

WOODTURNING

FUNdamentals

AAW
EDUCATION

Publication of the American Association of Woodturners
January 2015 vol 4, issue 1 | woodturner.org

PROJECTS

Making a Tippe Top

Neal Brand & John Solberg

Two-Piece Candle Holder

Nick Cook

VIDEO

Using a Morse Taper Collet Chuck in the Tailstock

Using a Drawbar with a Morse Taper Drive

Alan Zenreich

Using a Waste Block for More Efficient Use of Wood

Vince Wilson

TECHNIQUES

TIPS

Woodturning FUNdamentals

TABLE OF CONTENTS

AAW
EDUCATION

January 2015 - Volume 4: Issue 1 Features



Welcome Message from the FUNdamentals Chairperson	1
Pen Turning: So you want to be a pen turner! Kurt Hertzog	2
Projects	
• Two-Piece Candle Holder, Nick Cook	11
• Giving tippe tops to kids of all ages is FUN! Neal Brand & John Solberg	13
Tips	
• In Defense of One Chuck Body, Mark Palma	17
• Safety: Fire in the Shop, Dave Milano	19
• How do you learn? John Giem	22
• Spiff Up Your Lathe with Turned Grips, Bob Hadley	24
• Shop Tips:	
Down & Dirty Log Cradle, Wayne Kuhn	26
Drilling a Hole in the Top of a Cylinder, John Anderson & Dan Schmoker	27
Fingernail-Grind Jig, John Kaner	27
Paste Wax on Pen Bushing, Jon Spelbring	27
Video	
• Using a Waste Block for More Efficient Use of Wood, Vince Wilson	28
• Using a Morse Taper Collet Chuck in the Tailstock, Alan Zenreich	29
• Using a Drawbar with a Morse Taper Drive, Alan Zenreich	29
Member Gallery	30
Video: AAW Annual International Symposium	34

Woodturning Fundamentals

a bimonthly publication by the American Association of Woodturners
222 Landmark Ctr.
75 5th St W
St. Paul, MN 55102
phone 651-484-9094
website woodturner.org
Exec. Director: Phil McDonald
phil@woodturner.org
Program Director:
Linda Ferber
linda@woodturner.org

Board of Directors

Kurt Hertzog, President
Art Liestman, VP
Rob Wallace, Sec.
Gregory Schramek, Treas.
Lou Williams
Denis Delehanty
Louis Vadeboncoeur
Jeff Brockett
Kathleen Duncan

Woodturning FUNdamentals Committee

Denis Delehanty, Chair
Linda Ferber, Editor
Beth Ireland
Rob Wallace
John Lucas
Alan Zenreich

A Note About Safety: An accident at the lathe can happen with blinding suddenness. Respiratory and other problems can build over years. Take precautions when you turn. Safety guidelines are published online at <http://www.woodturner.org/?page=Safety>. Following them will help you continue to enjoy woodturning.

Cover photo: Cathy Wike-Cook

AAW | AMERICAN ASSOCIATION
OF WOODTURNERS
Fundamentals

WELCOME

A Note from the Woodturning FUNdamentals Chair

In this edition of *Woodturning FUNdamentals*, we are happy to start our fourth year of publication with a new 2015 cover design. We have undergone many changes in content, as well as in presentation yet our objective continues to be to provide resources for learning the skills and techniques of woodturning.

Past issues of *Woodturning FUNdamentals* are available for download or viewing at <http://www.woodturner.org/default.asp?page=FUNDamentalsRes>.

We welcome you to share your passion for woodturning in the form of questions, tips, and projects!

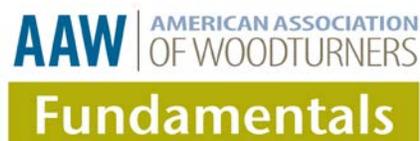
We all develop tips and techniques that work. What woodturner does not love a good jig? Do you have a pesky woodturning problem that just won't go away? Or, are you looking for a resource for a tool, finish, or wood? *Woodturning FUNdamentals* may be able to help.

If you have a question or problem, it is very likely that many others have the same question or problem. Sharing your woodturning issues through *Woodturning FUNdamentals* is a great way to help everyone! Please send a description of your problem or question to us at linda@woodturner.org. We will do our best to find a professional who can provide you with an answer.

Another valuable resource is the AAW Forum at <http://www.woodturner.org/?page=AAWMemberForum>. The Forum features a photo gallery of member work, as well as wide variety of woodturning discussion topics. Take a few minutes and create an account if you are not currently an AAW Forum member.

As always, I welcome your suggestions, questions, or concerns.

Sincerely,
Denis Delehanty
denis@woodturner.org



TURNING A PEN

So you want to be a pen turner!

Pen turning is a funny segment of woodturning. There are woodturners who turn pens and pen turners who turn only pens. They really fall into two separate and unique categories. The woodturner who has or adds pen turning to his or her repertoire usually has all that is needed except the mandrels, bushings, and pen-specific doodads. Sometimes, the turner started with pens and then moved into the broader realm of woodturning or more rarely was a woodturner who now takes an interest in pens. Regardless, when folks who are entirely new to the craft (hobby, sport, profession?) make the leap, they are at their most vulnerable. There are dollars to be had and no end of places to spend them. We'll dedicate this column to "starting from scratch" and, hopefully, provide a reasonable road map for those getting their feet wet while preventing them from taking a bath. Making pens, in a nutshell, is gluing brass tubes into a hole in the wood, and then turning and finishing to a size appropriate to press-fit in the rest of the parts (see Figure 1).

DISCLAIMER

Before we go too far, let me throw in a few disclaimers. First, this is a way to get into pen turning, but certainly not THE ONLY way. I explain it with a clear conscience, having no financial stake in it at all; if and when you go

shopping, don't forget that some of the folks giving you advice have a financial stake in the game—that isn't sinister, but certainly take it into consideration.

The next disclaimer is about safety. I assume that you know that safety glasses are the MINIMUM in required personal protective gear. Face shields and dust masks might be in order for sanding; however, I'm not covering PPE (personal protective equipment) or ventilation, since that is a totally different issue. Safety is in your hands, so don't ignore it—it is important.

My last disclaimer is the same as for all my articles: I write this as one who has made most of the mistakes already and I am sharing the path, minus my mistakes, with you. I didn't do it all right the first time and am not speaking from the high ground—only from experience.

LATHES

Obviously, you'll need a lathe. You'll hear of and perhaps see every concoction from pistol drills squeezed in a vise to attachments for a drill press being used as a lathe. Is this workable? Perhaps it is; however, it's probably not the best way to begin if you intend to continue to turn pens over the long haul. What kind of a lathe? Without being facetious, it doesn't matter—pretty much, whatever you have will work! You can turn pens quite nicely on the biggest lathe there is, right

down to nearly the smallest there is that will accept a pen mandrel.

If you don't have a lathe, I suggest choosing a lathe of the size you want, with electronic variable speed, No. 2 Morse tapers on both ends, and a 1" x 8" headstock thread. Regardless of the lathe you end up with, don't ever lose sight of the fact that there have been, and continue to be, nicely created pens made on the old Rockwell Beaver lathe.



Figure 3: There are “pen tools” available, but standard-size tools work quite nicely and their size and mass add value.



Figure 1: As you might read in a dictionary, pen making is gluing brass tubes into wood to be turned so that the brass pen components can be press-fit into the tubes.

