

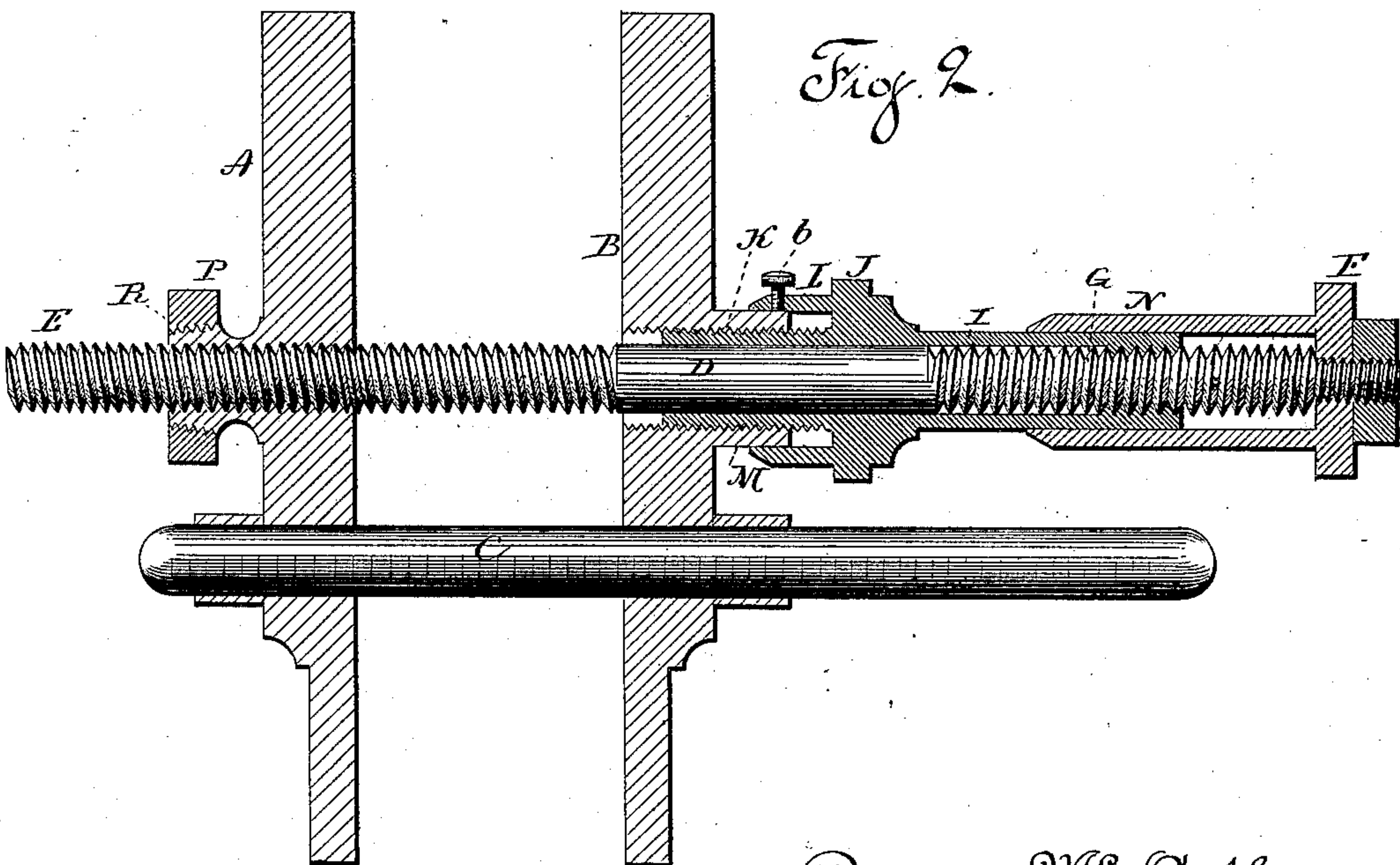
