time. He plans to write an article for a future newsletter based on a paper he wrote for a class that he just completed.



Shannon DeWolfe showed a wedge filter (left photo) that is part of an X-ray machine, and allows organs such as the lungs to be shaded while X-raying the heart.

Dennis Cranston built an automatic temperature controller (right photo) for his metal casting pot with an inexpensive temperature controller (\$35) that he purchased on eBay. The

controller met his criteria of 110V, j-type thermocouple, and solid-state relay output. He modified the thermocouple by adding a short aluminum bar to protect the thermocouple from the hot metal.



Problems and Solutions

A member asked for a source of drill bushings and was referred to Rex or Bass Tool.

Advice on speeds and feeds to drill a 5/8-inch diameter countersink in 1020 steel was requested. Answers were to use a similar speed and feed to a 1 flute drill and 150 RPM to prevent chatter.

Help with a differential head to cut a 127-tooth lathe gear to be used to cut a particular thread was requested. He was referred to [this article](#) on the website by Dick Kostelnicek.

A question was asked on how to drill two holes at the end of a long bar to fit a pin spanner wrench. Laying a drill press on the floor was suggested, *half in jest*.

Novice SIG Activities

SIG coordinator *Rich Pichler* discussed how to calculate feeds and speeds for cutting tools. The Novice Notebook was consulted for information used in the calculation. Effects of too fast a speed or too heavy a feed were reviewed. A member's work-in-progress was discussed.

Articles

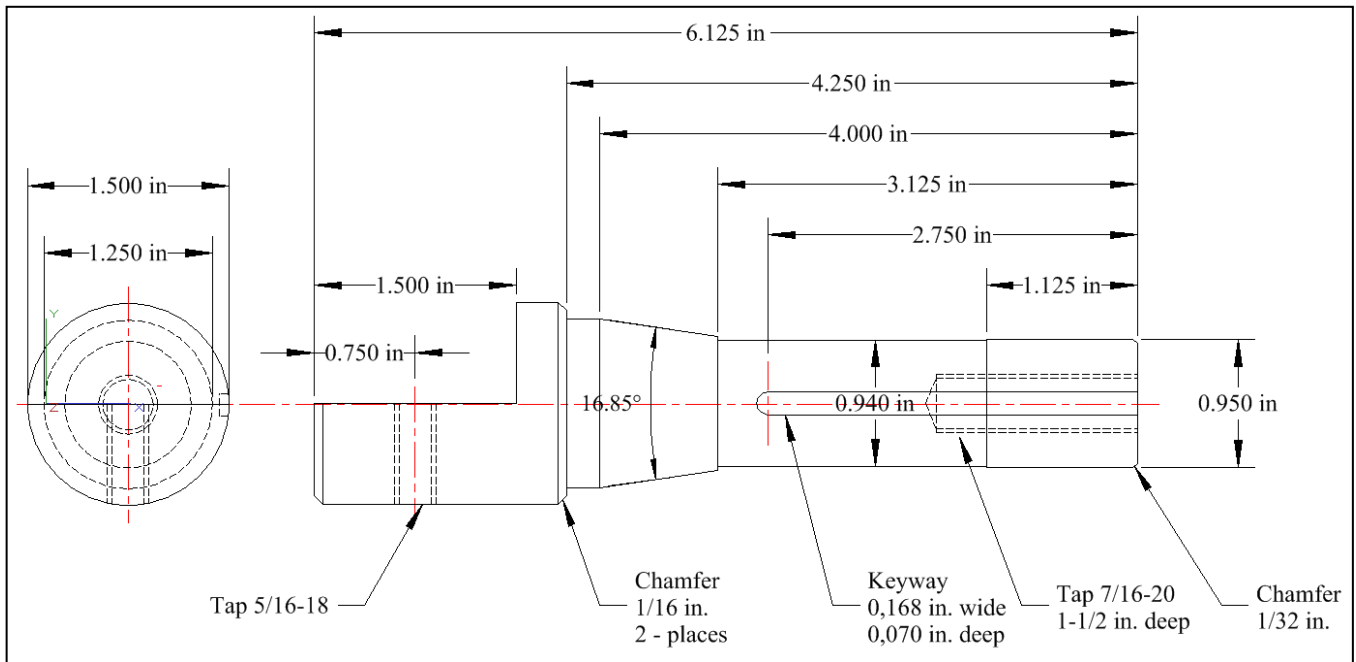
Adjustable Sweep Fly Cutter with R8 Shank

