Technical Tidbits–No. 5

by Stephen Nelson (OK)

Power Pegging

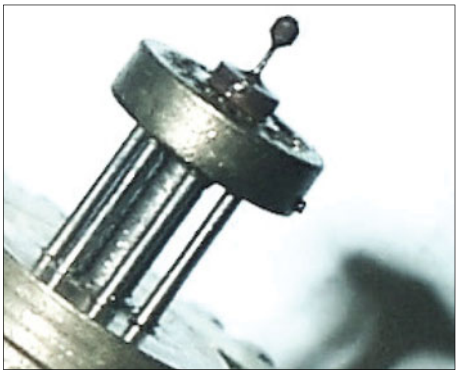
How do you clean pivot holes? I was taught to use pegwood (often toothpicks): taper the end with a knife, then twirl the pointy end in each pivot hole. Resharpen when the taper is dirty (or when it breaks off in one of those really small holes), and repeat until it comes out of each hole clean. I have done a lot of this, but I will admit, on any hole larger than, say, an eighth of an inch (3 mm), it took real effort to get the holes clean—enough effort that I have blistered my fingers more than once pegging mechanisms.

Why do we peg holes? We want them clean. And understanding a bit about the black stuff in the holes is important.

Most of us are aware that steel pinions often wear faster than brass gears. I have seen many British longcase clock mechanisms with pinions that were worn significantly. Often this is due to the owners oiling the gears. Once oiled, dust is picked up by the oil and provides a perfect environment for wear. The dust suspends in the oil (wearing both the brass and the steel) and also becomes embedded in the brass, the softer of the two metals. The embedded dust no longer abrades the brass, but instead forms an abrasive surface that erodes the steel pinions.

In the same way, dust that gets into the oil around a pivot abrades both the pivot and the hole. Figure 1 is an image of a pivot from a German clock that was still functional, but barely.

The goal in pegging holes is to remove the fine bits of dust and ground up metal (from the worn pivot) from the inside of the pivot hole. Because the dust/ground metal is embedded in the walls of the pivot hole, it is important to be a bit aggressive in cleaning—hence the use of wood to mechanically abrade the hole and remove whatever abrasive materials that we can.



COURTESY OF BOB CRANE.

Figure 1.

It is an easy job to peg pivot holes with a tapered dowel in a wood lathe. (If you don't have a wood lathe, plan B is shown in Figures 14-16). With a wood lathe, it is pretty easy to taper a peg to perfection with a skew chisel. And then, with the lathe spinning, you can polish the inside of the largest holes, including the winding arbor holes, as well as the holes the posts pin into. When the peg becomes dirty, use the skew chisel to cut a new face and peg again.

If you don't have a woodworker's lathe, a watchmaker's lathe, or one of the micromachines, Sherline or Unimat, also works. You can also use a power drill, though this will require some innovation in tapering the dowels (can always use a pencil sharpener to sharpen the dowels).

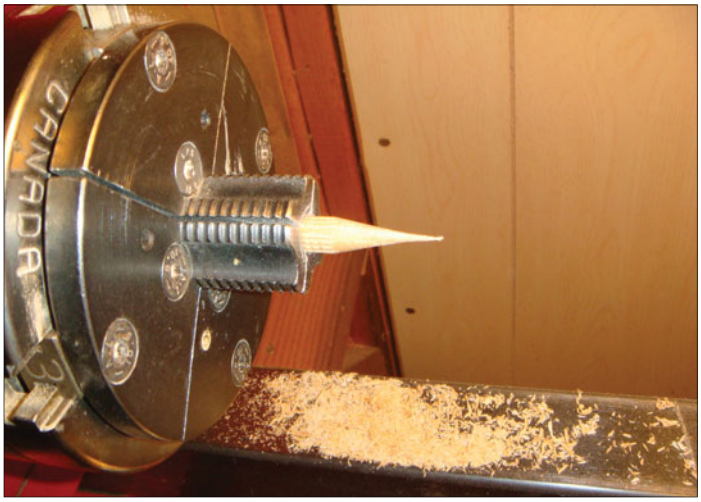


Figure 2. A freshly cut taper in my wood lathe chuck ready to peg a hole.

