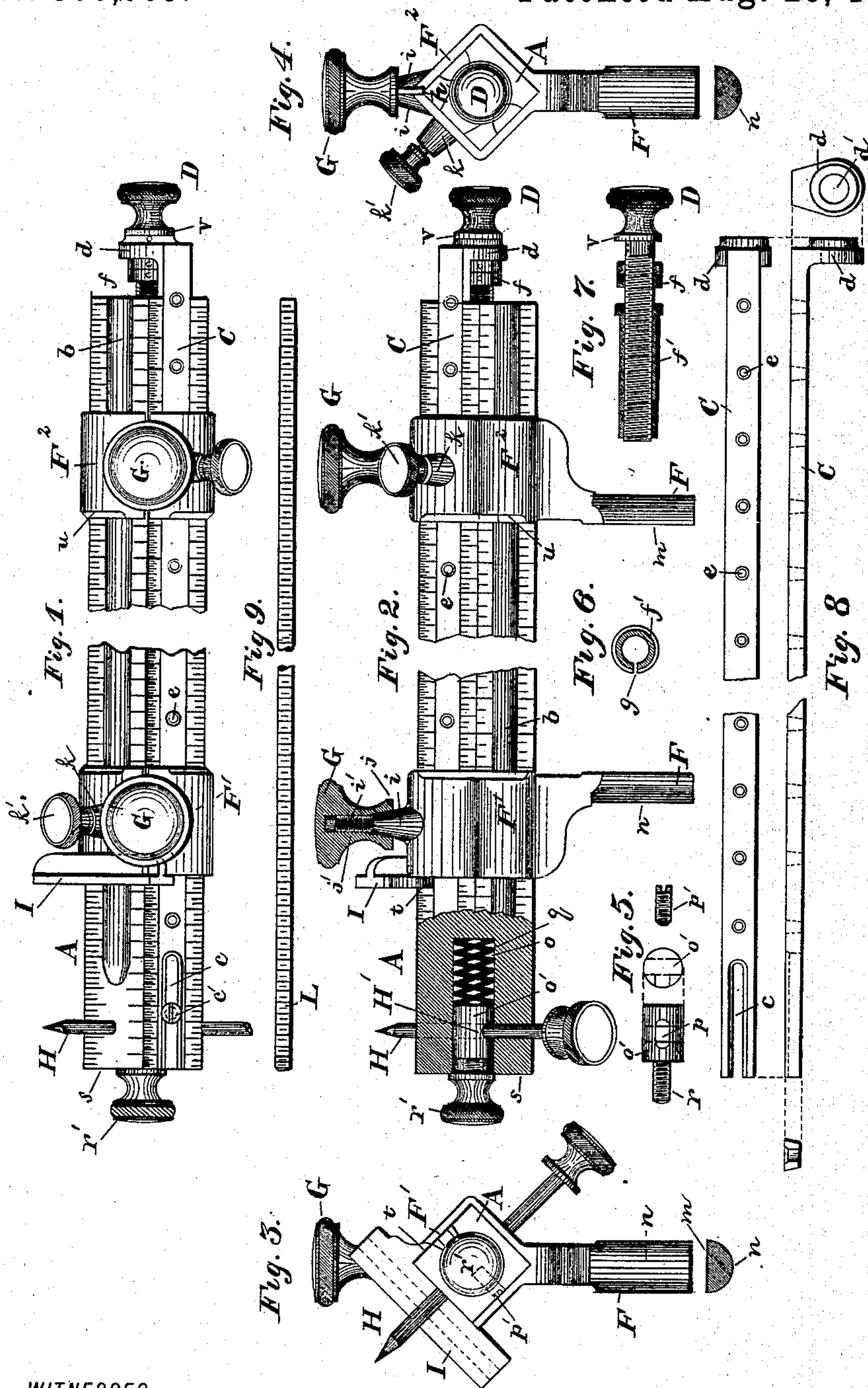


(No Model.)

E. J. HADLEY.
MICROMETER CALIPERS.

No. 388,669.

Patented Aug. 28, 1888.



WITNESSES:

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MICROMETER-CALIPERS.

SPECIFICATION forming part of Letters Patent No. 388,669, dated August 28, 1888.

