ACCURATE CHAMFERS

By GEOMETER

A CHAMFER-Or bevel--is the alternative to a radius where two faces join, except when a sharp corner or a knife edge is needed for a definite purpose. Which of the two alternatives is to be used, a tiny chamfer or a small radius, is a question that must often be decided by the worker, for general-arrangement and semi-detail drawings provide no information on this point.

A true detail drawing of a single part gives the dimension of a definite chamfer which may be quite small, as with the chamfer at the corners of a tiny nut. In addition, a detail drawing may instruct us-specifically with arrows, or generally by a note to "Take off sharp corners." But how it is to be done (by a chamber or a radius) is again at the discretion of the machinist or fitter.

The way in which corners are finished is not, however, a point of no significance. Unless the job is done neatly with attention to uniformity, a somewhat crude look is given to otherwise excellent work. It may be particularly noticeable when there are numbers of corners and many similar parts, as on most pieces of equipment and mechanical models. Unequai finish on details detracts from the general effect.

Occasionally a chamfer which is non-functional at small dimensions becomes significant when it is carried too far. An example is provided by the end of a poppet valve which is contacted by a tappet. With a tiny chamfer at the end of the stem, there is minimum reduction of area. But the larger the chamfer, the smaller the area at the end of the stem-and the higher must be the contact pressure to lift the valve against its spring.

In general work, non-functional chamfers and small external radii are made by hand filling with the machining operations completed. The tyre of file is important as well as the way that it is used. For small parts, a file of finest cut is advisable-a Swiss file, which can be kept clean by pushing a piece of chisel-edged brass across its teeth, and not by use of a wire brush.

To make the chamfer, use the file along the corner of the work, not across it. Two or three light strokes remove the raw edge and leave a tiny flat. If more than this is needed. care should be taken to maintain the flat of uniform width. These points are shown at A-l a block as machined; 2 with a neat, uniform chamfer: 3 with a rough chamfer from filing across the corner; 4 with a chamfer of varying width.

With a chamfer, there are two corners instead of one at the junction of faces. By tilting the file on to one and then the other of these corners, on successive strokes, a small " radius " is produced. Further smoothing can be done with a strip of emerycloth along the file. Sometimes an emery hone can be used.

Long work can be chamfered, or radiused, by sliding the file at an angle (B; upper diagram) as an alternative to pushing it flat along the edge, as in the lower diagram. Very small work should be held in a pin vice or a toolmaker's clamp.

Work in the lathe can be chamfered with a file in even, light strokes; and a small radius can be produced by tilting the file one way and the other from the corner. No attempt should be made to file a large chamfer. It will be faulty, the same as a filed radius. When a corner is near a reduced diameter or shank, care is needed not to mark this with the file, as at C. Mishap is avoided with a ground flat V on the file.

Moderate-sized chamfers are best machined with right- and left-hand angle tools, as at ***D.*** Large chamfers require a set-over on the topslide, as at E, to feed the tool at an angle WX. This applies to internal chamfers with the tool fed at an angle YZ.

Small internal chamfers can be produced with a scraper. Holes can be chamfered with a drill ground to 90 degrees. A split jig for holding small washers for chamfering is as at ***F.*** ❑