PRACTICAL MECHANISM.

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PATTERN MAKING.

Of chisels, the principal kinds used are the paring chisel, used entirely by hand pressure, and the firmer chisel, for use with the mallet. The difference between the two is that the paring chisel is the longer. A paring chisel, worn to half its original length, will however answer for use as a firmer chisel, because, when so worn, it is sufficiently long for the duty. A chisel should not, however, be used indiscriminately as a paring and firmer chisel, for the reason that the paring chisel requires to be kept in much better order than the firmer chisel does. It is necessary to have several sizes of chisels, varying in width from an eighth of an inch to an inch and a half. A paring chisel for general use is shown in Fig. 18. Its width is about one and a half inches, and its handle should be exactly of the form shown in the engraving, the total length of handle being six inches, from A to B being one and a half inches, and the diameter at C, and from B upwards, being one and a half inches. The hollow below B is of three eighths inches radius, and the diameter at D is one inch. This shape and size gives a good purchase, especially from A to B, where the hand is most often applied, the end, E, being against the operator's shoulder. A firmer chisel having a handle of the ordinary pattern is shown in Fig. 19.

Fig. 18.

Fig. 19.

Fig. 21.

Fig. 20.

Chisels are sharpened in the same manner as plane irons; but being usually narrower, they require special attention in the grinding, as they should be held against the grindstone with an amount of pressure proportionate to their width. In describing Figs. 5 and 6, in a previous issue, we explained how a long feather edge may be given to a tool in the grinding; and these remarks apply especially to chisels. Hence, towards the finishing part of the grinding operation, the chisel should be held very lightly against the stone; the flat face of the chisel should never be ground, but should be kept straight and even, otherwise the whole value of the tool will be impaired. In setting the edge of a chisel upon an oilstone, it is necessary to exercise great care that the hands are not elevated so as to oilstone the blade at a different bevel to that at which it was ground, and not to allow the movement of the hands to be such as to round off the bevel face at and near the cutting edge, an error which, from lack of experience, is very apt to occur. The position in which the bevel of the chisel should be pressed to the oilstone should be such that the marks made by the oilstone will lie from the back of the bevel to the cutting edge, but be shown more strongly at and towards the cutting edge. The motion of the hands of the operator should not be simply back and forth, parallel with the length of the oilstone, but partly diagonal, which will greatly assist in keeping the bevel level with the oilstone. Very little pressure should be applied to the chisel during the latter part of the process of oilstoning; and the flat face of the chisel should be held level with the face of the oilstone, and moved diagonally under a light pressure, sufficient only to remove the wire edge. After the setting is complete, the chisel should be lapped upon the hand to remove the fine wire edge left by the oilstone.

The next tool is the gouge, of which there are several kinds. Those having the bevel on the concave side are termed inside gouges; and when the bevel is on the convex side, they are called outside gouges. Gouges, like chisels, are also classed into firmer and paring gouges, the distinction between the two being the same as in the case of chisels. It is not necessary to possess a full set of each kind of gouges; half a set each of inside and outside will suffice, with an extra one or two for paring purposes. Fig. 20 represents a paring, and Fig. 21 a firmer, outside gouge.

