
The Fine Art Of Thread Chasing

Frank B. Penta

Overview

Thread chasing is a wonderful skill to add to your woodturning repertoire. It is fun to do and with practice can be mastered in a relatively short time. Thread chasing will enable you to add threaded lids to your boxes and urns. There are many turnings that would be enhanced with a set of threads in order to make them more functional.



Top

Bottom

Tools

Four tools are needed to make threads:

- a small hooked scraper for cutting a relief hollow,
- a male thread chaser for cutting external threads, and
- a female chaser for cutting internal threads, and
- a thread chase holding tool.

Any small angled hollowing tool can be used to make the relief hollow.



External Cutter (Male)



Internal Cutter (Female)



Hooked Scraper



Chaser Holder

The chasers are generally sold as pairs with either 14, 16, 18, or 20 teeth per inch (TPI). I recommend a beginner start with a set of 16TPI chasers. I have found that the 16TPI chasers are slightly easier to use to make threads in a wider variety of wood.

Wood

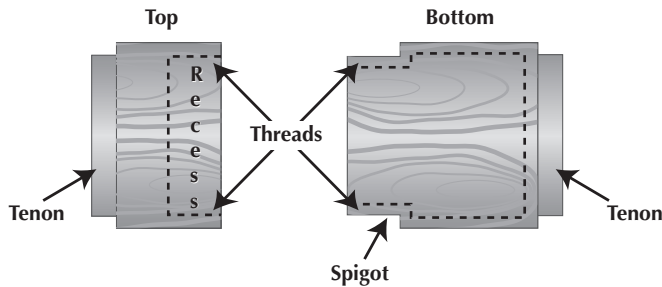
It is easier to cut good threads on wood that is hard, dry and tight grained. Therefore, woods such as cocobolo, rosewood and dogwood are good to use for thread chasing. If you must make threads on soft or green wood, you can cut preliminary threads and put thin CA glue over them and recut the threads. The glue will act to toughen the wood fibers. I have also found that sanding sealer is useful for this purpose. In addition, sanding sealer can help prevent fibers on dry wood from breaking.

Another way to make threads in soft wood is to turn the wood in the lathe so that you are turning threads in the side grain rather than in the end grain as is commonly done. I learned this technique from Soren Burger and was pleasantly surprised how well it works.

Having the right wood is essential to good threads.

Preparation Of The Blank

Once you have roughed out the blank, you need to turn a tenon on each end of the blank for later chucking. Next, part the blank into two halves, one half for a top and the other half for a bottom.



It is recommended that the top recess be cut first, because it is easier to fit the bottom spigot into the recess than the other way round. Chuck the half in which you intend to cut a recess. Make sure that the blank is trued, then cut a recess to whatever depth is desired. Since this is the top of a box, you need only a shallow recess. It is extremely important that the sides of the recess where you will be cutting threads be perfectly parallel. The recess can be turned to any desired size, since you will be sizing the spigot to the recess.

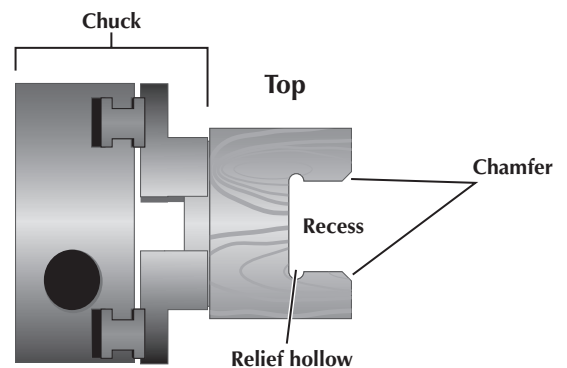
Recess sides must be parallel.

Next, cut a relief hollow at the bottom of the recess. This is necessary in order to prevent the cutter from hitting the bottom of the recess while cutting threads. If the cutter hits the bottom of the recess before it is pulled out it will damage the threads.

If you are making a box and will be sanding the inside of the recess, now is the time to do it and not after you have cut the threads, because the sandpaper may rub on the threads and round them over.

The initial thread is established on the chamfered edge.

The final step in preparing the blank is to cut a chamfer on the inside edge of the recess. This will make it easier to start the threads.