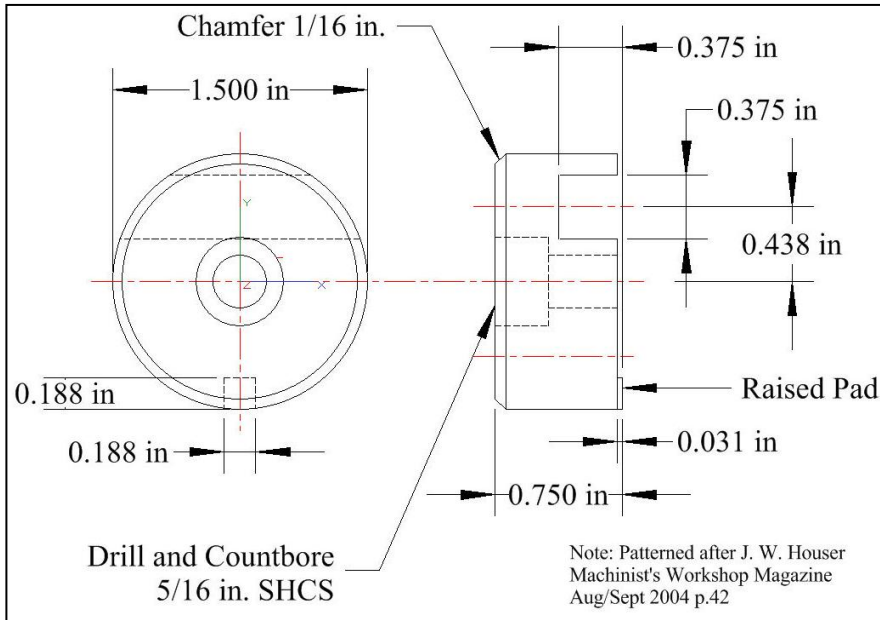
By *Dick Kostelnicek*



This adjustable sweep fly cutter swings up to 3-inches in diameter and has a R8 shank. Rotating the circular tool bit holder sets the span of its sweep. I've rounded the 3/8-inch brazed carbide insert so the bit cuts equally well regardless of the angle that its shank makes with the work's surface.

The non-bearing surfaces of the tool are Parkerized to inhibit corrosion. It is essential that a guard surround a rotating fly cutter, as there is always the possibility that the [tool bit can be launched](#) due to centrifugal force and do harm to persons or property. Additionally, hot chips thrown by fly cutters deliver severe pain when they stick to your skin.





Diamond Knurling with Straight Knurls

By J. R. Williams

I recently acquired two unconventional knurling tools with one set of knurls. My first experience with knurling was way back in high school some 60+ years ago. I have never seen this tool used (photo left below).

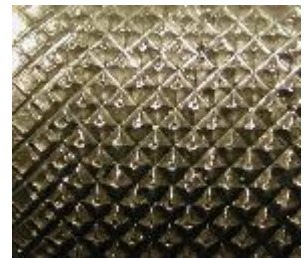


It's a B&S Mfg. Co. number 185-220. The straight knurls (right photo) can be set at any angle and adjusted to accommodate a range of stock diameters. The tool is designed to be held in a turret tool holder and has a 3/4" diameter shank. During the knurling operation, it approaches the work along the turning axis. Standard lathe knurling tools approach the work in a radial direction, either with single or double knurls. These are pressure formed knurls.