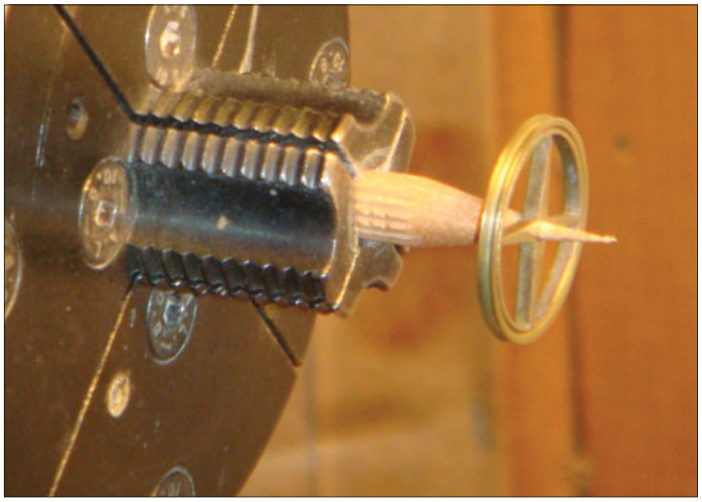


Figure 3. Pegging a pivot hole in a weight pulley.

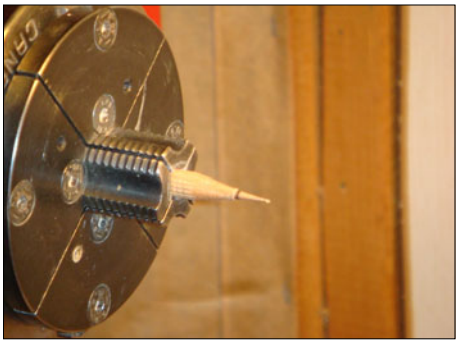


Figure 4. Residual material on a peg after pegging the hole in a pulley.

Figure 5. A dowel tapered to do several larger holes. The dowel is cut to be just too big to just slide into the holes–so that the outer edge of the peg is sheared off as it is spun into the holes.

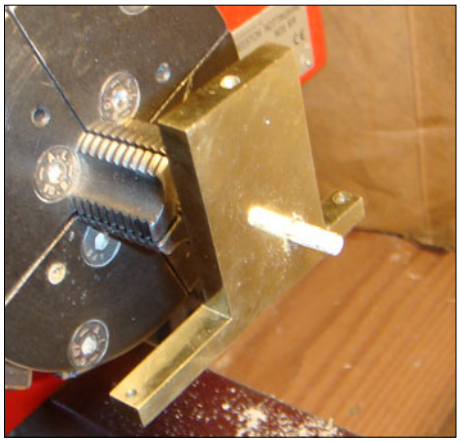


Figure 6. Pegging pivot hole in the carrier for a strike drum from an Elliott 9 tube mechanism.

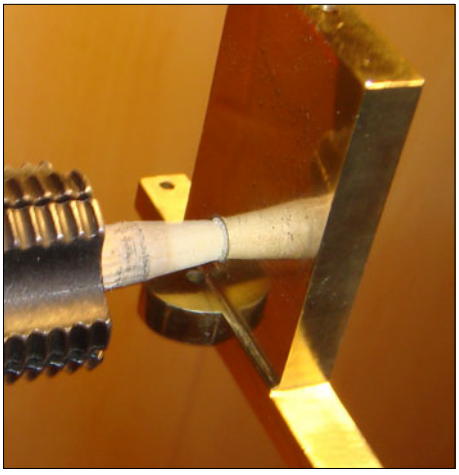


Figure 7. You can see how the peg sheers back, exposing fresh wood that exactly fits hole.

