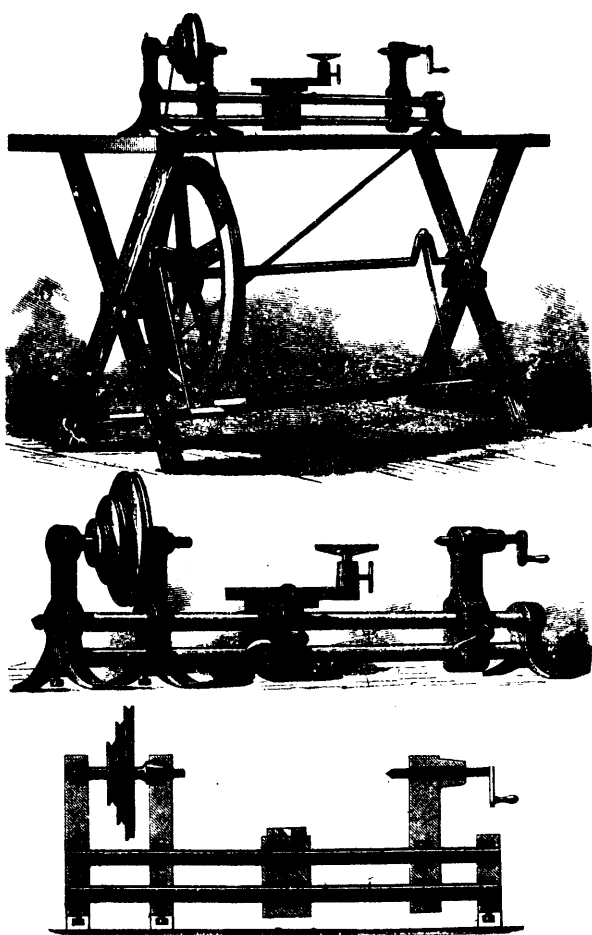


Amateur Mechanics.

THE LATHE.

For amusement, exercise, and profit we commend, to those who are mechanically inclined, the practice of working with tools of the smaller sort, either in wood or other of the softer materials, or in metals, glass, or stone. This practice renders the hands dexterous, the muscles strong, and the head clear, with the further advantage of producing something for either ornament or use. Of course, a bench with a vise and a few wood-working and iron-working tools will be required; but the most expensive as well as the most essential tool is a lathe. With this tool, not only turning in wood, metal, ivory, rubber, etc., can be accomplished, but it may also be used for screw-thread cutting, gear cutting, drilling metals, boring wood, spinning metals, milling, sawing metal and wood, grinding, polishing, moulding, shaping, and other purposes. A first-class plain lathe



of small size cannot be purchased for less than \$50 or \$60, and one of inferior quality will cost \$20 to \$30.

While the purchase of a lathe is recommended, there may be many who would prefer to make one. A lathe that will do admirably, and which may be easily made, is shown in the accompanying engravings, Fig. 1 representing in perspective the lathe complete; Fig. 2 is a perspective view of the lathe without the table; Fig. 3 is a vertical longitudinal section of the lathe, showing the manner of securing the head and tail stocks to the bars which form the bed or shears.

In making this lathe one pattern only will be required for the two standards of the head stock, and the support of the ends of the bars. The lower part of the tail stock is made in two parts,

so that they may be clamped tightly together on the shears by means of the bolt that passes through both parts, and is provided with a nut having a lever handle. The rest support is also made in two parts, clamped together on the ways in a similar way.

The patterns may be easily sawed from $1\frac{1}{2}$ inch pine. The holes that receive the round bars should be chambered to receive Babbitt metal, used in making the fit around the bars forming the shears, around the head and tail spindles, and around the shank of the tool rest. The smallest diameter of the holes that receive the round bars should be a little less than that of the bars, so that the several pieces that are placed on the bars may be fitted to hold them in place while the Babbitt metal is poured in.

The dimensions of the lathe are as follows:

Length of round bars forming shears, 24 inches; diameter of bars, 1 inch; distance from the upper side of upper bar to centre of spindle, 3 inches; between bars, $\frac{3}{4}$ inch; between standards that support the live spindle, $3\frac{1}{2}$ inches; size of standard above shears, $3\frac{1}{2} \times 1\frac{1}{2}$ inch; diameter of head and tail spindles, $\frac{3}{4}$ inch; diameter of pulleys, 5 inches, $3\frac{1}{2}$ inches, and 2 inches; width of base of standards, 5 inches; height of standards, 7 inches.

The live spindle should be enlarged at the face plate end, and tapered at both ends, as indicated in the engraving.

The pulleys, which are of hard wood, are made of three pieces glued together, bored, and driven on the spindle, secured by a pin passing through both it and the spindle, and turned off. The bars forming the shears may be either cold rolled iron or round machinery steel; they will require no labor except, perhaps, squaring up at the ends. The castings having been fitted to the bars, and provided with set screws for clamping them, the two standards that support the live spindle and the support for the opposite end of the bars are put in position, when the bars are made truly parallel, and a little clay or putty is placed around each bar and over the annular cavity that surrounds it, and is formed into a spout or lip at the upper side to facilitate the pouring of Babbitt metal. The metal must be quite hot when poured, so that it will run sharp and fill the cavity. To guard against a possible difficulty in removing the castings from the bars, it might be well to cover the side of the bar next the screw with a thin piece of paper. The pieces of the tail stock and tool rest support are fitted to the bars by means of Babbitt metal, the metal being poured first in one half and then in the other. The bolts which clamp the two parts of the rest support and tail stock together are provided with lever handles. After fitting the parts to the two bars by means of Babbitt metal, the tail spindle, which is threaded for half its length, is placed in the tail stock parallel with the bars and Babbitted. A binding screw is provided for clamping the tail spindle, and the spindle is drilled at one end to receive the center, and has at the other end a crank for operating it.

A steel or bronze button is placed in the hole in the stand, and that supports the smaller end of the live spindle, and the spindle is supported in its working position and Babbitted.

The thread on the spindle should be rather coarse, so that wooden or type metal face plates and chucks may be used.

The table shown in Fig. 1 is simple and inexpensive. It consists of two pairs of crossed legs halved together and secured to a plank top. A small rod passes through the rear legs near their lower ends, and also through a piece of gas-pipe placed between the legs. A diagonal brace is secured to the top near one end, and is fastened to the lower end of the rear leg at the other end of the table.

A block is secured to each pair of legs for supporting a pair of ordinary grindstone rollers, which form a bearing for the balance-wheel shaft. This shaft has formed in it two cranks, and it carries an ordinary balance wheel, to the side of which is secured, by means of hook bolts, a grooved wooden rim for receiving the driving belt. The cranks are connected, by means of hooks of ordinary round iron, with a treadle that is pivoted on the gas-pipe at the rear of the table. The shaft will work tolerably well, even if it is not turned. The cranks must have half round grooves filed in them to receive the treadle hooks. The size of the different diameters of the drive wheel may be found by turning the larger one first and the smaller ones afterward, using the belt to determine when the proper size is reached. The wooden rim may be turned off in position by using a pointed tool.

The lathe above described, although very easily made and inexpensive, will be found to serve an excellent purpose for hand work, and if the holes, instead of being Babbitted, are bored, and if the bars forming the shears are turned, the lathe may be converted into a kind of engine lathe by placing a feeding screw between the bars, and putting a small tool post in the rest support.—*Scientific American*.