

A. E. WHITMORE.  
CALIPERS.

No. 105,153

Patented July 5, 1870.

Fig. 1.

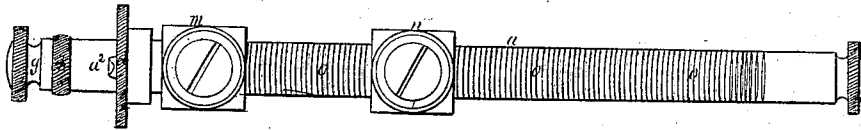


Fig. 2.

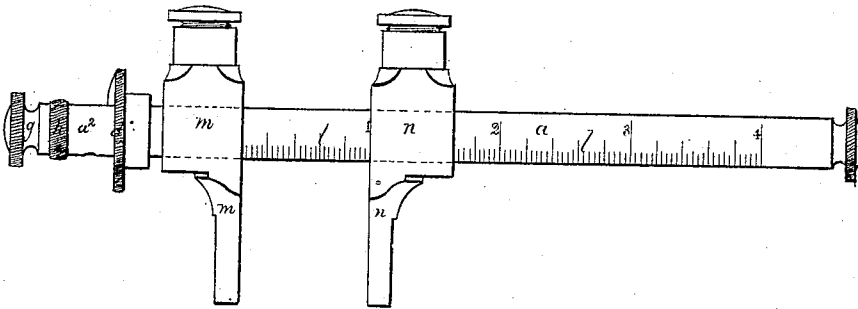
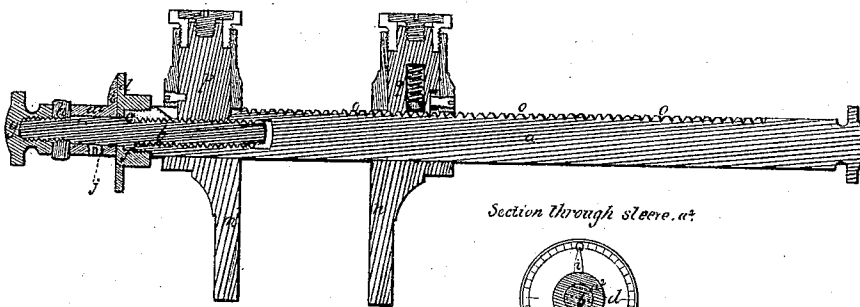


Fig. 3.



Section through sleeve, a²

Witnesses.  
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# UNITED STATES PATENT OFFICE.

ANDREW E. WHITMORE, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN CALIPERS.

Specification forming part of Letters Patent No. 105,153, dated July 5, 1870.

*To all whom it may concern:*

Be it known that I, ANDREW E. WHITMORE, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have made an invention of a new and useful Caliper-Gage or Registering Sliding Calipers; and I do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawings, making part of this specification, and in which—

Figure 1 is a plan, Fig. 2 a side elevation, and Fig. 3 a longitudinal section, of an instrument embodying the features of my invention.

On the 27th day of July, 1869, Letters Patent of the United States No. 93,026 were issued to me for improvements in sliding calipers. The elementary features embraced in the instrument shown in such Letters Patent consisted, briefly, in the adoption of a stationary and of a movable jaw mounted upon a tubular bar inclosing a male screw which passes through and so actuates the movable jaw as to produce sliding movements of it upon the shank toward and receding from the stationary jaw, which is fixed to the bar, the said bar at its opposite end being provided with a fixed disk or collar, upon which is engraved a scale of divisions for determining the infinitesimal fractions of an inch, which are measured by the instrument, an adjustable index-pointer being applied to the adjacent extremity of the screw, and in conjunction with the scale before mentioned, in such manner as to be readily loosened upon the screw and returned to the normal or zero point of the scale, should any discrepancy manifest itself after moving the adjusting semi-nut of the movable jaw upon the screw which actuates it.

Although certain defects which were found to exist in this construction of calipers naturally suggested to my mind the invention herein described, it should not be coupled with that thus made, as the only thing in common to the two is a bar and two jaws sliding thereupon.