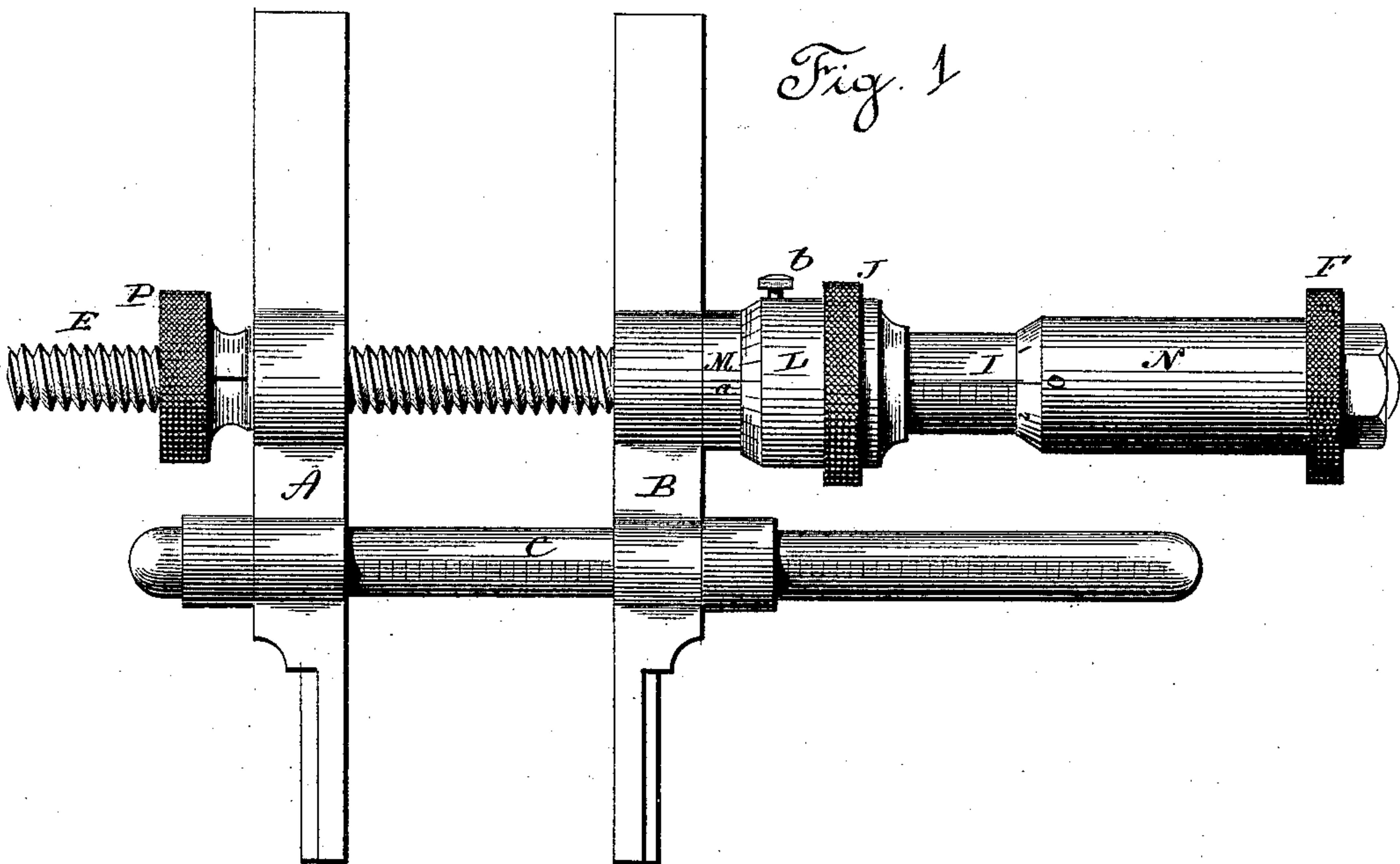
(No Model.)

