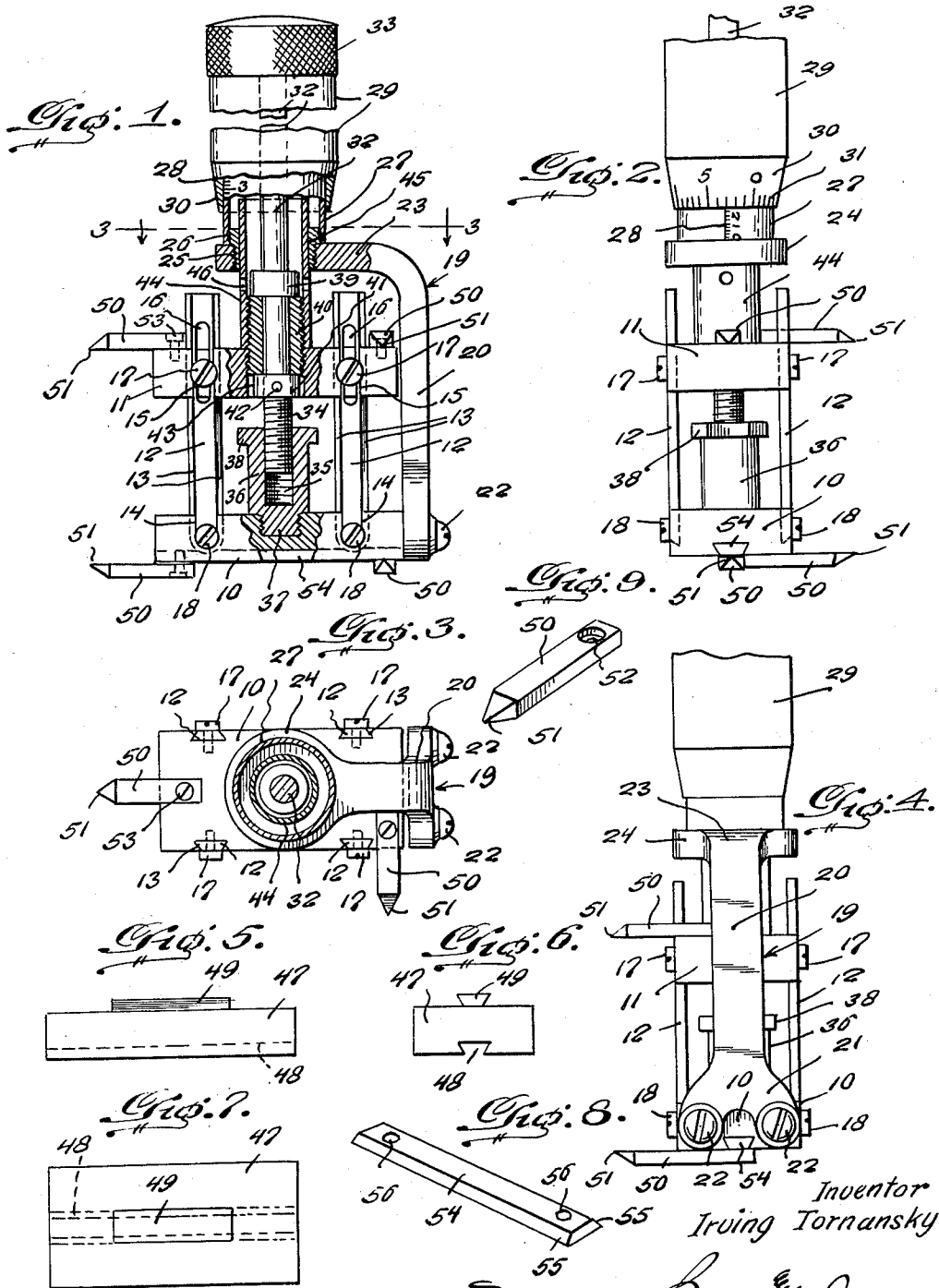


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ADJUSTABLE BLOCK GAUGE

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ADJUSTABLE BLOCK GAUGE

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This invention relates to precision gauges and more particularly to those of the type commonly known as block gauges, an object being to improve generally upon this particular type of gauge and to provide especially for certain practical adjustments of the same and provide for a substantial universal use of the same in precision work.