The inside gouge may be ground a little keener than the chisel or plane iron, and requires care in the operation, since it has generally to be ground on the corner of the grindstone, which is rarely of the same curve as the gouge requires. In oilstoning a gouge, what is called a slip is employed. Slips are wedge-shaped pieces of oilstone, of various curves and shapes to suit the purposes for which they are applied. The gouge should be held in the left hand, and the slip in the right, the latter being supplied with clean oil. The back or convex side of the gouge must be laid level on the face of the oilstone, and the handle worked to and from the workman, who must roll it at the same time, so as to bring every part of the curve of the gouge in contact with the face of the oilstone. All the remarks upon grinding and oilstoning chisels apply with greater force to gouges, because the small amount of the surface of the gouge, in contact with either the grindstone or oilstone, renders it extremely liable to the formation of a feather edge in grinding, and a wire edge in oilstoning. In grinding outside gouges, a new feature steps in; for if the gouge be kept at the same inclination throughout the grinding, as in the case of all the tools heretofore mentioned, the center of the gouge will be keener than the corners, to avoid which the gouge is given a rolling motion to bring every part against the action of the grindstone, while at the same time lowering the back hand as the corners of the gouge approach the stone. This, if evenly performed, give an equal keenness to all parts of the cutting edge The same rising and falling motion of the back hand is necessary in oilstoning the convex side of the gouge. The concave side is to be rubbed with an oilstone slip, taking care to let the slip be flat in the trough of the gouge and not elevated at the near end; for if once a habit of beveling, however slightly, the flat faces of tools is contracted, it tends to increase, so that the tools finally lose their characteristics and are in fact ruined so far as their application to good work is concerned. Hollow gouges are dispensed with by the use of rabbet planes, shown in Fig. 11

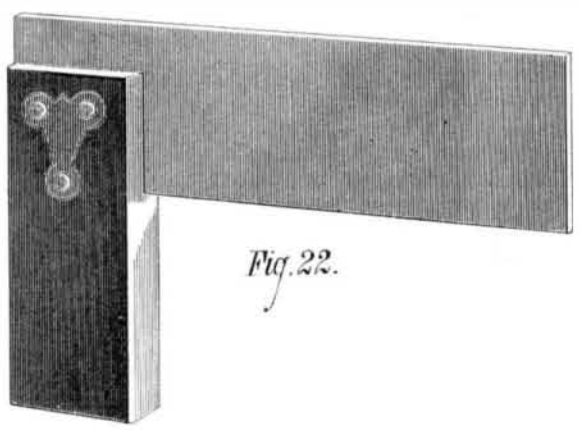


Fig. 22.

Several sizes of the squares are necessary to the pattern maker, because his work necessitates in many cases that the blade be short in order to admit of its application to the work. Fig. 22 represents an ordinary try square; the blade should be of sawblade, and the back of hard wood, the inside and outside edges of the back being covered with sheet metal to prevent undue wear. In addition to this, however, a bevel square is required; and it is best to have one with a sliding blade, so that the length it projects from the square back, on either side, may be adjusted to suit the work. Such a bevel square is illustrated in Fig. 23.

Fig. 24.

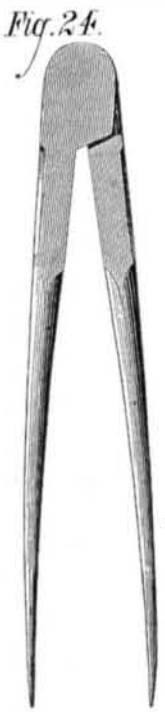
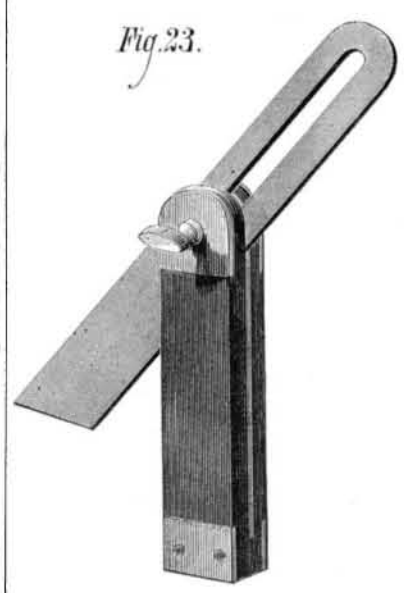


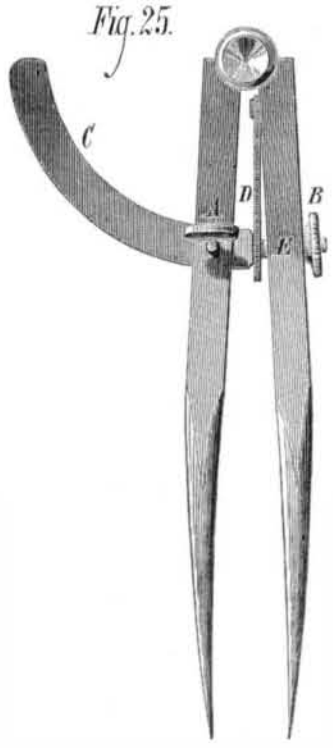
Fig. 23.



