(No Model.)

E. S. COBB.

MICROMETER CALIPERS.

No. 335,214. Patented Feb. 2, 1886.

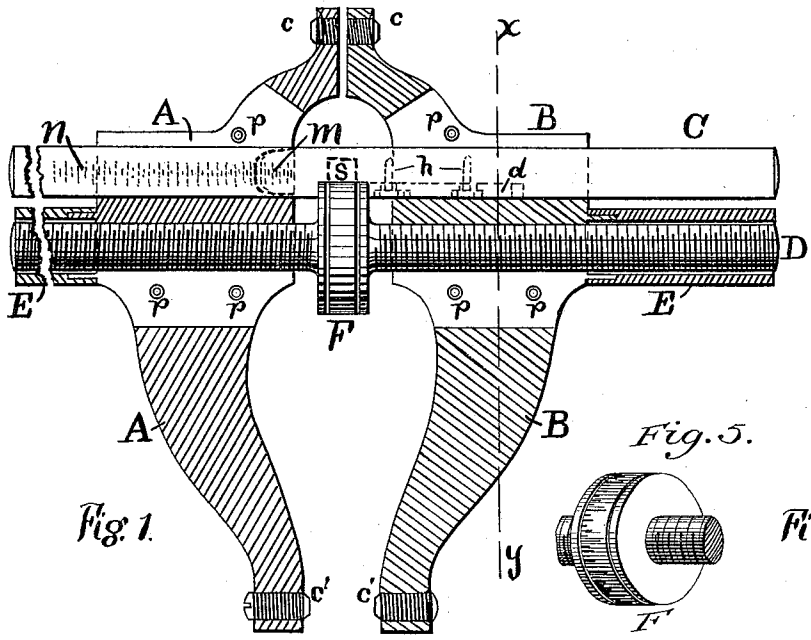


Fig. 1.

Fig. 5.

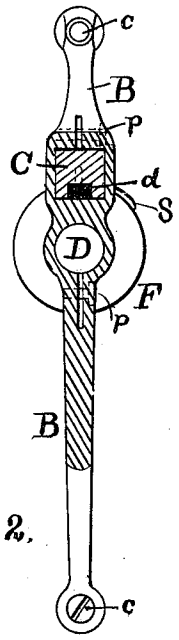


Fig. 2.

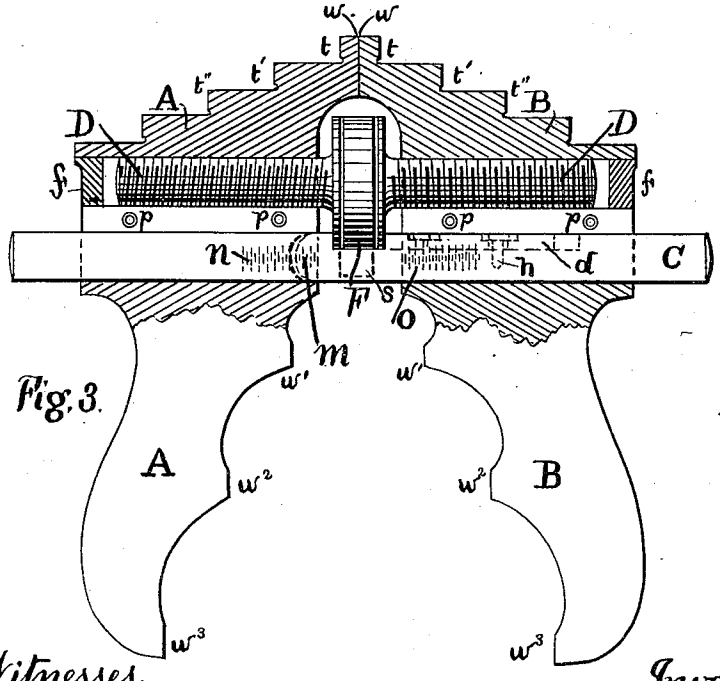


Fig. 3.

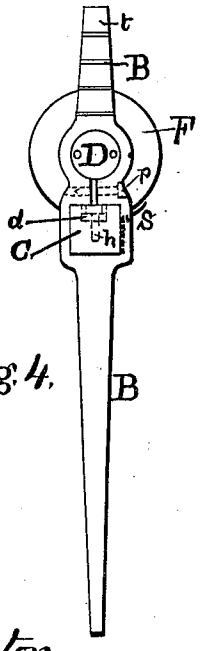


Fig. 4.

