

Special files and shapes

GEOMETER writes on the application of non-standard shaped files for metal and wood working

AS EXPERIENCE IS gained in using files, it is soon discovered that there are occasions when the ordinary varieties are unsuitable because of their size or shape. Also, it is apparent there are forms which it is virtually impossible to produce with precision by mere unguided filing.

Happily, however, there are available at the present time numerous special types of files to meet unusual situations and some of the more common geometrical shapes, one-off or repetitional, can be produced with reasonable ease by the use of simple jigs and templates.

Special files

Ordinary files are not well adapted to curved bores such as may be encountered in making a model engine or doing a little home tuning to motorcycle or car, when it is required to reduce sharp corners in ports and smooth the interior of manifolds, where the riffer file (A) is useful.

It is double-ended, as shown, with curved tooth surfaces and made in a variety of sections—round, oval, rectangular, D-section, etc. No particular skill is required in its use, it is only necessary to ensure that any adjacent seating surface is not damaged in the process.

The rotary file (B) is employed in model engineering, toolmaking, die-sinking and in circumstances where, for any reason, machining is not admissible. It is used in an electric drilling machine, or driven from a flexible shaft, the shank being round to grip in a chuck. Again, there are various sections and generally two cuts at least, coarse and fine.

Common sections are round (ball) round parallel, barrel shape and tapered-sided. Some of the larger rotary files may be screwed on shanks.

Rotary files

Use of rotary files to produce the desired results demands practice and manipulative skill, since the rapidly-revolving tool tends to drag itself along a surface, so the drill or flexible-shaft head must be held firmly, yet at the same time moved to produce the

required contour. Particularly to be guarded against are involuntary movements when a cut is almost completed and resistance is suddenly reduced, for then the tool may jump and cut an unwanted hollow before the corrective movement can be applied.

Needle files, of which C depicts an example, are the smallest sections produced, generally for working in very small slits or apertures. The shanks are generally circular, though the files are intended for use by hand. As with larger files, there are numerous different sections.

A lever! link or connecting rod usually finishes with a rounded end or boss and when precision is required,

the component is produced by milling or grinding on a jig or rotary table. Very good results, however, can be achieved by filing, using as a guide a washer, or a disc of metal from a bar.

When a radius is required at a corner (D), the washer can be located flush with the side and end of the work and the two clamped in the vice, surplus material sawn off and the radius carefully filed to fit the washer.

To produce a nicely-rounded end on a connecting rod (E), the bore should be finished (as by drilling and reaming), then a pair of washers of similar bore and required outside diameter placed one each side on a close-fitting rod, which is just short of the total length, so washers and con-rod can be gripped in the vice.

For one-off work, steel washers need not be hardened-though they should be case-hardened for continuous use-or better, made in steel such as cast steel, which can be hardened outright by heating to red and cooling in water.

Use of templates

A template considerably facilitates working where the same feature has to be repeated a number of times. Depending on the use to which it is to be subjected, a template can be in mild steel, unhardened, case-hardened, or in cast steel, hardened and tempered.

The material need be no thicker than that necessary not to bend or deflect easily in use, having regard to the size. Using a template, it is necessary, of course, to file squarely.

To produce a ratchet quadrant (F), the template has a locating hole and a vee-nick of the required size, moved round the work in filing each tooth-in which way small saws and cutters can be produced.

Filing slotted joints

Slotted dovetail joints for a wood box (G), can be filed from a metal template, long enough to embrace width, or moved for the necessary number of tongues and grooves.

Small numbers of special armature laminations for a motor or dynamo can also be filed from a suitable template, (H), in this case swinging round to the required angular positions.

Some of the many shapes of files used for special work. Their application is described in the text

