

# Boring small holes

By GEOMETER

**E**VEN when drilling and reaming are possible for finishing holes, there is a good deal to recommend boring in the lathe, apart from the numerous occasions when it is the only practicable method. It ensures straightness in holes, and there is concentricity with outside diameters. Moreover, one has control of intermediate sizes and surface finish.

When a hole is drilled, there is considerable scope for the results to go wrong. Even after a carefully centred start, a drill may wobble or wander in working. Depending on how it is ground, it may cut undersize or oversize. It may leave a surface reasonably smooth or alternatively rough or containing a spiral.

Assuming all to be well in drilling, drill sizes are in such "steps" that often the required fit is unobtainable. To cover all possibilities, one would

need an expensive quantity of drills in fractional, number, letter and millimetre sizes. If a hole is to be finished by reaming, it is desirable to leave in it only a thou or two of metal. The drill may leave far too much, thus causing more work for the reamer, and sometimes resulting in risk of damage to the work, if it is difficult to hold firmly or rotate smoothly.

In work on the lathe, many of these hazards can be eliminated by boring with a tool from the slide rest following undersize drilling; and if reaming is to be the final operation, only the required minimum of material need be left. For small size holes—say, about 1/8 in. dia.—suitable tools and a holder which can be set up with the minimum of trouble are essential for success, as there is little accommodation for errors in setting.

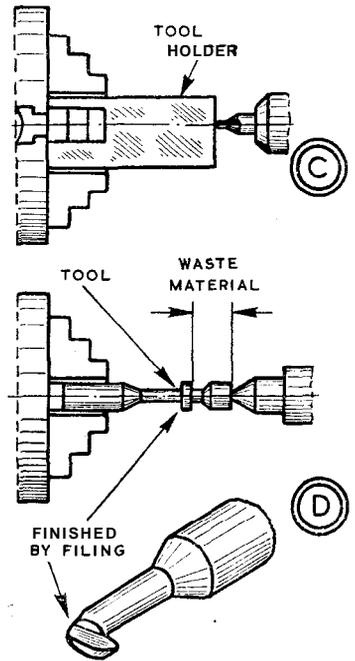
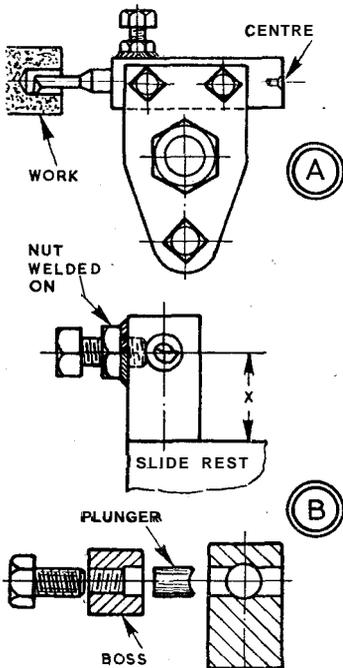
## Made to fit

The toolholder should be made for use on the particular lathe without packing on the slide rest, and the bore for round tools should then be exactly at lathe centre height. As at A, the holder may have a centre at the rear end, so that for setting when the slide is at an angle, a centre in the mandrel can be used in the toolholder bore at the front, and the tailstock centre entered at the rear. If the slide is parallel, the holder can be set to that. Tools can be made in silver steel rod 1/4 in. or 5/16 in. dia.

Rectangular section mild steel bar can be used for the holder with a nut welded at the side (a garage would do this) to take a setscrew for holding the tools. According to size chosen for these, the screw can be 1/4 in. or 5/16 in., and with a BSF thread. The material for the holder should be set up on the slide rest (as the holder will be in use), and bumped up to a centre in the mandrel and back to a centre in the tailstock. This makes an indentation each end at correct centre height, as at B distance X. With the material set in the four-jaw chuck, as at C, the indentations can be centre drilled and the hole drilled and reamed or bored to take the tools.

As an alternative to a nut, a boss can be machined in mild steel to

weld on the holder, tapped for the setscrew and counterbored for a plunger which can have a rounded end to grip the tool. This will ensure a firm hold without a flat on the tool shank or without marking it if it is not dead hard. The holder material can be cross-drilled right through and the boss located by a rod for tack-welding, then finally welded with the rod removed.



For making a small tool, the silver steel rod is chucked and turned down behind the front end to form a shank smaller in diameter than the hole. The shank will then be sure to enter it truly and the material at the end can be filed to the nose shape of tool required, as at D. Sometimes springiness may require the use of the tailstock with removal of waste material afterwards. Tools may be hardened and tempered in the usual way for silver steel and kept sharp by grinding and honing.