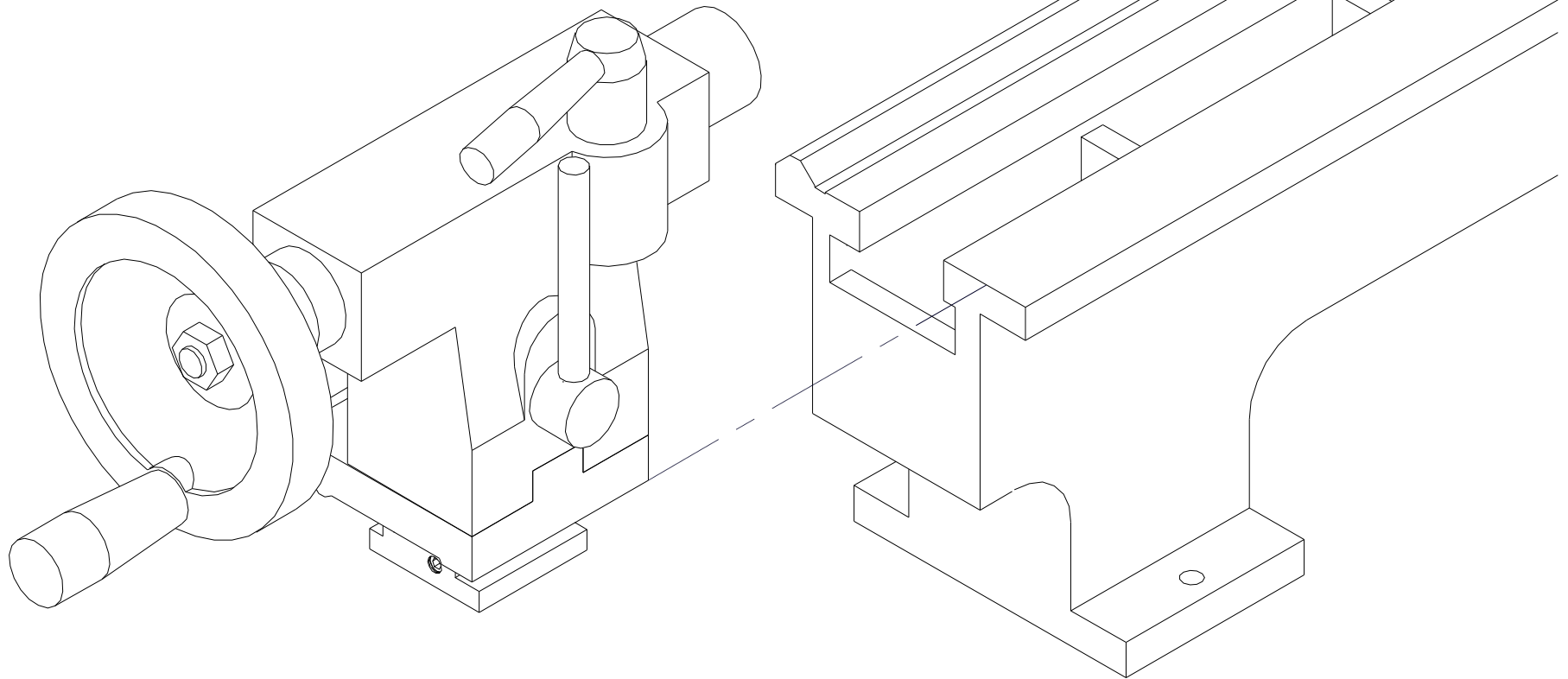


MINILATHE CAM-ACTUATED TAILSTOCK CLAMP MODIFICATION



ORIGINAL SYSTEM MAY BE RESTORED
EXCEPT FOR THE NEW HOLE IN TS CASTING.
VIEWED FROM REAR OF TAILSTOCK

1	RUST-OLEUM		COLOR - SEE NOTE 13	PAINT, AEROSOL SPRAY	13
1	4 OZ. CAN W/ BRUSH	49550	DYNATEX (ACE HARDWARE 87645)	GREASE, ANTI-SEIZE	12
2	∅.080 X .19		NYLON TRIMMER STRING	INSERT, NUT, ANTI-LOOSEN	11
1	∅.375 X .025 EXTERNAL	TYPE 303	STEEL, BLACK OXIDE TRUARC 5100-37	RETAINING RING	10
1	#10-32 UNF X .625	TYPE 303	STEEL, BLACK OXIDE	SETSCREW (MODIFIED)	9
1	5/16"	18-8	STAINLESS STEEL	WASHER, FLAT (MODIFIED)	8
1	.040 SPRING TEMPER	17-4PH	PIANO WIRE	SPRING, COMPRESSION	7
1	M10 X 1.50 JAM NUT	18-8	STAINLESS STEEL	NUT, HEX (MODIFIED)	6
1	∅.313 X 3.00 ROUND BAR	TYPE 303	STAINLESS STEEL ROUND BAR	LEVER ARM	5
1	.75 X 2.25 ROUND BAR	TYPE 303	STAINLESS STEEL, ROUND BAR	CAM	4
1	.75 HEX X 1.10	TYPE 303	STAINLESS STEEL, HEX BAR	BODY	3
1	∅.500 X 3.00	1018 CRS	STEEL ROUND BAR	POST	2
1	∅.375 X 1.50 X 1.60	1018 CRS	STEEL, FLAT BAR	CLAMP PLATE	1
REQ'D	SIZE	SPEC	MATERIAL	DESCRIPTION	ITEM