2 Sheets—Sheet 1.

D. McARTHUR.
MICROMETER CALIPERS.

No. 343,478.

Patented June 8. 1886.



Witnesses.
J. H. Shumway
Fred C. Earle

Duncan McArthur.
Inventor.
By Atty.
John E. Earle

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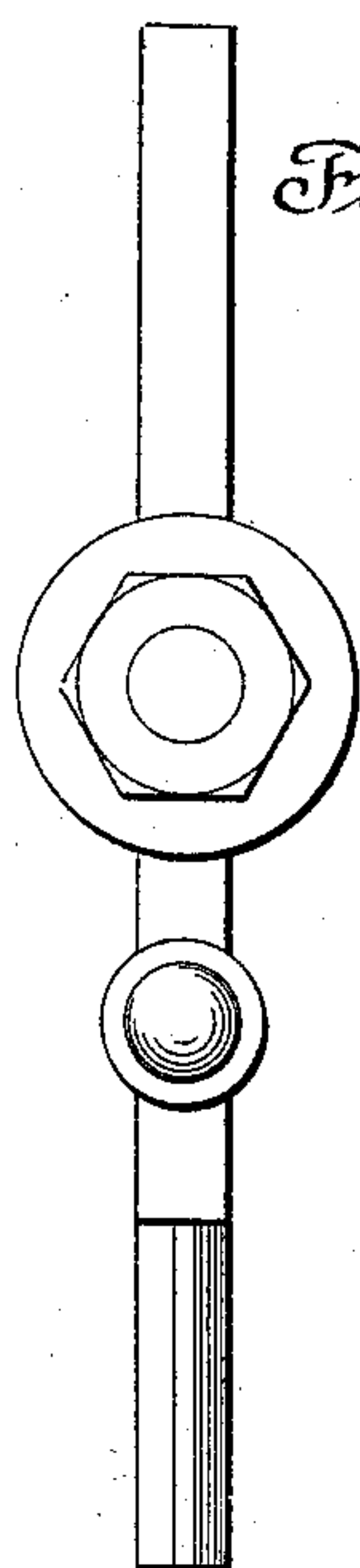


Fig. 3.

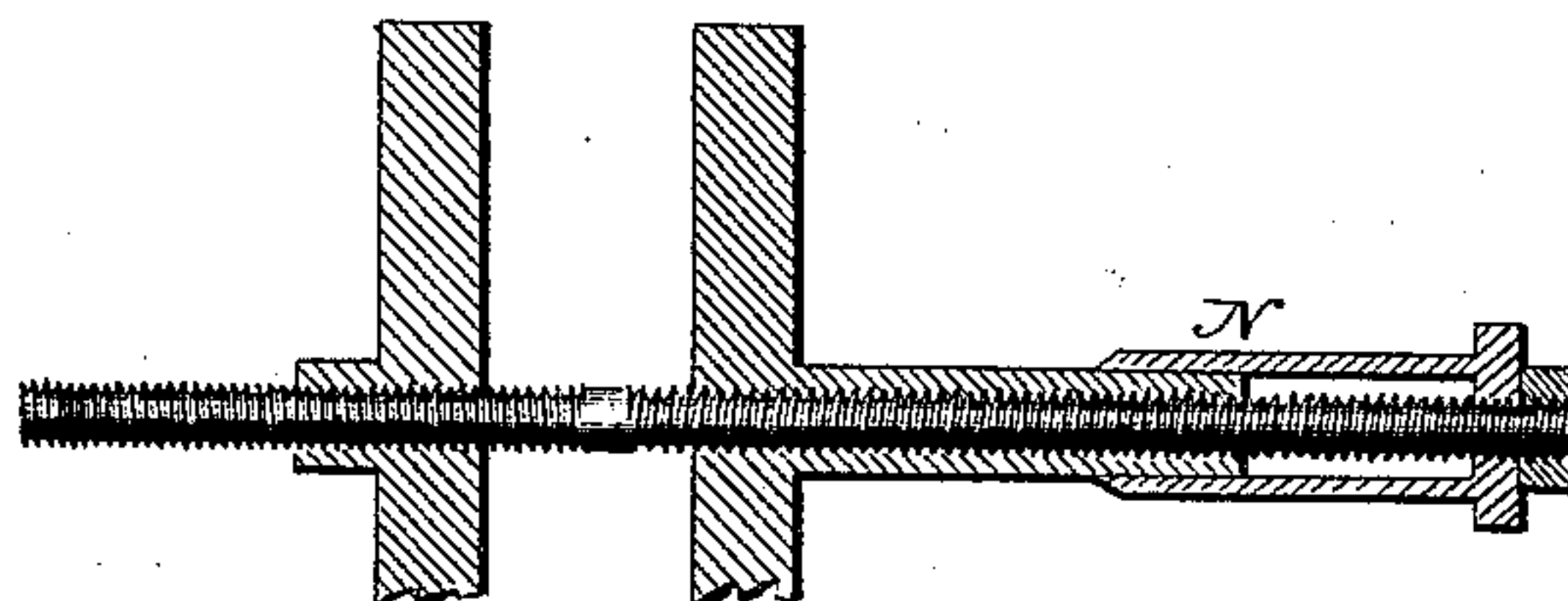


Fig. 4.

