(No Model.)

J. P. LAVIGNE.

MICROMETER GAGE.

No. 488,280. Patented Dec. 20, 1892.

Fig 1

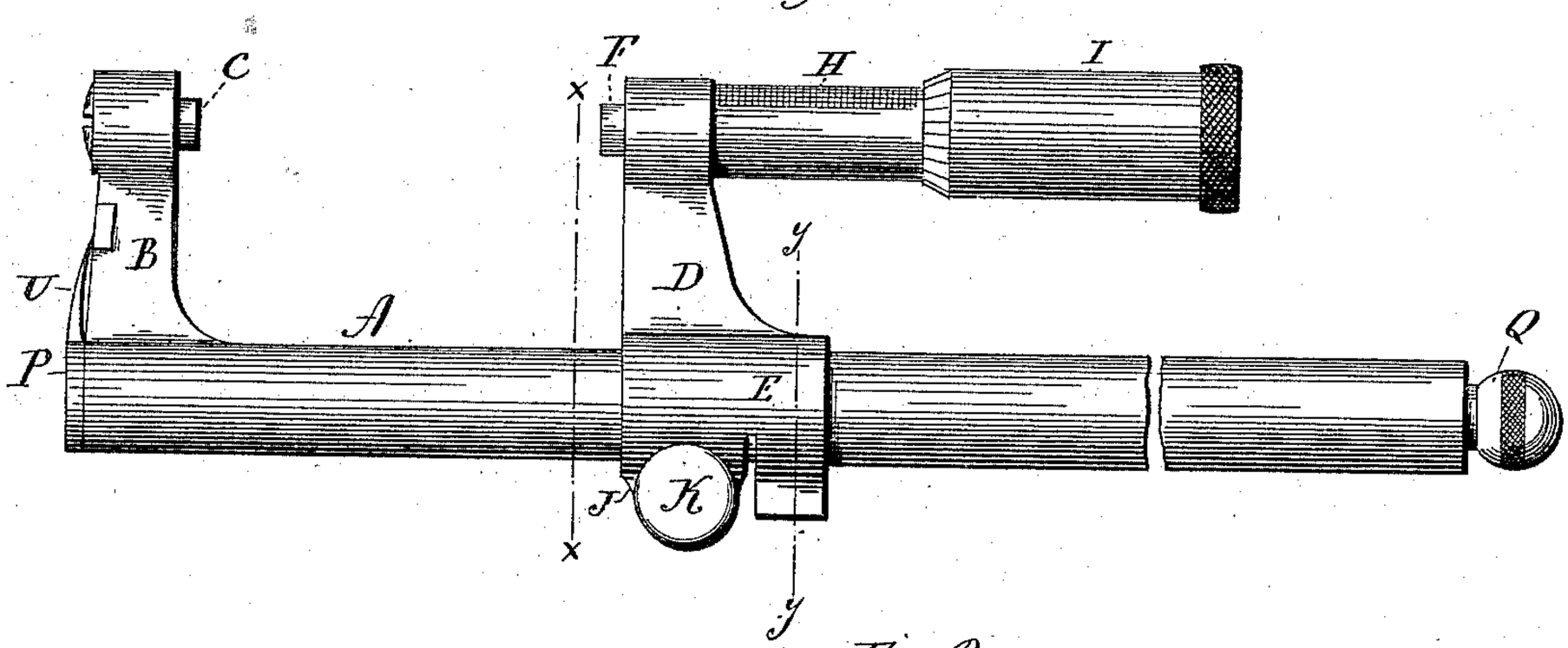


Fig. 2

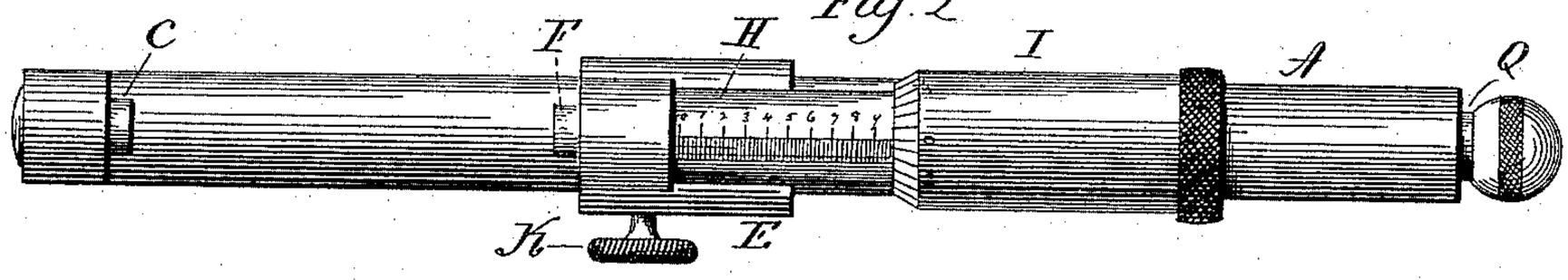