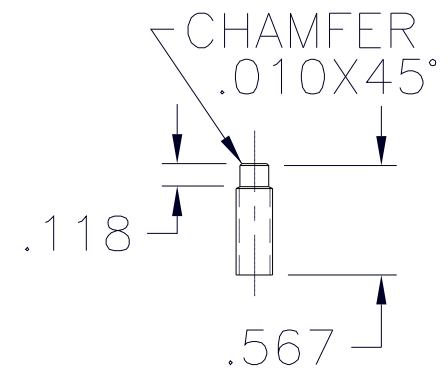
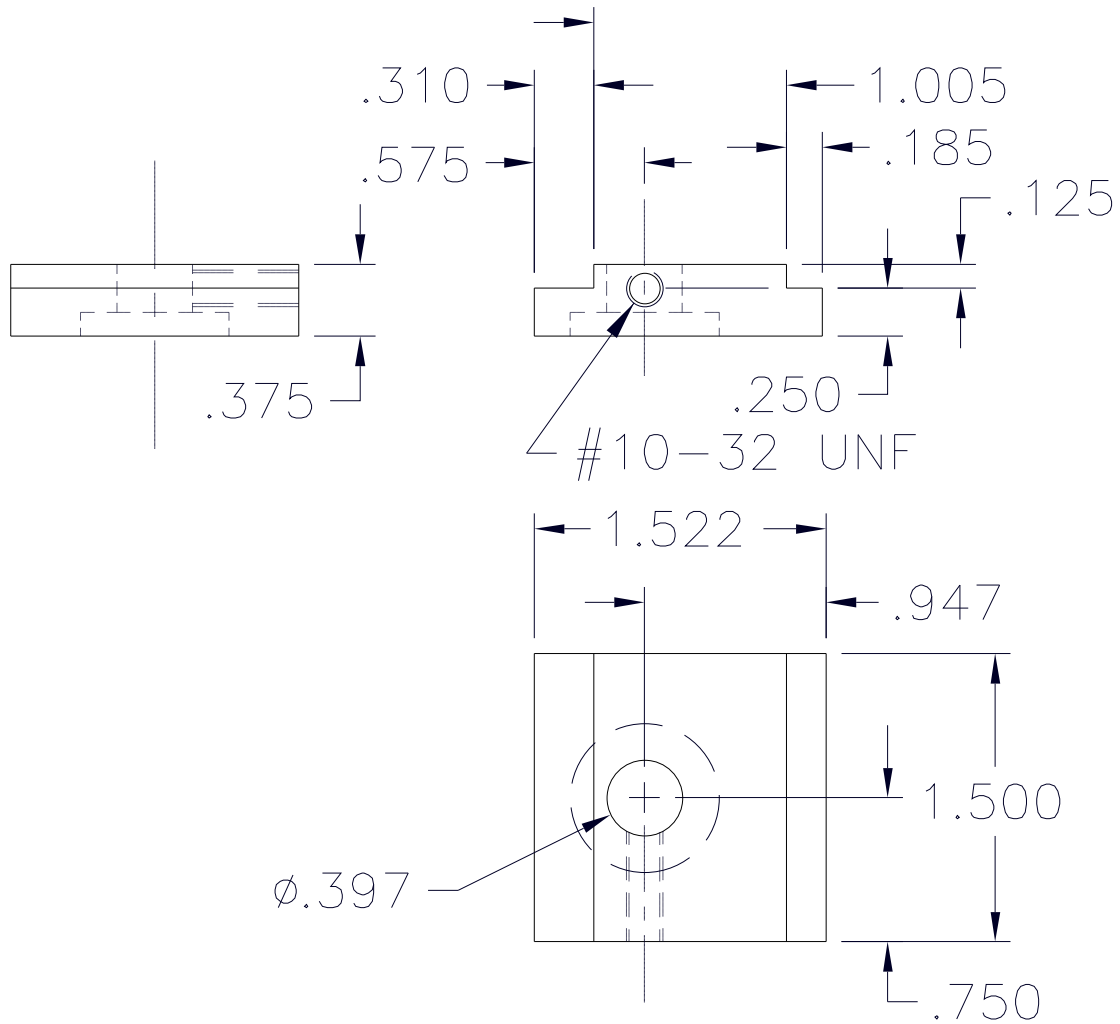
COMPONENTS AND MATERIALS REQUIRED FOR ONE ASSEMBLY

GENERAL NOTES:

1. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.
2. TOLERANCES: .XX, .010; .XXX, ±.005; ANGLES ±.5°; FINISH $\sqrt{32}$.
BREAK EDGES .01 MAX; FILLET INSIDE CORNERS .01 MAX.