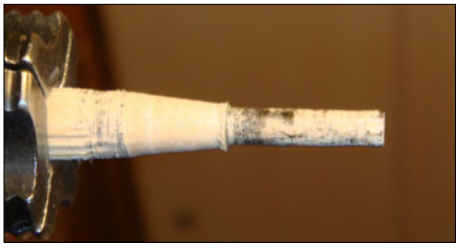


Figure 8. Residual on peg after doing both strike drum carriers.

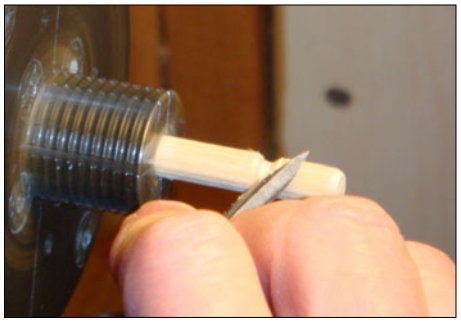


Figure 9. Using a skew chisel to cut a special peg to polish the inside of a tapered hole.

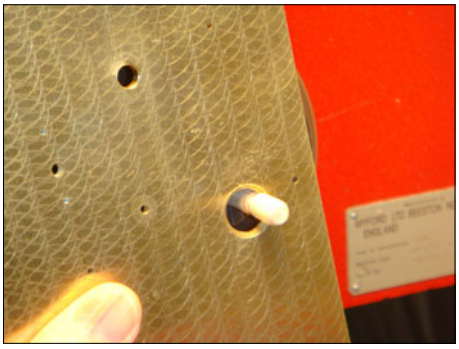


Figure 10. Polishing the inside of a tapered hole.

Figure 11. Polishing holes in a large plate.

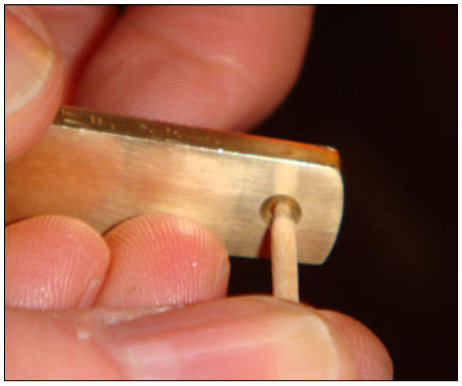


Figure 12. Using a toothpick to push out a broken-off peg.

General comments

The more gradual the taper, the more effective you will be in polishing holes. And, the more chances you will have to cut tapers with your skew chisel!

If you polish the plates and other bits with a brass polishing compound before pegging, the bit of residual polishing compound in the holes will let you readily tell which holes are done and which await polishing. And, the small amount of polishing compound that hides in the holes after polishing the plates will aid in polishing the inside of the pivot holes.

You can cut grooves in the dowel and use it to polish unusual holes—the example I show in Figure 10 is a large view hole through a plate that is beveled on both sides. I cut a groove in the dowel to polish the beveled edges.

You can also effectively polish the insides of large holes, like those for plate pillars, with a smaller diameter dowel by carefully shifting the plate from side to side, and up and down, while polishing with the smaller diameter dowel.

I find that I can effectively polish the inside of pivot holes down to around 1.5 mm (1/16") in diameter on the wood lathe. Smaller than that and I peg by hand using a sharpened toothpick or the like.

Safety first

Wood lathes are powerful and can spin at rather high speeds—I am convinced my Myford Maestro turns at a guadzillion rpm at its highest speed. Fortunately, we are using very small dowels (I use 5/16 inch and smaller-diameter dowels) and we don't need to turn all that fast. When using any lathe, there are rules to follow:

• Don't wear gloves (they can and will catch all too easily on a chuck or on the spinning piece of wood with rather dramatic results)

• Don't wear loose fitting clothing that can get caught on the chuck or the spinning piece of wood.

• Do wear some form of eye protection.