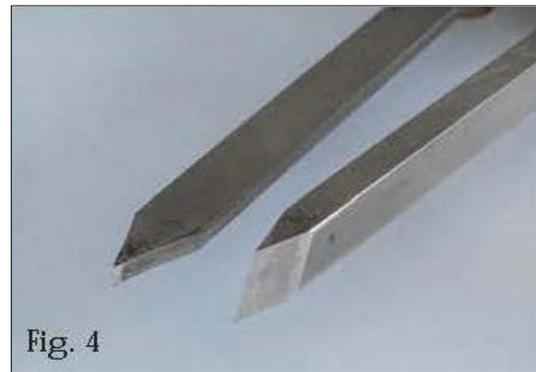


Figure 4: In essence, a parting tool is a skew chisel ground straight across with the other aspect ratio. Presented as it should be, it works and cuts like a skew.



Figure 2: The wood has no idea what tool was used; a sharp tool, properly presented, cuts nearly any material you'll encounter.



Figure 5: Though native woods can be spectacular in larger turnings, the orientation and size of pens make nearly all the features disappear, and highly figured exotic woods create much more interesting pen turnings.



Figure 6: You are drilling endgrain for the most part; a sharp drill that is used with the material, appropriate speeds, and feeds will do the job.

TOOLS

What kinds of chisels are necessary for turning pens? Well, if you are already a woodturner, you should know that it doesn't matter, and if you are new to turning, understand that it still doesn't matter. Pens can be turned with a 3/4" roughing gouge, a 1/8" parting tool, a carbide tool, or anything in between. Don't get duped into buying some collection of tools because you were told that you NEED them.

Pen turning is a misnomer because there isn't a lot of turning in a pen. You spin the blank around and knock off the corners until you get to the bushing dimension. Sand, finish, assemble, and move on. I say this not to offend pen turners, but to explain to newcomers that the woodturning in a pen is minimal. Just about any tool you can find—from a sharpened screwdriver to a bench chisel—will turn pens, provided that it is sharp and is presented to the work properly. Do I recommend using screwdrivers? Not at all! I'm just trying to drive home the point that the magic isn't in the tool; it is in the hands of the

user. I suggest repeating those two sentences every time you feel like shopping. You are far better off investing in a class on the proper sharpening and use of woodturning tools than buying a tool that you can't sharpen properly, and can't or won't use in the correct manner (see Figs. 2, 3, and 4).

For now, get a standard-size roughing gouge or parting tool; learn to sharpen it and use it correctly, and you'll be able to turn just about any pen out there. As an alternative, there are a host of carbide cutter tools either made specifically for pens or certainly suited to turn them. I've tried them all and they do work, so pick what suits you, but don't let yourself be convinced that you need a set of tools or mini-tools; pick a tool, any tool, learn to keep it sharp, and master it.

SHARPENING

A treatise on sharpening might be a great topic, but space prohibits it here. To be a good woodturner (or pen turner), sharp tools are a necessity. How you get there can take many paths. You can join those with the carbide-tipped tools, and reorient or replace the cutters as needed to keep a sharp edge in play. Barring that replaceable cutter method, you'll need to sharpen tools. It isn't difficult and it isn't voodoo, as many believe. Sharpening is fairly similar to woodturning except that the material comes off the tool instead of the wood on the lathe. The same process is used on the grinder—anchor, bevel, cut.

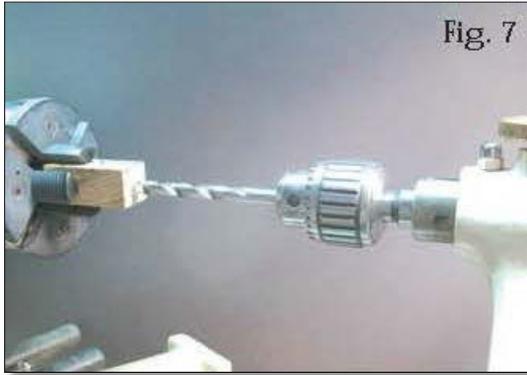


Figure 7: I can't think of a better drilling device than your lathe.



Figure 9: Gluing tubes into the drilled hole can be accomplished with a number of adhesives.



Figure 8: A drill press will also get the job done and you certainly can use a pen drilling vise, a machinist's vise, a block of wood, or as shown, a quick clamp to hold the blank.

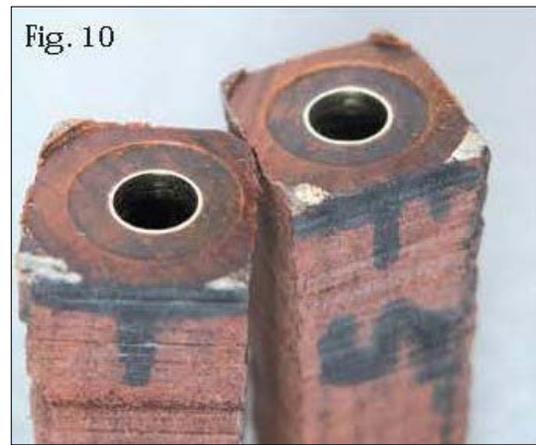


Figure 10: The wood needs to be faced perpendicularly back to the edge of the tube, and no farther.

PEN STUFF

Up to now, our discussion has been generic, so let's get to the pen stuff and talk about the basics of pens. In a nutshell, wood is glued around a piece of brass, the extra wood is eliminated until it matches the rest of the kit fittings, and then everything is press-fit together—absolutely simple. That being said, there are some things that can be done to help you create pens that are above the norm. We'll use the base level 7mm kit as an example, but accept that almost all holds true for the other styles of kits as well.

Among the items you usually have to buy is the kit itself. Though there are many vendors who have kits to sell, there are only a few sources for the materials. Most retailers either have kits made in the Orient to their specification, or they are reselling kits from the biggies who are buying in large quantities from their sources in the Far East. As with anything, you can overpay, but when you buy smart, price is usually a good measure of quality. Again, overlooking any excessive profit margin, a kit selling for \$2 cannot be expected to be of the same quality as the same style kit selling for \$7. The fit, finish, plating, core components, or something is driving the price differential.

Wood or alternate materials are usually purchased. The local species, though wonderful for a platter, bowl, or other large turning, usually doesn't exhibit much interest or beauty in small turnings, such as a pen—especially because the spindle orientation doesn't show off exciting figure, such

as bird's-eye maple, quilting, or other chatoyant features. To make a pen “pop,” you will need some exotic or figured wood that has been dyed or stabilized or both. Dyeing will make the grain jump out at you, and the stabilization (impregnating with plastic) will make the pen blank turn much like plastic and take a high-gloss finish (see Figure 5).

At this point, we've got a lathe, a sharp tool, a pen kit, and a pen blank. Let's walk through the making process, and note the items that might make your job simpler and more controllable.

DRILL A HOLE

You'd think something as simple as drilling a hole would be a noncontroversial topic—not so. Depending on what faction you fall into, drilling a hole borders on political discussion: do you use a drill press, a bench vise, a lathe, a drilling vise, a long quill travel or trickery with a short quill travel, or a 118° or 135° or brad point. My recommendation is a sharp drill of the appropriate size with reasonable speeds and feeds. Use the lathe to hold the blank and drill with a drill chuck in the tailstock, or use the drill in a pistol drill holding the wood in a vise, or use the drill press holding the blank in anything that will hold it. Just get it done. Drilled reasonably and glued properly, not a soul will know how it was done unless you spill your secret.



Fig. 11

Figure 11: One method that works very well at facing the tubes is using a “pen mill.”



Fig. 12

Figure 12: In contrast to the pen mill— which pilots on the tube—you can freehand the facing on a disk or belt sander, although I recommend against this.