There were no instructions available for setting up the unit, so it became a trial and error process. I held the knurl holder in a Jacobs chuck that was set in the tailstock. The first trial was not correct as the knurls were set in opposite directions. It cut a great multi-pitch thread. The next move was to set the knurls correctly. The knurls were advanced over a section of 5/8" diameter CRS bar. They were first set to touch the work and then the assembly was withdrawn from the stock. The next adjustment was to advance each knurl (radially) toward the work an equal amount on each side and lock the adjustments. A little cutting oil was applied to the work and the knurl unit was moved along the bar stock with the tailstock hand wheel.

The result is shown in the right close up photo of the work. Its almost a perfect diamond with a square base. It was mostly accomplished on the first pass when the knurls were set correctly. No attempt was made to calculate the ideal bar stock diameter based on the knurl's pitch.

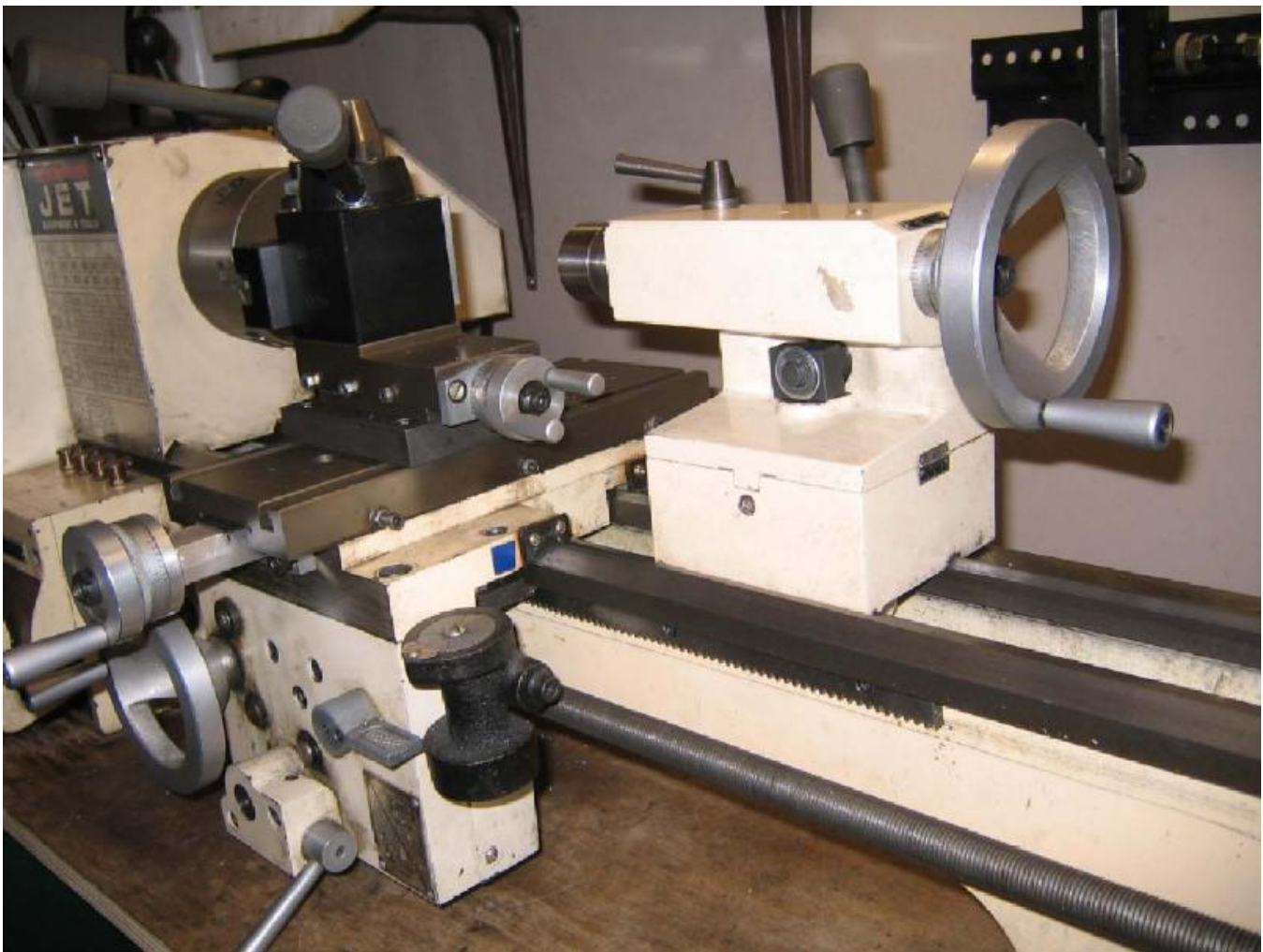


Tailstock Cam Lock - 9 X 20 Import Lathe

By *Martin Kennedy*

On my 9 x 20 lathe, a bolt secured the tailstock. Every time I wanted to move the tailstock, I had to figure out where I put its wrench. That meant that it often took more than five minutes just to find