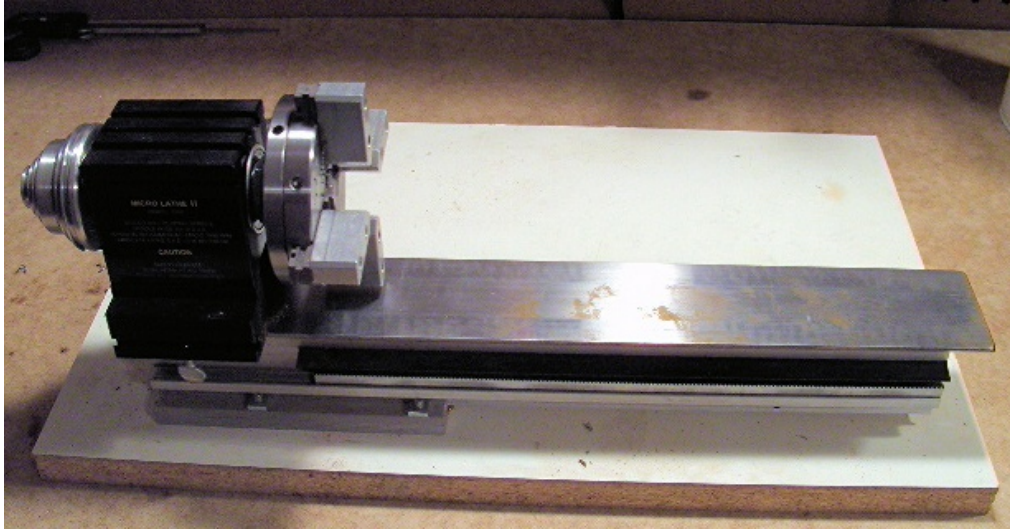


Lathe Operation

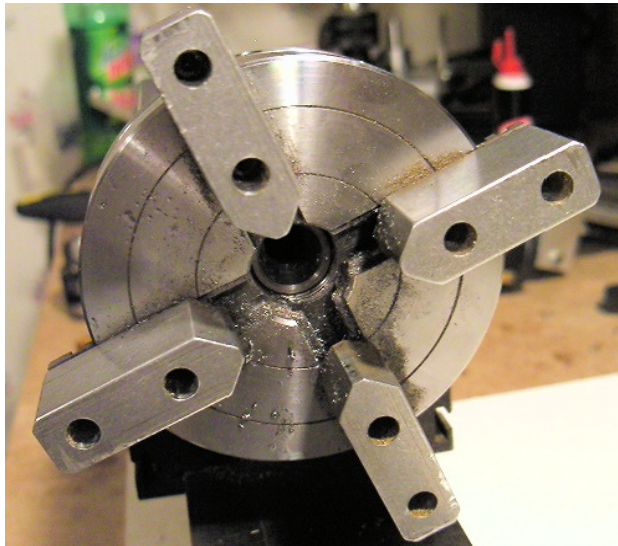
Part 1 - Lathe Basics

By Lee Byrne

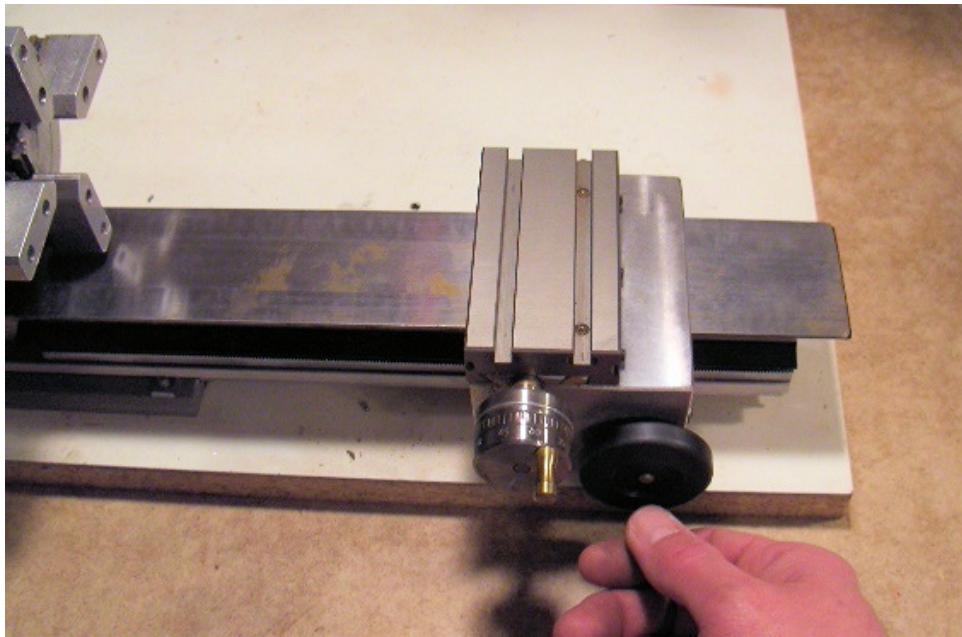
I am going to describe the lathe using a Taig lathe, as seen below, because that is what I own. All metal lathes are basically the same, with only minor differences.



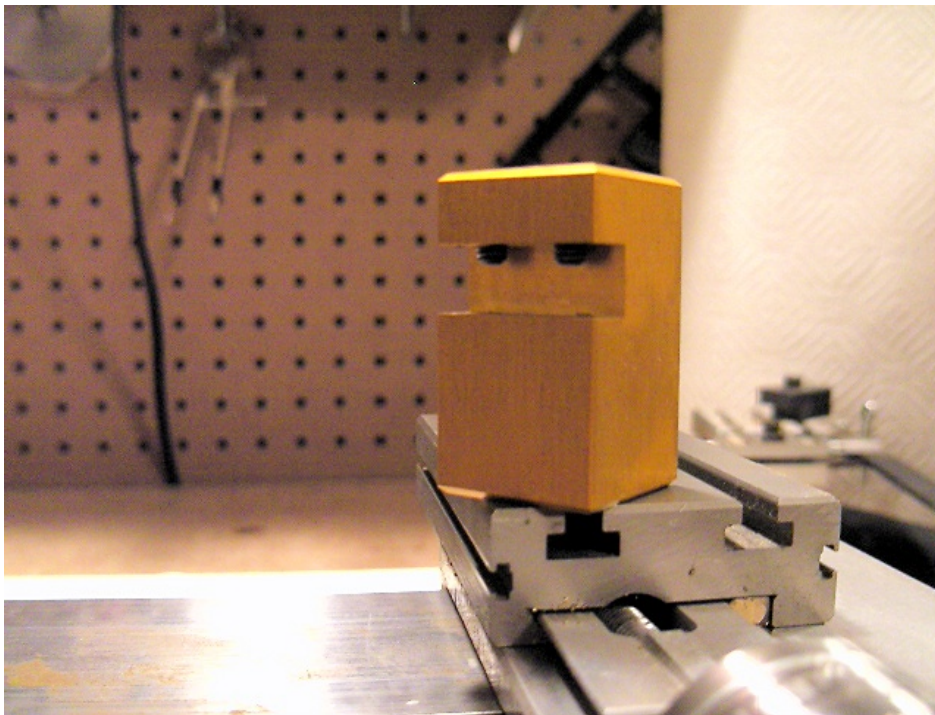
This is the lathe bed with the headstock mounted. There is a pulley on the back with six different grooves. By changing which groove the belt runs in-you change the speed. Some lathes, such as a Sherline, have a variable speed control instead.



This is the chuck of the lathe; it is a four jaw scroll chuck-the best kind for all around hobby use. This will grip both round and square stock. Its called a scroll chuck because all four jaws close at the same time. There is also a three jaw scroll chuck; this is good for round and hex shapes but it will not grip square stock. There is an advanced chuck called a four jaw independent chuck. This is the most versatile type of chuck because it will grip any shape but it requires additional tools and time to master. Each jaw moves separately, so stock can be offset and any size shape can be clamped. I only use a four jaw scroll chuck for ship-modeling projects.



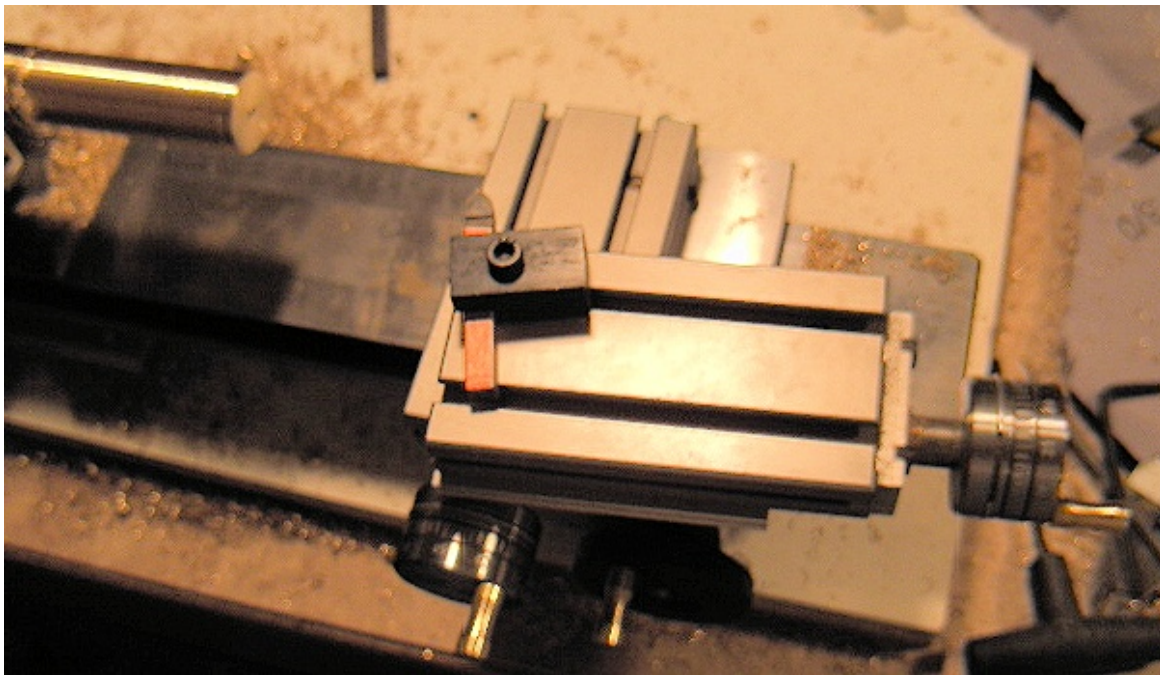
This is the carriage and cross slide. This gives you two axes (directions) of movement: along the table towards the chuck and across the table. My hand is on the hand wheel to move the carriage toward the chuck; the other wheel is for moving across the table.



This is the basic tool post, the slot is wider than the tool so you can adjust the bit-tip up or down. The post mounts to a T-slot on the cross feed carriage. Your tool post might mount differently.