Of compasses there are two kinds, one being plain and having no means of permanent adjustment, as shown in Fig. 24. This is used for casual measurements or marking. The other has an attachment by which it may be permanently set, as shown in Fig. 25, in which A represents a thumb screw employed to set one leg firmly against the radius piece, C, and B being an adjusting screw for finally adjusting the compass points after the thumbscrew, A, is fastened, the spring, D, operating to keep the leg, E, firmly against the face of the screw, B; so that, when the adjustment of the compass points is once properly made, the compasses may be laid upon the bench and used from time to time without danger of the adjustment being altered by handling or by a slight blow.

An excellent attachment for compass points has lately come into use; it is for the purpose of fastening to the marking leg a pencil, to avoid scratching the surface of the work with the compass point. This device and its mode of application are shown in Fig. 26, in which A represents a thin tube with feet on it, provided with the split, B. C is a

Fig. 25.



clamp provided with a thumbscrew, E. D represents one of the compass legs. F is a piece of lead pencil which passes through the tube, A. The attachment is slipped on the compass leg, and the screw is tightened up, clamping that leg to the feet, C G, and clamping at the same time the pencil in

Fig. 26.

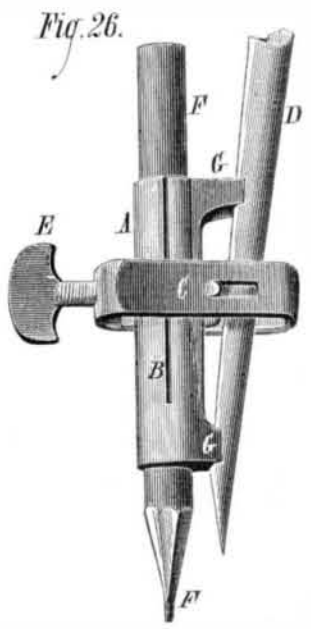
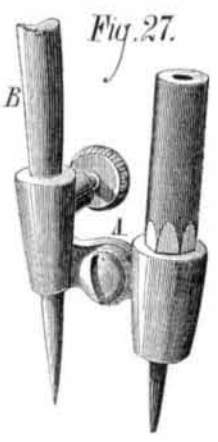


Fig. 27.



the tube. Another of these attachments, in which the pencil point is adjustable in a direction other than that in which the compass point stands, is shown in Fig. 27, the pencil tube being swiveled at A, and B representing the compass leg.

Fig. 28.

The points of compasses should be forged out when they get thick from wearing short, and they should be tempered to a blue color. For marking small holes, compasses are too cumbersome for fine work, and spring dividers are preferable. A recent improvement in these tools consists in making the spring helical, as shown in Fig. 20, instead of making it broad, flat, and thin, as formerly.

Iron Sheets Thinner than Paper.

We have heard of iron as thin as paper, but have just had a packet of specimen iron sheets brought to our office, not half as thick as the sheet this is printed on. This sheet is 0·004 inch in thickness; the iron sheets we have received are 0·0015 inch thick, or only three eighths of the thickness of the paper. At the same time the iron sheets are so tough as to be torn with difficulty, and so flexible as to bend with almost the facility of ordinary printing paper. These wonderful specimens of iron were made from the rough pig up to the rolled sheets by our neighbors, the Pearson and Knowles Coal and Iron Company, whose skillful manager, Mr. Hooper, has discovered a means of rolling these infinitesimally thin sheets in numbers without their sticking together.—*Warrington (England) Guardian.*