

# Threaded Acorn Box 101

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The objective of this presentation is to provide a set of step by step instructions on how to make a threaded acorn box.

The set of instructions will include the following:

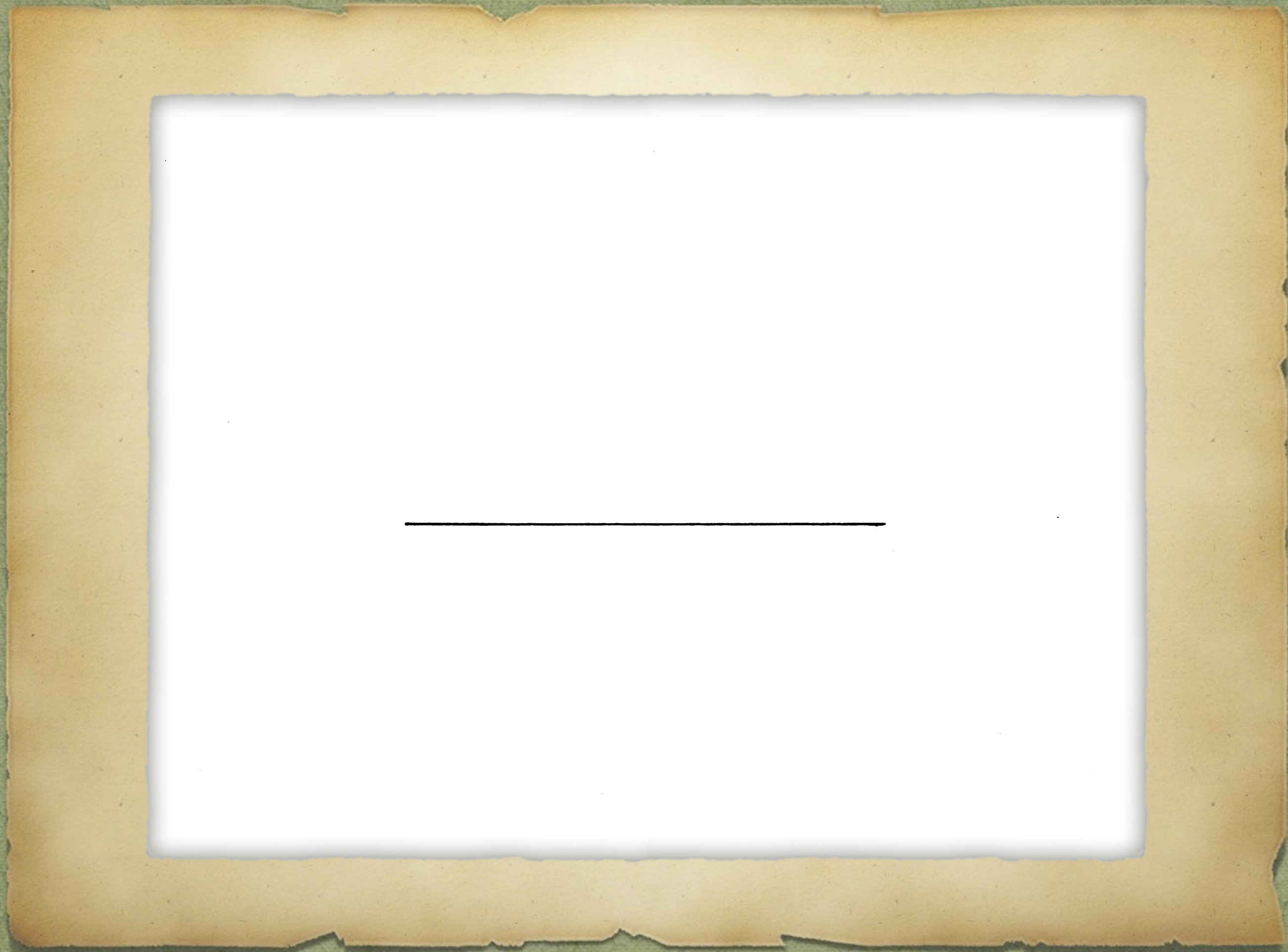
- Designing the acorn box
- Setting up the dome chuck
- Pictures and notes of the key steps

Also included will be a set of instructions published by David Lindow



**Designing your Acorn Box**

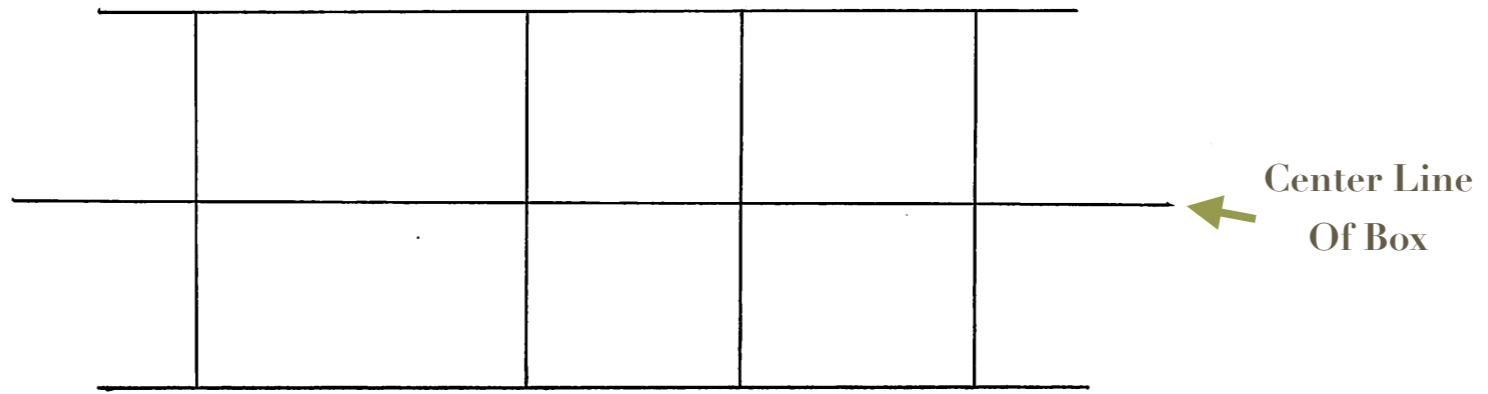






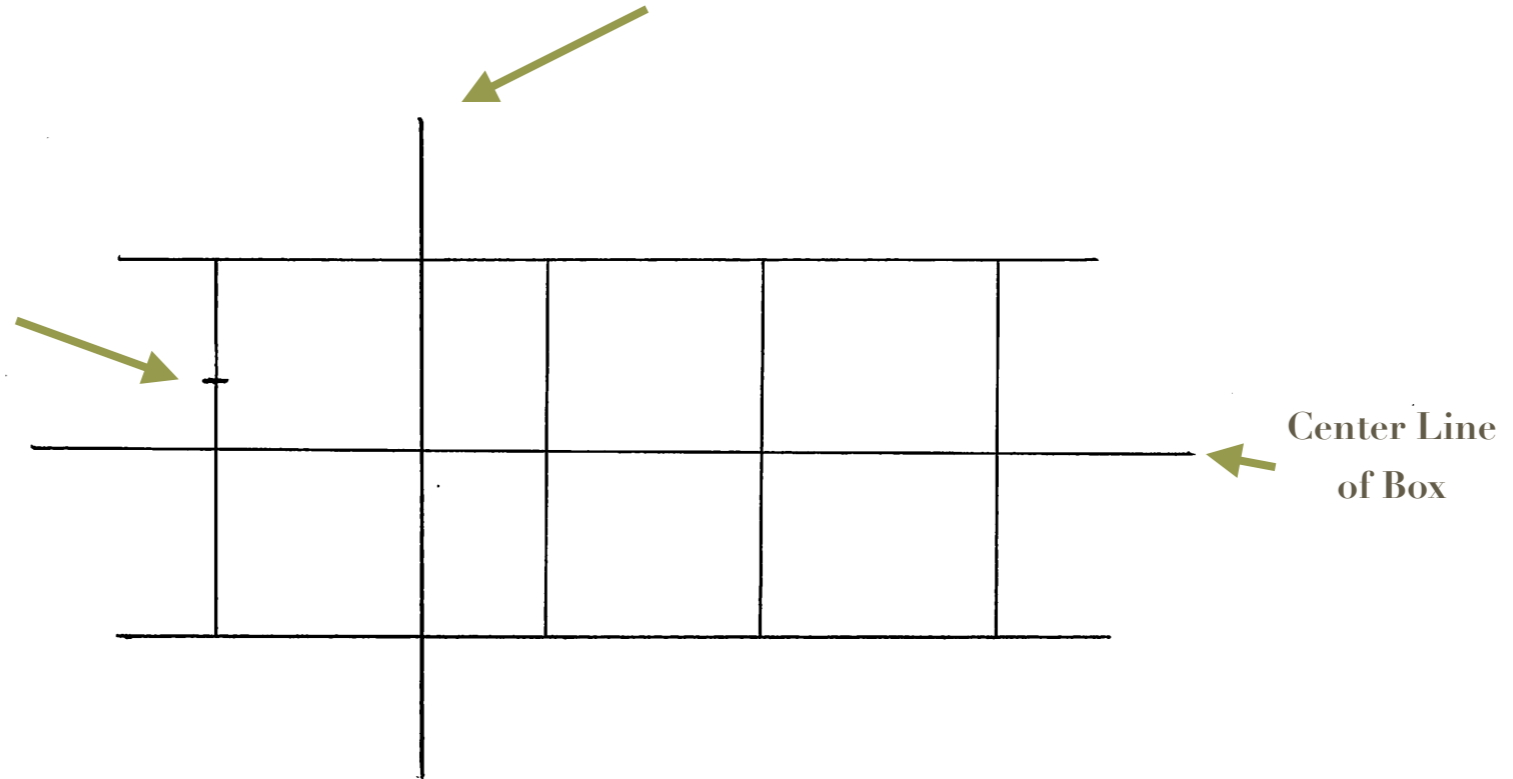
	<b>Box</b> 2" X 1.75"		<b>Lid</b> 2" X 1.25	
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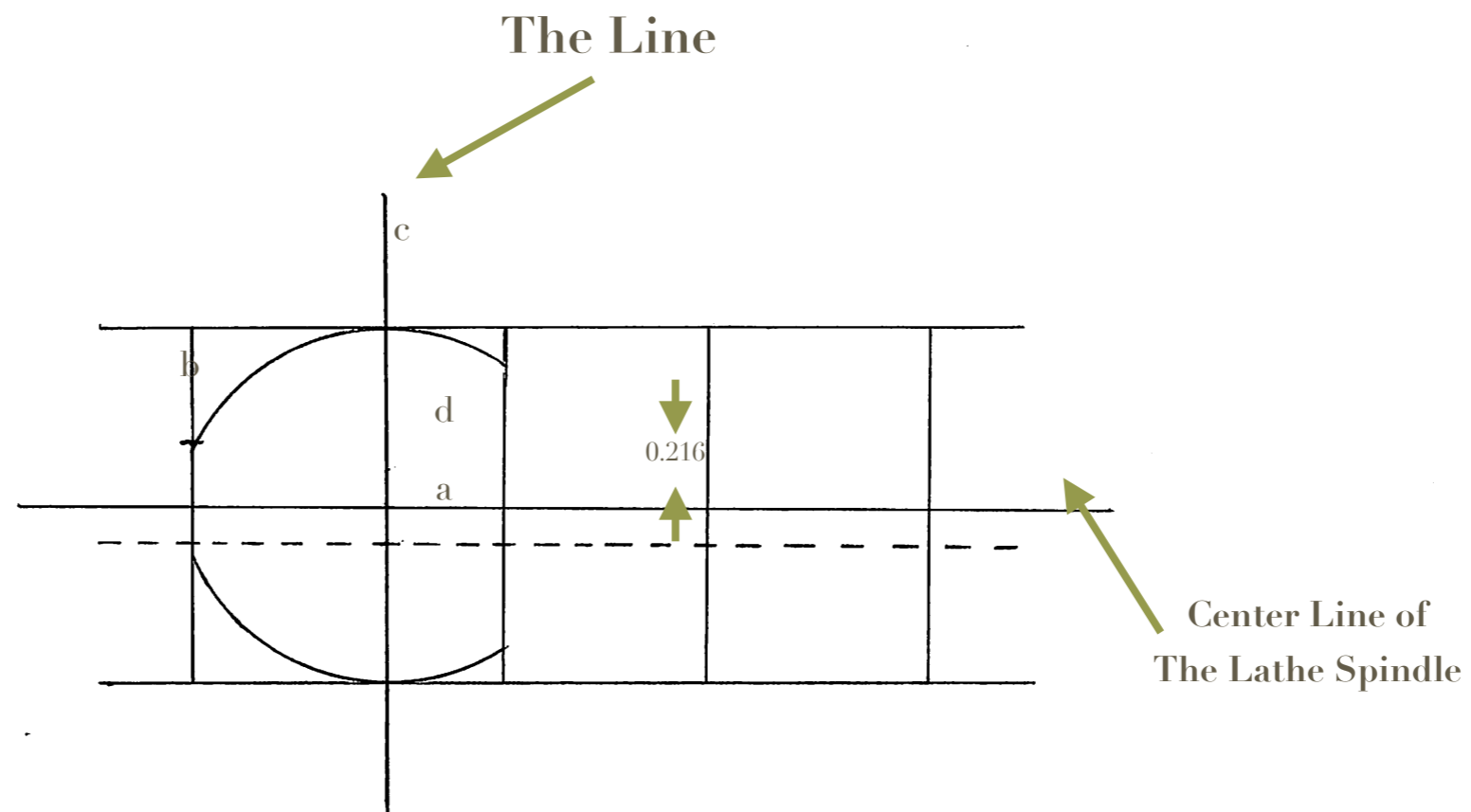




Outside Edge of  
Base 0.33" From  
Center Line



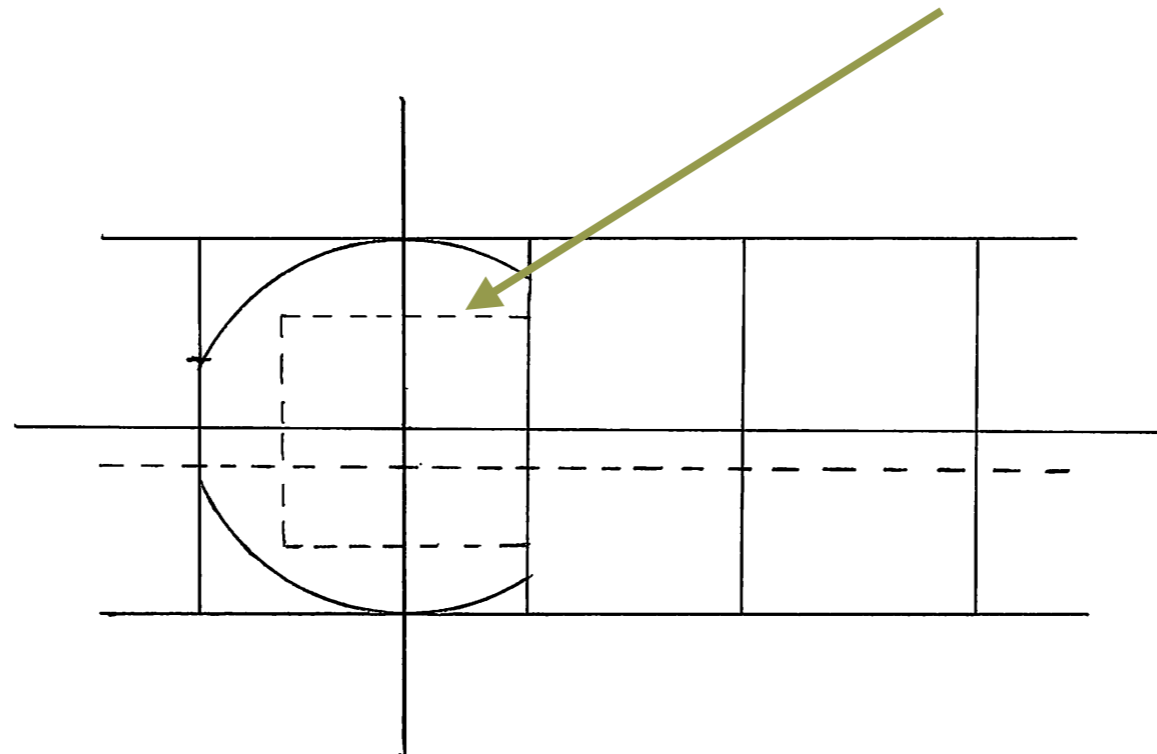




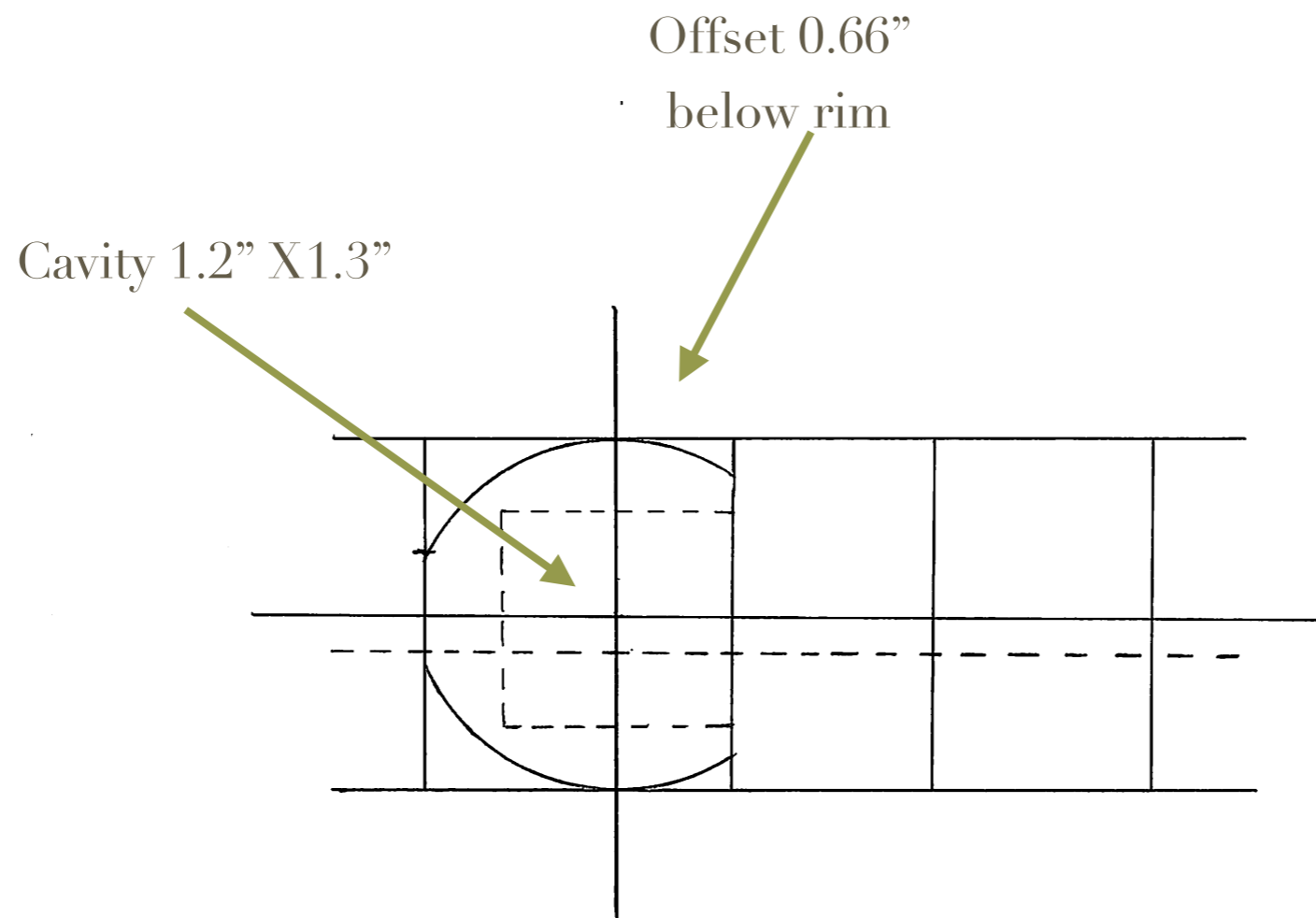
Offset Adjustment - In determining how far you move the box away from center, you put your compass point on **THE LINE** and adjust it until you can connect point **b** with **c**. In this case, my compass point was at point **a**. The distance from **a** to **d** is my offset adjustment.



The depth and width of the interior of the box can also be measured. In this instance, I made the cavity 1.2" wide by 1.3" deep.







