Feb. 7, 1950 A. A. BALK 2,496,655

INSIDE CALIPER

Filed Jan. 20, 1947

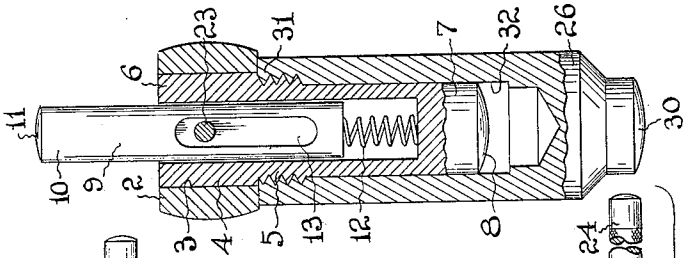


FIG. 2

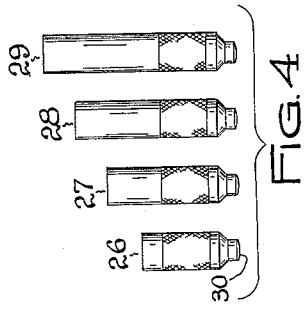


FIG. 4

FIG. 3

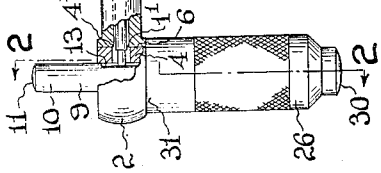


FIG. 1

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Patented Feb. 7, 1950 2,496,655

UNITED STATES PATENT OFFICE

2,496,655

INSIDE CALIPER

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Application January 20, 1947, Serial No. 723,137

1 Claim. (Cl. 33—143)

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The invention relates to improvements in inside calipers, and particularly to improvements in devices of this character whereby the range of use of a single caliper structure is greatly increased. This improvement is effected by providing a caliper structure which will readily and conveniently accommodate any one of a large number of different length so-called extension buttons, and permit quick and convenient replacement of one button by another, whereby any one button will serve a distinctive portion of the entire field of measurement covered by the calipers. The structure provides for use of the calipers over the smallest range without utilizing any button.

The annexed drawing and the following description set forth in detail certain means illustrating the improvements in inside calipers, such means presenting, however, only one of the various forms in which the principle of the invention may be embodied.

In said annexed drawing:

Figure 1 is a partial side elevation and partial axial section of the improved inside calipers with the sliding plunger in locked position, the view showing one of the selective extension buttons incorporated with the caliper main assembly;

Figure 2 is a section, upon an enlarged scale, taken in the planes indicated by the lines 2—2, Figure 1;

Figure 3 is an exploded view of the structure shown in Figure 1 except that it does not include the extension button shown in Figure 1; and

Figure 4 is an elevation of a plurality of buttons of different lengths.

Referring to the annexed drawing in which the same parts are indicated by the same respective numbers in the several views, a longitudinally recessed caliper body 1 is formed with a ball head 2 whose axis is normal to the body axis, the head 2 having a bore 3 within which one end of a bushing 4 is secured with a press fit, the end face of the bushing 4 lying flush with an end face of the ball head 2. The enclosed end 6 of the bushing 4 is open and the portion of the bushing 4 extended from the ball head 2 is of reduced section for the greater part of its length and has a closed end 7 formed with a contact face 8. The outwardly extended part 5 of the bushing portion of large section is externally threaded.

A plunger 9 telescopes in bushing 4 and is formed with an elongated axial recess 9^1 adapted to receive a coiled compression spring 12 which at one end bears upon the inside face of the

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closed end 7 of the bushing 4 and at its other end bears upon the end wall of the recess 9^1. The outer end 10 of the plunger 9 is closed and has an exterior contact face 11. A groove 13 is formed in one side of the plunger 9 and holes 1^1 and 4^1 formed in the body 1 and the bushing 4, and which are aligned when the calipers are assembled, have axes which intersect the groove 13.