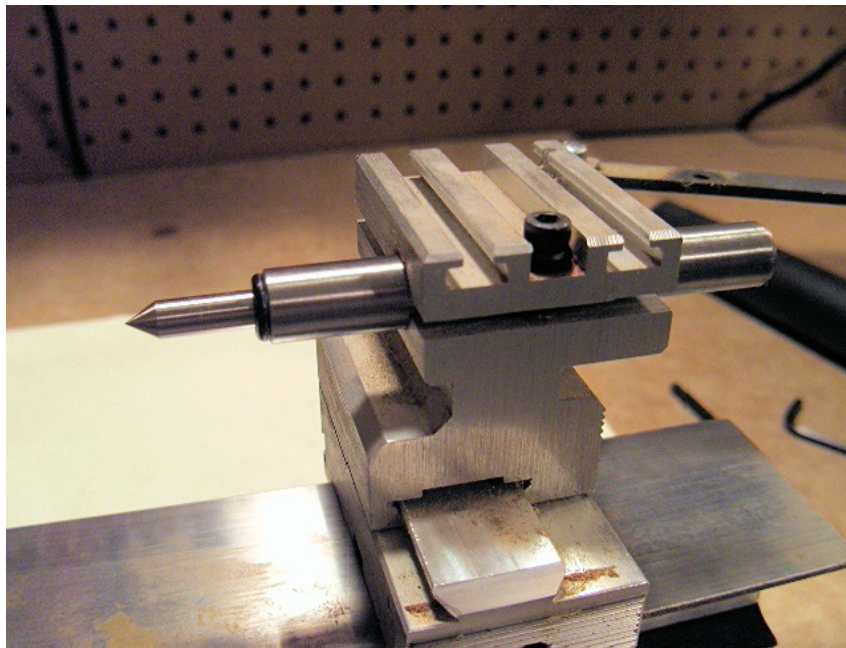
This picture shows a bit mounted in the tool post. By putting shims under the bit you could raise the whole bit. By placing the shim only under the back of the bit, you could lower the tip. On this post, the bit is held by two allen head set screws.



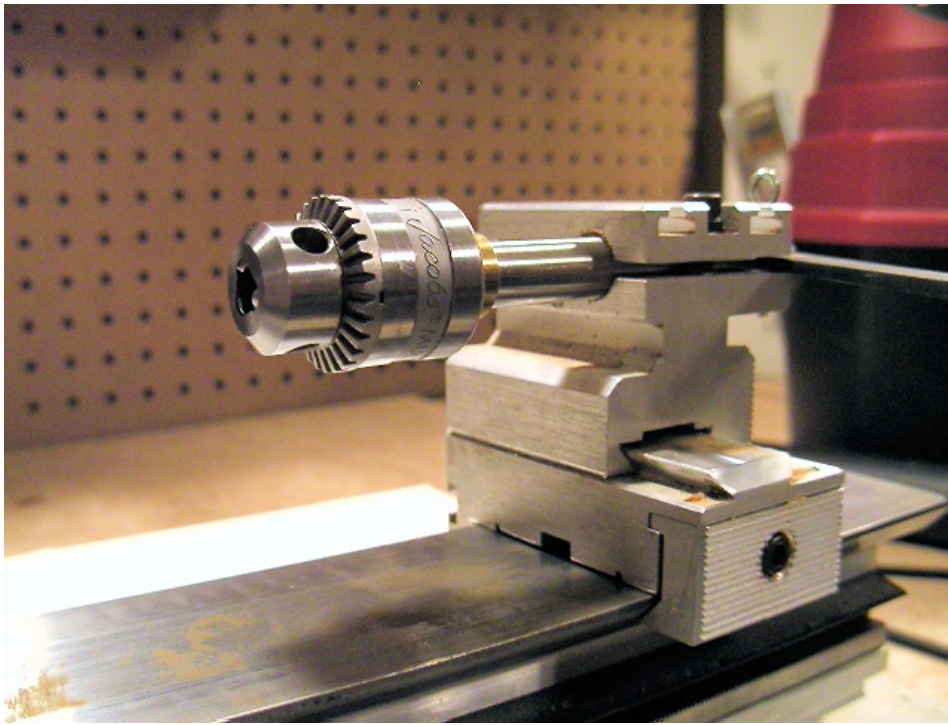
This is the taper slide accessory mounted to the top of the cross slide. You can see that a special type of tool post is used to keep the tip of the bit centered on the work. The angle you set the slide at is the degree of taper you will get. It uses the exact same bits as a regular post. Your lathe setup might be different. Just always be sure the taper attachment/adjusters are tight before you start.



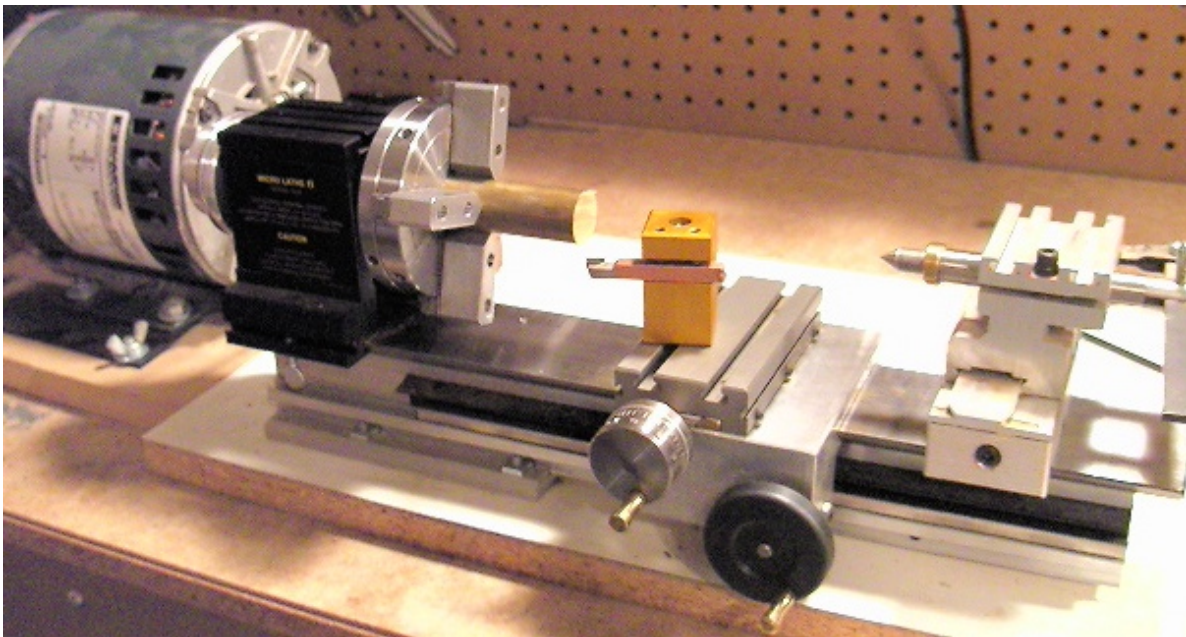
Here is a hand wheel with markings. It doesn't matter if your lathe is metric or imperial, the hand wheels work the same. This is imperial measure and each "line" is one one-thousandth of an inch. Remember that moving the bit in one line will take off two thousandths of an inch because you are removing material from BOTH sides of an object at once.



This is the tailstock, and it holds centers, drill chucks, etc. Not all tailstocks are the same in design, but they all do the same things. This picture has the "live center" mounted. "Live center" means the pointed tip you see spins along with the work. That way friction doesn't scorch or leave marks on the piece. A "dead center" is just a piece of pointed metal, there is no bearing inside and oil or some other lubricant should always be used with a one. Just a drop on the tip every five minutes of working will be fine-not too much or the oil gets thrown off, and makes a mess.



Here is the tailstock again, but now a drill chuck is installed. A unique feature of the Taig is that the drill chuck mounts to the “dead center”. Other lathes may have a different set-up but this gives you the idea. Remember, the drill chuck or dead center does not turn in the tail stock, these are held motionless and the work spins.



Here is the entire lathe with a piece of brass chucked up. It is easy to get totally involved in the turning and never realize you are going to run the carriage into the spinning chuck. This makes a hell of a noise, but don't panic! Always know where the on/off switch is in a hurry. This will save your lathe, and is important for safety.

Before starting the lathe, place a couple drops of light machine oil on the moving parts-slides, lead screws, into the “racks” of the chuck, etc. This is a good habit, and will prolong the life and accuracy of your lathe.

After you are done with a project, do a little maintenance. Remove all chips with a brush (I use a small paint brush). Turning metal makes quite a mess and these chips get into every nook and cranny!

When everything is cleaned up, wipe the entire lathe down with a oily rag, add a drop or two of oil to the slides and work them back and forth a few times. Loosen any allen head bolts that might seize up in storage. Wrap all the bits in an oily rag for storage, and always cover the lathe, protecting it from dust. Do this little bit of work and the lathe will last a long time.

This takes care of the lathe itself. Now I will give you my opinion on what you need for this hobby-again this is my list and yours might be different.

1. Lathe with tailstock and cross-slide.
2. At least one tool post, I have two just in case one goes missing in a messy shop.
3. I like to have both centers, live and dead.
4. A drill chuck(s) that mounts to the tail stock, so you can use tiny and large drill bits.
5. About 10-20 H.S.S. (high speed steel) lathe bits. You can buy pre-sharpened bits if you want, but you don't have to. HSS bits are very inexpensive, always order extra.
6. A four-jaw scroll chuck.
7. A good assortment of allen wrenches; on most lathes all changing of bits or tooling is done with these.
8. A means to turn tapers. On some lathes this is built-in; on others it is an optional part you must purchase.
9. Miscellaneous drill bits, oil and a chip brush.
10. EYE PROTECTION.

Part 2 – Grinding Lathe Bits

In this part, I will concentrate on how to get a good finish on your work, a little about lathe set-up, and most importantly how to grind your own bits. There is nothing complicated about any of this, and I won't go too far into any one thing because you will find its mostly stuff you really don't need to know for ship modeling projects.

First let's talk a little about bit choices. For hobby use there are only two choices, high speed steel (hss for short) or carbide.

Carbide bits are factory ground to cut many different materials-what works well on steel may not work for aluminum or brass, or at least give you the finish you want. Most carbide bits that are within the hobby-use price range are cheaply made in Asia. The material grades range from OK to plain garbage. It is very hard to know until you have bought them and given them a try. Carbide can be sharpened when it gets dull but often for us it costs the same amount to buy a new bit. Good luck finding carbide bits that will do a GREAT job on brass - I have never found any. I will show the finish you get with a couple I have later.

High Speed Steel is what I always use unless I am turning steel or cast iron. Properly sharpened these will give a great finish on brass, aluminum, and wood. They also work with the much harder materials-but then you actually have to sharpen them carefully-with brass you do not.