CONSTRUCTION NOTES:

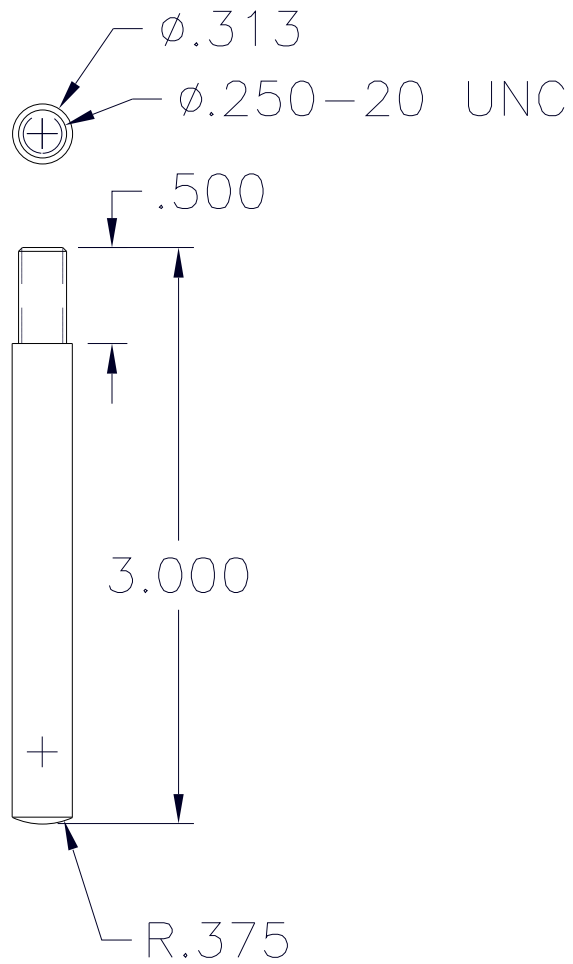
3. USE AN END-MILL TO CUT A CLEAN, FLAT SURFACE UNDER CLAMP BODY.
4. TURN THE TS BOTTOM SIDE UP IN THE MILL VISE, LINE BORE THE HOLE FOR THE CLAMP POST, ELONGATE ABOUT .080 INCHES FRONT-TO-BACK TO ALLOW SOME TRAVEL FOR OFFSET ADJUSTMENTS IF YOU INTEND TO DO SO.
5. EXPOSED STEEL COMPONENTS CAN BE FINISHED WITH COLD BLUE OR TOOL BLACK SOLUTIONS.
6. CLAMP BODY AND POST TIGHTLY TOGETHER WHEN SETTING UP TO CROSS DRILL FOR CAM PASSAGE.
BE EXTRA CAREFUL IN CENTERING THE CROSS-HOLE IN THE BODY, SO THAT THE POST HAS EQUAL MEAT ON BOTH SIDES OF THE CROSS-SECTION.
7. CLAMP TS ASSEMBLY IN THE MILL VISE WITH THE FRONT SIDE UP, POSITION THE BODY IN-LINE WITH THE POST BORE.
USE A SHORT LENGTH OF 1/2" DIA BAR TO AID IN ALIGNMENT OF THE TWO BORES. MAKE A PILOT HOLE IN THE TS.
8. REMOVE THE BODY AND ALIGNMENT TOOL, DRILL THE TS CASTING TO FINAL SIZE.
9. TRIAL ASSEMBLE THE COMPONENTS, ADJUST THE NUT UNDER THE FOOT FOR CORRECT OPERATING ANGLE OF HANDLE.
10. IF THE BOTTOM OF THE STUD/NUT INTERFERE WITH THE BED CASTING, ADJUST LENGTH/THICKNESS TO FIT.
11. GREASE THE CAM PARTS AT ASSEMBLY, TOUCH UP PAINT WITH MATCHING COLORS OF SPRAY.
12. SETSCREW (PC 9) LOCKS THE CLAMP PLATE (PC 1) IN-LINE WITH LATHE BED FOR EASY INSTALLATION.
13. SEE LMS SITE <WWW.LITTLEMACHINESHOP.COM> FOR DATA ABOUT MATCHING COLOR INFO.