Preparing the Recess

Preparing To Cut Threads

Set the tool rest parallel to the side of the blank and slightly below center. Set the lathe speed as slow as possible, preferably between 200 and 400 rpms. The slower the speed the easier it is to control the thread chaser.

The chaser holder should be held on the tool rest and the female chaser should rest on the chaserholder against the bottom hook. Threads can be made by resting the tool directly on the tool rest, however, you can better rotate the thread chasing tool easier while cutting using the chaser holders.

Starting The Female Threads

Start by gently pushing the female chaser into the edge of the recess, keeping the tool flat and at the 30-degree angle. With this first cut you only want to establish the lead thread at the opening of the recess.

Follow this with more light pushing cuts while bringing the chaser parallel to the side of the recess. It is necessary to time your strokes such that the teeth of the chaser drop into the grooves made by each of the previous cuts. The slow speed helps with your timing and eye-hand coordination. When you reach the relief hollow, lift the chaser away from the teeth and out of the recess.

Continue to gently make cuts until a set of initial threads can be seen. This should only take a few passes with the chaser.

Completing The Female Threads

It is important that you use only gentle pressure on the chaser as you place it in the lead thread. You want to avoid making the lead thread deeper than the rest of the threads.

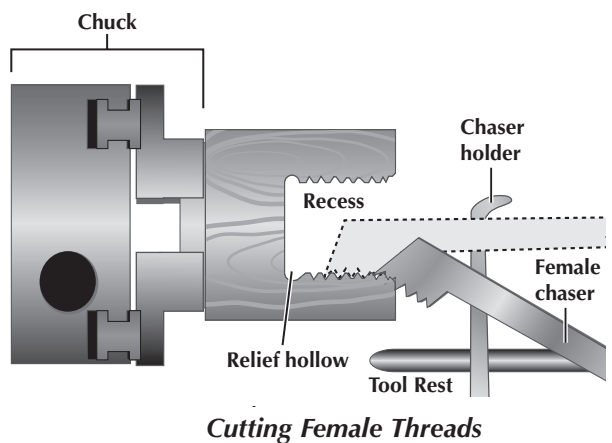
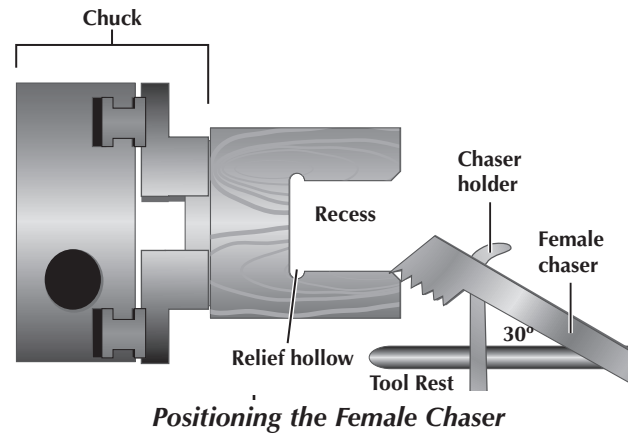
When you are refining the threads keep the tool parallel and the pressure even. As you are cutting the threads deeper, it is essential that the chaser teeth drop into the threads cut by each of the previous passes. As you place the chaser into the lead thread, the previous threads should draw it along. The key word in thread chasing is gentle. Aggressive turning will only result in poorly formed threads. Once the female threads are cut, you are ready to cut the male threads.

Preparing The Spigot

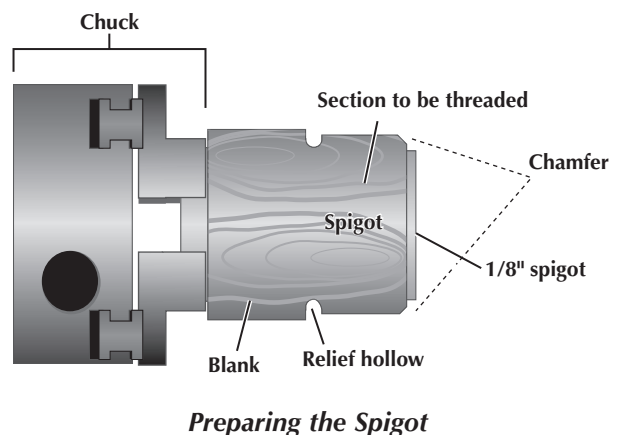
After chucking and truing the blank to be used as the spigot, turn a 1/8" wide spigot that fits snugly into the thread recess you have just turned. This is a technique I saw Allan Batty demonstrate. The diameter of the 1/8" spigot represents the highest point of the female thread and therefore establishes the lowest point of the male thread. It is a close approximation of the height you need to cut the male thread.