Another object of the invention is to produce an adjustable size block gauge which may be used as a standard height gauge in certain kinds of work and which also may be used in a manner similar to the ordinary types of "go" and "not go" snap gauges, fixed size-block and planer gauges, and gauges of similar character.

Still other objects and advantages to be attained will hereinafter more fully appear in the following description.

An illustrative but non-limiting exemplification of the invention is illustrated in the accompanying drawings, in which:

Figure 1 is a view partly in side elevation and partly in vertical section and with portions broken away and removed to foreshorten the view, the same being illustrative of the adjustment and operation of the device;

Figure 2 is an elevational view taken at right angles to the showing in Figure 1;

Figure 3 is a horizontal section taken on or about the line 3—3 of Figure 1;

Figure 4 is a view similar to Figure 2 but looking at the opposite side of the device;

Figure 5 is a side elevational view of one of the block elements;

Figure 6 is an end view of the block shown in Figure 5;

Figure 7 is a top plan view of the same;

Figure 8 is a perspective view of one of the bar elements for carrying an indicator or scriber arm thereon; and

Figure 9 is a perspective view of one of the indicator or scriber arms.

Referring now to the drawings in detail, the numeral 10 designates a lower gauge block of an accurate rectangular form and of a definite size. This block may be of any approved or desired rectangular shape but, as shown, it is elongated or of an oblong form.

Movable toward and from said lower block 10 is a similar block 11. The block 11, as shown, is movably mounted upon the block 10 by the provision of four upright bars or prong elements 12 which are secured at their lower end portions rigidly to the opposite side portions of the lower block 10. As shown, these bars or prong elements

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12 have their opposite longitudinal edge portions beveled, as at 13, (see Figure 3) and the lower end portions of the bars or prongs are fitted in counterpart undercut pockets 14 provided therefor in the adjacent side portions of the block 10 with a dovetailed fitting. The corresponding side portions of the upper block 11 are provided with undercut transverse slots 15 in which the upper portions of the bars or prongs 12 are slidably fitted. In the region where the bars or prongs 12 are slidably fitted to the block 11 said bars are provided with longitudinal slots 16 therein and screws 17 are provided so as to enter the slots 16 in the bars or prongs 12 and be inserted in screw threaded apertures provided therefor in the block 11. By this provision the block 11 may be adjusted to different positions lengthwise of the bars or prongs 12 and releasably fastened in such positions. The members 12 are detachably but rigidly fastened at their lower ends to the lower block 10 by screw elements 18.

In accordance with the invention, suitable means is provided for effecting the movement and adjustment of the upper block 11 with relation to the lower block 10, a practical exemplification of which is illustrated in the drawings.

As shown, the means for movement and adjustment of the block 11 involves a micrometer provision and arrangement. The illustrated provision and arrangement comprises an angular bracket designated generally by the reference numeral 19, the same comprising an upright base portion 20 which is secured rigidly at its lower end to one end portion of the lower block 10. As shown, the lower end portion of the upright member 20 is widened and bifurcated or branched to provide two separate leg portions which are respectively secured to the adjacent end portion of the block 10 by screw elements 22. Obviously, this attachment of the parts 10 and 20 may be accomplished in any other desirable or approved manner and also the part 20 may be formed integrally with the block 10.

The standard or post 19 is formed with a horizontal arm 23 having a flat circular end portion 24 provided with a relatively large central opening therethrough. As shown, this opening is screw threaded to receive the correspondingly threaded reduced portion of a bushing 25 having a collar or circular head 26 at the outer end thereof which is externally screw threaded peripherally thereof. In some cases, instead of providing the bushing 25 the central hole in the circular end portion 24 of the arm 23 may be a plain bore without any internal screw threading

and in place of the collar or head 26 of the bushing 25 the hole in the arm 23 may be surrounded by an upstanding annular collar or shoulder portion formed integrally with the arm 23 and provided with external screw threads peripherally thereof.

Screwed onto the screw threaded peripheral portion of the collar 26 of the bushing 25 or the integral collar or annular shoulder portion of the arm 23 if the same be provided as just above described is the cylindrical barrel member 27 of a micrometer provision, which latter, except for such modification thereof as is necessary in accordance with the present invention, is conventional, that is to say, this barrel member 27 is provided on its outer face with a longitudinal scale 28, and on the barrel member 27 is sleeved a thimble element 29 which is rotatable and movable lengthwise thereon, said thimble element having the usual tapered end portion 30 and around the sharpened edge portion of which is inscribed an annular scale 31.