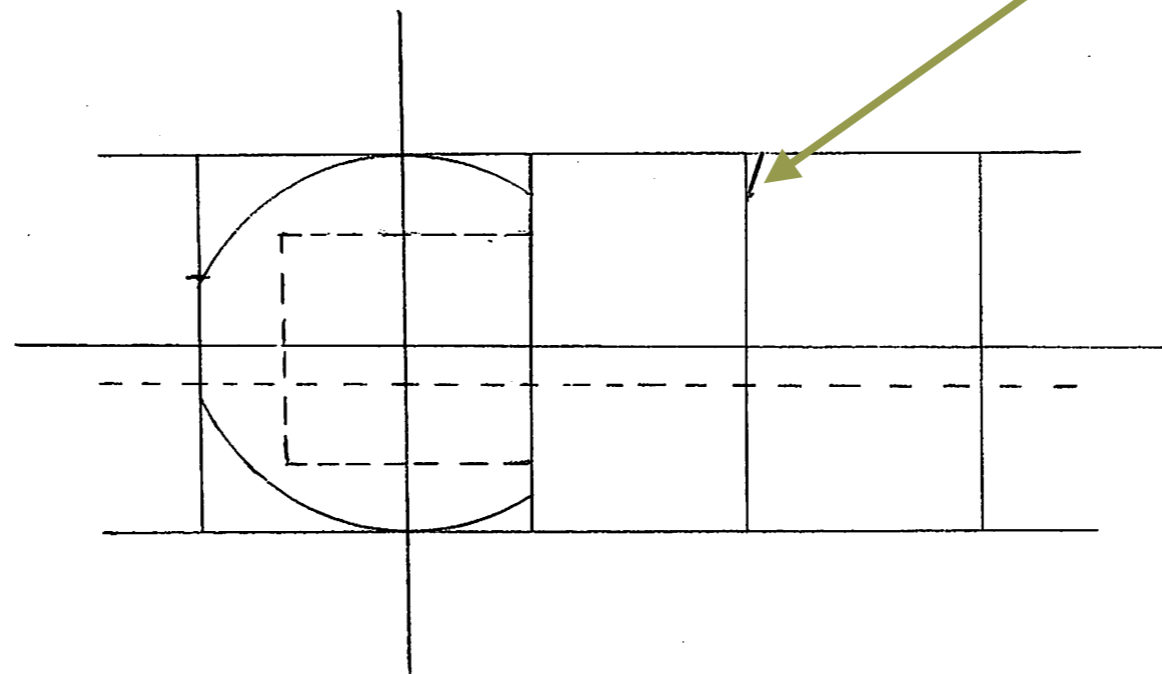
Threading Information for 16 tpi

Female threads - cut 0.038"

Male Tenon  $1.2 + (0.38 \times 2) = 1.276$  - cut 0.055"

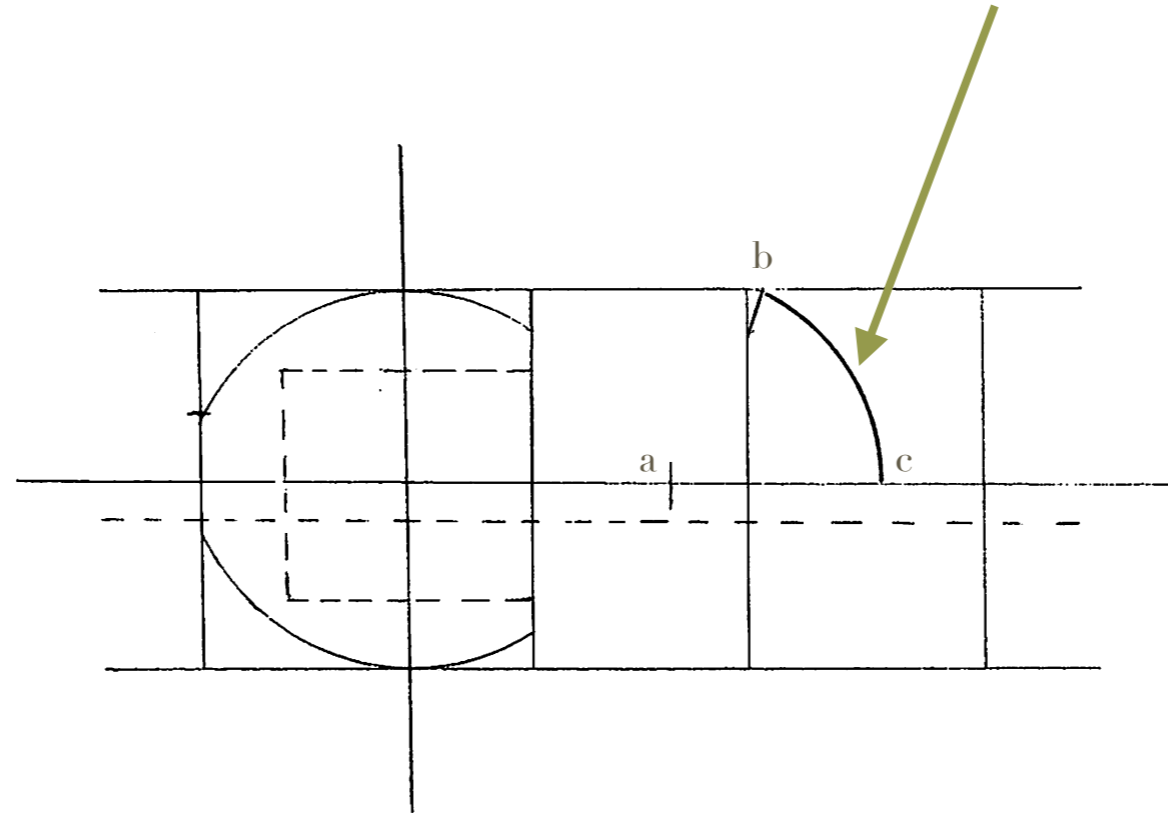


Draw your lid relief here.



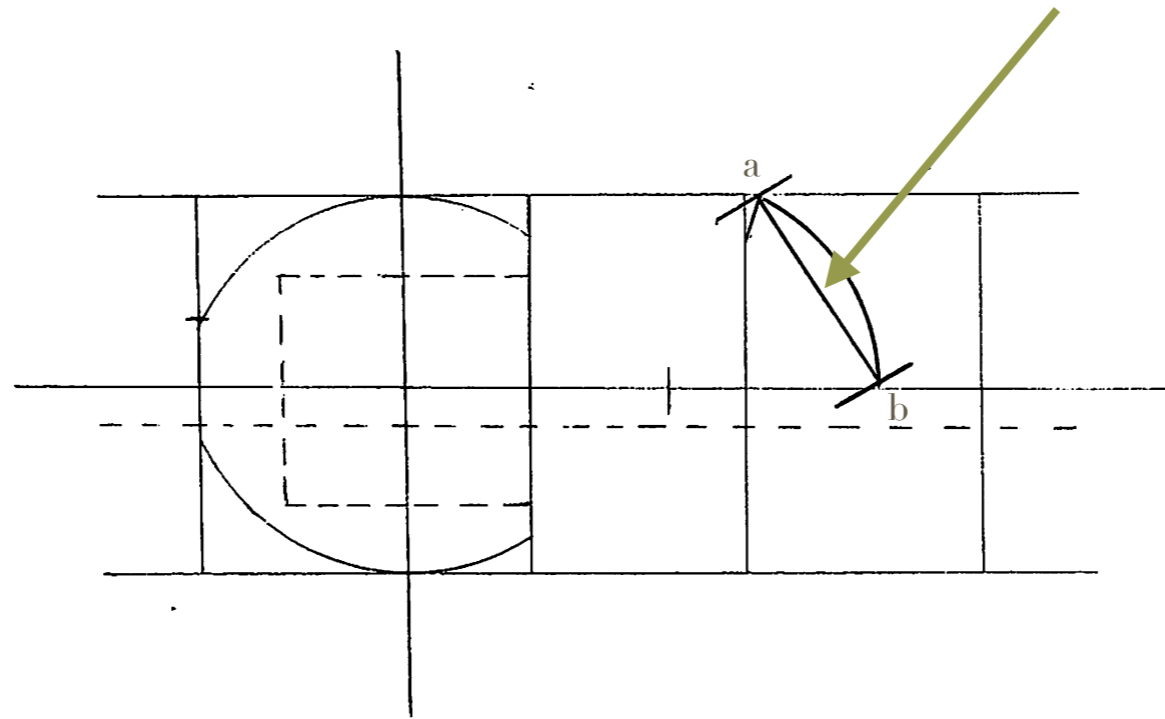


Determine the relative shape of your lid. Then place compass on point a and connect point b point c



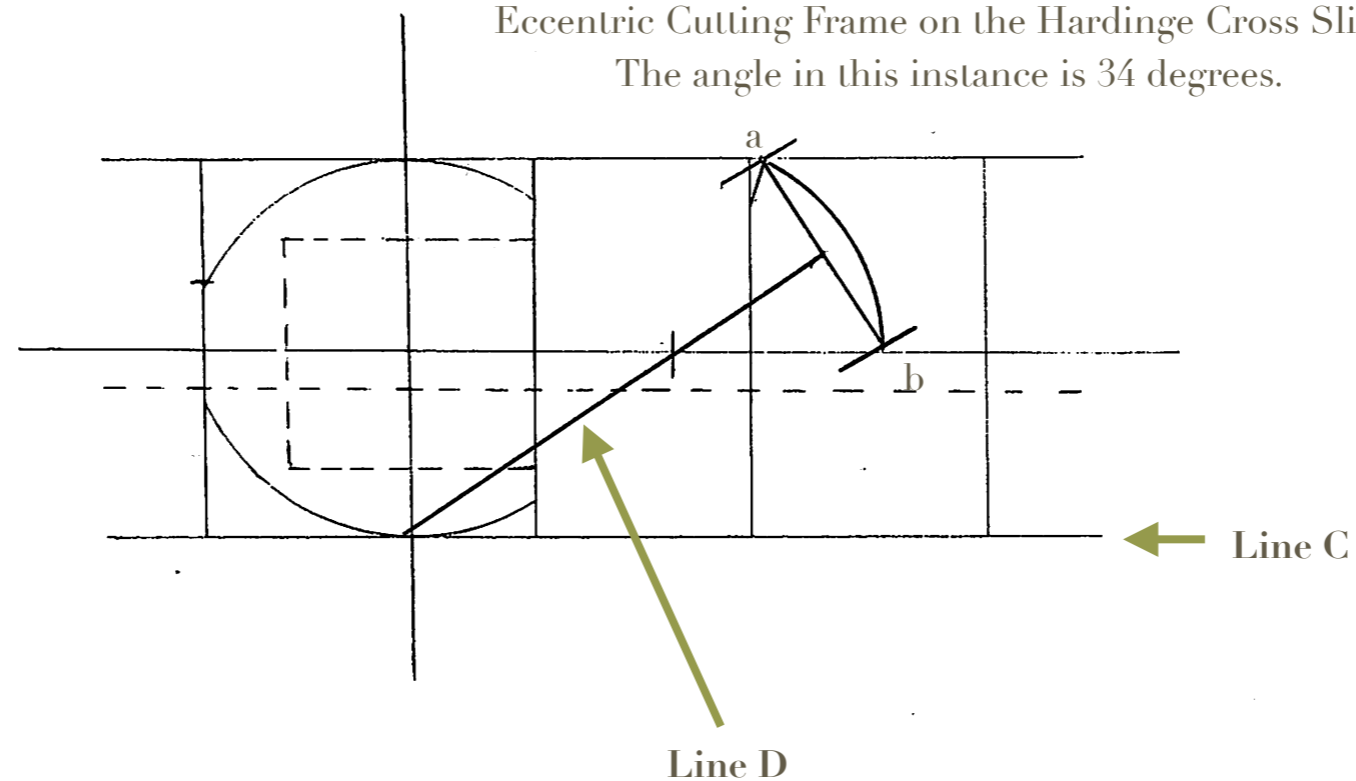


Draw 2 parallel lines at point a and point b. Draw a perpendicular line connecting these same points.





Measure the distance between point **a** and point **b** and find the halfway point. In this case the distance between the 2 points was 1.2" so the halfway point is 0.6". Draw a line perpendicular to line **ab** and carry it all the way to line **c**. The angle formed from line **C** and Line **D** will be the angle at which you will set the Eccentric Cutting Frame on the Hardinge Cross Slide. The angle in this instance is 34 degrees.



Depending on the desired size of “knob” and the cutter used, you take 1/2 of 1.18 (0.59) and add 0.125 for the center point cutter.  $0.059 + 0.125 = 0.7150$  In my case I wanted to undersize the lid so I set my cutter to 0.637” It becomes personal preference at this point!



After the base is threaded and mounted on the dome chuck, you will make these adjustments. The cutter will be lowered 0.66" below the rim of the box. The box will be moved away from center and towards the cutter 0.216". Once the lid is mounted, you set the ECF to 34 degrees and adjust your cutter diameter to 0.637". If everything is done correctly, you will get the shape that you have drawn!



