A spiral - **feed** FACING TOOL

By GEOMETER

BY a simple arrangement of worm and pinion drive, spiral feed can be given to a facing tool in the lathe, as an alternative to the self-feed described in my previous article. This type of feed has the advantage of moving the tool continuously away from or towards the centre (preferably towards), instead of suddenly once every revolution, as happens with self-feed from a star wheel turned from a stop on the lathe bed.

Another point is that tool movement, ro feed per revolution, is finer with spiral feed as a natural result of the gearing employed. Using a convenient worm and pinion ratio, and a suitable pitch of thread: a feed of 0.0025 in. per revolution is obtained, whereas a natural feed for a self-feeding tool. 1s. about. three times as much. This is particularly helpful in promoting a fine finish. It has merits, too, for machining hard materials.

As with self-feed for a facing tool, the component can be mounted on the bed of the lathe, or on the saddle, without cross feed being essential; and if the component must be fixed on the bed, the tool can be drawn out from its mounting to give the depth of cut required.

The arrangement of worm, pinion, feed screw and guides is as at ***A***- for mounting on a faceplate. The worm X, on a rod in bearings in the spindle, causes the pinion to turn and rotate the feed screw. The facing tool is held in its block by a setscrew at position Y, with the option of moving it to position Z.

The guides are pieces of straight rectangular material, such as mild steel,. two pieces for each, separated by distance pieces or collars to leave a space between them. The baseplate on which the tool block is mounted moves in this space, and the tool block itself is of a width to move without shake between the upper members of the two guides. The nut for the feed-screw is at the bottom of the base-plate; and the bearing for the pinion at the tail end of the feedscrew is a piece of square or oblong material (brass or duralumin) held by counter-sunk screws between the lower members of the two guides.

All these parts are flat, parallel, square-edged shapes, easily produced by normal workshop processes.

The pinion and feedscrew are rotated through turning about the stationary worm, which is fixed as at ***B.*** Two bushes--one each end of the spindle-provide bearings for the rod where the worm is mounted on a reduced diameter, riveted at the end. The opposite end carries locknuts for adjustment, and for holding a piece of flat bar, wedged or held in any convenient way.

A right-hand thread on the worm gives a feed that **draws** the tool from the periphery to the centre, and one revolution of the faceplate moves the pinion one tooth-as is usual on a single-start worm. If the pinion has 20 teeth, it is moved l/20 turn each revolution; and if the feed screw has 20 t.p.i., the feed is l/20 x l/20 = l/400 in. = 0.0025 in. Other ratios and pitches provide other feed-and there is also the possibility of altering the feed by gearing the worm shaft to the spindle, instead of its being stationary.

The arrangement of tool block, baseplate and nut in the guides is as at C. The collars for spacing the guides for the baseplate can be rubbed on a file in fitting, and shims can be used if they are made too thin. The depth of the lower portions of the guides allows the baseplate to slide over the pinion and worm.

Drive is transmitted to the feed-screw as at D, so that with the holding nut slackened, the screw can be turned to retract the tool to its starting position. For this, the screw is turned down to a stem and threaded at the end. The nut there holds the washer, sleeve and pinion firmly, but permitting rotation in the bearing which is mounted in the lower portions of the guides.