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D. K. LEE.  
MICROMETER.

APPLICATION FILED DEC. 15, 1905.

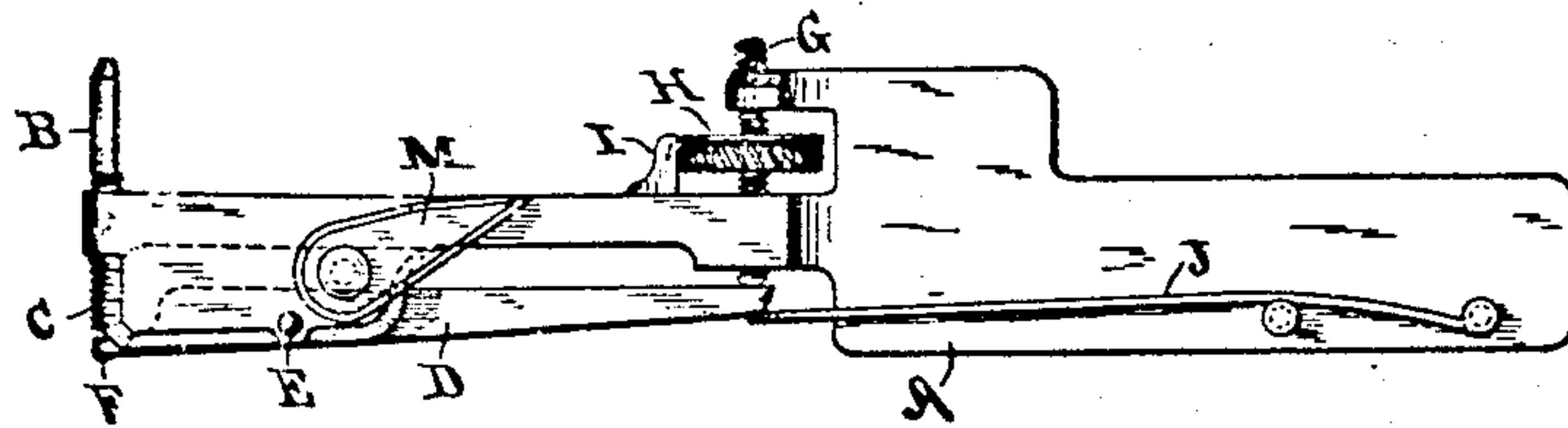


Fig. 1.

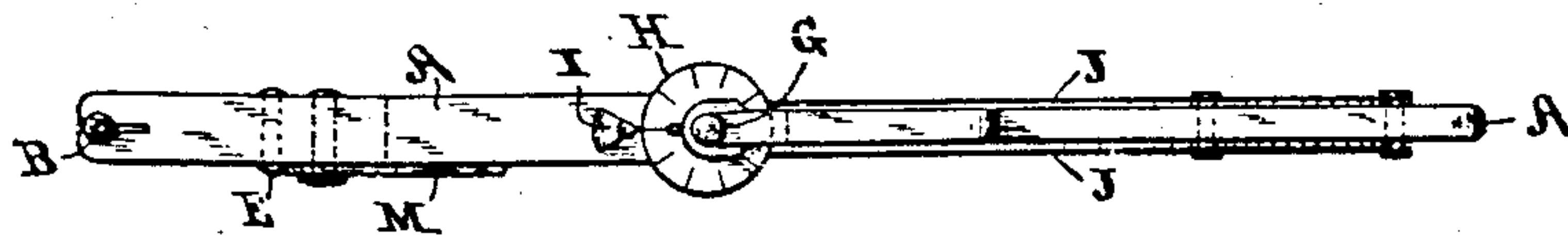


Fig. 2.

