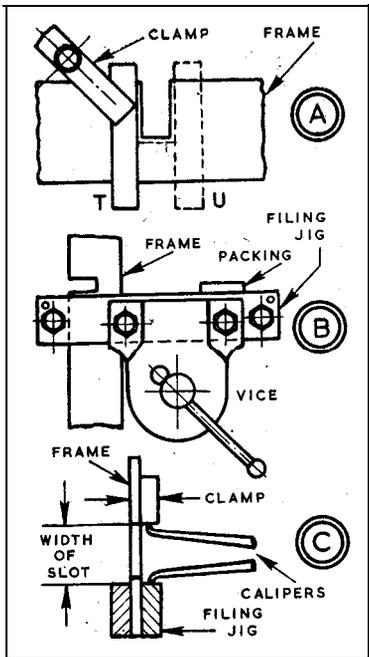


# ACCURACY in HAND FILING



In most occupations depending on co-ordination of hand and eye, considerable practice is necessary to achieve proficiency—which means being able to work speedily and with certainty as to results. It is so in free-hand filing, and particularly when it is essential to adhere to dimensions and alignment.

Starting with a piece of metal such as plate or flat bar stock, the filing of an edge reasonably straight, flat and square with other surfaces, is an achievement in itself. When, however, a dimension is applied at which the edge must finish, the work becomes much more demanding in skill and time; for not only must the edge be geometrically accurate, it must be at the specified dimension. So whatever the skill in free-hand filing, time is required for checking and correcting to be sure that no part of the surface is filed beyond the given position.

### Using a jig

Accuracy in a case like this and in many others, is best achieved not by free-hand, filing to the finish, but by using a guide or jig after the work has been roughed out. The guide or jig is clamped to the work with its surface at the given dimension—then the upstanding edge of the work is carefully filed down to this surface. Hardening is not necessary if a guide or jig is used carefully, once or a few times, especially if it is sub-

stantially thicker than the material being filed. For contact of the file with the surface and light marks on it indicate that filing must stop.

Using a guide, squareness is easily obtained at the ends of plate material—as on locomotive frames, or the bedplate of a model engine. The usual way is to mark the ends using square and scriber, saw off the surplus and finish by filing to the scribed line, checking with the square.

If a guide is clamped on for finishing, it can be set to dimension, checked true with the square, and the surplus filed down to its surface at the first attempt. On a part whose opposite end must be finished parallel with the first, and to a close overall dimension, a second guide can be clamped and its position checked with calipers before the first is removed.

The principle is applicable to open-sided slots, like those in small locomotive frames. A guide T, as at A, is clamped and squared to the roughly

cut slot, then frame and guide gripped in the vice for filing. Before the guide is removed, another U can be clamped in position, using a simple gauge (flat or round stock) between them to give the dimension.

A filing jig, as at B, sometimes allows greater freedom for mounting in a vice. Two pieces of flat bar are drilled and doweled with their edges flush? and the frame is set in at the required position, packing of the

## By GEOMETER

same thickness balancing the grip in the vice. Resetting the frame for filing the other side of the slot can be done as at C. A piece of material is clamped flush to the finished edge, then calipers can be used to the filing jig to give the width of the slot.

To avoid altering the edge of a slot while another at right angles is filed, the safe edge of the file should be worked to the one not to be touched. When a square file is used it means one edge must be ground smooth to a safe edge, and it has the incidental advantage of providing a much sharper corner at edges. As at D, the normal square file V has radii at the corners, and grinding a side smooth W eliminates radii at two corners. On the other hand, a three-cornered file X can be used to clear corners.

For gauging the width of a slot as a second edge is filed, a taper gauge is helpful; it can be either the full final width of the slot, or provided with a reference mark indicating depth of entry.

Enclosed slots which are roughed out by chain drilling are best trimmed at the edges with a straight-sided chisel, as at E. In very small slots, this helps in starting files. The chamfered edges of the ordinary chisel cause it to slide at an angle Y, but the straight-sided type can be driven straight down Z. Accurate filing can be done with a jig as at F, and for locating the second edge, a width gauge stepped at the end can be entered to set the jig.

