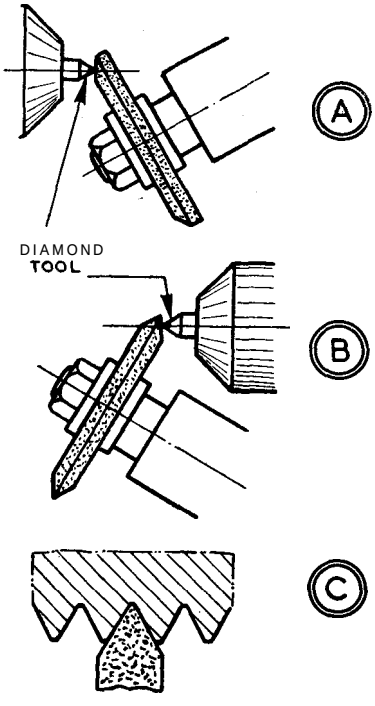
Thread grinding

By GEOMETER

COMPARED with machining, the general advantages of grinding are greater precision, smoother finish, improved control of cut, ability to deal with hard or tough materials; and where difficulties would be encountered by other methods, there may be a saving in time, apart from the fact that, on occasion, grinding may be the only possible way of performing the work. All of this is true to some extent in thread production; and for the special or awkward job, grinding may well provide an easy solution to some otherwise difficult problems on external threads.

There are two principal ways of arranging thread grinding set-ups on a lathe, one employing a grinding head (or portable grinder), and the other a jig. Using a grinding head, the set-up can be as for ordinary screwcutting; the job mounted in the chuck, with the shaped grinding wheel substituted for the screwcutting tool and fed into the work from the cross feed, and the saddle traversed by the leadscrew. Using a jig, the grinding wheel is run in the chuck, and the work is mounted and rotated in a holder.

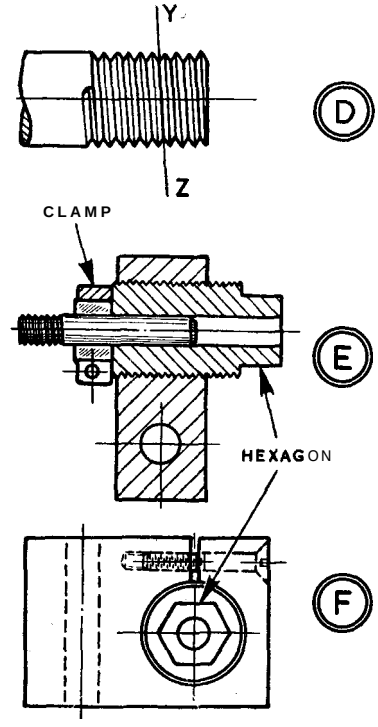


If there is a partly-formed thread on the work-as from a previous screwcutting operation, the essential advance as the work is rotated can be obtained by arranging for a plunger to engage the thread; or the holder may incorporate a threaded sleeve both for mounting and to provide the advance; and the pitch of the ground thread will then be the same as that on the sleeve. By this means, it may be possible to thread cleanly and precisely, one after the other, a number of small or delicate parts -with the added advantage that, whereas a grinding head or portable grinder might be expensive, the jig can, perhaps, be made up from oddments.

Whichever -set-up is employed, the grinding wheel must necessarily be trued to the flank angle of the thread; and in each case this can be done on the lathe itself, given a diamond tool or dresser. For the jig set-up, with the grinding wheel running on a mandrel in the chuck, flank angles can be produced by mounting the diamond tool on the topslide, setting this round each way, and taking fine cuts off the edge of the wheel. Using a grinding head or portable grinder on the topslide, this is again set round each way, so that cross feed can be used to take the running wheel past the diamond tool mounted in the chuck, as at ***A,*** and in the tailstock, as at ***B.***

The thread produced can be as at C, with small flats at roots and crests often satisfactory in any circumstances and, in fact, standard in Europe and the USA. But a radius can be produced using the grinding wheel by carefully touching the corners with a piece of broken wheel, while crests can be radiused on the work by subsequent lapping.

With each type of set-up, work and grinding wheel axes should diverge from parallelism at an angle equal to the slope of the thread Y-Z, as at ***D.***



This angle varies according to the pitch and diameter of the thread; and is the angle whose tangent is pitch/circumference at the pitch diameter. For right-hand threads, the grinding head or jig must be set with its rear or right-hand side high; and often a set-up is best made on the vertical slide using an angle plate which can easily be tilted.

For setting up in this way a simple jig for small parts can be made as at ***E*** and ***F.*** The body portion, a rectangular block of aluminium alloy for easy machining, can be bored and screwcut in the lathe with a thread of the required pitch, drilled and tapped for a gripping screw (to regulate friction), split, and drilled for a mounting bolt. The threaded sleeve,, which can be in brass, is bored or drilled and reamed for the part to be a good fit. The nose end is split to close by a clamp, and a filed or milled hexagon at the opposite end provides for turning by spanner. ❑