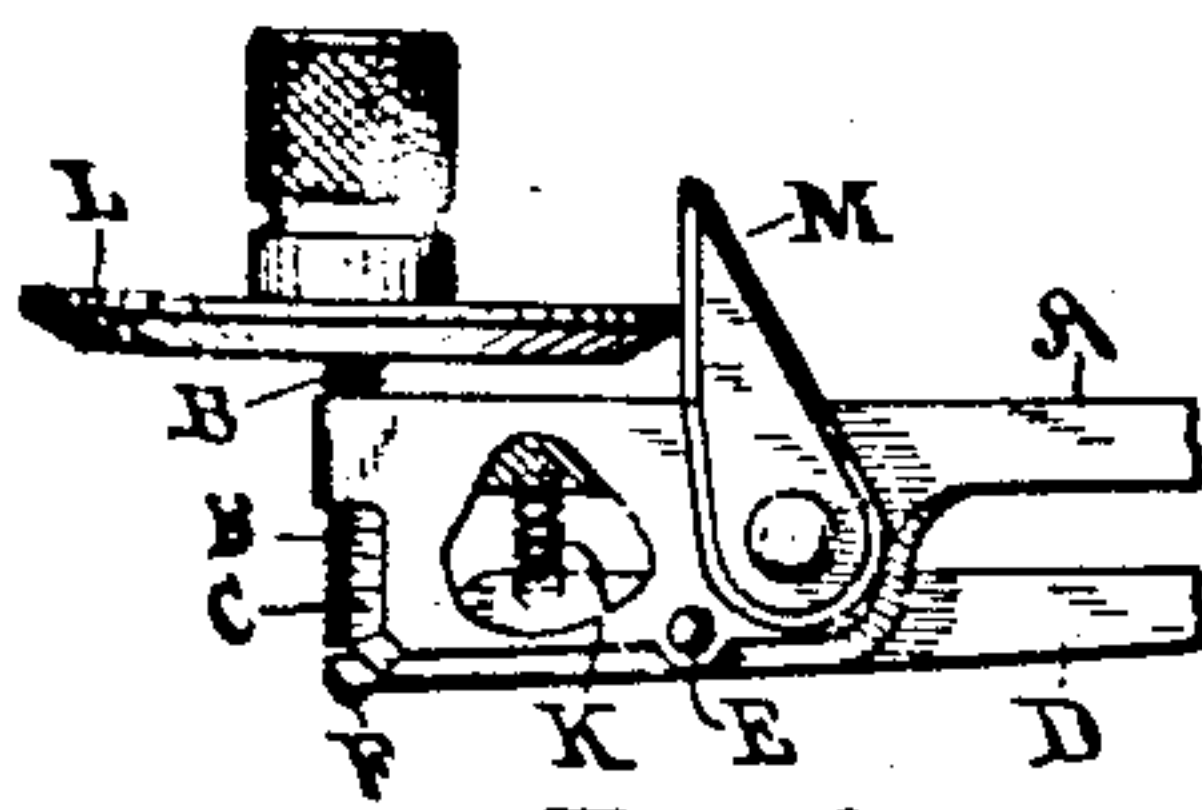


Fig. 3.