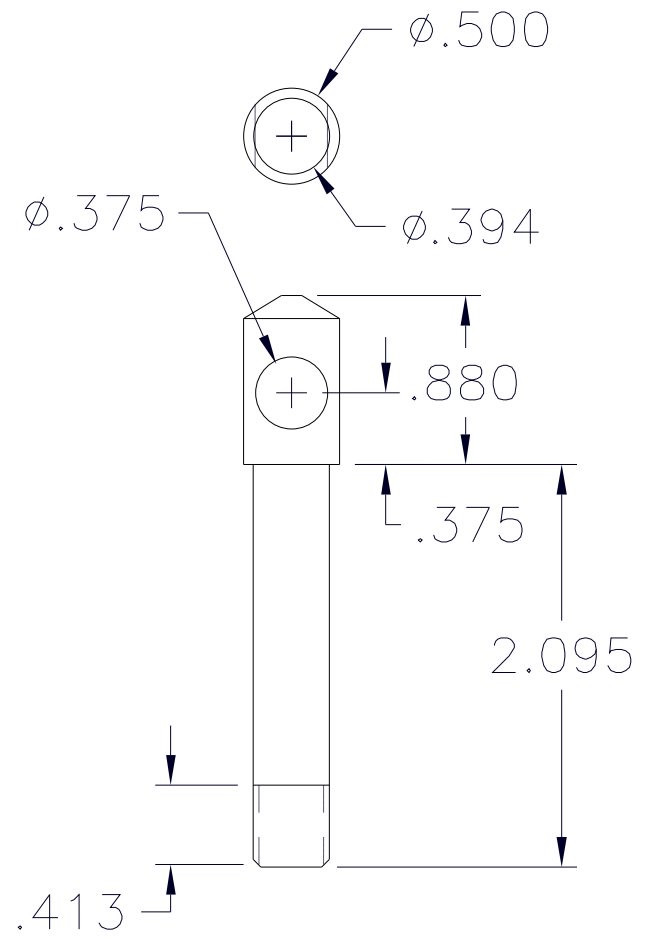
MAKE FROM
#10-32 X .75
STANDARD PART

① CLAMP PLATE
1 REQUIRED

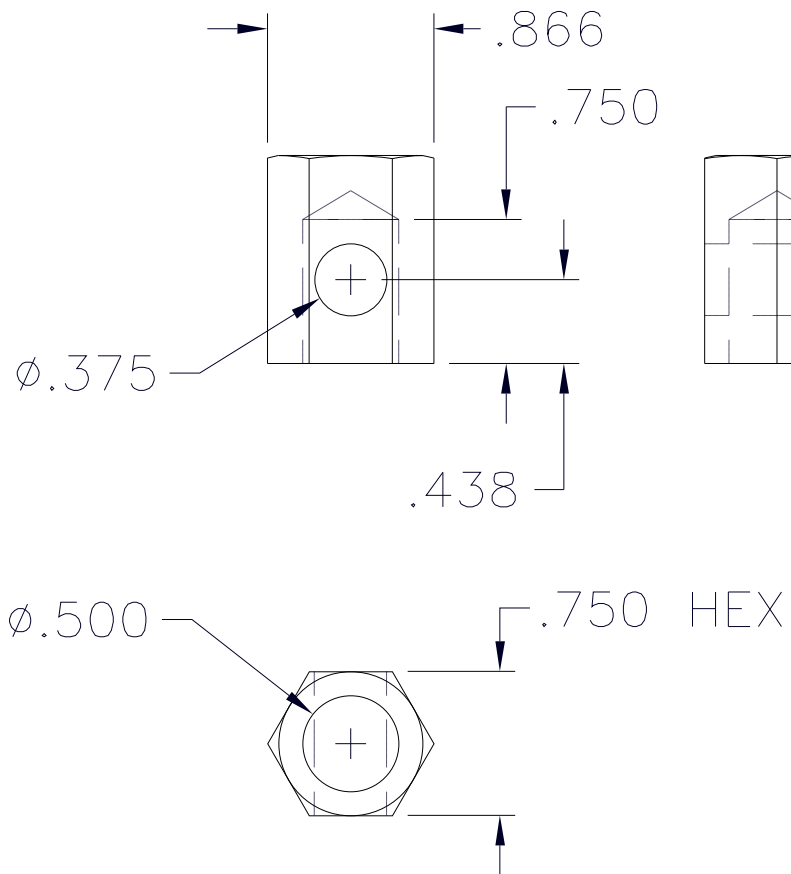
⑨ SETSCREW
(DOG POINT)
1 REQUIRED



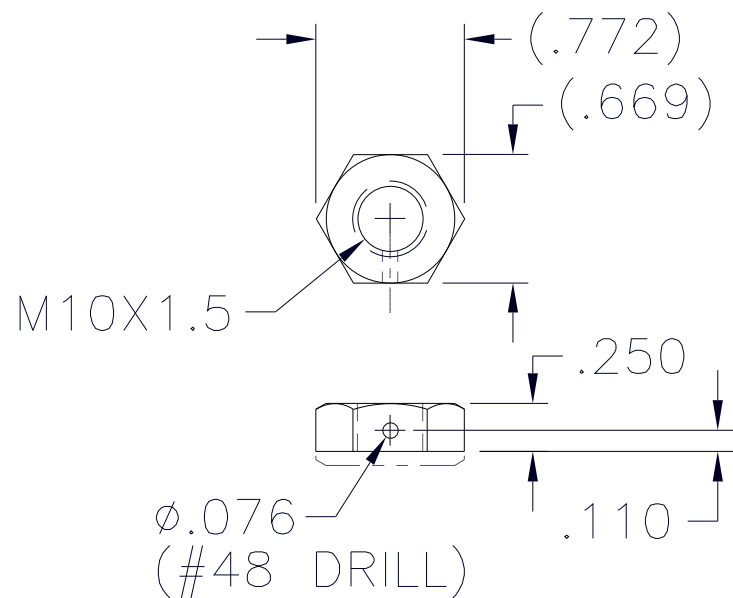
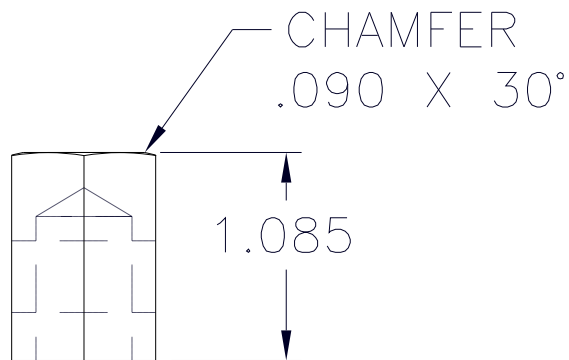
⑤ LEVER ARM
 1 REQUIRED