it! For some operations, such as drilling, reaming or tapping, it is necessary to move the tailstock multiple times. What I needed was a cam lock. It lets you secure or release the tailstock with a quarter-turn of a handle, which means that you can do it in about one second.

I had built a cam lock for my smaller 7x14 lathe and really liked it. So, I wanted one on my larger lathe. They're fairly simple in concept, and easy to fabricate. The most complicated part its construction is modifying the tailstock. You can see the completed cam lock on the tailstock at the right side of the photo below.



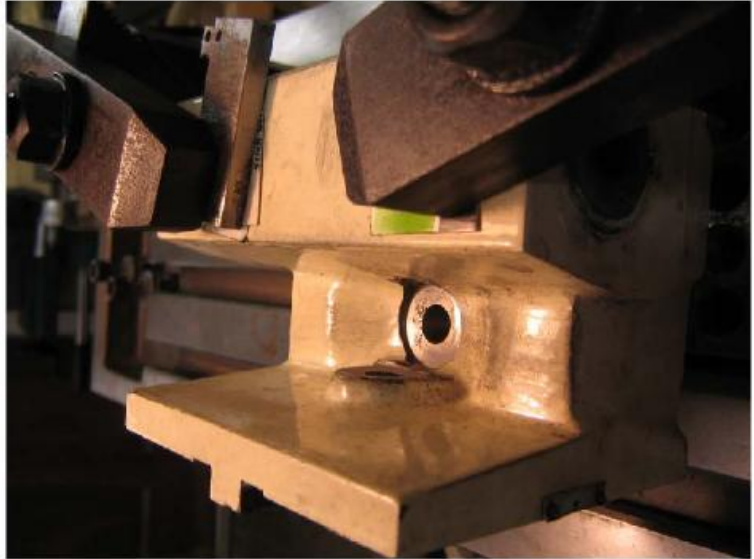
The following photos and drawings show how I made my cam lock.

Machining Tailstock

I used a 7/8" mill, mostly because the shank was long enough to reach down into the tailstock. I also machined the area around the tailstock clamp bolt hole to make it flat.

I drilled a 32/64" hole through the tailstock, and followed it with a 3/8" reamer.

Measure twice before you start machining, and make sure your clamps hold tightly!



Cam lever

Back view of tailstock, showing new cam lever. Install key or set screw so that open to close stroke is +/- 45 degrees from vertical. It should clear the spindle handwheel with the 5 degree offset.

The parts are black because I Parkerized them.