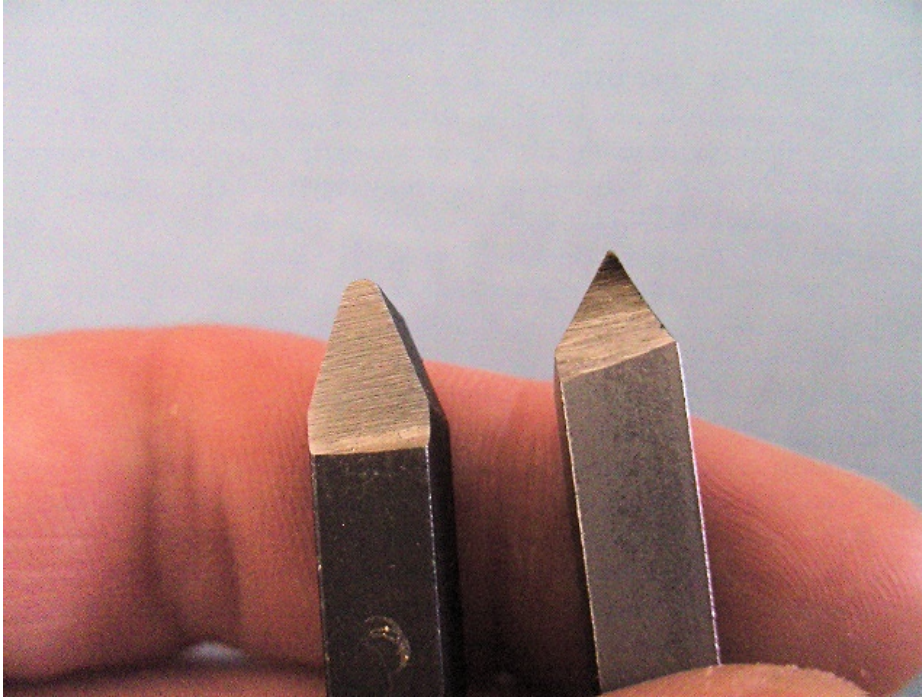
HSS is very inexpensive to buy and cheaper still is to buy them as "blanks". Blanks are just short pieces of completely unsharpened tool steel. You can also buy them pre-shaped, but for our use you don't have to. I will show you the "quick and dirty" way to shape and sharpen your own blanks. Don't take the "quick and dirty" part to mean poorly: I mean the easy way. There are entire books written about sharpening bits and for the hobbyist this is much more information than you will ever need and just causes confusion.



You can see the carbide bits on the left, the end has an extra piece (this is the carbide) brazed on. On the right are a few HSS bits, I am showing many shapes but I use my lathe for many things other than ship modeling. In reality we need two basic shapes for brass, wood, and aluminum. Though there are two colors of HSS bits, they are the same-just bought at different times.

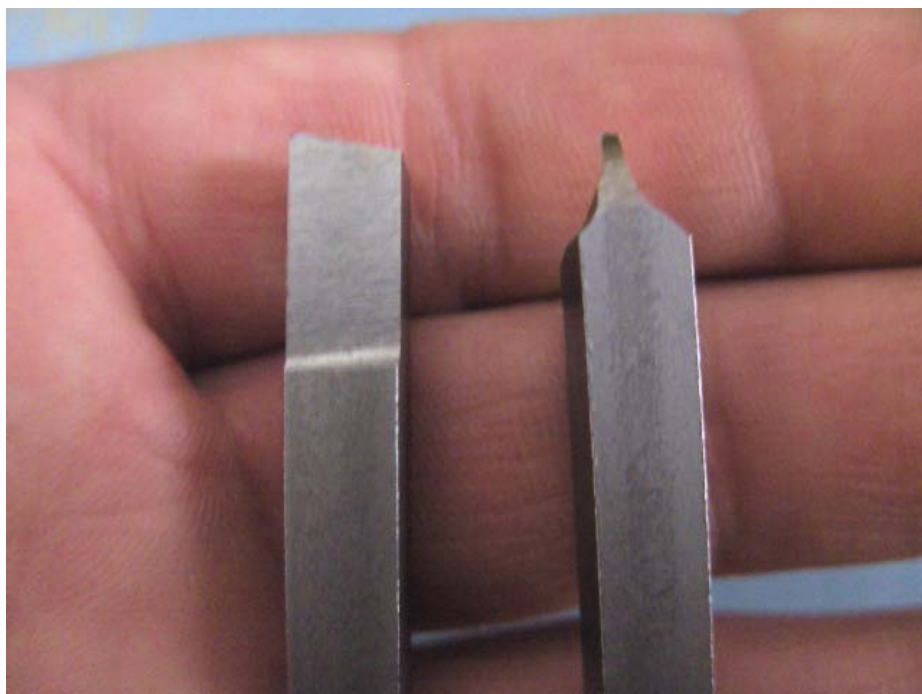
To get the basic idea of the actual shapes available, I recommend you buy one set pre-sharpened and then about 20 blanks. The ones that are factory sharpened will give you a general pattern, then for ship modeling make your own tips MUCH smaller. After all, we are not making crank shafts!

By grinding the ends down to a tiny size, you will cut way down on a lot of the problems people have turning brass: poor finish and “chatter marks”. I will go into finish in a minute, but first the shapes I used for the turnings I will show.



On the left is a stock “finishing” bit, you notice the size of the tip-great for steel but poor for brass! Also, the tip on this is rounded off. Again this is for very hard materials, not what we work with. But that is how you will get them, a “one size fits all” kind of thing.

The one I have ground on the right has the same GENERAL shape but it is not rounded over at all and the tip is very tiny and sharp. This type of grinding will give you a far superior finish in soft materials like brass and wood. I use this bit for 99% of all the brass work I do. For the other 1% I use a regular turning bit, but again ground very small. This bit is small enough to do inside turning (like inside a bell) and I also use it for parting purposes.



Stock on the left, mine on the right-same BASIC shape-just much smaller. You can see the words “precision ground” don’t apply to how I do the shaping-it doesn’t have too!



All the “keeper” turning I will show was done using this ONE bit.

I will show my grinding set-up now, nothing expensive or “high tech” at all.



Here is my entire set-up for sharpening bits.

All I use is an old grinder and a cup of water. You notice the old miter box in the foreground. I only use this as a wrist support.

Each bit will need three “bevels”. You can get the idea of the general shape from the stock ones you bought. If you don’t have any stock ones, just search the internet for some pictures.

What I’m going to show you I learned a long time ago from a very good machinist, back before CNC and high-tech equipment.

Books will tell you that you must have an EXACT amount of bevel on your bits or they will not cut. One book I read said you need 9.5 degrees of bevel for brass. This is false. I measured the bevels on the bits I am about to show and they varied from 6 degrees to 21 and they all cut great. I think there is so little to sharpening bits for brass they make stuff up to fill the pages of the book, and in doing so make this seem like voodoo.



Here is what I learned- use your bare hands and turn the lights down!

When you are grinding, the metal is going to get hot. If the bit gets too hot to hold before you have one complete bevel done-you are grinding at too steep an angle. This will teach you “how much is too much” in a hurry. Once the bevel on one side is ground, dip the bit into the water. Then grind a bevel on the next side.

As you grind, you are working toward the very front of the bit or the cutting tip. By turning the lights almost off, you will be able to watch the sparks “climb” toward the tool tip. Once the sparks reach the top, the bevel is done. It’s that simple-and it really does work.

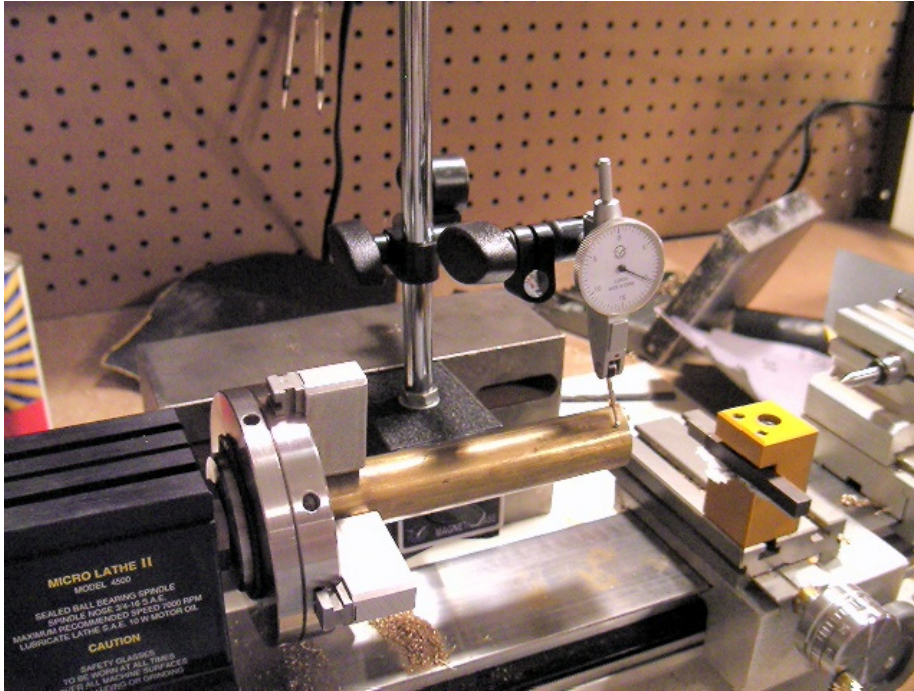
If you have always had trouble getting bits to cut brass with a good finish, follow this method. There are no exact bevels and no rocket science. Just remember: small tips for ship modeling, soft material, bare hands, lights dimmed and HSS bits.



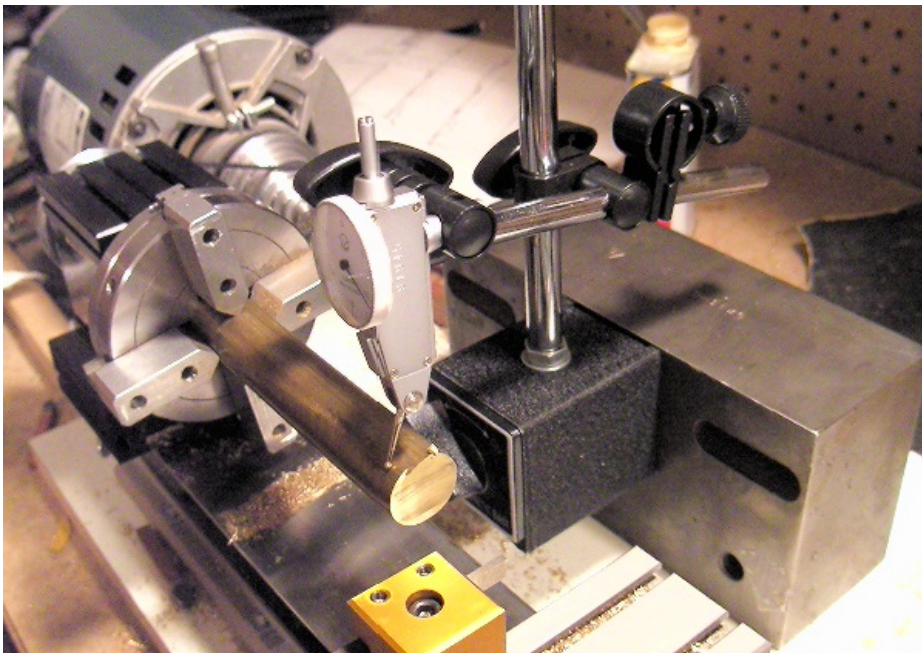
These are bits I ground using this method. The two on the left are not small enough for ship modeling; those are for a project in steel. But, the one on the right I will use in this tutorial.

