(No Model.)

S. H. BELLOWS.

MICROMETER GAGE.

No. 456,875. Patented July 28, 1891.

Fig. 1.

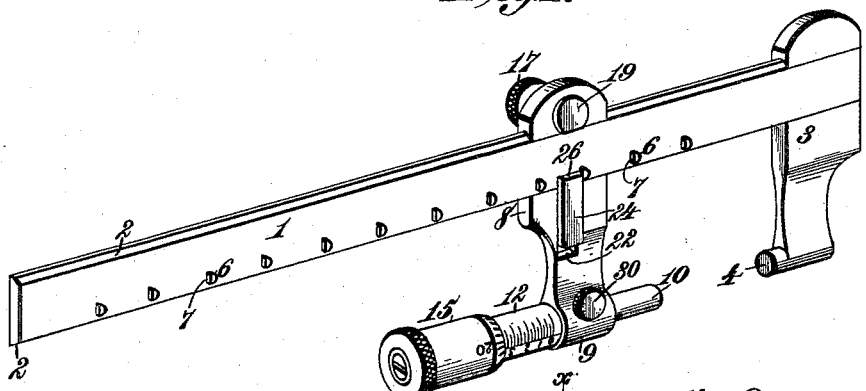


Fig. 2.

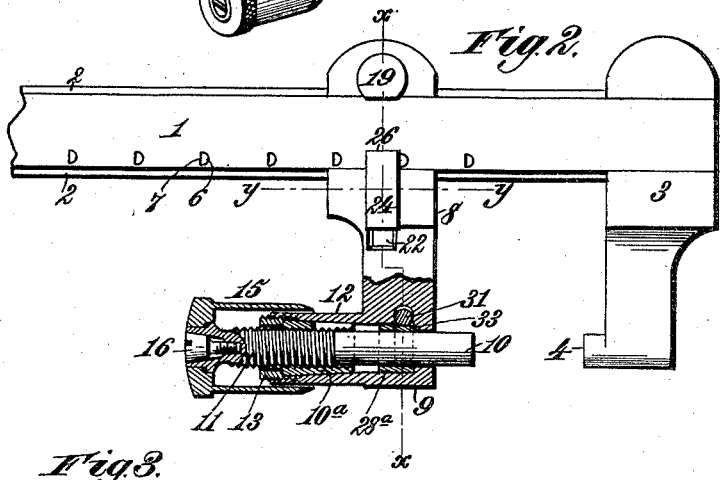


Fig. 3.

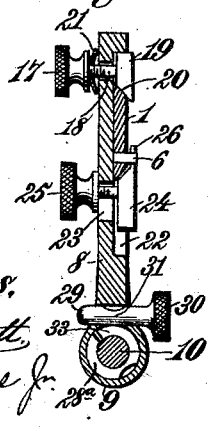


Fig. 4.

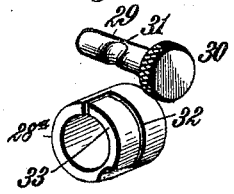
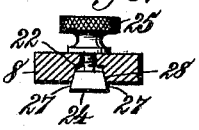


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MICROMETER-GAGE.

SPECIFICATION forming part of Letters Patent No. 456,875, dated July 28, 1891.

Application filed December 4, 1890. Serial No. 373,553. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN H. BELLOWS, a citizen of the United States, residing at Athol, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Micrometer-Gages, of which the following is a specification.

This invention relates to the micrometer-gage for which Letters Patent No. 403,726 were issued to me May 21, 1889, and has for its objects to improve the prior instrument by providing novel means whereby the adjustment of the slide from one graduation to another on the beam or bar can be quickly and accurately effected without special care or skill on the part of the workman; to provide a novel construction by which the instrument is rendered more accurate and correct in practical use by avoiding the possibility of errors arising from inaccurate adjustments of the index-line on the slide relatively to the line-graduations on the beam or bar; to provide a novel stop-pin graduation on the beam which can be readily renewed if worn, or if improperly set or produced in the manufacture of the instrument; to provide a novel device on the slide which coacts with the stop-pin graduations on the beam for accurately adjusting the slide to and from the fixed jaw of the instrument; and, finally, to provide novel means for instantly locking or holding the micrometer-screw in its position of adjustment, and thereby preventing accidental displacement or movement of the screw in handling the instrument after it has been properly adjusted for the measurement desired.