Fig. 5

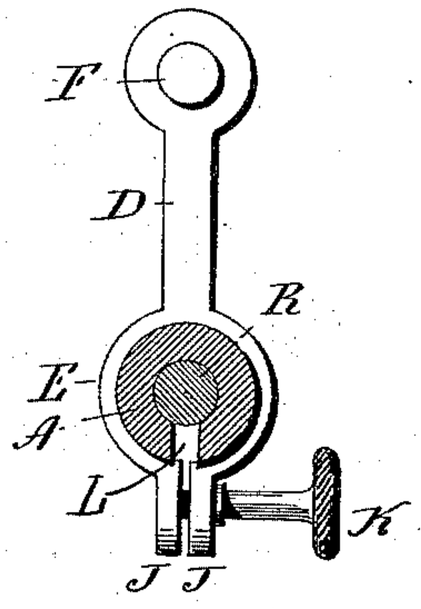


Fig. 3

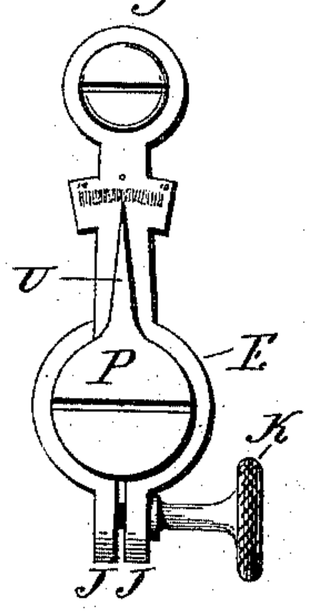


Fig. 6

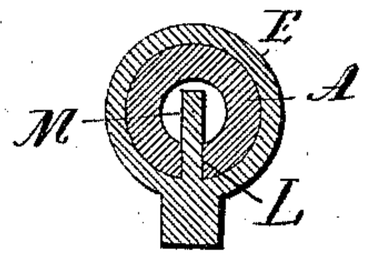
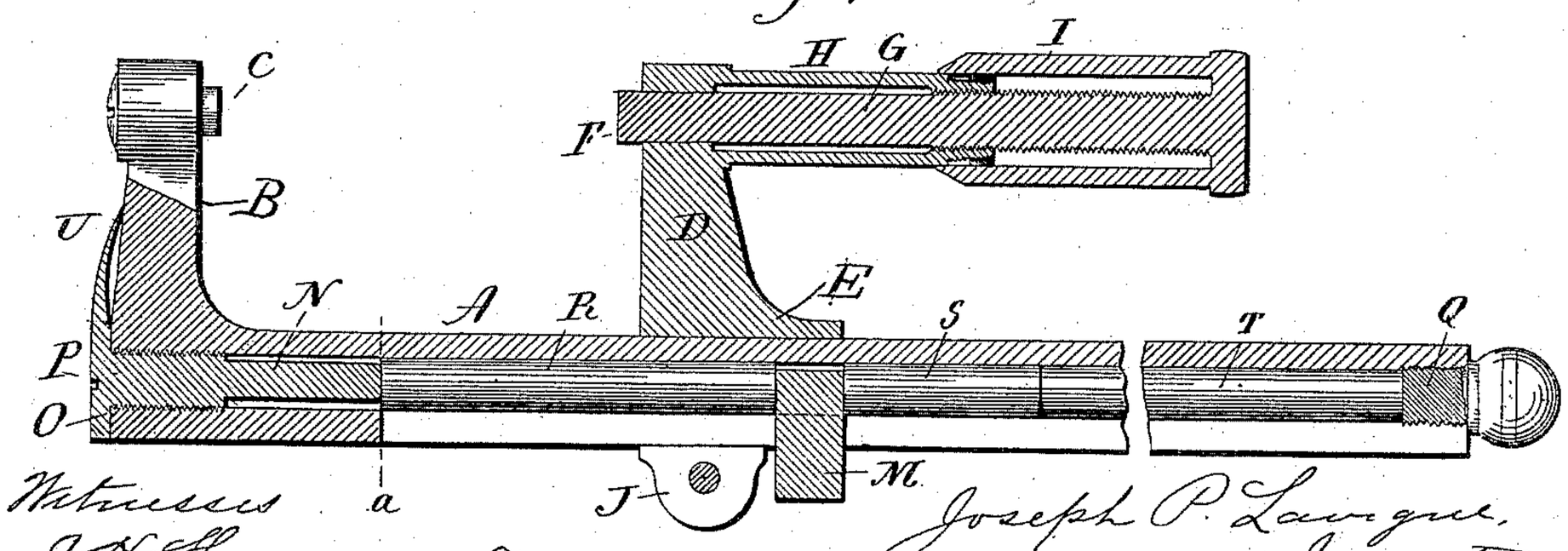


