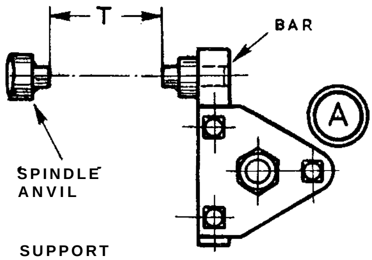
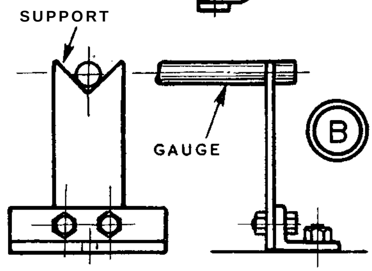
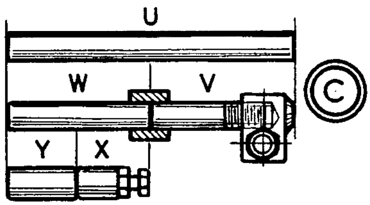
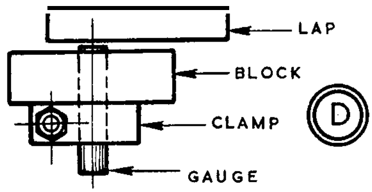
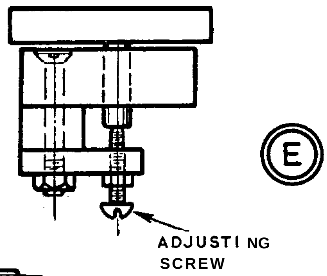
Gauge making with the lathe

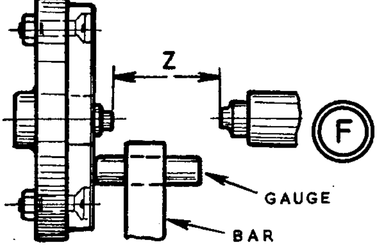












As the previous article explained, measuring with the lathe can mean much more on occasion than using the micrometer collars on feed screws to obtain diameters and lengths of features on components.

The ordinary centre lathe, in fact, resembles a horizontal measuring machine? with its straight bed and centres in opposition. With simple adaptation, it can be employed for actual measuring. Flat centres or anvils are substituted for the pointed ones, then tests can be made on components, and dimensions can be held to a relatively high standard of precision. The process is aided by a micrometer collar on the tailstock barrel, or by a graduated ring or sector on the handwheel.

Greater precision is possible when an indicator replaces the tailstock anvil, for in this application-as in all others-an indicator has the advantage over human touch of uniform sensitivity. Errors, moreover, are shown magnified on its dial.

By GEOMETER

For a lathe which has no graduated feed to the tailstock, the topslide offers an alternative mounting for an anvil or indicator, in opposition to the one in the headstock spindle. An anvil can be screwed or pressed into a flat bar for mounting squarely on the topslide, as at ***A. Any*** dimension, ***T,*** can then be obtained within the capacity of the lathe, the graduated feed on the topslide screw providing fine adjustment. The same can be done with an indicator mounted on a bar, its plunger at centre height and pointing straight at the spindle anvil.

Any of these ways of measuring can be employed for checking simple gauges, which, themselves, can be used for a variety of purposes-for measuring, for setting callipers, work and tools, for supporting parts, or for obtaining zero settings on indicators which are used with the surface gauge on the lathe or surface plate.

End gauges, which are the easiest type to make, will perform all these functions, providing a standard of precision equal to those of many toolrooms. The rods employed for them can be either mild steel or silver steel; and for occasional use, either can be left soft, though for lasting accuracy mild steel should be casehardened at the ends and silver steel should be hardened and tempered. This treatment must be before gauges are finished to length, which is done by lapping

Short gauges may be held in the fingers for measuring, but long ones should be laid in V-supports, as on a measuring machine. The object in this case is to avoid strain, though for very precise measuring, it is just as important to avoid expanding a gauge with the warmth of the hand. Two supports are required for a gauge, each positioned about one-fifth of the total length of the gauge from the end. Diagram B shows a design made from angle and flat stock. The bolt holes in the latter should be slotted so that it can be adjusted to set gauges to centre height.

As for the standard which is used in gauge making, it must depend on what is available-a micrometer or a vernier calliper. Assuming, however, it is only a 1 ft rule, a high standard of accuracy is possible. With care, the error on this length should not exceed 0.010 in. ; and it can be much less.

As shown at C, two 6 in. gauges can be made from the original one, U. These are ***V*** and W, each with half the original error. From these, two more can be made, X and Y, with the error halved again. Thus, it can be reduced to 0.0025 in. on 3 in., which is no more than might obtain in making three 1 in. gauges from a micrometer. As shown, a sleeve joins pairs of gauges for testing. Means of adjustment are also provided on gauges ***V*** and X, so that only gauges ***Wand*** Y need to be lapped.

For hand lapping, a block is bored and faced, the gauge is pushed through, and the lap, charged with abrasive, is rubbed over the end. Adjustment is provided, ***D*** and ***E,*** by taking packing from a clamp, or using an adjusting screw. In lapping on the lathe, ***F,*** the gauge is pushed through a bar on to an abrasive-faced disc. For testing length **Z,** it is tried between the anvil.