

wooden Get a Grip



By Richard Kleinhenz

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Most pen kits I've seen use metal or plastic for the grip section, but I miss the beauty of a wooden-grip section. Metal grips add considerable weight to a pen. Weight isn't the most important factor in selecting a pen; in fact, many people prefer some heft. But to me, light weight is a bonus.

If you're ready to try a turned grip section from wood, the project on these pages shows you how to fabricate a closed-end fountain pen with a wooden grip. In a subsequent article, I will describe how to add a fully functional, flexible wood clip for the ultimate wood show pen. But for now, we will use the standard clips, simply replacing the stock metal finial with one turned from wood.

This project is based on parts from a Gentlemen's pen model. For the most part, you can apply these instructions to any other closed-end design. However, the grip section featured in this article is specifically for the Gentlemen's kit, the Statesman, and some of the other large kits from Crafts Supplies USA,

such as the Emperor, the Lotus, or the Imperial. A sidebar on page 25 details how to make a wood section for the El Grande, Churchill, or Liger models.

In planning the design, there are some special considerations. When filling a fountain pen from a bottle, the end of the grip is inserted into ink. Because you don't want ink soaking into the end grain, it's important to completely seal all the wood surfaces. More about that later.

Get started

For turning tools, you'll need a 1/2" spindle gouge or skew, and a parting tool or square scraper. A diamond-point tool is handy for pen projects. For details on specialty

penturning tools, see the photo at right, which includes a pen mill, shim tubes, Beall collet chuck, expansion mandrel, and other penturning tools.

Note: You can construct a shim tube by gluing a Slimline brass tube into a piece of scrap wood. The wood is then turned to just slip inside the larger brass tube used for this pen. This keeps the center shaft of the pen mill concentric with the barrel and the end perfectly square. Strictly speaking, for the pen body and cap, such shim tubes are not needed because the faces can be squared tight on the lathe.

The grip of each collet is 0.040";

A pen mill (1) allows you to square the ends of the pen barrels. Make appropriate shim tubes (2) as needed. A Beall collet chuck (3) is the ultimate holding accessory, shown here with a homemade expansion mandrel (4). (A commercial version of this expansion mandrel is available from pen-supply catalogs.) At the bottom you see an industry-standard ER32 collet (5) holding a pen mandrel (6) with bushings (7). You need two sets of bushings: Gentlemen's bushings for the cap and Broker bushings for the grip section (shown).



make sure you have the right size collet. My homemade mandrel is 0.615" at the mounting end, so a 5/8" collet (a 16mm collet if you have a metric set) is right for me. Because each collet grips a range, it doesn't matter whether your collets are imperial or metric sizes.

This project requires more than a standard pen blank. You can turn the body and cap from one pen blank, but you'll need an extra piece for the grip section and the cap finial. If you are cutting your own pen blanks, this does not present a problem, but if you purchase blanks you will need the equivalent of 1½ blanks. Carefully choose blanks that have similar grain. The project shown uses *afzelia xylay*, one of my favorites.

The photo *above right* shows the components required from the Gentlemen's kit. Put the leftover body and cap finials into your spare parts box for another project.

Turn the pen body

Creating the closed-end body is relatively straightforward. Cut a 3" piece of pen blank, and use a 15/32" bit to drill it to the length of the body brass tube (2.36" for this project). Drill a second hole 2.6" deep, using a #N drill bit, or 5/16" if you don't have letter bits. The holes should be concentric, so drill the second hole before removing the blank from the drill jig. This secondary hole allows a spare cartridge to be stored or accommodates a conversion pump.

In the steps shown here, I do not use a tailstock. The Beall chuck eliminates the chance that the mandrel will come out of the headstock. If you use a drill chuck to hold the mandrel, you need to bring up a live center to prevent the chuck from coming out of the spindle.



This pen project requires 1½ pen blanks and just the Gentlemen's parts shown *above*. Discard extra parts from the pen kit.