Fig. 13

Figure 13: If you intend to sand to face the blanks, perpendicularity to the ID of the tube can be achieved using a commercially available sanding jig or the homemade equivalent of it.



Fig. 14

Figure 14: For those who would prefer to purchase their sharp edge rather than grind it, any of the carbide cutter tools can be used to turn pens.



Figure 15: Bushings can get you close to where you want to be, but for the best fit, you will probably want to measure the actual parts being used and make your turnings match those parts.

GLUE IN THE TUBES

Another one of the argument starters among pen turners is what glue to use. I have my favorite, but I answer, “It really doesn’t matter.” Any of them will work well. The keys to any adhesive bond are universal: clean surfaces, sufficient tooth, and appropriate gaps. When making pens, use any of the traditional adhesives, ranging from epoxies through cyanoacrylates to poly-urethanes. Any failure of the bond will nearly always trace back to preparation, not the adhesive itself (see Figure 9).

GET READY FOR TURNING

If there is anything that will be unfamiliar to a woodturner with no pen turning experience—or for the newcomer—it is the importance of facing the pen blanks. The importance of perpendicularity can’t be stressed enough. Facing the pen blank so that the wood surface is precisely at the end of the brass tube will allow for the best interface with the rest of the

components and the proper stack-up of dimensions for the finished pen (see Figure 10). There are ways to get there using a disk or belt sander, but I am a fan of the “pen mill” (see Figure 11). This simple and modestly priced tool can be used in the drill press or a pistol drill, or on the lathe. Because it pilots on the ID (inside diameter) of the brass tube, there is little chance of any variation from perpendicularity. I’m sure that you can appreciate the potential for problems if you’re working freehanded at the sander (see Figure 12). There are certain kits and other occasions where I’ll choose a sander, but when I do, I use a jig that will pilot on the ID while I sand (see Figure 13). Even with the sanding jig, I find that there still is the potential for more error; therefore, I use it when necessary, but not as a first choice.

TURN, TURN, TURN

As noted above, pen blanks can be turned with nearly any tool in the box, other than perhaps a scraper; any of the cutting tools, whether they are carbon steel, high-speed steel, or carbide cutters, will get the job done (see Figure 14). Follow the instructions that came with the kit you are using and turn things down to the bushing sizes. Later on, you’ll probably want to learn how to use calipers and measure things, but for now, get the wood down to the bushings for the proper sizing (see Figure 15).



Figure 16: The better the preparation of the blank to accept a finish, the better the finish will turn out, because any flaw of any kind will be highlighted under the finish.



Figure 17: From the myriad of finishes available, pick one or two (at most) that you like and master them.

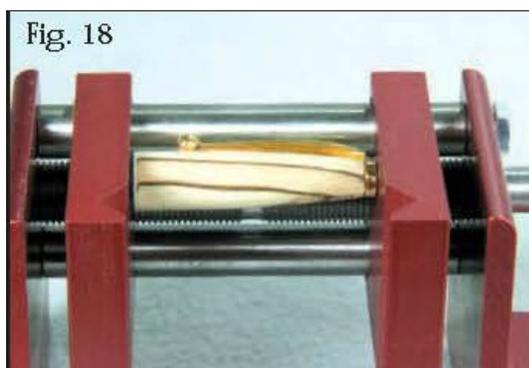


Figure 18: There are some wonderful drilling fixtures that also serve as assembly presses.

SANDING AND FINISHING

The better the cutting, the less need there is for sanding. If you believe that sanding is preparation for a finish rather than a cover-up for poor turning, good for you. Do your best at turning and then sand to feather things together, to get to that final size on the bushing, and to prepare for the application of a finish. There is no magic here—it's just good woodworking and woodturning skills, and the better the surface preparation, the better the potential for a great finish (see Figure 16). The newcomer to pen turning will often start with waxes and friction finishes on their pens because they are quick and easy to apply. They are not very durable, however. Because a pen lives in a terribly abusive environment, I recommend that you quickly learn to apply a cyanoacrylate glue (CA or superglue) or lacquer finish. Either method is easily learned and far more durable (see Figure 17).

FINAL STRETCH

So far, pretty easy, eh? The trickiest part is putting the tubes inside the blanks and facing things properly; everything else is fairly straightforward. Now with the parts completed, it is time to press everything together. There are some very fine drilling vises on the market that will work superbly to do the press fits (see Figure 18). These vises allow for adequate force, yet offer some semblance of finesse. If you have one, by all means use it. If not, the bench vise, a quick clamp, or the lathe will work well to press things together (see Figure 19).



Figure 19: A bench vise, a quick clamp, or the lathe will work well to press things together.

CLOSING THOUGHTS

This quick overview of the pen-making process isn't intended to be anything more than a teaser to show you how easy it is to get into pen making (see Figure 20).



Figure 20: This quick overview is a teaser to show you how easy it is to get into penmaking. Each of the points of this article is enough to fill an entire chapter if it is elaborated on.

Each of the points of this article is enough to fill an entire chapter if it is elaborated on.

I'm certain that you'll see how addictive pen making can become. You can go from being a novice turner to making a finished pen in less than an hour without breaking a sweat, and entry-level pen turning brings a large number of people into the woodturning arena. My "newbie into woodturning" scenario might seem simplistic and it is; Cub Scouts can be taught how to do this in a morning and they can all go home with pens. That said, you can spend the rest of your turning life expanding and trying to "master" the pen-making process—there really isn't an end point, just the journey!

~ Kurt Hertzog
Henrietta, New York

Kurt is a professional woodturner, demonstrator and teacher, and a Board member in the American Association of Woodturners. His work has been featured in many exhibits and he was published in *Woodturning* and *Woodturning Design*. You can see his work on his website at <http://www.kurthertzog.com/>.

CANDLE HOLDER

Two Piece Candle Holder



This project has two components, the base turned on a chuck and the spindle or post turned between centers. It's a great gift for mom. The project will utilize both faceplate and spindle techniques. You will use a 3/8" bowl gouge to make the base and a spindle roughing gouge and spindle gouge to make the spindle.



MATERIALS

- You will need two blanks, a 6" diameter round x 1-1/2" thick for the base and a 2-1/2" x 2-1/2" x 8" piece for the spindle. You will need a 2" x 2" x 2" blank for a mandrel to turn the spindle.
- The base will be drilled on the bottom to fit the expansion jaws of the chuck and a hole in the top surface to receive the tenon of the spindle.
- The spindle will be drilled to receive the candle cup.
- Brass candle cup. Never make a candlestick without a metal insert.



TURNING THE BASE

1. Mount the chuck on the lathe.
2. Place the 6" diameter blank on the chuck using the larger recess in the bottom of the blank.
3. Use the chuck key to expand the jaws and lock the blank onto the chuck.
4. Set the lathe speed to approximately 900 RPM.
5. Use the 3/8" bowl gouge to shape the base to desired design.
6. The spindle tenon will fit into the 1-3/8" hole in the top of the base. Leave approximately 1/2" around the hole for the spindle to be fitted.
7. Sand and finish the base with Wipe-on Poly finish and paper towels.



TURNING THE SPINDLE

1. Mount the 2" x 2" x 2" blank in the chuck and turn the end down to fit the hole in the end of the spindle.
2. Mount the 2-1/2" x 2-1/2" x 8" blank between mandrel and the live center in the tailstock.
3. Use the spindle roughing gouge to rough turn the blank to a cylinder.
4. Use the parting tool to turn a tenon on the bottom of the spindle to tightly fit the hole in the top of the base.
5. Use the roughing gouge and spindle gouge to turn the desired shape.
6. Sand and finish the spindle with Wipe-on Poly as above.
7. Glue the spindle into the base.
8. Tap the candle cup into the top of the spindle.

