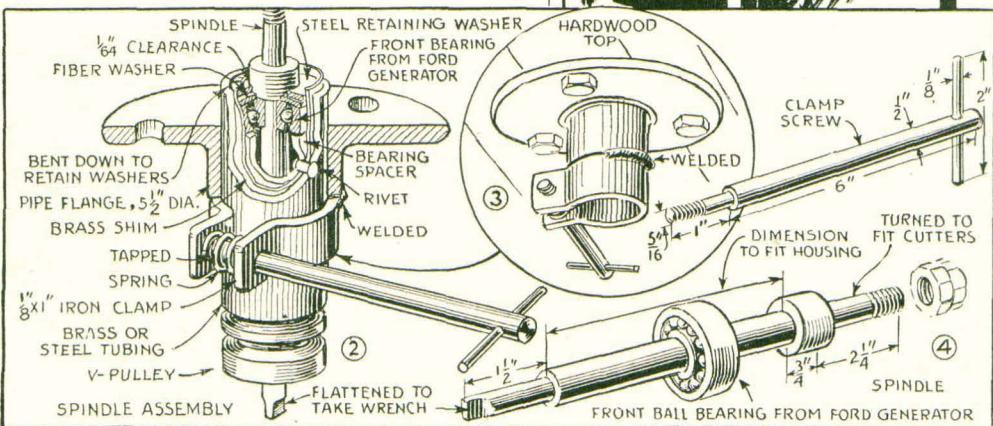
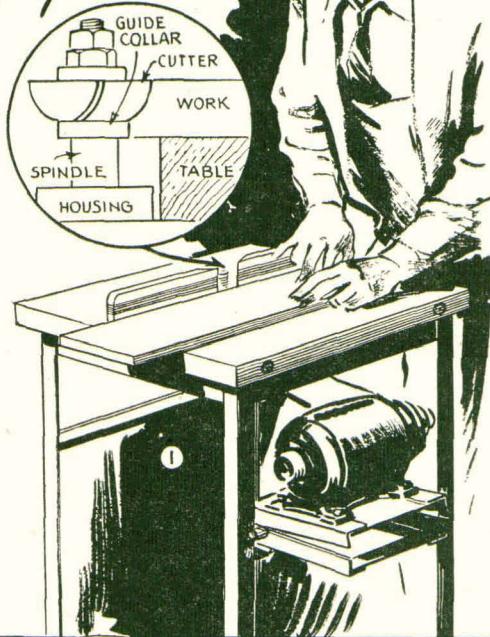


Homemade SHAPER has ball-bearing spindle

By Albert C. Larson

WITH this shaper set up ready for work you are independent of the limitations of stock moldings, for, with an assortment of cutters you can make practically any molded shape you may require in a few minutes time.

The greater part of the story on construction of the spindle is told in Figs. 2, 3 and 4. The spindle assembly is housed in a 5-in. length of brass or steel tubing. This length is only an approximation for you may have to file the ends back slightly to get proper fit of the retaining washers. Note especially from Fig. 2 that there is an inner tube which acts as a bearing spacer and that between this and the housing proper is a light sheet-metal shim. The shim extends beyond the ends of the housing and the whole thing is held in

