F. R. CUNNINGHAM.

MICROMETER STOP.

APPLICATION FILED FEB. 17, 1910.

965,844. **Patented July 26, 1910.**

Fig. 1.

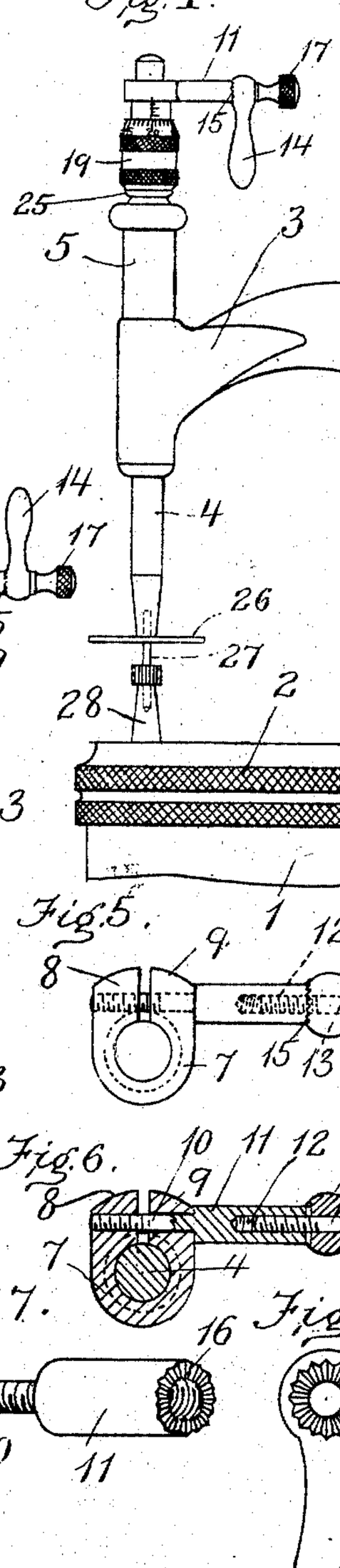


Fig. 2.

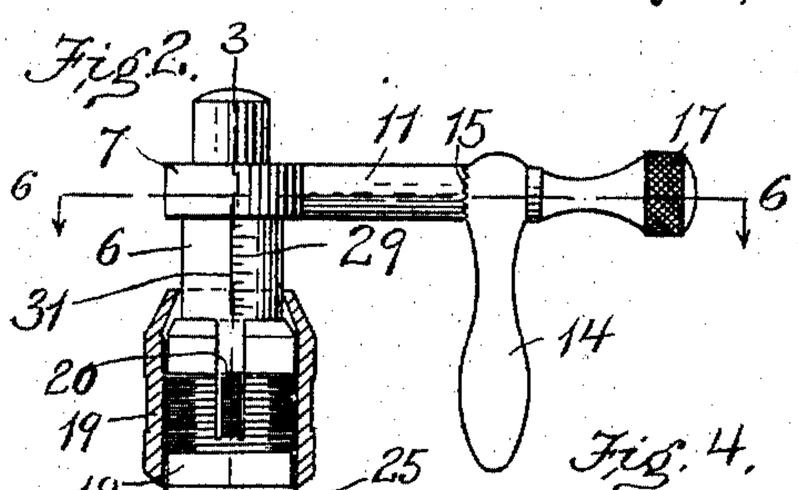


Fig. 4.

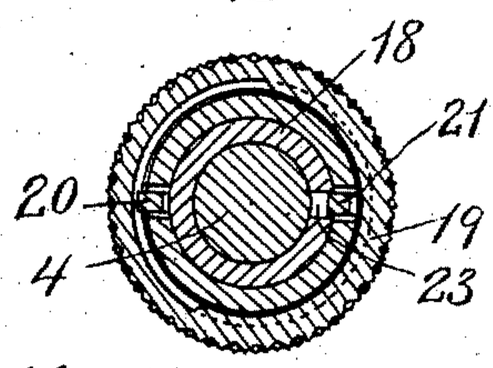


Fig. 12.

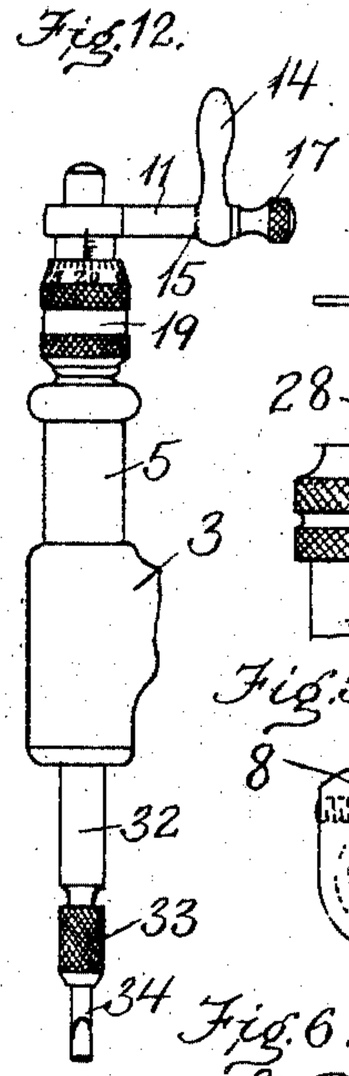


Fig. 3.