Fig. 4



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UNITED STATES PATENT OFFICE.

JOSEPH P. LAVIGNE, OF NEW HAVEN, CONNECTICUT.

MICROMETER-GAGE.

SPECIFICATION forming part of Letters Patent No. 488,280, dated December 20, 1892.

Application filed July 18, 1892. Serial No. 440,341. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH P. LAVIGNE, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Micrometer-Gages; 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 gage complete. Fig. 2, a top view of the same showing the adjustable spindle withdrawn. Fig. 3, an end view looking from the left. Fig. 4, a longitudinal central section of the same showing the parts in position as in Figs. 1 and 2. Fig. 5, a transverse vertical section cutting on line *x*—*x* of Fig. 4. Fig. 6, a transverse section cutting on line *y*—*y* of Fig. 4.

This invention relates to an improvement in that class of calipers or gages which are adapted to be set or to measure with the greatest accuracy, and commonly called "micrometer gages" or "calipers," the object of the invention being to adapt the gage to be readily adjusted to units of measurement, but with positive accuracy, and the invention consists in the construction as hereinafter described and particularly recited in the claims.

A, represents the beam upon which is a stationary head B, carrying the stationary gage-point C.

D, represents the second head, formed as a part of a slide E, adapted to move longitudinally on the beam, and which carries the adjustable gage-point F. The gage-point F, is made at the end of a spindle G, arranged through a tubular arm H, projecting from the rear of the head D, and parallel with the beam. The spindle G, is connected to a sleeve I, which is adapted to slide longitudinally on the arm H, and so as to be rotated thereon. The spindle G, is screw-threaded, and the arm H, is correspondingly screw-threaded, say forty threads to the inch. The sleeve I, slides longitudinally over the arm H, and so as to project the gage-point F, from the head, or draw it toward the head as the case may be. The sleeve is graduated longitudinally for a unit measurement, as one inch, see Fig. 2, this inch being divided into forty fractions, and the edge of the sleeve directly around the arm is graduated into twenty-five divisions. The graduations on the arm and the screw-thread being alike, forty divisions to the inch, and the graduations on the sleeve twenty-five, make the graduations on the sleeve one thousandths of an inch; this is a common and well known arrangement for the movement of a micrometer spindle.