With a ½" spindle gouge or 1" skew, turn the pen barrel with a rounded end.

Coat the mandrel with wax; this will prevent the blank from sticking to the mandrel if you use cyanoacrylate (CA) glue for a finish. It is not necessary to use a pen mill to square the blank; we'll do that later on the mandrel.

Measure the trim ring that butts up against the open end; this one measured 0.598". It's best to measure each ring. Be sure to use the same calipers on the pen barrel. Using a ½" spindle gouge or a 1" skew, turn to whatever shape pleases you (**Photo 1**). For a large pen, I prefer a rounded shape. The safest way to round over the end is with a diamond-point tool, but a spindle gouge or a skew works fine.

Make sure there is enough wall strength where the body brass

tube ends. I aim for 0.050". The brass tube diameter is 0.450", so you want to measure at least 0.550" at that point. This still allows you to give the pen a nice shape with a slight taper in the upper part. Use calipers to bring the headstock end of the barrel to about 0.592"–0.595", slightly smaller than the 0.598" trim ring. Remember that the CA finish will build up a few thousandths. Square the open (left) end with a parting tool.

Apply the finish

For finish, apply the first coat of thin CA with 400-grit sandpaper. (Because CA is an irritant, I prefer low-odor CA.) While the lathe is running, work the CA into the grain, which creates a slurry that seals the wood and fills small holes or torn grain. When the finish dries, sand down the CA completely to bare wood, which removes any cloudy film sitting on the surface.



2 With an old skew gently scrape cured cyanoacrylate (CA) from the body.

With the lathe running at a low speed, drizzle CA on the blank, and spread with your finger wrapped on a polyethylene bag. Repeat this process to build three or four coats of finish.

Scrape and polish

By the time you've applied three or four coats, the surface should be a little bumpy. If you start sanding this, there is a good chance that you'll sand through some of the low spots before removing all of the high spots. With a skew, gently scrape the CA, taking off fine shavings (**Photo 2**). You want to remove all the high spots; generally 60–80 percent of the surface will be dull. Then return to 400-grit sandpaper and remove all the shiny spots. Do not wrap the sand paper around the body; you have to allow dust to fall off.

Here's the sanding technique that works well for me: While I hold the sandpaper in my right hand, my left index finger rides the blank to feel for bumps and monitor the temperature. At this step, the surface needs to be completely dull; any shiny spots are low and will show up later.

Finish up by sanding the barrel lengthwise with the lathe stopped; turn the spindle by hand.



3 Use the cap brass tube to precisely mark the drilling depth.



5 Reduce the diameter to $\frac{7}{8}$ ", which will slip into the cap brass tube.

Now step through Micro-mesh 1500, 1800, 2400, 3200, and 4000 finishes. At each step, polish out the lengthwise scratches from the previous step on the running lathe, and then finish up with new lengthwise strokes before switching to the next finer size. Concentrate on the end of the barrel throughout the polishing; it spins slower than the rest of the blank and it's easy to end up with a duller finish there.

Finally, remove the collet chuck from the lathe and buff on a buffing wheel charged with white diamond. (The collet chuck makes a convenient handle.) For most projects, white-diamond compound is all that's needed to bring up the luster. If a defect appears, go back to a Tripoli polishing bar, and then repeat with the white diamond.



4 With the cap mounted between bushings, turn the stock to a 0.650" diameter.



6 Part off the final cap, leaving a $\frac{1}{2}$ "-long tenon.

Finally, retrim the open end to produce a square shoulder (usually a little CA needs to be removed).

Turn the cap

Prepare the cap barrel blank in the conventional way. Cut to the brass tube length (2.05") plus $\frac{1}{4}$ " and drill a $\frac{3}{4}$ " hole. With the drill bit shoulder flush with the blank, use the brass tube to mark the drilling depth (**Photo 3**). You can drill this hole at the lathe or with a drill press. Take care to avoid exiting the cap.

