LARGE HOME-MADE MICROMETER

WORKSHOP HINTS and TIPS

MAKING equipment to measure to a high standard of precision is not so difficult as it might be thought by anyone who has never attempted it-a fortunate circumstance for those who need accuracy on dimensions beyond the 1 in. of the popular standard micrometer and cannot afford additional equipment.

Most micrometers, of course, have threads of 40 t.p.i., which are the same as those employed for many model fittings, and are specified when nuts are to be run on thin-walled tubes, or when they are to be screwed into the tube plates of boilers. Commercial taps and dies for cutting

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these threads produce excellent results when they are used with ordinary care and skill, and so it is quite practical to use them for micrometers.

The principle by which measuring to 0.001 in. is obtained on the ordinary micrometer can likewise be followed in the home-made equipment, by providing a similar thimble or sleeve, or even a disc, divided into 25. Then 40 (t.p.i.) x 25 equals 1,000 (1 in.), with one division giving 0.001 in. Dividing can be done from any change wheel with a suitable number of teeth.

Having settled the principles and decided means for producing the more important parts, you can consider the general design. Here simplicity, solidity, and built-up construction have much to recommend them, with all parts made separately. This tends to confine the scope of errors; and you can use the " measuring head " for a purpose other than the one originally intended.

A large home-made micrometer, as at ***A*** and ***B,*** provides an example. The frame or body can he built up from two pieces of rectangular mild steel bar, with a steel distance piece or spacer bolted between them. The length of the spacer controls the gap of the micrometer, and so by having a number of such spacers, each longer than its predecessor by the movement of the micrometer spindle, measurement is possible over an extended range. In addition, the head bar carrying the micrometer spindle can be used in other precision equipment by making provision to bolt or clamp it on.

Both pieces of bar, which with the spacer form the frame, are drilled and tapped 40 t.p.i., when clamped to the faceplate, the one for anvil X, the other for spindle Y. Each is slotted from the end and is fitted with a screw for closing the slot, the anvil being gripped firmly (after setting) and the spindle adjusted to a smooth working fit. Locking the spindle to hold a setting is done from a threaded plate in the slot of the head bar-the plate being forced down by another when the knurled nut Z is tightened. The head bar carries a scale, with 1/40 in. divisions, against which registers the disc on the spindle with its 25 divisions.

Mild steel can be used for both anvil and spindle, though the-working end of each can be casehardened. For a high-quality fit, spindle threads can be produced slightly oversize-regulating the opening of the die-and finished by lapping with fine abrasive compound using a split brass or aluminium lap.

Lapping can also be the means of finishing the gauges by which the micrometer is set. These can be of mild steel rod, carefully faced a few thou overlength. Then a guide block can be faced, drilled, reamed, or bored in the chuck, so that a gauge can be pushed through it, C, for a brass or aluminium lap to be used at the end. Two accurate gauges in a sleeve give 2 in.; if the micrometer has 1 in. movement, it can be opened to 3 in. Three gauges give an initial 3 in. and the micrometer an ultimate 4 in., and so on.

For dividing, the disc (which is gripped by a knurled nut to the spindle) can be mounted with a change wheel on a mandrel. If you lack other means of indexing, the arrangement D can be rigged, using angle iron to the lathe bed and two bars held together by a rubber band. ❑