Nov. 17, 1925. 1,561,630

R. A. WILSON

MICROMETER CALIPERS

Filed Nov. 14, 1924

Fig. 1.

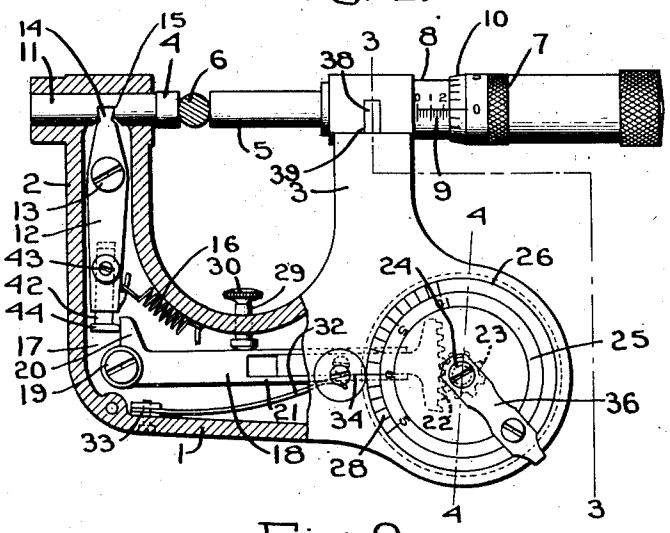


Fig. 2.

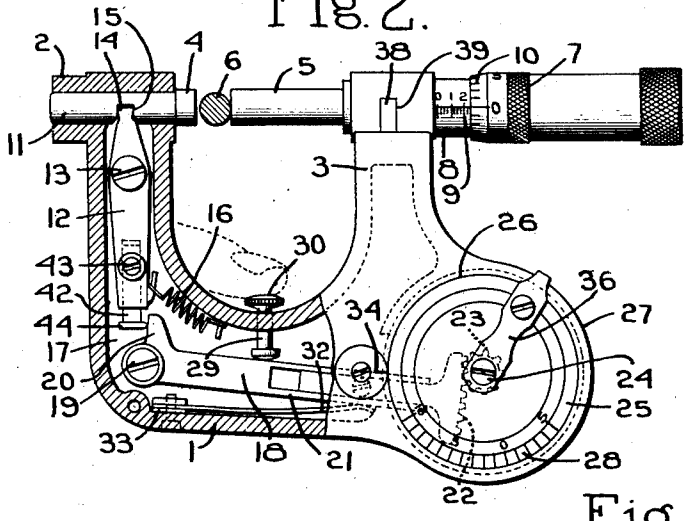


Fig. 3.

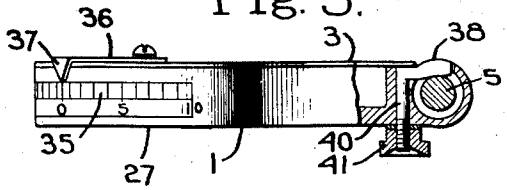
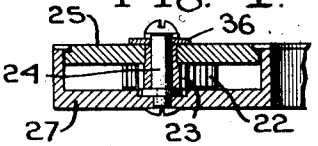


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROBERT A. WILSON, OF WALTHAM, MASSACHUSETTS.

MICROMETER CALIPERS.

Application filed November 14, 1924. Serial No. 749,859.

To all whom it may concern:

Be it known that I, ROBERT A. WILSON, a citizen of the United States, and resident of Waltham, county of Middlesex, State of Massachusetts, have invented an Improvement in Micrometer Calipers, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to micrometer calipers and has for its general object to provide an improved device of this type by which the measurement of any piece of work can be facilitated and can be accurately made.