Part 3 – Setting Up Using a Dial Gauge

I am going to show a little advanced set-up. You will probably never need any of this for our hobby but this will give you some ideas in case you ever do need it. This is a dial test indicator, which is different from a normal indicator because it has a “finger” that moves side-to-side. A regular indicator has a “plunger” that moves in-and-out. Both will work for hobby use but a test indicator is a little more versatile.



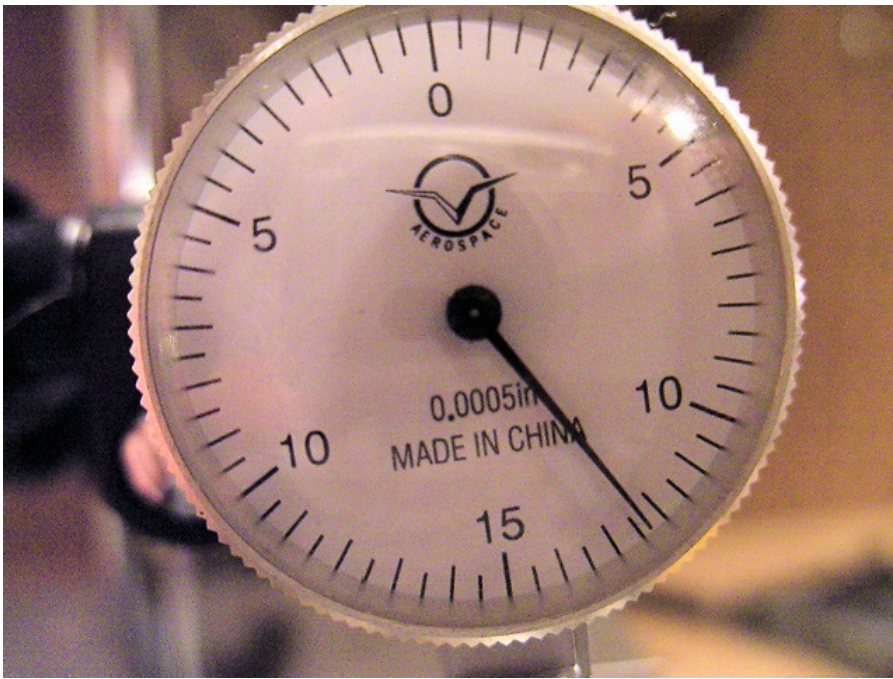
A dial gauge measures how far out of round an object is or, used a different way, how flat something is or how far off center something is. Any deviation is measured by the finger and the amounts are shown on the dial. They can be set-up on a base like I have here or mounted to the lathe or mill. What you are trying to measure determines the setup.



You can see the arms for the set, these are totally adjustable: up, down, angled, in and out, etc. All the arm does is hold the indicator head itself. The set-up I have here has a magnetic base for mounting. This is a good set-up for the lathe. Just make sure the base and arm are very solid or the measurements of TIR will be off. Total Indicated Run-out (TIR) is just what it sounds like, total amount out of “not perfectly centered, flat or round” something is, as measured by the indicator. I am not going far into this advanced stuff, because you will never need it for our hobby but this will acquaint you with some of the terminology.



Here is the face of the indicator; notice the minimum it will measure. This is a very inexpensive set, less than \$100.00, but more than adequate for anything related to our hobby. You can get ones called “tenths indicator” meaning one tenth of one thousandth of an inch, or .0001. We do NOT need or WANT one of these for our hobby. The finger moves back and forth such a tiny bit we could never measure anything without running out of finger travel. If you buy one for hobby machining, this size is fine. Notice the gage is set at 11. I just quick set this up; normally you would rotate the outer face of the dial until it read zero to start. You want to set this up so the finger (when you first begin) is in the middle of its travel.



Now spin the stock by hand and read the maximum amount the finger has moved both ways. Comparing the last picture with this one, you can see that the needle has moved 3.75 lines, for a total indicated run-out (TIR) of .00175". People often misunderstand tolerances for machining. A commercial machine shop setting up important parts will use much more accurate tools, getting much closer to a .000000 (perfect) TIR. For anything I do at home this is close enough.

You do not need a dial gauge in our hobby but if you require it for another type of project, at least you will have some understanding of what it does.

Part 4 – Facing and Finish

While reading this, if you see something unsafe looking or un-workmanlike DON'T DO IT! Remember to be safe and use common sense at all times. No-matter what happens, the lathe and work can be replaced with a few dollars, a hand or an eye cannot.

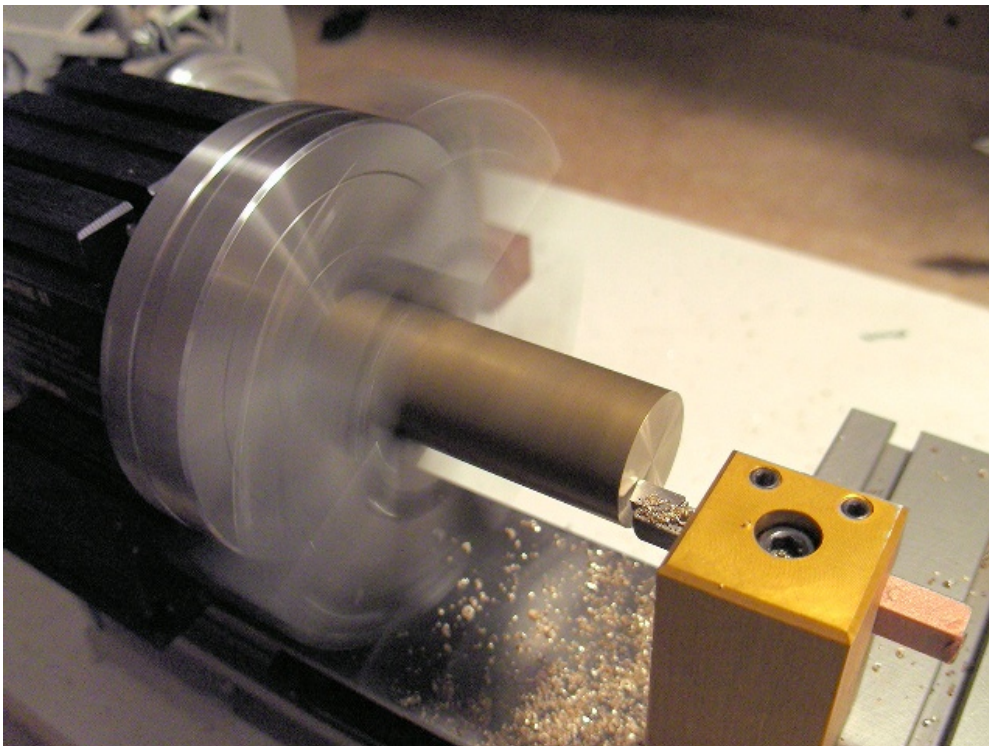
NEVER reach into a lathe to clear something out. Turn it off first.

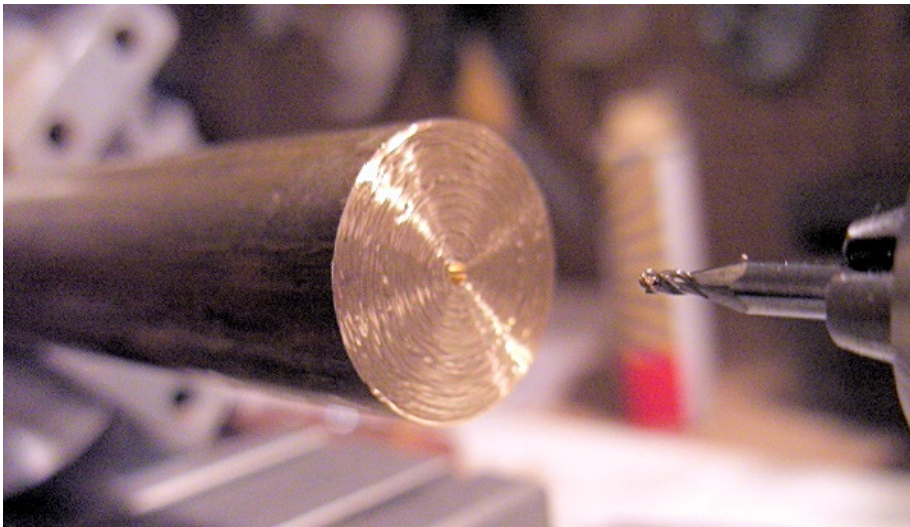
ALWAYS wear something over your eyes. The chips can really fly; these are sharp and sting like hell. If you don't wear eye protection sooner or later you will not be able to remove the chip from your eye yourself, requiring the services of your local ER.

Now to get to work! Put a piece of brass in the chuck-something round. This is the shape that is most common for all the metal work on a ship model. I use ONLY 360C free machining brass; this is very easy material to find. There are other types of brass and each has its own qualities but 360C will give you a superior finish and is easy to machine.

Tighten the work in the chuck well. Then before ever turning on the lathe, spin the chuck around a few times with your hand. It is VERY easy to leave a wrench, tommy bar or something else on or in the path of the lathe jaws. By doing this EVERY time, you will avoid damage to the lathe (and more importantly, yourself!)

Now turn on the lathe. The first thing to do is called 'facing'. All this means is we are squaring up the end of the work. I am using a carbide bit for this but HSS will work fine. Move the bit across the face of the work, removing just a tiny amount.





Here is a picture of the brass rod after facing off and centering the bit. See how rough it is? I can't do ' much better with any carbide bit on brass. I will continue to show some work done with carbide and HSS bits. This will help you recognize some of the problems you might encounter with your finish.

When you have finished facing off, if there is a little nipple of metal left in the very center of the work the bit needs to be adjusted up or down just a tiny bit until that nipple is gone. This is called centering the bit.

Unless your bit is WAY out of center (if it is way out, re-shape the bit), a shim can be used to make the adjustment. I generally use different thickness of paper to do this. Starting from thinnest to thick: tracing paper, then writing paper, then card stock, then folded card stock or any combination of these. When turning brass it is very important that the bit tip is dead center to the work!

