

## SIMPLE FORM TURNING

**F**EEDS of cross-slide, topslide and saddle provide for ordinary facing and turning operations, while small irregular features can be machined with form tools, and radius tools or radius-turning attachments enable regular radii to be produced.

There remain, however, larger forms which none of these processes properly cover, since there is a limit to the size a form tool can be made-apart from the chatter which occurs with a broad cut. For machining to be smooth and clean, the single-point tool principle must be adopted, and this means the tool must be guided in some manner, 'whether the cut is to be over the end of a piece of work or along the side.

At **A** is shown how a conical end can be provided on work by setting the topslide at an angle, for the line, X-X to be produced with the slide travelling along Y-Y. If, however, it is necessary to finish the work with a curved end, the method shown at **B** is about the simplest that can be contrived.

It might in some circumstances, of course, be possible to machine the work free-hand to a plate gauge; and again, on occasion, a radius turning attachment might be used-if the curve is a proper radius and not too large.

The method shown employs a sliding tool in a holder mounted on the topslide in the normal manner. A collar is attached to the rear end of the tool against which bears a spring to keep the tool in contact with a form plate. This plate is mounted on a pad centre in the tailstock, and a cut is applied to the tool by tailstock feed. Ordinary cross-slide feed then carries the tool over the work.

In any type of form turning, the form plate should provide a solid backing for the tool and be capable of feed so the tool can be advanced to the work for succeeding cuts. Here, this is conveniently done from the tailstock. The plate can be of angle iron held by screws or bolts to the pad centre-or mounted in any other convenient manner, such as by brazing it to a taper shank.

The required profile can be marked, then with the surplus metal sawn away, it can be filed and scraped to a finish for the rear end of the tool to slide smoothly over it-with a drop of oil. Too great a movement should not be attempted for the tool.

The above provides for machining a curved crown on a piston, or for finishing the outside of a shallow bowl-the inside being turned with a form plate of opposite shape. For tool application to the side of work, such as for crowning a pulley or flywheel rim, or machining handles, candlesticks or shaped table legs, the principle is the same and a tool set-up can be made as at **C**.

A similar type of spring-loaded sliding tool is used with the rear end bearing on a form bar carrying the profile. The form bar is backed by a guide in which it is free to slide,

and the whole is mounted on a piece of flat steel plate which has a clamping hole to fit over the stud of the topslide for holding down with a distance piece and nut.

The form bar has a hole at the end for attachment to a link, which is itself fixed to a bracket on the end of the lathe, or a wall at the end-the principle being to hold the form bar from movement endwise but permit the cross-slide to be fed in to apply the tool to the work.

By altering the form bar, as at **D**, long curves can be machined, as are necessary on work of the type mentioned. For end work of the type at **B**, the tool mounting must be at right-angles, and the form bar anchored at the back of the lathe.

The form plate mounting on the tailstock pad centre for **B** is shown in the bottom diagram.

