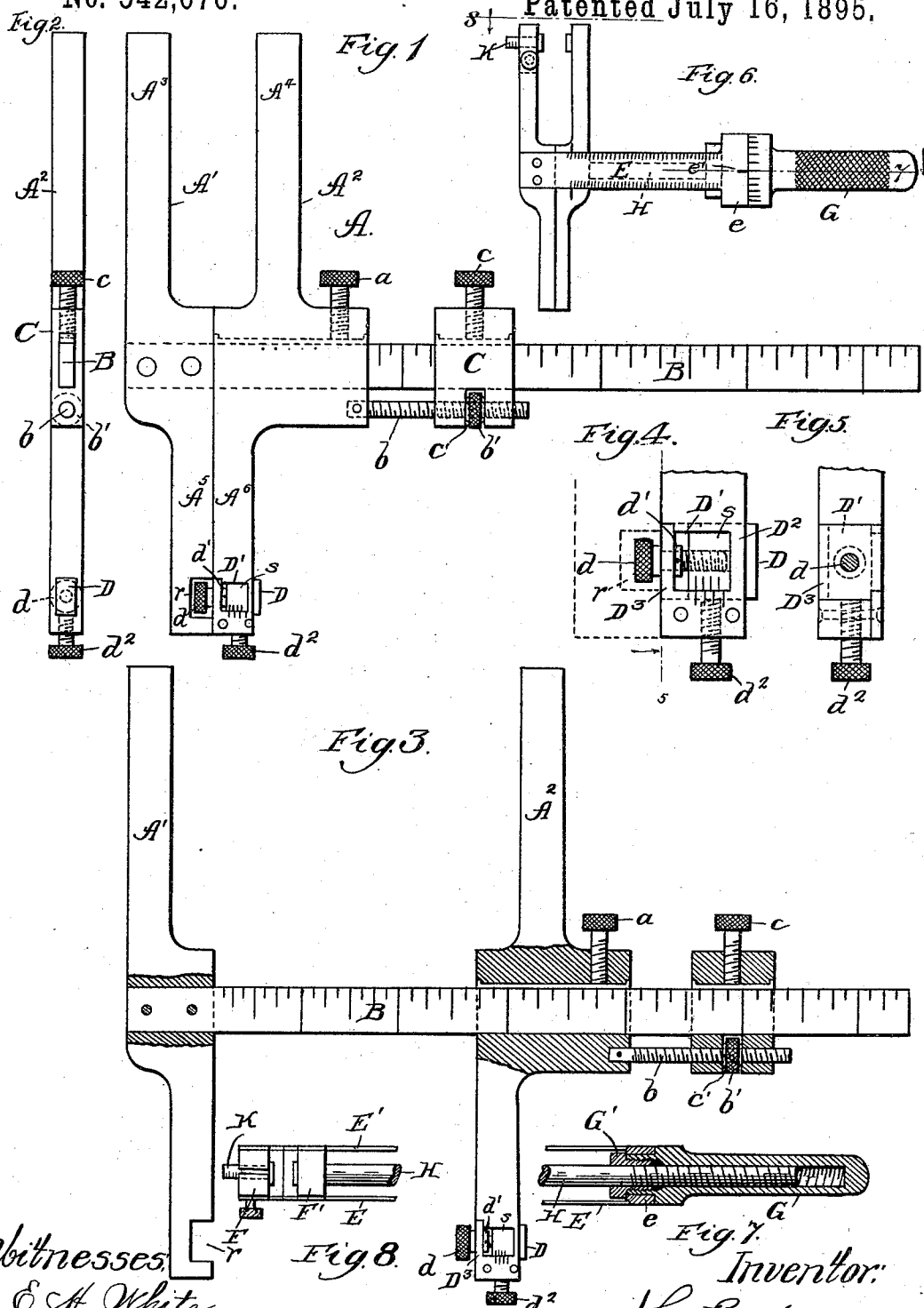


(No Model.)

J. BYSTROM.  
MICROMETER CALIPERS.

No. 542,676.

Patented July 16, 1895.



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# UNITED STATES PATENT OFFICE.

JOHN BYSTROM, OF CHICAGO, ILLINOIS.

## MICROMETER-CALIPERS.

SPECIFICATION forming part of Letters Patent No. 542,676, dated July 16, 1895.