The slide E, is arranged to move longitudinally on the beam A. It is constructed with ears J, see Fig. 5, upon the under side of the beam, and that portion of the body is divided, and so that by means of a screw K, through the two ears, the slide may be clamped upon the beam at any desired point. Thus far the construction is a common and well known micrometer gage, the adjustment of the spindle and the slide on the beam being too well known to require particular description. The beam is made tubular and is constructed with a longitudinal slot L, see Figs. 5 and 6, preferably upon the under side, and the slide E, is constructed with a projection M, which extends through said slot into the inside of the beam A. At the head end of the beam a spindle N, is introduced, and is screw-threaded as at O, the interior of the beam being correspondingly screw-threaded, and the threads, for reasons hereinafter described, should be made upon a predetermined standard, say forty threads to the inch. The head P, of the screw bears directly against the end of the beam when the screw is properly inserted.

The length of the spindle N, is such that when the slide E, with its head D, is moved toward the head B, to bring the projection M, against the end of the spindle N, and the spindle G, is turned inward to bring its inner end or point F, to a bearing against the corresponding point C, the spindle G, will stand in the zero position, the spindle N, and the projection M therefore form a stop, which will arrest the slide E, with all it carries at the zero point. The end of the beam opposite the spindle N, is closed by a screw Q, and the distance between the inner end of the screw Q, and the corresponding end of the spindle N is a predetermined number of units, say six units plus the width of the projection M on the slide.

To lock the slide E, to the beam at units positions, removable spindles R, S and T are introduced into the beam, each spindle being units of measurement in length, say the spindle R, two inches long, the spindle S, one inch, and the spindle T three inches, the combined length of the spindles being just equal to the distance between the end of the spindle N, and the screw Q, minus the length of the projection M, on the slide.

In Fig. 3, the device is represented with the head set at a position of two inches opening, this is accomplished by removing the head from the beam, and also taking the screw Q from the beam and placing the two inch spindle R, into the beam, then replacing the slide E, with the projection M, through the slot in the beam, and forcing the slide with its head along the beam until the projection M, bears against one end of the spindle R, and forces the other end of that spindle R, against the inner end of the spindle N, then the other two spindles S T are introduced against the other side of the projection M, and the screw Q, set in place will force the spindles all to a bearing against each other, and against the projection M, so as to clamp the projection M, and the slide rigidly at the predetermined point between the end of the spindle N, and the screw Q, thus fixing the position of the head corresponding to the units of length of the removable spindle which stands between the spindle N, and the projection M.

If three units of distance are required, the two spindles R and S, may be first introduced, and then the spindle T, against the projection, or vice-versa. If one inch distance is required, then the spindle S, of that length will be first introduced, and then the spindles R and T, follow the projection M, the location of the slide and all it carries being alike rigidly fixed at any unit position to which it may be set.

The division of the removable spindles may be made as desirable, for illustration, all may be made one inch long, but in any case the total length of the removable spindles must correspond to the distance between the screw Q, and the fixed bearing within the spindle plus the width of the projection M, from the slide.

It is desirable in a gage of this character to be able to measure much smaller fractions than can be measured by means of the sleeve I and the tube H. To provide for such infinitesimal measurement, say ten-thousandths of an inch, the spindle N, is screw-threaded, say forty threads, and on this screw is an indicator of any character, here represented as a pointer U, see Fig. 3, extending from the screw-head, so that it may rotate with the screw-head; this pointer extends up on the back of the head B, and on the head is a graduated segment of twenty-fifths of a circle, and these twenty-fifths of a circle divided into ten parts, as shown, and as shown the zero point is in the center, with ten divisions at each side; each of the ten divisions indicate a two hundred and fiftieth part of the circle, and as a single rotation or completion of the circle or spindle will move that spindle one thread, or one-fortieth of an inch, it follows that each of the divisions of the head indicate one-ten-thousandth of an inch. Under this construction the spindle N, in its normal position will stand with the pointer or indicator at zero. The movable head E, having been adjusted as near as the graduations between the sleeve I, and the tube H, will permit and make perfect indication, and which will be one-one-thousandth of an inch, then the spindle N, is turned until the end F of the spindle G, and the point C, come to a bearing, and the movement which has been thus produced to bring them to a bearing will be shown by the graduations over which the pointer U, has passed, and will be ten-thousandths of an inch. This illustration will be sufficient to enable those skilled in the use of such instruments to adjust the gage under the various circumstances in which such adjustment is desirable. Preferably the graduations for the spindle N, run in both directions from zero, so that the spindle may be turned in either direction accordingly as it is desirable to move the head D, toward or from the head B. In adjusting the spindle N, it will be understood that the screw Q is to be correspondingly adjusted, that is to say, if the spindle N, is to be moved to withdraw it from the beam, then the screw Q, at the other end will be turned inward, if, on the contrary it is desired to make the adjustment in the opposite direction, then the screw Q, will first be withdrawn to a sufficient extent, then the spindle N, adjusted, and then the screw Q, reset to lock the slide in place.

