(No Model.)

S. H. BELLOWS.

MICROMETER GAGE.

No. 403,726. Patented May 21 1889.

Fig. 1.

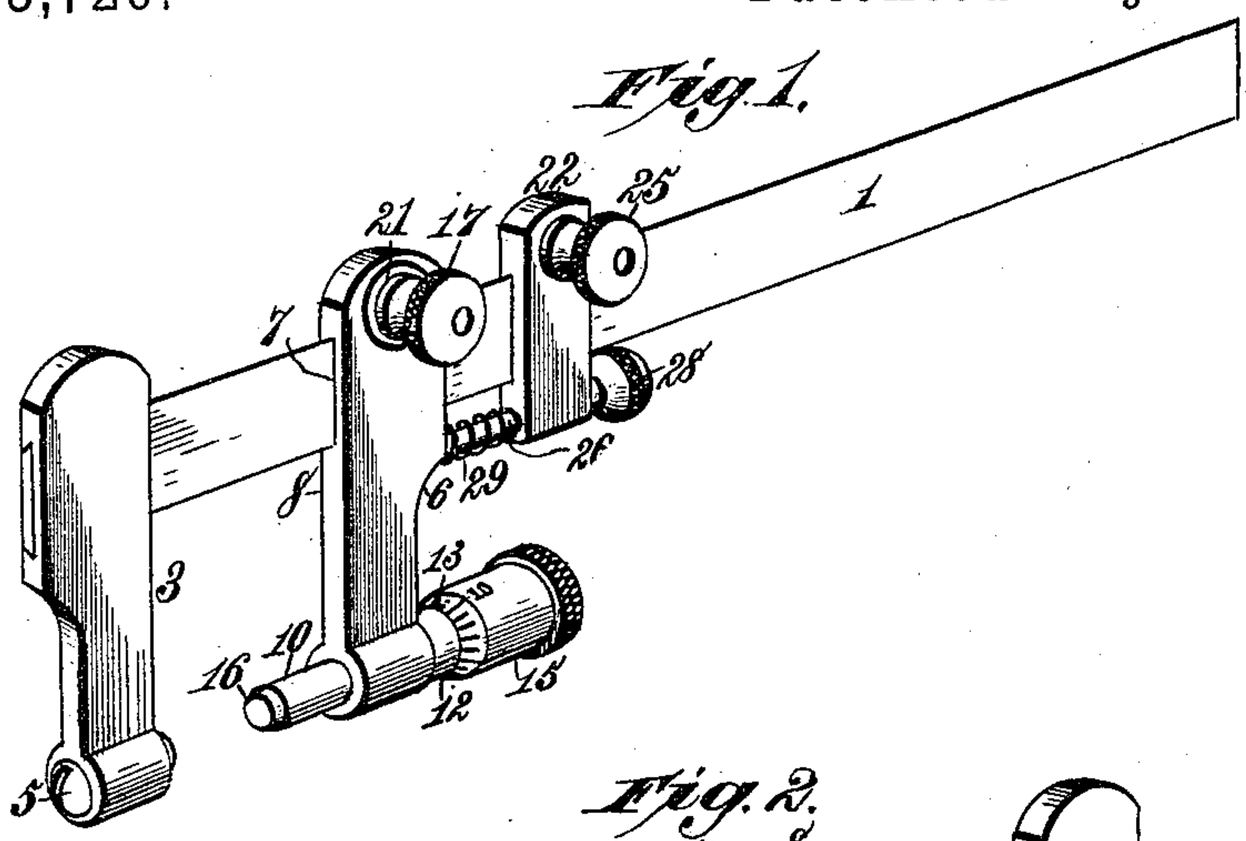


Fig. 2.