As in the usual micrometer structure, there is provided an elongated axial stem or spindle element 32 which is attached at its outer end in a conventional manner to the closed end portion of the thimble 29 so as to rotate and move endwise by and therewith. The barrel member 27 and thimble element 29 are each of a length to permit considerable longitudinal movement of the one relative to the other, in the usual manner, and the stem or spindle element 32 is of a length to extend a substantial distance beyond the inner end of the thimble element 29. The thimble element 29 is provided at its outer end with a knurled annular head portion 33 by which said element 29 may be conveniently manipulated by the fingers of the operator.

In practice, the bushing 25 is usually tightened in the opening of the arm 23 of the standard or post 19 with the annular collar or shoulder portion 26 of the bushing in contact with the adjacent face portion of the arm 23. So, too, the barrel member 27 as screwed on the collar or head portion 26 of the bushing 25 has its inner end portion tightened against the adjacent face portion of the arm 23. However, for the purposes of adjustment, the bushing 25 may be turned to move the same a slight distance outwardly in the opening of the arm 23 and the barrel member 27 may also be turned on the collar or head 26 of the bushing 25 so as to adjust the member 27 longitudinally outward.

In the structure thus far described the barrel member 27 is normally stationary on the arm 23 of the upright or standard 19 and in the operation of the device the thimble element 29 and the attached axial stem or spindle element 32 are movable rotatably and longitudinally together and in such movement the spindle element 32 has a swiveled attachment to the upper block 11, in a manner to be presently more fully described, whereby said block 11 is caused to move toward and away from the lower block 10, depending on the direction of rotation of the thimble element 29 and the stem or spindle element 32.

Lengthwise movement is imparted to the stem or spindle element 32, in the illustrated structure, by having the lower end portion of the element 32 screw threaded throughout a substantial length thereof, as at 34, said screw threaded end portion 34 being fitted in a screw threaded bore 35 formed in a guide nut or upright block 36 which is mounted centrally on the lower block 10. This member 36 is made and formed for detachability

so that the same may be removed and replaced.

As shown, the element 36 is provided with a reduced lower end portion which is externally screw threaded and fitted in a counterpart internally screw threaded recess 37 provided therefor in the central upper portion of the block 10. As shown, the element 36 is provided at its upper end with an annular collar 38 which may be circular and peripherally knurled or otherwise roughened or formed for the convenient grasping of the same to turn the element 36 into and out of place. So, too, the head or collar portion 38 may be formed polygonally and, in some cases, the collar or enlargement 38 may be eliminated and the entire body portion of the element 36 formed polygonally externally thereof. That is to say, these parts may be of hexagonal or octagonal form. This particular provision and arrangement is for the application of a suitable wrench or tool for the turning of the element 36 into and out of its seat 37 in the block 10 and for which purpose the element may be provided with an opening or openings in its side wall for the application of a spanner wrench or the like in the usual manner. These noted provisions and arrangements being obvious the same are not illustrated in detail in the drawings.

The relative length of the bore 35 in the element 36 and the screw threaded end portion 34 of the stem or spindle element 32 must, in any case, be ample to afford the desired length of travel of the upper block 11 relative to the lower block 10 and both part 34 and bore 35 threaded in a thread size corresponding to the graduations shown on the thimble and sleeve of the micrometer element so that the movement of the block 11 relative to the block 10 will be readily and accurately shown in the micrometer element in the operation of the device for general gauging purposes.

As a part of the means for the swiveled attachment of the stem or spindle element 32 to the upper block 11, in the particular illustration in the drawings, said element 32 is provided intermediate its ends with a collar 39 (see Figure 1) and said collar 39 may be adjustable or not on the element 32 as desired. As shown, the portion of the element 32 just below the collar 39 is fitted rotatably in an axial bore in a cylindrical bearing element 40, which latter is fitted tightly against endwise movement but freely rotatable between said collar 39 and a second collar 41 which is removably placed on the stem or spindle element 32 and held in place by a transverse pin 42 or other suitable securing means. The removability of the collar 41 is to facilitate assembling the part 40 on the element 32.