NOT HAVING THE BIT PERFECTLY CENTERED ON THE WORK IS ONE OF THE CAUSES OF POOR FINISH ON BRASS.

Because this picture also shows a small hole bored, lets talk about drilling brass. You can buy a “center drill”. This is a special tapered drill bit and they work well. They are pricey and do not work that well in brass without “dulling down” the bit a little.

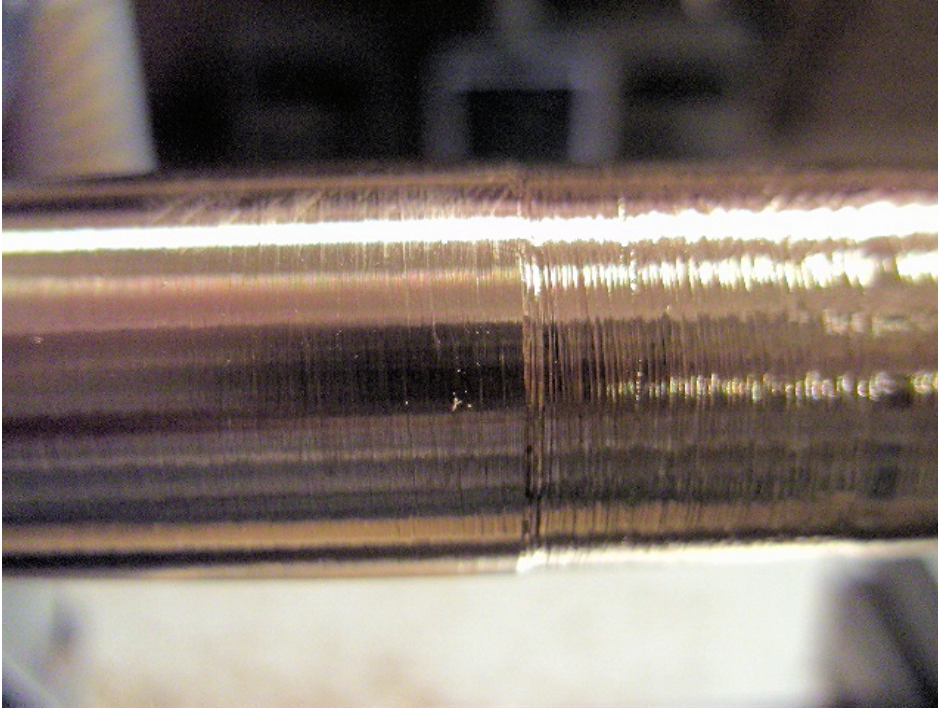
What the picture shows is how I do this. In the drill chuck is a 1/16" end mill. This end mill is a four flute center cutting mill, meaning it will cut like a drill bit-straight in. These do a great job without flexing off center like a drill bit. A good one will last your lifetime without ever requiring sharpening. You can buy them on E-Bay. These never try to “screw themselves in” like a regular drill bit, avoiding many headaches.

Now that you have faced-off the brass and drilled a small hole, mount the dead center in the tail stock and insert it into the brass. Do not ram it in too hard, just make it a tight fit. I know the hole we have drilled is not the right shape for the center (cylindrical vs. pyramidal) but this does not matter much for a soft material like brass. In hard materials like steel it matters a lot! You might want to enlarge the hole a little if you have problems with the finish you are getting. Alternatively you could use a 60 degree center drill which will match up perfectly with most centers (live or dead).

Whenever you use a dead center, you must use a lubricant; for brass just a drop of oil is enough. Apply it whenever the tip of the center looks dry.

Now that everything is faced and mounted solidly we can do some turning on the side of the piece.

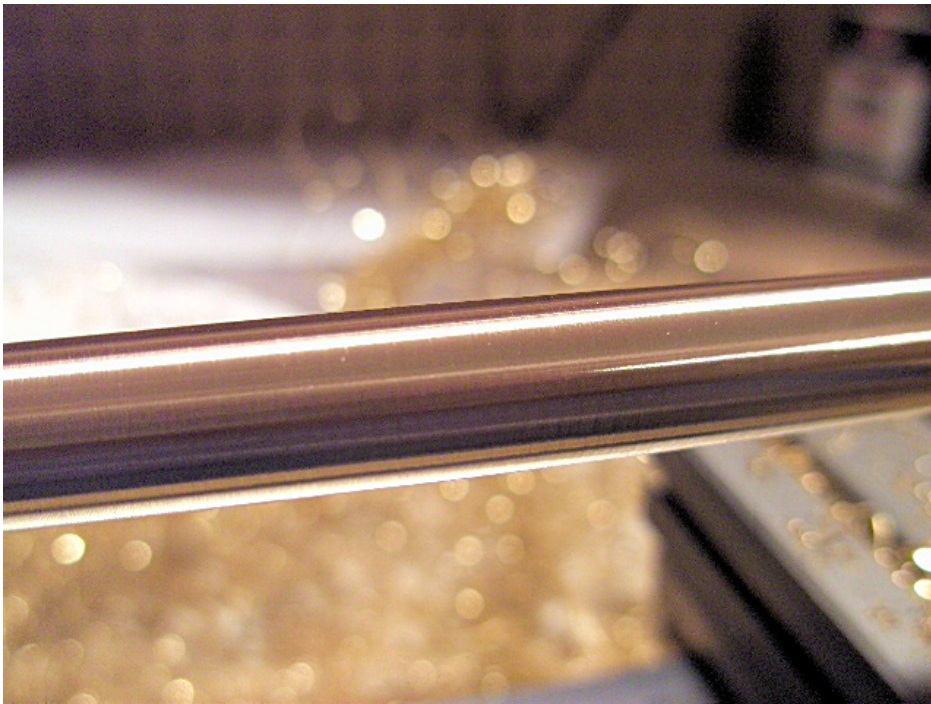
IMPORTANT! Chatter marks are mostly caused by the work “flexing” on the lathe. Sounds impossible, but even this 1 inch thick piece will flex. Working with metal takes a lot of pressure and by not having a rigid setup, the work WILL flex. I will show chatter marks and some ways to get a better finish. **MOST CHATTER MARKS ARE CAUSED BY A NON-RIGID SET-UP!**



Here is a close-up comparing a medium finish with a poor finish. If you look close at the far right side of the poor finish, you will see some chatter marks. See how the light reflects like little mirrors in the center of the work? Those are marks caused by flex of the 1" brass rod. I used a carbide bit for this shot, with and without a center mounted. The finish on the right is without a center and the one on the left with one mounted. Even the finish on the left is pretty poor; the camera made it look better than it really was. I would describe the one on the left a medium finish.

Chatter sounds like hammering and if it is really bad it can be quite loud. This is from the work slamming into, moving away, then slamming back into the bit because of a non-rigid setup. Chatter can also be caused by speed but that is much less likely to be the problem. Rigid setup is the most important aspect of turning anything on a lathe. If you are working very close to the chuck, you can potentially get away without a center but still might have some problems. **ALWAYS USE A CENTER WHEN YOU CAN.**

The most difficult thing to get a good finish on is when you are bit boring a long piece. Boring with a bit begins by making a hole in the end of the stock with a drill bit or end mill large enough to fit a turning bit into. Then you slowly move the bit **TOWARD** yourself, removing stock. A turning bit is not a drill bit and will not make its own starting hole! This type of turning would be used to shape the inside of a bell.



Now would be considered a perfect finish, with hardly a tool mark on the piece. This was formed using a HSS tool and a dead center. See the gold stuff in the back ground?



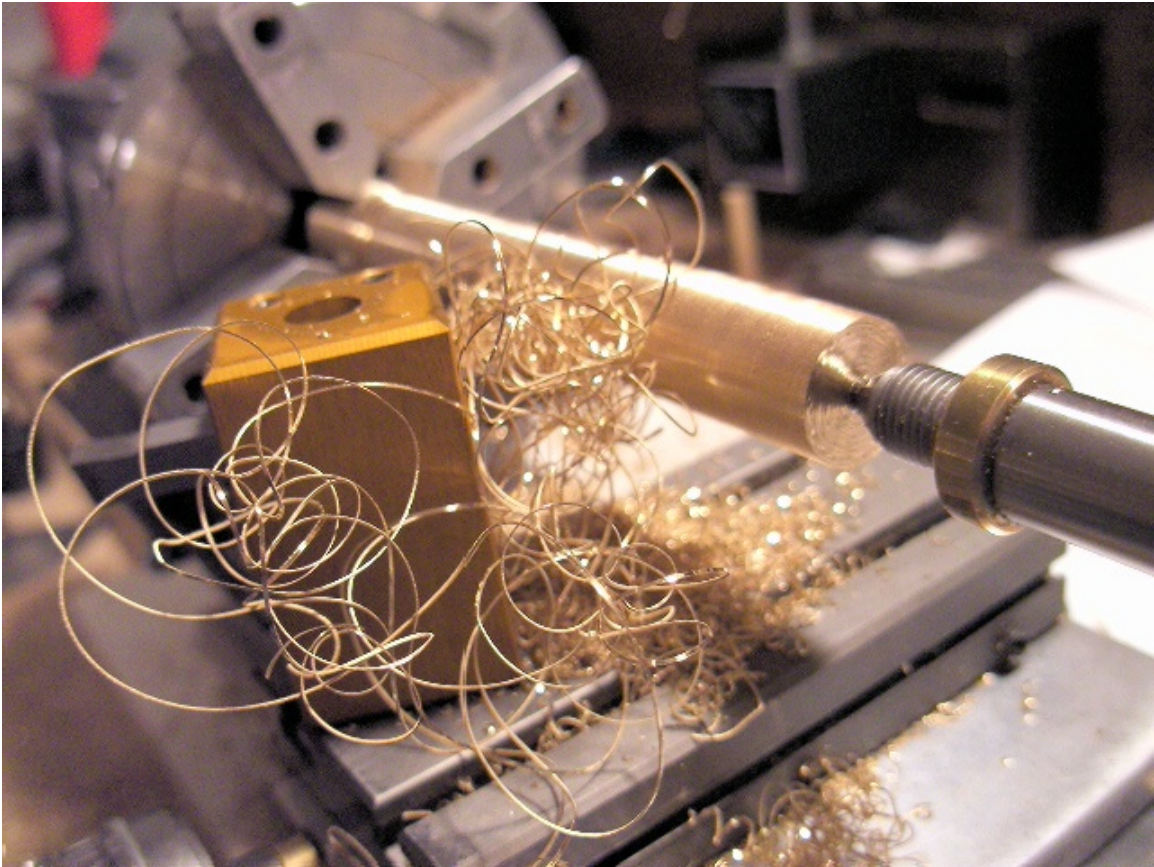
These are brass shavings and chips. Chips are occur because of chatter. Think of it this way, metal is like a roll of toilet paper; if you tore off one tiny sheet at a time and threw them on the floor-those are chips. The motion is jerky and not smooth at all. Now if you grabbed the end of the toilet paper roll and smoothly rolled it all off the core, it comes off the roll nicely. THIS is how metal wants to be cut, one long smooth shaving. The “gold stuff” in the previous picture is a big pile of smooth shavings.

