Spring Pole Lathe

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18-Dec-2004

Introduction

The following document describes my version of a spring pole lathe that I use to turn chair parts, stool legs, dowel pins, tool handles and other items.

Design

spring pole lathe

The first photo shows the entire lathe. The main body of the lathe consists of a pair of 2 x 6 beams that form the bed of the lathe that are bolted on either side of the 2 x 4 legs that raise the bed to the appropriate height. Carriage bolts hold the bed beams and the legs together, and keep the unit square. A base of 2 x 4's supported by diagonals keep the lathe supported perpendicular to the main frame.

The basic dimensions depend on how tall you are, and the length of the longest thing you're going to want to turn. My lathe is 40 inches wide, which allows me to turn spindles up to 26 inches long. The top of the bed is 42 inches off the ground, the poppets are eight inches tall, with seven inches between the top of the bed and the point of the dead centers in each poppet.

The poppets are made from three pieces of 2 x 4 glued and screwed together. The middle piece is long enough to extend down through the bed and below, and has a large tapered mortise in it. A wedge is fitted into this mortise, and when the wedge is driven into the mortise, it pulls the poppet down and holds it in place in the lathe bed.

The dead centers themselves are mild steel round bar, ¾ of an inch in diameter. I turned the ends to points with a file, using my treadle lathe to spin the rod. Roy Underhill showed a similar operation using a post drill, and I imagine a drill press would also work. You don't want a long taper because it will drive itself too far into the workpiece. Instead, you want the taper to be about 45 degrees, so the distance from the start of the point to the point itself is about the same as the radius of the rod. You can see how blunt the center looks on my lathe, even though the point itself is pretty sharp.

The spring pole part is actually a bungee cord that is stretched parallel to and above the lathe bed. The rope that wraps around the workpiece is loosely tied to the bungee cord. You can control how much effort it takes to push down on the pedal, and how quickly the lathe returns by how much you've stretched the bungee. The ability to move the rope across the bungee is useful so you can place the rope on the workpiece away from where you are presently turning.

left poppet

The pedal is just a long flat board with a piece of cloth stapled to the underside. The cloth is then stapled to another piece of wood that you'll stand on with your inactive foot. You could put a metal hinge here, but the cloth allows you to adjust where you're pulling the rope and also helps keep the rope away from where you are turning.

On my lathe, I never bothered to make a true tool rest, but simply clamp a piece of wood to the poppets, with the top edge of the board set at about the height of the dead centers. It's not as useful as a true tool rest that could be moved closer to the workpiece, but it does work. A traditional tool

rest would look sort of like a third poppet, but much shorter, and with a movable extension on it that can be moved toward and away from the workpiece, and has a rest that is the same height as the dead centers.

The first picture shows the lathe all set up with a piece of birch between the centers. And the last picture shows a close up of the turning setup. The rope goes around the workpiece twice and is then tied to the bungee cord such that the pedal is in an appropriate "up" position. The rope wraps around the workpiece in such a way that when you press down on the pedal, the workpiece spins toward you. This is the cutting stroke, and is when you're moving the tool ever so slightly into the workpiece. When you release the pedal, you pull the tool back slightly so it's not riding on the wood when the bungee pulls the rope back up. The slight movement back and forth quickly becomes habit, but it's difficult to remember at first, especially while concentrating on how you're actually using the tool.

temporary tool rest

To get the workpiece ready for turning, I scribe a circle on the ends with a compass, and chop down close to these lines with a hatchet. A draw knife brings the piece closer to a cylinder. Before putting the piece between the centers I like to drill a very shallow hole at the center point for the centers to ride in. If the piece works it's way off the centers, you may need to make this hole deeper and wider so the piece stays on the centers.

You'll also notice in the last photo that the rope is wrapped around a narrower section in the workpiece. It's often helpful when turning a large diameter cylinder to start by turning a narrow groove for the rope to work in. Not only will it keep the rope from moving into your tools, but the smaller the diameter where the rope is, the faster the workpiece will turn. A large diameter cylinder with the rope wrapped around a very narrow section can be spinning really quickly, and this often makes turning easier.

Finally, keep in mind that turning with a spring pole lathe is much easier with wet wood. This style of lathe was typically put together in the forest by spindle turners so they could cut down, chop, round and turn chair parts right on site. The first time you try turning wet wood instead of dry, you'll understand why they did it this way. You certainly can turn dry wood on a spring pole lathe, but don't expect it to be easy.

Other designs

Roy Underhill shows a different design for a spring pole lathe in the 2004 season of *The Woodwright's Shop*. He used 2 x 12 side pieces, and cut mortises in them that hold 2 x 6 pieces for the lathe bed. The advantage of this design is that the 2 x 12's provide stability both front to back, but also side to side. He also extends the legs up, and they could support the bungee cord above the turner's head. In my lathe, you either need to clip the bungee cord to eye bolts in the ceiling, or screw some extensions onto the legs (as pictured above) to provide a place for the bungee.

Instead of using a bungee cord to provide resistance when turning, Roy uses a pair of long thin pieces of wood that are tied together at one end and are apart at the other. The rope attaches to the very end of the upper rod, extends up over the lathe, and then back down to the pedal. When the pedal is pressed, the upper rod and the lower rod bend. The strength of this bending can be adjusted by controlling where the two thin rods are joined with a movable collar. Move the collar toward the end where the rope attached and the strength increases (because there's less wood involved in the movement). It's an elegant design, and doesn't involve a bungee cord. But it's also a lot more complex.

He also shows several different types of lathes in his books, including the treadle lathe that can often be seen on the show. A treadle lathe has the (very great) advantage of allowing the user to work the wood as long as the treadle is turning because the lathe converts the up and down motion of the pedal into continuous turning of the workpiece. What I found, however, is that getting a treadle lathe to work well was much harder than a spring pole lathe. It's main advantage is it's simplicity, and because it's so simple, it's much easier to get it working on the first try.