~ Nick Cook
Marietta, Georgia

Nick has been a full-time production turner for more than 23 years, producing a wide variety of gift items, one-of-a-kind bowls and vessels, and work for furniture makers and millwork contractors. He spends much of his time teaching both individuals and groups throughout the country. He has conducted workshops for woodturning groups in Australia, New Zealand, Canada, and England.

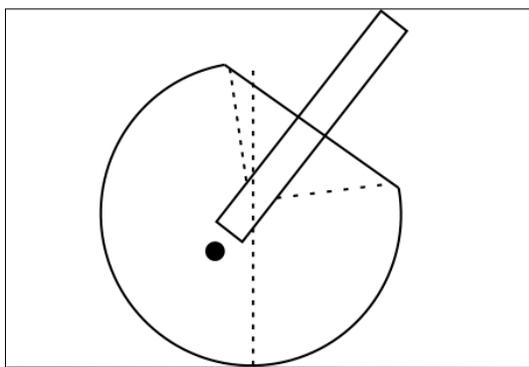
He is a founding member of the AAW and has served on its board of directors and as vice president. He has written articles for various woodworking publications, including *American Woodturner*. In 2002 he was named the 12th honorary lifetime member of the AAW.

TURNING A TIPPE TOP

Giving tippe tops to kids of all ages is FUN!

A tippe top has the curious property that when it is given a good spin, it will, on its own, flip upside down and spin on its stem. Tippe tops became somewhat popular in the 1950's and 1960's, but now most people have never heard of them. It is not difficult to make a top that looks like a tippe top, but to make it work properly takes some care. Here we reveal the secrets we discovered, mostly by trial and error, that make a tippe top work.

In order for a tippe top to work, the center of mass should be low in the top, as shown in the diagram below where the center of mass is marked with a dot.



Keeping the center of mass low can be accomplished in a variety of ways. First, the top can be hollowed fairly deeply to get rid of a lot of the mass that is high in the top. Second, one could place a weight (we use a ¼ inch ball bearing) low inside the top. Third, the blank could be made by gluing a dense wood on the bottom and a light wood on top.



Photo 1: Shows tops made using these three methods.

Another issue is that the top requires a good spin to have enough energy to flip. If the top is too large, then it is too difficult to spin fast enough. The ideal diameter seems to be between ¾ inch and 1 ½ inch.

Here is an outline of how to turn a tippe top. We are assuming that the blank will be mounted for a spindle turn, that is, the grain runs parallel to the axis of the lathe. You can also turn it cross-grained by making the appropriate modifications. Most importantly, DON'T use a spindle roughing gouge or a skew for cross-grain turning! Photo 2 shows the outcome of the steps below. We refer to the various stages below by counting from the left.

1. Start with a blank that is ¾ to 1 ½ inches square and at least 2 inches long. Maple is a great choice if you plan to decorate the top, but any wood works. Mount between centers and make a tenon as the first turning

in photo 2. Then mount the blank on a chuck and turn it round (typically with a spindle roughing gouge or a bowl gouge) as in the second turning of photo 2.



Photo 2

2. Next start turning the body of the top and hollow it as in the third and fourth turnings in photo 2. You can use a spindle gouge, detail gouge, gouge, or even a bowl gouge. Be sure to leave enough support material that the body can be hollowed. Hollowing can be accomplished by pushing a gouge into the center of the body about 1/8 of an inch with the bevel at approximately 45 degrees and then pulling the gouge toward you. If you intend to insert a weight, do not hollow very deeply. If you do not plan to insert a weight, then hollow to at least the widest part of the body. (That is, if it were a whole sphere, hollow to at least the center.) Drill a 1/4 inch-diameter hole for the stem as in photo 3 and the fifth turning in photo 2. Make the hole 1/4 inch deep if you are not adding a weight and 1/2 inch deep if you are.

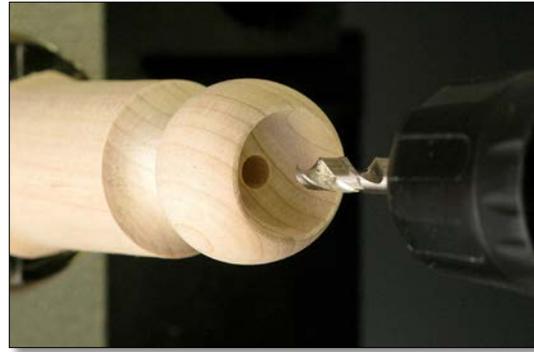


Photo 3

3. Now is the time to sand and finish the inside of the top. Finish by rubbing a small stick of carnauba wax on the surface and then polishing with a paper towel or rag while the lathe is turning fast. Repeat this process two or three times. If you wish, you can texture with your favorite texturing tool and add color with a paint marker before waxing.
4. Turn the outside of the top to be approximately round and part it off with a parting tool.



Photo 4

- There are several methods of mounting the body of the top. For example, use a ¼ inch collet or a drill chuck that allows you to mount a ¼ inch steel rod approximately 1 ½ inches long or steel dowel pin. Another method is to make a jam chuck. Photo 4 shows all three options. Use the drilled ¼ inch hole to mount the top as in photo 5. One advantage of the jam chuck, photo 6, is that its size is adjustable.

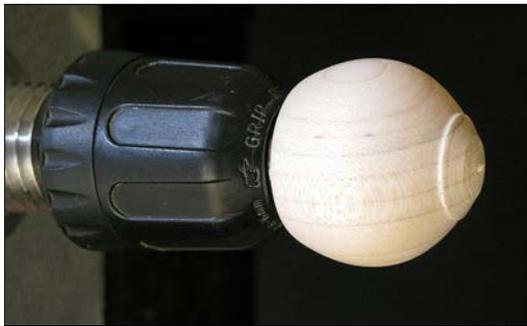


Photo 5



Photo 6

- Finish turning the outside of the top, making sure that the shape is approximately round as in photo 6. The top seems to work better if it is a little shorter than a perfect sphere.

- Sand and finish with carnauba wax as before. Again, you can use a texturing tool and paint pens to decorate the top before finishing.
- If you planned to use a weight to lower the center of mass, insert a ball bearing into the ¼ inch diameter hole and push it to the bottom. A drop of CA glue will secure the ball bearing, if it fits loosely.
- Plan to have the stem extend approximately ½ inch above the body and measure the length needed for the stem.

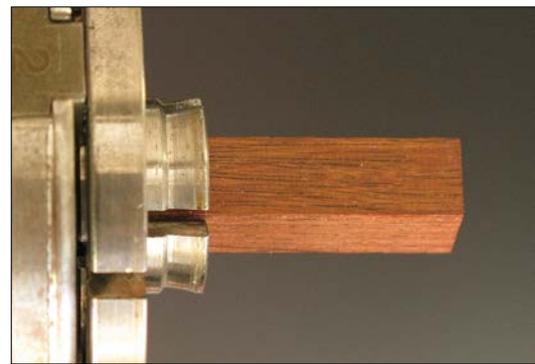


Photo 7

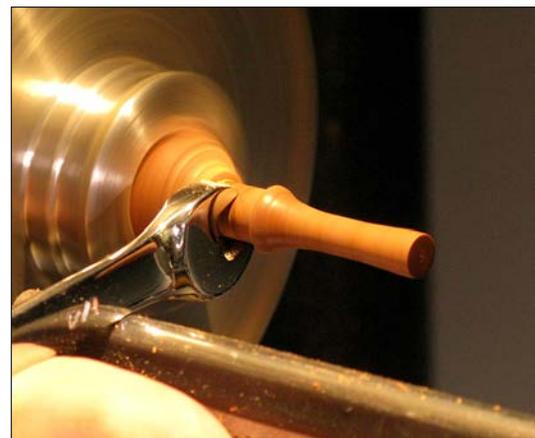


Photo 8

10. Use a blank approximately ½ inch square by at least 1.5 inches long for the stem. Mount in a chuck as in photo 7 and turn the stem. Make the stem ¼ inch in diameter or less. Give the stem a nice shape. Make the tenon 1/4 inch diameter to fit snugly in the hole drilled earlier. A sharpened ¼ inch wrench can be used to size the tenon, assuming the hole is not oversized. See photo 8. Be careful about the shape of the top of the stem. It can be flat, concave or slightly convex. The stem in photo 2 has a flat top. If it is too convex, when the top flips up, it will not catch, but just fall.