A tubular handle 16 is externally threaded at one end 17 for engagement with an outer internally threaded end 15 of the body 1 and the opposite end 18 of the handle 16 is interiorly threaded for engagement with an exteriorly threaded end 21 of a tubular lock spindle 19. The threaded end 21 of the lock spindle 19 is formed with an axial recess 22 against the base of which is seated one end of a lock pin 23 which intersects the handle 16 and body 1 and whose other end is adapted to pass through the aligned holes 1^1 and 4^1 and engage the groove 13 to hold the plunger 9 in the bushing 4 against the compression of the spring 12. The other end 20 of the lock spindle 19 is interiorly threaded for engagement with an externally threaded end stem 25 of an extension handle 24.

The device thus far described will serve as calipers for measuring inside diameters over a field of from about 1" to 1¼", for instance. Now, for the next field of operations; possibly from 1¼" to 1½", an extension button is utilized; and, for still larger fields of operations, progressively longer extension buttons. Four of the buttons of different lengths are shown in Figure 4, viz., "26," "27," "28," and "29." Each of these buttons has a closed end with a contact face, such as contact face 30 on button 26, for use in conjunction with the contact face 11 of plunger 9 for the measuring or gauging operation.

The bushing 4 and the extension buttons are formed to permit quick assembly of a button, or the replacement of one button by another button, by the provision of a cylindrical recess 32 in the button whose wall serves as a bearing surface for the side wall of the closed end of the bushing 4, the extension button being attached by means of an open interiorly threaded inner end 31 which engages the externally threaded part 5 of the bushing 4.

Thus, by the bushing structure shown and described, together with a plurality of selective cooperating different length extension buttons, the field of possible measurement by any one caliper assembly, which assembly is complete for the entire field except for the particular extension button selected, is greatly increased.

The use and functioning of calipers of the character described is well-known and consists briefly in placing the ball end of the calipers in the hole to be measured, with the plunger 9 in its innermost locked position, then backing off the lock spindle 19 to permit the contact faces 11 and 8 of the plunger 9 and the bushing 4, or the contact faces 11 and 30 of the plunger 9 and the particular extension button utilized, to engage the wall of the hole being measured, and then the calipers set at that measurement by again tightening the lock spindle 19, after which the calipers are withdrawn from the hole and the measurement read by a micrometer or other suitable means.

What I claim is:

Inside calipers, comprising a tubular body having a ball portion formed with a bore, a bushing secured in the bore and having an end face disposed substantially flush with an end face of the body ball portion, said bushing having a closed extended opposite end portion formed with a contact face, a longitudinally-recessed plunger telescopically fitting the bushing and extended from the end of the bore opposite the extended end of the bushing, the plunger having a closed end formed with a contact face, a compression spring mounted in the recess of the plunger and in the bushing and bearing on the latter at one end and on the inside face of the closed end of the plunger at the other end, the plunger being formed with an exterior side groove, coaxial holes formed in the ball and bushing whose axes intersect the groove, a tubular handle secured to the body, a lock pin loosely disposed within the body and handle, movable longitudinally thereof, aligned with the holes, and adapted to engage the groove with one end to hold the plunger locked against the compression of the spring, a lock spindle mounted on and movable longitudinally of the handle and engaging the lock pin, said bushing being formed with an end portion of comparatively large diameter secured in the bore and slightly extended from the latter, together with an opposite end portion of comparatively small diameter, the slightly extended large portion of the bushing being exteriorly threaded, and an open-ended button of uniform diameter, internally threaded at its open end, engaging the bushing thread, having a bearing surface for the exterior wall of the closed end of the bushing, and formed with a closed end having a contact face, the button abutting the ball portion of the body with its open end, whereby buttons of progressively greater length can be selectively attached to the bushing for measurement of inside diameters over different ranges of measurement.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,559,801	Steinle	Nov. 3, 1925
2,223,182	Muller	Nov. 26, 1940
2,326,410	Swinney	Aug. 10, 1943

FOREIGN PATENTS

Number	Country	Date
68,847	Switzerland	July 11, 1914

OTHER REFERENCES

Publ.: Popular Science Magazine, April 1944, p. 173.