While preferring the employment of the spindle N, as a means for adjustment, and to form the bearing for the inner end of the removable spindles, that spindle may be dispensed with, and the bearing point for the removable spindles be stationary within the slide, as for illustration, the beam may be solid from the point where the removable spindles are to rest say as on the line *a*, Fig. 4, or the spindle may be employed and brought to a hard bearing against the end of the beam when its inner end is in position to form the stop, and without the adaptation of the spindle for adjustment.

While indicating a specified length for the removable spindles, it will be understood that they may be of any length by which they may aid in locating and securing the slide at a predetermined position. Under this construction in the first unit measurement the projection M, will bear directly against the end of the spindle N, and the adjustment by the spindle N, will be made directly upon the projection M, and without the interposition of either of the removable spindles between the spindle N, and the said projection. It will thus be seen that in gages where but a

single unit of measurement is required, the adjustable spindle N, may be employed for the finer adjustment, and without the employment of the removable spindle, this part of the invention is therefore not to be understood as necessarily limited to the combination of the removable spindles.

I claim—

1. In a micrometer gage, a tubular beam carrying a stationary head at one end, combined with a slide longitudinally adjustable on said beam, the said slide carrying the longitudinally adjustable spindle, the beam made tubular and constructed with a longitudinal slot opening into the interior of the beam, a projection from said slide through said slot into the interior of the beam, removable spindles adapted for insertion into said beam upon opposite sides of said projection from the slide, a bearing near the end of the said beam against which the end of the spindle forward of the projection on the slide may bear, and a screw at the opposite end of the beam adapted to bear against the end of the spindle on the opposite side of said projection, substantially as described, and whereby the said slide may be held at a predetermined position on the beam.

2. In a micrometer gage the combination of a beam carrying a stationary head at one end, with a slide longitudinally adjustable on the beam, the said slide carrying the longitudinally adjustable spindle, the beam made tubular and constructed with a longitudinal slot opening from the outside into the interior of the beam, a projection from said slide through said slot into the interior of the beam, a screw-spindle longitudinally adjustable in the head end of the beam, with an adjusting screw in the opposite end of the beam, removable spindles adapted for arrangement within the beam upon opposite sides of said projection and between the spindle at one end and screw at the opposite end, substantially as described.

3. In a micrometer gage the combination of a tubular beam carrying a stationary head at one end, a slide longitudinally adjustable on the beam and carrying the other head, the said head carrying the adjustable spindle, the beam made tubular, and constructed with a longitudinal slot opening into the interior of the beam, the said slide constructed with a projection extending through said slot into the interior of the beam, a longitudinally adjustable screw-spindle at one end of the beam, a corresponding screw at the opposite end of the beam, removable spindles adapted for introduction within the beam and between the said projection and the screw spindle and screw, the said screw spindle having its thread according to a predetermined fraction of measurement, a graduated scale and an indicator on the head of the screw spindle adapted to show on said scale the extent of rotation imparted to said screw, substantially as described.

4. In a micrometer gage the combination of a tubular beam carrying a stationary head at one end, a slide longitudinally adjustable on said beam and carrying the adjustable spindle, the beam made tubular and constructed with a longitudinal slot opening into the interior of the beam, a longitudinally adjustable screw-spindle in the head end of the beam, the slide constructed with a projection extending through said slot into the interior of the beam, and adapted to bear against the end of said screw-spindle in the beam, a graduated scale and an indicator on the head of said screw-spindle adapted to show on said scale the extent of rotation imparted to the screw, substantially as described.

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

JOSEPH P. LAVIGNE.

Witnesses:
GEO. D. SEYMOUR,
FRED C. EARLE.