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UNITED STATES PATENT OFFICE.

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MICROMETER-CALIPERS.

SPECIFICATION forming part of Letters Patent No. 335,214, dated February 2, 1886.

Application filed February 24, 1885. Serial No. 156,682. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. COBB, a citizen of the United States, residing at Terre Haute, county of Vigo, and State of Indiana, have invented a new and useful Micrometer-Calipers, of which the following is a specification.

My invention relates to improvements in micrometer-calipers in which there is employed a micrometer-screw and points, between which articles whose dimensions are required may be accurately adjusted. The dimension in thousandths of an inch is then read from the circumference of the thumb-wheel on the micrometer-screw and the graduations on a certain bar or slide.

The objects of my invention are as follows: first, to provide a micrometer-calipers of such a construction that it will accurately measure the inside diameter of a hole, the length of a slot, or other similar measurements; second, to provide in the same instrument, when necessary, a means of measuring the outside dimension of an article, and have the whole so constructed and arranged that while one portion of the calipers gives the accurate inside dimension, as of a hole, another portion of the caliper will give the same external measure, as of a plug to fit the above-mentioned hole; third, to provide a micrometer-calipers for measuring either internal or external dimensions, and be easily and quickly adjusted to suit a large range of sizes. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of one form of the calipers; Fig. 2, a section through the line *x y* of Fig. 1; Fig. 3, a vertical section through a second form of the calipers, and Fig. 4 an end view of the form of calipers of which Fig. 3 is a section. Fig. 5 is a perspective view of the thumb-wheel F, showing the graduations upon its periphery.

Similar letters refer to similar parts throughout the several views.

The legs A A and B B, with the right and left hand threaded micrometer-screw D, bar C, and sleeves E E, constitute the principal parts of the caliper.

The screw D may be made so that one half of its length has a right-hand thread cut upon it and the other half of its length a left-hand thread cut upon it; or it may have cut upon its respective half-lengths screws of different pitch, the whole forming what is known as a "differential" screw. I prefer in general practice, however, the first-mentioned form. In the center of the length of the screw D thus formed there is a thumb-wheel, F, as shown in perspective in Fig. 5. The screws D fit accurately through threaded holes in the legs A and B, respectively.

The bar C may be either round, square, or polygonal in cross-section. It has near the center of its length a recess, formed crosswise of the bar, which will accurately fit over a portion of the thumb-wheel F, as shown. On either or both sides of the recess formed for the thumb-wheel F, and running lengthwise of the bars C, there are grooves formed for the reception of a small slide, *d*, which, when properly adjusted to its position, is held there by the screws *h h*, the object of the slides *d* being to take up any wear which may occur between the sides of the thumb-wheel F and the sides of the recess into which it fits. On the bar C graduations are marked, as shown at *n n* and *o*. Their use will be explained further on.

The legs A and B are symmetrical in form, and are provided with threaded holes for the reception of the screw D, and with plain holes for the reception of the bar C. They are split on a plane passing through the centers of the holes for a short distance, either side of or between the holes. Screws *p* are provided to close the split, so as to take up the wear between the legs A and B and the screw D and bar C. The legs A and B are free to slide on the bar C when actuated by the screw D; but one of the legs could be firmly attached to or made a part of said bar, and the thumb-wheel F made sufficiently small to revolve without coming into contact with the bar, which construction would be practical and accurate. A portion of each of the legs A and B is so formed that they will enter a hole the dimension of which is required, as at the screw-points *c c*, Fig. 1, and at *t t' t'*, &c., Fig. 3, and another portion of the legs is so formed as to inclose an article to be measured, as at the ends where the screws *c' c'* are placed, Fig. 1, or the small surfaces, *w w w' w' w² w²*, Fig. 3. The screws *c c* and *c' c'*, Fig. 1, are provided

for taking up the wear incident to use and for the proper adjustment of the calipers.

It is an important feature in the form of calipers shown in Fig. 1 that when the outer ends of screws *c c* are at a certain distance apart the inner ends of the screws *c' c'* shall be the same distance apart.

In the form of calipers shown in Fig. 1 the tubes or sleeves E E are fitted upon the legs A and B, respectively, for the purpose of protecting the projecting portions of the screw D, and their ends may be closed to exclude dirt and chips.

