April 30, 1940. C. BIGWOOD 2,199,236

INSIDE MICROMETER ATTACHMENT

Filed May 18, 1939

Fig. 1

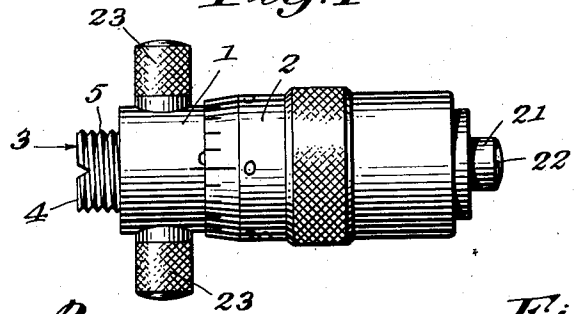


Fig. 2

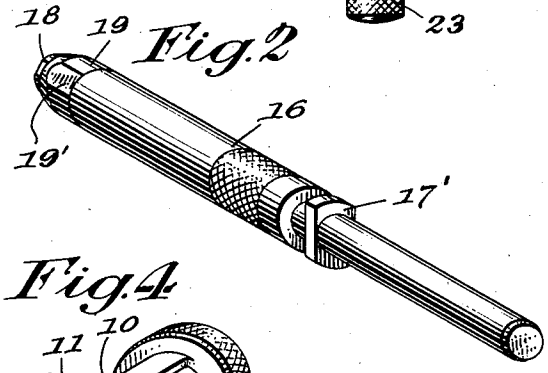


Fig. 3

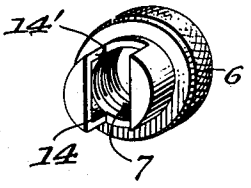


Fig. 4

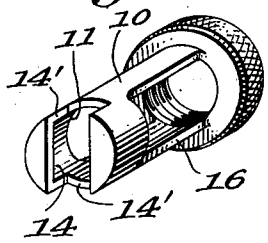


Fig. 5

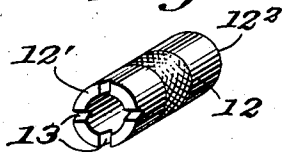


Fig. 6

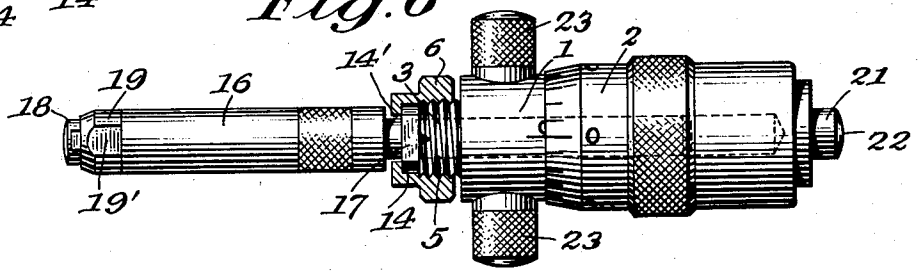


Fig. 7

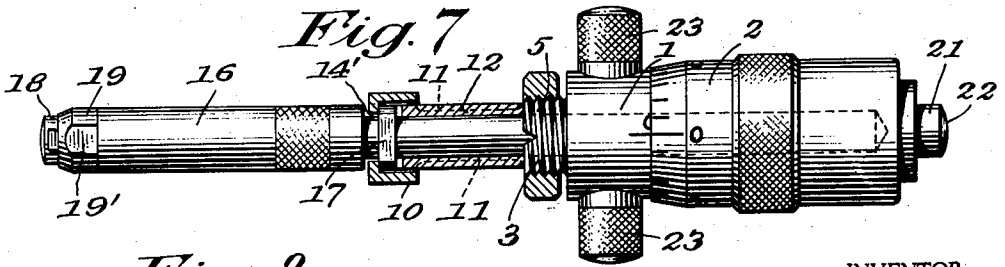
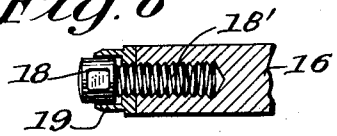


Fig. 8



INVENTOR.
Clifton Bigwood
BY Spear Rawlings & Spear
ATTORNEYS.

Patented Apr. 30, 1940 2,199,236

UNITED STATES PATENT OFFICE

2,199,236

INSIDE MICROMETER ATTACHMENT

Clifton Bigwood, Athol, Mass., assignor to The L. S. Starrett Company, Athol, Mass., a corporation of Massachusetts

Application May 18, 1939, Serial No. 274,343

4 Claims. (Cl. 33—167)

This invention relates to inside micrometer calipers and particularly to those having an end adjustability of gaging range or distance by means of supplemental extension rods used interchangeably with a micrometer head which gives fine readings within the limits of the length of its adjusting screw which is provided with a sleeve graduated to read micrometrically on a scale on the body.

In such devices heretofore much difficulty has been encountered in the joint or point of attachment to the head of the extension rod which, due to its long leverage, when moved against opposing surfaces was subject to loosening strains which sometimes resulted in breakage. My invention therefore contemplates as one improvement the more positive seating of the anvil of an extension rod as upon the face of a seat to which it is drawn and held by novel means as herein disclosed.

These extension rods are provided at their outer ends with little adjustable anvils. Heretofore after a few adjustments these anvils tended to become loose and it became impossible to hold a correct over-all setting. My present invention contemplates as a second improvement means for ensuring a positive and tight interlock of rod and end anvil after, as well as before adjustment of the anvil.