Books will quote lathe speeds. All these charts were designed to get the maximum amount of production out of the workers and still acquire a good finish. Most of the charts say 1400 RPMs with HSS in brass. This is a good guideline, but that’s all it is, a guideline. I am not working on the floor of a shop when doing ship model building. I will tell you that I turn brass mostly at about 2200 RPMs, but I can also turn it VERY slowly, around 500 RPMs. Don’t go by what a book says; use the speed that works for you. The speed of the lathe is not as important as the “feed speed” you use and how much material you try to remove in one pass.

Feed speed is how quickly you move the bit along the work using the hand wheels. If the feed speed is too slow, you will not get a nice shaving, but you should bet some shaving. If the feed speed is too fast, you will get a shaving but with a poor finish. Feed speed cannot be taught, it will take just a little practice.

Now imagine I set my lathe speed at maximum: 7000 RPMs. No matter how fast I turned the hand wheel I cannot do it fast enough! I will never get a god turning this way. So lathe speed is a little important. If you are having trouble getting a good finish, try slowing down or speeding up your feed speed. If that does not help at all, decrease the RPM.

Depth of cut is also important. If you try to take too much off in a pass this will result in some noise, either a high pitched squealing, or even worse, chatter. It is easy to try and remove too much but it is impossible to remove too little. I will try to describe the noise you will hear when everything is right--
scs.



And that's what it will look like!

Now I admit, it took me a solid 10-20 minutes of messing with feed speed and lathe speed to get this. If you are brand new at turning, it will take longer but it will happen with just a little practice.

Don't use oil for turning on brass. You do not need it and it just makes a mess. Only use oil on the tip of dead center.

Part 5-Making a Ship's Bell

The first thing you should try turning is a bell. Everyone wants to start by making canons: these are hard to make and easy to screw up. On the other hand, a bell is a small project that will teach you everything you need to know and if you screw up not much time or effort has been spent. Also, you can use very small pieces of metal for this, saving your stock for when you are able to turn a cannon properly. I will not use a taper tool for this. It will all be made free-hand as this is an important skill to learn.

Get a picture of a bell for your pattern or at least have an idea of what you want in your head before starting. Remember that a bell does not look like half of an egg shell! Chuck a short piece of brass and face off just like the start of any turning. Try to buy stock as close to finished diameter as possible. This saves you time and money. I am not going to go through all the steps of turning a bell; I will just show some high points.

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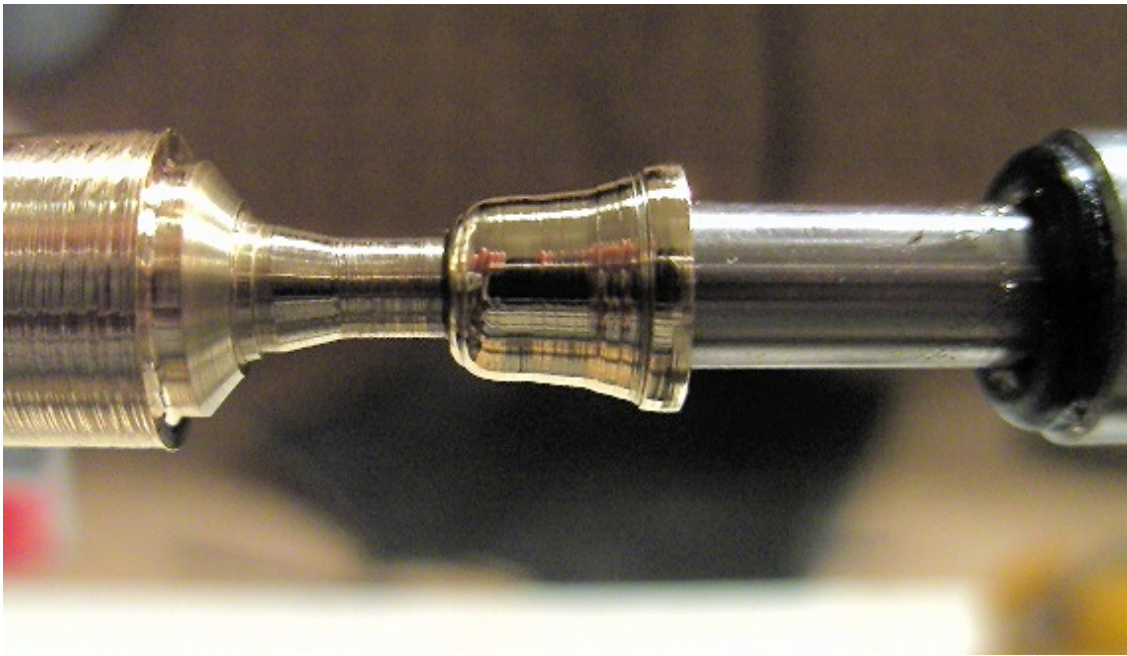
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Here is the bell almost done and notice the tiny HSS finishing bit. If you look closely, just on the chuck side of the bit, the brass has funny marks on it (kind of like lines radiating from the center). These marks are the result of the dull side of the bit for turning (a bad habit but not a dangerous one). You can get away with taking tiny amounts off this way; just make sure this bad finish is not on the bell itself! Doing this will also make one of the noises you must listen for and be able to identify; noises are important in turning metal. Learn to identify all these noises. By recognizing the sound instantly you can make corrections before you ruin the turning.

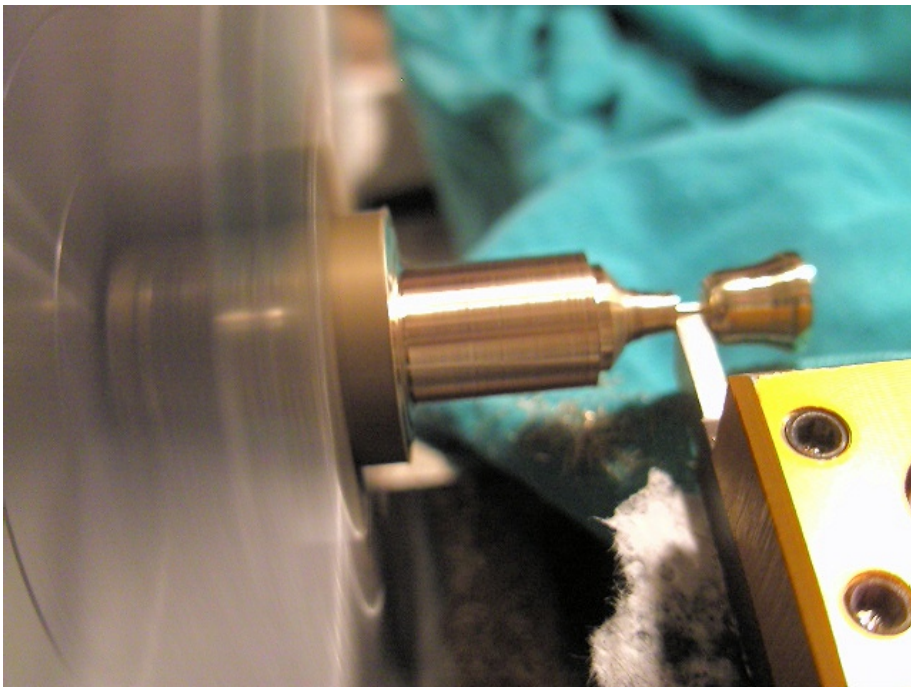
Also notice the boring that was done inside the skirt of the bell. Even on this short piece it hard to get a really good finish because the turning is not rigid when you do this.



Here you can see I am getting ready to part the bell. Notice the shape...no straight lines at all. This is done by turning both hand wheels at the same time. It takes practice and a light touch. I have inserted the live center into the bell. As the stock gets thinner chatter is going to happen. I am using a live center because it will turn with the work. The inside of the bell is finished and a dead center would leave ugly marks.

NEVER completely part a turning off with a center in the work! This is dangerous and unnecessary-and even if you don't get hurt, the turning will probably be ruined. Only use a center until the very end, then slide it out of the way and cut the last tiny bit of metal.

You can see my fingers as I am taking this picture in the reflection of the bell, that's a good finish and exactly what you are after.



Here is an important picture. First, notice the stock shaped parting tool. Notice how wide it is? This width is totally unnecessary for this tiny turning. Second, a piece of greasy paper towel has been placed under the bit as a shim. Thirdly, the center parting has been removed for parting.

The piece of green piece of cloth in the background will protect the turning when it falls off. Just be sure whatever you use cannot be grabbed by the jaws of the chuck!

Now a couple pictures of the finished bell.

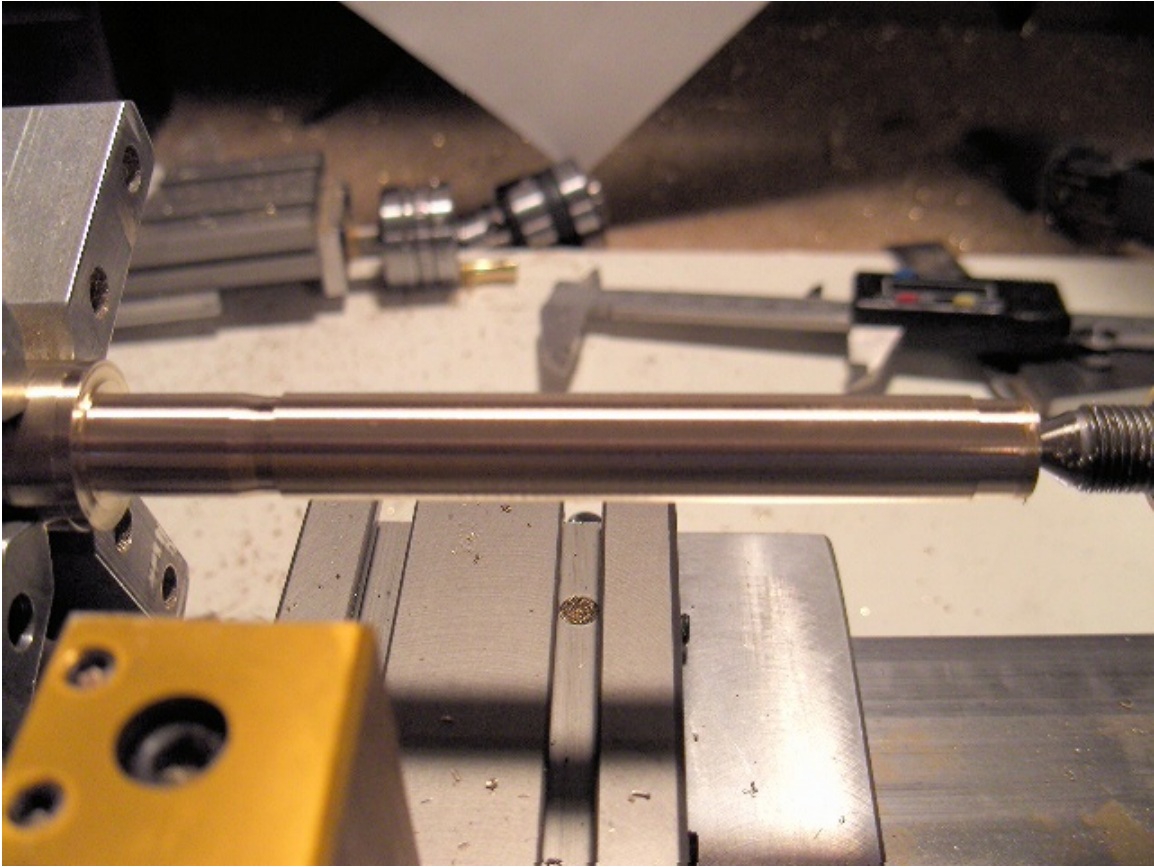


You can see how small it is; not much stock was used. Notice the molding. Nothing special was used here other than the tiny, pointed finishing bit I showed you earlier. This is not the greatest bell, but it is great practice giving you all the needed skills for a harder project, like a canon.