11. Now is the time to wax and polish the stem. You can texture and paint the stem, if desired.

12. Insert the stem into the top and test it. If it works well, glue it, and you have finished, but if not, the top may still be salvageable by reshaping the body, or if it almost works, by using a longer or shorter stem.



With some practice you can make a very attractive and working tippe top in less than 30 minutes. Have fun making, playing with, and giving kids (of all ages) tippe tops!

~Neal Brand & John Solberg
Both of Denton, Texas

Neal Brand and John Solberg are members of Golden Triangle Woodturners in Denton, Texas, where they each have served as president. They are also members of Dallas Area Woodturners and Woodturners of North Texas. They each joined AAW soon after they started turning wood approximately 10 years ago.

ONE CHUCK BODY

In Defense of One Chuck Body

Hold on! I love tools. I have drawers (and boxes, and cabinets, and shelves) of tools. I love the smell of tools. I review every tool catalog, surf the web for new tools, and go to every tool store within a broad radius.

Originally, I purchased a lathe chuck body which came with a set of jaws. I have used it over the last two years on numerous projects and it serves me well. Along the way I purchased additional jaws to add to its versatility. In my research through reading magazines and tool catalogs I noted one can purchase “bare” chuck bodies. Several authors expound on the advantages of owning multiple chuck bodies (up to five or six if you view their videos) to eliminate the “need” to change jaws. Silly me, two years of total inconvenience, life in the stone age, as well as the opportunity to purchase another tool (or five, mind you) that I must have to turn wood like the pros.

I was totally committed (down to begging my spouse for an increase in my tool allowance and even the need to add more drawer space for the purchase) when I needed to change jaws in my only (and lonely) chuck for a project. In removing the existing jaws, I learned that several of the setscrews were loose or too tight. One of the jaws would not come off even with the screws removed. I found wood chips, grit, and finish, caked within the chuck body.



I took everything apart, cleaned every surface, scrubbed finish and grit out of the crevices and corners, and even read the owner's manual! Next, a careful coat of lubrication was put on the parts, just as the manual said I should have done, ahem, some time ago! While I was at it, I cleaned off the threads of the lathe, the Morse taper, and each of the setscrews for the chuck. When I reassembled it, the chuck worked beautifully and performed as it had been advertised when I purchased it two years prior. I guess I never noticed that it was degrading in performance little by little over time.

So herein lays the question – would yours truly have had the self-discipline to maintain multiple chuck bodies? (My track record so far has been abysmal at best!) A loose jaw is a safety issue. If the screws had fallen out of a jaw, not only would a chunk of spinning wood have become a projectile, but possibly a chuck jaw could have come sailing through the air! (How much wood can a woodturner duck if a woodturner must duck wood?)

Chucks seem indestructible. Modern chucks are so well-designed that we take them for granted as we reach for them in our shop. However, they work better with routine maintenance. Oddly, chuck manufacturers actually intend us to read those owner's manuals that are sent out with the chuck bodies. So should I ignore the maintenance recommendations and wait for a disaster? Probably not. Will I remember to take apart two or three chuck bodies and clean, lubricate, and inspect them all? Not in a thousand Saturdays!

Maybe the right answer for me is to keep one chuck body, take care of it, and change the jaws as needed. That may be the best answer for this woodturner.

Now that I “saved” all that money I “needed” to spend on chuck bodies, I now remember that I need...

~ Mark Palma
Cameron, Wisconsin

Mark Palma is a tax lawyer by day and a woodworker whenever he finds that “spare” time that isn’t spoken for. He thanks his family for allowing him to have a shop, a tool allowance, wood stash, and the time to pursue his addictive hobby.

GETTING STARTED IN WOODTURNING

Features shop-tested insights and detailed practical advice a beginner needs for a great start in woodturning, including:

- Buying and aligning your first lathe
- Safety practices for dust collection, face shields, and the shop
- Techniques for sharpening and using your turning tools
- 18 skill-building projects for bowls, pens, holiday ornaments, doorknobs, and more



ORDER TODAY AND YOU'LL BE READY TO MAKE THE WOOD CHIPS FLY IN NO TIME.

LIST PRICE: **\$27⁹⁵** ORDER AT WOODTURNER.ORG
SIGN IN FOR EXCLUSIVE AAW MEMBER PRICING

AAW | AMERICAN ASSOCIATION OF WOODTURNERS
877-595-9094
woodturner.org

Where to turn for Woodturning

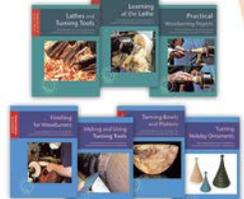
- ✓ **AAW** is the organization with global membership that professionals and hobbyists turn to for inspiration, education, and information about woodturning tools, techniques, projects, safety, and more.
- ✓ **We're your source for expert, shop-tested materials.** As publisher of the *American Woodturner* journal, we offer practical and reliable educational resources for woodturners written by woodturners. Our books are available individually in soft cover, digital download, and as soft cover sets.
- ✓ **Join the AAW member community** and get six issues of *American Woodturner* annually, free digital downloads of special publications, and access to the largest collection of woodturning information anywhere in the world. What's more, you'll be able to tap into the expertise of more than 15,000 members globally who share your passion for woodturning.



Free digital download with membership



Our newest resource book



AAW | AMERICAN ASSOCIATION OF WOODTURNERS
Expand your resources. JOIN US.
woodturner.org or call 651-484-9094

SHOP SAFETY TIP

Fire in the Shop

It was the tail end of a long woodturning weekend roughing out green bowls, and the floor was littered with chips, two feet deep in places and getting deeper. I had finally mounted the last of my blanks and was happily making the concluding additions to the chip pile when suddenly I noticed smoke coming from one of my Moffatt lights. Shavings had obviously gotten stuck in there and were attempting to ignite. I grabbed the fixture and instinctively shook the smoldering chips out, then after the briefest moment of self-congratulation, realized I had sent the embers neatly into the mound of shavings on the floor. There I saw another thin stream of smoke, this time rising from enough tinder to set my shop ablaze in mere seconds. I immediately scooped with two hands the section of chips containing the culprits, dropped the mess into a nearby bucket, and hurried outdoors to douse the tiny burning embers with a garden hose.

“Yikes,” I thought. “Dodged a bullet that time.” Then I got to wondering... Had I had gotten *all* the embers? Just to be sure, I took a few minutes to wait and watch. I grabbed a stool by the workbench, leaned on my elbows, and for the next five minutes or so, scanned the floor. Sure enough, another thin wisp of smoke appeared, this one a good four feet from the original pile. At that point, knowing I couldn't move all the potentially smoldering chips to a place where fire wouldn't matter, and not knowing where exactly to point my

fire extinguisher, I knelt down on the floor and patted the tiny glowing spot out, then proceeded to hurriedly sift through the entire heap, searching for latent hot spots. To my great relief, I found none. After giving due thanks to whatever karma had saved me from catastrophe, I got the shovel and broom and proceeded to clean the shop.