Here is everything you will need to make this project





Truing up the blank on my metal lathe





My finished blank with tenons





Box marked and ready to be split





Base split on traditional lathe



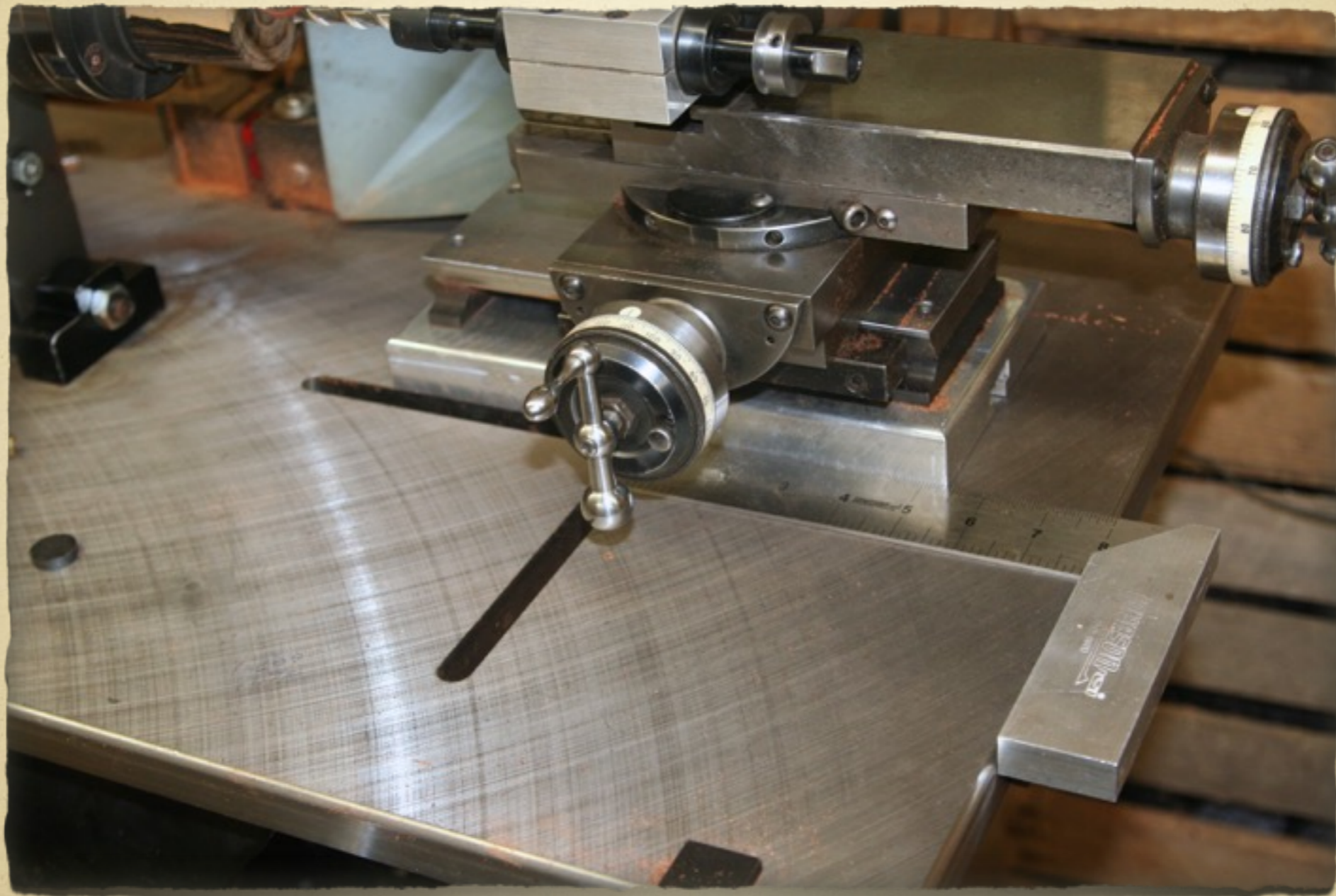


Both halves split



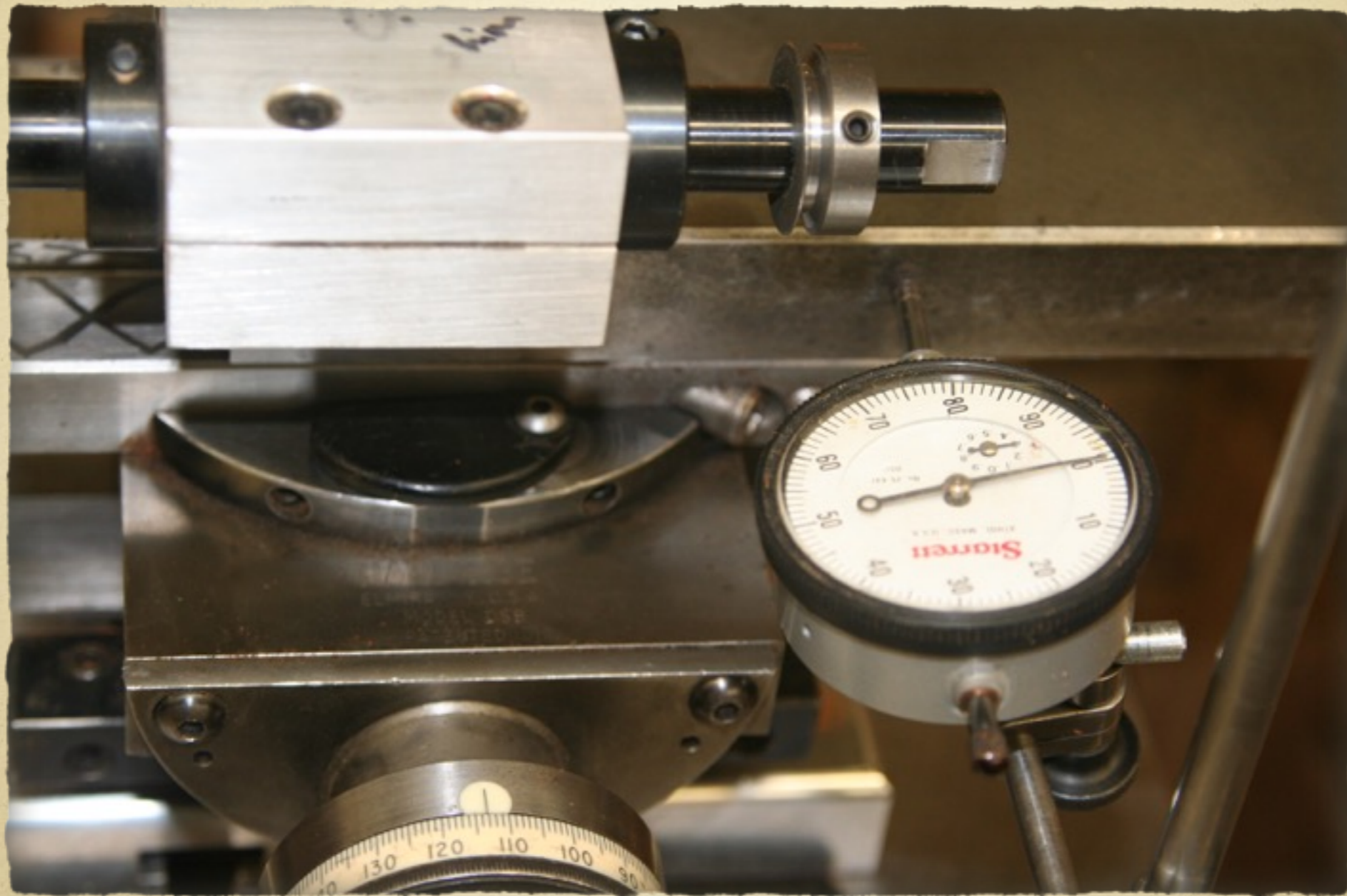


Beginning the alignment process of the cross slide



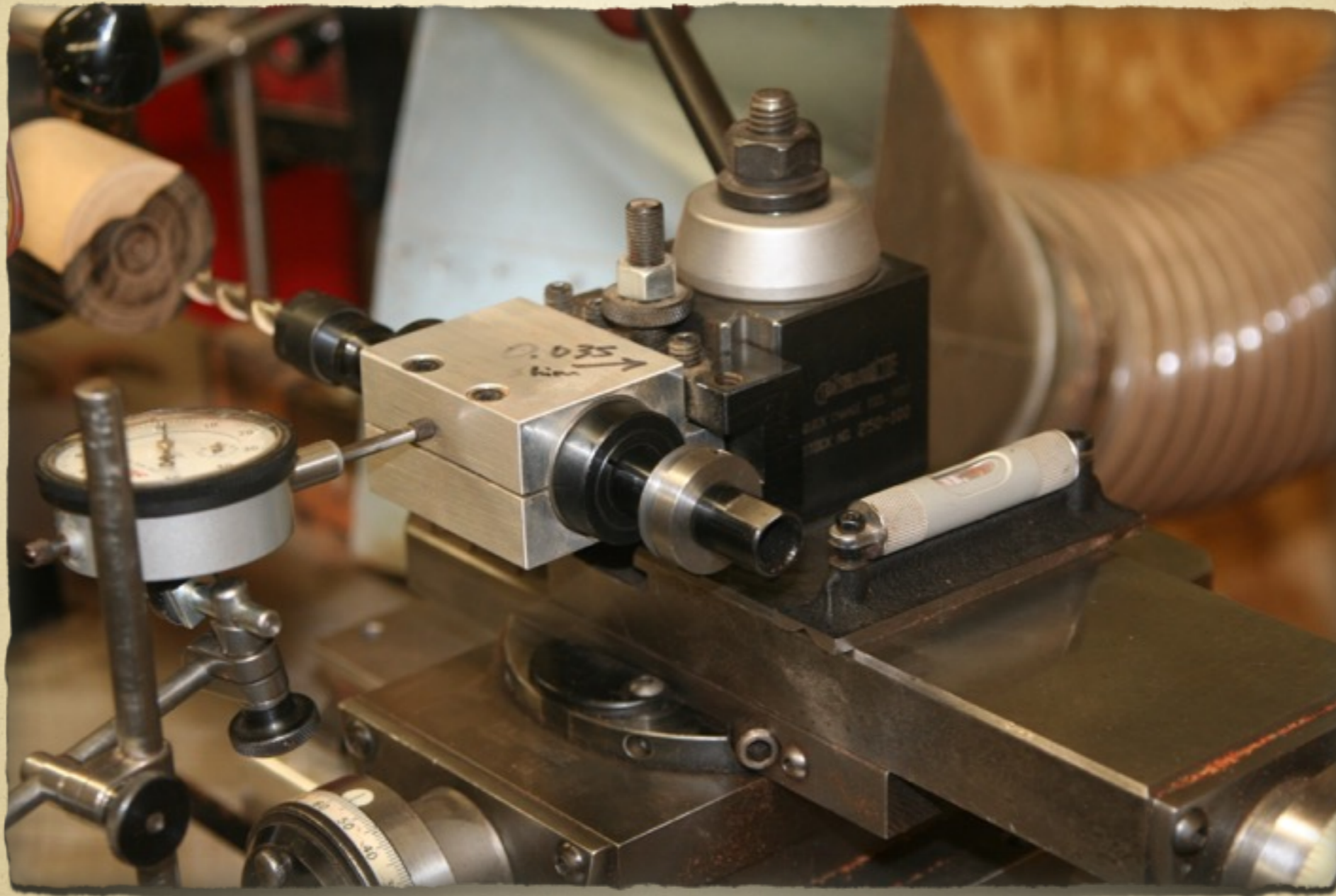


Check the alignment of the compound slide



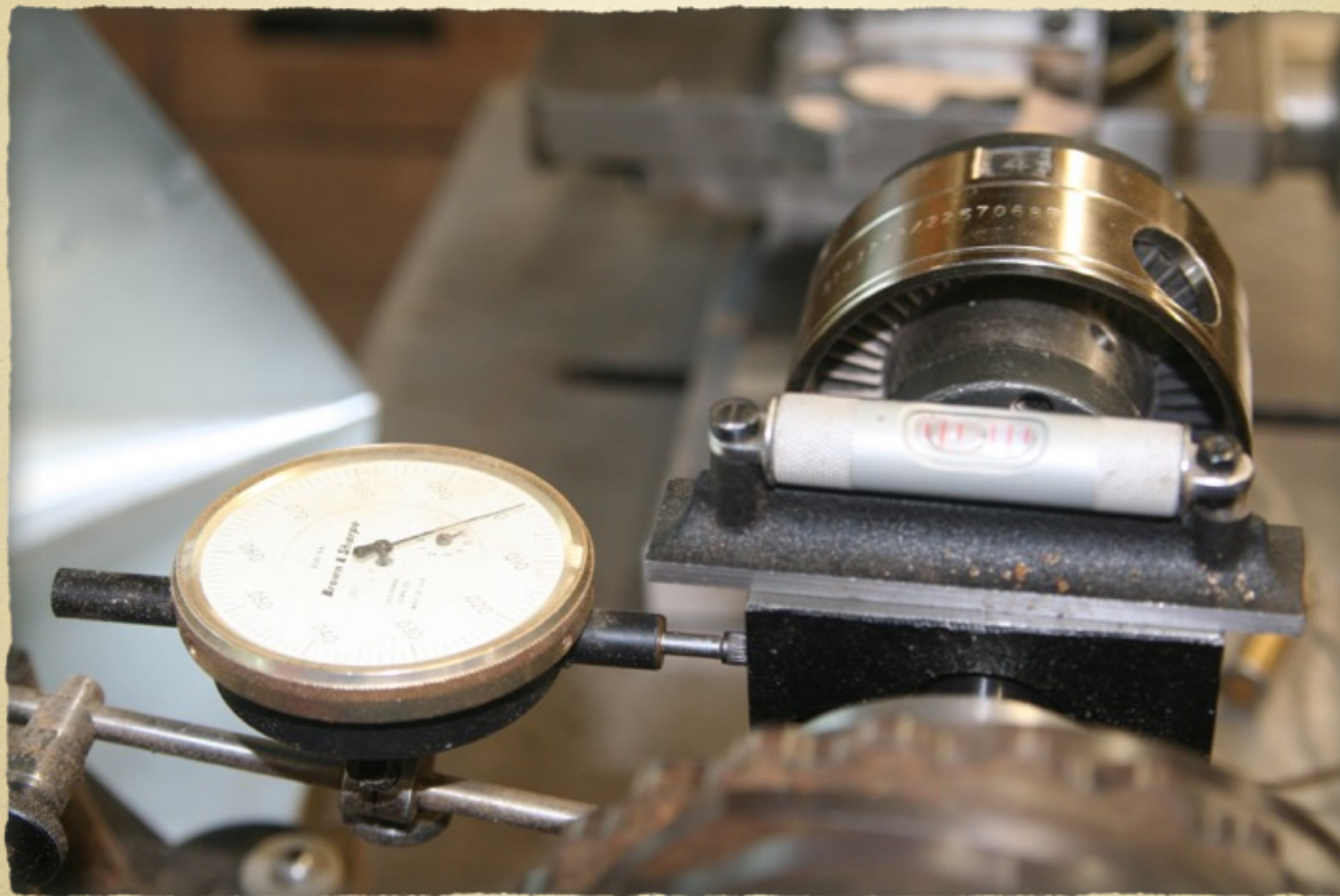


Make sure that the drill frame is in alignment  
Also check level of cross slide





Set the headstock to match cross slide and set indicator to zero



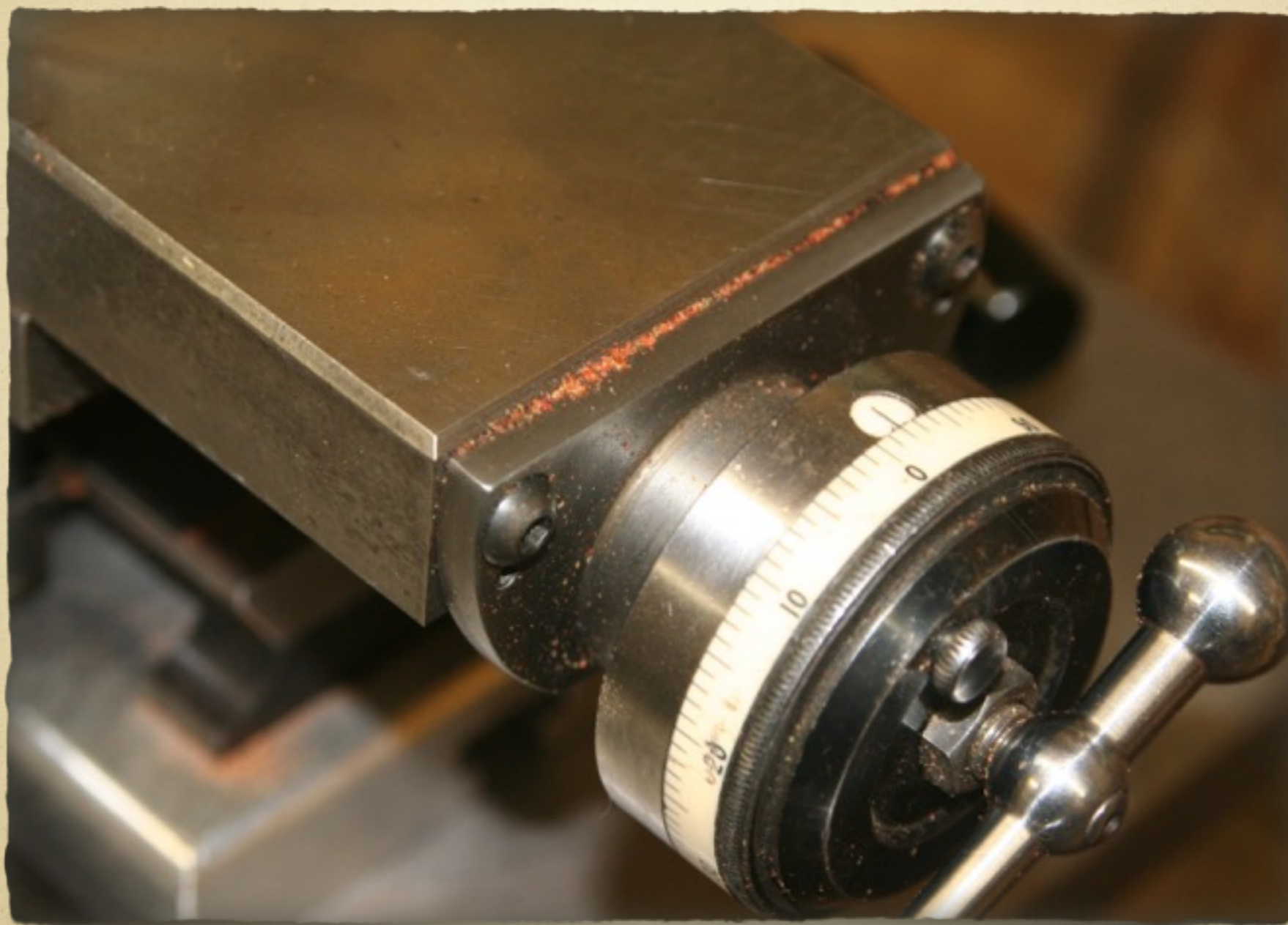


Begin squaring off the face





When I think that I am cutting all around the face, I set the  
compound dial to 0.098



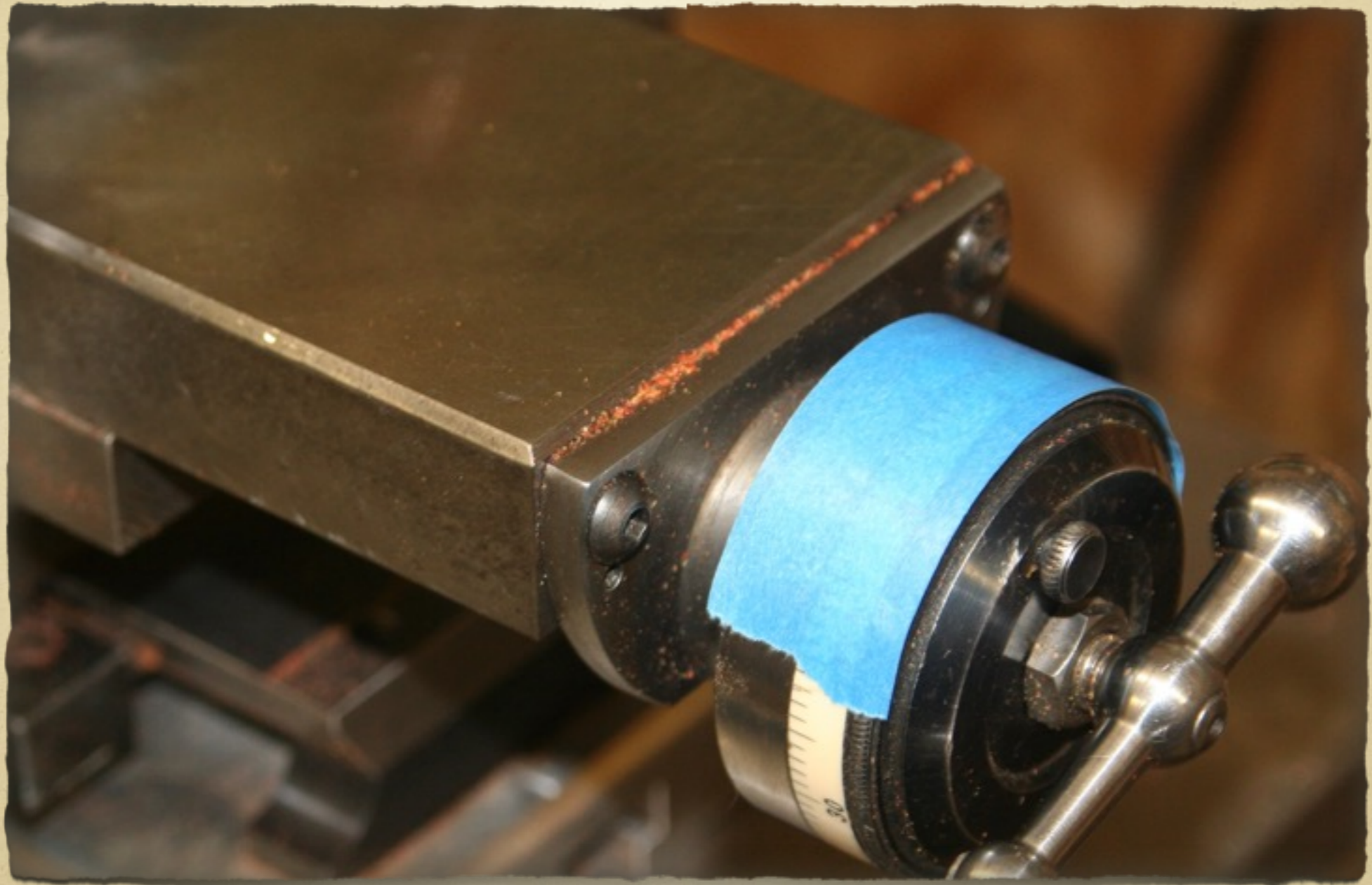


I make one final cut of .002"





I tape dial so I don't bump it.



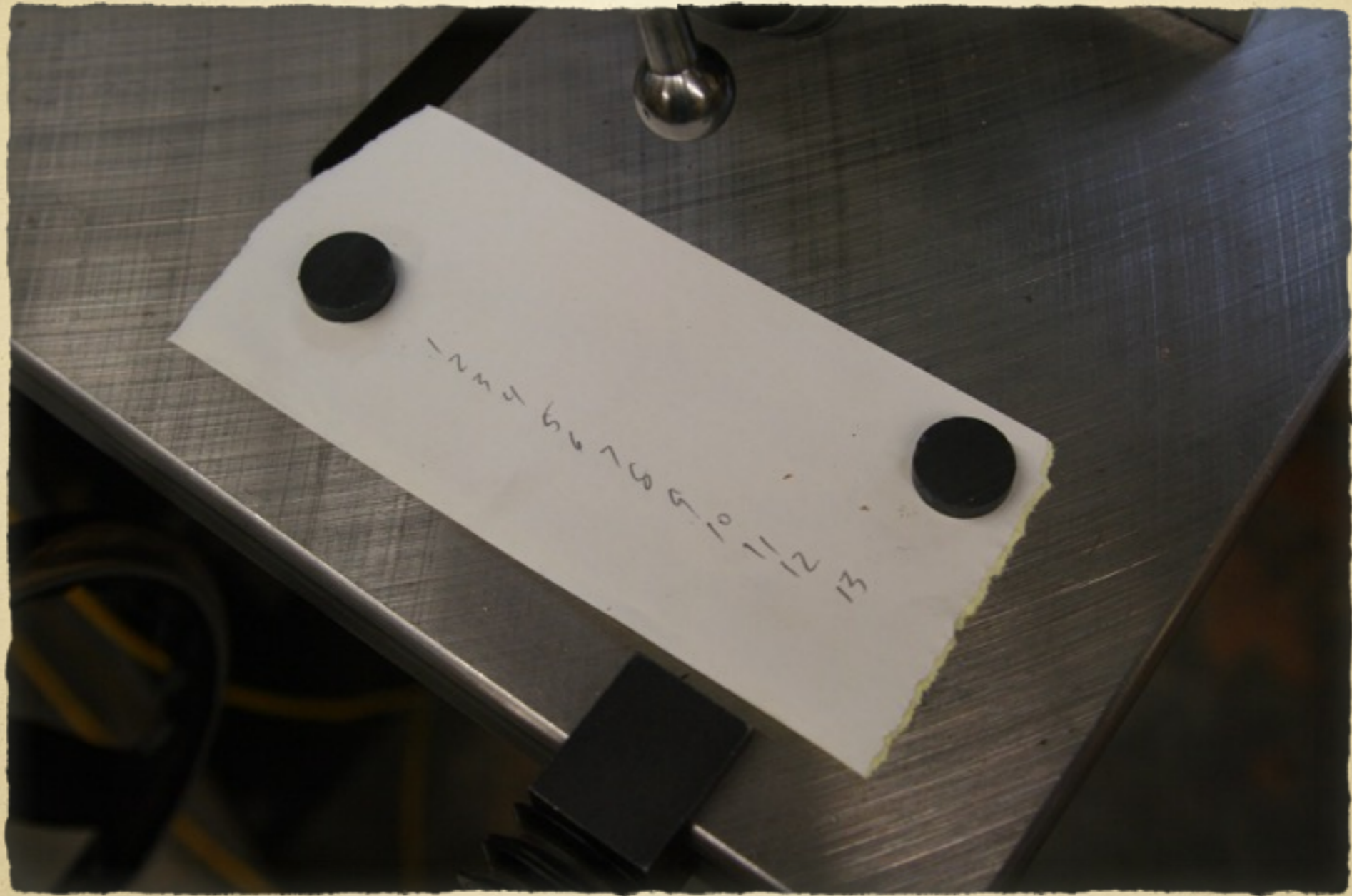


Once I am across the face, I remove tape and begin plunge cut.





Since I can't remember what I had for breakfast I make myself a cut checklist



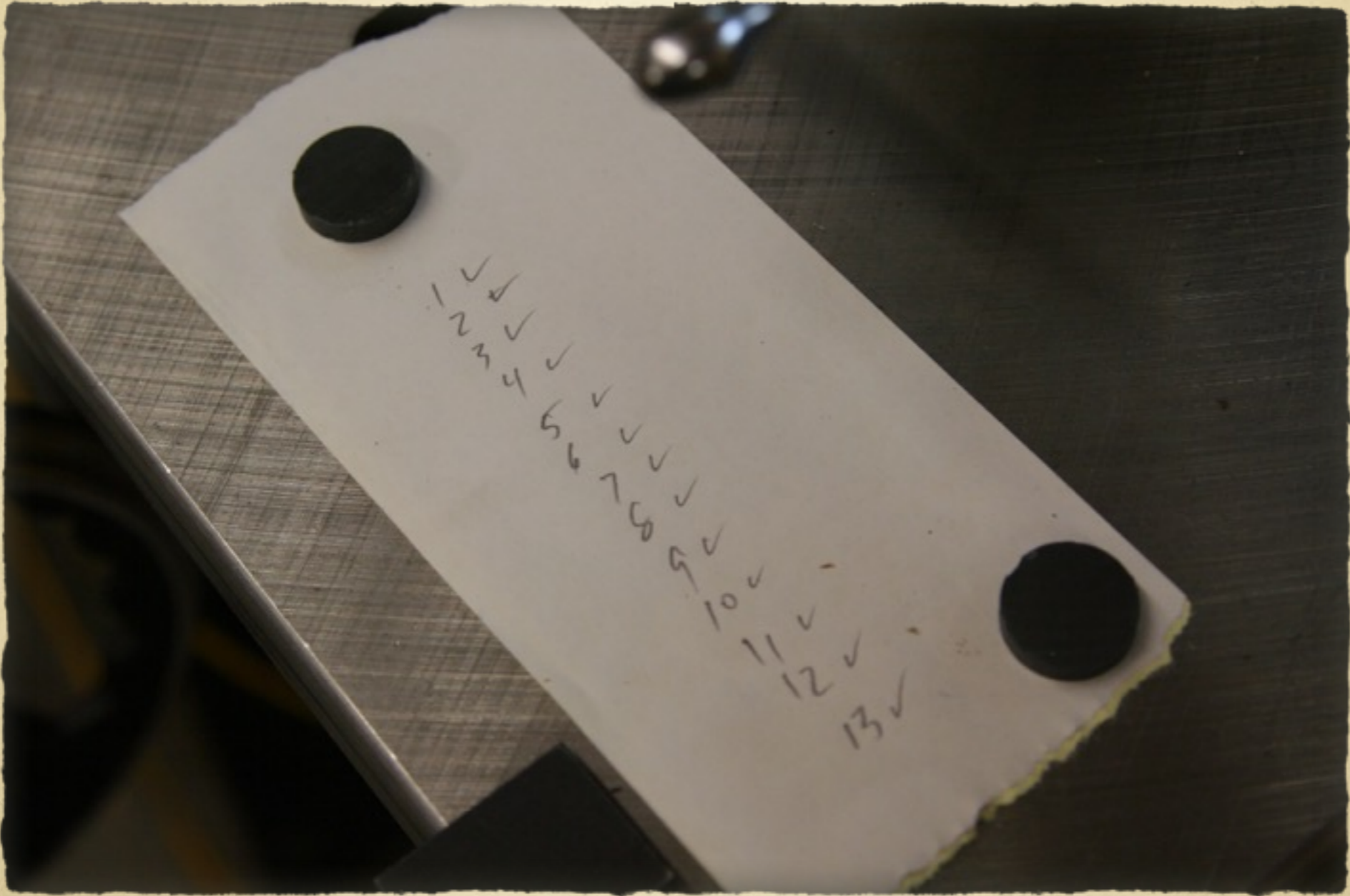


Here is the beginning of my plunge cut for the hollowing process



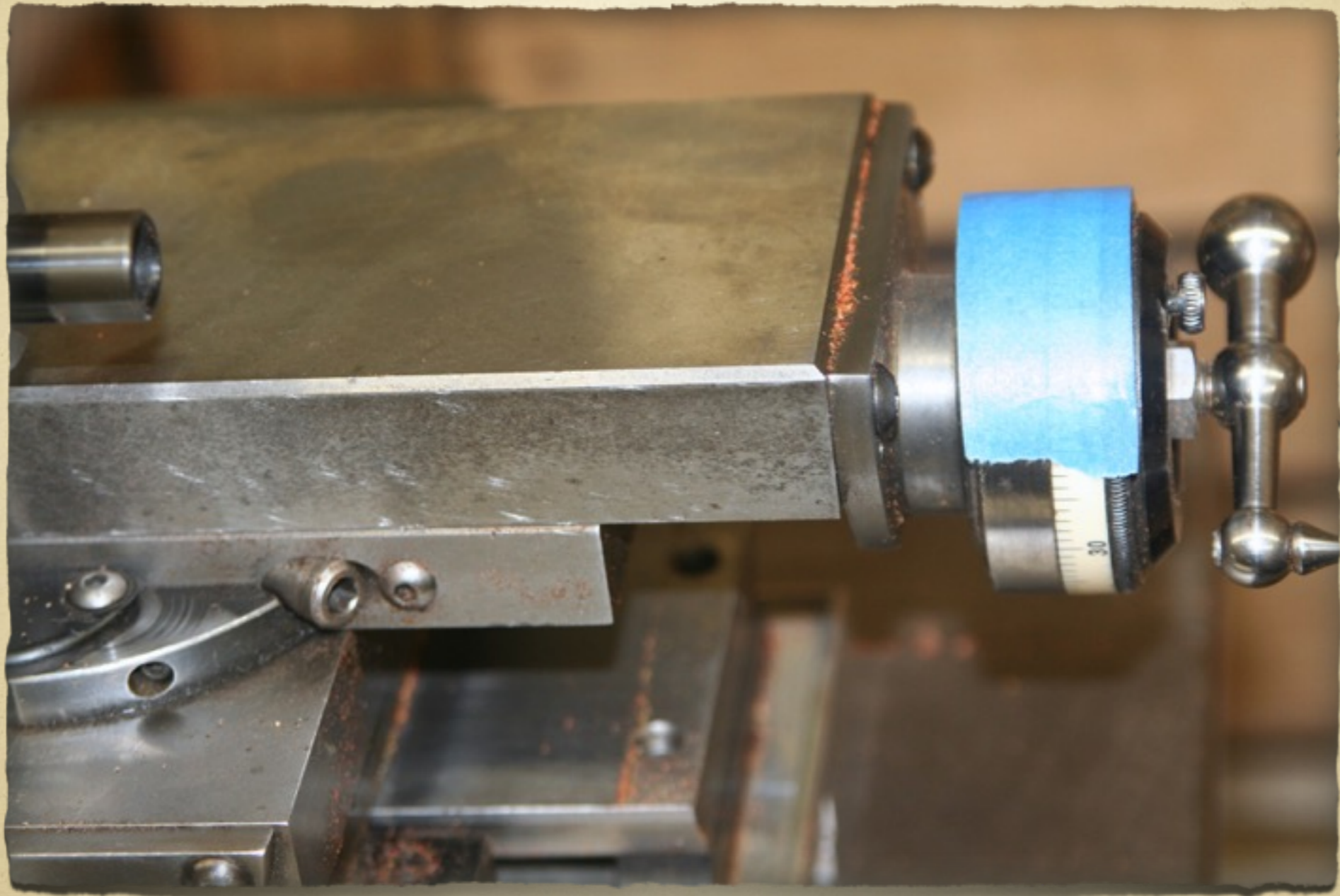


Cut list complete





Once I've completed cutting 1.3", I tape handle again.





