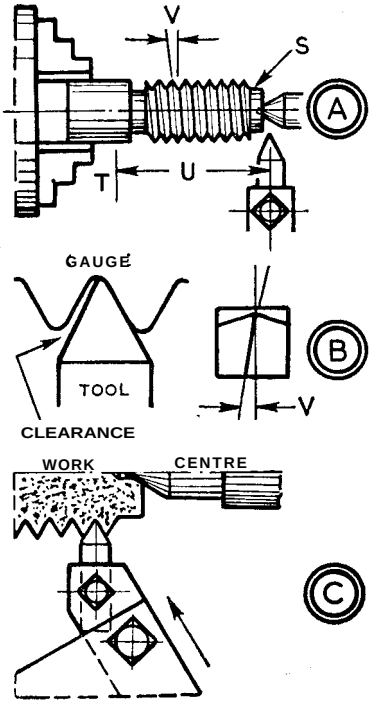
Exercise in screwcutting

IN a recent hint on using an independent chuck as a machine vice, I suggested mounting it boss-to-boss with a driving plate through a screwed piece or threaded stub. In this way the face of the driving plate makes a broad base to stand on the drilling machine table with the chuck upwards.



You can then use the four independently adjustable and reversible jaws to hold work as if the chuck were on the lathe, with obvious advantages over the ordinary machine vice on the drilling machine. For one thing, you can grip much larger work-to say nothing of the various awkwardly-shaped, easily-distorted jobs which would otherwise tax your wits to hold securely.

I suggested making the threaded stub-which is fitted half in the driving plate, half in the chuck backplate-as an exercise in screwcutting. Indeed, it would be hard to think of a better one to make a threaded part whose purpose is functional but whose dimensions are not critical; for which you can use soft material like brass, aluminium or duralumin, but on which you must employ screwcutting methods throughout, without being able to dodge the issue by finishing the thread with a chaser.

You need a piece of material larger than the thread on the spindle, and 3-1/2 in. to 4 in. long, so that one end can be held in the chuck and the other supported by the tailstock centre, as at A, after facing and centring. The outside diameter should be turned the same size as the thread on the spindle. For the core diameter, or root diameter, you can machine a short distance at the end S which will go comfortably into the thread of the driving plate. With a parting tool, a groove can be cut to this diameter at the overall length of the blank. Then you are ready for screwcutting..

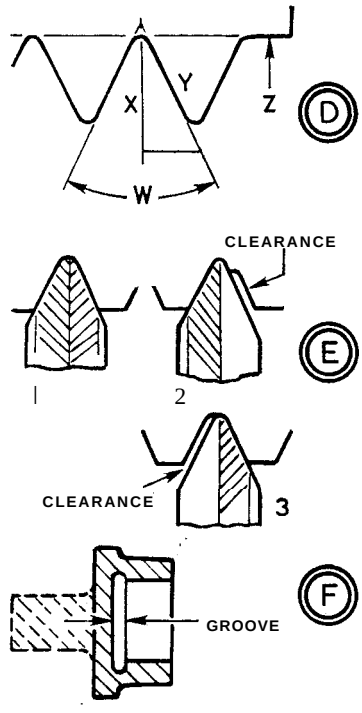
For this oneration, it is advisable to employ what may be considered " the proper method " as the thread is too deep to be cut easily by what I think of as " the alternative method."

By the proper method, you make a tool, as at B, with slight clearance in the thread gauge-or in the thread on the spindle in this instance. You leave the topslide parallel to the lathe bed, and deepen and widen the thread on the work by movements of the cross-slide and tonslide. both of which should be adjusted firmly.

By the alternative method of screwcutting, you make the tool to fit the thread, and set the topslide at half the thread angle, as at C.

Satisfactory as this is for fine and shallow threads, it is not recommended for heavy and deep ones, owing to the several broad roughing cuts near the finish. Another disadvantage is the cutting on only one flank of the thread, so that the other is sometimes left rather rough-although this does not matter if you later use a chaser or die.

If your lathe has no screwcutting dial, you can pick up for successive cuts by a simple principle, which



applies to any thread with a whole number of t.p.i. Take the trial cut, as at A, draw back the tool at the end of the blank, and stop the lathe with the tool at T. Go back with the saddle to some whole inch unit as U (say, 3 in. in this instance), reengage the nut, reset the tool, and take the second cut. (For half-threads you go back in 2in. units.) For clean cutting as the thread deepens, the point of the tool must have a slope V as seen from the front, diagram B, to suit the slope V of the thread at A. Take cuts with cross-slide and topslide feeds to the depth of the thread which can be read off the cross-slide collar.

With the topslide at an angle, you must feed it further than the thread depth, as at D. Here W is the included angle of the thread. By cross-slide feed, the tool would be advanced along X, whereas it is now along slope Y to core diameter Z. For 55 deg. threads, multiply by 1.13, and for 60 deg. threads by 1.15 ta get the topslide movement.

Diagram E shows wrong cutting (1) on two edges of a tool, and correct cutting on either edge (2 and 3). For an internal thread, you should machine a groove, as at ***F,*** in which to stop the tool. ❑