FILE FINISHING in the lathe

EVEN when there are no technical draw backs in machining, filing may often be 'conveniently employed for producing' small features on components, such as radii and chamfers, minute degrees of taper, and for de-burring at corners. But when there are difficulties against easy working, such, as an inadequate lathe with flimsy spindle, small slides, a worn chuck, tools that are wanting, or lack of a flow of lubricant, then judicious filing represents the sole means for obtaining reasonably precise work.

By GEOMETER

For filing brass and mild steel, normal turning speed is satisfactory. A somewhat lower speed is advisable for tough materials like cast and silver steel, and also for cast iron, which is likely to glaze. For needle diameters, maximum lathe speed is not too high. Stock removal is conveniently done with an 8 in.. smooth-type file when diameters are substantial and a few thou are involved. Afterwards, tine emerycloth can be used under the file to improve, the finish. For tiny diameters, a 4 in. to 6 in. very smooth file of the " Swiss " type is recommended, and it may be used instead of emerycloth for producing a high but not polished finish following stock removal with the larger file.

Strokes with the file should be firm and long, with material removed evenly and the swarf carried away by the teeth Short dabs and scrubbing strokes'are not efficient for stock removal; and if the file is kept still the teeth fill up, with the possibility of embedded swarf tearing the surface. In fact, that is something to be constantly on guard against.

At every stroke, the file must be felt to be cutting cleanly or it may be suspected that swarf is building up in the teeth. While it is loose, it can be jarred out, tapping the file edgewise. on a block of metal (not the lathe), but when embedded it must be pushed out using a piece of brass or duralumin sharpened to a chisel edge.

A file on which a stick of chalk has been rubbed, holds swarf less readily than one not so treated. Chalk likewise reduces the energetic cutting of a new file to something like the. smooth action of one which has been carefullv broken in. Oil is not recommended as it sticks the swarf to the file.

A smooth file on a turned diameter immediately reveals machining deficiencies from a changed appearance, as at ***A. The*** diameter must, of course, be oversize to begin with-to be sized to micrometerr But given this there need only have been no deep grooves for the surface to finish uniformly smooth. A lead on a mandrel can be made similarly for mounting_ a component by its bore. By filing, too, a smallchamfer or radius can be made, and any " pip " left in facing removed, which might otherwise deflect a centre drill. Using a file overlapping an end, watch should be kept for swarf embedding at X.

For successful filing, a diameter must have length or end at an undercut, as at **BI .** Filing a spigot diameter, 2, is likely to lead to the fitting condition 3. But filing helps immensely in fitting a taper shaft to a bore, as at C. Stopping while the shaft is oversize, and noting the tight point with the tapers away from the fitting position, that on the shaft can easily be corrected and sized.

A needle point. for regulating discharge from a jet, even when comparatively lengthy, can easily be filed as at D, using maxhnum speed. The diameter is prepared by turning short lengths, at the first stage a point being made to hold in a centre punch dot in a plug in the tailstock. This then provides support to the moment when the point is finally completed by filing, and the portion engaged in the plug comes off.

A slight chamfer or filed radius on a dieter to be threaded helps a die to engage, but such tapering must not be excessive or it will be apparent on the thread.; On the other hand, filing the end of a finished thread is likely to lead to unshapeliness, with a pushed-over feather edge, as at ***E. This*** obstructs engagement, but can be cleaned off with a three-square file Y, or knife file Z.

With care, both positive and reverse radii can be smoothed and corrected by filing, as at ***F, using*** fiat, round and half-round files. Working on a gositive radius close to one, of reverse curvature, a ground radius on a flat tile avoids cutting a groove in the neck which would show and weaken it.

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