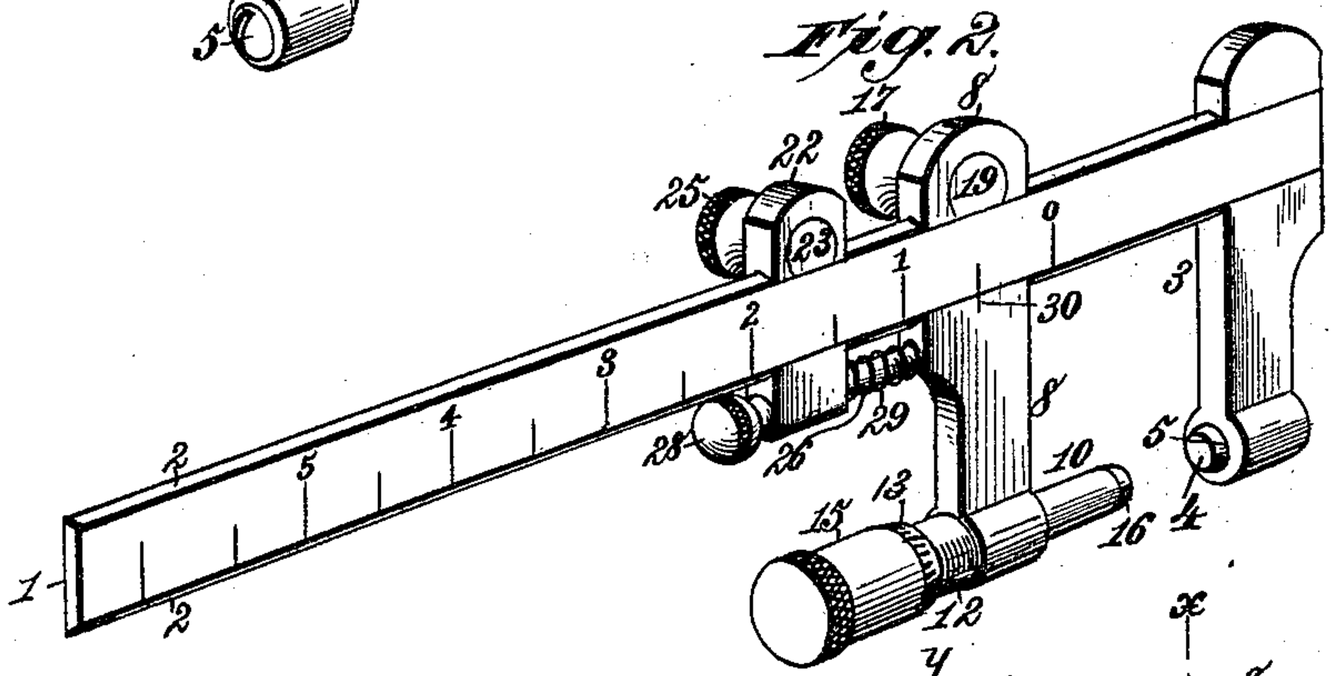


Fig. 3.

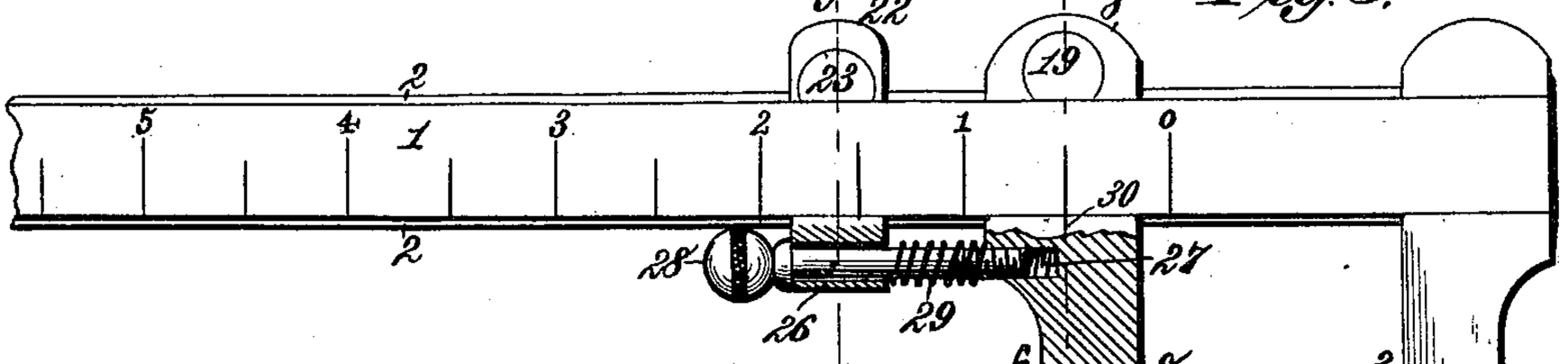


Fig. 4.