Now, for all you woodturners out there unable to suppress the thought that I must be a complete moron to dump a little fire into a big pile of fuel and oxygen, let me say that I don't disagree with you. Nevertheless, I would ask that you have mercy, and consider that anyone can make a mistake, and accept my assurance that I have no significant intellectual deficiencies yet my actions really did not seem ridiculous at the moment. I'm guessing there might be others out there making similar mistakes—maybe even folks with more mental acuity than yours truly.



And anyway, like every good fireman will tell you, the best solution to the problem of fire, no matter how quick-witted the victim, is prevention.

Before getting to the preventatives, allow me to state emphatically that my lighting system—Moffatt lights on the Gary Sanders system of flexible arms—is a godsend. It is really, to me, indispensable—extremely helpful and adaptable enough to keep my work brilliantly visible no matter what its size or shape. Good light, of course, is not only essential for good work, but is itself a safety measure, helping, for example, to prevent accidents from errant tool placement. But here's the thing: I don't think Moffatts as many have them configured, i.e. with high-wattage incandescent bulbs (mine are approved for standard 100W, A19 bulbs), are appropriate for woodturning. The reason is simple: Incandescent bulbs create a *lot* of heat—obviously enough to ignite tiny bits of kindling of the sort woodturners routinely send flying around the shop every day.

Exactly how much heat an incandescent bulb creates is hard to say. The bulb's formulation, the amount of air flowing past the bulb, the presence of heat sinks (which Moffatt lights are equipped with) and other factors can all affect surface temperature. Nevertheless, based on my experience, there is clearly enough heat at the surface of an incandescent bulb to, in certain circumstances, start a fire. Not good, especially when the bulb's environment is laden with wood dust and other combustibles.

So what to do? Well, the answer these days is pretty simple: Use low-heat lamps, the best of which are LEDs, which shed ample light (the 100W-equivalent A19 LED bulbs in my local hardware store are rated up to 1,600 lumens) at very low heat levels—even less than the heat produced by compact fluorescents.

Since LEDs are available in sizes comparable to standard incandescents, you might find that a fix for your task lighting is as easy as screwing in a light bulb. In my case, there was a small hitch. Bulb size designations indicate style and diameter, but not necessarily length. My A19-equivalent LEDs fit into the Moffatt lights, but protruded beyond the edge of the fixtures (see photo), creating blazing glare.

My solution was to extend the fixtures, which I accomplished by cutting a 4" Schedule 40 PVC coupling in half crosswise, and with silicone tape attaching each of the two halves to the ends of my system's two fixtures (see photo). The original Moffatt grills snapped perfectly onto the PVC.



A test with artificially planted wood chips was successful. No excessive heat, no smoke, no fire.

The cost was \$45.00 for the two LED bulbs, the PVC coupling and a roll of silicone tape—well worth it for the peace of mind, especially for somebody known to make a bone-headed mistake now and then.

~ David Milano
Wellsboro, Pennsylvania

David Milano is a long-time woodturner based in Wellsboro, Pennsylvania. He is an officer in the Endless Mountain Woodturners chapter of the AAW. See his work at milanowoodturning.com

AAW | AMERICAN ASSOCIATION
OF WOODTURNERS



Join the **World's Authority** on Woodturning

Become part of the AAW, the organization with a global membership that professionals and hobbyists turn to for inspiration, education and information about woodturning tools, techniques, projects, safety and more.

As an AAW member, you'll receive six issues of *American Woodturner* journal each year and get free digital downloads like *Woodturning Fundamentals*, an educational series that offers projects, tips, videos and information on techniques to advance basic turning skills. You'll have members-only access to the single largest collection of woodturning information and resources anywhere in the world. What's more, you'll be able to tap into the expertise of more than 15,000 members globally who share your passion for woodturning.

Join AAW today

Call us at 877-595-9094

Visit us at www.woodturner.org

HOW DO YOU LEARN?

How do you learn?

Lee Carter helped establish the Rocky Mountain Woodturners in northern Colorado. He told us that whenever he watches a demonstration, he tries to learn at least one new thing. Here are some tips to help you learn one new thing (or more) from demonstrations, workshops, and reading material.

Ask why?

When a statement is made or technique shown, ask *why*? When you know the *why* of a technique, you will be able to successfully internalize and utilize the information in the future, especially if a situation is different from your own experience.

Trust but verify

When you read an article, you can be fairly confident that the author is making statements that are true; however, just because something is published, it does not necessarily mean that it is correct or that it applies to your situation. Verify that the information applies to your goal. How much verification you require will depend on your personal comfort level for safety, materials on hand, time constraints, your equipment, and your level of skill. Verification can take many forms: personal experience, consulting other experts, reading and researching additional articles, and even going to the shop and trying it out. The archives of *American Woodturner* are always available for research and the various online forums are open for consultation.

Transfer techniques

Take workshops and classes to learn new ideas and techniques that can be applied to other projects. When I took a carving class from Dixie Biggs, we used oil for finishing our carvings. She used a small disposable brush to dab the oil into the details of the carving until the oil was absorbed, which avoided applying too much. This helped solve a problem I had with my woodturnings: When finishing turnings that had fine details, oil would puddle in tight areas. Using Dixie's method solved that problem.

What did the demonstrator say?

Sometimes a statement is made that we do not understand or that does not sound right. Ask the demonstrator (or author) to explain in more detail.

When there are time (or space) constraints, sometimes clarity is sacrificed or perhaps your prior knowledge or personal perspective are not considered. Demonstrators appreciate questions and often your questions will help others better understand the information being conveyed.

The Internet provides resources for exchanging ideas and clarifying concepts. The AAW forum at aawforum.org/vbforum/ is a good place to start. There, you can ask questions and get feedback from fellow woodturners. Verify, though!

Take notes

It has been said that the faintest of pens is stronger than the best of memories. Take notes. Don't like to write? Use your smart phone to photograph equipment setups, techniques, and demonstration pieces. Underline passages in books and magazines (or bookmark them in your digital reading device), make sketches, and acquire literature at trade shows to aid you in remembering important details.

Summary

When you learn something, you will be able to boldly create exciting new woodturnings with your newfound insights and knowledge! You don't have to look far to find some rich experience and resources – so explore!

~ John Giem
Fort Collins, Colorado

John Giem is a longtime woodworker and engineer and is active in the Rocky Mountain Woodturners.

WHERE TO TURN FOR WOODTURNING

Selected readings from *American Woodturner*, journal of the American Association of Woodturners

Getting Started in Woodturning



1. Safety for Woodturners
2. Lathes and Turning Tools
3. Learning at the Lathe
4. Practical Woodturning Projects

Elements of Woodturning

1. Turning Holiday Ornaments
2. Making and Using Turning Tools
3. Turning Bowls



Your source for expert, shop tested materials

Since 1986, *American Woodturner* has been a genuine treasure-trove of practical and reliable information written by woodturners for their fellow woodturners.

ORDER TODAY!

64-page soft cover or
digital download

AAW | AMERICAN ASSOCIATION
OF WOODTURNERS

877-595-9094

Visit www.woodturner.org > online store

TURNED GRIPS

Spiff Up Your Lathe with Turned Grips

Some of the nicest lathes have fancy brass or anodized aluminum grips on the tailstock and banjo handles. If your lathe has more humble roots, you can add custom grips. Here's how I dressed up my Jet 1642.