Hollowing out the middle





Checking the diameter with a telescoping gauge set to 1.20".





Cutting a chamfer on the interior lip on my lathe





Squaring off the lid face



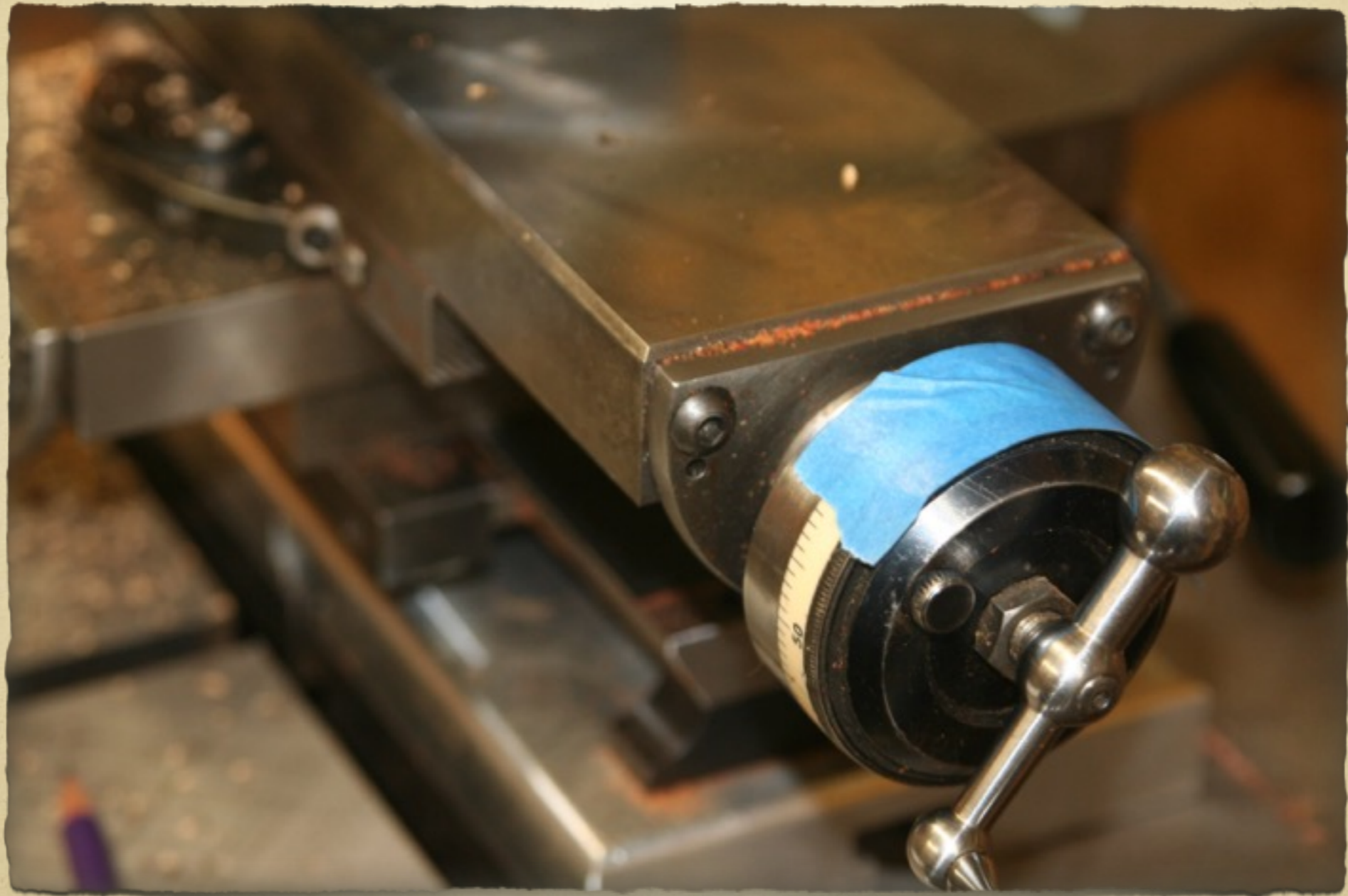


Once face is smooth a cut 0.325" deep is made



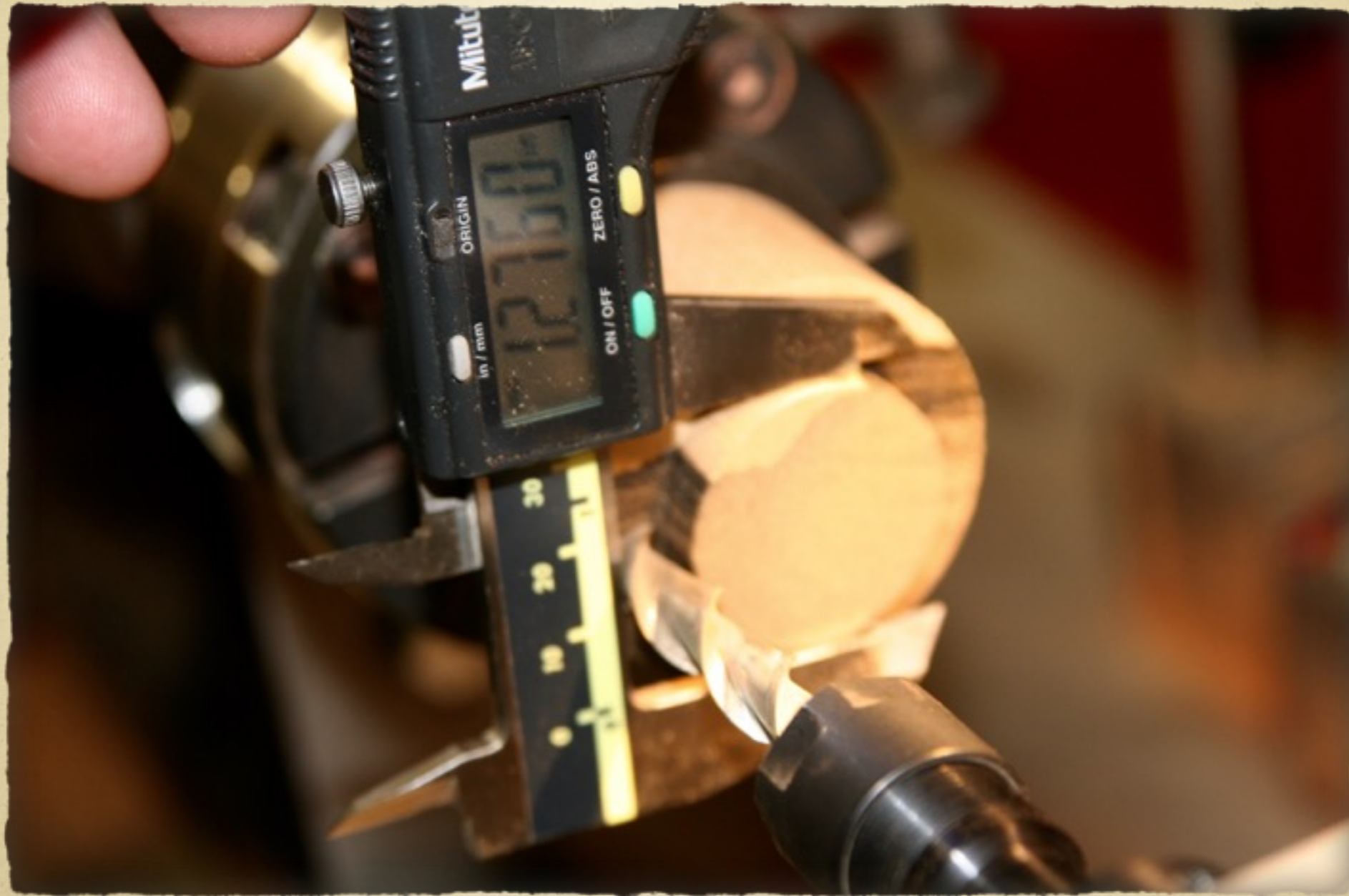


I tape the dial of the compound





Cutting the male thread tenon to 1.276"





Finished tenon 1.276" X 0.325"





Chamfered edge



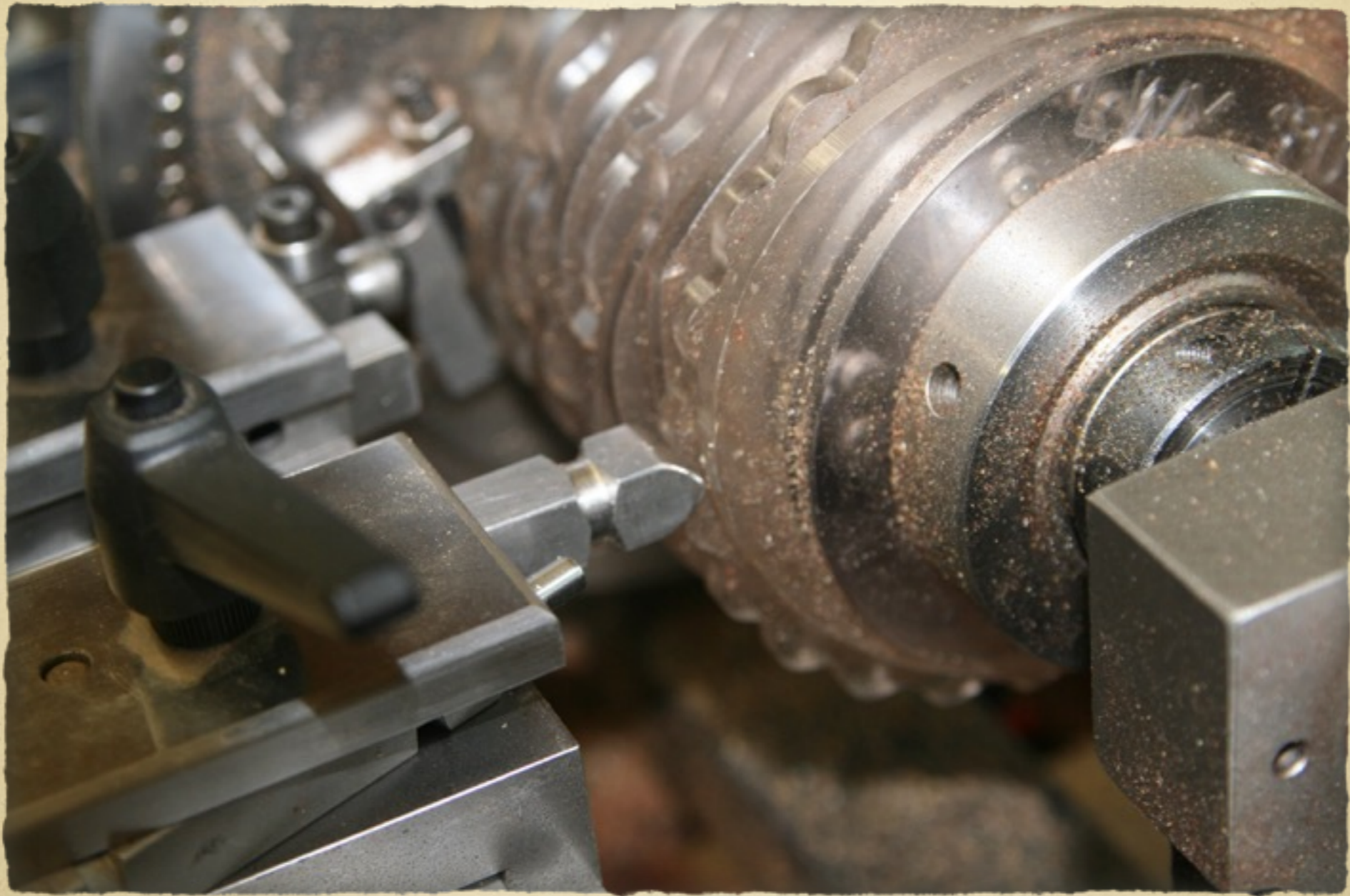


Cut 0.1875 relief with a parting tool



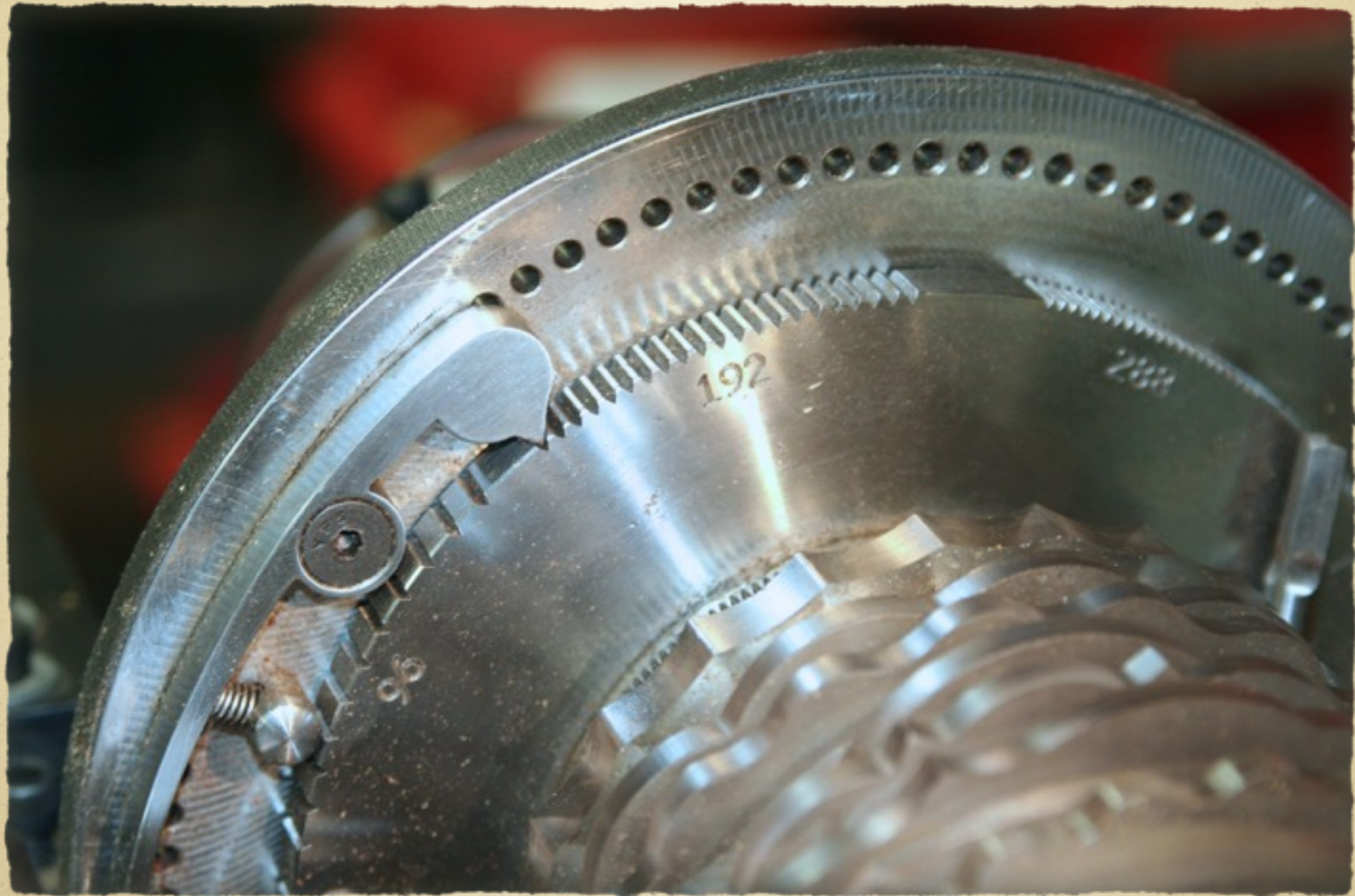


Setting up to decorate the bottom of the lid. 24 bump rosette  
0.068 amplitude.





To create a swirling pattern on the bottom of the lid, I  
use the 192 division portion on the crossing wheel