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UNITED STATES PATENT OFFICE.

DUNCAN McARTHUR, OF NEW HAVEN, CONNECTICUT.

MICROMETER-CALIPERS.

SPECIFICATION forming part of Letters Patent No. 343,478, dated June 8, 1886.

Application filed February 19, 1886. Serial No. 192,509. (No model.)

To all whom it may concern:

Be it known that I, DUNCAN McARTHUR, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Micrometer-Calipers; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of the caliper complete, enlarged; Fig. 2, a longitudinal central section of the same; Fig. 3, an end view of the same; Fig. 4, modifications.

This invention relates to an improvement in that class of measuring-instruments which consist of a pair of legs adjustable toward and from each other, for the purpose of measuring diameters, either internal or external, and in which the adjustment is made to indicate the smallest fractions—say, thousandths of an inch, commonly called “micrometer-calipers”—and particularly to that class in which the legs are moved by means of a leading-screw having combined therewith a differential screw, whereby fractional movements of the pitch of the principal screw are produced. In this class of instruments the leading-screw is more generally constructed of so fine a thread or small pitch that in any extent of adjustment a great number of revolutions of the leading-screw is required, and hence considerable time is required in making the general adjustment from large to small extent, or vice versa.

The object of my invention is a construction in which the leading-screw may operate much more rapidly than in the previous construction referred to, and yet readily make the adjustment to the smallest required fraction, and the invention consists in the construction as hereinafter described, and more particularly recited in the claims.

A represents one leg, and B the other leg, of a pair of calipers, their adjacent faces being straight and parallel with each other. The one leg, A, is fixed to a bar, C, and the bar extends through the other leg, B, and so as to form a guide by which the two legs may be moved toward or from each other, and maintain their parallelism, it being understood that

the bar C is at right angles to the adjacent faces of the two legs.

D is the leading-screw, which is arranged parallel with the bar C, and extends through both legs. At one end, E, a screw-thread is cut, say, right hand, and of a pitch, say, one-twentieth of an inch. The leg A is correspondingly screw-threaded, and so that the screw may work through the said leg. At the other end of the screw a head, F, is provided, by which the screw may be rotated. That end portion, G, of the screw is threaded of a pitch the same as the thread at the other end—say, one-twentieth of an inch—but in the reverse direction or left hand. Over this left-hand screw-threaded portion G a sleeve, I, is placed, internally screw-threaded, corresponding to the threaded portion G. The sleeve is provided with a collar, J, by which it may be readily rotated, as occasion requires. From the collar there is an extension, K, of the sleeve, concentric with the screw, toward the leg B, and so that it may revolve on the cylindrical portion of the screw, which is between the two threaded portions. The exterior of the extension K is screw-threaded, and the leg B is correspondingly screw-threaded, so that the threaded portion K of the sleeve will work in the thread of the leg B. The pitch of the thread on the portion K of the sleeve is less than that of the threaded portion G—say, of a pitch of one-fortieth of an inch in the same direction to that of the threaded portion G of the screw; hence, if the sleeve be held in rigid engagement with the leg B, the leading-screw will work through the sleeve I and through the leg A, and by the rotation of the screw the legs will be forced asunder, according to the pitch of the two ends—that is, the pitch being twenty to the inch, the movement of the legs will be one-tenth of an inch to each revolution of the screw; but if the leading-screw remain stationary, and the sleeve I be revolved—say, in the direction to take the sleeve onto the threaded portion G—one revolution of the sleeve will draw the sleeve in that direction one pitch or one-twentieth of an inch, and the leg B would have been correspondingly removed from the leg A, but that at the same time the threaded portion K has made one revolution in the leg B, and has therefore forced the leg

from the sleeve one pitch or one-fortieth of an inch. Consequently the leg in one revolution of the sleeve has moved from the leg A one pitch of the screw-threaded portion G, minus
 5 one pitch of the thread of the portion K—that is, one-fortieth of an inch.