The trick is boring out the grip in a way that attains a reasonably precise fit. The tailstock handle on my lathe measured 0.748", so a 3/4" bit was ideal. But the banjo lever was .700" and the tool rest locking handle (which is an aftermarket model and metric) was 0.393" (metric 10mm).

I drilled the tailstock handle 5" deep with a 3/4" Forstner bit. To minimize

drifting off-center, first drill to the limit of the bit without the extension, then add the extension to finish the depth.

For the banjo shown at right, turn a maple plug gauge as close to 0.700" as possible. The gauge end needs to be a little longer than the depth of the hole (for my lathe, about 3 1/2"). To bore the hole, I started with a 5/8" Forstner bit and then enlarged the hole using a squarenose scraper. (Be careful not to end up with an ever-increasing taper toward the bottom of the hole, which is why the plug gauge is necessary.) Carefully bore the ID out to the size in small increments. Test the fit and continue until the final depth is reached. Use the same process for other handles you want to customize. Just so things matched, I also added a grip to the headstock locking lever as shown at right.



As far as the tolerance to the fit goes, I found that a "hand" fit is best--that is, the grip should just slip over the handle with only the slightest friction. If the fit is too tight and you have to

pound the grip onto the handle, it will probably split the wood. If the grip rattles, it's too loose, and it either won't look right when you glue it or the grip will split where the void can't support the repetitive pressure from articulating the handle. If the fit is just right, you will need to drill a small hole in the closed end to allow the trapped air to escape. Otherwise, when you glue the grip to the handle, the glue will act as a seal and the compressed air will prevent the air from completely sealing.

After you've bored the handle hole, mount the stock between centers and turn the outside to the desired shape. Then sand and buff to a high shine before applying a finish. (I used Crystal Coat to finish my grips.) To bond wooden grips and the metal handles, use an epoxy or a polyurethane product (Gorilla Glue is one popular brand).

~ Bob Hadley
Yorba Linda, California

SAFE TURNING IS FUN TURNING

The first in a new workbook series from the editors and contributors to *American Woodturner* journal



SAFETY FOR WOODTURNERS

Safety for Woodturners, the first book in the series *Getting Started in Woodturning*, is essential reading for all woodturners. Whether you're a beginner or a seasoned turner, these selected articles on woodturning best practices will help you sharpen your skills at the lathe.

ORDER YOUR COPY NOW

64-page soft cover: \$14⁹⁵

Digital download: \$9⁹⁵

www.woodturner.org
877-595-9094



SHOP TIPS

Down & Dirty Log Cradle

This log cradle cannot be easier, cheaper, or more useful. It is basically a consumable log cradle with no chance of damaging your chain saw chain. I have used this many times; I would hate to go without it when sawing my green wood bowl blanks.

Materials: Two by Four, dowels and drywall screws. Fabrication is simple--start with 4 equal lengths of two by four. I prefer 12-inch lengths and have cut some very large diameter logs.

Once cut, apply glue to all mating corners and insert 1- 2 ½" drywall screw through each corner.

Drill a hole the size of a chosen dowel in each opposite corner; I use two dowels per corner.

Glue and insert dowels. Let assembly dry overnight and remove the screws.

The cradle is ready to use without any metal fasteners. Store outside with your log pile.

When you finally do cut through the cradle and it is no longer usable you can make another one with very little expense.

I hope you find this as handy as I do.
Down and dirty log cradle.

~Wayne Kuhn
Columbia, Maryland
Baltimore Area Turners

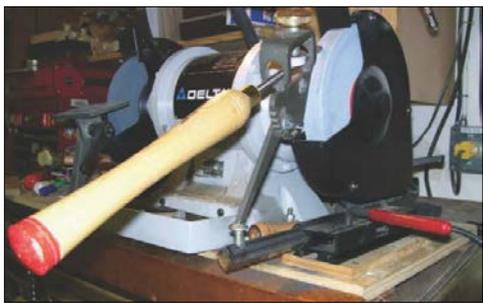


SHOP TIPS

Drilling a Hole in the Top of a Cylinder

Trying to drill a hole in the exact top of a cylinder is very difficult even with a “V block”. The piece rotates or the drill bit tends to wander and results in a hole off to the side. The Lincoln Land turners are making mallets from trees that were planted when Lincoln was President for a celebration next May and found that they needed a fixture for the drilling. While turning the mallet head between centers the tool rest is aligned with the lathe center and a line drawn on the mallet head marking the top dead center and center punched. The part is then put into the “V block” and held in place with a C-clamp and a wedge forced between the mallet head and the C-clamp.

~ John Anderson & Dan Schmoker
Both of Springfield, Illinois
Lincoln Land Turners



Fingernail-Grind Jig

Using the fingernail jig with the V-notch rod is a balancing act—the bottom of the jig wants to move all around and I sometimes get faceted grinds. My solution was to use an 18" (46cm) length of ."- (19mm-) square tubing. Using a V block, I drilled a 5/16" (8mm) hole. I used a 5/16" cap-head bolt that uses an Allen wrench. I drilled out the hex socket with a 3/8" (10mm) drill bit. A friend tack-welded the bolt, but you may use JB Weld, or even a nut to hold the bolt. I then lightly ground the sharp edges on the leg of the fingernail jig. This allows smooth movement and better control to achieve a consistent grind.

As an alternative, you could turn the V-notch bar over and drill the hole there. That way you don't need to buy a new piece of steel. Mike Moore pointed that out when I sharpened his gouge, using my new adapter bar.

~ John Kaner
Anchorage, Alaska

Paste Wax on Pen Bushing

I recommend putting a little paste wax on your pen bushings when using a CA finish. The wax will keep them from sticking to the pen material and chipping out.

~ Jon Spelbring
Belleville, Illinois

WOODTURNING FUN VIDEO

Using a Waste Block for More Efficient Use of Wood



Using a Waste Block for More Efficient Use of Wood video clip by Vince Wilson (TRT 7:45). Video link: <http://vimeo.com/woodturner/review/107334346/1f0b9863d5> (Tip: If you have trouble accessing the video directly from this document, you may copy the video link and paste it directly into your browser.)

A Note About Safety

An accident at the lathe can happen with blinding suddenness. Respiratory and other problems can build over years. Take the appropriate precautions when you turn. Among the most important of these is the use of face shields, safety glasses, and dust masks. It is important to observe all manufacturers' safety guidelines. Following manufacturer's safety guidelines and information will help you continue to enjoy woodturning years into the future.

WOODTURNING FUN VIDEOS



Using a Morse Taper Collet in the Tailstock by Alan Zenreich (TRT 3:28)
Video link: <http://vimeo.com/woodturner/review/114698045/741f0fdbb6> (Tip: If you have trouble accessing the video directly from this document, you may copy the video link and paste it directly into your browser.)



Using a Drawbar with a Morse Taper Drive by Alan Zenreich (TRT 4:43)
Video link: <http://vimeo.com/woodturner/review/93999983/278806b61f> (Tip: If you have trouble accessing the video directly from this document, you may copy the video link and paste it directly into your browser.)



Visit our website woodturner.org for Woodturning FUNdamentals archives.

MEMBER GALLERY

Bill Boehme, Dalworthington Gardens, Texas



Post Oak Burl Hollow Form

Southwestern style hollow form from post oak burl. Turquoise Inlax used to fill some of the larger borer trails and splits in the wood. Some epoxy reinforcement was needed on the interior due to splintering that existed around the natural opening at the top. The burl was partially hollow so the shape was constrained a bit.

