Self-feeding FACING TOOL

By GEOMETER

IN meeting the needs of a small workshop, a lathe may perform many operations that are work for specialised machines in a large machine shop. It is not unusual for features on components of a single model or piece of equipment to require the maker's lathe to function as planer, shaper, grinder, milling machine and boring mill-as well as in its ordinary capacity.

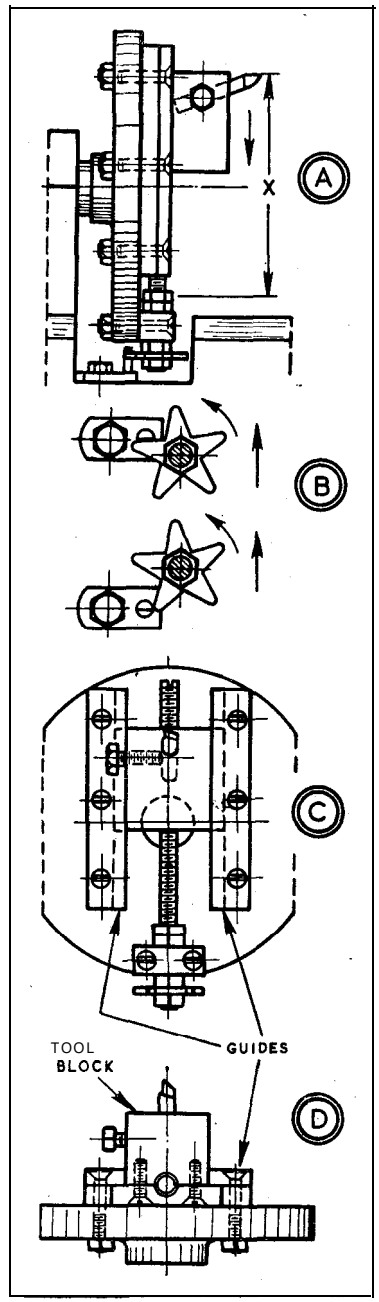
Much ingenuity is necessary in setting up and machining components -and one may regret the lack of facilities provided by specialised machines, particularly when one is working near the full capacity of the lathe.

An occasion of this sort occurs when there is need to face a large surface or series of bosses on a component which cannot be swung on a lathe principle, or moved across the bed past a tool or cutter in the manner of work on a milling machine. What is needed then is the feature of the special head on a boring mill by which a tool can be swept, not on a fixed radius, but in a flat spiral. Given this, the work can be fixed either to the slotted saddle or to the bed of the lathe-which is used to maximum capacity.

Self-acting cross feed

Many operations can be performed, of course, with a tool in the chuck or on the faceplate, sweeping on a fixed radius;. but to machine a flat surface with It, cross feed is required, and is not possible at full capacity, though it is another matter when, as now indicated, the tool besides being rotated is fed on an increasing or diminishing radius.

The easiest way of providing this self-feed for a tool is an arrangement as at ***A,*** with the feedscrew turned by a star wheel from a peg on the lathe bed, as at ***B.*** Simple guides for the tool block can be from flat material, attached to the faceplate (or to a large chuck backplate), as at C and ***D.*** A right-hand thread on the screw draws the tool block towards the centre, retracting the tool from the radius giving the large circle X. To return the tool, a loose handle can be fitted to the feed screw-or it can be rotated with a screwdriver via a slot in its end.



For a fixed component, depth of cut must be provided by setting the tool further out of its block. It can be done without special provision for the type of work performed, although a taper-ended screw from the end of the block to the bottom of the tool would give fine adjustment.

Rate of feed of the tool is governed by the t.p.i. on the screw which is moved 1/5 turn for every revolution of the faceplate. Divide 1,000 by 5 (200), and the answer thus obtained by the t.p.i., gives the feed per revolution in thou. With a screw of 26 t.p.i. which it is convenient to use, the feed is just under 0.008 in. per revolution. This is satisfactory for a facing operation if the **tool has** a small flat at its cutting edge. Back gear for slow speed should, of course, be used.

The tool block is mounted to its flat base by countersunk screws; and the two are drilled and tapped at the joint line for the feedscrew. If adjustment is required to give a good working fit for the screw, it can be provided by carefully facing (draw-filing) the bottom of the tool block. Draw-filing can likewise be the method of fitting the guides to the flat base of the tool block, to ensure the firm support that is essential to obviate chatter in machining. To the same end, the extension of the tool from its block should be a minimum.

Any or all of three features in the drive will safeguard it from jamming if the lathe is left running. The feed-screw may be given a plain portion on to which the thread in the block can run. The star wheel is gripped between locknuts, admitting of slip under heavy thrust. And the peg for the wheel is set in a plate which is tightened just to hold in normal working.