FACING AND COUNTERSINKING

Beginner's Workshop

By GEOMETER

IN OTHER THAN small sizes it is generally advisable for spot or facing cutters to be provided with more than two teeth. For when, say, four or six teeth are operating at once cutting is smoother and there is far less likelihood of chatter or digging-in occurring.

Of course, two cutting edges are convenient on a spot facing cutter with a spigot or guide to enter the hole in the work, because cutter and guide can be solid, yet the teeth are easily filed. With several teeth, however, it is otherwise, since the spigot offers an obstruction to filing. Hence, constructions are necessary in which cutter and spigot are separate.

Two common constructions are as ***A.*** In the upper cutter the spigot and cutter shank are one piece, unhardened, the shank being threaded to screw into the cutter, which can be of silver steel, drilled and tapped, provided with filed teeth, then hardened and tempered. In the lower cutter, the spigot is a small separate piece, short, tight-fitting mild-steel or silver-steel rod, unhardened, while the cutter and shank are of silver steel, hardened and tempered. Coned countersinks for screws can be made in either of these ways.

Another solution

On occasion the screw-on cutter provides a solution to the problem of back-facing behind a lug or inside a component where there is obstruction to normal application. The threaded shank is put through the hole, the cutter screwed on to it, and the tool pulled back into the work instead of pushed, as it is rotated in drill or brace.

Flat and coned cutters of this type, ***B,*** are provided with teeth facing the opposite way to normal,. owing to the reverse direction of rotation. The bore for the threaded shank should be plain to just beyond tooth depth, since with the thread to the end of the teeth, there is danger of breakage when the shank pulls in tightly. Pliers may hold the cutter for unscrewing, or spanner flats can be provided.

On either flat or coned cutters, teeth, C, can be provided with small three-cornered files. These should be used tilted off-square for the cutter teeth to be deeper on the outside than at the centre-in which way, the files are kept clear of the cutting edges on the opposite side. For this work the cutter can be held on the top of the vice jaws, screwed on a piece of rod. Cleaning and sharpening after hardening can be performed with three-cornered hones or abrasive slips.

Tongue and pin drives

A tongue formed on a machined shank or a pin put fhrough a plain shank are alternative means to threads for providing drive to cutters. The latter then have plain holes for pushing tightly on the shanks.

On a machined shank, C, the spigot or guide is turned leaving a substantial boss or shoulder. Then the driving tongue is formed by filing down each side beyond the spigot. The backs of the cutters are file-slotted to engage on the tongue.

On a plain shank a removable crosspin can be provided, ***D,*** and the back of the cutter again slotted-either entirely by filing or by drilling a hole and filing down into it to leave a rounded bottom.

On a coned cutter, ***E*** (left), a removable spigot, X; can be employed to control depth of countersinking if a piece of flat metal is placed beneath the work and care observed that chips do not get beneath the spigot-a method ensuring rapid and uniform countersinks without danger of marking top surfaces.

Rapidity is also a feature of setting up a cross-pin drive cutter for truing internal faces or bosses, ***E*** the cutter being placed inside the work, the shank entered and the driving pin fitted.

Back-facing, such as in a tube to leave the bore clear when countersunk screws are fitted, can be performed as ***F,*** with a screw-on cutter like the coned type at ***B.***

The tricky operation of drilling a shank at an angle to take an inserted cutter can be easily performed as G. A steel collar is fitted on the spigot, cut at an angle for starting the drill, and held to the shank in a vice using a distance piece if necessary. ❑