THE FOOT LATHE.

Number 6.

METAL SPINNING.

Spinning sheet metal into various forms is another kind of work which can be done in the foot lathe, and it is here that the amateur can show his taste and dexterity.

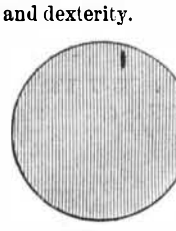

Fig. 25.

The process consists in forming a blank, like the engraving, into an ornamental base for a lamp, or an oil cup; in fact, any thing whatsoever. All that is requisite is to have a fac simile, in wood, of the shape you wish to make. This is bolted or otherwise made fast to the face plate, and the blank is then set up against it, and held as the cylinder head shown in Fig. 21, is; that is, with a rod leading from the back center of the lathe to the work.

Fig. 26.

A tool like this is then used to press the metal into all the recesses, or curves of the pattern. The speed must be high and the metal quite soft, and moistened with a little soap-suds or oil, so that it will not be scratched by the tool.

To spin metal requires some dexterity, but it is easily acquired after a little practice. The rest must be furnished with holes like this figure, and a pin, so that the tool can be brought up against it like a lever.

Fig. 27,

Still another kind of metal spinning can be done in the lathe. This relates to making circular shapes, or cylindrical, more properly—such as napkin rings, the tops of steam pipes, or similar things. To do this a mandrel is requisite. The mandrel must be of steel and turned to the desired pattern—like this, for instance:

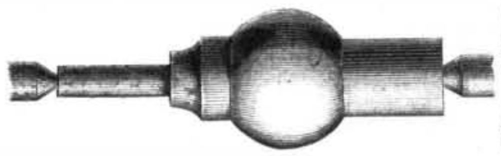

Fig. 28.

A ferrule is then made and soldered together with lopped edges, so that there will be no seam. The mandrel must be as much smaller than the size of the finished work as will allow it to come off freely, for it will be apparent that if the work was spun up *on* the mandrel it could never be taken off. The ferrule when put on them will stand eccentric to the mandrel, as in this figure—that is, when the tool bears on it. In other respects the process is just the same as spinning on the face plate. Tripoli, chalk, whiting, rot'en-stone, and similar substances, are used to give the fine polish on such work.

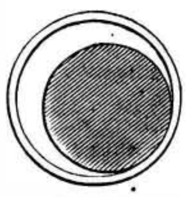

Fig. 29.

We know of no prettier or more expeditious process of making a small steam boiler for a toy engine,

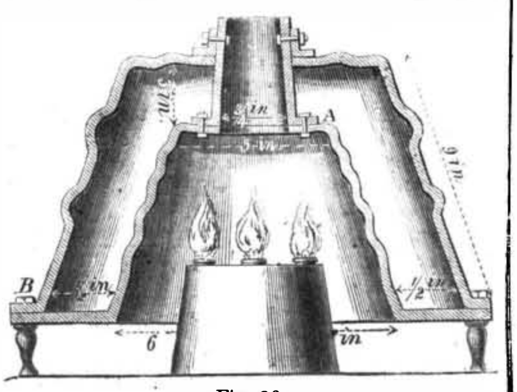

Fig. 30.

than by spinning it upon the lathe. The boiler will be very strong, have large fire surface, and be without joints, having only one at the bottom, where it is easily kept tight. Fig. 30 is the boiler.

The metal must be thin (twenty gage), the sheet brass sold in the shops will answer, as it is already annealed, and the corrugations must not be too deep on the sides, or the work will not come off the mold. The center of the fire-box, A, must be left flat so that the flue will have a bearing on it. For a small engine, 1-inch bore and 2-inch stroke, a boiler of the dimensions given here is ample. The flue must be brazed or soldered at A, and the bottom must be riveted at B, for everytwo inches; this is not necessary, however. There are only three pieces in this boiler —the shell, the fire-box, and the flue, and the water must not be carried more than three-fourths of an inch over the crown of the furnace.

We shall now again revert to cutting tools.

Probably many of our readers, who use hand lathes not furnished with slide rests have wished for that indispensable appendage where boring is to be done. For ordinary turning, we do not appreciate a slide rest on a hand lathe so much as many do that we know, but for boring out valves, cocks, or, in fact, any thing, a chuck and a good slide rest are invaluable.

Some persons are always "meaning" to do a thing, yet never do it. Sometimes, for the want of facilities, at others for the lack of an idea. If the latter be of any value we can furnish one or two on this subject that may be useful.

