

Shopmade Lathes

Low-Cost Wooden Longbed

by Carlyle Lynch

I designed and built this lathe to turn everything from chessmen and chair rungs to tall bedposts. The materials cost \$179.25 including \$30 for a used ½-HP motor, but not including some scraps of plywood and oak left over from other jobs. The spindles are made from machine steel tubing, which I threaded and reamed to a #2 Morse taper so standard Delta lathe accessories will fit.

Sources for heavy timbers are so uncertain that I decided to glue up the 3-in.-thick wooden members from kiln-dried southern yellow pine framing lumber; two 2x10s, four 2x8s, and one 2x6, each 12 ft. long. My local building supply dealer let me flip through his stacks to find pieces with straight grain and few knots. Besides the ready availability of standard "2 by" lumber, laminating had other advantages over heavy timbers. Until final glueup, most of my work was easier because I was hefting just half of each member at a time. The laminated members are also stronger and more dimensionally stable than heavy timbers.

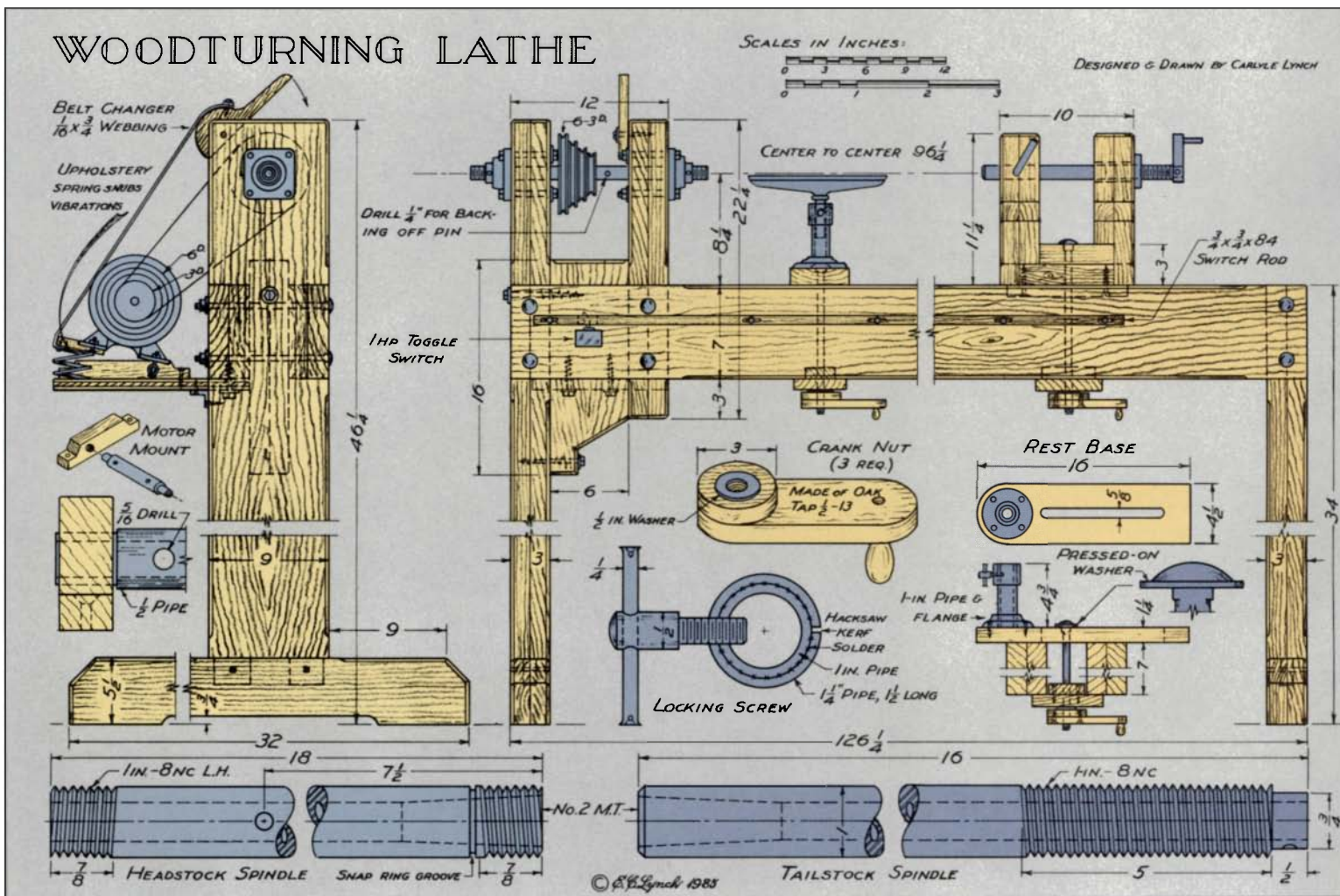
Each of the ways is made from two pieces of 2x8 (1½ in. by

