By Geometer

Further DRILLING METHODS

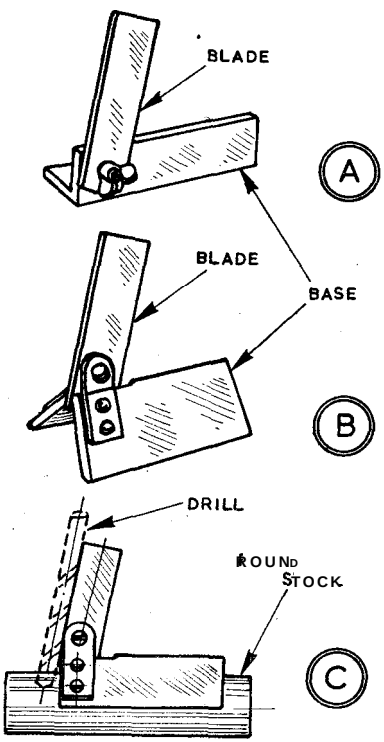
To ensure horizontal accuracy in hand drilling, some types of hand and breast drills are provided with small built-in spirit levels. Thus, using such a machine horizontally, keeping the bubble central will maintain the line of the hole horizontal, and looking at the drill from above, it is easy to see if reasonable squareness obtains in the other direction,

For verifying the accuracy of the built-in level (and it is always advisable to test one's tools), another small level is required. The accuracy of this is first tested by placing it on a surface to bring the bubble central, then turning it through a half circle and observing that the bubble is again central. After which, the level can be laid on a stiff true drill or piece of rod held in the machine chuck, when the bubbles of both levels should lie centrally.

If required, a machine without a built-in level can be aligned in this manner, placing the level on the drill before commencing, then re-checking when the hole has progressed a little way but not so far as to prevent correction if necessary. Yet another method is to hold a small square to the work and align the drill to the blade.

On occasion it is necessary or desirable for one hole or series of holes to be vertically below another as may happen in hanging doors or gates in existing surrounds. Then a plumb line dropped from the upper hole(s) will provide the line on which to position the lower.

For the occasional angle drilling job occurring in circumstances when it is not convenient to employ gauges described in the previous issue, adjustable types are useful equipment. From any type of protractor, they can be set on a nearby flat or straight surface, then applied to the work.



For round or flat stock

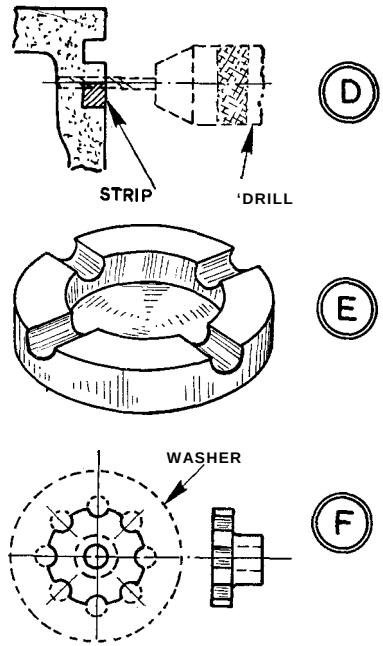
The gauge at ***A*** can be made from angle iron 1 in. on the flat, 2 1/2 in. long for the base, with a blade about 3/32 in. thick, 3/4 in. wide, 2 1/2 in. long. The pivot should be a screw with a wing nut for holding the blade when set.

An alternative type, ***B,*** for use on either flat or round stock, may have the same general dimensions; but the angle iron should be slotted at the corner to accept the blade centrally, a small lug then being attached each side to take the pivot screw and wing nut. This gauge may be set with a protractor on either round stock or a flat surface, then employed as C.

If rivets are used for fixing the lugs, the holes should be countersunk in the underside of the angle iron; and to hold the gauge on round stock, there can be situated in the base back from the blade an upstanding screw on which to hook the ends of a stout rubber band (from an old motor tube) passed round the round stock.

Half-round holes produced by drilling may on occasion be necessary as a feature of components, though at times the principle can be employed as a convenience or an alternative to other methods.

An example of the necessity for half-round holes is the provision of locating pegs for piston rings of small two-stroke engines. On large pistons using wide rings, locating pegs can be in' the grooves ; but on small pistons such pegs would take up too much space. Consequently,. ***a*** fitting half in the grooves, half m the lands is desirable. Drilling can be performed as ***D,*** with a strip wedged in the groove. The hole may then be tapped not quite through, the strip removed, and a peg (of brass) screwed tightly in, snipped off and filed flush.



Another example of such drilling can be seen in ash trays made from flat discs-of brass or aluminium. If they are made in pairs, each with the centre turned out, they can be clamped face to face for the drilling, which should be followed by reaming if possible. When opened, a neat effect is revealed? ***E.***

The principle is applicable to small handwheels or knobs for models, when a close-fitting washer is placed over for the drilling, ***F.*** Given reasonable care, the result again can be very neat.