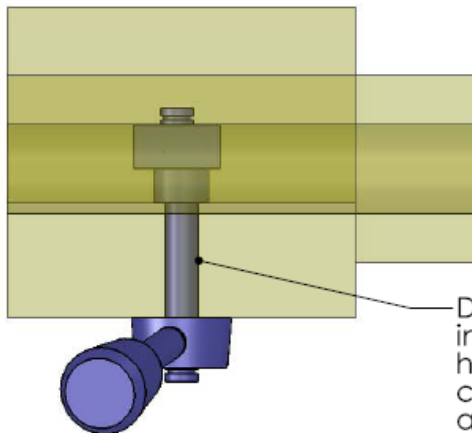
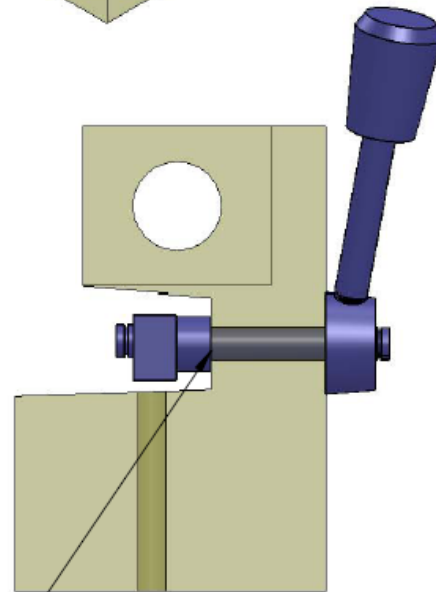
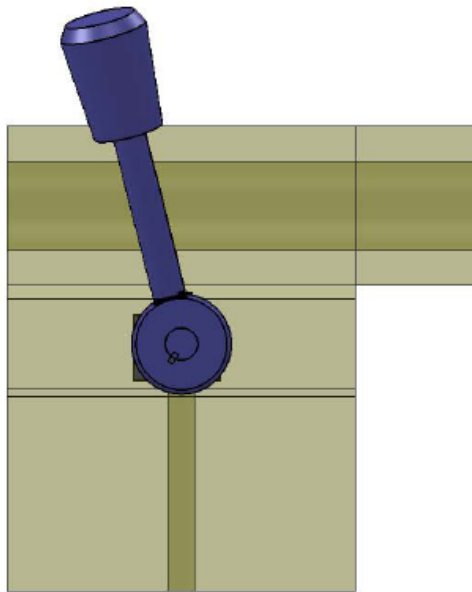
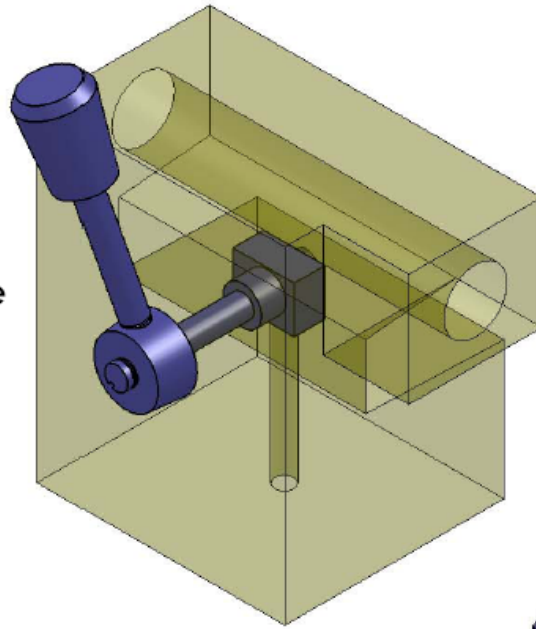
Actuation Block

There's very little clearance in the tailstock to install the block. It must be large enough to not deform on the top, and to provide sufficient engagement threads for the tailstock clamping bolt



