(No Model.)

M. F. SMITH.

MICROMETER CALIPERS.

No. 404,057. Patented May 28, 1889.

Fig. 3.

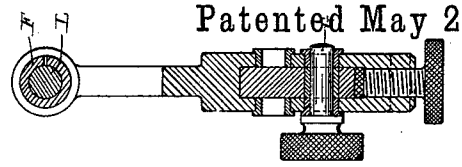


Fig. 5



Fig. 4.

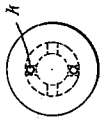


Fig. 2.

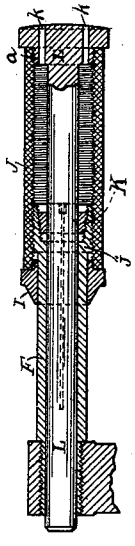
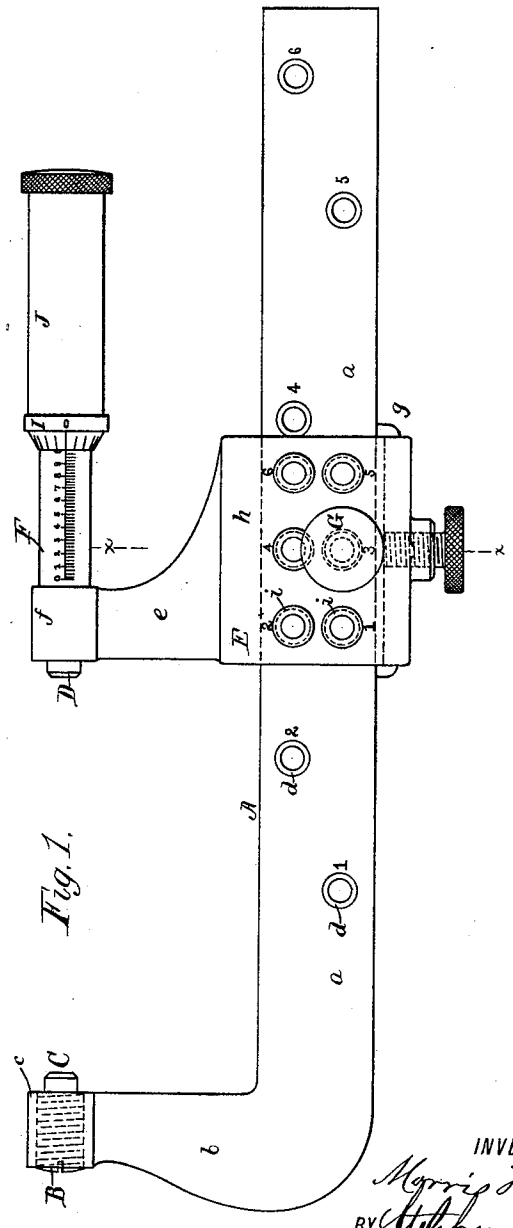


Fig. 1.



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MORRIS F. SMITH, OF NEW HAVEN, CONNECTICUT.

MICROMETER-CALIPERS.

SPECIFICATION forming part of Letters Patent No. 404,057, dated May 28, 1889.

Application filed January 17, 1889. Serial No. 296,658. (No model.)

To all whom it may concern:

Be it known that I, MORRIS F. SMITH, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented new and useful Micrometer-Calipers, of which the following is a specification.

Figure 1 is a side elevation of my improved micrometer-calipers; and Fig. 2 is a vertical central section of a portion of the slide, the micrometer-screw, and graduated parts. Fig. 3 is a section on line *x*, Fig. 1. Fig. 4 is an end view of the micrometer-screw, and Fig. 5 is a view of the wrench.

My invention relates to that class of micrometer-calipers which measures distances greater than one inch by means of moving a slide which carries one of the caliper-points.

The objects of my invention are accurate and expeditious adjustment of the slide and improved means for taking up the wear of the micrometer-screw.

To enable others to make and use my improved calipers, I will give a description of the same in detail, reference being had to the drawings hereto annexed.

The beam A, Fig. 1, has the two parts *a* and *b*. The part *a* is rectangular and of equal size throughout its length and the part *b* integral with the part *a* is bent at a right angle to it and terminates in the cylindrical enlargement *c*, which is tapped to receive the screw B. The part *a* is perforated in two lines parallel and near to the sides of the beam, into which hardened-steel bushings *d* are forced. These bushed holes are arranged to operate in conjunction with the bushed holes in the slide, so that when bushings having like numbers are brought in line the micrometer-screw being in the position shown in Fig. 1, the distance between caliper-points C and D will be as many inches or units of measure as the number on the coincident bushings indicates. Thus in Fig. 1 bushings 3 are in line, and the distance between points C and D is three units. Fractional measurements are obtained in the same manner as in the ordinary micrometers. The screw B is reduced in size where it protrudes from the beam, and is chamfered at the end C, and forms one of the caliper-points.

