

# HAND FILING METHODS

By GEOMETER

**T**HE construction of any model or piece of equipment by processes involving hand fitting always calls for work with files and there is little doubt that abillity in the use of these tools is one of the most important workshop skills.

In certain cases where machining may be difficult, skilful filing can be good substitute for it. Other jobs which can be done with files are correcting minor dimensional errors after machining, and improving surface finish by removing machining marks. Again, the cleaning up of small features which may be non-functional, can lend an impression of precision in detail work, and contribute greatly to the general appearance of almost anything mechanical.

Only considerable practice, of course, can give dexterity in the manipulation of files, but in many instances their choice and method of use are equally important. However skilfully, for example, an unsuitable file is used, good work cannot be produced. Changing the method of using the file is often all that is necessary at other times to obviate most of the skill that would otherwise be required. An example of this is uniformly smoothing or easing down a small flat surface on a component, during which precision is better retained by rubbing the component on the file, rather than holding the component in a vice and filing it.

Here there is regard for the "geometry of the surface and the manner in which the file makes contact; and unrelaxing attention in these respects-at all times, adapting methods to circumstances is a vital factor in good filing.

Thorough cleaning of a file is the first consideration. It should be examined for a mass of swarf or embedded pieces of dragged metal, either of which will prevent vigorous cutting in a roughing down operation. Embedded pieces of metal inevitably scratch a surface which only requires smoothing; and loose particles of hard material, such as cast steel, scratch brass or aluminium. Consequently, for an important job, a file should be cleaned before use;

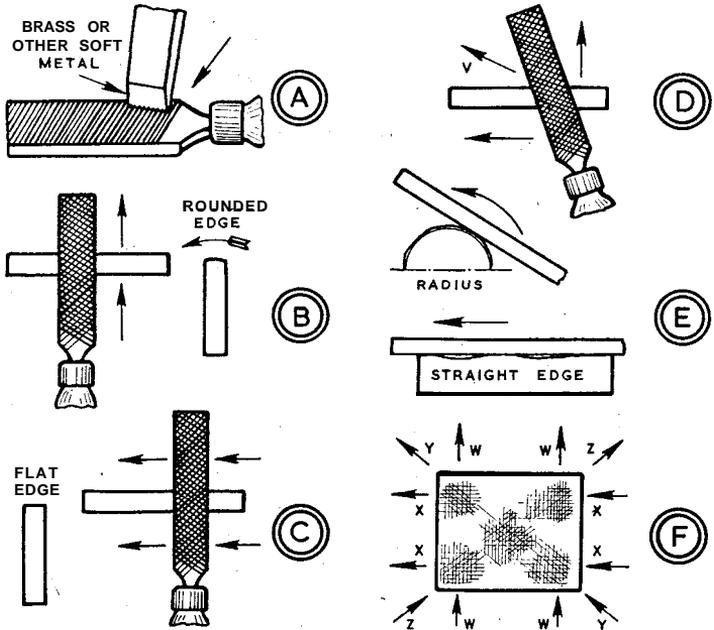
and even then unless it is a known file, the early strokes should be tentative.

Cleaning can be done, as at A, with a piece of brass or other soft metal with a chisel edge, pushing it cross-wise in the teeth. The wire in file carding or a wire-brush is too coarse to enter between the teeth of a small smooth file, though either can be used on larger files-from which, too embedded metal can be removed with a pointed mild steelrod, tapping with a hammer if necessary.

In filing an edge, as at B, a tendency to rounding occurs with straight-

V-and it also reduces dither and noise if the material is unstably thin.

Contacting with the file only high spots on edges or flat surfaces, and sweeping the file so as to change continually the line of contact on curved surfaces, are two methods for promoting accuracy in filing. As at E, a file pushed lengthwise along a straight-edge contacts and reduces only the high spots until the edge is straight, and a file swept round a radius obviously does not produce local flats. When there are obstructions to this method, modifications can be made by draw-filing (C) with



across strokes unless care is taken; and even if the edge is kept reasonably flat, it may be slightly out of square with the sides. Observation from one end or application of a small square reveals the error; and draw-filing, as at C, pulling the file flat along the surface, shows up high spots in a few strokes. Continuing like this, small errors can be eliminated, though for larger ones a return to localised cross-filing will result in speedier removal of metal.

In this respect quick removal of metal while maintaining accuracy at a high level follows from using the file, as at D, diagonally in direction

a rolling action, or by diagonal filing (D).

Cross-filing from different directions is a method of revealing high spots on a surface, and at the same time taking them down to give a high standard of accuracy. Thus, as at F, strokes can be straight across W, lengthwise X, and diagonal Y and Z.

On a surface of considerable area, contact of the file can be felt and the spreading of the high areas as they are reduced-which can be observed every few strokes-is a guide to how the work is proceeding. With small parts this principle can be followed in rubbing them on the file. □