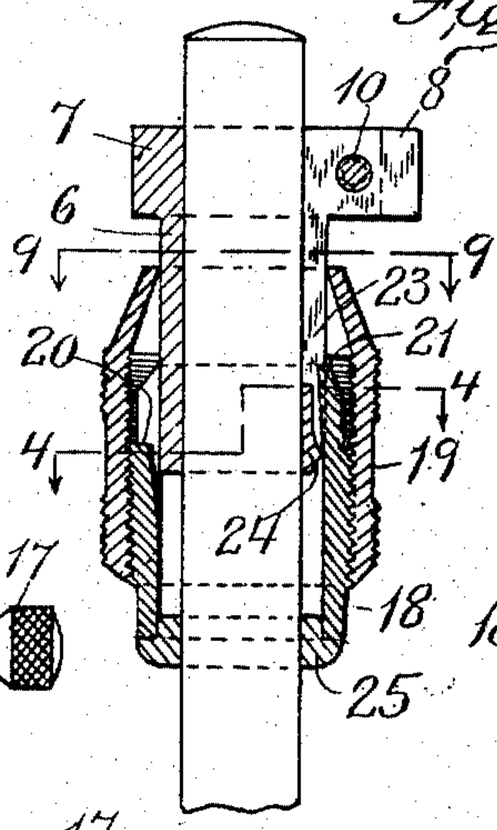


Fig. 10.

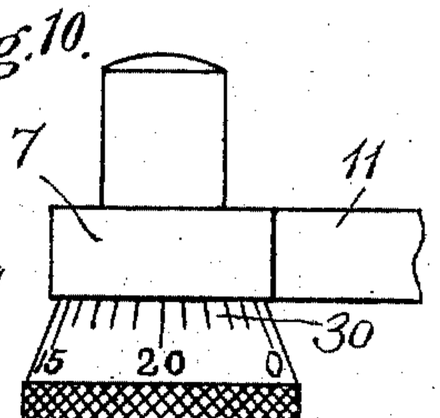


Fig. 5.

Fig. 6.

Fig. 11.

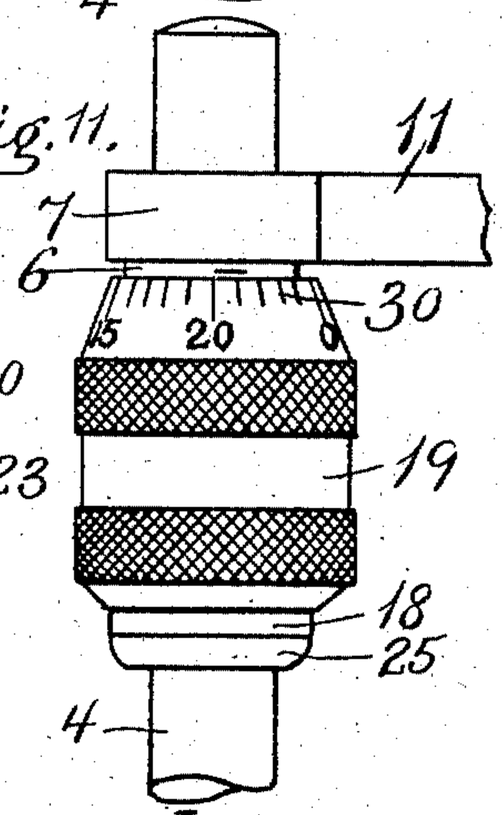


Fig. 7.

Fig. 8.

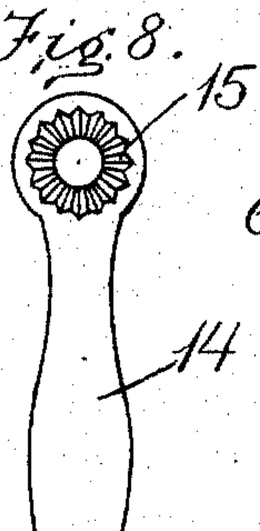
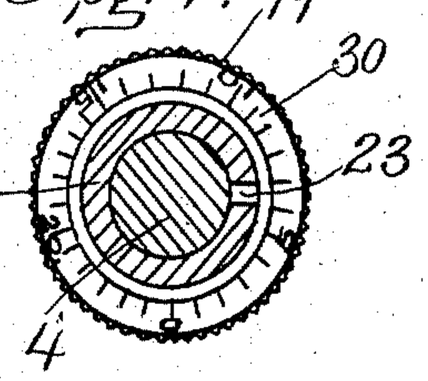


Fig. 9.