From the sleeve-collar J a sleeve, L, extends toward the leg B, and onto its hub M, the hub being cylindrical, and the sleeve L of
 10 corresponding shape, so as to revolve thereon, and both concentric with the leading-screw. The edge of the sleeve L next the leg B is graduated—say, into twenty-five equal divisions, as indicated in Fig. 1. On the hub is a
 15 fixed indicating-mark, *a*; hence comparing the graduations on the sleeve L with the fixed mark *a* on the hub, the extent of rotation of the sleeve L, and consequently of the sleeve I, will be indicated—say, in divisions of one-
 20 twenty-fifth.

As before stated, the relative arrangement of the differential threads on the sleeve I are such that one full revolution of the sleeve imparts a corresponding movement of the legs
 25 to the extent of one-fortieth of an inch, the graduations on the sleeve therefore indicating twenty-fifths of a revolution—that is, twenty-fifths of one-fortieth of an inch—consequently each graduation on the sleeve indicates one
 30 one-thousandth of an inch movement of the leg B.

The head F is constructed with a sleeve, N, concentric with the leading-screw, and which extends onto the sleeve I, as does the sleeve
 35 L onto the hub of the leg. The sleeve I, being graduated, as indicated in Fig. 1, will indicate the revolutions of the screw, each full revolution being one-tenth of an inch, and the end of the sleeve N may be circumferentially graduated—say, in ten divisions—with a zero-mark
 40 which, brought to the line *a*, indicates a full revolution, and each graduation brought to that same line will indicate one-fifth of a revolution of the screw, or one-fiftieth of an inch.

Between the sleeve I and the leg B a setting device is necessary, that the sleeve may be held fixed or rigidly engaged with the leg. This may be done by a set-screw, *b*, through
 45 the sleeve L, to bind upon the hub of the leg, and when the leg and sleeve are so engaged then the leading-screw works upon both legs alike, and will be turned by its head F until brought near the final adjustment. The movement of the legs under this arrangement is very
 50 rapid, one-tenth of an inch at each revolution of the screw. Then, for final delicate adjustment, the sleeve is disengaged from the leg, and that adjustment made by the rotation of the sleeve I while the leading-screw remains
 55 stationary; and in order that the leading-screw may be held stationary, I arrange a nut, P, on an outwardly-projecting divided hub, R, on the leg A, the hub being slightly tapering and the nut of corresponding shape, both screw-
 60 threaded, so that turning the nut onto the hub will clamp the hub upon the screw, so as to

hold the leg A and the screw in rigid engagement, and so as to leave the sleeve L free to turn upon the leading-screw as its axis. It will be understood that any other known set-
 70 screw may be introduced between the leg and leading-screw as a means for clamping the leg to the screw. Under this construction the most delicate adjustment may be obtained, and at the same time a rapid separation or ap-
 75 proach of the legs may be made when required, thus greatly facilitating the use of this class of instruments. Where the more delicate adjustment is not required, the sleeve I may be omitted, the right-and-left hand leading-screw
 80 extending through and working into both legs, as seen in Fig. 4. In this arrangement, with the pitch of thread as before described, and with the graduations on the sleeve N, the indications will be by fiftieths of an inch. 85

I claim—

1. In micrometer-calipers, the combination of the two legs A B, parallel to each other, a leading-screw, D, arranged through the said
 90 legs and at right angles thereto, one end portion of the leading-screw threaded in one direction and the leg at that end correspondingly threaded, the opposite end portion, G, of the leading-screw threaded in the opposite direc-
 95 tion, and the other leg, B, provided with a screw-thread corresponding to the said screw-threaded portion G of the leading-screw, the leading-screw constructed with a sleeve, N, concentric with the leading-screw, and encir-
 100 cling a corresponding projection from the leg B, the sleeve N graduated, substantially as described.