Application filed November 22, 1894. Serial No. 529,574. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN BYSTROM, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented a certain new and useful Improvement in Calipers and Micrometers; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 is a side view of my improved calipers designed for use as both inside and outside calipers, and where very fine adjustment is required. Fig. 2 is an edge view of the same. Fig. 3 is a side view, partly in section, showing the construction and jaws of the calipers partly extended. Fig. 4 is an enlarged view of one of the lower jaws, it being the end on which is the adjusting-block. Fig. 5 is a view on line 5 of Fig. 4. Fig. 6 is a view showing the construction when used as a micrometer. Fig. 7 is an enlarged section on line 7 of Fig. 6, showing the mode of attachment of the scale-bars to the thumb-nut. Fig. 8 is a section on line 8 of Fig. 6, viewed in the direction of the arrow.

My invention has for its object the production of an instrument usually known as calipers or micrometers, which, besides having the usual adaptabilities of such instruments, will also be adapted to both inside and outside measuring, and, further, to give both the inside and outside measurement with only one setting, and, lastly, when used for the purpose of sizing a hole or opening through which a shaft or other body is to pass or fit into, it may, by means of an adjustable scaled block, be so set that it will give, by simply taking the measurement of the shaft or like body which is to pass through or fit into the hole or opening and preadjusting the said block, the exact size of such hole or opening and, first, leave allowance for shrinkage; second, a tight or driving fit; third, the exact outside diameter of the body measured, and, fourth, a loose fit; and to this end the nature of the invention consists of providing a scale-

bar, to one end of which is rigidly secured one jaw of the calipers, and having loosely mounted thereon the other jaw, having a set-screw so as to lock it in any desired position. Attached to this jaw, by means of a screw having a thumb-nut thereon and also sliding upon the scale-bar, is a block also having a set-screw to lock it in position, by means of which a very fine adjustment of the movable jaw of the calipers may be had. To the end of one of the jaws used for inside measuring is attached the adjustable block used for the different set measurements referred to above, also having its proper adjusting and set screws. When these jaws are applied to the micrometer there are two scale-bars, one on either side of the jaws and rigidly secured to the outer jaw, while to the inner jaw is secured the threaded adjusting-spindle.

The invention further consists in a combination of devices hereinafter described, and pointed out in the claim.

Reference being had to the drawings, A represents the calipers of my improved construction, A' being the rigid jaw and A<sup>2</sup> the movable jaw. To the jaw A' is rigidly secured in any suitable manner a scaled bar B, which of course can be marked, as ordinarily, in any fractions of an inch. Mounted loosely upon this bar is the movable jaw A<sup>2</sup> having the set-screw *a* to lock it in any desired position. These jaws A' and A<sup>2</sup> are preferably made so that the inner side of the upper portions A<sup>3</sup> and A<sup>4</sup> lie a little outside the vertical plane of the outer sides of the lower portions A<sup>5</sup> and A<sup>6</sup>.

Attached to the jaw A<sup>2</sup> by means of a screw-threaded bar *b* is a movable block C, which is also mounted loosely upon the bar B and having the set-screw *c* to lock it in position. This block is preferably mounted loosely upon the threaded bar *b*, is cut away, as at *c'*, to admit of the insertion of an internally-threaded thumb-nut *b'*, traveling upon the threaded bar *b*. By means of this thumb-nut *b'* and threaded bar *b* the jaw A<sup>2</sup> can be very minutely adjusted.

When it is desired to take a measurement, the set-screws *a* and *c* of the jaw A<sup>2</sup> and block C, respectively, are loosened and the said jaw

and block moved along the scale-bar to approximately fit the article which it is desired to measure. The set-screw *c* is tightened, securely holding the block *C* in place. The jaw *A*<sup>2</sup> is then adjusted to the exact position required by means of a thumb-nut *b'* and threaded bar *b*.

