

Sine bar construction



WITHOUT departing from the principle of the sine bar, there are various ways in which it can be constructed, either from the solid or built-up. With some of the constructions, a high standard of accuracy can be achieved using simple equipment. Besides a lathe, essential items are a surface plate (sheet of plate-glass), a surface gauge to carry an indicator (simple pivoted arm type), an angleplate for mounting the sine bar, and micrometer (or micrometers) for producing distance pieces and end gauges, checking rollers, etc.

A convenient type of sine bar has its locating faces in the same direction, and can be set up as at A against the face of an angleplate. One roller can be a toolmaker's button screwed to the face of the angleplate for the lower end of the sine bar to be lodged on it. The other roller, which must

be the same diameter, can be solid—such as a short length of silver steel rod.

A base block R should be used to set the button to working height; then moving it to the other side, it is employed to support the gauge or packing piece S. This gauge represents the vertical height of the right-angled triangles. Its dimension is obtained by taking the fraction for the angle from sine tables and multiplying this by the length of the sine bar. Once the bar has been set to angle, it can be conveniently clamped (toolmaker's clamps) to the angleplate, and the equipment for checking placed on it without danger of movement.

A sine bar of this type can be either of solid or built-up construction, as at B. If it is solid, there will be milling and grinding facilities, and the bar will probably be of tool steel, heat treated between the milling and grinding operations.

Grinding operations should be in two stages. In the first, the locating

faces for the rollers from the top edge of the bar should be brought to the same dimension, T, using a newly-dressed wheel working on the periphery. In the second stage, a cup wheel should be used to finish the vertical faces for the roller centres to a suitable dimension, U, which can conveniently be 5 in. and should certainly be to the nearest whole inch.

By GEOMETER

After truing both faces, grinding one or the other will give the length required.

For the built-up construction, use highly accurate material. Facing in the lathe and lapping to length will be the major operations. The pieces can be soft or hardened. In the latter event, the lapping would follow hardening. One roller is located by a block V and the other from the end piece or stop W.

Preferably the bar should be made long, so that lapping the end face where stop W is attached will give the length. But if the bar be made short, a piece of shimstock could be used as packing—with any lapping on the end that might then be necessary. For checking, long rollers, as at C, can be located to the shoulders and each clamped, for a measurement X to be made over them.

A simpler type of sine bar is as at D, and is equally satisfactory for angles at which obstruction cannot occur between the spacing piece and the supporting gauge. One roller can be held by a central screw to the backing piece. Then if the spacing piece lapped to dimension Y has slotted or oversize holes, it can be pushed up to square the roller and all screws tightened to make an assembly which can be located, like the other bar, on a button, as at A.

If desired, a sine bar can be made with bored, button-located holes, as at E and F, where effective length is Z. Then an adjustable pin in the angleplate will carry the bar, and a built-up U-piece, packed by gauges, support the roller.