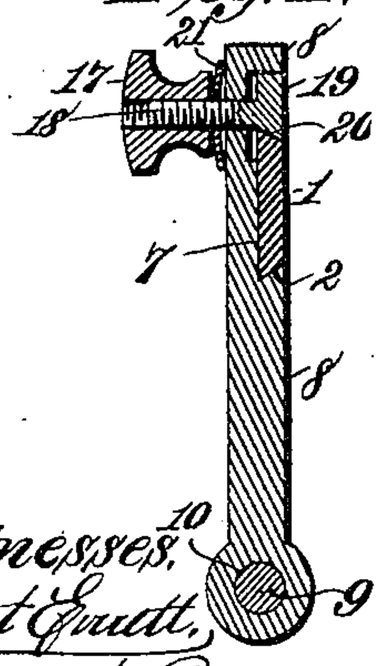
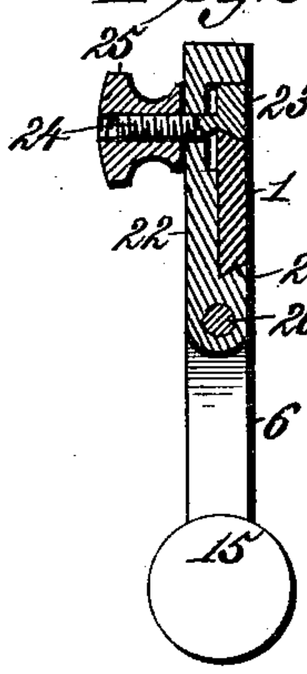


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MICROMETER-GAGE.

SPECIFICATION forming part of Letters Patent No. 403,726, dated May 21, 1889.

Application filed January 16, 1889. Serial No. 296,508. (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 new and useful Improvements in Micrometer Caliper-Gages, of which the following is a specification.

This invention relates to that type of micrometer-gages wherein a screw is lengthwise adjustable in a jaw which is adjustable on a graduated beam, so that its point coacts with an opposite fixed jaw or arm for the measurement of objects between the point of the screw and the fixed jaw or arm of the frame.

The objects of my invention are to improve such type of micrometer-gages and render them capable of a wide range of adjustment for close and accurate measurements; to provide a micrometer caliper-gage that is not confined to measurements within the scope of the adjustable screw, but wherein a slide having a wide range of movement and adjustment is provided with a lengthwise adjustable micrometer-screw, the point of which projects beyond the slide to coact with a contact-point on a fixed or stationary jaw for the accurate measurement of articles largely varying in thickness; to provide a micrometer caliper-gage with novel means for taking up the lost motion of and finely adjusting the slide that carries the lengthwise-adjustable micrometer-screw and for bringing the graduations of the beam and slide into accurate coincidence, and to provide a novel micrometer caliper-gage wherein one face of the slide carrying the micrometer-screw is located in the same plane with and exposes the entire graduated face of the beam, so that all the graduations are always visible and can be quickly read, while the mechanism for locking the slide brings the latter solidly and squarely upon the edge of the beam without the crowding motion so liable where a set-screw passes through a slide and bears against the square edge of a beam or bar.

The objects of my invention I accomplish by the features of construction and combination of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a perspective view looking at one side of the micrometer caliper-gage; Fig. 2, a similar view looking at the opposite side of the same; Fig. 3, a sectional side elevation; Fig. 4, a transverse sectional view taken on the line $x\,x$, Fig. 3; and Fig. 5, a similar view taken on the line $y\,y$, Fig. 3.

