A slide for spherical turning

When a lathe is equipped with a spherical turning slide, hollow or ball-ended components can be machined with a single point tool, which is the best means for ensuring a good finish and accurate dimensions.

It is true that spherical surfaces can be machined with form, tools, or by free-hand turning? followed by careful filing or scrapmg .Likewise, surfaces of ball ends can be trued and smoothed with a keen hollow punch, fitted with a handle and used from a support, like a hand turning tool.

But none of these methods gives results to compare with those of a spherical, turning slide, either in speed or accuracy. For this reason, a tool-room lathe often has' such a slide among its accessories, enabling special work to be done almost with the facility of turning tapers from the top slide.

On a small lathe, similar advantages obtain, and the sketches show details of a slide that can be built up from stock material. Its features and proportions can be freely altered and adapted to individual needs, so long as construction is kept substantial and rigid. The slide is intended for mounting on a slotted cross-slide table, and its use on a cross-slide with circular table and spigot would require adaptation of the base.

As shown, the base ***A*** is flat with plain holes for holding bolts, and tapped holes for the pillar stud and bearing setscrews. The pillar stud is a separate piece to permit careful filing or lapping of the end of the pillar (if necessary for a nice endwise fit for the bearing. Were it not for this, the stud could be a threaded extension of the pillar. Similarly, the end of the bearing and nut can be lapped , if dimensions are such that the pillar grips.

At the top end, the bearing is bored with a recess for the flange on the pillar and turned to press into the flat material used as the base for the guideways-where it is brazed. The bottom end is turned for the worm wheel and threaded for the nut which secures it . This nut can b broad-based to help to support the bearing and slide.

The two bearings ***B*** for the worm shaft are of rectangular bar material, the thrust of the worm being taken on the one adjacent to the handle. Optionally, the worm may be integral with its shaft, or held by a nut. Special hobbing of the worm wheel can be avoided by using a narrow gear and lapping its teeth on a pattern worm-although it is realised that objections might be made to this method.

The guideways are rectangular material, secured by setscrews-to keep the underside of their base clear. A locking screw from the side permits of gripping the tool block, when necessary, with the tool at a fixed radius. The tool block is mounted on its base by countersunk screws-and it will be seen that a good working fit on this base in the guideways can be obtained by carefully filing or lapping the one or the other

A round tool is specifie atd a fixed height, which -means its tip must be ground to coincide with the lathe centres. This can easily be done, "mikin g" the tool when grinding, though an alternative would be a slotted tool block in which the tool could be packed to height, as in a turret. Two holding screws would then be required.

For the small amount of use made of the tool block, its feedscrew can by a vee-thread type; while the handle can screw on and be secured by a locknut-a fitting also employed for the worm shaft handle.

Setting the slide centrally under the lathe axis, and the tool to radius, are processes aided by a plug and gauge. The plug locates in the pillar, and the upper part is machined half through and has a line scribed down it. With the flat of the plug across the lathe axis, the slide is set for the line to coincide with the point of a centre. And with the flat parallel to the lathe axis, a gauge can be used to set the tool to radius.