My present invention, herein described, and which constitutes the subject-matter of these Letters Patent, dispenses with the tubular bar and long screw; and it consists in the employment of an attenuated bar, square or polygonal in cross-section, and having upon one or more sides a scale of divisions of inches and frac-

tions of an inch, and upon its upper side, preferably, a range of segmental or concave grooves or channels cut across its face at right angles to its longest axis, the extent of each minute division of the scale being equal to that of the scores or channels last mentioned and disposed directly in alignment therewith, in order that when the stop-block or detent, hereinafter referred to, is screwed down upon and engages with the channels, the indicating or inner face of the primary jaw shall be immediately against or in coincidence with the infinitesimal fractions of an inch, this last-mentioned jaw being fed forward and backward, as desired, by a short screw disposed within a recess in the end of the bar, and pivoted to the rear end of the latter in a suitable manner, and also provided with an index-pointer which acts in conjunction with a circular scale engraved upon a disk fixed to the extremity of the bar, the whole being in manner and for the purpose as hereinafter explained.

The drawings hereinbefore mentioned as accompanying this specification, and which illustrate my invention, represent at *a* an attenuated bar, one extremity of which is bored axially a short distance to receive a male screw, *b*, which enters loosely within it, this screw being swiveled to the end of the bar *a* in any proper manner which will permit of rotations of it, but prevent endwise movements thereof, the number of threads of such screw to an inch being equal to the divisions of the scale of the bar and, for convenience in use, being cut left-handed thereupon. The means adopted in the present instance to effect this connection of the screw and bar, consists in screwing upon the end of the bar a ring or collar, *c*, this ring carrying at its outer end an integral disk or dial plate, *d*, upon the outer face of which is engraved a scale of divisions to denote the infinitesimal fractions or decimals of an inch, the divisions of this scale varying in number with the degree of exactitude with which it is expected the instrument will register. The screw *b* passes easily through the bore of the ring and disk, and has a collar or annular rib, *e*, formed upon it, which collar is disposed with an enlarged recess, *f*, made within the collar, and serves to prevent endwise retraction of the screw. Upon the outer end of the screw *b* is affixed a milled head or

rosette, *g*, and also screwed thereupon is a check-nut, *h*, while interposed between such head and end of the bar *a*, and mounted loosely upon the screw, is a tube or sleeve, *a*<sup>2</sup>. By means of the head *g* and check-nut *h* the collar *c* of the screw *b* is drawn forcibly against the bottom of the recess *f*, before mentioned, thus preventing any endwise play or variation of the screw with respect to the bar *a* and its dial, and enabling it to maintain a tight or loose union of the parts, according to desire. The sleeve *a*<sup>2</sup> is provided with an outstanding radial index-pointer, *i*, and is fixed to and so as to revolve with the screw *b* by means of a screw, *j*, screwed through it and against such screw, the index-pointer acting in conjunction with the circular dial before mentioned. The object in view in applying the sleeve *a*<sup>2</sup> to the screw or rod *b* in an adjustable manner is to enable the index-pointer to be set at the zero of its scale when the registering-jaw is at the beginning of its scale. This latter-mentioned scale is engraved upon one side of the bar *a*, as shown at *l* in the drawings, and as being composed of inches, each inch being subdivided in the present instance into twenty-five parts, to correspond to the threads of the screw *b*, as before alluded to.

The registering-jaw of the instrument is shown at *m* and the primary and adjusting jaw at *n*, both being mounted upon the bar *a*, and so as to slide easily thereupon. Upon the upper surface of the bar *a* is impressed or cut a range of concave or segmental grooves or channels, *o o o*, &c., such grooves being disposed equidistant from each other and at right angles to the longest axis of the bar, and, like the threads of the screw *b* and the divisions of the scale *l*, are graduated to the number of twenty-five to the inch, and, as before stated, are disposed opposite or in alignment with the divisions of the said scale *l*. The upper part of each jaw *m* or *n*, and reaching to the bar *a*, is tubular or chambered, and within each of such chambers is swiveled, in a suitable manner, a stop block or detent, *p* or *q*, these detents being so arranged as to be depressed, respectively, into engagement with the threads or teeth of the screw *b* and the grooves *o o o*, &c., of the bar *a*, or elevated from contact with the same, the said grooves, as will be apparent to mechanics, to whom this specification is chiefly addressed, taking the place, though under a somewhat different arrangement, of the long screw in my former instrument.

The above comprises the constituent parts and mechanical construction of an instrument embodying my present invention, the method of ascertaining measurements by it, which is similar to that practiced in the use of my patent before mentioned, being as follows:

For measuring large bodies, when extreme accuracy is not essential or necessary, the primary jaw only may be used in connection with the scale *l* upon the side of the bar or beam *a* of the instrument, it being remarked that in

thus operating with the primary jaw alone care shall be taken that the measuring or inner face of the registering-jaw shall coincide exactly with the first division-mark of the scale *l*.

