TRUING and CENTRING

BY

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ALL dimensions except the simplest ones-like the distance between two points -contain integrated elements of alignment, so that on finished parts, such as machine and engine components, it is impossible to separate dimensional accuracy from angular alignment.

As an example, a cylinder can be specified 1 in. dia. x 2 in. long, which implies that it must be 1 in. dia. each end. If it is not, there is an error of alignment which has caused a taper.

Obviously, there are times when small errors of alignment have no real significance. One would have to be a perfectionist to quibble about a taper of one or two thou, across the periphery of a flywheel, though it would lead to a serious error in a cylinder. Similarly, on short spigots and in shallow recesses dimensional accuracy is of more importance than parallelism, which would be mainly theoretical.

Before work is begun on a component, the features which settle its size and shape (dimensional accuracy and alignment of faces) can be considered separately. In the wide sense, alignment depends on the alignment of the lathe and the setting up of the component, while dimensional accuracy depends on what is done with the tools under one's immediate control. Consequently, a condition for a job to proceed without hitch is that the lathe must be in proper alignment-which is to say, true.

A test for truth of the lathe spindle with the bed is to turn material in the chuck, feeding the tool by the saddle. Should a taper result, it is usually possible to correct a loose headstock by packing with shimstock; or there may be adjusting screws in the tongue of a headstock on a flat-topped bed. To check a top slide setting, material can be turned in the chuck, with the slide to feed the tool. In each instance, an indicator can be applied to a parallel mandrel held in the chuck.

True spinning of a headstock centre can easily be verified with an indicator, or by bringing a piece of material near to it. Grinding the centre, using an attachment, automatically ensures its truth. Then it can be marked to be fitted always the same to the spindle. But as the centre revolves with the work, hardening it is not essential, and so one in good mild steel or cast steel can be turned true from the top slide.

A tailstock centre must be hard; and for machining parallel work it must be true with the one in the headstock. The device at ***A*** can be used to check alignment; it consists of a centred bolt, two nuts, a plate, and a setscrew with locknut. If the tailstock centre is true, the gap X on the faceplate will be repeated at X, vertically and laterally, when the device is turned. It reveals a dropped centre as well as one which requires adjustment from the tailstock.

A similar device, held in the chuck ***B***, checks squareness and setting of a slide-mounted angle plate on which work is to be set up for milling, the gap Y being repeated at point Z.

Centre-punched work can be trued in the independent chuck with the simple device at C. This comprises a needle with a small half-ball; a springy strip with a countersunk hole to contain the half-ball, but leaving the needle free; a holder for the slide; and a rubber sleeve to retain the needle.

The needle can be 3/32 in. silver steel rod, pointed each end, and threaded for a nut which is rounded to make the half-ball. Cycle valve rubber will hold it.

Many tests of lathe accuracy can be made with an indicator-diagram ***D***- showing how truth of the tailstock centre can be verified. The reading should be steady as the indicator is swung round the centre.

A test similar to A is made with an indicator mounted by a clamp to a mandrel ***E;*** and when the mandrel is held in a chuck, a test the same as ***B*** can be made, but more accurately.

The fault of a dropped centre can be overcome as at ***F*** by machining a mild steel holder for the tailstock. Drilled and bored from the chuck, it takes a hardened silver steel insert. ❑