7 in. after dimensioning), as shown in the drawing below. After temporarily screwing the ways together, I clamped the uprights to each way in turn, and made sure that the ways were square to the uprights. I drilled the carriage-bolt holes in the ways with a long electricians' auger bit guided through the dadoed bolt holes in the uprights. Then I glued, screwed and clamped the ways together.

The headstock brace was made a snug fit between the headstock uprights and the ways and fastened to the headstock leg with two ½-in. by 5-in. lag screws and washers.

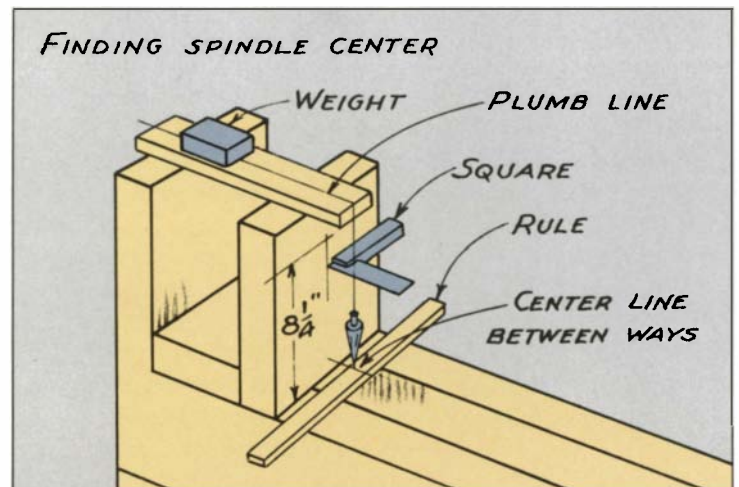
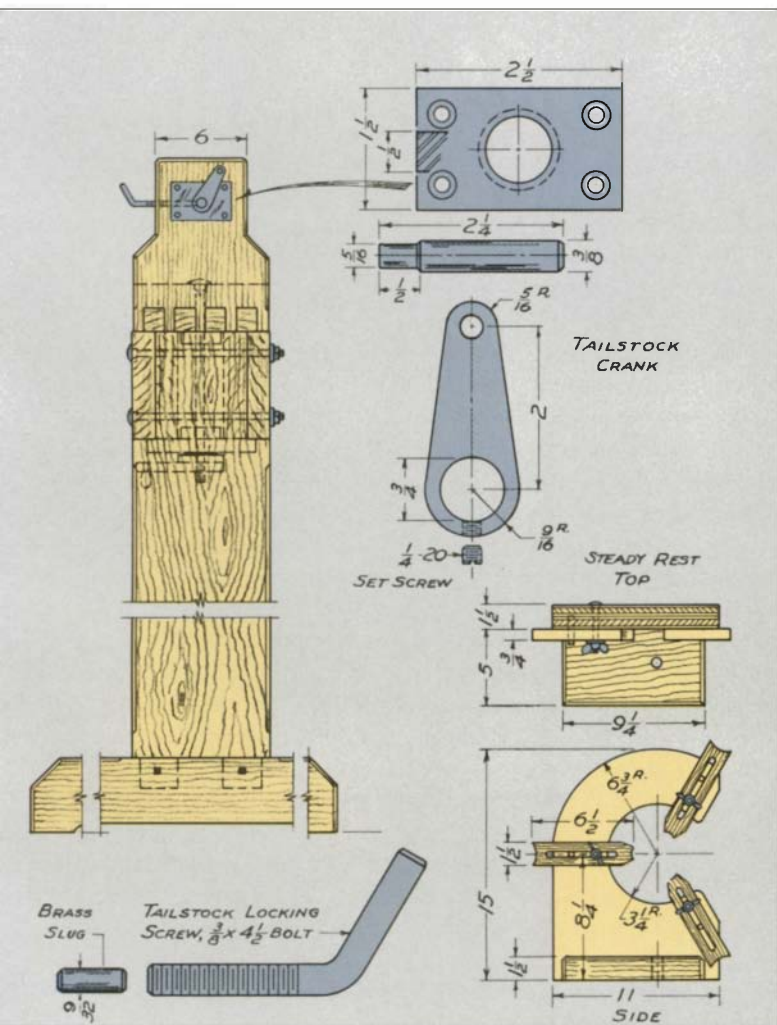
Each foot is made of two pieces of 2x6 (now 1½ in. by 5½ in.). I outlined blind mortises for the leg tenons, unscrewed the pieces and cut the mortises in each half. The foot halves were then glued, screwed and clamped together, then bandsawn to shape when dry.