The bearing and supporting element 40 is screw threaded externally throughout the entire length thereof and its lower end portion is fitted in a counterpart threaded upper portion of a bore 43 provided centrally in the upper block 11 and coaxially with the bore in the horizontal arm 23 of the standard 19, the lower portion of said bore 43 being of a diameter somewhat larger than the diameter at the base of the threads in the upper portion of the bore so as to afford ample clearance peripherally of the collar 41 and also to permit the bearing and supporting element 40 to pass freely through the lower portion of said bore 43 in the assembly of the parts and in making certain adjustment in the position of said member 40 in the upper block 11.

In assembling the parts of the device thus far described, the upper block 11 is unfastened from

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the uprights or prong members 12 so that said block 11 is freely movable vertically on said members 12, or, if desired, or necessary, said block 11 may be entirely removed from the members 12. The supporting and bearing element 40 when positioned swivelly on the stem or spindle element 32, between the collars 39 and 41 as just above described, the same may have its lower end portion screwed into the upper threaded portion of said bore 43 of the upper block 11. With the member 40 thus positioned, the stem or spindle element 32 is rotated by manipulation of the thimble element 29 and the threaded lower end portion of said element 32 is thereby screwed into the axial socket 35 provided in the nut or guide element 36. A guide sleeve 44 having an internally screw threaded lower end portion is then fitted on the upstanding portion of the bearing and supporting element 40 above the block 11. This sleeve member 44 is turned on the member 40 until its lower end is tight against the adjacent top face portion of said block 11. The sleeve element 44 so positioned and rigidly supported has its upper portion extended through a plain cylindrical bore 45 in the bushing 25 with the upper end of said sleeve 44 terminating some distance above the top of said bushing 25. By this provision and arrangement the sleeve member 44, supported rigidly as it is on the bearing and supporting member 40, is slidable longitudinally through the bore 45 in said bushing 25 with stable guiding effect. Said element 44 has a spanner wrench hole or holes 46 therein. From the foregoing it will be seen that the upper block 11 is moved longitudinally of the uprights or prong members 12 toward and from the lower block 10 by rotation of the stem or spindle element 32 through the medium of its attached thimble element 29, according to the direction of rotation of said thimble element. At the same time the calibrated scales 28 and 31 on the micrometer members 27 and 29 indicate accurately the distance apart the blocks 10 and 11 are placed relative to each other, or, in other words, the dimension between the scriber arm 50 provided on the under side of said block 10 and the top of said block 11, or under side of arm 50 attached thereto.

When using the device for "go" and "not go" type of snap-gauge, all four arms 50 are attached to the blocks, with the set nearer the upright or bracket 19 and at right angles to the blocks and with a small piece of .003" or .004" thickness of shim-stock placed between the upper arm and block 11 so as to allow for a slight high limit of tolerance on the "go" side.

So much for the adjustable part of the device as thus far described.

The device further comprises a plurality of separate and separable building blocks of various sizes, particularly as to height, that is to say, for example, the respective blocks may be made in standard sizes of one-half inch, one inch and two inch thicknesses and so on up to a maximum size and obviously, in various other fractional sizes as to thickness of the blocks. In use, these blocks are piled one upon the other to build up a height gauge of a definite size and for use in the usual manner as with height gauges except that, on top of the uppermost separate and separable block is placed the aforesaid assembly of the base block 10 and adjustable upper block 11.

To facilitate the assembly of the blocks in building up the height gauge, said blocks, designated generally by the reference numeral 47 (see Figures 5, 6 and 7), are provided on their under

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side with longitudinal undercut grooves 48 which may be either of the dovetail cross section type as shown or, obviously, said grooves may be substantially T-shaped in cross section. On top of each block 47 is provided a medial longitudinal undercut rib 49 corresponding in cross section to the longitudinal groove 48 on the under side of the block but said ribs, as shown, may be of a length to terminate short of the opposite ends of the block, this for intermediate gauging with a dial indicator. That is to say, any one of the separable blocks may be slid out of the set-up of blocks (one-quarter inch or more) and the measurement thus indicated with a dial indicator and subsequently checked for accuracy with an ordinary outside micrometer. These blocks 47, as above noted, are made in different sizes as to thickness and, in some uses of the device, some of the blocks may be made in greater length than the major number thereof which are generally used in building up a height gauge, that is to say, certain of the blocks which are used as the base blocks for the height gauge. The interfitting of the longitudinal grooves 48 and ribs 49 of the blocks facilitate the ready assembly of the blocks in the built-up structure and the frictional engagement holds the blocks in place when assembled.