2. In micrometer-calipers, the combination of a pair of legs parallel to each other, a leading-screw, D, extending through the said two
 105 legs at right angles thereto, one end portion, E, of the said screw D screw-threaded in one direction and one of the legs correspondingly screw-threaded, through which said screw works, the other end portion, G, of the lead-
 110 ing-screw threaded in the opposite direction, a sleeve, I, on said oppositely-threaded portion of the leading-screw and correspondingly threaded, the said sleeve constructed with an extension, K, concentric with the lead-
 115 ing-screw, and externally screw-threaded in the same direction as the threaded portion G of the leading screw, on which the sleeve works, and of a fractional pitch thereof, the said extension K adapted to work through the other
 120 leg, which is correspondingly screw-threaded, substantially as described.

3. In micrometer-calipers, the combination of a pair of legs parallel to each other, a leading-screw, D, extending through the said two
 125 legs at right angles thereto, one end portion, E, of the said screw D screw-threaded in one direction, and one of the legs correspondingly screw-threaded, through which said screw works, the other end portion, G, of the lead-
 130 ing-screw threaded in the opposite direction, a sleeve, I, on said oppositely-threaded por-

tion of the leading-screw and correspondingly threaded, the said sleeve constructed with an extension, K, concentric with the leading-screw and externally screw-threaded in the same direction as the threaded portion G of the leading-screw on which the sleeve works, and of a fractional pitch thereof, the said extension K adapted to work through the other leg, which is correspondingly screw-threaded, the said sleeve constructed with a collar, J, and with a sleeve, L, extending therefrom toward and so as to encircle the hub of the leg, the said sleeve L circumferentially graduated, substantially as described.

4. In micrometer-calipers, the combination of a pair of legs parallel to each other, a leading-screw, D, extending through the said two legs at right angles thereto, one end portion, E, of the said screw D screw-threaded in one direction and one of the legs correspondingly screw-threaded, through which said screw works, the other end portion, G, of the leading-screw threaded in the opposite direction, a sleeve, I, on said oppositely-threaded portion of the leading-screw and correspondingly threaded, the said sleeve constructed with an extension, K, concentric with the leading-screw, and externally screw-threaded in the same direction as the threaded portion G of the leading-screw on which the sleeve works, and of a fractional pitch thereof, the said extension K adapted to work through the other leg, which is correspondingly screw-threaded, the said sleeve constructed with a collar, J, and with a sleeve, L, extending therefrom toward and so as to encircle the hub of the leg, the said sleeve L circumferentially graduated, and the leading-screw provided with a head, F, and with a sleeve, N, projecting therefrom concentric with the leading-screw surrounding the sleeve I, substantially as described.

5. In micrometer-calipers, the combination of a pair of legs parallel to each other, a leading-screw, D, extending through the said two legs at right angles thereto, one end portion, E, of the said screw D screw-threaded in one direction and one of the legs correspondingly screw-threaded, through which said screw

works, the other end portion, G, of the leading-screw threaded in the opposite direction, a sleeve, I, on said oppositely-threaded portion of the leading-screw and correspondingly threaded, the said sleeve constructed with an extension, K, concentric with the leading-screw, and externally screw-threaded in the same direction as the threaded portion G of the leading-screw on which the sleeve works, and of a fractional pitch thereof, the said extension K adapted to work through the other leg, which is correspondingly screw-threaded, the said sleeve constructed with a collar, J, and with a sleeve, L, extending therefrom toward and so as to encircle the hub of the leg, the said sleeve L circumferentially graduated, and with a set-screw, b, between the sleeve and the leg B, substantially as described.

6. In micrometer-calipers, the combination of a pair of legs parallel to each other, a leading-screw, D, extending through the said two legs at right angles thereto, one end portion, E, of the said screw D screw-threaded in one direction, and one of the legs correspondingly screw-threaded, through which said screw works, the other end portion, G, of the leading-screw threaded in the opposite direction, a sleeve, I, on said oppositely-threaded portion of the leading-screw and correspondingly threaded, the said sleeve constructed with an extension, K, concentric with the leading-screw, and externally screw-threaded in the same direction as the threaded portion G of the leading-screw on which the sleeve works, and of a fractional pitch thereof, the said extension K adapted to work through the other leg, which is correspondingly screw-threaded, the said sleeve constructed with a collar, J, and with a sleeve, L, extending therefrom toward and so as to encircle the hub of the leg, the said sleeve L circumferentially graduated, and the set-screw between the leg A and the leading-screw, substantially as described.

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Witnesses:

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