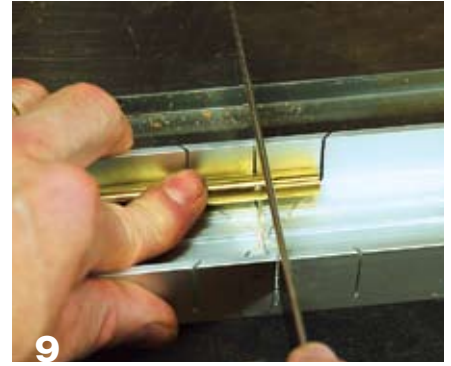
Cut the drilled blank to the brass-tube length. Glue in the brass tube using 5-minute epoxy. Square the ends using a pen mill or a disk/belt sander with a squaring jig. Turn between bushings to final diameter 0.650" (**Photo 4**). Apply a CA finish following the step-by-step process described earlier.



7 With a scraper or parting tool, reduce the centerband fitting for a slip-fit.



8 To knock out the threads from the grip, use a $\frac{19}{64}$ " punch and block with a 10mm hole.



9 A model railroader's miter box is ideal to cut brass tubes to length.

Make the cap finial

The cap finial is turned from a 1" to $1\frac{1}{2}$ " pen blank. The exposed finial is about $\frac{3}{8}$ " high, and you'll need a $\frac{3}{8}$ " to $\frac{1}{2}$ " tenon inside the cap. There are plenty of techniques for this key detail, but I prefer holding this small cap in a 4-jaw scroll chuck.

Drill a $1\frac{3}{32}$ " hole to a depth of 1", measured at the shoulder of the drill bit. Using a spare tube or the pen barrel to check the fit, turn a tenon that slips into the tube with a $\frac{7}{8}$ " length. It's OK to be a little undersized at the open end, but you need a precise fit at the shoulder to ensure proper centering of the clip attachment ring (**Photo 5**).

Switch to the Beall collet chuck and appropriate collet, and reverse the finial. The wall thickness of the tenon tube is about 0.06". Turn the finial to the desired shape; I like a $\frac{3}{8}$ " height for the finial. (The dome diameter needs to match the pen barrel, i.e. 0.650". Beyond that, the shape is arbitrary.)

Finish with thin CA as described above. Then resquare the shoulder, taking care to remove any CA that oozed around during the finishing step. Part off the cap finial, leaving about $\frac{1}{2}$ " of the tenon. (**Photo 6**).

Before assembly, turn down the centerband fitting for a slip-fit. I chuck up a center coupling in the appropriate collet and screw the centerband fitting onto that. A scraper easily turns down the black plastic and the metal part (**Photo 7**).

Assemble the cap by epoxying in the centerband fitting, finial, and clip. Be sure to get some epoxy under the clip ring to prevent it from rotating later.

Make the grip

Unscrew the nib from the grip section (it comes out as one assembly). Use a $\frac{19}{64}$ " punch (a transfer punch set in 64ths is a great tool to acquire for general pen disassembly) plus a hardwood block with a 10mm ($\frac{25}{64}$ ") drilled hole to carefully knock out the threads from the stock grip section (**Photo 8**). Tap lightly or you may damage the internal threads of the piece you are removing.