Laterally projected caliper indicator or scriber arms 50 may be provided on the assembly of the device as indicated in Figures 1, 2 and 4. These arms, as shown, are of a generally rectangular form but have their outer ends pointed or rounded and tapered. In the illustration the ends are pointed, as at 51. They are apertured near their inner ends, as at 52, for the reception of securing screws 53 by which they are attached to the blocks 10 and 11. In their attachment to the upper blocks 11 said arms 50 are fastened to the top faces thereof. As to the lower blocks 10 a different means of attachment is provided for the arms 50. In this instance removable filler bars 54 having beveled opposite side edges 55 are provided for insertion in the groove formed in the bottom of the block 10 similar to the aforesaid grooves 48 in the several other blocks 47. The filler bar 54 is provided near its opposite ends with apertures 56 which are internally screw threaded to receive the securing screws 53 of the arms 50.

In the assembly illustrated in Figure 1 there is a pair of said arms 50 projected medially from the opposed ends of the blocks 10 and 11, said arms 50 thus constituting caliper indicator projections which are moved towards and from each other by manipulation of the micrometer portion of the device. In addition to the pair of arms projected from the opposed ends of the blocks 10 and 11 another pair of said arms may be projected laterally from said blocks 10 and 11 and the arms being located near the ends or opposite to those from which the aforesaid pair of arms project.

When the device is assembled as a height gauge wherein a standard is built up from a multiplicity of the aforesaid blocks 47 the caliper indicator or scriber arms 50 may be eliminated from the lower block 10 of the adjustable upper micrometer assembly. So, too, in this connection, it is here noted that the filler bars 54 are placeable in the longitudinal slots 48 of any of the several blocks 47, in which case, of course, the respective arms 50 may be applied to the filler bar 54.

The device of the present invention is capable

of adjustment and variation in assembly to readily adapt the same for substantially universal use in the measurement of different classes of work and the illustration in the drawings is but one exemplification of a practical adaptation of the invention. The structure admits of considerable modification within the purview of the invention as defined by the appended claims. The invention, therefore, is not limited to the specific construction and arrangement shown.

Having thus described the invention, what is claimed is:

1. An adjustable gauge block comprising a first block, a bracket positioned transversely of said block adjacent one end thereof and having one end fixedly secured to said block, an internally threaded guide nut having one end open superimposed on said block intermediate its ends and fixedly secured thereto, a scriber arm projecting from the other end of said block, a hollow sleeve positioned in alignment with and spaced from said guide nut extending through the other end of said bracket and fixedly secured to said other end of said bracket, a second block positioned in parallel spaced relation with respect to said first named block surrounding one end of said sleeve and mounted on said first named block for movement toward and away from the latter, a second scriber arm projecting from the end of said second block adjacent to said other end of said first named block, a spindle element rotatably supported within said sleeve and having one end extending into and in threaded engagement with the threaded open end of said guide nut and having the other end projecting out of and terminating at a point beyond the other end of said sleeve, and a bearing element carried by said spindle element and in threaded engagement with said second block for securing said spindle element in position in said second block, and hand actuable means on the projecting end of said spindle element for effecting rotation of the latter.

2. An adjustable gauge block comprising a first block, a bracket positioned transversely of said block adjacent one end thereof and having one end fixedly secured to said block, an internally threaded guide nut having one end open superimposed on said block intermediate its ends and

fixedly secured thereto, a scriber arm projecting from the other end of said block, a hollow sleeve positioned in alignment with and spaced from said guide nut extending through the other end of said bracket and fixedly secured to said other end of said bracket, a plurality of prong elements positioned transversely of and on said first named block and having one end fixedly secured thereto, each of said prong elements adjacent their other end having elongated slots therein, a second block positioned in parallel spaced relation with respect to said first named block surrounding one end of said sleeve and mounted on said prong elements for movement toward and away from said first named block, means extending through each of said slots in the prong elements and engageable with said second named block for securing said second block in selected position on said prong elements, a second scriber arm projecting from the other end of said second block adjacent to said other end of said first named block, a spindle element rotatably supported within said sleeve and having one end extending into and in threaded engagement with the threaded open end of said guide nut and having the other end projecting out of and terminating at a point beyond the other end of said sleeve, and a bearing element carried by said spindle element and in threaded engagement with said second block for securing said spindle element in position in said second block, and hand actuable means on the projecting end of said spindle element for effecting rotation of the latter.

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