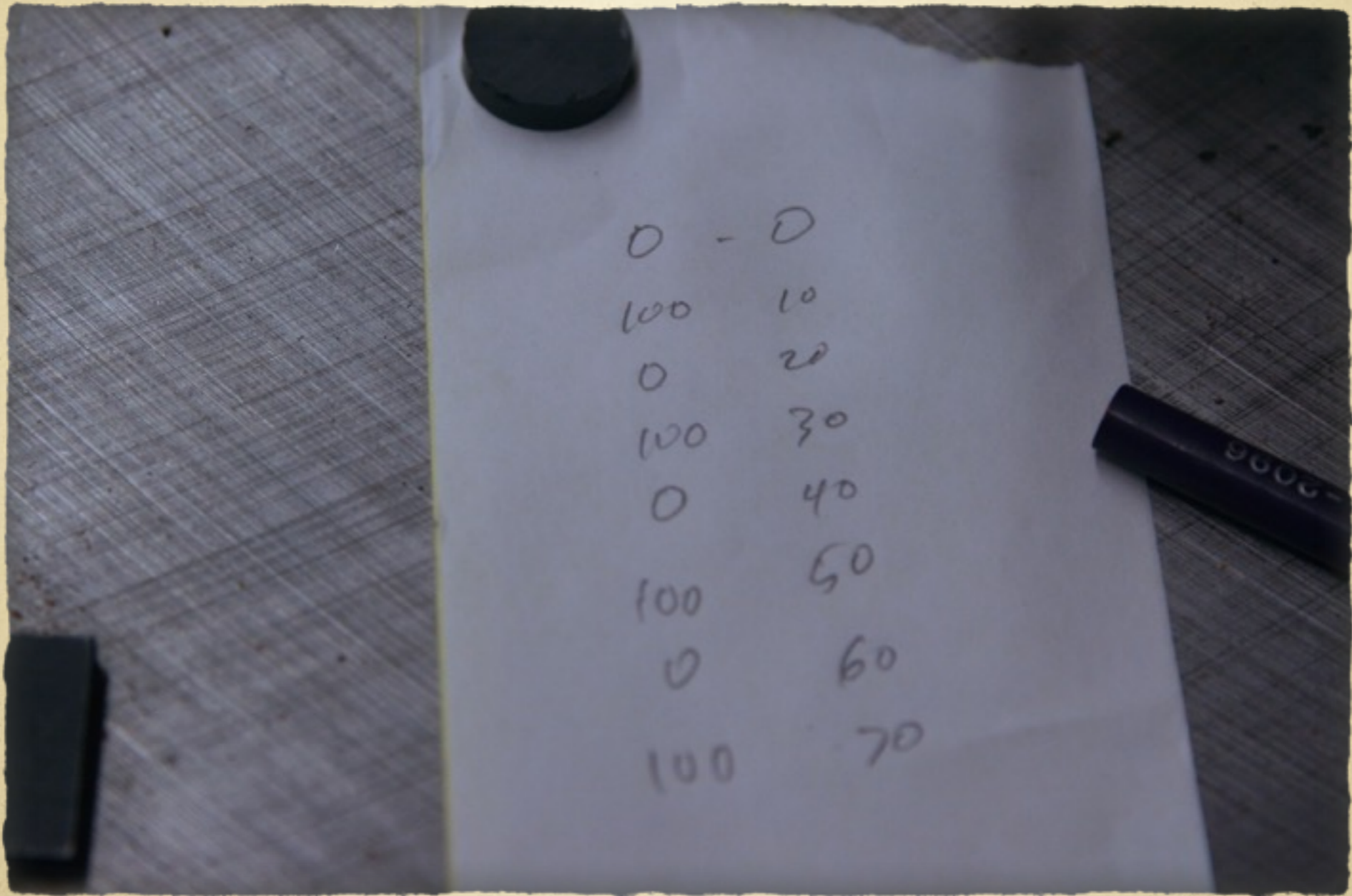


Did I mention that the sunsets are sometimes beautiful in  
Lamont, Iowa





Prior to cutting I make myself a cutting recipe



0	-	0
100		10
0		20
100		30
0		40
100		50
0		60
100		70



Finished pattern



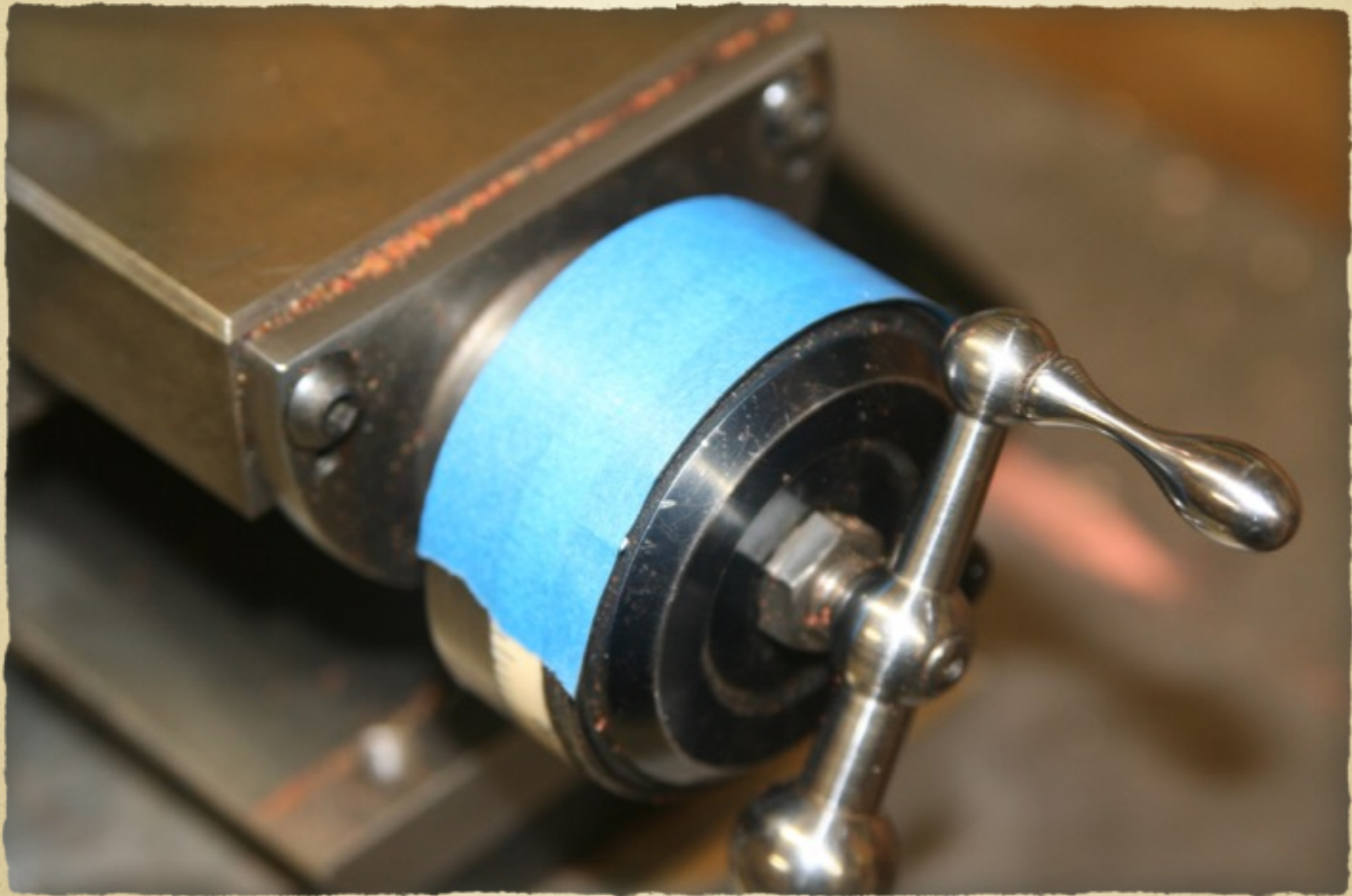


Setting up for threading. Using Gorsts feel-o-meter



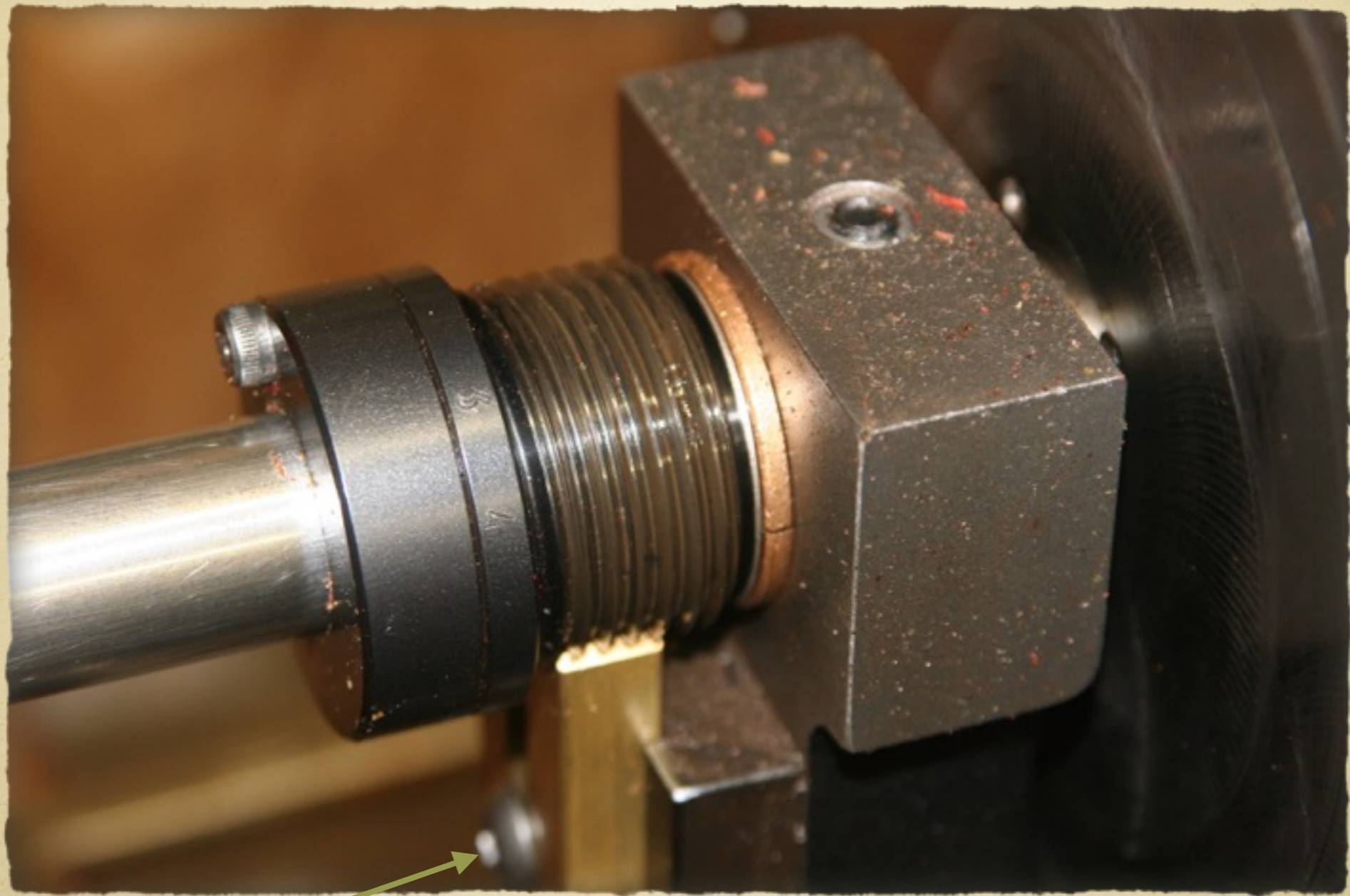


You guessed it, I use a lot of blue tape. Once I set the threading procedure, I do not move the compound until both leads are complete. Cutting depth will be 0.055"





A view of the threading attachment



Lock in place



I set up a dial indicator against the compound to measure depth of cut.





This is a good sign when my test acorn fits on the threads



This is an acorn where I used the measurements for a larger diameter acorn and I almost cut through.



Here is the lid off the lathe





Base mounted and ready for threading





Use the dial indicator to measure depth of cut for female threads.  
Indicator on compound. Depth will be 0.038".





A check with my test acorn lid.





A blind squirrel finds an acorn once in a while.

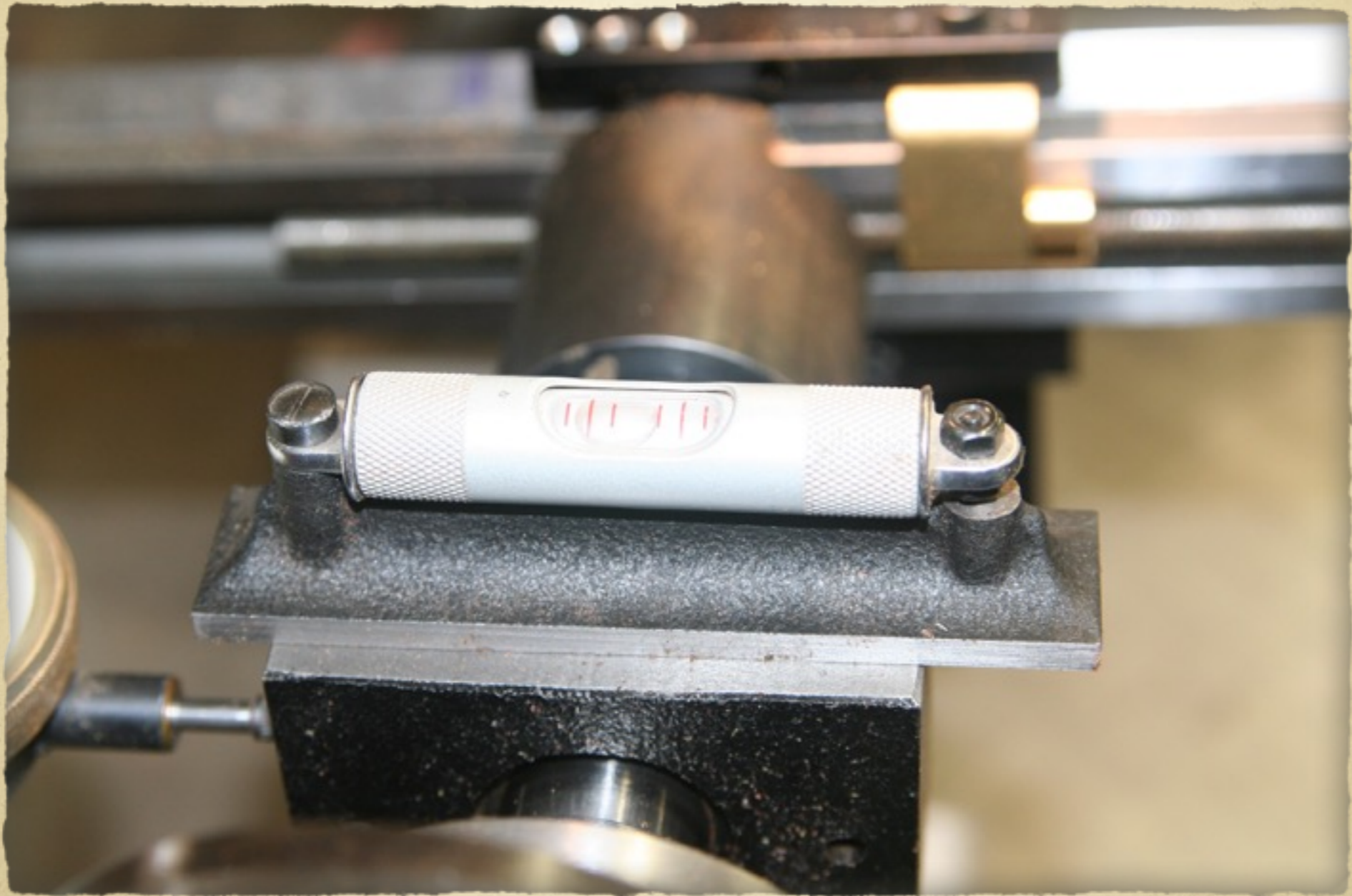




# Setting up the Dome Chuck

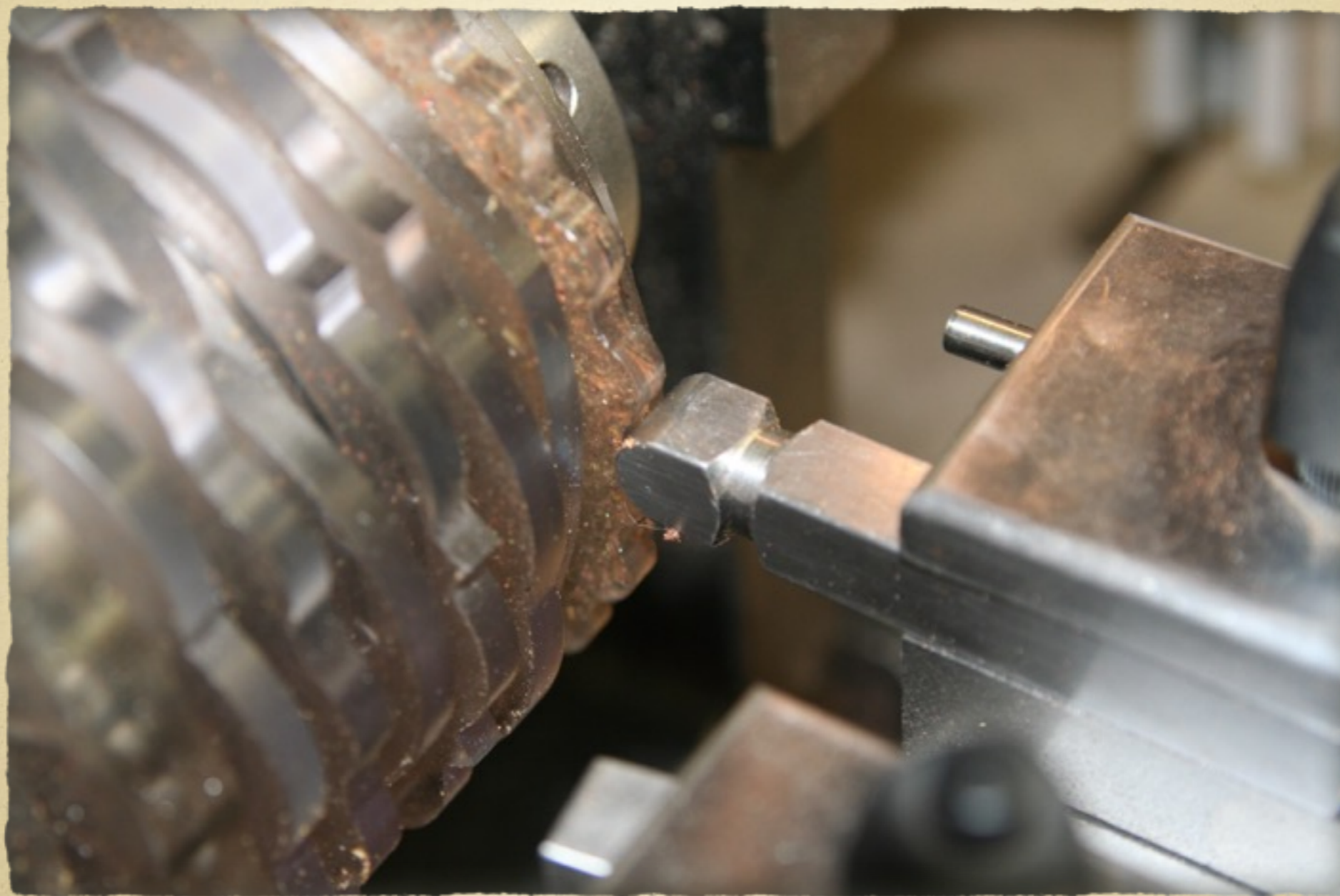


Using your 4" level, take a reading



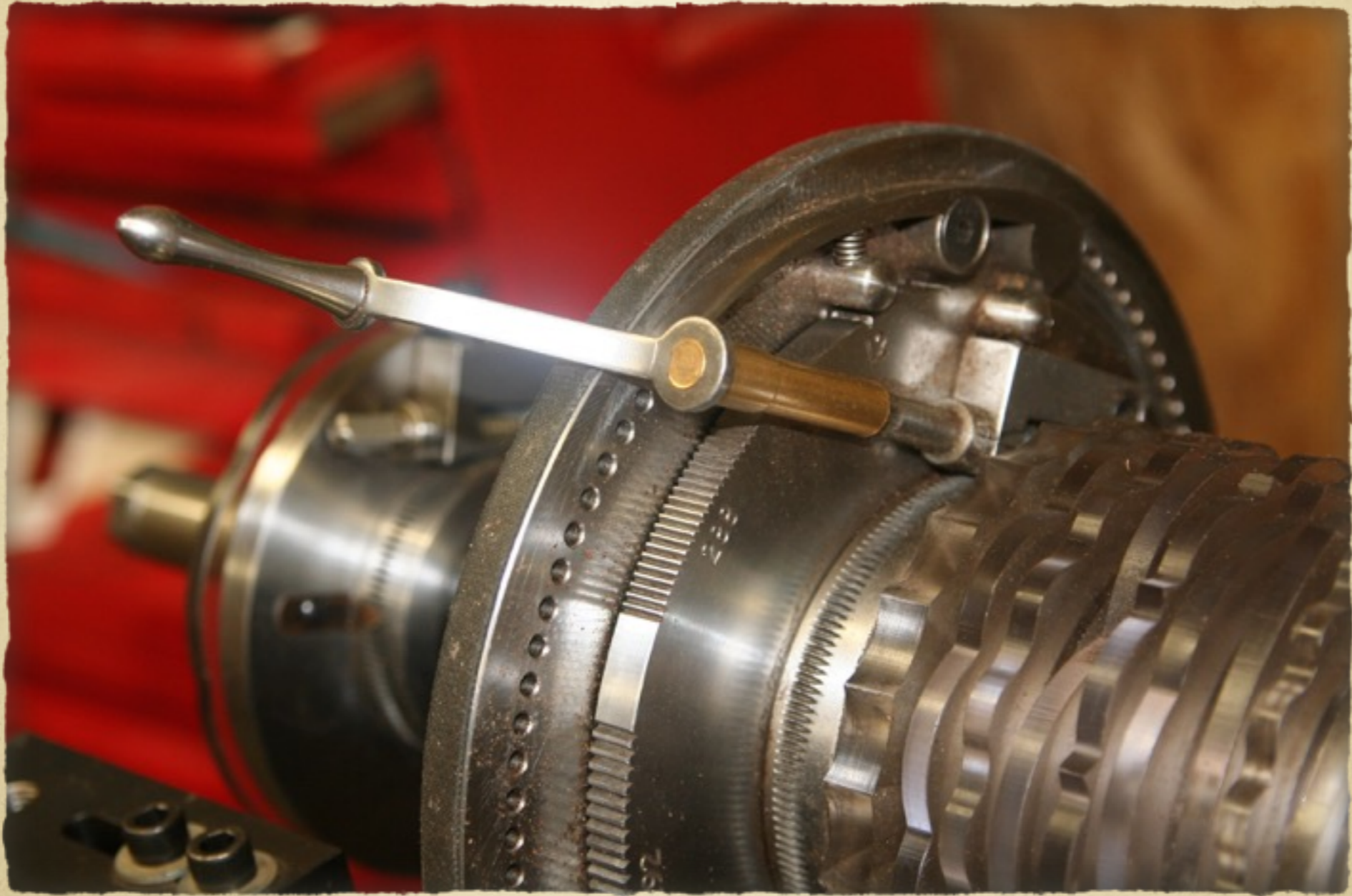


Using your 24 bump rosette and the rounded 45 degree rubber,  
place the rubber in the valley of the rosette.