The tailstock is made of two uprights joined to a base with dovetails. I cut 10° tails on the base with the bandsaw. I cut the





Glued up from yellow pine framing lumber, Lynch's wooden lathe cost less than \$200 in materials. With its 10½-ft. bed, it can handle up to 8-ft. work. A strip of wood, screwed to the bed through slotted holes, activates the on/off switch from anywhere on the bed.



Hardware specifications:

2—One 1-in. bore, 4-groove cone step pulley, 3, 4, 5, and 6 in. dia., and one to fit motor shaft (Made by Browning Mfg., Emerson Electric Co., P.O. Box 687, Maysville, Ky. 41056)

2—1-in.-bore flange block bearings (Fafnir RCJ, made by Fafnir Bearing Div. of Textron Inc., 37 Booth St., New Britain, CT 06050)

1—12-in. toolrest (Delta part no. 46-692; Delta lathe parts are available from local Delta dealers or may be ordered by phone from Delta International, 1-800-223-7278.)

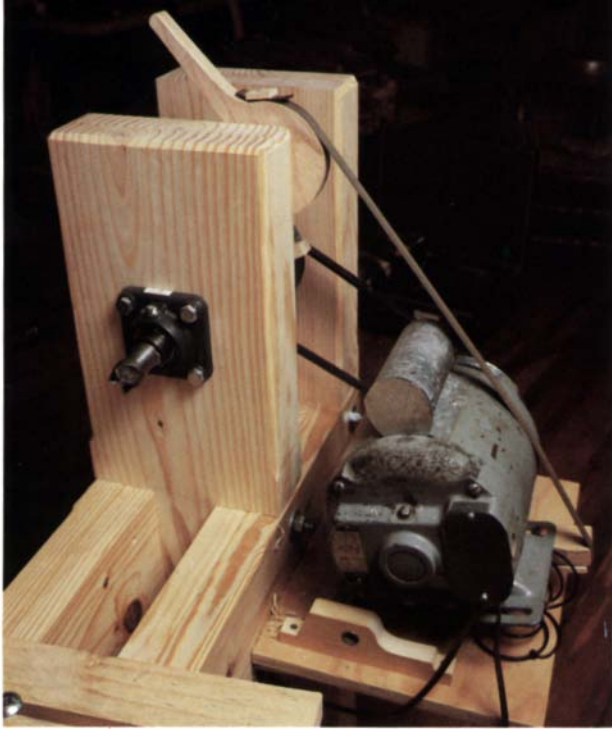
1—6-in. faceplate, 1-in. -8 thread (Delta part no. 46-937)

1—Spur drive center #2 M.T. (Delta part no. 46-933)

1—Cup center #2 M.T. (Delta part no. 46-439)

1—Headstock spindle; 16 in. by 1-in.-OD machine steel tubing

1—Tailstock spindle; 15 in. by 1-in.-OD machine steel tubing



The headstock spindle turns in flange-block bearings bolted to the headstock uprights. The weight of the ½-HP motor keeps tension on the belt. Pulling forward on the lever pulls a strip of ¾-in. webbing to lift the motor forward and take the weight off the belt for changing speeds. The upholstery spring under the motor damps vibration. A birch-plywood indexing ring (above) screws on the inside of the inboard headstock upright. With the belt removed from the motor pulley, a pointer fits around the headstock spindle so that an 8d nail can slide through a hole in one of five concentric rows. A bar on the pointer passes through a hole in the spindle.

matching pins on the tablesaw by setting the miter gauge at 80° and standing the board on end. The other three tailstock pieces shown in the drawing are glued to these three parts. On the underside of the base, I screwed an oak guide block exactly as wide as the gap between the ways, so the tailstock moves smoothly on the ways without any side play.