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 bar composed of a flat strip of steel or any other material suitable for the conditions required, having parallel vertical faces and beveled longitudinal edges 2 to constitute what I may term a "dovetailed beam," which at one end is rigidly secured to a stationary jaw, 3, having at its outer end a contact-point, 4, (here shown in the form of a screw-plug, 5,) adjustable in a screw-threaded orifice in the jaw to compensate for any wear that may occur by the use of the instrument. The beam is graduated on one vertical face into half-inch spaces, and a slide, 6, having a dovetailed groove, 7, in one side is fitted upon the beam so that one surface, 8, is located in the same plane as the graduated surface of the beam, to leave all the graduations always exposed and visible, so that they can be quickly read, while by reason of no part of the slide having sliding contact with or extending over the graduated face of the beam the said graduations will never be worn or marred by the slide. The outer end of the slide is tubular, as at 9, for the lengthwise movement of the smooth cylindrical stem 10 of a micrometer-screw, 11, larger in diameter than the stem, which engages a screw-thread formed in a cylinder-extension, 12, having on its exterior the stationary micrometer-gage graduations 13, that coact with the graduations on the tapered end 14 of a shell, 15, rigidly fixed to the micrometer-screw and working over the cylinder-extension. The stem of the screw extends beyond the slide and its contact-point 16 is accurately in line with the contact-point 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. 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 a 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, thereby securing the slide in a fixed position and forcing it solidly and squarely upon the beam without any crowding action such as is liable where a set-screw binds against the square edge of a beam-caliper. 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 beveled edge of the beam when the thumb-nut is loosened to avoid bruising or injuring the edge in the use of the instrument.

A secondary slide, or, as I will term it, a "sliding block," 22, is dovetailed upon the beam in rear of and in the same manner as the micrometer-screw-carrying slide, and is furnished with a locking-plate, 23, a screw, 24, and a thumb-nut, 25, constructed and operating the same as the corresponding parts for the slide. The outer end of the sliding block is furnished with a smooth-surfaced cylindrical orifice, in which can rotate a cylindrical pin, 26, having at its inner end a screw-thread engaging a screw-threaded socket, 27, in the slide, and at its outer end an attached head or thumb piece, 28, by which to rotate it, and on the pin between the slide and sliding block is located a spring, 29, preferably of the spiral order. This rotary screw-pin serves for moving the slide to secure very fine adjustments thereof by bringing the index 30 on the slide into perfect coincidence with the graduations on the beam, while one purpose of the spring is to avoid the loss of motion between the slide and sliding block. The head or thumb piece being turned in one direction, when the thumb-nut 17 is loosened to rotate the pin and move the slide in a direction away from the stationary jaw the spring is compressed, and when the pin is turned in the opposite direction the expansive force of the spring moves the slide toward the stationary jaw according to the rapidity with which the screw-threaded part of the pin turns in the screw-threaded orifice of the slide.

It will be obvious to those familiar with micrometer-gages that the pitch of the screw and the graduations may be varied to secure any requirement or measurement, and that the graduations of the beam may be increased or diminished; but since the micrometer-screw has ordinarily an adjustment of one inch, the division of the beam into half-inch spaces will be sufficient for all purposes. A caliper-gage has heretofore been provided with a jaw adjustable to and from a fixed jaw on a graduated bar by a micrometer-screw; but in such the screw simply moves the jaw and does not project beyond the same as a contact-point to coact with a contact-point on a fixed jaw for the measurement of objects between such points. A beam-caliper has also been provided with a sliding jaw adjusted by a screw-threaded pin extending through a slide-block and having a screw-nut, a spring being located on the pin between the sliding jaw and slide-block, but in such there is no micrometer measuring devices on the sliding jaw to coact with a contact-point on the stationary jaw, and, besides, the screw-threaded pin is a rigid part of the sliding jaw and the screw-nut revolves to move the pin lengthwise.

I am aware of German Patent No. 40,298, and therefore do not broadly claim a slide located on a graduated beam and carrying a lengthwise-adjustable micrometer-screw, with such slide connected by a rotary screw with secondary slide on the beam.