Tailstock Camlock for 9x20 lathe

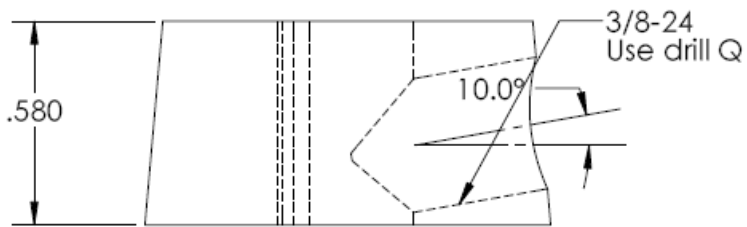
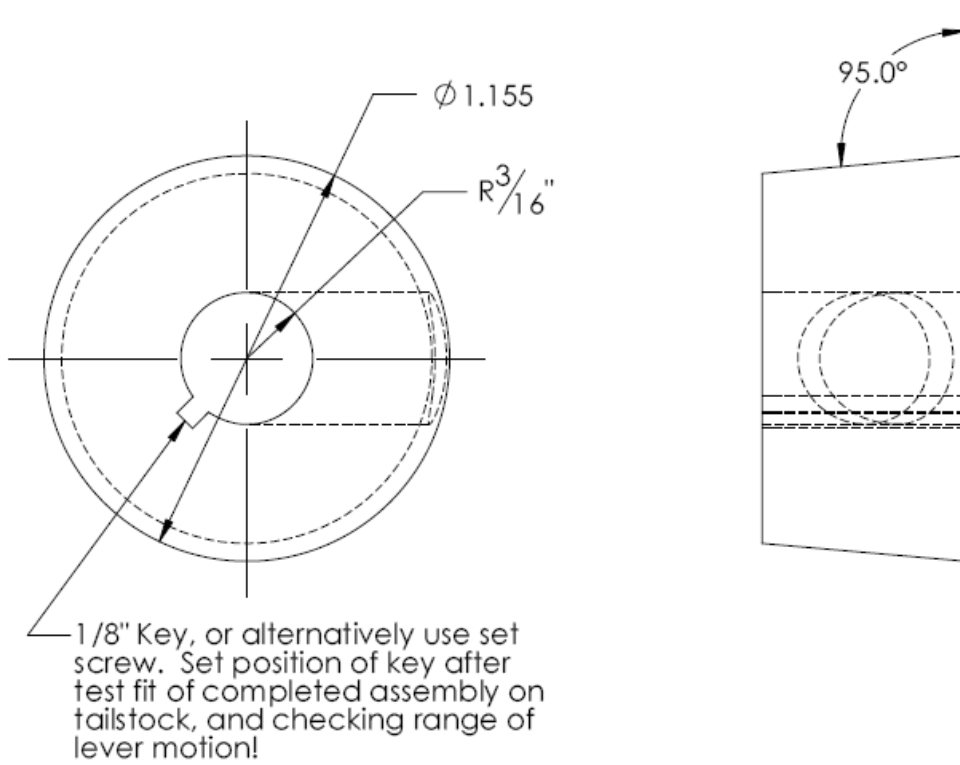
Due to variations in casting, please verify or modify all part dimensions around casting!



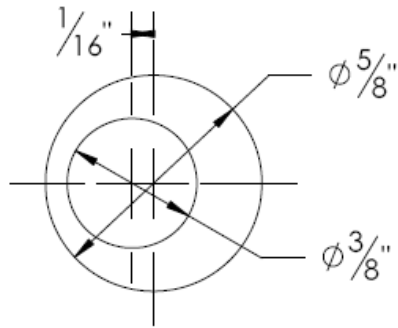
Machine flat spot here. Must be at least 5/8" diameter around new hole to accommodate new Cam Shaft. See picture in this packet.

Drill and ream 3/8" hole, similar to picture in this packet, through tailstock. Center hole directly above existing tailstock clamping bolt, in center between top and bottom of tailstock