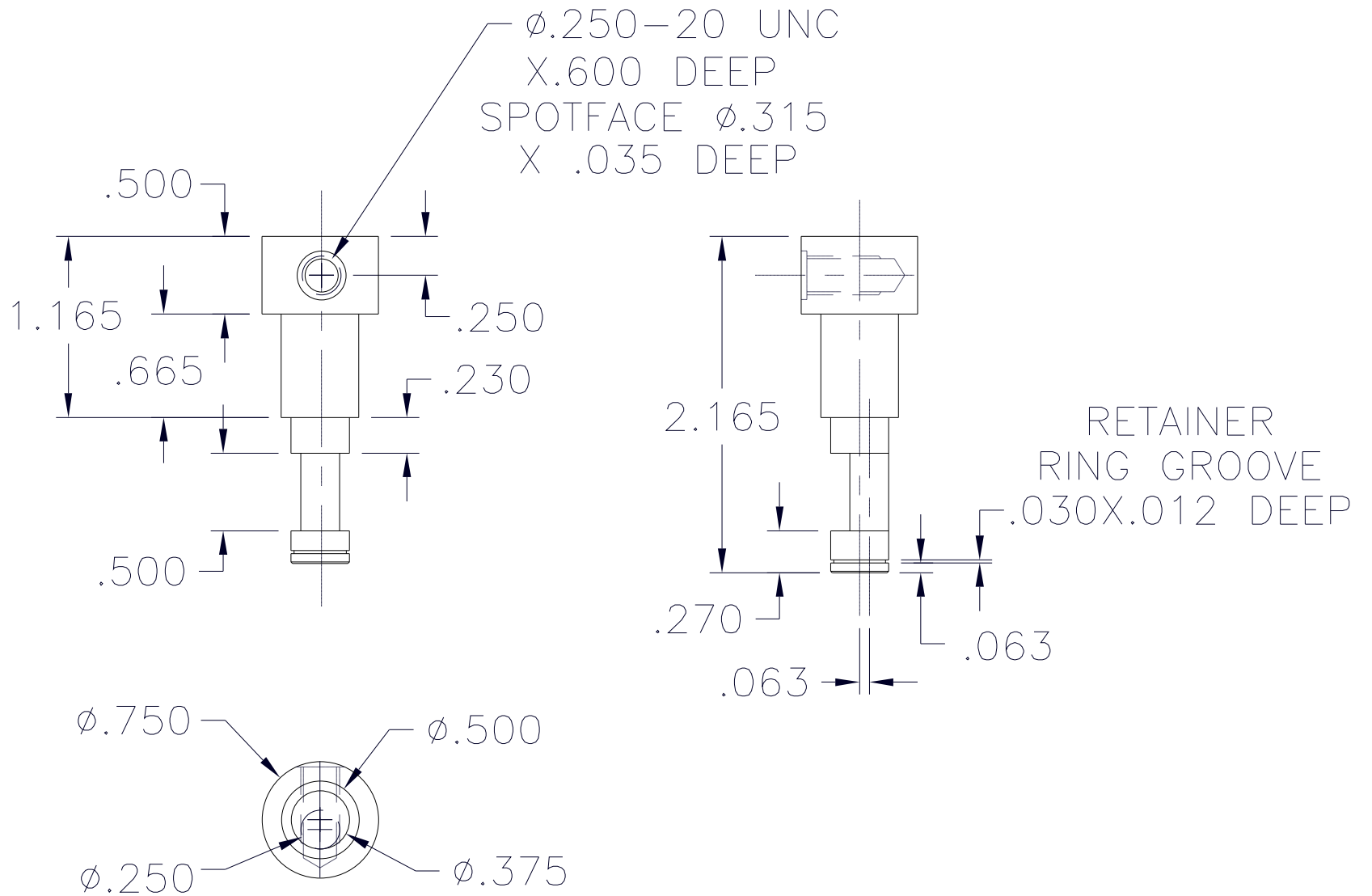
② POST
 1 REQUIRED



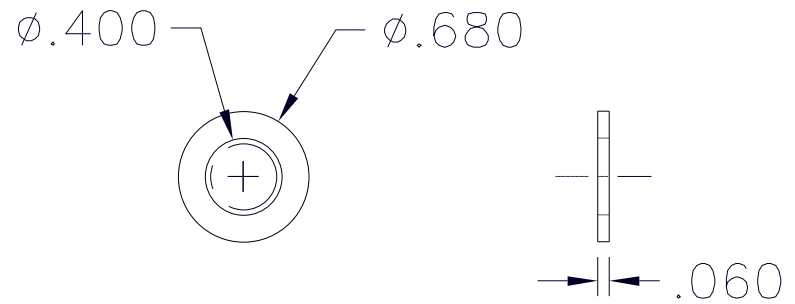
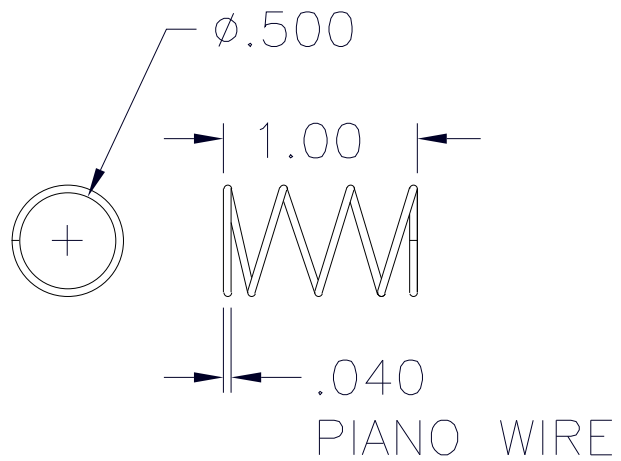
③ BODY
 1 REQUIRED