Having thus described my invention, what I claim is—

1. A micrometer-beam caliper-gage consisting of a graduated bevel-edged flat beam having a stationary jaw, a slide adjustable on the beam and having a tubular end provided with a cylinder-extension containing on the external surface the stationary micrometer-gage graduations, a micrometer measuring-screw adjustable lengthwise in the slide and extending through the same in line with the contact-point of the stationary jaw and having a hollow shell working lengthwise upon the external surface of the cylinder-extension and having a beveled inner end provided with graduations, and a sliding block on the beam having a spring yielding connection with the slide, substantially as described.

2. A micrometer caliper-gage consisting of a graduated beam having a jaw, a slide movable on the beam and having a micrometer measuring-screw lengthwise adjustable on the slide in line with a contact-point on the jaw, a sliding block on the beam, a lengthwise-yielding screw-connection between the slide and sliding block for adjusting the slide and its screw and bringing the graduations of the beam and slide into perfect coincidence, and a spring encircling the screw-connection between the slide and sliding block, substantially as described.

3. A micrometer caliper-gage consisting of a graduated beam having a jaw, a slide movable on the beam and having a lengthwise-adjustable micrometer measuring-screw in its outer end and a socket between its opposite end and the measuring-screw, a sliding block on the beam, a cylindrical pin supported by the latter and movably engaging the socket in the slide, and a spring encircling the pin between the slide and sliding block, substantially as described.

4. A micrometer caliper-gage consisting of a graduated beam having a jaw, a slide movable on the beam and having a lengthwise-adjustable micrometer measuring device at

its outer end and a screw-socket between its opposite end and the measuring device, a sliding block on the beam, a rotary cylindrical stem loose in the sliding block and screwing into the screw-socket in the slide, and a spring between the slide and sliding block, substantially as described.

5. The combination of the dovetailed beam having a jaw with the slide dovetailed to the beam and carrying an adjustable micrometer-screw, the locking-plate having a beveled edge parallel to the edge of the beam and provided with a lateral screw extending transversely through and beyond the slide, and a thumb-nut on the screw abutting the side of the slide for clamping the beveled edge of the locking-plate on the beveled edge of the beam to secure the slide in a fixed position, substantially as described.

6. The combination of the dovetailed beam having a jaw with the slide dovetailed on the beam and carrying a micrometer-screw extending through the slide toward the jaw, the locking-plate having a beveled edge parallel to the edge of the beam, and a screw extending transversely through the slide, and a thumb-nut on the screw and abutting the side of the slide, substantially as described.

7. The combination, with the dovetailed beam having beveled edges and graduated on one face, of a slide dovetailed on the beam extending along one side only thereof and having one surface in the same plane as the graduated face of the beam to leave all the graduations on the latter visible, a micrometer-screw extending through and lengthwise adjustable in the slide, the locking-plate having a beveled edge engaging the beveled edge of the beam and provided with a lateral screw extending transversely through the slide, and a thumb-nut on the screw abutting the side of the slide for clamping the locking-plate on the beveled edge of the beam, substantially as described.

8. The combination, with the beam graduated on one face and having beveled edges and a stationary jaw carrying a contact-point, of a slide adjustable on the beam dovetailed and having one surface in the same plane as the graduated face of the beam and provided with an index, and a micrometer-screw carried by said slide in line with the contact-point of the stationary jaw, substantially as described.

9. A micrometer caliper-gage consisting of the graduated beam having a jaw and beveled edges, a slide dovetailed on the beam and having a screw-socket and carrying a micrometer-screw which projects through it toward the jaw and is lengthwise adjustable, a sliding block dovetailed on the beam, a rotating pin passing through the block and engaging the screw-socket in the slide, a spring encircling the pin between the slide and block, two locking-plates seated, respectively, in the slide and block and having lateral screws extending, respectively, transversely through the said slide and block and having straight beveled edges engaging one beveled edge of the beam, and thumb-nuts on the screws, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

STEPHEN H. BELLOWS.

Witnesses:
CHAS. O. STONE,
ANDREW J. HAMILTON.