CROSS-SLIDE ANGLE PLATE MOUNTING

By GEOMETER

USING a lathe which has no vertical slide or slotted cross-slide, one is handicapped in performing many milling operations which complement normal turning and which are speedily performed and precise in the results when there are means for making set-ups.

Of course, bars, plates, clamps and simple fixtures, contrived for the occasion and mounted on the top slide, are in some ways substitutes. But they fall considerably short of the facilities offered by the broad face of a vertical slide, or the substantial area of a slotted cross-slide.

It is difficult, too, to mount a large casting on the top slide, or even a machine vice, which, once set up, can often be used for small parts.

Fortunately, the disadvantages are greatly alleviated by using an angle plate in place of the top slide, locating it according to one's needs, face to face with the chuck, at right-angles to it, or at intermediate angles for special operations. Components can then be clamped in orthodox ways, and the machine vice mounted in a variety of positions.

Cutters are no problem, neither are they expensive. Single-point tools serve for facing operations when mounted in blocks with an off-set in the independent chuck. Radii can be machined with pre-determined off-sets of such tools, or by fly-cutters set in mandrels and run from the chuck with support from the tailstock centre. Silver steel or cast steel rod is usually to hand for making spot-facing cutters, end mills, and keyway cutters.

In relation to the spindle axis, all basic mountings of the angle plate are made in its setting on the cross-slide, except the important one of squareness in the vertical plane. This might be presumed, though it would not necessarily obtain-in precise terms-even with a true angle plate.

So a test, A, is advisable.

Lacking an indicator, a piece of rod can be bent, gripped and swung in the chuck, when clearance to the face should be the same top and bottom. The clearance at the sides can be checked by swivelling the plate; but if there is vertical error, it must be corrected by packing with shimstock at Y or Z.

In preparing the angle plate for mounting, a recess is usually needed to accept the spigot which normally locates the top slide. The correct size drill can be used after a preliminary run with a smaller one, each being run in the chuck with the angle plate pushed up by the tailstock.

For a flat-bottomed recess, the lips of the larger drill can be modified by grinding after they have entered some distance. But the problem in many cases is lack of a suitable drill -and then a piloted spot-facing cutter in silver steel or cast steel rod is required, B.

This tool-left a few thou larger at its cutting lips than the measured diameter of the spigot-involves plain turning followed by sawing and filing for flats and clearance angles. Hardening is done normally; but tempering, with stubbiness making heat-flow difficult to control, is best accomplished on a bed of sand on a metal plate over the source of heat, quenching at near dark straw.

For mounting an angle plate, a pair of slots permit variation in radius to align to the bolts in the tee-slot of the slide. However, slight opening with a round file keeps bolt centres parallel with the face. In other cases, holes can be drilled.

Parallel and angular settings to the lathe axis can be made with a test bar and protractor, C, a projecting screw or pin in the bar providing clearance at the tailstock for a parallel setting. For an angular setting, a protractor is used to the bar-or up to a driving plate or faceplate when that is more convenient.

An example of work done at a parallel setting (although it can be performed in other ways) is machining the radius on a saddle casting with a fly-cutter, D. For this, the casting is held between small angles by a bolt through its bore, and is prevented from turning by a bar studded to its face and the angle plate. El