⑥ NUT (MODIFIED)
 1 REQUIRED

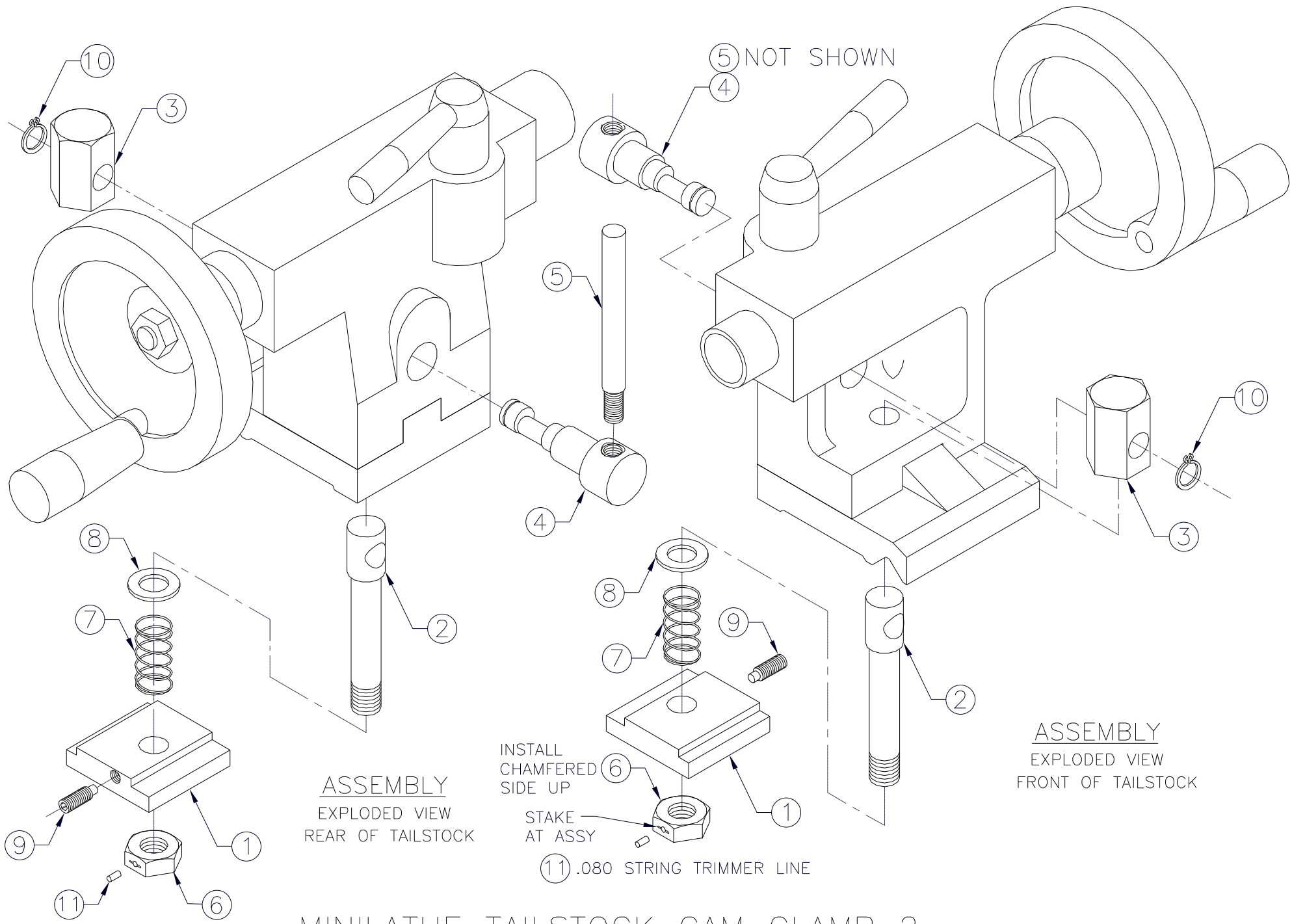


(4) CAM
 1 REQUIRED



⑦ SPRING
 1 REQUIRED

⑧ WASHER (MODIFIED)
 1 REQUIRED
 18-8 STAINLESS STEEL



ASSEMBLY
EXPLODED VIEW
REAR OF TAILSTOCK

INSTALL
CHAMFERED
SIDE UP

STAKE
AT ASSY

(11) .080 STRING TRIMMER LINE

ASSEMBLY
EXPLODED VIEW
FRONT OF TAILSTOCK

Components of the Tail Stock Lever Clamp ready to assemble. The post, foot, spring, washer, and nut have been pre-assembled. The TS casting has been machined by an end-mill to produce a square, flat bearing surface for the body component. Paint is touched up using the "Colonial Red #7925 Satin by Rust-Oleum American Accents.