Part6-Turning a Cannon

Now comes the fun part! You have seen the highly decorated French cannons on this forum. All those canons are cast but first you need a master for making the mold. If you have done some practice and followed this tutorial, you can now do this.

This part will be heavy on the pictures and light on the words.



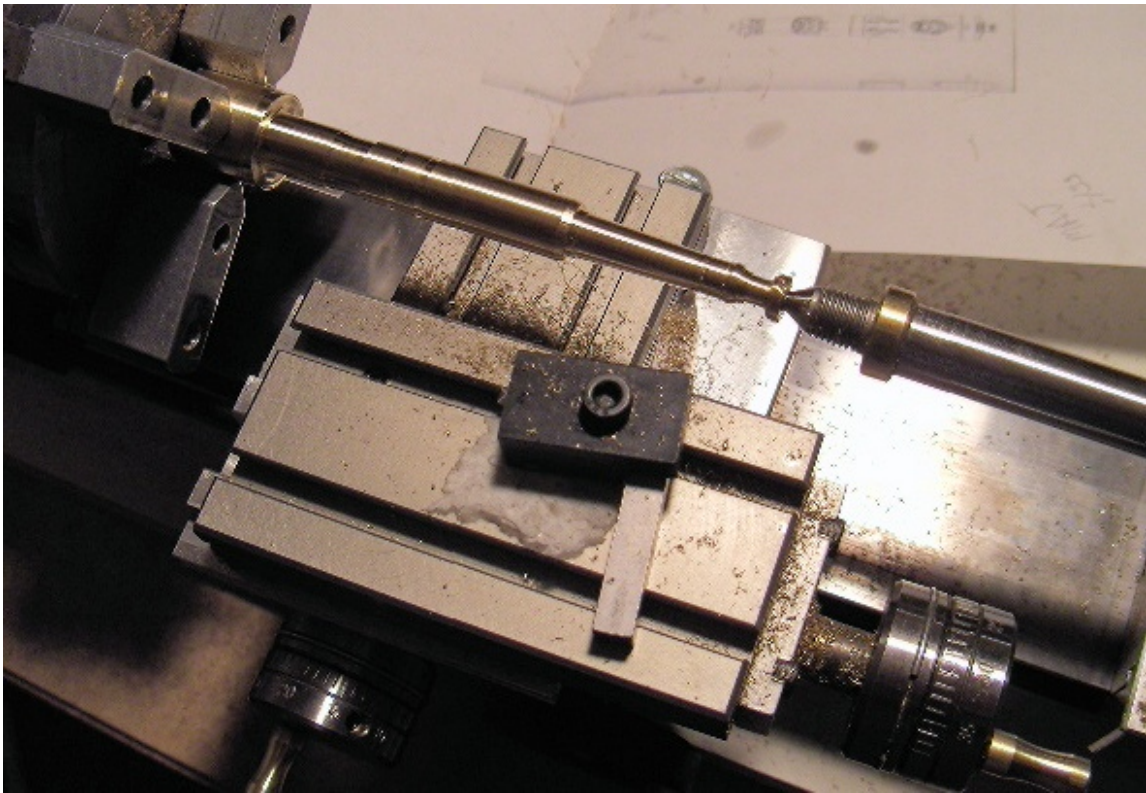
Turned to the rough diameter, total length marked out.



I have measured and marked out all the moldings and shoulders.



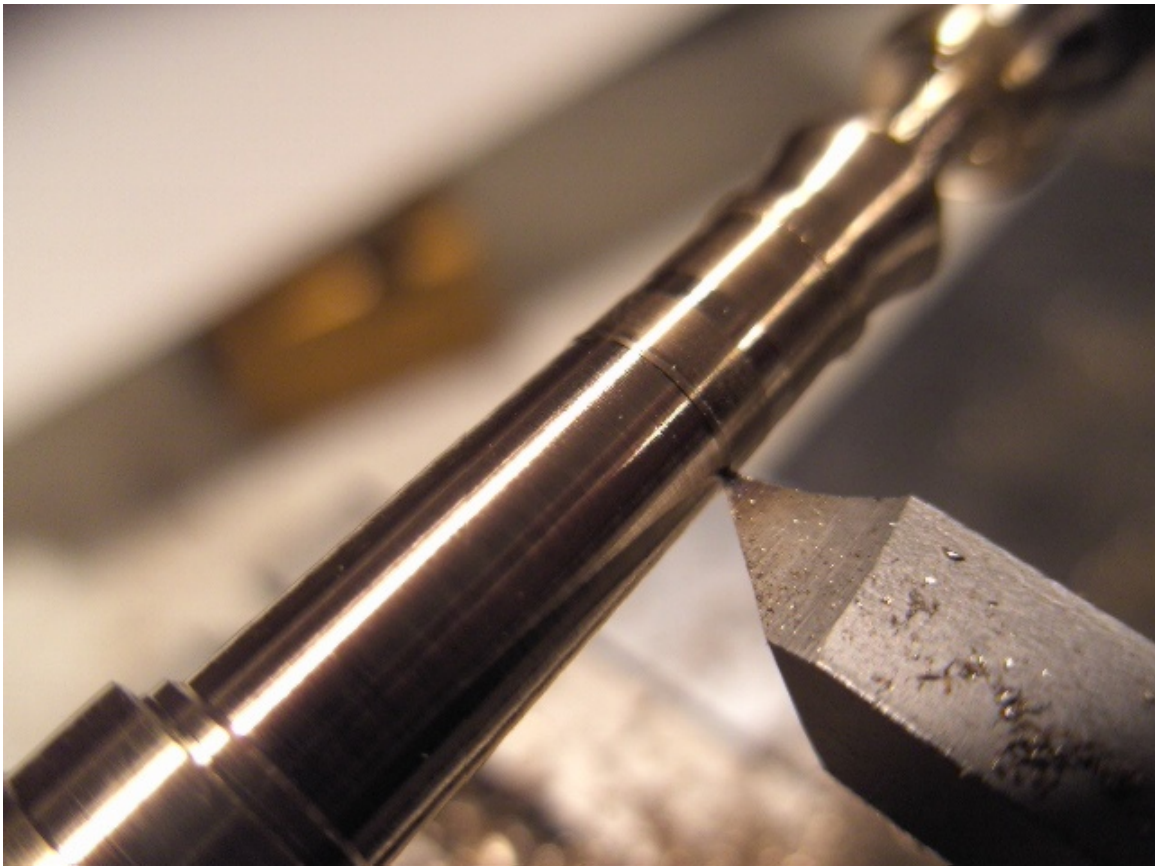
I am beginning to define the muzzle.



I have added the tapering attachment, set at 2 degrees. The hand wheel is on the right. Your setup will vary depending on the lathe's manufacturer.



Good shot of my finish bit, I am working the muzzle quite a bit because it is a hard part. If I screw up now not too much time was wasted and I will just start over.



Great shot of the bit, starting to make moldings. Look at the finish.



Finished muzzle and molding, all done with finishing bit.



Notice the dead center and the extra material at the end of the cannon. This allows me to continue to use a dead center, which is just a little more rigid than a live one.



Moving up the barrel, I am starting to define moldings and a shoulder. I am always checking the measurements from the back of the canon.



Here I am tapering checking the diameter and measuring frequently. This is the beginning of the next reinforce.



You might ask how I get all those molding shapes. The tool post I am using can be turned and tightened at any spot in a full 360 degrees. By turning the post just a little (like this picture shows) an infinite number of “shapes” can be made with this one bit. If you have a lathe that the tool post cannot be swiveled, you will either have to modify the tool post or make bits to the angles you need.



Both shoulders or “reinforce” are done completed. Notice how fine the shavings are. I am running the lathe at about 2200 RPM's but I am feeding VERY slowly-just enough feed speed to give a good finish but not fast enough to accidentally ruin the turning.



It is easy to see in this picture how I made the molding, these are very small but because the bit tip is also tiny they are not hard to turn.



Starting work on the cascabel.



Now its time to move back towards the muzzle. We need to finish the work here before the metal gets to thin and loses what rigidity it has towards the cascabel end.



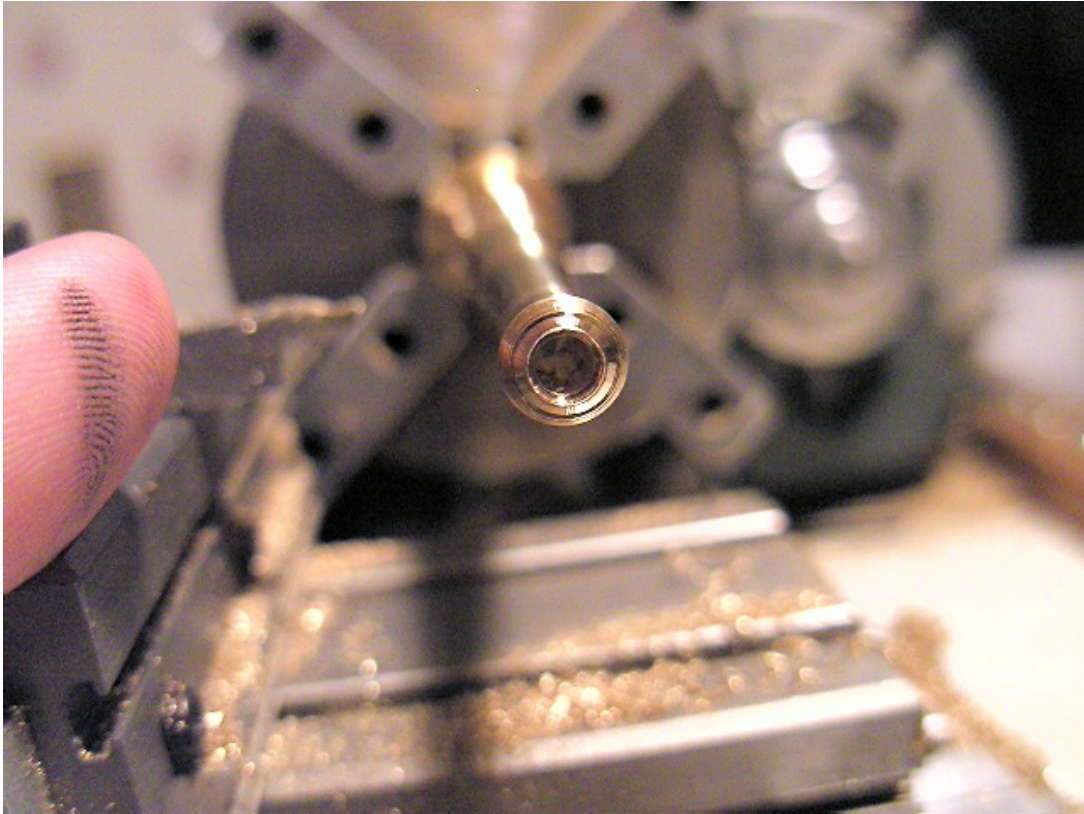
Finally, the tiny turning tool is used all parting work. I move it side-to-side and slowly remove the metal. At this point I remove the dead center.



