

DRILLING ON THE LATHE

Drilling on the lathe presents a unique opportunity for the pen maker. Theoretically, any blank drilled on the lathe will be drilled straight, and the capacity of the lathe is much larger than the capacity of a drill press. This paper is intended to demystify the tools required and illustrate the techniques and practices that will aid success in drilling on the lathe.

Lathe Drilling Tools

The basic method of drilling on the lathe is to turn the piece while the drill bit does not twist. In order to do this, you will need a chuck fitted to the headstock spindle that will center the blank. This method works best for straight regular blanks. PSI sells 2 chuck capable of this, as well as a set of jaws for the C series chucks. The jaws have grooves that will center square and round stock in the chuck. The chuck should be threaded onto the headstock and should never be mounted on a taper unless it can accept a drawbar.



In addition, a chuck to hold the drill bits in the tailstock. This chuck must not rotate, so avoid purchasing a drill chuck denoted as “live”. A 1/2” drill chuck is recommended in order to accommodate most common drill bit sizes.

The first step in drilling is to put the piece into the drilling chuck and tighten the jaws. The piece should be as far back as possible but it is very important that the jaws do not extend past the ends; otherwise it will be difficult to perform the next step.

Mark the Center

This next part is important in that it will mark the center of rotation. You may mark the center using traditional methods, but it is very important to mark the true center of rotation as it is when the piece is mounted rather than rely on marks done off of the lathe.

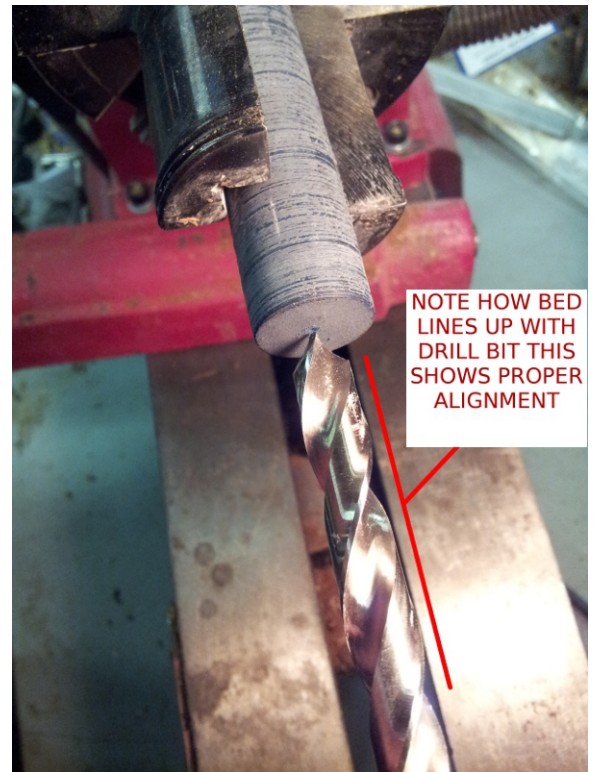
To do this step you will need a skew chisel and you will be using the longer point on the chisel to mark the center (See Picture). Make sure the end is well lit and line up the tool rest across the end piece. Turn on the lathe and look at the spinning piece. You'll be able to see the center point of rotation. Use the skew chisel point to dig in a small hole exactly at that center. This will ensure that the drill point is placed exactly where it is needed.



Lining up the bit

The next thing to consider is lining up the drill bit so that it points exactly to the center mark made in the previous step. In addition the drill bit must be straight in relation to the lathe. There is some necessary play in tailstocks to allow movement along the lathe bed. This play can allow a drill bit to be slightly off angle, which will cause drilled holes to taper as the bit is advanced. In order to prevent this, the bit should be aligned using the center mark and the lathe bed rails to make sure the drill bit is oriented straight as well as being pointed directly at the center of rotation. The drill bit should almost touch the blank to maximize accuracy and minimize adjustments.

You may notice that the the tailstock will naturally align when pulled against one side of the bed. Note this for easy orientation when drilling—but still double check alignment visually before drilling. Once the alignment is good, lock the tailstock in position.