Since the cam is made of Stainless Steel, galling can occur in service if a quality lubricant is not used. This assembly was made using Anti-sieze grease from Ace Hardware. The only bearing points are the cam and the adjacent shoulders in contact with the body through-hole. The cam does not actually touch the casting bore.

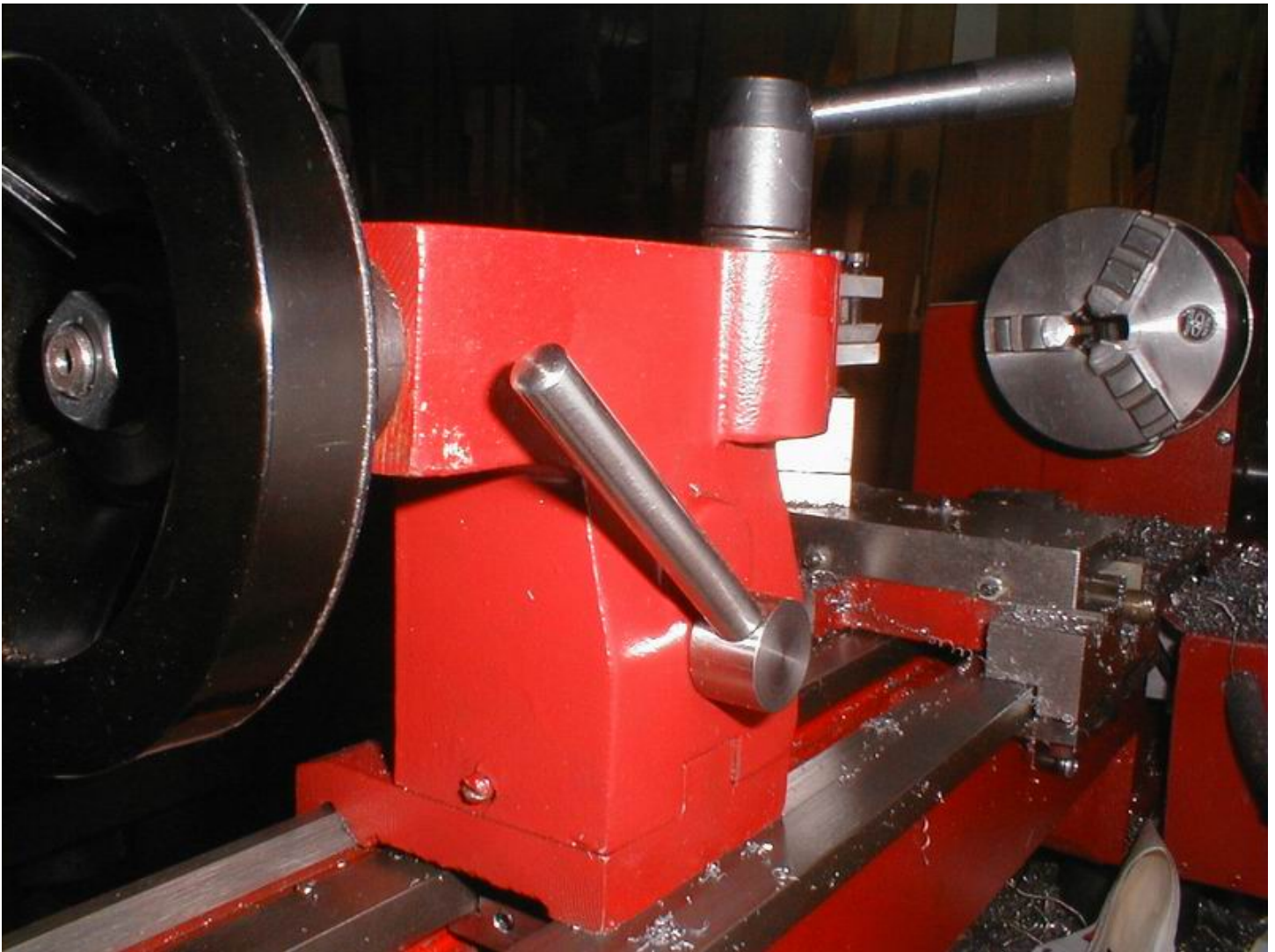
View of the Cam-lock components as seen from the front of the TS assembly. The snap ring does not have much work to do, since the cam is straddled by the bore through the post, and cannot be dislodged until the spring on the underside of the assembly is compressed sufficiently to align the shoulder of the cam with the bore through the post.



Shame on me; I did a poor job of cleaning the setup before making the photo. This 7x10 Minilathe was purchased at the Harbor Freight store in 2005. The Leadscrew bearings did not have any provision for lubrication. The parts were drilled and countersunk to accept a pump-style oil can, so that lubricant can be forced into the bearing surfaces. The open holes are an invitation for abrasive material to find it's way into the bearing. Soon, some ball-top oilers purchased from LMS will be installed to correct the situation. Another similar lathe purchased in 2001 was fitted with oil fittings out of the box.

