

## *My twist on Hand Chasing Threads in Wood, submitted by Sam Angelo*

Hand-chasing threads in wood may be looked upon as a nearly forgotten *art* by today's woodturners. As a design feature, wooden screw threads can elevate your work to a mysterious and intriguing level. Before the availability of inexpensive glues, joining wooden parts was accomplished mechanically with hand-cut dovetails, mortise and tenon joints, and with hand-chased threads.

When Bill Jones and Allan Batty coupled together two pieces of wood for the first time by chasing threads, neither had the benefit of the well written books, magazine articles, DVD's or the internet that we have today. For more information, visit *YouTube*, *wyomingwoodturner-channel*, *Thread Chasing: Wood, Books, and Resources*

My primary objective for this article is to bring-to-light various resources available on the topic of chasing threads in wood. I will provide links to my own YouTube videos that correspond, step-by-step, to important elements described in the article. This visual aid will hopefully increase the likelihood that readers will take the first step and try their hand at a skill they thought beyond their abilities.

### **Tools of the Trade**

For more on chasing tools, visit *YouTube*, *wyomingwoodturner-channel*, *Thread Chasing: Tools and Sharpening: and THREAD CHASING IN WOOD: TOOLS OF THE TRADE*

Fig.1 shows (top to bottom) the point tool, armrest tool, 20 TPI thread chasers, and recess tool.

Thread chasers are available through Hamlet, Crown, and Robert Sorby tools respectively. Ashley Iles makes the Unichaser which is a female chaser that is turned over 180 Degrees to chase the male threads. Please see the resource list for more information on these tools. Each set of thread chasers will be configured with a certain number of teeth per inch-TPI: as low as 3 and upwards of 40. The lower the TPI, say 10 or 12, the more difficult it is to learn. I would recommend starting with 18 or 20 thread-per-inch chasers. I began with a 16 TPI set and did well, after a while.

### **Armrest Tool**

(See Fig.1) History reveals that lathes did not always have a tool rest that could be adjusted perpendicular to the bed ways. Traditionally, the armrest tool could assist in performing turning operations such as drilling or hollowing end grain as well as chasing female threads with the tool *parallel* to the bed ways. It *is* possible to chase the female threads without using the armrest tool. When doing so, the right hand must coordinate and perform all motions necessary for this operation. I find the armrest tool brings into play the left hand which makes chasing more efficient. Those who use the arm rest tool say it is indispensable. I agree.

### **Point Tool**

(See Fig.1) Hand chasing threads in wood is a tradition with roots set deeply in the trades. Efficiency and speed of production dictated that using one tool was better than using two or three. Watching videos of Allan Batty and John Berkeley using the point tool, provides much credibility to this idea. In [Notes from the Turning Shop](#), Bill Jones describes a point tool fashioned from a triangular file and used for various turning operations in place of other tools.

For more on the point tool, visit *YouTube*, *wyomingwoodturner-channel*, *Thread Chasing: The Point tool*

## ***Chasing Female Threads First***

For an on-line video, visit, *YouTube*, *wyomingwoodturner-channel*, THREAD CHASING: FEMALE THREADS-UPDATED

- Drill or turn a recess to meet the requirements of your project. Start with a hole the sides of which are parallel and large enough for the thread chaser to operate. My favorite tool for this operation is a ½” square-end scraper from Doug Thompson *Lathe Tools*.
- In preparation for chasing the female threads, establish a 1/8” chamfer on the front, inside edge of the recess. This will give the chaser a place to start and later will allow the mating surfaces to thread together more easily. Then cut an 1/8<sup>th</sup> inch relief groove at the point where the female threads will end. (Both are seen in Fig. 2)

This relief area is necessary in *both* male and female threads whenever chasing *threads* into a shoulder. This groove allows the chaser to be withdrawn at the end of each pass; without this relief, the tool will hit the shoulder and rip out the threads you have already established.

- The female thread chaser should be held level-with the top surface of the tool positioned slightly above the center line.