To accomplish all these objects my invention involves the features of construction, the combination or arrangement of devices, and the principles of operation hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a perspective view of a micrometer caliper-gage embodying my invention. Fig. 2 is a side elevation of the same, showing a portion of the slide in section. Fig. 3 is a transverse sectional view taken on the line x x, Fig. 2. Fig. 4 is a detail perspective view of the split ring or bushing and its operating cam-pin for locking or holding the micrometer-screw in its position of adjustment. Fig. 5 is a detail sectional view on the line y y, Fig. 2.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The numeral 1 indicates a beam or bar composed of a flat strip of steel or other suitable material having parallel faces and longitudinal beveled edges 2 to constitute a dovetailed beam, which at one end is rigidly secured to or formed with a stationary jaw 3, having at its outer end a contact point or face 4. The beam is graduated on one vertical face into half-inch spaces through the medium of laterally-projecting stop-pins 6, having true vertical faces 7 and inserted into orifices in the beam in such manner that any one or all can be removed and replaced, if occasion demands. The stop-pins are so relatively arranged in a longitudinal plane on the beam that the space from the vertical flat face 7 of one pin to the similar face of an adjacent pin is exactly one-half inch; but obviously the spaces may be varied so long as they correspond with the adjustment of the micrometer-screw hereinafter described. For example, if the micrometer-screw has an adjustment of one inch the distance from pin to pin should be one inch.

A slide 8, having a dovetailed groove in one side, is fitted upon the beam, so that one surface is located in the same plane as the surface of the beam from which stop-pins project. The outer end of the slide is tubular, as at 9, for the lengthwise movement of the smooth cylindrical stem 10 of the micrometer-screw 11, which engages an interiorly-threaded nut 10^a, fitted into the cylinder-extension 12 and provided with a slit. A nut 13, having a smooth internal bore and an exterior screw-thread, engages the extension 12 and serves to adjust the nut 10^a for forcing it along the smooth conical or tapering internal surface of the extension 12, thereby compensating for wear of the calipers or micrometer-screw.

The extension 12 has on its exterior the stationary micrometer-gage graduations that coact with the graduations on the tapered end of a shell 15, connected with the micrometer-screw and working over the cylinder-exten-

sion. The stem of the screw extends beyond the slide, and its contact-point is accurately in line with the contact point or anvil 4 of the stationary jaw for measuring articles between such points. The adjustment of the slide is entirely independent of the micrometer measuring-screw, and the adjustment of the latter is entirely independent of the slide. To compensate for wear on the micrometer-screw and anvil, the shell 15 is made adjustable through the medium of a tapering screw 16, which enters an orifice in the outer end of the screw and serves to expand such outer end and thereby connect the screw and shell by a friction-coupling, as is well known. The slide is movable on its dovetailed connection with the beam, and is rigidly held in any position to which adjusted by a simple turn of the thumb-nut 17, engaging a screw 18 extending from and rigid on a locking-plate 19 setting in a cavity in the slide, and having a beveled edge 20 parallel to and acting upon one beveled edge of the beam, so that by tightening the thumb-nut the beveled edge of the locking-plate is clamped upon the beveled edge of the beam. A spring-washer 21, preferably concaved, is placed on the screw 18, between the thumb-nut and the slide, which acts in a manner similar to a gib for holding the locking-plate to the bevel edge of the beam when the thumb-nut is loosened to avoid bruising or injuring the edge in the use of the instrument. The slide 8 is provided with a rectangular or other suitably-shaped cavity 22, and a slot 23 extending at right angles to the length of the beam or bar, and in the cavity is arranged a stop-plate 24, having a screw-threaded stem extending through the slot and provided with a milled or thumb nut 25, adapted to rest against the back of the slide when tightened up. The stop-plate 24 is provided with a pendent lip or flange 26, to strike against the flat face 7 of any one of the stop-pins 6, and this plate, as here shown, is provided with longitudinal beveled edges 27, which are adapted to the inclined or beveled walls or edges 28 of the cavity 22, as in Fig. 5, the object of which construction is to compensate for wear and enable the stop-plate to be so rigidly held in a fixed position on the slide as to render it unlikely that the plate will accidentally move after being adjusted and locked to strike the stop-pins. By the means described the more tightly the nut 25 is screwed up the more firmly the stop-plate is held in its seat. The stop-plate can be loosened by turning the nut 25 in the proper direction for permitting the plate to be so moved as to clear the stop-pins for adjusting the slide along the beam. The movement of the stop-plate to clear the stop-pins can be merely in an outward direction to provide sufficient space for the passage of the stop-plate directly over the outer extremities of the stop-pins; but the slot 23 enables the stop-plate to be slid or moved in a direction at right angles to the length of the beam or bar for the purpose of clearing the stop-pins. In practice the stop-plate by contact with the flat face 7 of any one of the stop-pins secures accurate adjustment of the slide on the beam to the scale of half-inches without care, skill, or expertness on the part of the workman.