The type of micrometer caliper which is now commonly used comprises a yoke-shaped frame having two jaw members supported in the arms thereof, one of which is fixed and the other of which is adjustable by means of a micrometer screw. In using this type of caliper to measure the diameter of any piece of work it is necessary first to back off the movable jaw by the micrometer screw so as to open the jaws sufficiently to receive the work between them and then to screw up the screw-actuated jaw by means of the micrometer screw until the two jaws engage opposite sides of the work.

The accuracy of the measurement which is made with this type of instrument depends to a considerable extent upon the delicacy of the touch of the person using the instrument and two persons using the same instrument will not always arrive at the same results simply because one person has a more delicate touch than the other.

It is one of the objects of my present invention to provide a novel construction by which the accuracy of the measurement which is made is not effected by the character of the touch of the operator.

Another object of the invention is to provide a micrometer caliper by which a measurement can be more rapidly made than with the ordinary type now in use.

Other objects of the invention are to improve micrometer calipers in various respects all as will be more fully hereinafter set forth.

Figs. 1 and 2 are side views of micrometer calipers embodying my invention with a portion broken out to illustrate the interior construction;

Fig. 3 is a section on the line 3—3, Fig. 1;

Fig. 4 is a section on the line 4—4, Fig. 1.

The yoke or frame of the calipers is shown at 1 and it is formed with the two arms 2 and 3 which support the two jaw members 4 and 5 between which the work 6 is measured. The jaw member 5 is of the usual adjustable type and may be moved toward and from the jaws 4 by means of the usual micrometer screw, the latter comprising the rotatable handle 7 by the turning of which the jaw 5 is advanced or retracted. This rotatable handle is in the form of a sleeve which slides over the stem 8 carrying the fixed scale 9 and said handle is provided with the peripheral scale 10 all as usual in micrometer calipers.

For convenience I will hereinafter refer to the jaw member 5 as the screw-actuated jaw member.

In accordance with my present invention the jaw member 4 is mounted in the arm 2 so that it can have a limited movement toward and from the jaw member 5 and a scale, preferably in the form of a dial, is associated with the jaw member 4 for the purpose of measuring or indicating the extent of its movement.

In using the device to test a piece of work to see if it varies at all from a predetermined measurement, the micrometer screw will be set at exactly the required measurement. The device is then operated by manually withdrawing the jaw 4 so as to open the jaws sufficiently to permit the work to be inserted and then releasing said jaw to permit it to move it against the work under spring pressure. The gauge or dial connected with the movable jaw will indicate whether the work varies any from the predetermined measurement.

The jaw 4 is shown as having a stem 11 which is slidably mounted in the arm 2. This stem is connected to a lever 12 pivoted to the arm 2 at 13, the end 14 of said lever having a dove-tail shape and entering a recess 15 formed in the stem 11. This gives a knife edge bearing between the lever and the stem.

The lever 12 is acted on by a suitable spring 16 which tends to move the jaw 4 backwardly. This lever 12 is received in a recess or chamber 17 formed in the frame.

Situated within said chamber is an elbow lever 18 which is pivoted at 19. Said elbow lever has a short arm 20 which engages the lower end of the arm 12 and it has a long

arm 21 which is formed at its end with the rack teeth 22 that engage a pinion 23 on a stud 24. The stud 24 has fast thereto a graduated dial 25 which operates in a circular opening 26 formed in the side face of the frame so that the dial is exposed to view.

The frame is made with the enlargement or extension 27 to accommodate the dial. This dial is provided with suitable graduations 28.

29 indicates a push pin which is slidably mounted in the frame and is adapted to engage the lever 18, said push pin having a finger piece 30 situated outside the frame that can be easily manipulated by the finger or thumb of the operator.

32 indicates a leaf spring which is secured at one end to the frame as shown at 33 and at the other end bears against the lever 18, said spring tending to raise the lever. This spring 32 acts in opposition to the spring 16 and it is normally of greater power than the spring 16 so that the resultant tendency of the two springs is to move the jaw 4 forwardly toward the jaw 5. When, however, the finger piece is depressed as shown in Fig. 2 the lever 18 will be correspondingly depressed thus moving the short arm 20 of said lever toward the right and allowing the spring 16 to act through the lever 12 to retract the jaw 4.

