Measuring with the lathe

By GEQMETER

MEASURING is often performed with a modern lathe in the normal course of machining. The topslide feed screw and also the cross-slide feed screw, have micrometer collars. The leadscrew of a small lathe sometimes has a graduated handwheel, and it is not unusual for a tailstock barrel to have a similar graduated handwheel or a micrometer collar.

With these it is possible to machine many short steps, shallow recesses, overall lengths, widths of flanges, and so forth, to within a few thou of an inch, which is an acceptable standard for parts that have no stated tolerances to their dimensions.

An example of general procedure is to machine a piece of bar with a short diameter to a shoulder, using the topslide and cross-slide feedscrews.

First, the topslide collar is set to zero, then the saddle is moved for the tool to take a facing cut on the bar, after which the saddle is locked to the bed, or is located by engaging the leadscrew nut. When the facing cut has been taken, the topslide screw is used to obtain the distance to the shoulder, reading on the micrometer collar.

To obtain the diameter, a check is made on the bar-by micrometer-following a trial cut. This shows how much there remains to machine. Half the amount is taken on the cross-slide micrometer collar, after it has been set to zero, for the tool cuts on a radius, whereas the check is over a diameter.

With this procedure the lathe is used not only to turn, but to measure the job: and the result is obtained in a shorter time and to greater precision than when working haphazardly. Many variations are possible of the basic idea, here given in the simplest terms.

These typical uses, however, are not all the measuring operations of which a lathe is capable, for in its bed and its headstock and tailstock. it has the elements of a measuring machine. With a pair of flat-ended " centres " as anvils, one in the spindle, the other in the tailstock barrel, as at ***A,*** a lathe can be used for measuring parts, or for holding dimensions for verification.

A motorist who has a lathe, but no large micrometer, can check a set of pistons more accurately than with callipers, using feeler gauges to test variations. With callipers or simple adjustable end gauges, cylinders can be tested for ovality and taper, and the dimensions brought to the lathe to reveal variations.

In a similar way, a lathe, functioning as a large micrometer or rigid callipers, will hold dimensions that are set with inside micrometers-which is a valuable function when long end gauges are being lapped to length, with frequent checks.

For any of these measuring operations, it is an advantage for the tailstock to have a micrometer collar -or some other means by which thous of an inch can be read off, even though only through a short range. Lacking a micrometer collar, a simple solution to the problem is to mark the handwheel, and use a pointer like that of a surface gauge to it. For instance, if a range of 0.005 in. is needed, two marks can be made on the handwheel, one with, the other without, a feeler gauge 0.005 in. thick at the anvils.

A better way is to mount a graduated ring on the handwheel, or a ring on which a graduated sector can be clipped, as at B. Such a ring can be cut out with pointed tools from sheet steel which has been screwed to wood backing on the lathe faceplate. For use, the ring should be secured to the handwheel by two countersunk screws in tapped holes. The sector can be made as shown in detail-the plate 1, packing 2, clip 3, all from sheet steel and held together by two countersunk screws and nuts. With the sector clipped on the ring, it can be adjusted after the anvils have been set; and with the pointer of a surface gauge brought to its scale, measurements can be made through a short range.

Short range measurement, coupled with sensitivity, is obtained with an indicator mounted in the tailstock; diagram C shows an example of this arrangement. It is particularly helpful for making sets of end gauges of equal length, like the pairs at ***D.*** ❑