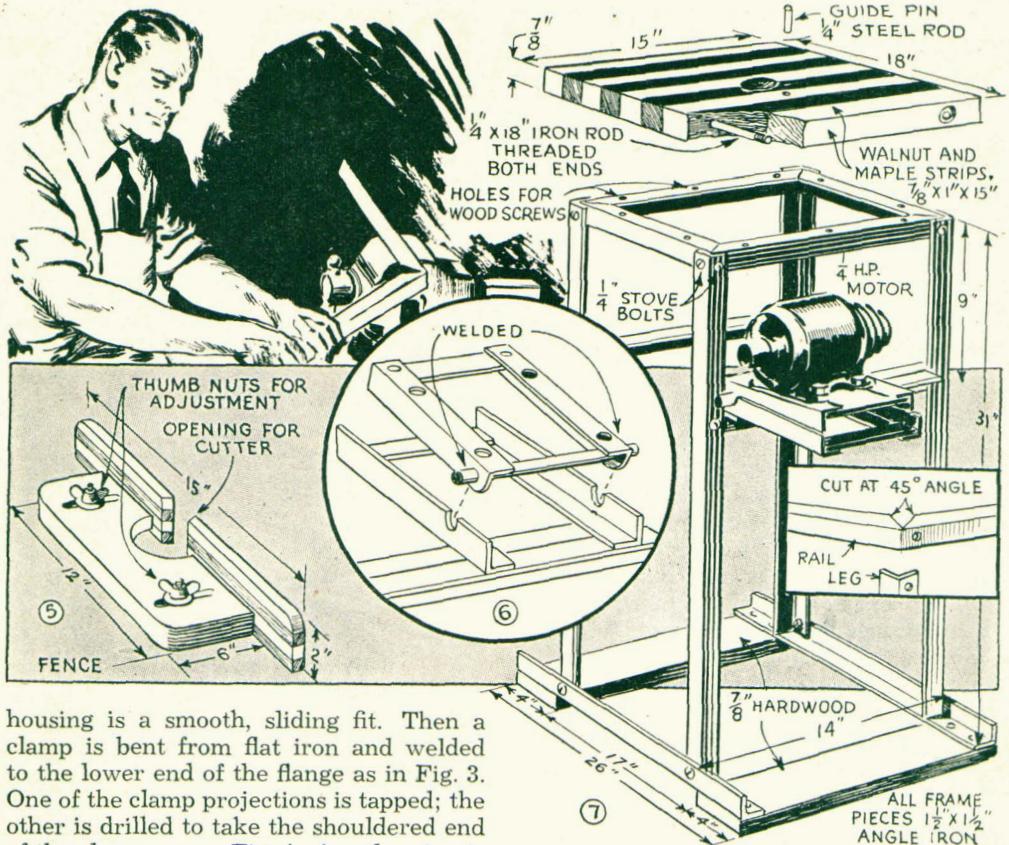


place with a rivet. The housing is also drilled and tapped for a pressure grease fitting.

Right at this stage the spindle, Fig. 4, should be made. Check the dimension through each of the inner ball races before you turn down the spindle between the cutter flange and the shouldered lower end, for this section must fit the inner ball

races in a snug, press fit. Thread the upper end of the spindle while in the lathe as the thread must be true. When you assemble as in Fig. 2 make sure, before seating the retainer, that the spindle turns freely, without perceptible binding at any point, through a complete revolution.

Next, you bore out the threaded sleeve of a pipe floor flange so that the spindle



housing is a smooth, sliding fit. Then a clamp is bent from flat iron and welded to the lower end of the flange as in Fig. 3. One of the clamp projections is tapped; the other is drilled to take the shouldered end of the clamp screw, Fig. 4. A coil spring is placed between the ends of the clamp when the screw is turned into place.

Figs. 5, 6 and 7 show how the spindle may be mounted on a convenient floor stand and driven with a $\frac{1}{4}$ -hp. motor. Fig. 6 suggests a good method of mounting the motor with the shaft in the horizontal position and driving with a half-crossed round leather belt. But, if you have a ball-bearing motor, you can simplify this installation by mounting the motor with the shaft in the vertical position. In either case, with a motor running at 1,750 r.p.m., you can use a 7-in. V-pulley on the motor shaft and a 2-in. pulley on the spindle. This combination will give the proper speed for the average work. The stand, as you see, is a very simple affair made from angle iron. The table top requires a little more care. It should be made of strips of hardwood glued together and drawn tight with iron rods threaded at both ends for a nut and washer. For accurate work it's essential that the table top be surfaced

smooth and flat on both sides. Finish it with shellac. Notice the guide pin, Fig. 7, which is necessary for starting the work when no fence is used. It should not be more than 3 in. from the center or axis of the spindle. When using the pin as a guide for the edge of the work when starting the cut, it is essential that the uncut portion of the stock ride on a guide collar as in the detail, Fig. 1. Although the pin can be used when starting either straight or curved work it's best to use a fence when molding straight stock. Fig. 5 suggests a simple type of fence, although it does not have an adjustment for offsetting the two halves which is necessary on certain kinds of work. A ready-made fence having this feature can be purchased at nominal cost. Three-lipped cutters should be used. They may be purchased ready-ground in a great variety of shapes together with suitable guide collars. Always use double nuts on the spindle and be sure that they are tight before starting the machine.