Mesquite Winged Natural Edged Bowl

Winged natural-edged bowl turned from green mesquite and finished with lacquer. Size is approximately 15 inches from tip to tip. Donated to local Tarrant Area Food Bank for upcoming Empty Bowls project.

Canopic Mesquite

Mesquite canopic style jar 16½ inches tall. Clear Inlax resin fills borer tunnels and exposed bark.



Pope Lawrence, Merced, California



Spalted Maple Open Form Bowl

Maple 10" diameter x 2.25" height

Olive Open form bowl

Olive 8" diameter 4.5" height

Bunch of Eucalyptus Bowls

Various diameters ranging from 6" to 12"



Lyndale Anthony, Dubuque Iowa

Top Right

Ambrosia maple form (gloss poly, suspended on a stainless steel rod, textured faux ebony/cherry finials/top and stands with tung oil finish.

Bottom Right

Nailed it! Curly maple dyed turquoise/purple, 20" tall with purple heart finials and suspended with stainless steel 16d nails. The stand is sculpted soft curly maple with a gloss poly finish.

Bottom Left

My tribute to Cynthia Gibson. The top is a sampler that I learned at a workshop with Michael and Cynthia. It is 22" tall, poplar dyed orange and gloss poly finish.



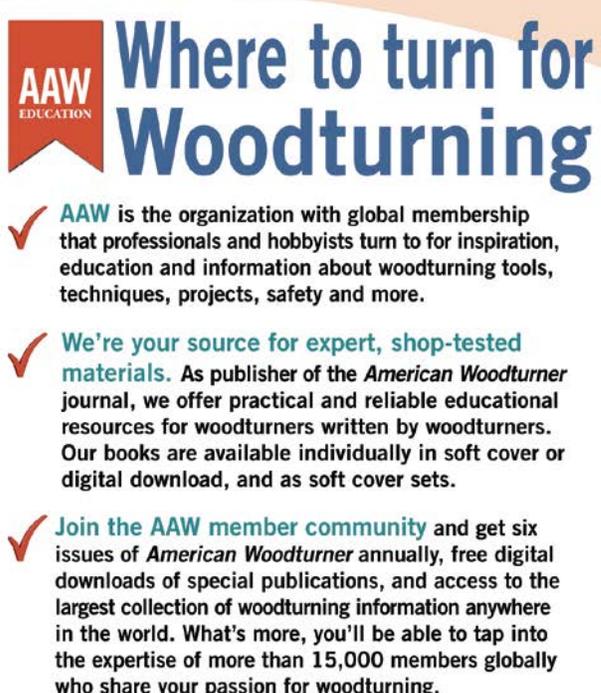
Submissions

Want to share your work in *Woodturning Fundamentals*? Please send your high-resolution images along with title, size and materials used to linda@woodturner.org.

Want to “pay it forward”? Woodturning Fundamentals welcomes other content including tips, projects and informational articles. Please send your content ideas to linda@woodturner.org. The deadline for submissions for the November issue of *Woodturning Fundamentals* is February 11, 2015.

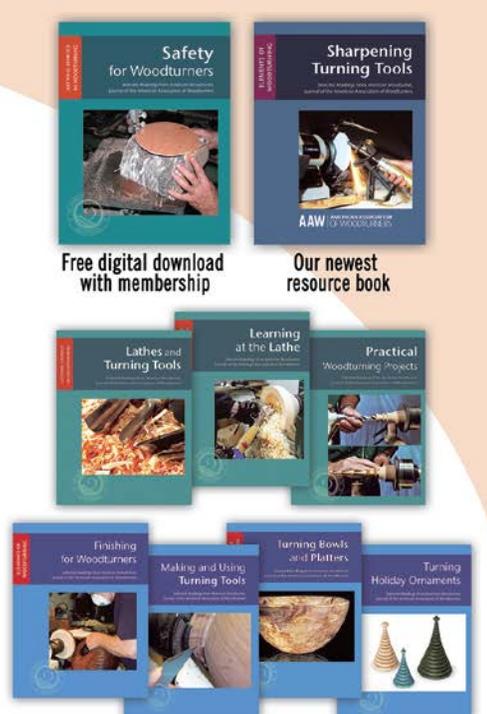
Please note: All content submitted may be subject to edit.

Expand your resources!



AAW EDUCATION **Where to turn for Woodturning**

- ✓ **AAW** is the organization with global membership that professionals and hobbyists turn to for inspiration, education and information about woodturning tools, techniques, projects, safety and more.
- ✓ **We're your source for expert, shop-tested materials.** As publisher of the *American Woodturner* journal, we offer practical and reliable educational resources for woodturners written by woodturners. Our books are available individually in soft cover or digital download, and as soft cover sets.
- ✓ **Join the AAW member community** and get six issues of *American Woodturner* annually, free digital downloads of special publications, and access to the largest collection of woodturning information anywhere in the world. What's more, you'll be able to tap into the expertise of more than 15,000 members globally who share your passion for woodturning.



Free digital download with membership **Our newest resource book**

Expand your resources. JOIN US.
Woodturner.org or call 651-484-9094

AAW SYMPOSIUM

AAW's annual international symposium has high-quality learning experiences for woodturners of all skill levels. Join us!



Watch a brief video that describes the AAW's annual international symposium and plan to join us in Pittsburgh 2015. (TRT 6:08) Video link: <http://vimeo.com/114628673> (Tip: If you have trouble accessing the video directly from this document, you may copy the video link and paste it directly into your browser.)

2015 AAW SYMPOSIUM



TOP 5 REASONS YOU'LL WANT TO ATTEND AAW'S 29TH ANNUAL INTERNATIONAL SYMPOSIUM

PITTSBURGH, PENNSYLVANIA
JUNE 25–28, 2015

- SOMETHING FOR WOODTURNERS OF ALL SKILL LEVELS**
Expert woodturner? Just getting started? Regardless of your skill level or interests, the AAW symposium will offer something for you. You'll be able to select from the broad range of demonstrations and panel discussions to focus on sessions that will enhance your woodturning experience the most. Watch for "Top Picks" from Al Hockenbery and others to help you identify the perfect rotations for your skill level.
- WORLD-CLASS DEMONSTRATIONS**
No other event offers you as many opportunities to learn from the world's best turners. We'll have eleven rotations and sixteen rooms (more than ever before) featuring demonstrations by some of the most talented and inspirational turners around. With 176 sessions to choose from over three and a half days, you'll have more opportunities to observe and interact with top experts than anywhere else.
- THE LARGEST WOODTURNING TRADESHOW ANYWHERE**
You'll be able to examine and purchase the newest woodturning products, visit with tool and lathe manufacturers, peruse a huge selection of turning wood from suppliers, and more in our enormous tradeshow. Enjoy ongoing demonstrations and see tools and machinery up close and in action. There is no substitute for holding tools in your own hands and having experts demonstrate tricks and techniques. Kick some tires.
- EXCELLENT VALUE**
The AAW symposium packs in more high-quality learning opportunities for woodturners than any other event. Sign up early for discounted registration and special hotel group rates. You'll receive a full-color 150+ page handout book loaded with information, techniques, and insights from demonstrators. Plus, the symposium Guidebook app for mobile devices will be available again this year so you can have the rotations, demonstrators, floor plans, and messaging at your fingertips.
- SOCIALIZE WITH LIKE-MINDED PEOPLE**
Step out of your shop and tap into the vast network of the AAW woodturning community. You'll be able to make and renew lasting connections with people who share your passion for woodturning.

SEE YOU IN PITTSBURGH! For more information, visit our symposium page at <http://www.woodturner.org/?page=2015Pittsburgh>