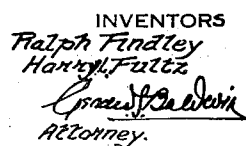


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PRECISION MEASURING INSTRUMENT

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This invention relates to improvements in precision measuring instruments. It is an object of the invention to provide such an instrument having a very wide range so that heights from say one to thirty inches or more may be measured within about one or two ten-thousandths of an inch.

Another object of the invention is to provide a precision measuring instrument including a body having an inclined side and a laterally extending foot, and a slide mounted for movement on the inclined side having a horizontal bearing face and a projection extending over the foot, so that vertical extension pieces may be superimposed upon the bearing face to build up to an even dimension and an additional fractional dimension may be accurately set by adjusting the vertical spacing between the projection and the foot, that is by moving the slide upon the inclined side of the body.

A further object of the invention is to provide such a precision measuring instrument wherein the spacing between the foot on the body and the projection extending from the slide may be absolutely accurately set either by the use of one or more blocks, or by the use of a conventional micrometer carried by the projection to contact the foot. Moreover to facilitate this adjustment coating scales, preferably a vernier, may be provided upon the body and slide for first obtaining an approximate setting.

Having thus briefly stated some of the objects and advantages of the invention I will now proceed to describe the invention with the aid of the accompanying drawing, in which:

Figure 1 illustrates a side elevation of the invention employing blocks between the projection and the foot.

Figure 2 is a plan view taken on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 1. Figure 4 is a section on the line 4—4 of Figure 3, and

Figure 5 is a side elevation showing a modification wherein a micrometer is mounted in the projection for accurately spacing the latter above the foot.

Referring to the drawing, 1 designates a body having an inclined side 2 and a foot 3 projecting from the end of the body adjacent and beneath the low extremity of the said inclined side 2. The upper surface 3a of this foot 3 is absolutely flat and horizontal for purposes hereinafter set forth. Mounted for longitudinal movement along the inclined side 2 of the body is a slide 4 having

a horizontal bearing face 5 thereon. The latter is provided with suitable means for supporting a plurality of similar extension pieces 6 superimposed one upon another to build up to a required height. In the present instance a vertical threaded opening 7 is formed in the slide 4 extending downward through its bearing face 5 to receive a threaded extension 6a on the lower extremity of the extension piece 6 resting immediately thereon, and the upper extremity of this extension piece is provided with a similar threaded opening 6b to receive the threaded extension 6a' on the extension piece 6' next above it, and so on until the required height is attained. The height of the several extension pieces usually differs however in order to build up a required height in inches, or fractions thereof. 8 denotes a feeler extending horizontally from the top extension piece 6 and secured thereon by a screw 8a in threaded engagement with the opening 6b in its upper extremity.

The slide 4 is movable along suitable ways 9 formed on the inclined side 2. The head of a bolt 10 is mounted for longitudinal movement in a T-slot 11 in the body 1, extends upwardly through the slide 4, and has a nut 12 on its upper extremity so that by tightening the latter the slide is held immovable. Suitably carried by the body 1 and held immovable relative thereto is a nut 13 in threaded engagement with which is a screw 14 the threaded end of which is so connected to the slide 4 that rotation of the said screw through the nut imparts axial movement to the slide. In the present instance an annular groove 15 is formed around the periphery of the screw 14 and a pin 16 inserted in the slide 4 engages the groove and permits free rotation of the said screw but prevents its longitudinal movement.

Extending from the lower end of the slide 4 over the foot 3 is a projection 17 the under surface 17a of which is absolutely flat and horizontal to rest upon the upper surface 3a of the foot 3 when the slide is at its bottom position. The projection 17 may be vertically apertured as shown at 19 to permit one extremity of a micrometer 20, usually a micrometer which registers in ten-thousandths of an inch, to project there-through. This micrometer is vertically supported in the aperture as by a set screw 21. The micrometer must be vertically so positioned that its work contacting extremity 20a rests upon the surface 3a when the two surfaces 17a and 3a are in contact and the micrometer reading is zero.

The height of the bearing face 5 on the slide

4 above the face plate 23, or other support upon which the instrument rests, is preferably an even dimension, say one inch, when the surfaces 17a and 3a are in contact. If it is desired to measure an even height dimension, say 30 inches, extension pieces 6, to a total height of 29 inches are superimposed upon the face 5, assuming the latter is exactly one inch above the face plate 23, in the manner already described. If, however, an uneven dimension is to be measured, say 30.1375 inches, the height is built up to 30 inches, and the additional distance may be accurately set in either of the two following ways: Either one or more Johanneson blocks 18, totalling exactly .1375 inch, may be placed between the surfaces 3a and 17a to exactly define the spacing between the latter, as shown in Figure 1, or the micrometer 20 may be employed for this purpose as shown in Figure 5.

To facilitate the approximate setting of the projection 17 relative to the foot 3, which of course involves movement of the slide 4 along the inclined side 2 of the body 1, the slide 4 and the body 1 may be provided with coating scales 24 and 25 respectively, preferably vernier scales, to permit the obtaining of a preliminary setting to within about one-thousandth of an inch, after which, by adjusting the spacing of the surfaces 17a and 3a in either manner above described a final setting to within one ten-thousandth of an inch may be obtained. It will also be noted that the inclination of the side 2 of the body and the coating face of the slide 4 may be less than that shown in the drawing, in which case of course the spacing between the vernier graduations becomes greater so that accurate readings may be made without resorting to the use of a magnifying glass.

While in the foregoing the preferred embodiments of the invention have been described and shown, it is understood that further alterations and modifications may be made thereto provided they fall within the scope of the appended claims.

What we claim is:

1. An instrument of the character described comprising a body having an inclined surface

thereon, an integral foot extending horizontally outward from beneath the lower extremity of said inclined surface and having an upper flat face, a slide movable along said inclined surface having a horizontal upper face, an integral projection on the slide extending horizontally over the foot and having a flat lower face parallel with the upper face of the foot, means for moving the slide along said inclined surface whereby the vertical spacing between said foot and projection is varied, and means for accurately measuring the vertical spacing.

2. An instrument of the character described comprising a body having an inclined surface thereon and an integral foot extending horizontally outward from beneath the lower extremity of said inclined surface, a slide movable along said inclined surface having a horizontal upper face, an integral projection on the slide extending horizontally over the foot, means for moving the slide along said inclined surface whereby the vertical spacing between said foot and projection is varied, and a micrometer supported by the projection adapted to contact the upper face of the foot for accurately measuring the vertical spacing between said foot and said projection.

3. An instrument of the character described comprising a body having an inclined surface thereon and an integral foot extending horizontally outward from beneath the lower extremity of said inclined surface, a slide movable along said inclined surface having a horizontal upper face, an integral apertured projection on the slide extending horizontally over the foot, means for moving the slide along said inclined surface whereby the vertical spacing between said foot and projection is varied, a micrometer extending through the projection aperture having its work contacting extremity downwardly disposed, and means holding said micrometer immovable relative to said projection whereby the vertical spacing between the latter and said foot may be accurately measured.

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