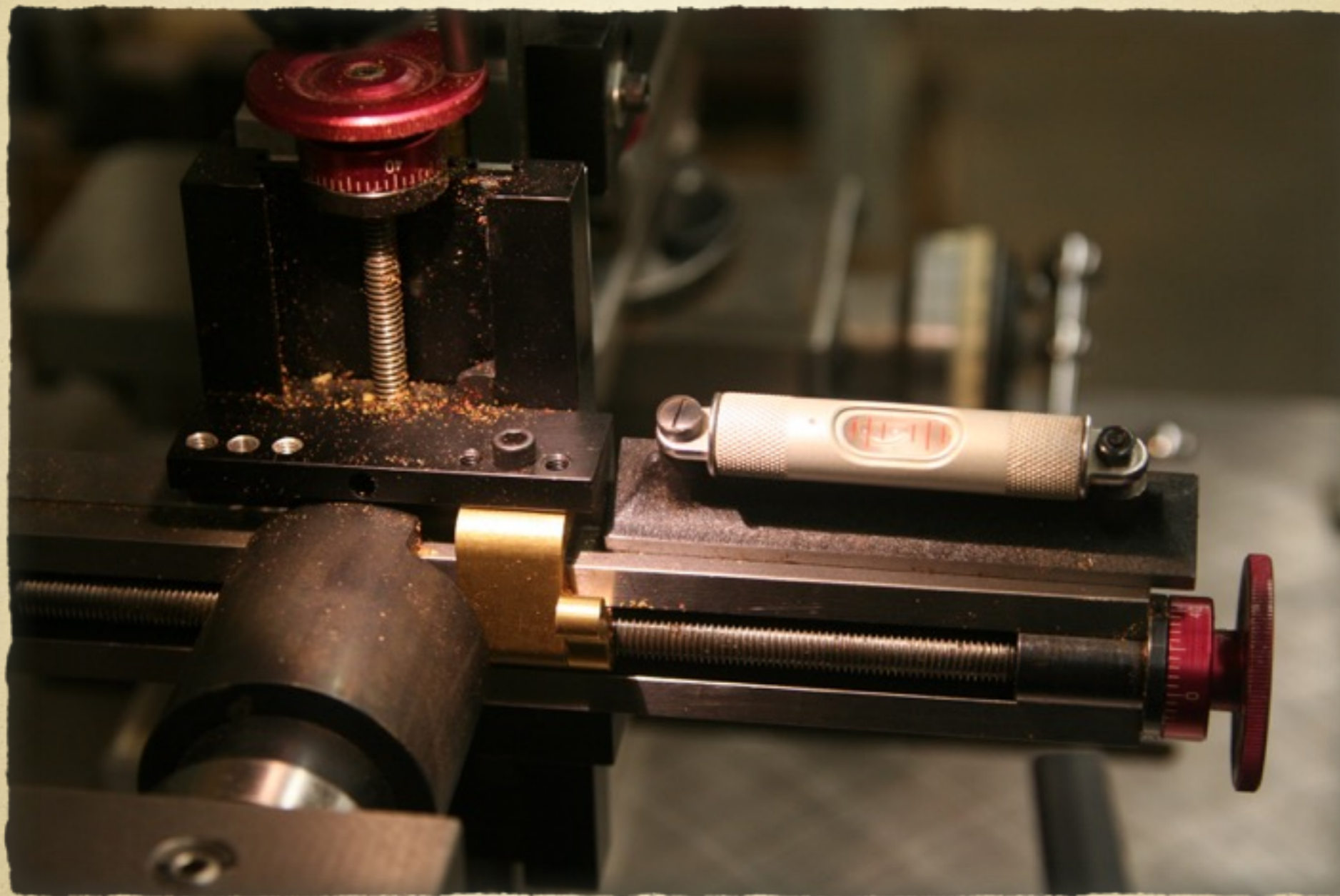


A picture of the clock key





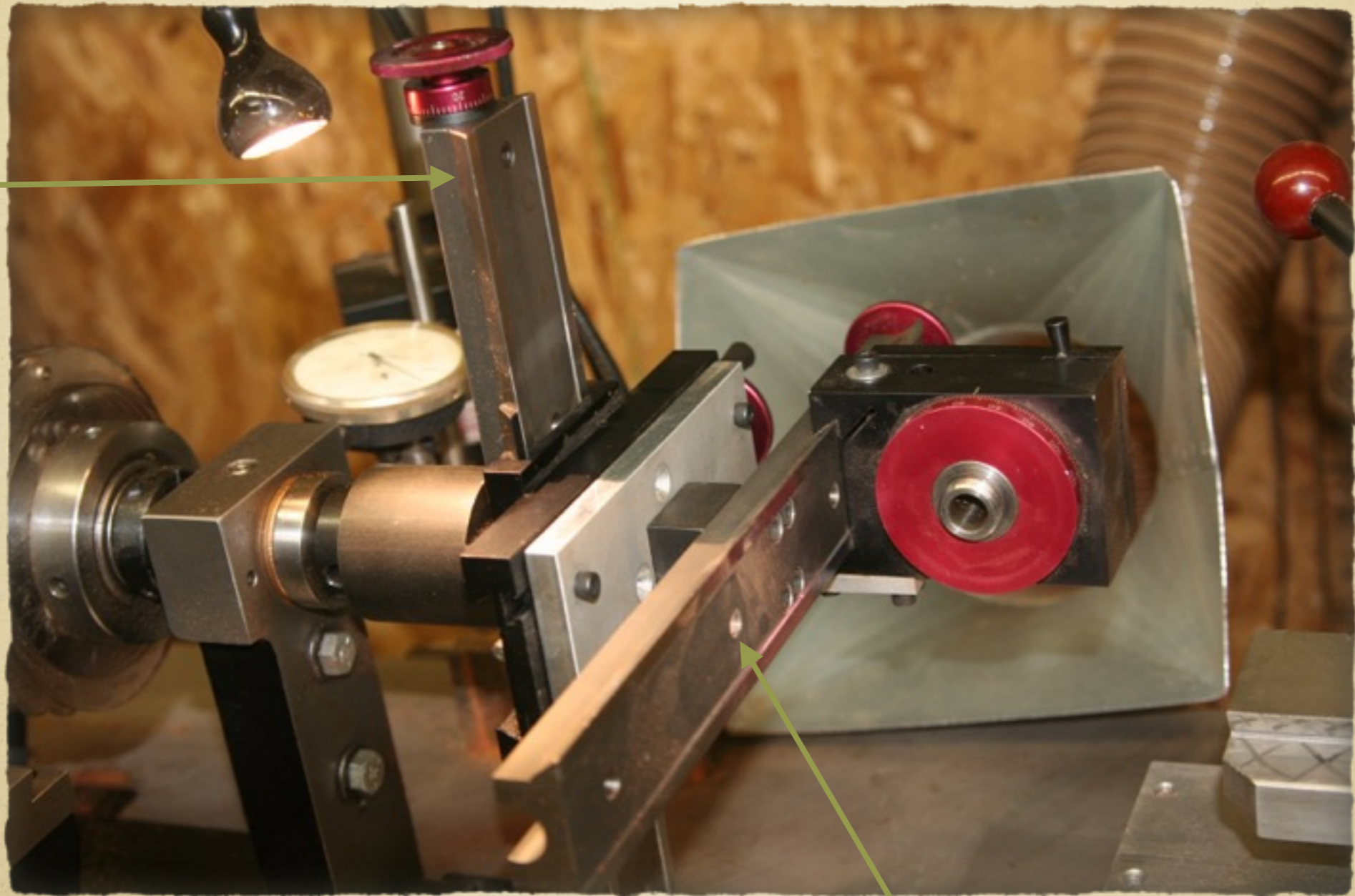
Place the level on the first slide (closest to the headstock) and adjust with clock key until it is level with the headstock.





Rotate 90 degrees and place level on the second slide

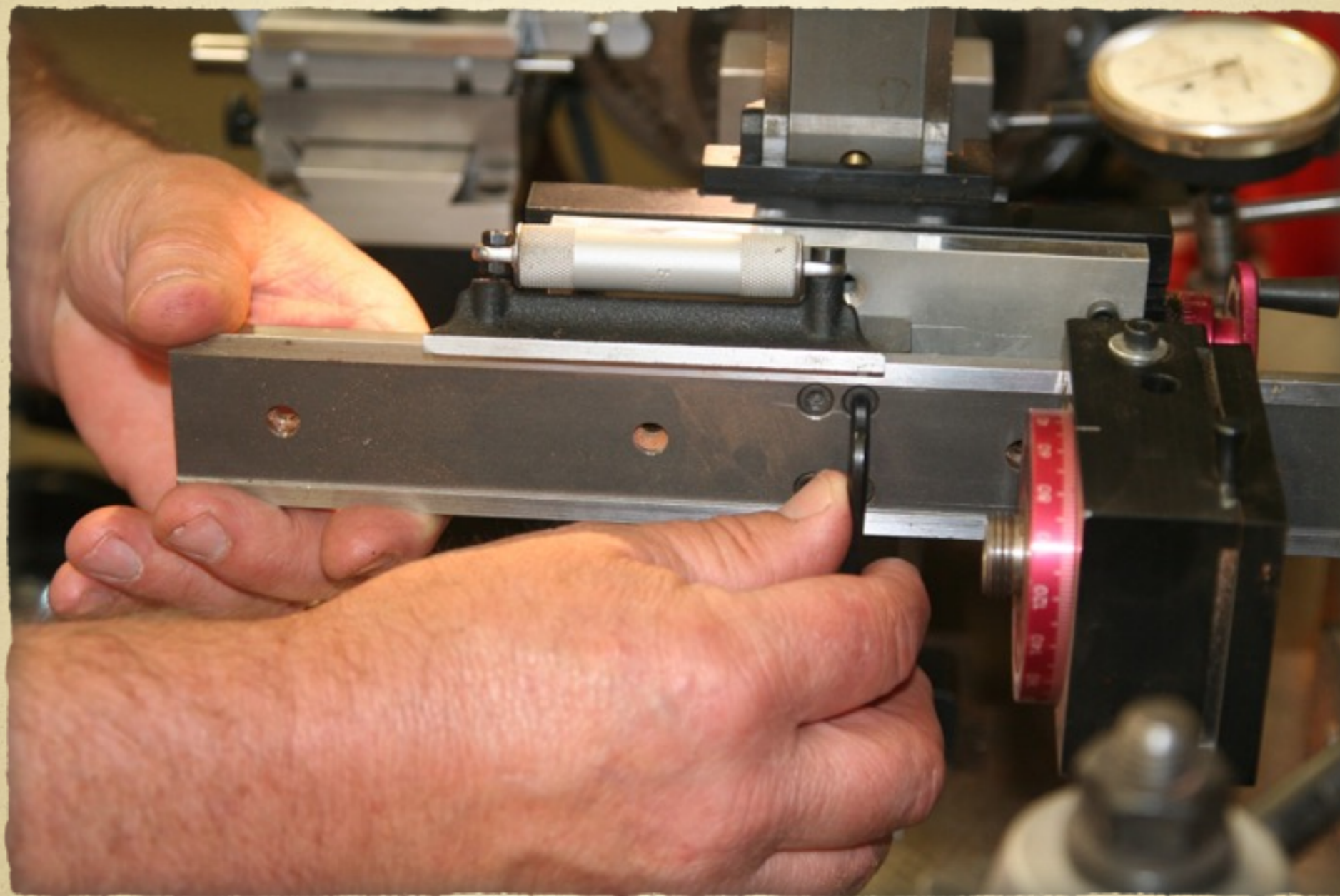
1st slide



2nd slide

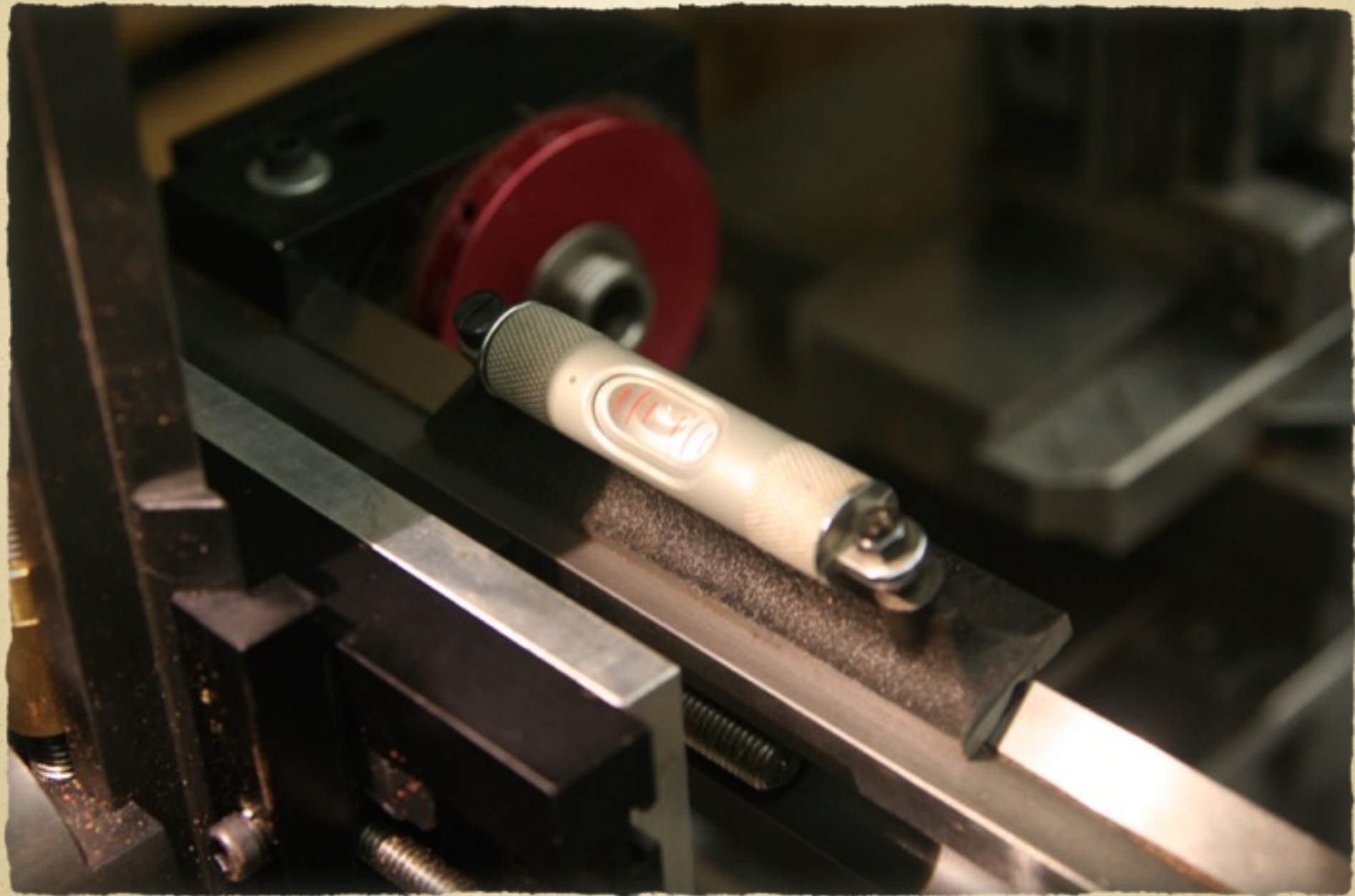


If it is not level, the easiest way is to adjust it with  
these 4 screws



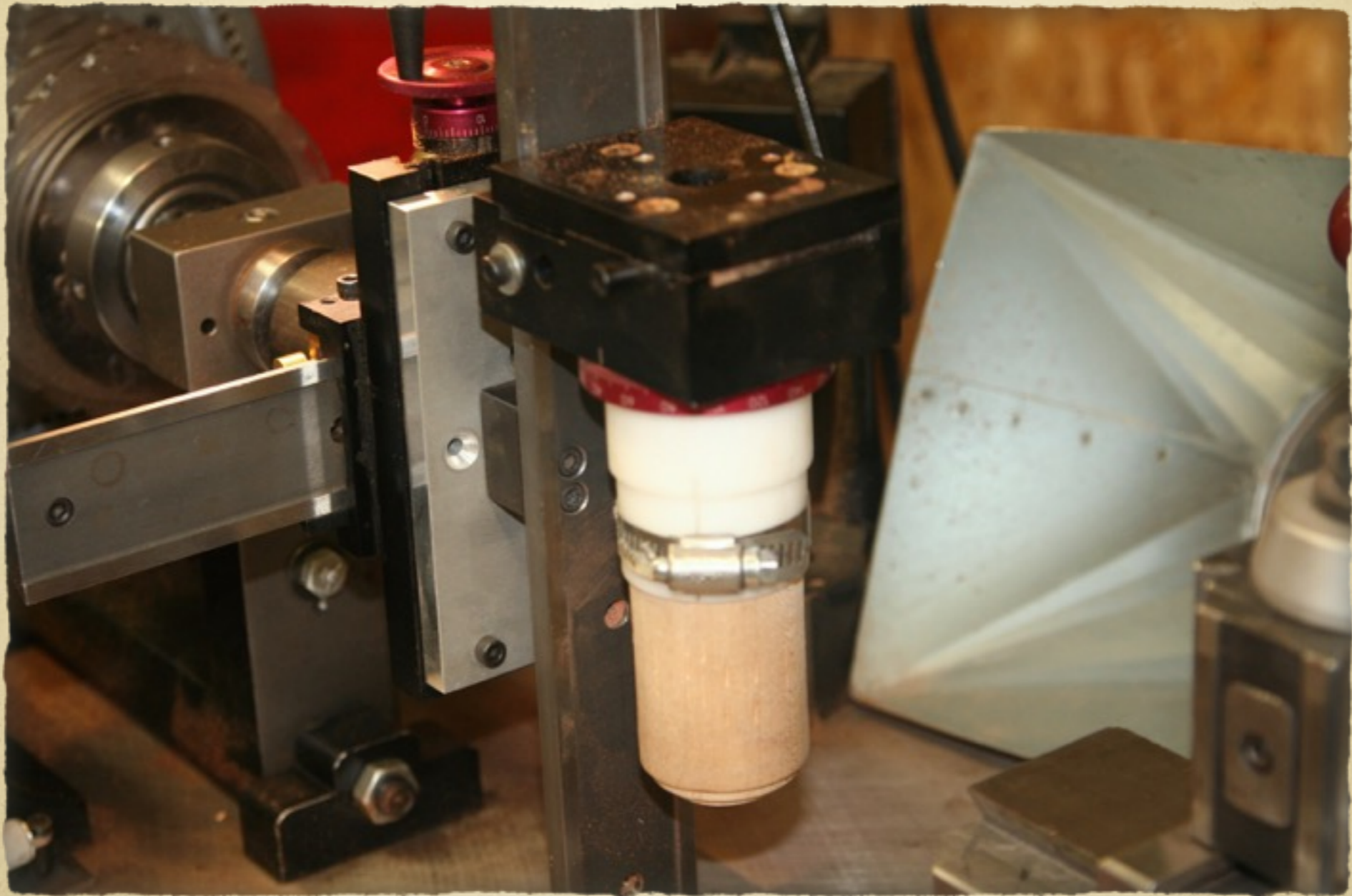


The leveling is now complete



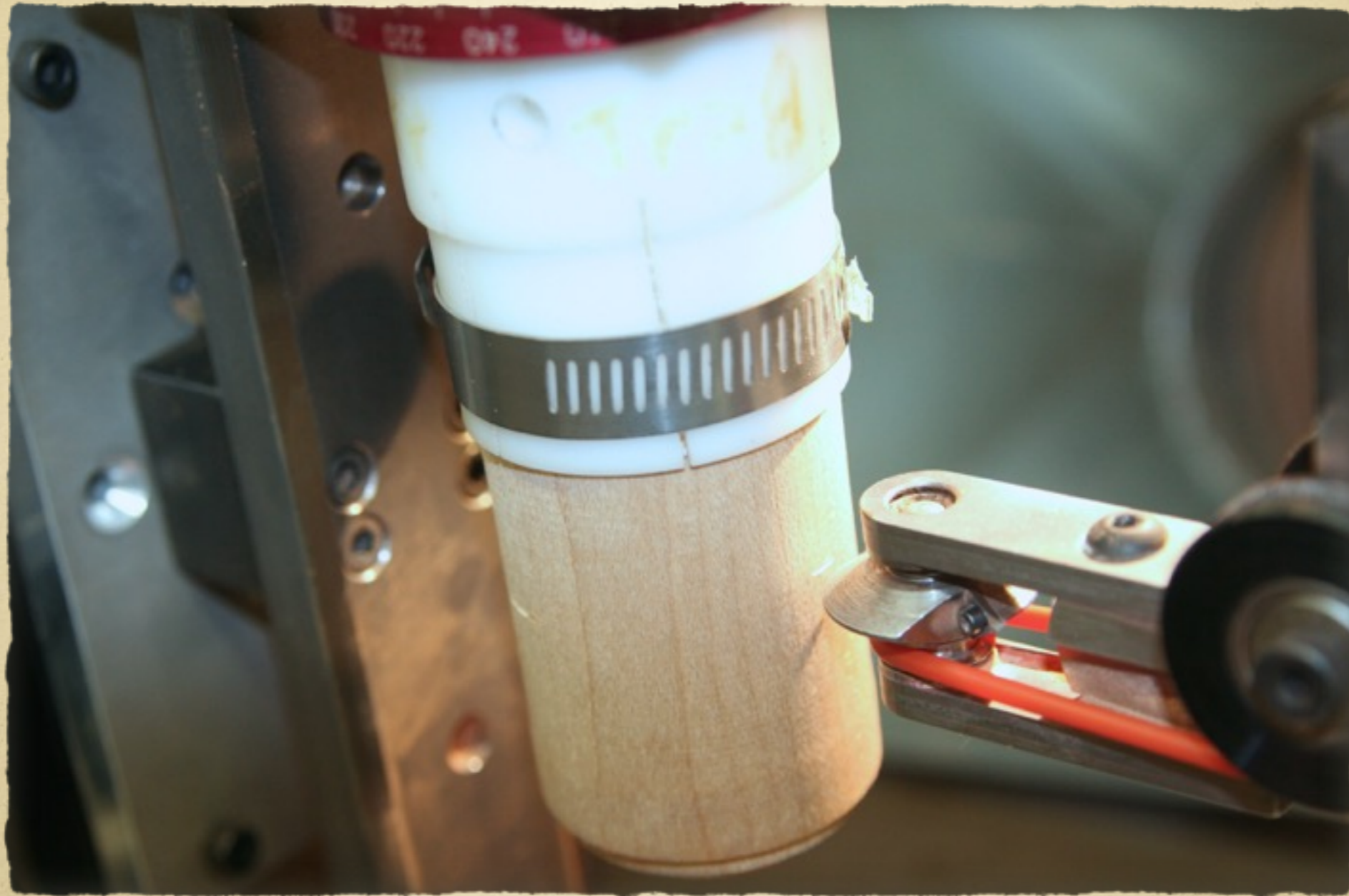


Set up to zero out the dome chuck



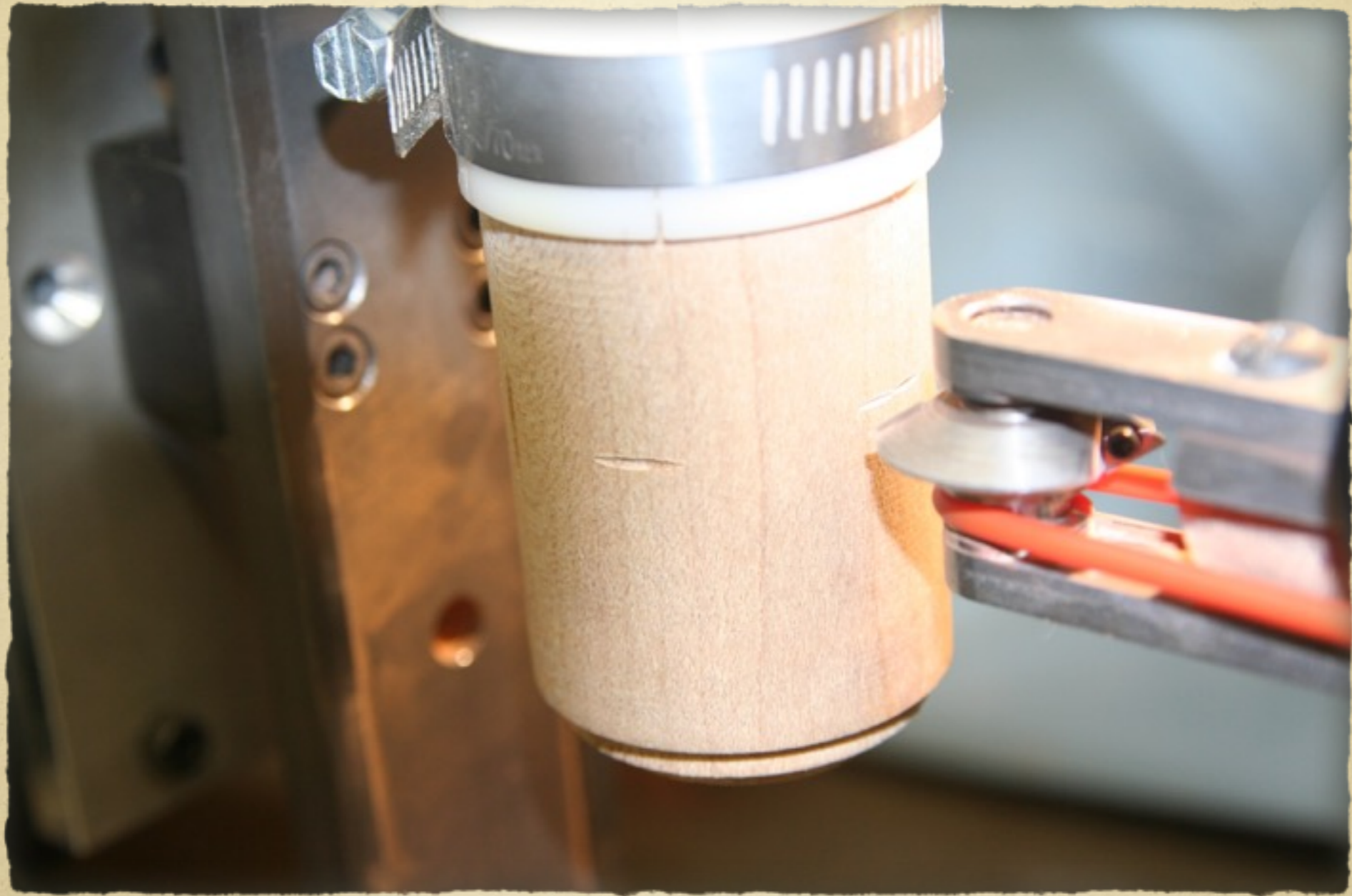


This operation is not necessary for this exercise however if you ever need to make sure your UCF is at center, you make a cut, rotate 180 degrees, and if they are different, you adjust your tool post holder



