BROKEN DRILLS and TAPS

By Geometer

IN MATTERS concerning drill and tap breakage " prevention is better than cure "-since the cure will at least involve the expenditure of time, and at worst the work will have to be scrapped and all one's previous labour lost. Nevertheless one must be resigned to some breakages in early efforts -as part of the price of experience. Then, too, on small or simple parts, it is quicker to scrap and start again than attempt removal of the broken tool, though that, of course, is not always possible.

Drills break for numerous reasons, but knowing the main ones many mishaps can be guarded against. First, drills should be suitably sharpened and spin truly in chucks. A blunt or incorrectly-sharpened drill requires heavy end pressure, which can cause breakage. Speed of rotation, also, should be reasonably in accordance with diameter-the smaller the drill, the higher the speed it should run. On deep holes, frequent withdrawal to clear swarf is important, as is lubrication with oil or cutting compound.

Holding and using

Drills should be held well back and firmly in chucks; and where slenderness is disadvantageous shorter ones are preferable. If a drill sticks in a hole the machine should be stopped immediately, as at least the shank will be scored and spoiled.

Drills should not be bumped on work to make a start-the shock alone can break small ones, or if the surface is sloping there will be sliding followed by breakage. Generally, it is advisable to centre-punch hole positions and align drills carefully into them. Any form of wringing or misalignment in hand or machine drilling must be avoided.

Care is essential as drills pass through work. Feed should be lightened, or the sudden clearance may cause breakage. For work on a machine table, it should have been verified beforehand that on the drill passing through the work it cannot strike the side of a slot or hole in the table-wringing in which fashion can cause breakage.

To prevent drills running tight or seizing in brass, gunmetal, hard steel, etc., points can be ground slightly off-centre which will produce oversize holes. It is best, too, not to use for such work drills which are dull or damaged on the flutes. Twisting work on drills to enlarge small holes is a frequent cause of breakage-and if done at all requires discretion.

Methods of removal

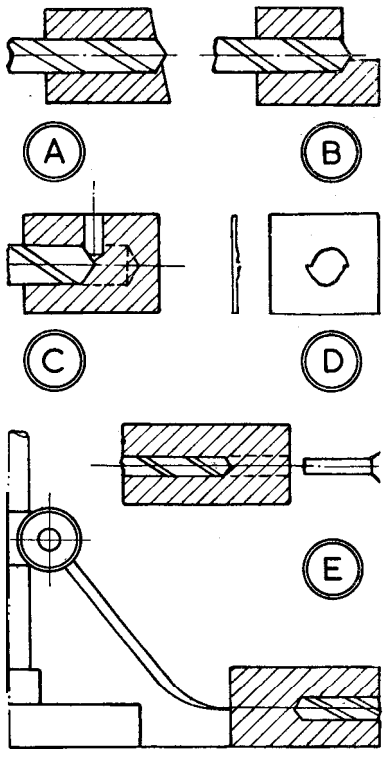
Drilling should be on the principle of producing holes of required size in which the drill does not stick, and clearing swarf sufficiently frequently to prevent any serious build up in flutes. In the event of breakage the piece of drill can then usually be shaken out-swarf having been washed and blown out.

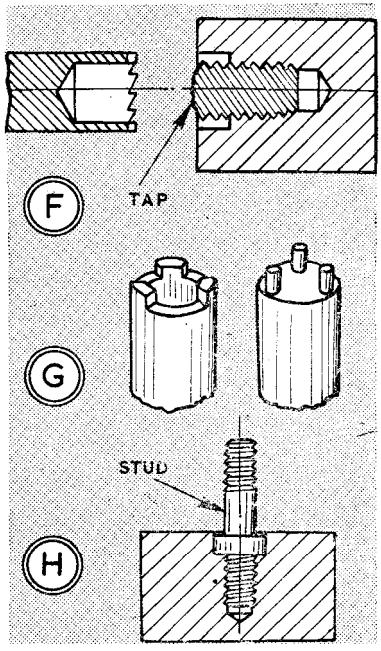
On sloping or shouldered faces (flanges of cylinders) ***A*** and ***B,*** should a drill break on clearing, the piece can be punched back or pushed with a piece of wire. In drilling cross holes the larger ones should be done first to avoid twisting or breakage, which could occur with condition C. Should there be breakage, however, a wire or small punch could be used to push on the drill point. Breakage in sheet metal follows from a hole being made as ***D;*** but if the drill is allowed to advance to the end of the flutes breakage is much less likely.

When a drill is broken firmly in a hole drilling from the opposite side when possible-enables a punch to be used for clearing, ***E,*** the position to drill being obtained using a surface gauge, then centre punching.

Light-alloy parts may be heated to expand them to attempt clearance. Steel and cast-iron parts may be heated red and cooled out slowly-which will also soften the drill or tap.

In the event of tap breakage, a reasonably-certain method of removal is to make a silver steel cutter to clear the top of the tap, F, following this with a tool, G, engagmg the flutes-made either from tube or from rod with pins in drilled holes. The hole can then be fitted with a special stud, H, having a flange to fit the recess with the top face just below the surface.





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