In order to illustrate how the device is used we will assume that the piece of work 6 to be tested or measured is supposed to be .25 inch in diameter. In order to measure the work the operator will first set the micrometer screw to indicate the .25 inch as shown. He will then depress the finger piece 30 thereby retracting the jaw 4 as shown in Fig. 2 and insert the work 6 between the jaws. The finger piece is then released and the jaw 4 will be moved forwardly into contact with the work as shown in Fig. 1 under the influence of the spring 32. The dial 25 will indicate whether the work 6 varies at all in diameter from the desired measurement. The graduations 28 on this dial may be any denomination but preferably will indicate thousandths of an inch and these graduations co-operate with a fixed indication mark 34 which is carried on the frame 1. If the work 6 is exactly .25 inch in diameter then when the jaw 4 is brought into the position shown in Fig. 1 in contact with the work the zero indication on the dial 25 will coincide with the indication mark 34, this indicating the zero position of the jaw 4. If, however, the work 6 has a greater diameter than the .25 inch then the jaw 4 will come up against the work before the zero point of the dial registers with the fixed indication point 34 and the reading on the dial will indicate the amount which the work 6 is larger than .25 inch.

We will suppose that when such a measurement was made the dial 25 read "5" when the jaw 4 engages the work. This would indicate that the work 6 is .005 inch larger than .25 inch. The work will then be further reduced in size and the measurement again taken as above described, this operation being repeated until when the measurement is made, the zero indication mark on the dial registers with the indication mark 34 thus showing that the work has the correct measurement. During the making of these measurements the micrometer screw is not disturbed but remains set at .25. The measurement of the work, therefore, is accomplished without disturbing the setting of the micrometer screw and by simply manipulating the thumb piece 30.

In addition to the scale on the dial 25 another scale 35 is provided on the edge of the extension 27, which scale co-operates with a pointer 36 that is fast on the dial 25, said pointer having a pointed or indicating end 37 that plays over the scale 35. This scale 35 will preferably be graduated to indicate thousandths of an inch. The advantage of having the scale on the edge is that it facilitates using the device for either dial or the scale 35 will be visible in any position in which the implement is used and the reading can be made either from the dial 25 or from the scale 35.

Where the device is used for making repeated measurements of articles of approximately the same size it is desirable that the micrometer screw should be locked in its set position so as to avoid any possibility that the setting may be disturbed during the handling of the instrument. I have, therefore, provided means for locking the jaw 5 in any position in which it may be set. This locking means is in the form of a locking jaw 38 adapted to frictionally engage the jaw 5. This jaw 38 operates in an opening 39 formed in the arm 3 and it is provided with a laterally-extending stem 40 which extends through the side of the jaw and has a clamping nut 41 screw-threaded thereto. This clamping nut is loosened while the micrometer is being adjusted and after it has been set to the required reading then the clamping nut 41 is tightened thereby clamping the jaw 5 in its adjusted position. When the jaw is thus clamped the device may be freely handled without danger that the reading of the micrometer will be accidentally upset or disturbed.

The lever 12 is herein shown as adjustable as to its length, the purpose of this being to provide means whereby the length of the lever may be adjusted if necessary to ensure an accurate measurement. The lever is shown as having an accurate measurement. The lever is shown as having an extension 42 which is adjustably secured to the main body of the lever by means of a clamping screw

43, said extension having a foot piece 44 that engages an arm 20 of the elbow lever 18.