Near the end of one of the lower jaws, or those designed for use as inside calipers, is a small block *D* inserted in the opening *D'*, cut in the jaw for that purpose. As shown this opening or "way" for the block *D* is cut through the jaw, leaving only the walls *D*<sup>2</sup> on either side, one of the walls being partly cut away, as at *s*, so as to expose the block *D*, and after the said block is in place the cap-piece *D*<sup>3</sup> is riveted or otherwise secured in its place so as to cover the way at the inner end. Through this cap-piece *D*<sup>3</sup> passes an adjusting-screw *d*, which works in a "tap" in the inner end of the movable block *D* and may have a collar *d'* or other means to prevent it from withdrawing but allow it to revolve freely, and when so turned will move the block *D* in or out; and immediately below the path of the said block is a small set-screw *d*<sup>2</sup> to firmly hold it in any position desired. The opposite jaw of the calipers is cut out, as at *r*, to fit over the head of the screw *d* so as to allow the jaws to come close together. This block *D* has marked upon the face, which is exposed through the opening *s*, four marks to indicate, first, the size to make the opening, with allowance for shrinkage; second, what is called a "driving" or tight fit; third, the exact outside diameter of the piece measured, and, fourth, what is called a "loose fit;" and four corresponding marks or pointers are marked upon the side of the jaw. It is desirable to have the pointers upon the jaw slightly farther apart than those on the block, so that if, for instance, the second mark or graduation is required, only the second mark on the block and the second pointer on the jaw will coincide, thus making the exact position more discernible. This, however, is not essential to the spirit of my invention. The purpose of these graduations is this, taking, for example, that it is desired to fit a collar on a shaft and have it a tight or driving fit: Before measuring the shaft the block *D* is moved out by means of the adjusting-screw *d*, so that the second mark, or the one corresponding to driving fit, on the block and the second pointer on the jaw coincide. By means of the screw *d* the block is then locked in this position. The shaft is then "calipered," as above described, and there is given on the jaws designed for inside measurement the exact size that it is required to make the opening in the collar in order to have a driving fit. This same process is had when any of the other sizes above referred to are required, moving the block to correspond with the one desired.

This instrument can of course be used as ordinary inside and outside calipers. The bar *B* being graduated in inches and fractions thereof will always give the correct measurement in inches or fractions thereof.

In Fig. 6 is shown a micrometer embodying my improvements, with these differences, however, that in this there are two parallel bars *E* and *E'*, which are rigidly secured to the outer jaw *F* at one end, while the other ends terminate in a collar *e*, which surrounds the end of the handle *G*, which also serves as a thumb-nut to open and close the jaws, which turned down will form a shoulder, so that the collar will make a "flush" fit. This handle is internally threaded at the inner end to accommodate the nut *G'*, which is drilled through the center to allow the passage of the spindle *H*. This nut *G* has a shoulder on its outer end slightly larger than the turned-down portion of the handle and when in place confines the collar *e* of the bars *E* and *E'* into its proper place, thus preventing the handle or thumb-nut *G* from pulling out, but at the same time allowing it to revolve freely. The spindle *H* is threaded at one end to fit a corresponding thread or tap in the thumb-nut *G* and at the other end is rigidly secured to the movable jaw *F'*, which moves between the two bars *E* and *E'*. Upon the collar *e* is a mark or station point *e'*, while the thumb-screw may, for example, have twenty-five points in its circumference, and if the thread on the spindle be forty threads to the inch by turning the nut *G* one point the jaws are moved one way or the other one one-thousandth of one inch, or one of the bars *E* or *E'* may be marked forty points to the inch and a station-point be marked upon the jaw *F*, thus making the movement of one one-thousandth of an inch more perceptible. The other edge of the bars may be marked in regular fractions of an inch—as sixteenths, thirty-seconds, &c.—the exact marking being immaterial to the spirit of my invention. The upper end of one of the jaws *F* or *F'* is split, as shown in Fig. 8, and a graduated pin *K* is inserted for the purpose of taking very small diameters, there being a small thumb-screw passing through the jaw at right angles to the "split" above referred to for the purpose of locking the pin *K* at any desired position.

While I have herein shown and described details of my invention, I do not, however, wish to limit myself to this exact construction, as the parts may obviously be changed and reversed without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

The combination with a caliper, micrometer or similar instrument adapted for both in and outside measuring of an adjustable block, set in one of said jaws, having on its face four

marks or graduations, corresponding marks  
or graduations on the jaw wherein said block  
is set, said graduations on said block repre-  
senting and, when set on either one, adapted  
5 to give, when a measurement is taken by the  
opposite jaws, the size required leaving allow-  
ance for shrinkage of the material operating  
upon, for a loose fit, the exact measurement

taken by said opposite jaws, or for a tight fit,  
substantially as and for the purposes set forth. 10

In testimony whereof I have signed this  
specification in the presence of two witnesses.

JOHN BYSTROM.

Witnesses:

ALF ROESSNER,  
OTTO SCHRAM.