

# A SMALL BENCH MILLER

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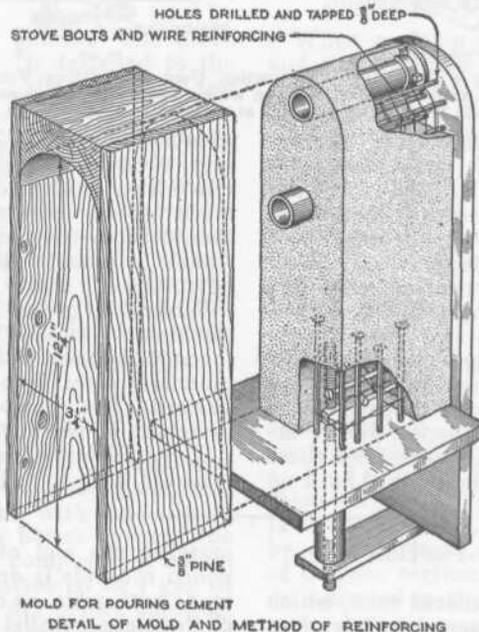
**D**URING the late war, machines which required massive castings in their design were built with beds of cement or concrete, simplifying the work of construction, and providing a means of making very heavy machines with a minimum of large castings. This method can be adapted to the use of the mechanic in the small shop, and by using a combination of cement and cold-rolled steel, small machines can be constructed sufficiently strong to stand a considerable amount of heavy work, while eliminating entirely a body casting.

The bench miller described in this article is an example of this method; only one casting is employed, and the rest of the machine is of such construction that but few simple tools, and little machine work, are required in the building of it.

The steel, flat and round, which can be obtained from any steel merchant, is first carefully checked for straightness and parallelism, using a good straightedge and a micrometer caliper; if any bent spots are discernible, straighten carefully, and if thick spots occur in the slides, scrape them off until a level surface is obtained. The holes in the front slide and base should then be laid off and drilled, including the holes for the spindle and overarm, and the 1/4-in. holes for the anchor bolts. These anchor bolts are 1/4-in. stove bolts of varying lengths, as shown in the smaller drawing, and are placed so that the heads will be staggered, to distribute the hold and strains more evenly in the cement. The holes

for the bolts are 3/8 in. deep, and tapped with a 1/4-in. bottoming tap. The base is a piece of 1/2-in. cold-rolled steel, or iron, and is fastened to the front slide by means of two 1/4-in. flat-head screws, countersinking the slide for the heads, so that they will be flush with the surface. The spindle and overarm pipes are fastened to the front slide by means of flanges, the pipes being bored—the overarm pipe to a sliding fit for a piece of 1 1/4-in. cold-rolled steel, the spindle pipe to fit the two bronze bushings which form the spindle bearings. These pipes must be fitted absolutely square with the front slide. A bolt and pipe, with a flat piece of steel, will be seen at the bottom of the base; these form a brace for that part of the slide projecting below the bench top, the flat piece also forming a bearing for the elevating screw. When this brace, the base, front slide, and pipes have been assembled, the next operation is the pouring of the cement.

The anchor bolts are interwound with soft-iron wire, as shown, and the form is placed in position, and clamped rigidly. A mixture of 1 part cement to 3 parts clean, sharp sand has proved ideal for this purpose; during the pouring, the spaces between the screws, and all edges and corners, must be thoroughly poked with a knife, or other sharp-pointed tool, to insure that the cement reaches every part. After pouring, level off the surface, and then lay the assembly aside to season; this is a very important part of the construction, the cement being wetted at least twice a day



The Main-Body Casting is Poured in a Mold Made of Soft Pine, the Top of the Front Slide being Shaped to Conform to the Contour of the Casting