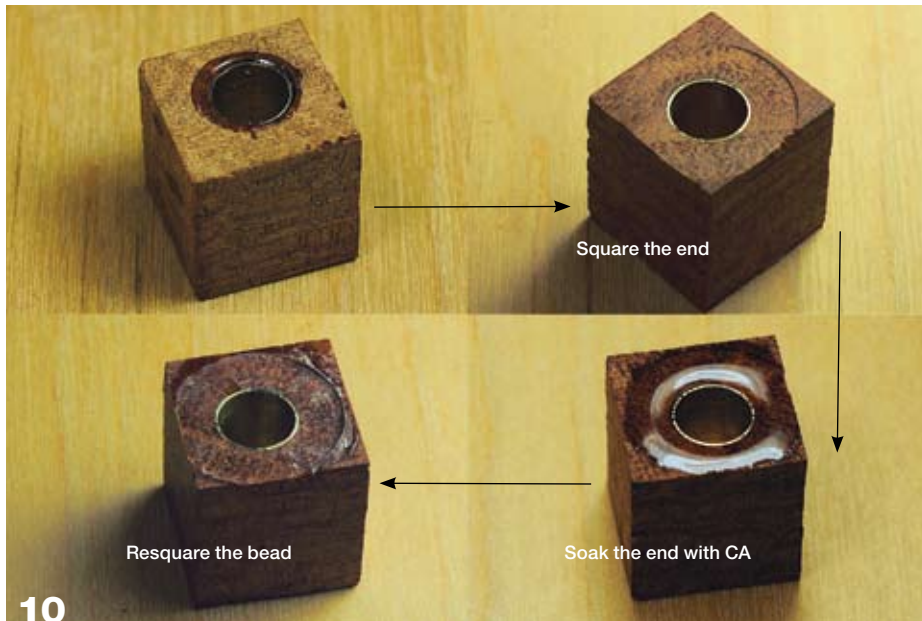
After removing the threaded piece, screw the nib assembly into the threads to check the fit. Since the grip section needs to pass through the cap threads, you need to measure the ID of the cap threads, or measure the front of the original metal grip. On the Gentlemen's kit, this is .440": This

is the maximum diameter you can allow for the wood grip.

Cut a $\frac{3}{4}$ " section off a spare tube for a Broker pen. These tubes are available from Craft Supplies USA or Woodcraft as spares for the original Wall Street pen. A small miter box (**Photo 9**) is the best tool I found to cut brass tubes. Exacto's razor-saw and miter gauge (about \$14), used by model railroaders, are available at many hobby stores.

Cut a $\frac{3}{4}$ " long section of wood, and drill with #U (0.368") bit. It is important to get an excellent glue joint here, so take all the precautionary steps: Sand the brass tube slightly, cover the brass tube with glue, cover the inside of the drilled hole with glue, and insert with a twisting motion. Unlike most other pen parts, this glued tube has an unbalanced load on it, and must be perfect to not come loose in time.

After the glue dries, scrape glue residue from the inside of the brass tube using a round file or the small blade of a pocketknife. Square the ends down to the brass tube.



10
To prevent ink from entering the grip section when reloading the fountain pen, follow the 3-step process: square, soak with CA and leave bead, and resquare the bead.



11
Turn the grip between centers and finish with thin CA glue.



12
Screw the nib housing into the threaded fitting knocked out from the original grip.



13
Hold the nib housing in a Beall collet chuck and reduce the tenon to 0.336".



14
When reassembled, the new parts are ready to thread into the body.

Now comes another critical step: Because you will insert the end in ink while filling from a bottle, it must be sealed well. I do this by running a small bead of thin CA

around the brass tube (**Photo 10**). Once it dries, resquare using the pen mill, being careful to leave a continuous film of CA.

Now turn the barrel. Use the 0.425" bushings from a Broker pen. Check the sizing frequently with calipers; turn to 0.44" or slightly under. It's actually better to turn slightly under 0.44" and build back up with CA; that way, you can be sure you have a good seal all around. Avoid gluing the grip section to the bushings by coating the bushings with wax before you start. This is especially important with a small piece like the grip section. The final diameter of 0.44" is critical. If you go above that, the grip may not pass through the cap threads. If you reduce the diameter too much, the thread pre-alignment suffers, it's harder to start the thread, or easier to cross-thread the pen.

Turn a slight hourglass shape to the grip (**Photo 11**). The drilled hole was nominally 0.368" so you can turn down to just above that. (I routinely go down to 0.385".) Finish with CA as described earlier.

Adapt the nib

First remove the nib. By squeezing the two wings of the nib and rocking back and forth, you can remove the nib and feed (the feathery part), leaving the nib housing (**Photo 12**).