Mark off the area of the blank (spigot) where you intend to cut threads. Turn that area down to a diameter slightly larger than the diameter of the 1/8" spigot. It is essential that the spigot be perfectly parallel if you are to cut parallel threads.

Then use a parting tool to cut a relief hollow between the rest of the blank and the spigot to be threaded. Also cut a chamfer on the edge of the spigot to be threaded.

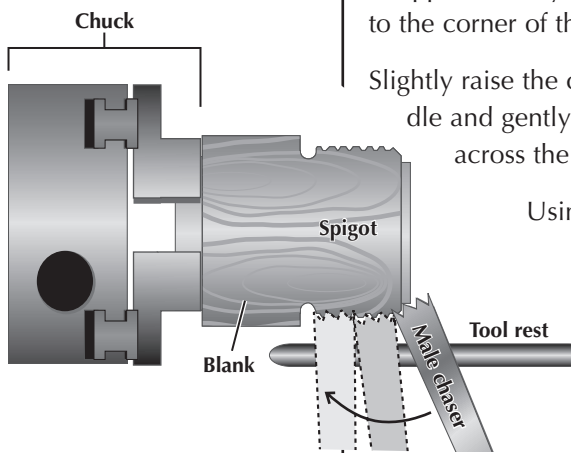


I like to put sanding sealer on the finished threads.



The chamfered edge helps establish the lead thread.

I use the male chaser directly on the tool rest.



Cutting Male Threads

Wax can be used as a lubricant when screwing the threads together.

Cutting The Male (External) Threads

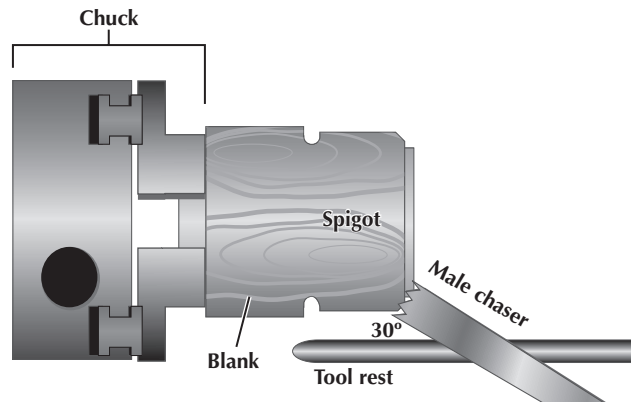
Remember to set the speed at the lowest possible setting before starting to cut the threads. Place the tool rest slightly below center and parallel to the spigot.

Hold the male chaser as you did the female chaser, level on the tool rest and at angle of approximately 30 degrees to the corner of the spigot.

Slightly raise the chaser handle and gently introduce the tool to the chamfered edge of the spigot. Move the tool across the chamfer from the right to the left, maintaining the 30-degree angle.

Using a somewhat circular motion, reintroduce the chaser into the edge again, creating a lead thread. Begin bringing the tool perpendicular to the spigot, creating the rest of the threads. As you carefully place the chaser in the threads just formed, the tool should be drawn along the spigot.

The threads must be cut perfectly parallel all along the spigot if they are to match the threads in the recess. It should not take more than a few passes to cut the threads. A good indicator that the threads are cut to the right diameter is when you see slight thread marks on the front 1/8" spigot. You can test them against the female threads to see how they fit. If they are too tight, carefully re-cut the threads and try them again.



Positioning the Male Chaser

References

Stuart Mortimer, *Techniques of Spiral Work*, pp.160-163.

Allen Batty, *Woodturning Notes*, pp.26-28.

Mark St. Leger, *Skill Building Projects*, Videotape

Acknowledgement

Thanks to Mike Mahoney for introducing me to thread chasing at the John C. Campbell Folk School, Brasstown, NC

Sharpening

A chaser should only be sharpened on the top face of the tool. You need to be careful that you do not touch the teeth with the grinder.