Rear view of the TS assembly on the lathe bed, ready to operate. The clamp lever is in the fully locked position, following adjustment of the lock-nut on the underside of the clamp foot. Very little clearance is available between the bottom end of the post and the top of the ribs in the bed casting. The locknut had to be made much thinner to achieve a comfortable fit.

This lathe now has LMS 14 inch bed conversion installed, and a 4-inch 3-jaw chuck is mounted on the spindle.



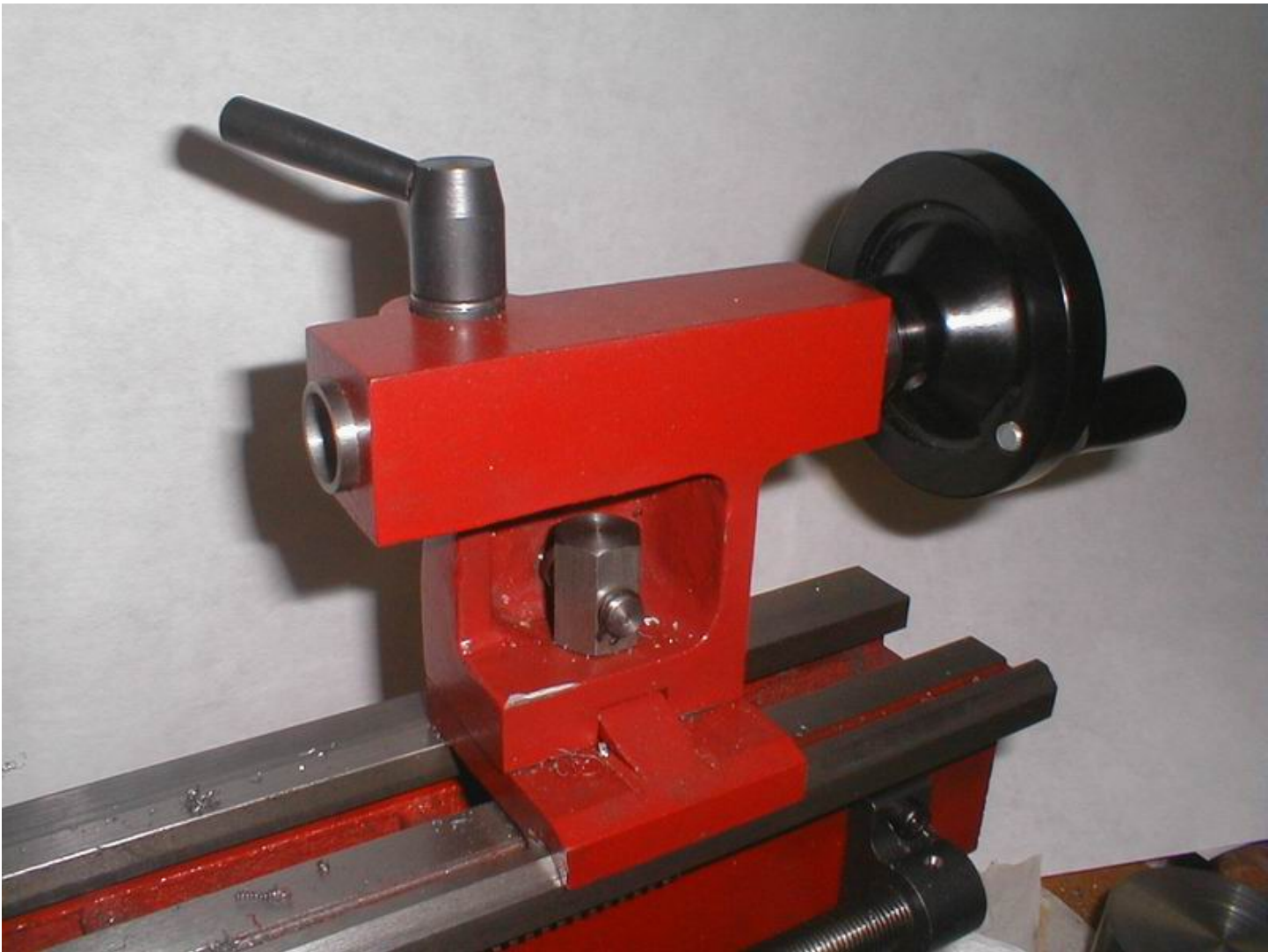
Note the setscrew in the rear edge of the new clamp foot. Its purpose is to lock the foot to the post, once all other adjustments are complete. The TS can be removed from the lathe bed and re-installed easily without having to grope under the end of the bed to align the foot, shaped similarly to a T-Nut, with the opening of the bed rails. Replacing the TS on the bed is now a one-hand operation.

Also, notice that the quill clamp assembly on top of the TS has an extra washer between the lever-nut and the cotter protruding from the casting. The lever, when tightened to clamp the quill, was at an inconvenient angle, so a spacing washer was made to enable a better position when tightened.

The finished product is ready to operate. Simple one-handed operation of the TS clamp allows quick movement of the TS position to whatever location the job in progress might demand.

The design and construction turned out to be much easier than feared when the project was being contemplated. This design is based on everything that could be found on the web prior to starting the task.

Enjoy your new Minilathe capability!



more pdf files available on

www.toolsandmods.com

All ideas, procedures, modifications and whatever is described or shown here is to be used at risk of the reader.

Take care and work safely.