

# LATHE MILLING

By GEOMETER

A CENTRE lathe with vertical slide and angle plate is equipped for many operations that would otherwise require a universal milling machine. For you can make single-point tools perform the same operations as multiple-tooth cutters by reducing the rate of feed so that a dig-in cannot occur.

You can make the tools from round and square bits and pieces of silver steel rod, to mount in holders in chucks or to fit in the taper in the lathe spindle. The cost in cash is small. If time presses, and you must keep to bare essentials, there are several easy-to-make holders that can be made from mild steel bar. They can be case-hardened or left soft. For frequent use, you should case-harden them before they become dented and worn.

According to need, you can set the vertical slide squarely or at angles on the cross-slide. The angle plate you can mount on the vertical slide, flat or sloping. To put on cuts, you have the leadscrew for the saddle, and the screws for the cross and vertical slides.

Any of these screws can be used to move work past a rotating cutter; and so, besides making set-ups at compound angles, you can feed work in any of three planes at right-angles.

Diagram A shows some typical operations which are performed by running tools in the chuck with the work mounted on the vertical slide.

For boring A 1, you can sometimes use an ordinary boring tool in the independent chuck. If the hole is small, you can make a round-shanked tool from silver steel rod and mount it in a holder. In each case, set the tool by adjusting it in the chuck jaws. Fix the vertical slide and cross-slide by the screws to their gib pieces; or wedge the slides with packing to prevent movement. Feed the work by the saddle.

For facing A2, you can fit a round tool in a reamed hole in a rectangular mild steel holder, fixing it through a grub screw. Adjust the circle swept by the tool by setting the tool and the holder. Apply cut to the work from the saddle, locking

this to the bed or retaining its position with leadscrew nut. Feed the work with the cross-slide or vertical slide.

For slotting or grooving A3, you can use an endmill in a holder in the chuck, setting the tool to run concentrically. Apply cut again from the saddle, and feed the work by the cross-slide or vertical slide.

The ordinary endmill has two cutting edges so that the end of the tool appears as at B1. To resharpen it, you need an accurate square-edged grinding wheel. When this creates a problem, the solution is to make an endmill with a single cutting edge, B2. Then you can resharpen it on any flat face on a grinding wheel. The single-edged endmill will do the same job as a double-edged type when it is run fast with slow feed for the work.

You can make a holder to mount round-shank tools in the independent chuck as at B3. Chuck two pieces of rectangular mild steel bar; face and centre the end and drill

through undersize. Finish the bore with a standard drill or a reamer. The abutting edges of the pieces you can ease with a file for the holder to grip the shanks firmly. To keep the halves of such a holder together, turn the ends circular and machine the grooves for circlips, B4. Make the circlips from coils of springs. A shank pushes into the holder with a friction grip.

Another holder for a chuck is shown at C, upper diagram. In this the tool is clamped by a grooved cotter made from a bolt. Fit the bolt first. Drill and ream the hole for the tool. Then cut the head off the bolt.

The holder at C, lower diagram, has a taper shank to fit in the lathe spindle. The rear end can be tapped for a draw-bolt. You slit the other end with a saw to line WX for clamping.

A holder for square tools, diagram D, consists of a centre block with sideplates YZ fixed by countersunk screws.