The nib housing has three diameters—the main barrel is about 0.295", a short section that tenons into the original metal grip section is 0.375", and a slightly larger disk you won't need to change. Turn down the tenon to fit into the grip made earlier. The Beall collet chuck with a 5/16" collet provides the simplest way to hold the nib housing (**Photo 13**).

Use a parting tool to trim the short tenon to 0.336". Remove the nib housing from the collet to check the fit into the Broker brass tube (it remounts in the collet with sufficient accuracy) or measure the tenon.

Assemble the pen

Reinsert the nib and feed. Notice there is a flat inside the housing. The feed can only go in one position. The nib and feed should be fully seated.

Dry-assemble the parts. The threads removed from the original grip should screw into the nib assembly smoothly. Be careful when threading. The nib assembly is soft plastic, and the threads are fine. You'll notice the threaded piece is slightly loose in the brass tube—that's OK. Use 5-minute epoxy inside both ends of the turned section and screw the pieces together (**Photo 14**). You can still remove the nib itself and swap to a different size or a 14k nib by removing it and the feed.

When you glue up the grip section, orient it to show the nicest grain lined up with the nib. With a closed-end pen, you can easily damage the closed end during assembly, so make sure the anvil of your press has a soft liner. (I like turning down the metal tenon of the center coupling for a slip-fit and gluing it in place.)

Use epoxy to glue the center coupling into the pen body. Screw the grip section into the center coupling first, then glue the center coupling into the body. Select the best grain to line up with the nib.

That's it! This lightweight, large fountain pen shows off wood like no other. It weighs about half as much as a standard kit Gentlemen's pen.

In the Spring 2008 issue, Richard will show a modified cap that uses a fully functional, flexible wooden clip.

Modifying the El Grande for a Wood Grip

A similar grip modification is possible on the El Grande family of pens (El Grande, Churchill, Ligeró), and perhaps other kits. On those models, there is little or no weight-saving since the grip section is plastic, but the modification shows more wood.

Remove the nib and feed by squeezing on the wings of the nib and rocking the nib and feed out as described for Gentlemen's pen. Your goal is to turn down the plastic grip to slip a Broker tube over it, which has a turned and shaped grip section as above.

The outer diameter of the grip section should be 0.433" to clear the cap threads and ensure thread prealignment. The Beall collet chuck comes in handy because it grips the extension just behind the threads.

To avoid damaging or collapsing the section, I turn a small insert (you can use hardwood, brass, or aluminum). You cannot use a live center directly in the other end of the section because an internal flat (there to align the feed section) will push the point off-center and it will not run true.

Note that there is a small recess that is circular and concentric; I missed this detail until fellow penturner Perry Copus pointed it out to me recently. This recess is enough to make a centering disc. For this step, I used $\frac{3}{8}$ " aluminum rod. Use a centering drill with 60-degree counter-sink. (A centering drill is a short specialty drill that is used widely in metalworking and is available in machine-shop supply stores.) If started a bit off-center, the bit will pull itself into the center (**Photo 15**).

Drill deep enough to create a conical surface. Now part off about a $\frac{1}{4}$ " disc. Reverse it in the collet. With a parting tool, turn a small 0.335"-diameter tenon about 0.020" wide. (**Photo 16**).

This 0.335" diameter is the ID of the Broker kit brass tube (**Photo 17**) that will support the turned wood section. You can use the original plastic section for tests.

This little disc will now be the outboard support. Now you can turn the section down for a slip-fit of the Broker brass tube, and epoxy it in place.

Within the El Grande family, the Ligeró is actually the most suitable for this modification because there is no load on the turned wood. —*Rich Kleinhenz*



15 A centering drill is ideal for drilling aluminum rod.



16 Turn a 0.335" tenon about 0.020" wide in the insert.



17 Grip the El Grande section in a collet, add the little support disk, and use a live center in the dimple. Turn away the contoured grip to a .335" diameter for a slip-fit Broker tube.

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