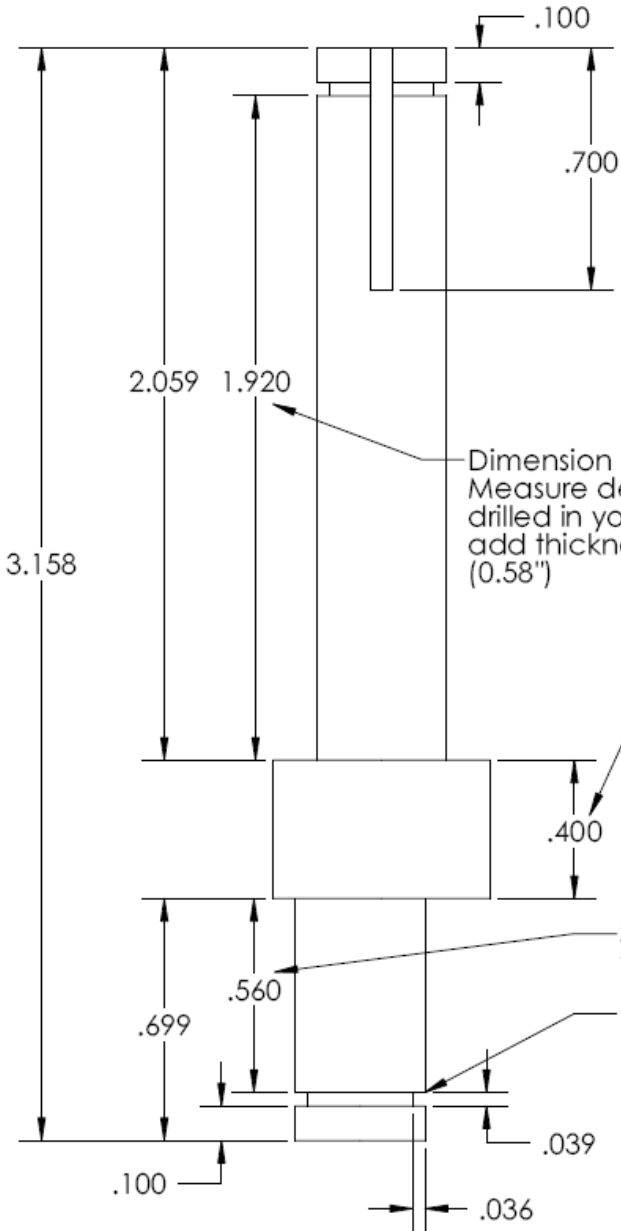
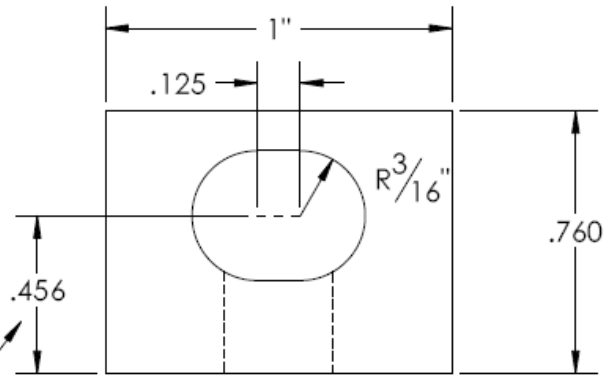
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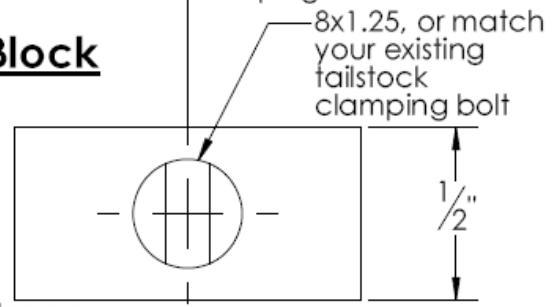


Cam Shaft



Dimension may vary!
Validate this works with where you drilled the new 3/8" hole in tailstock. Make as large as possible to provide sufficient threads for tailstock clamping bolt.

Block

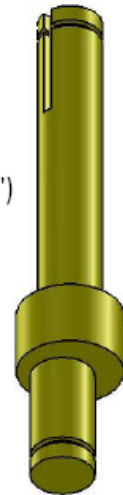
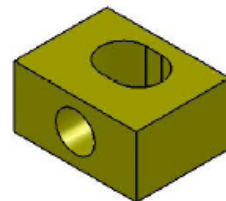


Dimension may vary!
Measure depth of hole you drilled in your tailstock, and add thickness of bushing (0.58")