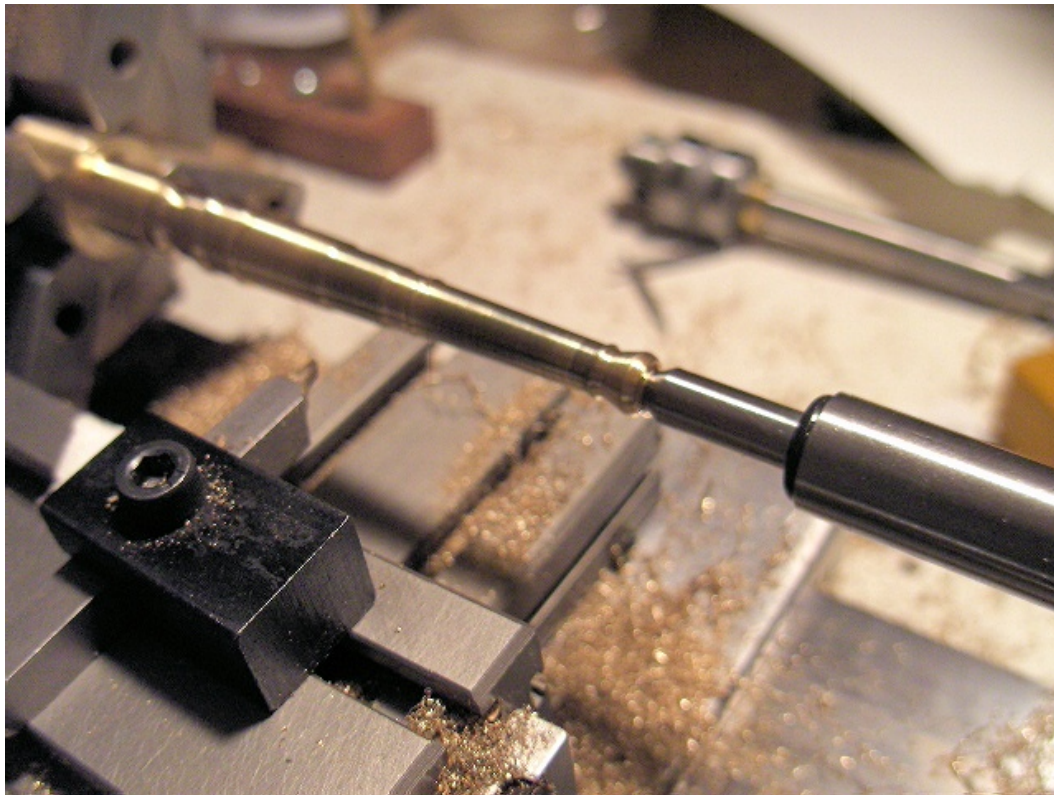
Here is the parting. Some people don't like to leave the extra material I do at both ends; this picture explains my reasoning. Once the center is inserted into the work, you obviously cannot see it. By leaving the extra material I never run my bit into the tip of the center- now THAT will dull the bit.



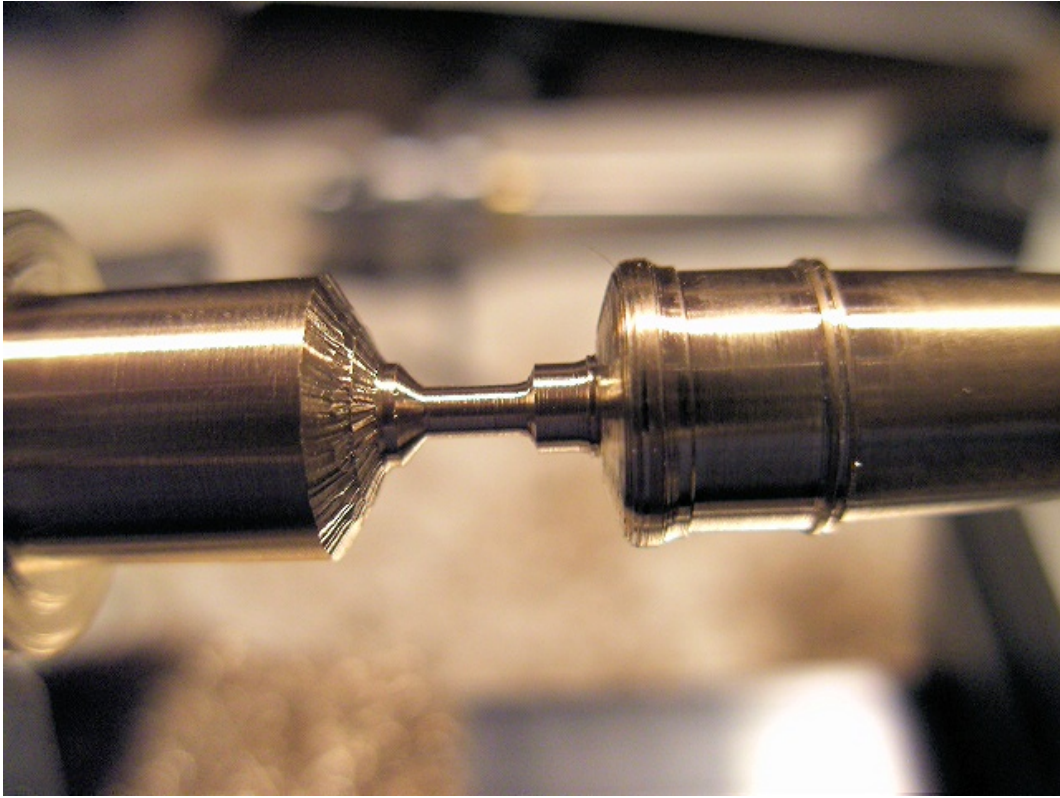
A 1/8" end mill is being used for the boring of the muzzle.



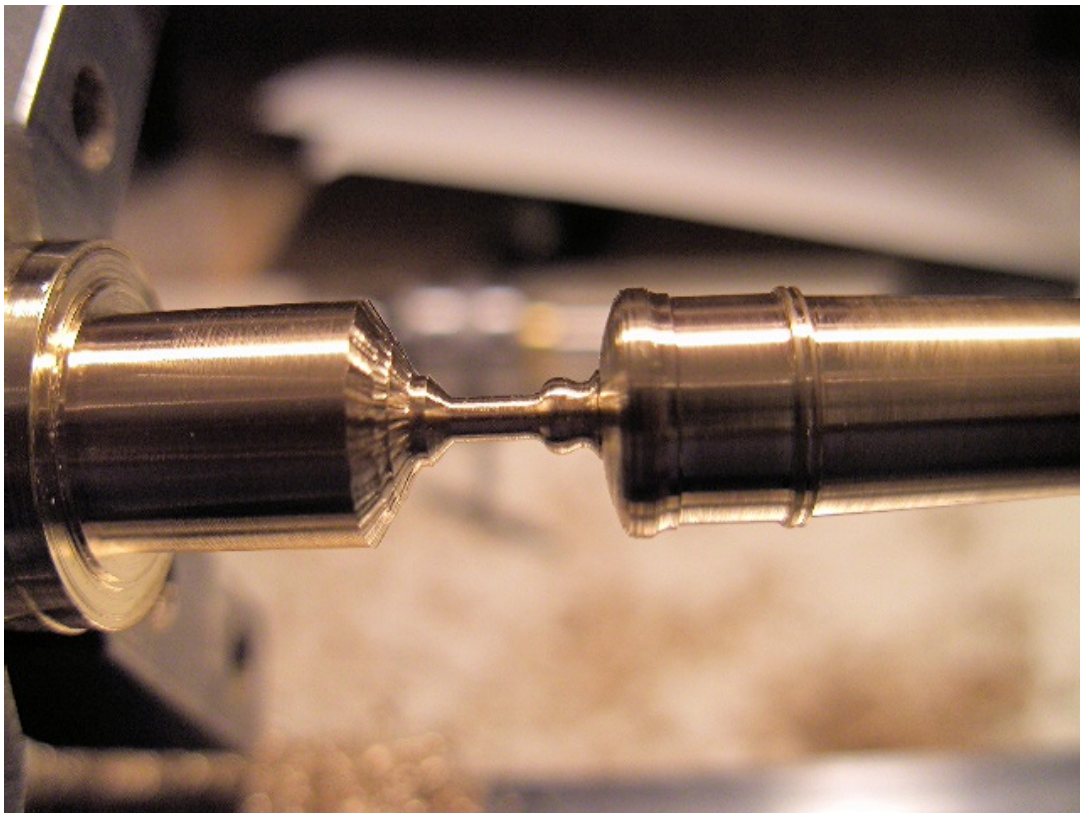
A good clean bore. This cannon is only being turned for making a mold or I would have bored in much deeper. This is deep enough to fit a pouring vent.



Now the live center is in the work. I do not want to mar the inside of the muzzle by using the dead center. I lost some of the set-up rigidity with the live center; that is why I did all the work except the button and the complete parting off before I did this.



Back to the cascabel, you can see all the moldings clearly.



Using the same two-handed technique you did used to shape the bell, here's what you get. Also notice the bad habit marks on the left.



I am ready to do the final parting. Notice the extra cloth for protection and there is no center in the muzzle. Before the final parting, complete any additional touch-ups. Fine files can be used to refine some of the shapes. You can also use sandpaper, starting with 600 grit and finishing off with 1000 grit. **Be very careful doing this.**



Here it is, and I am happy with how it turned out. All it takes is practice!