# Hand Drill Instructions

Check the contents of your package. You should have a drill chuck, a chuck key, a 2-1/4" 3/8 X 24 nipple , (2) 3/8 X 24 nuts, and a 3/4" copper ferrule about 9/16" long. Along with this instruction sheet that you're holding.

The following steps represent only one of many possible ways to make this project. It just happens to be the one that I would use, allowing for the tools that I happen to have, and the time constraints that I'd be working under.

Select a wood suitable for the handle. It should be 1-1/4" by 6" long. (Larger will of course work, but there will be a lot more of the wood ending up as shavings!) Since this is going to be a tool that you are going to be using for life, I'd recommend using a good quality hardwood, one that's not only to hold up structurally, but is going to be attractive in the years to come. Something like one of the rosewoods, or perhaps a figured maple. Of course, the remnants of a construction grade 2 X 4 will work, but come on, are you going to be able to proudly show that thing off to your kids and grandchildren someday? Only if you don't mind them thinking that they are descended from some pretty cheap people.

1 - Clean up one of the inside edges of the ferrule. Using a small round file, remove the burr from the edge. This can also be done by first wrapping the ferrule in several wraps of tape, holding it in the scroll chuck, and after centering it with the help of the tail stock center, using a round nose scraper to remove the burr. This will let you slip the ferrule onto the tenon and have good contact all along the tenon.

2 - (NOTE: The wood stock does NOT HAVE to be round for this next step. You can leave it square.) Find the center of one end of the wood. Drill a hole slightly smaller than 3/8" in diameter (U or 23/64") approximately 1-3/4" deep. Do this on the lathe if possible. Insert the drill chuck into the tailstock MT, and by holding the wood in a scroll chuck, drill by moving the chuck with the tailstock hand wheel. When you are done drilling, remove the wood from the scroll chuck and leave it suspended on the drill bit. Remove the scroll chuck and insert a spur drive into the headstock MT. Now move the tailstock towards the spur drive in the headstock. Using this method, you can accurately determine the centerline of the drilled hole through the wood by noting exactly where the center point of the spur drive just touches the end of the blank. (Make sure that the drill remains seated all the way in the hole.) Mark this spot.

Remove the stock and the drill chuck from the lathe.

3 - Now we're going to tap the hole. You can do this one of two ways, either by using the 2 nuts as a jam fit, or by using one nut and the drill chuck. Using the 2-nut method, thread them both onto one end of the nipple, and then tighten them into each other using two 9/16" wrenches. Now just start the other end (the one away from the nuts) into the hole in the wood. You are going to need to use a wrench to finish the threading. Run the nipple into the wood at least 1-3/4 inches. Remember, you are not cutting the wood, you're compressing it, so you don't need to do the occasional back-out thing. Just keep turning the wrench.

4 - For the next step, you're going to need some sort of live center for the tail stock, one that can hold a tapered fitting that is larger than the drilled hole

Drive the spur center into the spot that you marked in the step above and insert the spur center into the headstock. Bring the tailstock up, and use the tapered fitting to center the right end of the stock. Tighten it some, but not too much, You don't want to destroy too many of the threads you've just cut.

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To use, you'll need to first make a small dimple in the area to be drilled. Bring the tool rest to the center of the work, and using the skew on its side, just touch the center of the stock with the long point of the skew. Now the drill bit will self-center and drill without wobble.

First, turn a tenon on the right end to hold the ferrule. The tenon needs to be just over a half inch long and about 13/16" in diameter to start. Then, by using the ferrule as a guide, slowly turn the tenon down to a diameter that will just let the ferrule slide on with some slight resistance. (Be sure to slide the end of the ferrule you cleaned up in step ** first.) This can be accomplished by trial and fit; just slide the tailstock back, and see if the copper ferrule will slip on. If not, take just a smidgeon off the tenon, and try again. Keep this up until the ferrule just slips on. Now, with the long point of a skew, turn a small 'V' groove at the junction of the tenon and what will be the body of the handle. (This groove provides a place for the epoxy to collect when the ferrule is glued on during the next step.)

5 - Once you have got the tenon turned to fit, remove the stock from the lathe and, using a wooden hammer or regular hammer with a wooden block, seat the ferrule over the tenon after applying a thin coat of epoxy to the tenon (NOT the ferrule!). If everything is going as it should, when you're done with this step, you should have a nicely fitted ferrule that protrudes just a bit beyond the end of the tenon.

Return the stock to the lathe, and using a small round nose scraper, gently turn the right hand end of the ferrule down to the length of the tenon. You can also smooth out the corner of the ferrule and clean up the copper ferrule with fine sandpaper and 000 steel wool.

6 - Now turn the remainder of the stock to a pleasing shape that fits both your hand and your eye. In other words, make it comfortable to hold and pretty to look at. At the left end, turn the start of the butt end about a half an inch from the spur center. Sand as required, to 400 grit at least. If you're using a wipe on oil finish, you can apply the first couple of coats now as well. Be sure to protect the copper from the oil with a couple of wraps of blue masking tape.

7 - You can how begin the parting off of the blank from the spur drive center. Using a skew, (or a shallow gouge with a long fingernail grind), form the curve that will be the bottom of the handle, cutting as thin as you can. (Or dare.) Remove the handle, and sand off any nub left. Finish that area.

7a - You can alternately accomplish this step entirely by turning. First, wrap the copper ferrule with several wraps of tape. Then put the ferrule in the scroll chuck, and using the hole left by the spur center for alignment, tighten the chuck only enough to provide enough torque to turn the stock. Start turning the butt end, using either a skew or a shallow gouge. When you get close to a total part off, slow the lathe, and support the stock with your left hand, and turn only with your right hand. You should be able to completely part off the handle, leaving a minimum area to be sanded. Again, by loosely holding the stock in your left hand, sand with the right.

8 - The final step of construction will be to protect the copper from oxidation. Either mask off the body with tape or slip a piece of paper with a 7/8" hole over the ferrule to act as a mask. Spray the exposed copper with several coats of lacquer.

9 - Screw the nipple into the chuck tightly. Again, you can double nut and use that as a means to apply torque to the nipple while holding the chuck in a wood faced vise. Remove the nuts, and trial fit the chuck/nipple with the handle by screwing the nipple into the handle until the chuck bottoms out against the copper ferrule.

10 - Unscrew the chuck/nipple, drop a couple small globs of epoxy down the hole and screw the chuck/nipple assembly back into the handle. Let the epoxy dry, and you're done. And can call your children into the room and show them the treasure that they'll be inheriting some day.

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