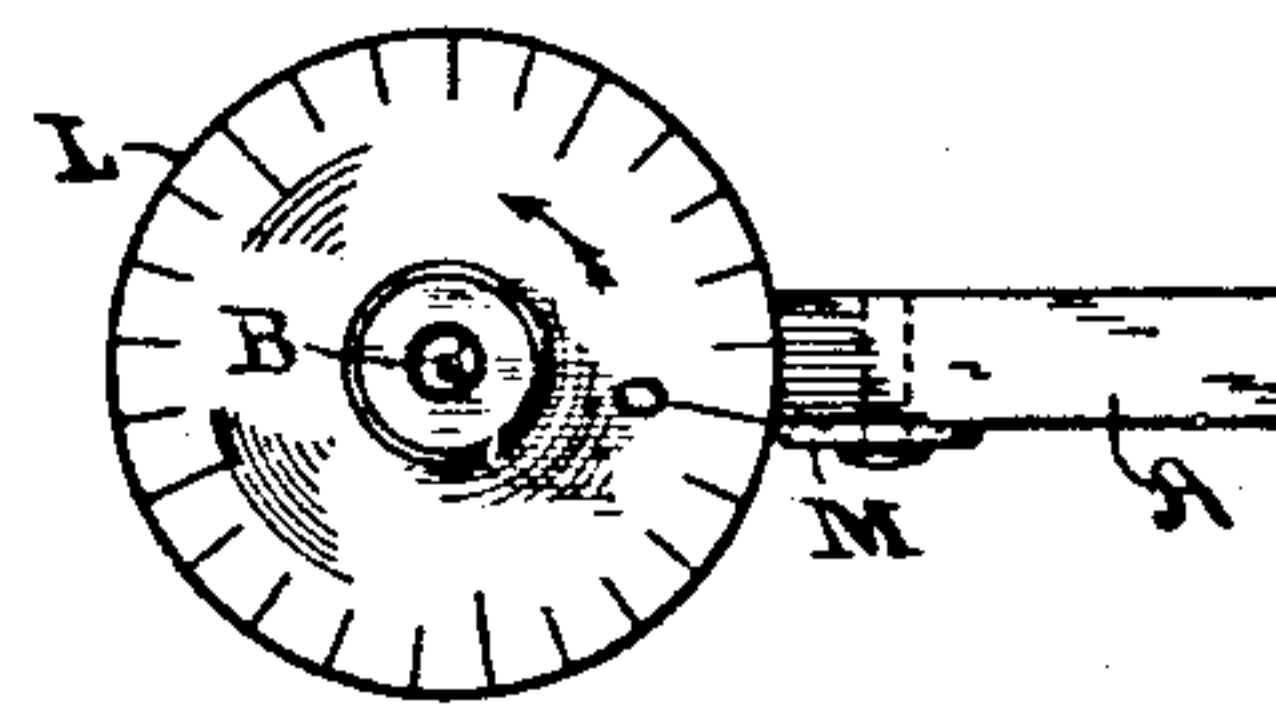


Fig. 4.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

DAY K. LEE, OF ATHENS, PENNSYLVANIA.

## MICROMETER.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed December 15, 1905. Serial No. 291,846.

*To all whom it may concern:*

Be it known that I, DAY K. LEE, a citizen of the United States, residing at Athens, in the county of Bradford and State of Pennsylvania, have invented certain new and useful Improvements in Micrometers, of which the following is a specification.

This invention relates to improvements in micrometer-gages for inside calipering; and my object is to provide a micrometer which shall be adapted to measuring small diameters and which may be readily and accurately adjusted for measuring larger or smaller diameters within its range.

A further object is to provide a micrometer of this type which will be simple in construction and which may be manufactured at a small cost and yet be accurate in its measurements.

I attain my object by constructing the micrometer in the manner illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved micrometer; Fig. 2, a plan view thereof; Fig. 3, a partial side elevation showing the device for adjusting the micrometer-pin, and Fig. 4 a plan view of Fig. 3.

Like letters of reference designate like parts in the several views.

The stock or handle A of the micrometer is given the form illustrated in Figs. 1 and 2 and is provided at the outer end with a clamping-jaw into which is screwed an adjustable pin B, the inner end of said pin being adjustable along the scale C, formed on the stock of the micrometer below the threaded jaws. The stock is longitudinally slotted on the under side, and in this slot is pivoted an arm D by means of the pivot-pin E. The outer end of this arm is provided with a caliper-point at F, which stands in line with the axis of the pin B, and the inner end of the arm D is engaged by an adjusting-screw G, which is rotated to adjust the arm by means of a graduated thumb-wheel H, the adjustment of which wheel is ascertained by the position of its upper surface and its graduations with reference to the index-finger I, which rises from the stock A. The arm D is held in engagement with the adjusting-screw by means of a spring J, which straddles the handle portion of the stock A and is fastened thereto and held in place by a pair of pins, as shown in Fig. 1.

The pivotal point E of the arm D is set at a

distance from the bearing-point of the adjusting-screw G equal to two and one-half times the distance from the pivotal point to the caliper-point F. In other words, the micrometer-arm is divided by its pivotal point in the ratio of two and one-half to one. The threads on the adjusting-screw G in the instrument herein illustrated are cut to a pitch of forty to the inch, so that one complete rotation of the screw to the right or left will cause the inner end of the arm D to move outwardly or inwardly to the extent of one-fortieth of an inch, and consequently there will be transmitted to the caliper-point F a movement in a relatively opposite direction of one one-hundredth of an inch. The face of the thumb-wheel H is divided into ten equal parts by suitable graduating-marks, one of said graduations being marked "0" and the others being marked from "1" to "9," or, if desired, only the graduation diametrically opposite the zero-point, which is "5" on the scale, need be marked. When the caliper-point F is in its mid-position, the upper surface of the thumb-wheel H will stand on a level with the top of the index-finger I and the zero-point on the thumb-wheel will register with said index. If now the thumb-wheel is turned one point to the right or left, it will be understood that the caliper-point F will be moved correspondingly toward or away from the pin B to the extent of one-tenth of one one-hundredth of an inch, or one one-thousandth of an inch. Therefore if the pin B be of such a length that its point will lie exactly one inch from the point F when the arm D is in its mid-position then inside diameters of an inch, more or less, may be measured accurately to the one one-thousandth of an inch by turning the thumb-wheel H in one direction or the other and noting the position of its graduations with reference to the index I. If the thumb-wheel is turned to the right, its upper surface will fall below the top of the index I and will indicate that the caliper-point F is moving toward the pin B, and therefore measuring a diameter less than one inch. If, on the other hand, the thumb-wheel be turned to the left, its upper surface will rise above the index I and will indicate a caliper of more than one inch.