• Do let the lathe do the work—don't push very hard on the tapered dowel spinning in the lathe—let the edges of the pivot hole cut away part of the dowel while you are putting only moderate pressure on the part being pegged. This will make it a lot easier to get out broken off bits of wood when they break off in the hole.

• Don't *ever* leave chuck keys in the chuck when you take your hand away from the key. Always remove the key unless you are in the process of either opening or closing the chuck.

• If there are any protruding posts, pins, or the like on the piece being power pegged, check to make sure the protrusions will not hit the chuck when you are pegging. Watch very carefully whenever working around such protrusions.

Figure 13. A well-used peg.

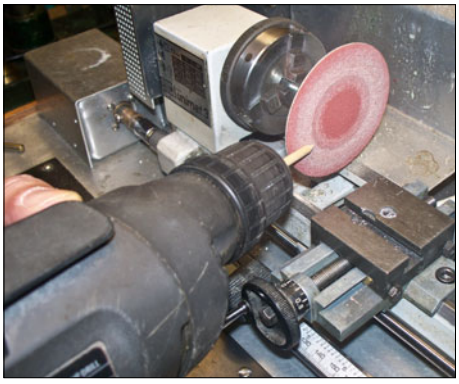


Figure 14. An alternate approach to tapering a dowel. (Figures 14-16 are provided by Bob Crane.)

Figure 15. Set up to power peg in a drill press.

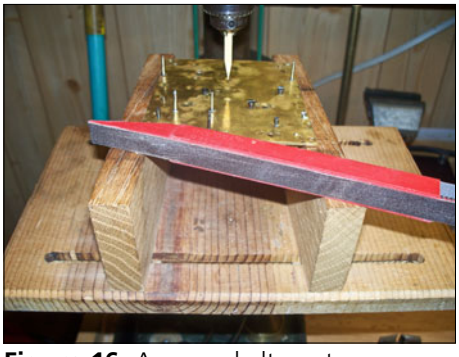


Figure 16. A second alternate approach to restoring a taper—using a sanding stick.

I also find that when I do break off the tip of a dowel in a hole, it comes out more readily than those I have broken off when I am pegging by hand. Hopefully this is because I am not pressing too hard when pegging on the lathe.

If a pivot hole is too hard to clean up, it is easy to apply a small amount of jewelers rouge to the tapered dowel and use the "rouged" dowel to polish the inside of the hole. When I am doing this I first "size" the peg by running it into the hole and cutting the dowel so that it is an exact fit in the hole. Examples of a "sized" dowel are shown in Figures 8 and 13. Then, I apply the rouge to the sized dowel, so that the polishing compound is being applied by a cylinder, thereby polishing the inside of the hole, but not tapering it, as it might if you just applied the rouge to the tapered dowel. Whether you use rouge or not, always keep pegging with clean tapers until the pegwood comes out of the hole completely clean. Jewelers rouge uses ferric oxide as its abrasive, and is designed to polish without any cutting action. Don't use other polishing compounds since they may well be aggressive enough to remove metal.

Do all of the pivot holes, including the inside of the weight pulleys, the inside of the gear wheels that rotate on the winding drum arbors, all of the pivot holes in bridges, and the holes in the fans on the strike trains. I will even cut a special taper so I can clean/polish the inside of the hour cannon.

I always run the plates and other pegged parts through my cleaning solution in an ultrasound tank after pegging to get rid of any fingerprints on the plates and any residual wood dust or polishing compound.

When you apply pressure to force the spinning peg deeper into the pivot hole, the edges of the hole shear off some of the wood, forming a collar, which can be used to effectively polish the inside of the oil sink—a nice two-for-one benefit.

To view the pictures included in this Tidbit in more detail, go to: http://snclocks.smugmug.com/Technical-Article/Pegging-pivot-holes-on-a-wood. In addition to photography and clock restoration Steve Nelson spends time helping others learn to work on watches and clocks. For more how-to aritcles, visit ww.snclocks.com