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To all whom it may concern:

Be it known that I, EDGAR J. HADLEY, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Combination-Calipers, of which the following is a specification.

My invention relates to micrometer-calipers for delicate measurements. The instrument is intended for machinists, and is adapted for measuring both inside and outside diameters.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the instrument. Fig. 2 is also a side view, but shows the instrument turned one-quarter to a transverse position from that shown in Fig. 1. Figs. 3 and 4 are end views of the instrument. Fig. 5 shows the tightening device for the scratch-point. Fig. 6 is a cross-section of the bushing for the adjusting-screw. Fig. 7 shows the adjusting-screw and a section of the bushing and nuts. Fig. 8 shows four views of the adjustable slide-bar. Fig. 9 is a view of the depth-gage.

The letter A designates a square bar having a longitudinal concave groove, *b*, on one or more of its sides. One or more sides of this bar are graduated accurately. An adjustable slide-bar, C, is movably attached on one side of the graduated bar. This slide-bar extends the entire length of the graduated bar and preferably occupies a groove therein, so as to be flush on the side of the graduated bar. At one end the adjustable bar has a slot, *c*, and a screw, *c'*, in the side of the graduated bar has its head projecting through the said slot. Thus the adjustable bar may move endwise, but the screw *c'* holds one end close to the bar A. The other end of the adjustable bar has a laterally-projecting head, *d*, provided with a hole, *d'*, and this bar has pin-holes *e* at intervals of a half-inch along its length. An adjusting-screw, D, passes freely through the hole *d'* in the lateral head *d* of the adjustable bar C and enters the end of the graduated bar A. Two screw collars or nuts, *f*, on the screw D confine the lateral head to the said screw. By turning the adjusting-screw D the bar C may be made to slide endwise, either forward or back.

A special construction in connection with

the parts last above referred to is a bushing, *f'*, (shown in Figs. 6 and 7,) which is to enter the end of the graduated bar A. This bushing comprises a tube, *f'*, having a longitudinal split or slit, *g*, whereby it may contract or expand. The bushing *f'* is to be internally screw-threaded and receive the screw D. Thus it is proposed to have the screw take hold of a screw-thread in this bushing, instead of a thread direct in the bar A. The object of the bushing is to allow the replacing of the screw-bearing when worn.

Each caliper-point F is attached to a clip-head which surrounds the square graduated bar A. The initial clip-head is designated by *F'* and the adjustable one by *F''*. The point F projects from one corner or angle of the clip-head, and the latter at another corner or angle is split or open, as at *h*, and said split is closed and tightened by a suitable thumb-screw, G. The construction for this part may vary; but, as here shown, a split cone, *i*, terminating in a split screw, *i'*, is employed. One of the halves of the screw-cone is attached to one side of the split clip-head, and the remaining half to the other side. The thumb-screw G has a neck, *j*, reamed out to fit on the split cone *i*, and is internally screw-threaded at *j'* to receive the split screw *i'*. The thumb-screw G will thus tighten the clip-head on the bar A.

Each clip-head has a boss socket, *k*, and a thumb-pin, *k'*, enters the said socket. In the case of the initial clip-head, *F'*, the end of the thumb-pin *k'*, which projects inward through the clip, is designed to enter a hole in the side of the graduated bar A and hold it firmly. In the present instance a scratch-pin, H, is shown passed through the said bar A; but as this scratch-pin is not used when employing the clip-heads merely for calipering, it will ordinarily be withdrawn, and then the hole it occupies in the bar A may receive the said end of the thumb-pin *k'*. The initial clip-head, *F'*, being thus set, the other clip-head, *F''*, may then be moved or adjusted along the graduated bar A, so as to effect the desired calipering. In the case of the adjustable clip-head *F''* the end of the thumb-pin *k'* enters one of the pin-holes *e* in the adjusting-bar C, and thereby attaches the said clip-head to the adjusting-bar. It will thus be seen that to cali-

per anything the initial clip-head, F' , will be first set firmly, and then the pin k' on the adjustable clip-head F^2 withdrawn, to allow said clip-head F^2 and its caliper-point to be moved to a position on the bar A and bar C approximating that which will enable the desired caliper to be effected. The pin on the said adjustable head will then be inserted, so as to attach the head to the adjusting-bar C. By now turning the adjusting-screw D the caliper-point F on the adjustable clip-head F^2 may be moved as desired, the minimum movement being the one-thousandth of an inch. This is attained by having adjusting-screw D adjoining the neck of the said screw provided with twenty-five graduations and the screw provided with forty threads to an inch, so that by turning the said screw one point the adjusting-bar C and its attached clip-head F^2 will be moved one thousandth of an inch.