I claim:

1. In micrometer calipers, the combination with a yoke-shaped frame having two arms rigid with respect to each other, of a jaw mounted in one arm thereof, a micrometer screw for operating said jaw, a second jaw slidably mounted in the other arm, a lever pivoted in said other arm and engaging said second jaw, a spring acting on said lever and tending to move said second jaw away from the first jaw, an elbow lever pivotally mounted in the frame, one arm of which elbow lever operatively engages the first-named lever, a spring acting on said elbow lever and tending through said levers to move the second jaw toward the first-named jaw, and a push pin carried by the frame and by which the elbow lever may be moved in opposition to its spring.

2. In micrometer calipers, the combination with a yoke-shaped frame, of a jaw mounted in one arm thereof, a micrometer screw for operating said jaw, a second jaw slidably mounted in the other arm of the frame, a lever pivoted to the frame and connected to said second jaw, an elbow lever, said lever having a long and a short arm pivoted to the frame and having its long arm extending across the bridge portion of said frame and the short arm engaging the first-named lever, a push pin located in the bridge portion of the frame for actuating the elbow lever, and springs acting against said levers whereby when the push pin is depressed the slidable jaw is moved away from the other jaw and when said push pin is released the slidable jaw is moved toward the other jaw.

3. In micrometer calipers, the combination with a yoke-shaped frame, of a jaw mounted in one arm thereof, a micrometer screw for operating said jaw, a second jaw slidably mounted in the other arm of the frame, a graduated rotary dial carried in the frame, a system of spring-actuated levers operatively connecting the second jaw to said dial and tending normally to move said jaw toward the screw-actuated jaw, said dial indicating the position of the second jaw and manually-operated means acting on said levers to retract said second jaw.

4. In micrometer calipers, the combination with a yoke-shaped frame, of an adjustable jaw carried by one arm thereof, a micrometer screw for adjusting said jaw, a second jaw slidingly carried by the other arm of the frame, a lever pivoted to the frame and operatively engaging said second jaw, an elbow lever pivoted to the frame, one arm of which elbow lever operatively engages said first-named lever, a graduated dial operatively connected to the other arm of said elbow lever, a spring acting on said elbow lever tending to move the second jaw toward the adjustable jaw, and a push pin carried by the frame and by which the elbow lever may be moved in opposition to the spring thereby to retract said second jaw.

5. In micrometer calipers, the combination with a yoke-shaped frame, of an adjustable jaw carried by one arm thereof, a micrometer screw for adjusting said jaw, a second jaw slidingly carried by the other arm of the frame, a lever pivoted to the frame and operatively engaging said second jaw, an elbow lever pivoted to the frame, one arm of which elbow lever operatively engages said first-named lever and the other arm of which is provided with rack teeth, a spring acting on said elbow lever and tending to move the second jaw toward the adjustable jaw, a pivotally mounted graduated dial, a pinion rigid therewith meshing with said rack teeth, and a push pin carried by the frame and by which the elbow lever may be moved in opposition to the spring acting thereagainst.

6. In micrometer calipers, the combination with a yoke-shaped frame, of a jaw mounted in one arm thereof, a micrometer screw for operating said screw, a second jaw slidably mounted in the other arm of the frame, a spring-actuated lever connected to said second jaw and tending normally to move it away from the first-named jaw, a second spring-actuated lever tending to move the first lever in opposition to its spring, a push pin carried by the frame for actuating the second lever, said frame having an extension formed with a circular edge, a dial pivotally mounted concentrically with said edge and operatively connected to the second lever, said curved edge being graduated, and an indicator finger rigid with the dial and co-operating with the curved edge.

In testimony whereof, I have signed my name to this specification.

ROBERT A. WILSON.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,561,630, granted November 17, 1925, upon the application of Robert A. Wilson, of Waltham, Massachusetts, for an improvement in "Micrometer Calipers," an error appears in the printed specification requiring correction as follows: Page 3, lines 28 and 29, claim 2, strike out the words "said lever having a long and a short arm" and insert the same to follow after the word "frame", line 30, same claim; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of January, A. D. 1926.

[SEAL.]

WM. A. KINNAN,
Acting Commissioner of Patents.