Checking clearances

By GEOMETER

WHILE in commercial practice, certain indicators, micrometers, gauges, jigs, etc., facilitate setting-up or the checking of parts and assemblies, they are usually too specialised and expensive for general use. Yet often the operation performed by a special tool is a simple one, and sometimes other means may be equally effective, though perhaps not so speedy.

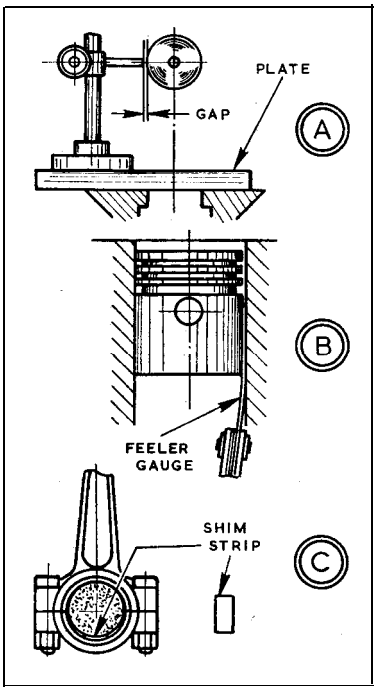
This may be the case when parts need to be checked for true running, even setting, or for clearance against others; and the solution to the problem may be a fixed pointer, feeler gauges, or shim stock of known thickness. At times, too, a simple jig or set-up may be contrived with little trouble and expense.

In setting work true on the lathe-on the faceplate or in the independent chuck-a dial indicator is advisable for easy " spot on " accuracy; but not every lathe user has one, and even when one is available it is only employed for final settings. A good substitute, as at ***A***, is a surface gauge with a " pointer " having a flat end or one of large radius, for the gap to the work to be seen against a white paper background.

Achieving fine accuracy

A plate across the lathe bed makes a convenient mounting, particularly on the type of bed with raised V-guides-and the point will push away from the work if set too close, whereas a tool on the slide rest would mark it. With care, spinning truth to 0.001 in. to 0.002 in. can be achieved merely by bringing the gap clearance as uniform as possible by observation. In final setting, however, marking blue can be smeared on the work to reveal where contact is made.

Another occasion when a pointer can be used in place of an indicator is for setting the release levers on a car clutch. There are usually three of these, and the pointer is rigged close to the operating end of one when the clutch assembly has been mounted on the flywheel. By rotating the assembly it can be seen if clearance is uniform for the other two. If it is not, adjustments are usually easy to make on nuts provided. Truly-spinning release levers, it may be said, are essential to elimmate 'judder"



or fierce take-up.

Feeler gauges provide for checking a variety of clearances. End play on shafts against shoulders or crankwebs, gaps at piston ring ends, side play of rings in grooves, tappet clearances, are typical examples. Piston clearance in a cylinder can be verified as at ***B***, when the feeler gauge should be inserted at the thrust face on the piston, not in line with the gudgeon pin.

Again, piston clearance can be checked with a strip of shim stock of specified width and thickness-for a car piston, often about ½ in. wide and 0.002 in. thick. This is fitted in the cylinder with the piston, and a spring-balance hooked through a hole in the shim stock. An average pull of 5 to 7 lb. is then required to pull it out. Like piston and cylinder, the shim stock should be smooth, clean and dry.

Clearances on big-end and main bearings can be checked with a strip of brass shim stock laid across the cap, as at C. Starting with a thickness of 0.0015 in., the thickness can be increased (to 0.002 in., 0.003 in., etc.) as required, until the 'bearing grips. Out-of-round on shafts can also be found in this way.

When valves must be ground at the ends for clearance, a micrometer gauge is generally used to obtain the length. This is fitted when the valve has been ground in, and set according to the distance from valve seating to tappet head. Instead of this gauge, however, each valve can be used, and the existing (too small) clearance checked by feeler gauge. The valve can then be placed in a simple jig, as at D, and the adjusting screw set down to the end. From this position, the clearance is increased to extent X, which is the difference between the existing clearance and the clearance required. As at ***E***, a valve for grinding can be mounted in a split block on the slide rest.

Backlash between a rear axle crown wheel and pinion usually requires an indicator for checking. But two blocks can be used as at F, to admit a feeler gauge, one, Y, clamped to the flange of the differential carrier, the other, Z, clamped to the crown wheel. ❑