In the form of calipers shown in Fig. 3 the plugs *f f*, screwed into the holes made for the reception of the screw D, are provided for the same purpose.

The piece S, secured to the bar C and passing partially round the periphery of the thumb-wheel F, is a pointer to assist in reading the graduations marked upon said wheel F.

The openings or notches *m* are cut from the legs A, immediately over the graduations *n* on the bar C, for the purpose of showing at a glance just what diameter of hole the screw-points *c c*, Fig. 1, or the points *t t*, Fig. 3, will enter, thus: Suppose, as in Fig. 1, the points of the screws *c c* are just one-half inch apart, then the inner edge of opening *m* over graduations *n* will indicate on said graduation just one-half inch; or, as in Fig. 3, that the points *t t* will just enter a hole three-tenths of an inch in diameter, then the inner edge of opening *m*, over graduations *n* on bar C will indicate on said graduations just three-tenths of an inch, the zero-graduation on thumb-wheel F being exactly coincident with the end of pointer S in both cases. The graduations *n* on bar C, Fig. 1, are read when this form of caliper is used, for either internal or external dimensions; but when the calipers is constructed in the form shown in Fig. 3, the internal dimensions measured are read from the graduations *n*, and the external dimensions are read from the graduations *o*, all on bar C, and read in either case in conjunction with the graduations on the periphery of thumb-wheel F.

Having thus described the several parts of the micrometer-calipers, I will now proceed to describe the method of using each form shown.

The form shown in Fig. 1 may be used as follows: Suppose the right and left hand threads upon the screw D to be cut forty to the inch and the periphery of the thumb-wheel F to be divided into fifty equal parts. Then if the thumb-wheel F is revolved in either direction, so that one of these parts passes the end of pointer S, the calipers will be opened or closed just one one-thousandth of an inch. Now, if by turning thumb-wheel F until the points of screws *c c* exactly fit inside of a hole, then the points of the screws *c' c'* will exactly fit outside of a piece to fit said hole, and the diameter of said hole and piece in thousandths of an inch may be read from the graduations *n* at the opening *m* in connection with the graduations of wheel F. Each one of the graduations *n* of the bar C represents that the calipers is open fifty-thousandths of an inch, and every additional thousandth up to fifty is read by the number of graduations on the periphery of the wheel F which have passed the end of pointer S. Thus if the calipers was set to fit a hole or plug that was two inches and twenty-seven thousandths of an inch in diameter, then forty of the graduations *n* would be visible in the opening *m*, and twenty-seven of the graduations on the periphery of the thumb-wheel F would have passed the end of pointer S.

The form of calipers shown in Fig. 3 is operated as follows: Suppose the same conditions of screw D and thumb-wheel F as before. First, to find the inside diameter of a hole, revolve the thumb-wheel F until a pair of the points *t t* or *t' t'* will just enter the hole. If the zero-point on wheel F be coincident with the end of pointer S, and the points *t t* just enter the hole, the diameter is just three-tenths of an inch. If *t' t'* just enter, the diameter is just one and three-tenths inch, and so on, the distance between *t'* and *t'* opposite being just one inch greater than the distance between *t* and *t* opposite. Second, to find the outside diameter of a wire or rod, turn the thumb-wheel F until the rod will just enter between any pair of faces, as *w w*, or *w' w'*, or w^2 w^2, then its diameter may be read from graduations O on bar C as follows: If it enters between the faces *w* and *w*, suppose the graduations to show the diameter to be three-thousandths of an inch, then the distance between the faces *w'* and *w'* will be just one inch and three-thousandths, and between the faces w^2 and w^2 two inches and three-thousandths, and so on.

The foregoing is, I believe, a full and clear description of my invention. I am aware that micrometer-calipers having a screw of a single pitch have been made for measuring wire, &c. I therefore do not claim that adaptation as a distinct feature; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a micrometer-calipers, a bar, C, having upon its surface one or more series of graduations, in combination with the graduated thumb-wheel F on the actuating-screw D, and the slide *d*, as shown and described.

2. In a micrometer-calipers, the combination of the screw D, having graduated thumb-wheel F, the bar C, having graduations *o*, for external dimensions, and graduations *n*, for internal dimensions, with the legs A and B, having surfaces between which external dimensions may be measured, and surfaces between which internal dimensions may be measured, as and for the purpose set forth.

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