LEVER-TYPE INDICATORS

By GEOMETER

IT is true, as Mr Westbury wrote recently in Postbag, that modern precision instruments are not essential for accurate work, and that many model engineers and craftsmen manage without their aid. Ingenuity and skill, patiently perfected, serve them instead.

It is fortunate that this is possible. Pause a moment in your lapping. Reflect that the most precise machines cannot generate surfaces to optical precision, but that the work can be done by craftsmen with crude equipment, and you have traced one of the sources from which has sprung our well-organised and thriving society.

Without lenses and prisms there would have been no telescopes, microscopes or spectroscopes. Man would have known little of stars and atoms. His knowledge of physiology and medicine would have extended over but a tiny fraction of the present area.

If you do not possess a dial test indicator, and feel the need for an accurate test instrument, you can make a craftsman's substitute of the lever or pointer type, two examples of which are shown in diagrams ***A*** and ***B***. With either. vou can true diameters and faces, set angle plates and slides on the lathe, and perform many tests on the surface plate.

The first indicator has a simple lever pivoted on the frame or backplate, its pointed end moving over a scale. A rise or fall at the working end X is multiplied in the ratio of the distances from the pivot, so that small errors can be easily seen. In setting-up, you bring the pointer to zero like the needle of a dial test indicator. Outside diameters and buttons can be adjusted to spin truly, and you can do the same with bores that are large enough to accept the working end of the instrument.

The second indicator, shown at ***B,*** is the same in principle as the first, but extra movement is obtained at the pointer by making it like a bell crank with a link between it and the lever. This gives two-stage multiplication of the rise and fall at X. You can read errors casier on the scale.

For use on the lathe, either indicator can be mounted on a holder of square steel bar. The ends of this can be faced in the independent chuck. Near one of them, a hole should be drilled to the same size as the holes marked W, say 1/4 in. Then the indicator can be held by a bolt. The bar gives vertical and horizontal mountings for the indicator throueh the way that it is clamped to the top-slide. The bolr permits angular settings-up-and-down and sideways.

An alternative holder of standard type can be easily made as shown at C. The square bar is drilled and tapped for a round pillar which is shouldered and threaded at the end. You may be able to make it to the size of the one on your surface gauge, so that the indicator can be used on this too.

For holding the indicator now, you need a knuckle joint as on a surface gauge, the type of fitting which consists of a cross-drilled bolt and sleeve. With this, the indicator can be set vertically on the holder at C. For a horizontal mounting, an angle bracket is used as well, as at DI. This bracket is drilled and fitted with a countersunk screw. after being bent.

Flat material between 1/16 in. and 1/8 in. thick can be used for the frame of either indicator : steel, duralumin, brass. The scale can be scribed on it; or if your prefer, the scale can be separate and screwed or riveted to the frame. Use celluloid sheet if you like. Scribe the arcs and graduations carefully and fill them with indian ink or black paint. Surplus blobs can be scraped off when they are dry. Markings show very clearly when they are-placed next to a strip of white plastic or uainted foil under the celluloid.

There is a choice of pivots for the pointer or lever. A thick frame can have a pivot locknutted in a tapped hole, D2. For a thin frame, the pivot should be shouldered, D3. Both should have a washer.

In making the knuckle joint, leave a head on the bolt, to set up as at ***E,*** for boring with the sleeve,' centrallv between iaws YZ. Then face the sleeve and mount it with the bolt in a plate for final facing, as at ***F.*** ❑