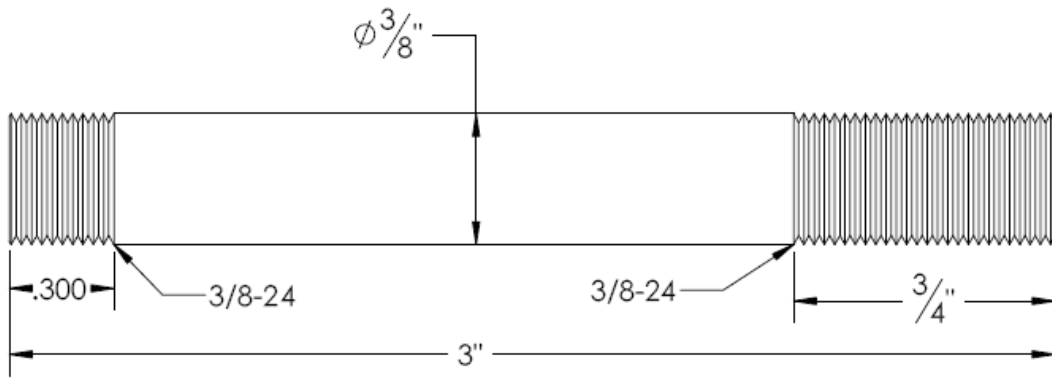
Dimension may vary!
Measure dimension from the flat you machined on your tailstock to centerline of existing tailstock clamping bolt, and subtract half of block thickness (0.25")

Sized for block plus washer (0.060")
verify your washer size!

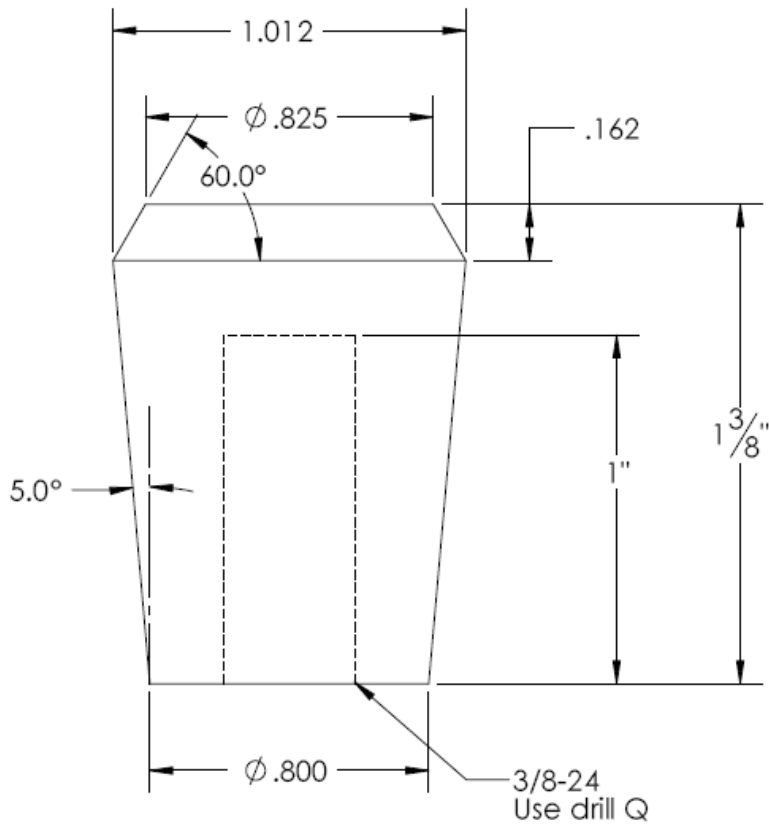
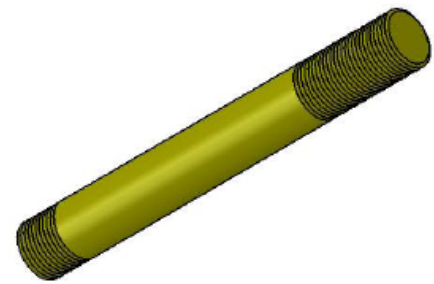
Use 3/8" External E-Ring



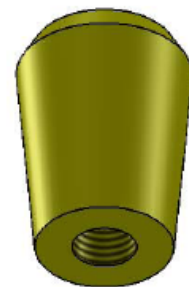
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Shaft



Knob



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