**Thread Chasing speed:** If your lathe speed is too slow, what are referred to as drunken (wavy) threads will ensue. With a speed that is higher than necessary, thread chasing is simply too fast for your eye and hand to keep pace. I find that between 300-350 revolutions per minute is my optimum range. The speed of some lathes begins perhaps at 450 rpm. This higher speed should not deter turners from trying their hand at thread chasing.

- With the female thread chaser in position (Fig. 3) and the handle pulled toward you about 45 degrees off the axis of the lathe, move the chaser from right to left. Gently make contact at the point of the established chamfer. The first two or three passes should be with the 3d or 4<sup>th</sup> tooth-using the entire length of the chaser. (See Fig 4) Continue until your chaser follows the threads that appear on the chamfer and proceed by swinging the tool handle away from you with each pass.
- When the axis of the thread chaser is parallel with the bed way, (see Fig. 5) the chaser will be threading with the lead tooth. *Aim* for parallel sides on both male and female threads. However, it is not uncommon for threads to taper slightly and may not interfere with a precise connection.

### **Establish the Male Threads and size them for a perfect fit:**

For an on-line video, visit, YouTube, *wyomingwoodturner*-channel, THREAD CHASING: MALE THREADS-UPDATED. In this video, I will present three methods for sizing the male “spigot” in preparation for chasing threads. One of those options is described below.

- Before chasing the male thread, the diameter of a short spigot must be established. With vernier calipers, I measure the top of the female threads and lock in this setting.
- Using this measurement, turn a 1/8” long spigot (see Fig. 6) where the male threads begin. This would be a good place to use the point tool.

The female threads will fit snugly, as seen in Fig. 7, with the top of the box resting on the spigot described above. The surface of this spigot is now a reference point that will eventually be the bottom of your male thread. To the left of this spigot, establish a new level with a diameter increased by the depth of the male threads.

- Cut a 1/8” relief groove and then champher the outside corner of the spigot.
- Set the tool rest just above the centerline with the thread chaser 45 degrees to the bed ways (see Fig. 8-9). In a right to left direction, softly touch the champher with the 3d or 4<sup>th</sup> tooth-using the entire length of the chaser.
- As a thread pattern appears, move the tool increasingly to a position perpendicular to the surface of the wood (see Fig. 10). At this point the lead tooth should be doing the chasing.
- Check the fit. If the threads are too tight, adjustment is needed. DO NOT reduce the size of the thread by more chasing; this will likely cause the threads to crumble. Increase the speed on your lathe and take off the high points of the male threads. Be careful not to remove too much material. Return to 300-350 RPM’s and chase the threads at the new level. Check the fit again: repeat if necessary.

## Threaded Inserts and Options

For an on-line video, visit, *YouTube*, *wyomingwoodturner-channel*, *Thread Chasing Projects You can Make*

Not all species of wood are compatible with thread chasing. Fine, closed-grained woods like English or Turkish boxwood make chasing a pleasure. Fig. 11 shows boxwood in various stages of drying: from a short log to small wafers that will be used as inserts.

Crumbling threads occurring from the use of softer “hardwoods” can be quite discouraging. One solution is to make male or female inserts that are glued into woods that do not thread well. Fig’s 12, 13, and 14 show male threads being chased on the base of a mushroom box, the female insert before being glued into the top, and the completed project.

Lately I have been turning hollow forms from Boxelder burl, (*Acer Negundo*, a soft maple), and incorporating a threaded finial. This native Wyoming wood is very soft and can be downright punky. The specific gravity of Boxelder is .42. By gluing a threaded boxwood insert into the base, a Blackwood finial can be added to the piece.

Another option is seen in Fig. 15. A machinist tap with a compatible thread pattern is used when a female thread chaser will not fit the recess. Held in a Jacobs chuck in the tailstock, the top of my box is threaded easily and is ready for the finial. (Please note this operation is done with the lathe turned off). Fig. 16 shows the completed finial turned while threaded into a waste block of boxwood. Finally, repeated applications of CA glue can be used to fortify crumbling threads. However, avoid using an accelerator for this procedure as it will make for brittle threads.