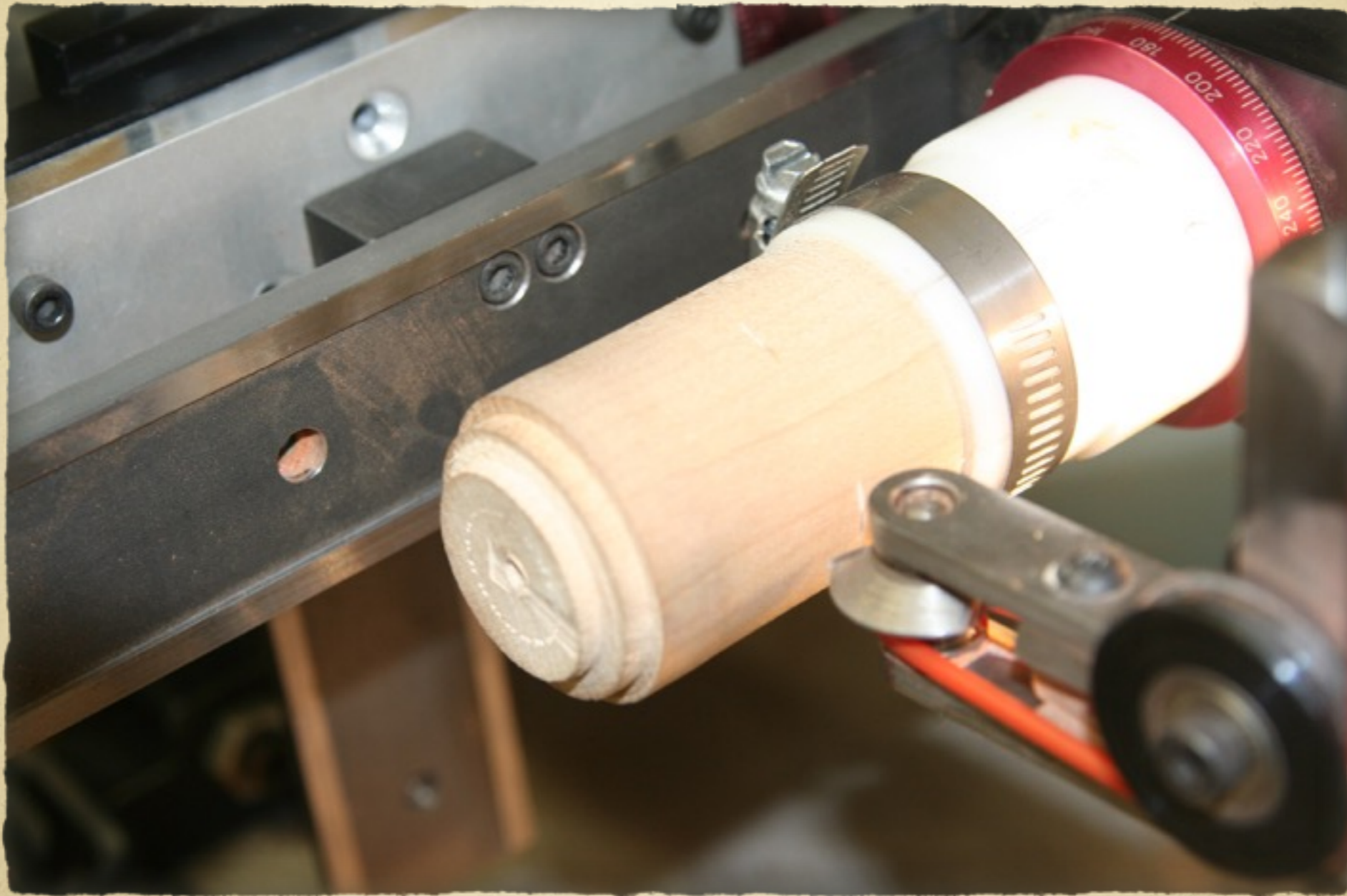


When they line up you are level





This is a critical step to insure that your UCF is at the exact center of the spindle. Your second slide should be parallel to the table. Make one cut, rotate 180 degrees and make a second cut.





Adjust the UCF until you get this result



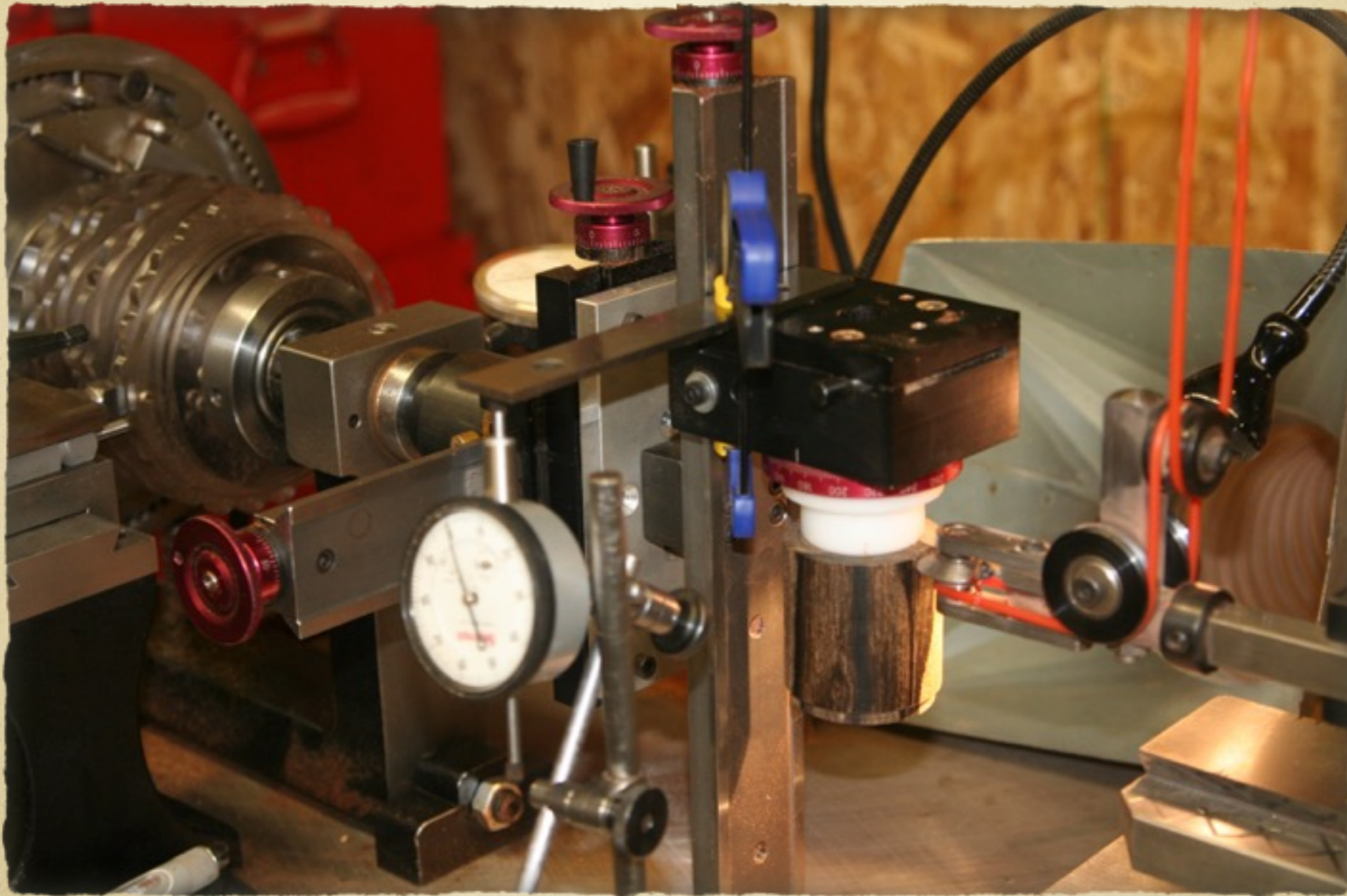


A close up





This is my set up for moving the UCF down 0.66" from the lip of the box.



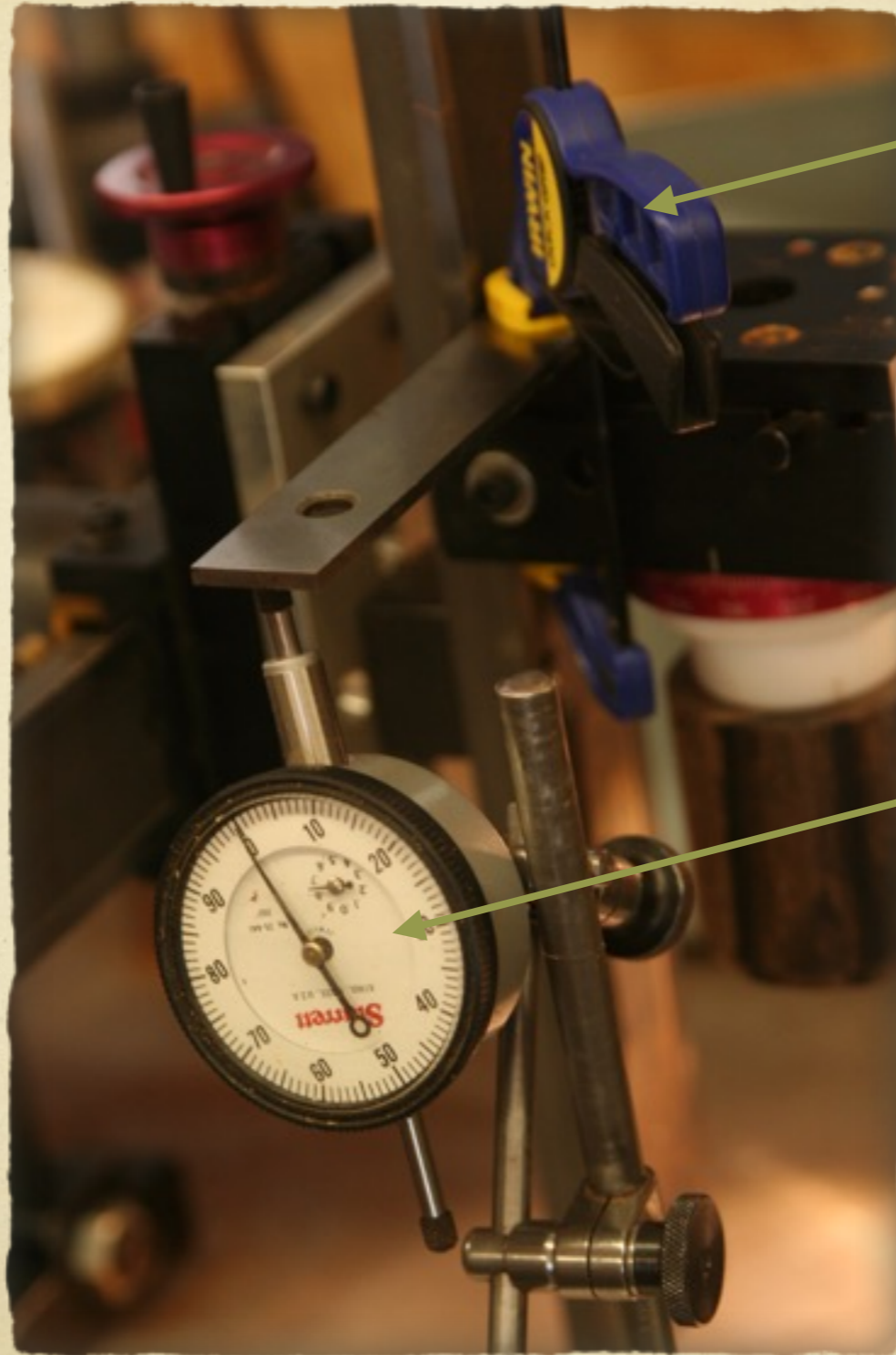


A close up of the universal cutting frame at the lip of the box





My set up



Metal bar clamped  
to top of dome chuck

Dial indicator to measure  
orienting UCF 0.66"  
from top of rim

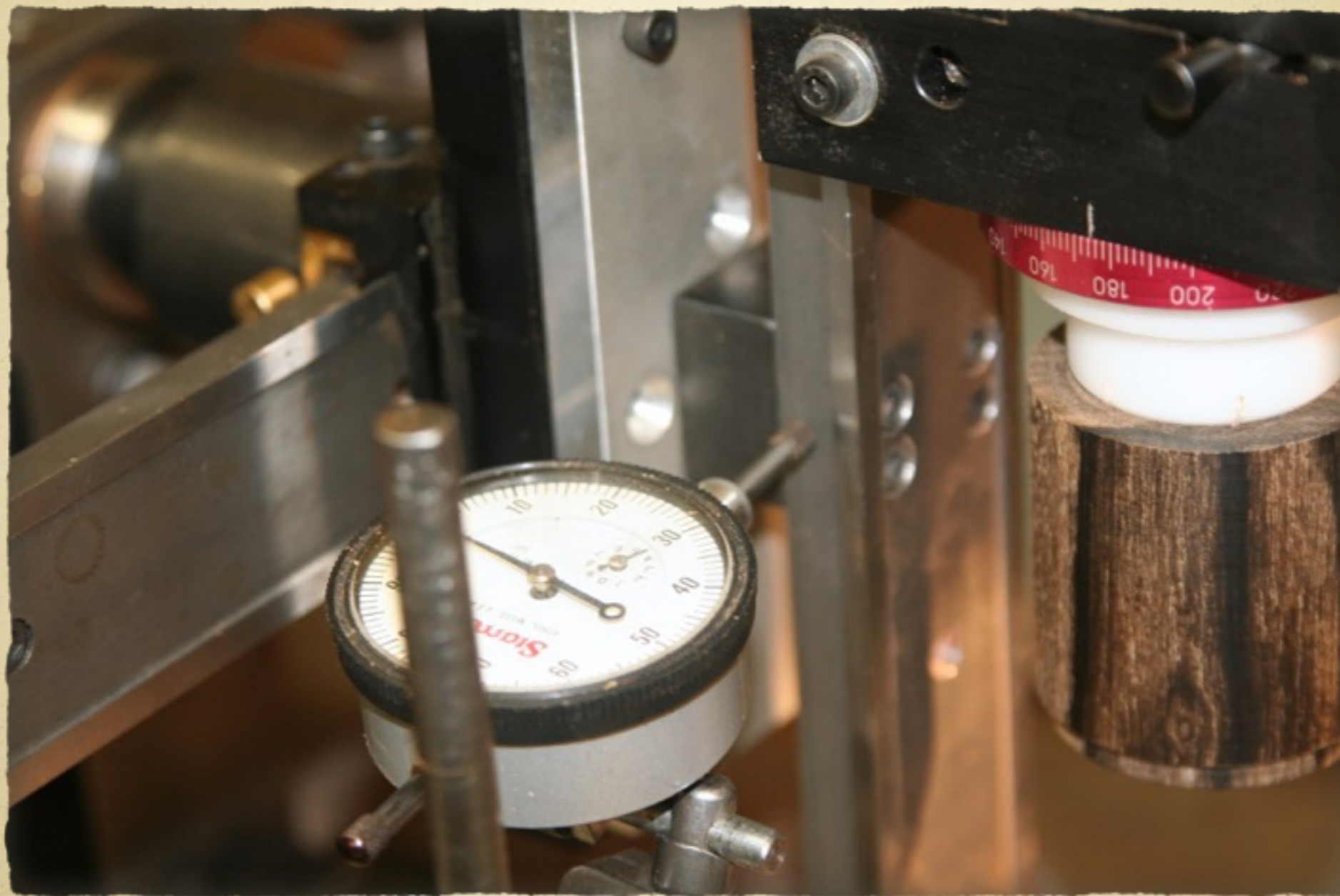


There we are...Universal Cutting Frame 0.66" below lip of box



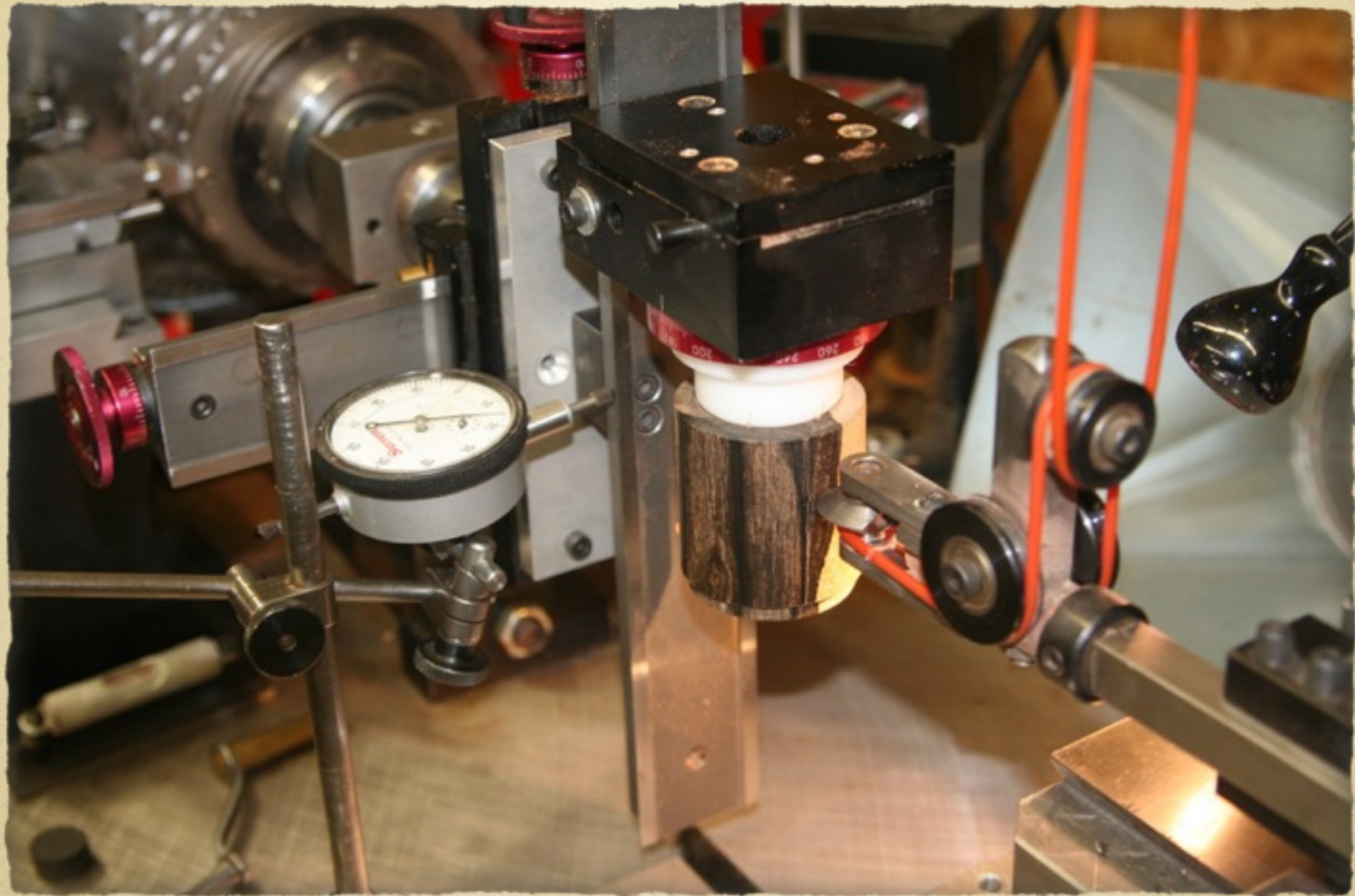


Place dial indicator against 2nd slide and move towards  
the indicator 0.216"



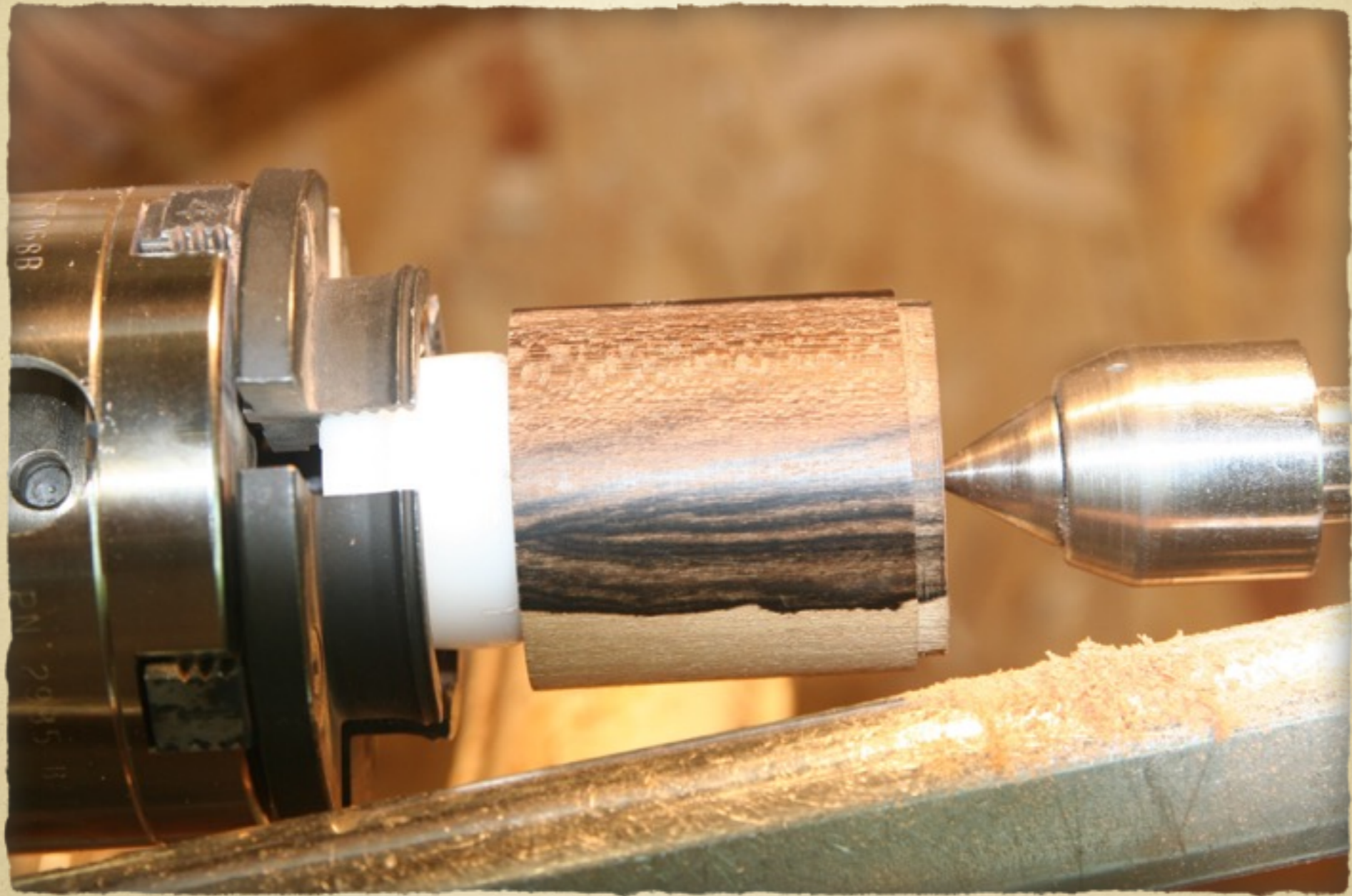


Another picture of the set up





Centering base in the Talon Chuck





Rough shape the outside of the box





1st cut you usually remove a lot of material. Subsequent cuts  
“not so much.”