In the instrument shown by my Letters Patent alluded to the line of graduations require skill and a practiced eye to secure correct and accurate adjustments of the slide on the beam, and sometimes a variation of one-fifth of a thousandth inch is made, which obviously is objectionable. By the conjoint action of the stop-plate on the slide and the laterally-projecting stop-pins on the beam, the objection alluded to is avoided, while the adjustment of the slide can be affected in an off-hand manner or without special care or skill. The employment of inserted or attached stop-pins is advantageous in that if a pin should be worn it can be conveniently removed and a perfect pin applied without disturbing any other part of the instrument, while in the manufacture of the tools, if too much should be removed from the pin in producing its flat face such pin can be replaced with another and perfect pin. These results cannot be attained where notches are provided in the beam for receiving a stop device on the slide.

In the use of micrometer-gages the micrometer-screw is frequently moved accidentally from its position of correct adjustment—as, for instance, in picking up and laying down or otherwise handling the instrument while engaged on the work requiring measurement. To avoid this objection and provide a set-gage, I employ a friction-brake for the smooth cylindrical stem 10 of the micrometer-screw, which brake, as here shown, consists of a spring ring or bushing 28^a, inserted into the tubular portion 9 and extending in a direction round the stem. This spring-ring is actuated by a cam-pin 29, located transversely in the slide, and provided with a milled head 30 by which to turn it in such manner that the cam or eccentric portion 31 may be caused to force the friction ring or bushing 28 firmly against the stem 10, and thereby lock or secure the micrometer-screw from accidentally turning after it has been adjusted for the desired measurement.

The spring ring or bushing is formed with a right-angled slit 32, Fig. 4, to provide the yielding portion 33, against which the cam-pin acts; but I do not confine myself to this particular form of spring ring or bushing.

Having thus described my invention, what I claim is—

1. A micrometer-gage consisting of a beam having a jaw and stop-pin graduations projecting laterally from one face, a slide adjustable on the beam and provided with a micrometer-screw, and a movable stop device for abutting the stop-pins to adjust the slide to and from the jaw on the beam, substantially as described.

2. A micrometer-gage consisting of a beam

having a jaw and stop-pin graduations projecting laterally from one face, a slide adjustable on the beam and having a micrometer-screw, a stop-plate movable on the slide and adapted to abut the stop-pin graduations, and means for clamping the stop-plate in a stationary position, substantially as described.

3. A micrometer-gage consisting of a beam having a jaw and stop-pin graduations projecting laterally from one face, a slide adjustable on the beam, carrying a micrometer-screw and provided with a cavity and transverse slot or orifice, and a stop-plate having a screw-stem extending through the slot or orifice and provided with a milled or thumb nut, substantially as described.

4. The combination, in a micrometer-gage, of a micrometer-screw having a smooth cylindrical stem, and a friction-brake acting directly on the smooth stem for locking or securing the screw after adjustment, substantially as described.

5. The combination, in a micrometer-gage, of a micrometer-screw having a smooth cylindrical stem, a spring ring or bushing to act directly on the stem, and a cam-pin for pressing the ring or bushing against the stem to lock or secure the screw after adjustment, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

STEPHEN H. BELLOWS.

Witnesses:

CHARLES L. MELLEN,

OSCAR A. SCOTT.