It will be seen that the caliper-points F may be set to caliper either a bolt or a slot or hole—that is, either outside or inside measurement. When an outside measurement has been obtained by the flat faces m of the caliper-points and the measurement is noted, the adjustable clip-head F^2 and its point may be moved along the graduated bar A toward the other clip-head and set for the same measurement inside diameter by the rounded faces n . When an inside measurement has been obtained by the rounded faces n , the instrument may be set for the same measurement outside by moving the adjustable clip head F^2 away from the other clip-head.

The instrument also has combined with it a gage, I, attached to one clip-head, F' , and a scratch-point, H, passed through a hole in the bar, A. This is for making an accurate scratch gage. To produce sufficient friction to temporarily hold the scratch-pin H from slipping, the following construction is provided. The end of the bar A has a longitudinal bore, o , and a piston, o' , fits therein. The piston has a hole, H' , for the scratch-pin to pass entirely through, and on one side, and only part way through, is a longitudinal slot, p , to loosely receive the end of a stop-screw, p' , which enters one side of the bar A. (Indicated by broken lines, p' , in Fig. 3.) The end of the stop-pin p' being in the slot p of the said piston o' , the latter may move endwise in the bore o to the extent of the length of the said slot p . This movement is sufficient for the purpose. A spiral spring, q , occupies the bore o and bears against the piston o' and normally presses it. When the scratch-pin H is entered or passed through its hole that is in the bar A, it also passes through the hole H' in the piston o' , whereupon the pressure of the spring q on the said piston causes the latter to bind on the scratch-pin and temporarily hold it from slipping. To

confine the scratch-pin H rigidly to its position, the following additional construction is employed. The piston o' has at its outer end a screw-threaded bolt, r , and a tightening thumb-nut, r' , is on said bolt, and its head bears against the end surface s of the bar A. By turning the thumb-nut r' the piston will be drawn as hard as may be desired, and thereby bind on the scratch-pin and confine it rigidly.

The gage I has an index-shoulder, t , which projects partly over one side of the bar A, as shown in Figs. 2 and 3, and coacts with one set of graduations.

The same hole in the bar A which receives the scratch-point may be used also for a depth-gage, L. This is shown in Fig. 9, and consists of a wire or slender rod provided with graduations. This depth gage is held by the piston o' same as the scratch-point.

The graduations on the bar and the chamfered edge u of the clip head F^2 can be used for ordinary measurements in calipering, but for close measurements the thumb-screw D will be employed.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A caliper having in combination a graduated bar, an adjustable slide-bar extending lengthwise of the graduated bar and provided with pin-holes along its length, and slot c at one end, the screw c' , an initial caliper-point, a clip-head, F^2 , surrounding the graduated bar and provided with the socket k , a thumb-pin to connect with the pin-holes in the slide-bar, and also provided with a caliper-point, and an adjusting-screw, D, for moving the said slide-bar endwise.

2. A caliper having in combination a graduated bar having in one end a bore, o , a clip-head surrounding the graduated bar and provided with thumb-screw for tightening it, and having a gage, I, a piston, o' , in the end bore, a spring, q , bearing against the piston, and a scratch-point, H, passing laterally through the graduated bar, and also through the said piston.

3. A caliper having in combination a graduated bar having in one end a bore, o , a clip-head surrounding the graduated bar and provided with thumb-screw for tightening it, and having a gage, I, a piston, o' , in the end bore, a tightening thumb-nut, r' , to draw on the piston, and a scratch-point, H, passing laterally through the graduated bar, and also through the said piston.

In testimony whereof I affix my signature in the presence of two witnesses.

EDGAR J. HADLEY.

Witnesses:

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