With these and other improvements, my invention provides for novel combinations and features long needed but unsupplied by the art.

As illustrative of my invention I have shown in the accompanying drawing embodiments well adapted to practical service and capable of quantity production on a basis of extreme accuracy.

Throughout the specification and drawing like reference characters are employed to indicate corresponding parts, and in the drawing:

Fig. 1 is a side view of a micrometer head without attachments.

Fig. 2 is a view of an extension rod according to my invention.

Fig. 3 is a view of a short nut for clamping an extension rod to the head.

Fig. 4 is a view of a substitute or replacement nut to be used with a hollow sleeve for spacing the rod.

Fig. 5 is a view of such a sleeve separate from the nut.

Fig. 6 is a side view of a head with rod attached with the short nut of Fig. 3.

Fig. 7 is a similar view of a head with the long nut holding the rod and spacing sleeve, and

Fig. 8 is a longitudinal section through a fragment of the contact tip of a rod end.

As will be seen in the drawing I may provide a conventional micrometer head having a barrel 1 and sleeve 2 carrying the usual screw, which being internal does not appear, but which has an axial bore to receive the reduced stem portions of the rods beyond their seating anvils 17. The end 3 of the head is formed as a cross grooved bearing seat 4 for the rod seating anvils and is surrounded by an externally threaded zone 5 for engagement by a clamping nut.

This clamping nut may be a short cup 6 internally threaded at 7 for engagement with the zone 5. It is internally shouldered as at 14 (see Fig. 3) and externally knurled for finger grip, or it may be an elongated clamping piece as shown in Fig. 4. As there shown it consists of a sleeve 10 open-sided as at 11 to expose a tubular collar 12 having a knurled exterior engageable through the open sides 11 and having a face 12′ frictioned by cross grooves 13. The opposite face 12^2 is preferably flat. The sleeve 10 also is shouldered at its outer end as at 14 and internally threaded as at 7 for engagement with the zone 5.

The extension rods 16, of different range or over-all length, have an undercut on each side at their attaching anvils 17 to offer auxiliary collars 17′ engageable by the interior end shoulders 14 of the clamping nuts which are made accessible by radial keyhole slots 14′. The flat face of the anvil 17 may thus be drawn firmly towards the seat 3 of the micrometer head by the pulling down of the shoulders 14 bearing against the face of the collars 17′ of the anvil 17 or on the end face 12′ of the collar 12. Whether the short nut 6 or elongated clamp 10 be used, a simple tightening up on the knurled finger grip will draw the same and with it the rod 16, the anvils 17 of which are gripped by the shoulders 14 of nut 6 or clamp 10.

The extension rods 16 are provided at their outer ends with anvils 18 which are longitudinally adjustable by means of the axial screws 18′ which secure them to the ends of the rods. As before indicated, after a few adjustments these anvils become loose and the accuracy of the instrument becomes impaired. To overcome this difficulty I provide the cupped nut 19 having flat sides 19′ for engagement by a spanner or other tool and which has a threaded portion which as shown in Fig. 8 engages the threads of the screw 18′ between the end of the rod and the anvil. When tightened this cupped nut 19

draws the anvil 18 tightly and evenly against the end of the rod as a seat. When adjustments are to be made the nut 19 is simply unloosened, the anvil adjusted, and the nut 19 re-tightened. This ensures as tight and rigid an interlock of rod end and anvil after as before adjustment.

There is an axial contact 21 at the end of the micrometer sleeve 2 provided with a point having carefully ground contact face 22. The micrometer head has the usual knurled studs 23 protecting the micrometer sleeve from accidental contacts.

Inside micrometers according to my invention afford great accuracy in getting internal lineal measurements of cylinders and rings, and for setting calipers, comparing gages, as well as measuring parallel surfaces.

What I therefore claim and desire to secure by Letters Patent is:

1. An extension rod attachment for an inside micrometer having a hollow externally threaded bearing terminating at one end in an outwardly facing anvil seat, comprising an internally threaded hollow nut engaging said bearing, and an extension rod clamped by said nut within said bearing, said nut having a reduced outwardly extending longitudinally slotted portion terminating in a pair of oppositely disposed inturned shoulders spaced apart from each other by said slot, and said rod having between its ends a generally oblong seating anvil presenting a pair of shoulders at its two opposite shorter edges which when the anvil is entered through the slot of said nut and the rod partially rotated relative to the nut are lodged behind the shoulders of said nut and draw the anvil axially towards said anvil seat when the nut is tightened.

2. The structure of claim 1, and a contact anvil having a shank threaded into the working end of said rod and having a head of less diameter than said rod, and a nut threaded to the shank of said contact anvil and having an outwardly facing cupped portion receiving the head of said anvil.

3. The structure of claim 1 and a hollow spacer disposed between said anvil and anvil seat.

4. An extension rod attachment for an inside micrometer having a hollow externally threaded bearing terminating at one end in an outwardly facing anvil seat, comprising an internally threaded hollow nut engaging said bearing and having at its outer end a longitudinally slotted shouldered portion, and an extension rod having between its ends a seating anvil of less dimension in one direction than that of said nut aperture to provide portions for entrance through the slot of said nut and on partial rotation of the rod relative to the nut for lodgement behind the shoulders of the nut thereby to draw the anvil axially towards said anvil seat when the nut is tightened.

CLIFTON BIGWOOD.