Cuts every 15 degrees





I am moving the cutting frame towards the acorn so I can get smooth, crisp ridges. Notice the dark spots in the circle



Flat spots



Finished





Setting up to decorate the bottom. Headstock is level.



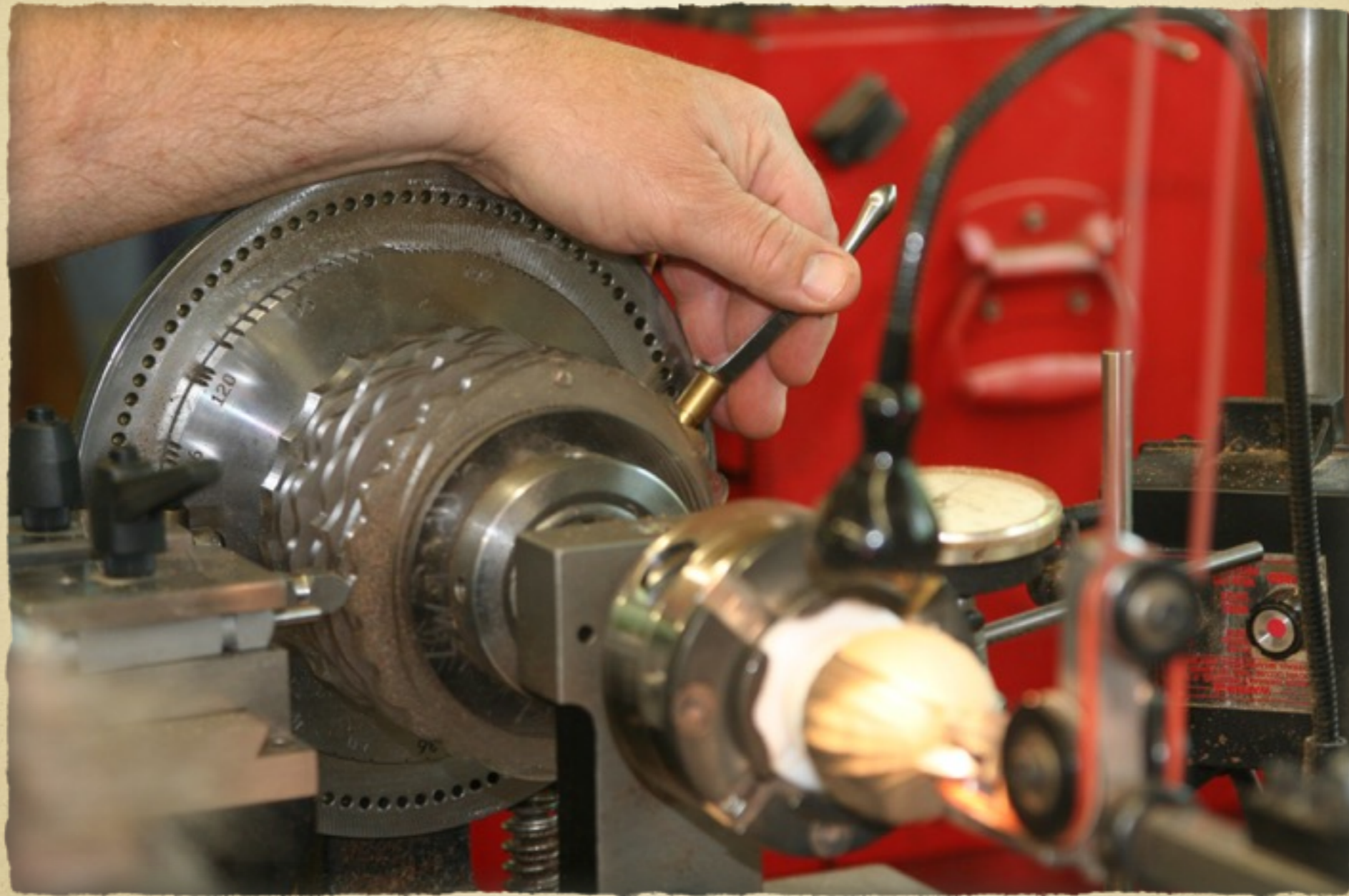


Here I am setting up



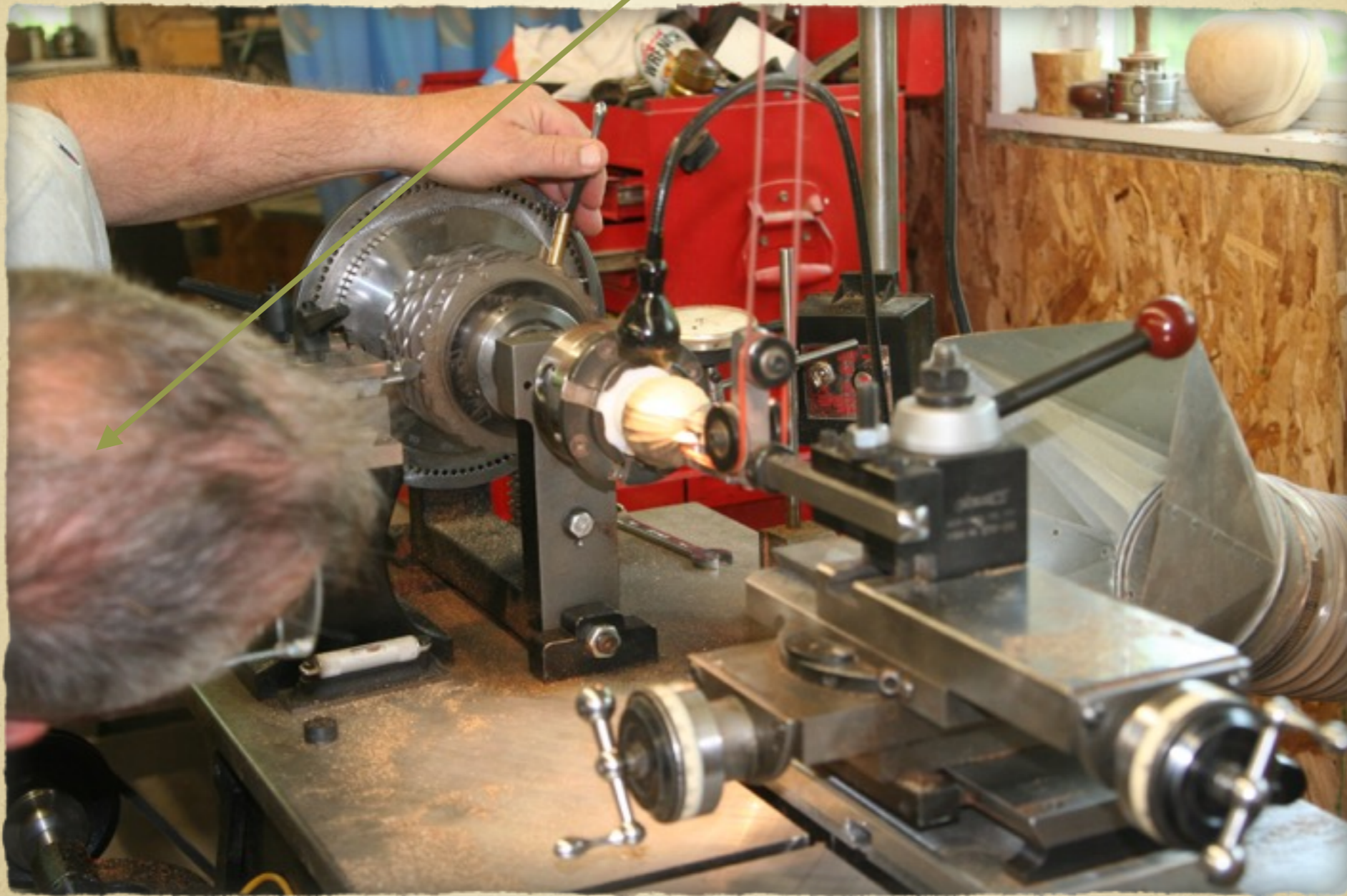


I am using the clock key to orient the cutter so the ridges come to a point at the base. Not necessary but adds a little flair!!



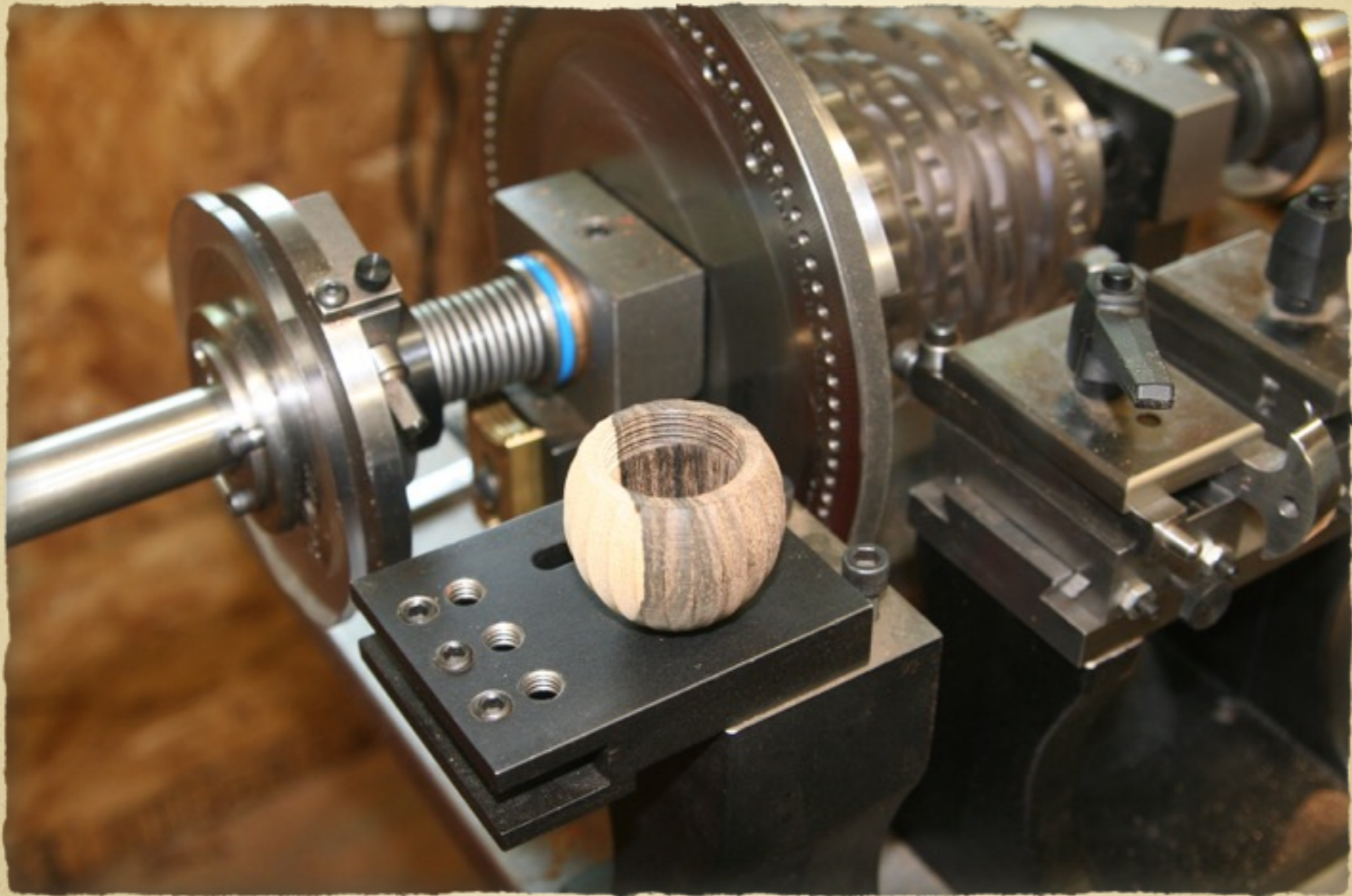


Now I know why my wife does not want me to cut my hair so short!



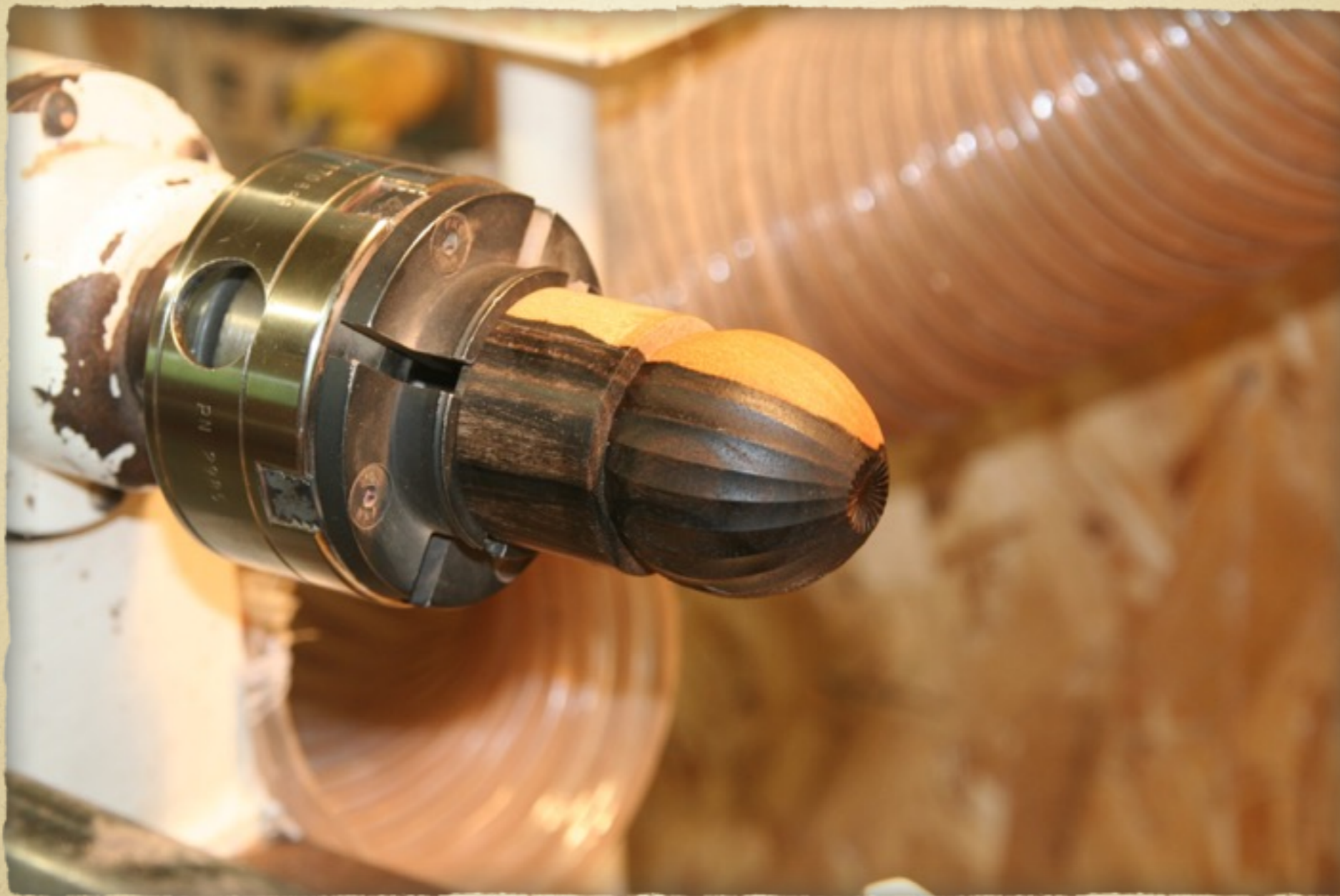


Finished base





Mount base on lid and lightly mark edge with pencil so you can determine how much chamfer you will need.





Chamfered edge





Lid mounted on waste block



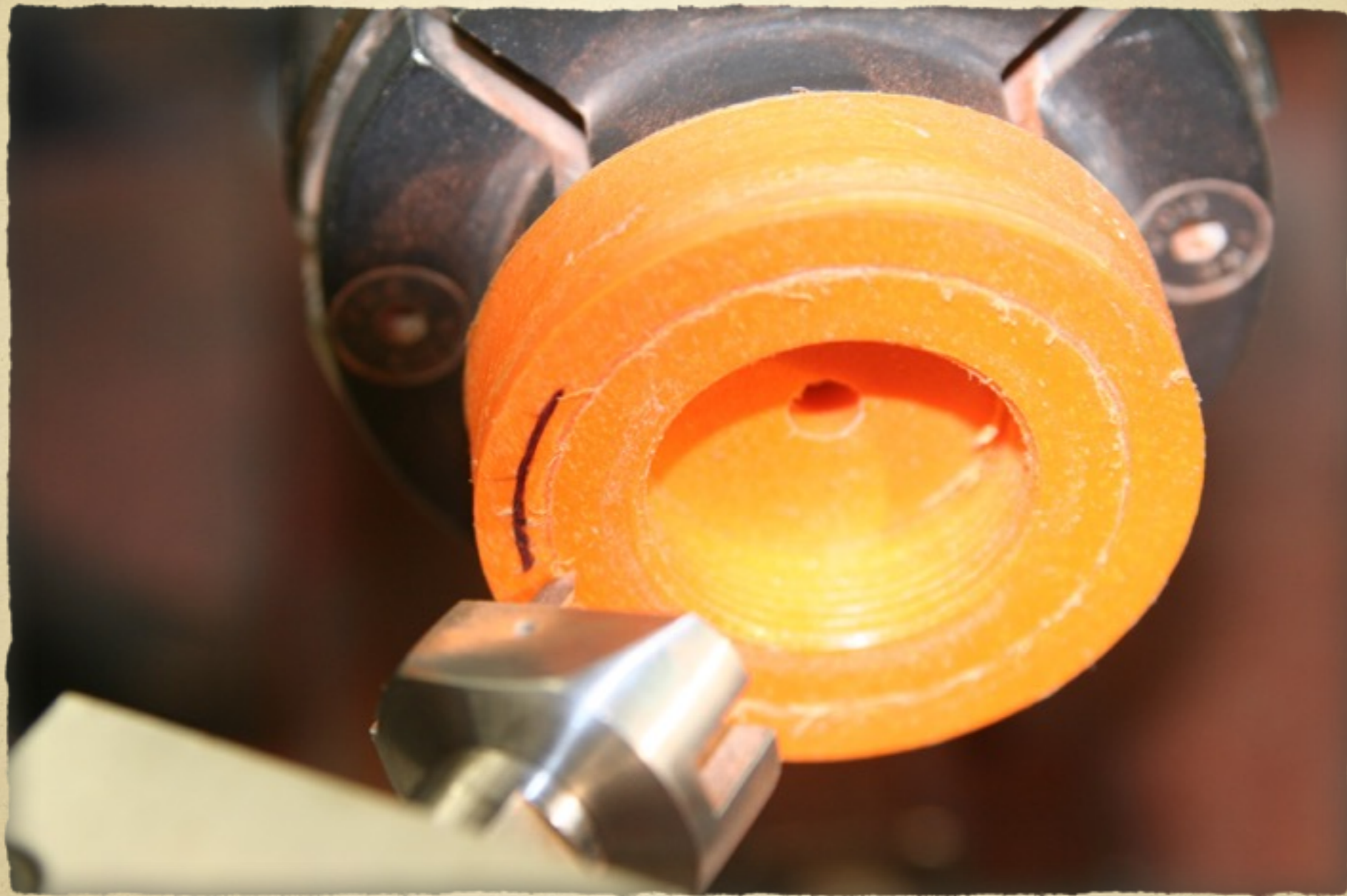


Lid rounded on Oneway lathe





Prior to cutting I determine where I want the compound to finish. The dark line represents the uncut edge of the lid. As you can see, I will be making the lid slightly narrower in diameter.





A view of the set up

Cross slide is taped and will not be adjusted

Depth of cut will be made with  
the compound slide









Cutting away. I chose to use the 24 bump pumping rosette.





Finished





Together at last!