When I *should* devote time developing my own elusive *signature piece*, I am too often drawn down the road less travelled ...by the lure of an untried technique or approach like thread chasing; “How hard can it be?” Beyond a cursory view of thread chasing, I have attempted to open doors to further exploration of the topic by providing resources that have helped me along the way.

One source of support and inspiration in all aspects of this project was British turner John Berkeley. John offered firm but kind direction in helping me understand the historical significance and legacy of thread chasing.

Learning to chase threads by hand is by no means an end unto itself. This newly learned skill will add another color to your palette. Turning a delicate suction fit lid on a box is evidence of your skill. Joining the lid and base of that same box with screw threads will elevate your work to the level attained by a small group of turners who are preserving an important part of woodturning history.

(possible sidebar)

### **Specific Gravity (SG) and Wood Density.**

Specific gravity is the comparison of the weight of a cubic foot of water at sea level, which is 62.4 lbs/cu.ft, to the weight of a cubic foot of wood. So a cubic foot of wood weighing 62.4 lbs at sea level is assigned a specific gravity number of "1". Woods with a SG less than 1 will float in water; those with a SG number greater than 1 will sink. When chasing threads, understanding the density of wood is vital for proper material selection. The specific gravity *number* provides an objective way to determine just how hard a species of wood really is.

Assigning a particular wood to the top of the density list is an interesting pursuit. My choice for first place will rest with R. Bruce Hoadley, author of Understanding Wood, who sites South African black ironwood (***Olea laurifolia***) as the heaviest wood with a specific gravity of 1.49: which translates to 93 lbs. per cubic foot.

Chasing threads requires wood with a specific gravity around 1. African Blackwood is 1.2, Lignum Vitae is 1.25: mountain Mahogany, Ebony, and Desert Ironwood are all right at 1.1 specific gravity.

Most turners will place boxwood on their most *favorite wood to chase threads in* list. With a SG of .9, it is not the hardest wood in the world. But this fine-grained wood is a dream to work.

As you progress on your own thread-chasing odyssey, you can elect to chase threads directly into suitably dense, close-grained hardwoods or make your own male and female threaded inserts that are glued into those projects using woods too soft for thread chasing. I will provide photos of both options.

**RESOURCES:** This list is not a comprehensive representation of thread chasing literature. It contains information that I have used or am aware of.

### Thread Chasing Tools

<http://www.crownhandtools.co.uk/page74.html> Crown Tools/Chasers

<http://www.hamlet-crafttools.com/> Hamlet tools/chasers

<http://www.robert-sorby.co.uk/> Robert Sorby Tools/Chasers

<http://www.johnberkeley.biz> Alternative Turning Materials, DVD's, Tools Ashley Iles, Unichaser;

\*John Berkeley of the United Kingdom gives credit to the Israeli turner, Eli Avisera for the idea of the unichaser.

### Thread Chasing Videos and DVD's

"Hand Thread Casing: Allan Batty"

John Berkeley "Screwplugs" Series

Robert Sorby: "Focus on Thread Cutting"

### YouTube

wyomingwoodturner (Sam Angelo)

Hand Thread Chasing with Alan Batty

John Berkeley: Ashley Iles Unichaser Demonstration

### Books

Making Screw Threads in Wood by Fred Holder

Bill Jones' Notes from the Turning Shop

Bill Jones' Further Notes from the Turning Shop

All Screwed Up, by John Berkely

Bill Bowers' Turning Boxes with Threaded Lids

### Wood supplier (Turkish Boxwood)

Tropical Exotic Hardwoods of Latin America, LLC

### BIO

Sam Angelo has been a long time woodworker and woodturner living in the Big Horn Basin of north central Wyoming. He enjoys demonstrating to kids and adults; and has developed and teaches in a successful after school woodturning program at the local middle school. Sam is the current president of the Worland Wyoming Woodturners: local AAW turning chapter. Retired after 38 years in public education, he is free to create, promote woodturning, and visit his granddaughters Sofia, Eva, and Grace.