If the pin B is of such a length that its point will stand one inch from the caliper-point F when its inner end registers with the



zero-mark on the scale C—that is to say, the graduation which lies nearest the point F—then by screwing said pin outwardly its point may be moved outwardly a distance equal to one-fourth of an inch, as the scale C is shown on the micrometer as herein illustrated, and the range of the micrometer with such a pin will be from one inch up to one and one-fourth inches, with additional one one-thousandths of an inch equal to the amount of adjustment permissible at the point F. In the instrument herein shown the thumb-wheel H may be rotated two and one-half revolutions in either direction, and therefore the caliper-point F may be moved toward or away from the pin B a distance equal to one-fortieth of an inch in either direction. By supplying the instrument with pins B of different lengths, each pin in a set being two-tenths of an inch longer than the next shorter pin, the micrometer may be set for calipering diameters from five-eighths of an inch or less upward.

To adjust the pin B, I provide a removable graduated disk L, which is adapted to be slipped upon the pin B, said pin having a flattened side, so that the disk may be placed in turning engagement therewith. If the threads on the pin B are cut to a pitch of forty to the inch, then the graduations on the disk L will run from zero to "25," and the rotation of the disk in one direction or the other one point will cause the pin to be moved inwardly or outwardly one one-thousandths of an inch. For quick adjustment, however, the scale C may be used, the movement of the inner end of the pin along said scale indicating an extension or contraction of one-fortieth of an inch for each point on the scale. For the purpose of setting the disk L, I provide an index-finger M, which is pivoted to the side of the stock A so as to be thrown down out of the way after the pin has been adjusted, as shown in Fig. 1 of the drawings.

Instead of using the form of spring J illustrated in Fig. 1 for holding the arm D against the end of the adjusting-screw G, I may provide a coiled spring, as shown at K in Fig. 3, said spring bearing against the outer end of the arm D and being completely concealed by the stock A when said arm is in place, or I may use both the spring J and the spring K in order to produce a pressure upon the arm D which will always insure its engagement with the adjusting-screw G, and consequently a perfect adjustment of the micrometer.

It will of course be understood that the different parts of my micrometer may be differently proportioned one to another and that the thread pitches on the adjusting-screw and caliper-pin may be other than forty to the inch, in which case the graduations on the thumb-wheel and adjusting-disk will be made to correspond to such pitch in

order to produce adjustments of one one-thousandth of an inch in the caliper-points.

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

1. A micrometer for inside calipering comprising a stock or handle provided at one end with a laterally-projecting fixed caliper-point, means for adjusting said point on the stock to different indicated diameters, an arm pivotally mounted between its ends upon the stock, a caliper-point at one end of said arm in alignment with and set in the opposite direction from said stationary point, an adjusting-screw on the stock engaging the other end of the arm to impart angular movement thereto, a graduated wheel on said screw, and an index on the stock adjacent the wheel, whereby the angular movements of the screw may be read to determine the adjustment of the caliper-point carried by said arm, the two caliper-points being at known distances apart when the wheel is at zero.

2. A micrometer for inside calipering comprising a stock or handle, a screw-threaded caliper-pin held in a threaded socket at one end thereof and projecting laterally therefrom, means for setting said pin for different determinate diameters, an arm pivotally mounted on the stock and having a caliper-point at one end in alignment with and set in the opposite direction from said pin, an adjusting-screw on the stock for imparting angular movement to said arm, and a graduated wheel on said screw for determining the adjustment of the caliper-point carried by said arm.

3. A micrometer for inside calipering comprising a stock or handle, a screw-threaded caliper-pin held in a threaded socket at one end thereof and projecting laterally therefrom, a scale at one side of said pin along which its rearward end travels and whereby the pin may be set for different determinate diameters, a movable caliper-point in alignment with said pin, and means for reading the adjustment of said movable point.

4. A micrometer comprising a stock or handle, a screw-threaded caliper-pin held in a threaded socket at one end thereof and projecting laterally therefrom, a removable graduated disk adapted to be placed upon said pin in turning engagement therewith, an index on the stock whereby said disk may be set to indicate the lateral movements of the pin due to partial rotations thereof, a movable caliper-point in alignment with said pin, and means for reading the adjustment of said movable point.

In testimony whereof I have affixed my signature in presence of two witnesses.

DAY K. LEE.

Witnesses:

G. M. TOZER,  
GEO. H. DOVE.