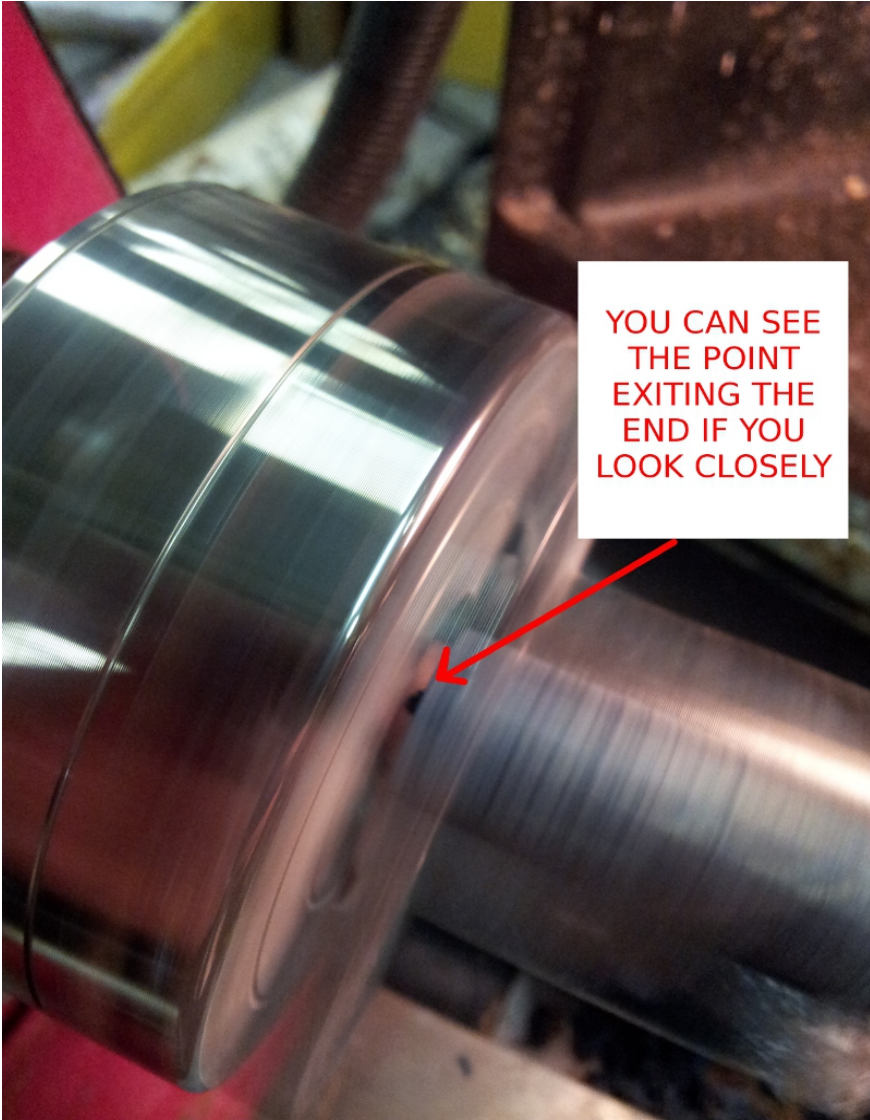
Drilling

Now it is time to do the actual drilling. Turn on the lathe at an appropriate speed for the drill bit. Some drill bits have a maximum speed, you should not go over this speed. If the maximum speed is unknown, use your best judgment. Large bits should be drilled slower than smaller bits. Speed adjustments should err on the side of slower to prevent drill wobble and breakage.



Now advance the drill bit by advancing the tailstock quill. This should be done as rapidly as it feels comfortable to do. Do not try to force the drill bit forward. If the drill bit starts to shake or wander as it enters, then it was not aligned properly. Stop and align until shaking stops. Note that wood blanks with diagonal grain may shake no matter what as one side of the bit will be encountering grain while the other is not. The only thing that can be done on these is to proceed slowly to limit the shaking.

Eventually, the quill will reach the end of its advancement. When this happens, stop the lathe and retract the drill bit. Loosen the tailstock and move it forward until it hits the bottom of the hole. If the drill bit was aligned properly when drilling began, you should not have to re-align at this point as the bit will naturally follow the hole already made. Once the tailstock is locked down again, turn the lathe back on and advance the bit again. Repeat the operation as necessary until you have finished drilling.



If drilling completely through a blank, you may be able to watch where the blank ends in the gap of the spinning jaws for exiting which can help in knowing when to stop advancing.

Once the blank is drilled, the lathe can be stopped and the blank can be removed and examined for accuracy and straightness.