To locate the headstock spindle hole on the inboard headstock upright, I assembled the lathe and leveled the bed in both planes by shimming the feet. I laid a rule across the ways and dropped a plumb line over the upright to the center point between the ways, as shown in the drawing on the previous page, then marked the center. I disassembled the lathe and drilled the spindle holes on the drill press—1½ in. dia. on the inboard upright and 1¼ in. dia. on the outboard leg.

To mount the spindle, I clamped one of the flange block bearings to the inboard upright, inserted the spindle, and clamped on the outboard bearing. I stuck a spur center in the inboard end of the spindle, and with plumb line, ruler, and a short spirit level on the spindle, I maneuvered the inboard flange block until the spindle was level and centered in the headstock upright. When it was, I clamped the inboard flange block in place. A strip of wood clamped under the flange block provided additional support while I drilled through one of the four mounting holes in the bearing for a bolt hole. With that corner bolted, I drilled and installed a bolt in the corner diagonally opposite. I moved the spur center to the outboard end and centered and bolted the outboard bearing in place. Once the headstock spindle was in place, I tightened the locking collars (supplied with the bearings) that hold the spindle in the bearings.

To mark the center for the tailstock spindle, I placed a spur center in the headstock spindle and slid the tailstock along the bed until it bumped into the spur center. Using this dent as center, I drilled a 1-in. hole through the inboard tailstock upright and a 1¼-in. hole in the outboard tailstock upright on the drill press. I spun the threaded steel plate onto the tailstock spindle threads and inserted the spindle through the holes in the tailstock. With a center in the tailstock spindle, I slid the tailstock up to the headstock to align the points. When the tailstock spindle was aligned and level, I clamped the steel plate in place and drove two No. 8 screws in diagonally opposite ⅝-in. holes in the plate, checked again for alignment and installed the other two screws. Then, two at a time, I removed the screws, drilled out

the holes to ¼ in., and replaced the screws with ¼-in. by 4-in. machine bolts. I made the tailstock spindle handle from a piece of flat steel bar, but a handwheel would be better.

The ½-HP motor rests on a plywood platform held to the back of the lathe bed by a piece of angle iron and a wood brace. The weight of the motor furnishes the belt tension. A piece of ¾-in.-wide webbing and an eccentric lever take the weight off the belt to make changing speeds easy, as shown in the photo, above left. An upholstery spring under the motor acts as a snubber to take out slight motor vibration. A 20-amp, single-pole, single-throw toggle switch is mounted on the front side of the bed. Slots cut in a ¾-in.-square 84-in. pine strip allow control of the switch from anywhere along the bed.

The drawing shows a wooden toolrest base with a pipe flange and short length of pipe that holds standard Delta toolrests. A 30-in.-long wooden rest can also be made for long work.

Tall bedposts and the legs of Sheraton tables are often reeded, fluted or carved, necessitating an indexing ring, not shown in the drawing. The ¾-in. birch-plywood ring is fastened to the left side of the inboard upright, as shown in the photo, above right. With the belt removed from the motor pulley so the lathe can't be accidentally started, a pointer is fastened on the headstock spindle so that an 8d nail can slide through any one of five holes in the pointer to engage one of five concentric circles of holes in the ring. Working in from the outer circle, the number of holes in each circle are: 60, 11, 9, 7, and 8. The circles were scratched by holding the nail against the plywood ring and revolving the spindle. A pair of dividers found the correct spacing by trial and error.

Long spindles must be kept from "whipping" while being turned, so I made a steady rest, as shown in the drawing. I carefully and slowly turn long pieces to a smooth cylinder for a couple of inches in the middle before turning the whole piece. Then, I set the hickory jaws of the steady rest against that smooth surface, turn the lathe on and touch on paraffin to lubricate the friction spot.

I finished the lathe with shellac, about the only finish that will prevent sappy grain and knots bleeding through. The lathe is bolted to the floor with angle irons, to keep vibration down. □

Carlyle Lynch is a retired teacher, cabinetmaker and designer in Broadway, Va.