One way to bore out holes parallel, without a slide rest, is to do it with the spindle of the back head. With a tool of peculiar construction, holes varying in size can be bored beautifully in this way. We present a view of such a tool in Fig. 31. It is merely a

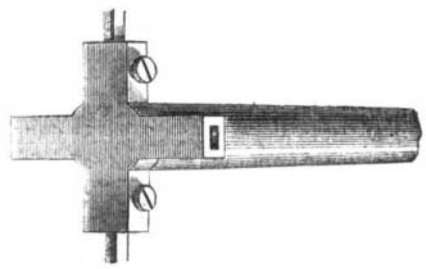

Fig. 31.

cross formed on the end of a center fitting the back spindle, the same as the lathe center does. The arms of the cross are made stout and thick so as to admit of a square hole being cut in them. The hole is made by drilling in and driving in a square drift afterward to take off the corners. The shanks of the tools are well fitted to these holes in the arms, so that a slight pressure of the screws in the side of the arm will hold them steady. When used the tool is put in the back spindle, and the cutters set to the size required, or less, if there is much to take out, and run through the work in an obvious manner. Any range of size can be had up to the diameter of the cross. It is not well to run the cutters out too far, however, as they will jump and chatter, or spring, and made bad work. The tool is so easily made that one can afford to have three or four for different jobs.

Another plan, but not so good, is to make a common center and disk, like Fig. 32.

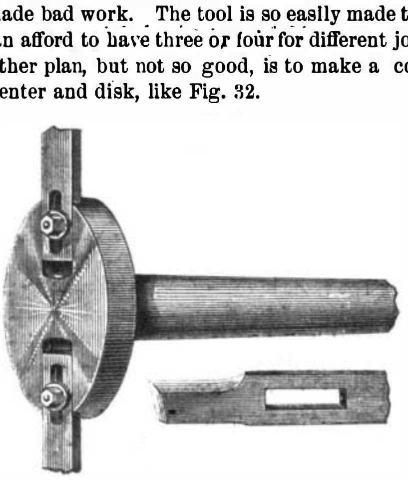

Fig. 32.

Here the cutters have a slot in them which a bolt passes through and screws into the disk; a small piece of wood put at the bottom of the tool, between it and the cutter, prevents it from slacking off so as to diminish the cut. These tools will be found useful and will do good work if properly handled. This latter tool is better for wood, but will answer for any metal by varying the cutters.

To make a slide rest in the common way is a costly and tedious job. For all purposes of boring, a good one may be made as shown in the following engraving, Fig. 33—

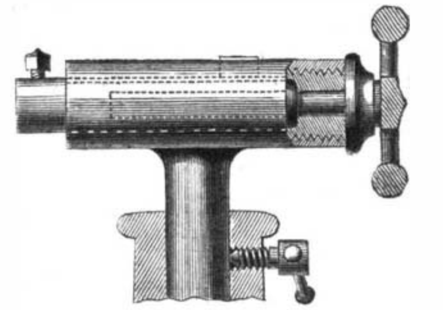

Fig. 33.

This is simply a casting fitted with a screw and spindle, as shown. The spindle has a tool let in the front end and held there by a set screw, and there is a wheel at the back end to run the spindle in and out. The casting has a leg to it which enables it to fit the common post the rest for the hand tool fits. There is also a key to prevent the spindle from turning round. By this arrangement it is easy to bore, not only parallel holes of any size, but tapering ones, which is often a great convenience. By a simple change of tool it can also face off any casting, and can easily be made to cut a thread of a given pitch by any ingenious workman. Not only this, but it can also be made without planing, or other work most amateurs have no facilities for. It is within the range of ordinary lathe work, and will be found indispensable. The T-head may be of cast iron, but the spindle should be steel, with a brass nut let in the back end for the screw to work in.

[To be continued.]

TWO KINDS OF ELECTRICITY.

A very simple contrivance will serve for examining the fundamental phenomena of electricity as developed by friction:—

Soften a little sealing-wax in the flame of a candle, and draw it out into a thread 8 or 10 inches long, and of the thickness of a stout knitting pin. Attach to one end of it a disk of paper about an inch square; suspend this rod and disk by means of a paper stirrup and a few fibers of unspun silk from a glass rod fixed horizontally to some convenient support. Now rub a stick of sealing-wax with a bit of dry flannel, and bring it near the paper disk: the disk will at first be strongly attracted, and will then be as strongly driven away. While it is in this condition of repulsion by the wax, bring toward it a warm glass tube that has been rubbed with a dry silk handkerchief; the disk will be immediately attracted, and in an instant afterward it will again be repelled, but it will now be found to be attracted by the wax. It is therefore evident, that by the friction of the glass and of the wax, two similar but opposite powers are developed. A body which has been electrified or charged with electricity from the wax, is repelled by the wax; but it is attracted by the excited glass, and *vice versa*. In order to distinguish these two opposite powers from each other, that power which is obtained from the glass, has been termed vitreous or positive electricity; that from the wax, resinous or negative electricity.

Let us suppose that the paper disk has been charged by means of the glass tube, so that it is repelled on attempting to bring the glass near it; this state will be retained by the disk for many minutes. This contrivance forms, in fact, an electroscope, for it furnishes a means of ascertaining whether a body be electrified or not, and even of indicating the kind of electricity. Suppose that a body suspected to be electrified is brought near the disk, which is in a state repulsive of the glass tube; if repulsion occur between the disk and the body which is being tested for electricity, it is at once obvious that the substance is electrified; and, moreover, that it is vitreously electrified, since it produces an effect similar to that which would be exhibited by an excited glass tube.—*Miller.*