The adoption of the stop block or detent *q* is to permit of rapid changes of the primary jaw upon the beam, and to and fro thereof with respect to the registering-jaw, in order that I may be enabled to adapt the instrument instantly to great variations in distances to be measured by it.

The purpose of the stop block or detent *p* of the jaw *m* is to effect endwise movements by means of the screw *b* of the said jaw upon the beam, for the purpose of obtaining the small fractions of an inch, and such stop block or detent may or may not be the means of serving as a stop to prevent escape of said screw from its chamber within the bar *a*.

The exactness of measurement of which the instrument is capable, is of course directly dependent upon the number of threads to an inch of the screw *b*, and of a like graduation of the scale *l* and the grooves *o o o*, &c., as well as of the minuteness or multiplicity of the divisions of the scale upon the dial-plate *d* at the end of the bar *a*. In the present instance the screw *b* is composed of threads which number twenty-five to an inch, while the circular scale upon the dial-plate is divided into forty points; hence a partial turn of the screw through the arc of a circle of sufficient extent to cause the index pointer or radiator to traverse the scale of the dial to the extent of one of its divisions, will produce a sympathetic movement of the registering-jaw *m* upon the beam of the instrument to the extent of one thousandth part of an inch, this fraction being the multiple of the number of threads to the inch of the screw, and of the subdivisions of the annular scale. It will in practice, undoubtedly, never be found necessary or expedient to exceed the above number of fractions of an inch, since few mechanics now work as closely as to thousandths of an inch.

My purpose in applying the sleeve *a*<sup>2</sup> in an adjustable manner to the screw *b*, or the rod upon which such screw is cut, is to enable the index-pointer *i* to be set at the zero of its scale, when the registering-jaw *m* coincides exactly with the first division or starting-point of the scale *l* upon the beam *a*, or when the two jaws of the instrument are in contact.

The adoption of the stop block or detent *q*, as before observed, allows of rapid and extended movements of the primary jaw *n* upon the beam *d*, which, but for it or an equivalent device, could not be effected. Measurements of twenty-fifths of an inch and upward are obtained by means of the primary jaw *n*. Fractions of twenty-fifths of an inch to the extent of one thousandths of an inch are obtained by means of the registering-jaw *m*, with its screw and indicator, and this fractional multiplication may be carried on to any extent. A suit-

able spring should be introduced between the primary jaw *n* and the beam *a*, to prevent slipping of the former upon the latter.

The advantages of my present invention over that shown in my Letters Patent before mentioned, and others of like character, are several and manifest: first, it is much cheaper, inasmuch as the long male screw shown in my patent and in some other instruments of like class is avoided, this screw being one of the most difficult and expensive parts of the instrument to produce; second, owing to the great comparative length of the screw in my original instrument, it was susceptible of a slight twist throughout its length, which was of sufficient extent to impair, in very close measurements, the accuracy of said instrument; third, measurements, whether great or small, are obtained by my present invention with much greater celerity and ease, and with less calculation on the part of the user than by the old mode.

I claim—

1. In a beam-caliper, the combination of a beam and of two jaws provided each with a stop block or detent, when one of said jaws is adjusted by a series of grooves or their equivalents, impressed or produced upon the bar, and the other actuated by a screw, a suitable scale being also impressed upon the bar, substantially as herein shown and set forth.

2. An improved beam-caliper, as composed of the bar or beam *a*, the two jaws *m* and *n*, the screw *b*, index-plate *d*, and sleeve *a'*, with its index-pointer *i*, the jaw *m* being operated by the screw *b*, and the position of the jaw *m* being determined and maintained by the channels or grooves *o o*, &c., or their equivalents, the two jaws being provided with the stop blocks or detents *p* and *q*, and the whole being organized and operating as explained.

3. In combination with the bar *a*, its grooves *o o*, or their equivalents, and the jaw *n*, a stop block or detent for enabling the position of the jaw upon the beam to be varied and adjusted, as explained.

4. In a beam-caliper as above described, the mode herein shown of securing the screw *b* or its rod to the dial-plate and its hub—that is to say, by means of the collar upon such screw which enters a chamber of the dial-plate—by means of the milled head or rosette and clamp or set nut *h*, the hub of the dial-plate being screwed to the rear end of the beam of the instrument, and the whole operating as explained.

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Witnesses:

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