The slide E is a rectangular box fitted to the beam, except on the lower side, where room enough is left for the shoe or gib *g* to fill. On its lower side a circular boss is raised, which is tapped to receive the thumb-screw which passes through the lower side of the slide and comes against the shoe *g*. The shoe *g* is turned up at each end at right angles to hold it in place when the screw is released. On the upper side of the slide extends upward, the arm *e*, terminating in the cylindrical enlargement *f*, which is tapped to receive the part F. When the slide is in place on the beam A, the axes of the threaded parts *c* and *f* are in line. The wider sides, *h*, of the slide are perforated in two parallel lines, which are in the same planes as the lines of the holes in the beam, and the holes are equal in number. Into these holes bushings *i* are forced, and are ground out, as is hereinafter explained. The pin G, with the knurled head, is fitted to these bushings and holds the slide from endwise movement when the tool is in use.

The micrometer device is made in five pieces—namely, the graduated cylinder F, the graduated piece I, the sleeve J, the screw K, and the cylindrical part L.

The part F is a hollow cylinder, and is split on one side for a portion of its length, as shown by the dotted lines in Fig. 2. If preferred, it may be split on both sides in a manner not to interfere with the graduations. On the opposite side it is graduated to tenths and fortieths of the unit of measure. One end, *j*, is enlarged and is threaded to a pitch corresponding to the finer graduations on the cylinder and receives the sleeve J. In the end *j* is a conical recess, which is threaded to receive the screw K. The other end is reduced in size, threaded, and screwed into the part *f* of the slide E. The conical screw K has a hole in the center large enough to freely admit the piece L, and is slotted in four places, as shown by dotted lines in Fig. 4, into which the points of the wrench, Fig. 5, may be entered to turn the screw when it is desired to take up the wear. When the conical screw K is screwed into the threaded conical recess in the part *j*, it spreads the threaded part *j* open, thereby taking up any wear of the threaded sleeve J and part *j*.

The part I is a short, hollow, cylindrical

piece reduced and threaded at one end to fit the sleeve J, and has a conical graduated surface at the other end. The bore in the part I is large enough to freely move on the graduated cylinder F, and intersects the conical surface, thereby making a sharp edge, which facilitates reading the graduations.

The sleeve J is a plain hollow cylinder, the bore of which is threaded to fit onto the enlarged end *j* of the part F. Into one end is screwed the part I, and into the other end is screwed the threaded portion of the piece L.

The piece L has three parts—a long small cylindrical part, which fits in the bore in the part F, and is chamfered at the end D, and is one of the caliper-points; a large threaded part, which is screwed into the sleeve J, and a still larger knurled part for convenience in using the tool. Two holes, K, are drilled in the enlarged part of the piece L, through which the points of the wrench, Fig. 5, pass in adjusting the screw K. By this arrangement the part F may be adjusted to the wear without exposing the threads to dust.

When the slide has been fitted to the beam and the bushings have been inserted in both beam and slide, the micrometer-screw is brought into the position shown in Fig. 1, the micrometer-scale reading zero, and a standard test-bar one inch in length is introduced between points C and D and the points are brought against the bar and the slide is secured by the thumb-screw. Now the bushings marked 1 will be approximately in line and are ground out in this position to the size of the pin G, thus making the holes in the bushings perfectly in line. So proceed with the other set of bushings with their respective lengths of test-bars.

It is well known that a series of holes has been used in the beam, in combination with a single hole in the sliding arm and a pin fitting both for the purpose of locking them in any desired position; but by my arrangement of having a hole in the sliding arm corresponding to every hole in the beam I attain much greater accuracy.

Having described my invention and the way it is made, what I claim as new, and desire to secure by Letters Patent, is—

1. In micrometer-calipers, a graduated hollow cylinder secured to the sliding arm and having an enlarged screw-threaded upper portion, in combination with an internally-threaded sleeve mating with the screw portion of the hollow cylinder and carrying an adjustable caliper-point which fits the bore of the hollow cylinder, substantially as described.

2. In micrometer-calipers, the graduated split part F, provided with the conical screw K, and having an enlarged threaded part, *j*, adapted to receive the threaded sleeve J, in combination with the threaded sleeve J, carrying a graduated part, I, and the part L, as shown and described.

3. In a micrometer-screw, a hollow graduated cylinder, the upper portion of which is enlarged and screw-threaded both internally and externally and split, in combination with an interiorly-threaded sleeve mating with the outer thread of the cylinder and carrying an adjustable caliper-point which fits the bore of the hollow cylinder, and an exteriorly-threaded bushing mating with the interior thread of the hollow cylinder, substantially as described.

4. In a micrometer-screw, a hollow cylinder secured to the movable arm and having the upper portion enlarged and screw-threaded internally and externally and split, in combination with an internally-threaded sleeve mating with the exterior thread of the hollow cylinder and carrying a perforated cap and an adjustable caliper-point, and an externally-threaded bushing mating with the interior thread of the split cylinder and provided with depressions registering with the perforations in the cap, substantially as described.

5. In micrometer-calipers, a rigid beam carrying the anvil and having a series of perforations, in combination with a sliding arm carrying a micrometer-screw and provided with a sliding box which fits the beam and has a series of perforations, each of which may be made to register with a corresponding perforation in the beam, and a pin which fits the perforation, substantially as described.

In testimony whereof I have set my hand in the presence of two witnesses.

MORRIS F. SMITH.

Witnesses:
JOSEPH H. KEEFE,
JAMES A. WOOD.