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UNITED STATES PATENT OFFICE.

FRANK R. CUNNINGHAM, OF MEDFORD, MASSACHUSETTS, ASSIGNOR TO KENDRICK AND DAVIS COMPANY, OF LEBANON, NEW HAMPSHIRE, A CORPORATION OF NEW HAMPSHIRE.

MICROMETER-STOP.

965,844. Specification of Letters Patent. **Patented July 26, 1910.**

Application filed February 17, 1910. Serial No. 544,405.

To all whom it may concern:

Be it known that I, FRANK R. CUNNINGHAM, of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Micrometer-Stops, of which the following is a specification.

This invention relates to an attachment for use particularly in connection with watchmakers' apparatus of the kind known as staking tools.

The main object of the attachment forming the subject matter of this invention is to enable a punch or other implement used in connection with a staking tool to be driven through a predetermined distance with absolute accuracy and without requiring measurements to be taken from the work to determine whether the distance to which the implement has been moved is sufficient or not, and enabling the required work to be performed in a single operation, without a number of successive trials. In other words, the object accomplished by the present invention is to enable the distance through which the tool is moved to be measured in advance instead of subsequently, and to insure absolute accuracy in the amount of movement which is given to the tool.

Another object of the invention is to make the attachment such that it may be used as a crank or handle for rotating a milling tool or the like and determining the extent of feed of such tool.

In the accompanying drawings I have illustrated the preferred embodiment of my invention and the manner in which it is to be employed, it being understood, however, that the essential principles of the invention may be embodied in many other and specifically different constructions and forms of devices.

Figure 1 represents in elevation a part of a staking tool with a punch and the present invention applied thereto. Fig. 2 is an elevation partly in section of the invention on an enlarged scale. Fig. 3 is a longitudinal section of the same on line 3—3 of Fig. 2. Fig. 4 is a cross-section on line 4—4 of Fig. 3. Fig. 5 is a plan view of the device. Fig. 6 is a sectional view of the device on lines 6—6 of Fig. 2. Figs. 7 and 8 are detail views of parts of the device forming my invention. Fig. 9 is a sectional plan view of part of the apparatus on the line 9—9 of Fig. 3. Figs. 10 and 11 are elevations of the device showing the manner of use of the same. Fig. 12 is an elevation illustrating the manner in which the invention is used for milling and like operations.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings and first to Fig. 1, the reference numeral 1 represents the base of a watchmaker's staking tool, which may be of any standard or approved construction, and upon which is supported the rotary die or table 2. 3 represents the overhanging head of the staking tool, which is provided with a longitudinal passage for guiding the punch or other implement used in connection with the staking tool for performing a variety of functions upon parts of watches and other articles. A punch of common form is represented at 4.

The implement or device in which my present invention is embodied is adapted to be applied to such a punch as that represented at 4, or to any other tool capable of being passed through the aperture in the head 3. In the drawings this device is shown as applied to the upper end of the punch 4, above the sleeve 5, which extends above and forms part of the head 3. The device consists of a sleeve 6, which is slipped over the end of the punch and has an easy fit thereon. This sleeve is divided at its upper part and is formed with a split collar 7 having wings 8 and 9, which may be drawn together by a clamping device, in order to secure the sleeve upon the punch. The clamping device which I employ is a bolt 10 passing freely through the wing or ear 9 and threaded into a tapped hole in the wing or ear 8. The head portion 11 of this bolt bears on the outer surface of the wing 9, and is of sufficient length to contain a tapped hole 12 in its end, into which is screwed a threaded pin 13 for securing an adjustable handle 14 in place. The handle 14 has a hub portion which is apertured to receive the pin 13 and one face of the hub is formed with clutch teeth 15, as shown in Fig. 8, which engage complemental clutch teeth 16 on the end of the bolt head 11. The pin 13 has a knurled head 17 by which it can be easily turned to force the teeth 15 and 16 into engagement, and to permit adjustment of the handle 14 relatively to the bolt. In practice I prefer to adjust the handle 14 in such manner that

when extending downwardly as shown in Fig. 1, it will bind the collar 7 and sleeve 6 with sufficient tightness on the punch, as with this adjustment the device can most conveniently be manipulated. Swinging the handle from the position shown in Fig. 1 to an upright position loosens the collar sufficiently to enable the sleeve to be removed from the punch or placed thereon and adjusted easily, while the swinging downward into the opposite position binds the sleeve firmly, and at the same time moves it out of the way and leaves a clear space all around the head of the punch, permitting it to be tapped by a hammer or mallet.

On the sleeve 6 is mounted a composite adjustable stop sleeve or micrometer stop, consisting of two members 18 and 19, the former of which slides freely upon the sleeve 6, and the other of which is threaded externally upon the sleeve 18. The sleeve 18 is cut on opposite sides to produce tongues 20 and 21, as shown in Figs. 2, 3 and 4. The tongue 20 lies in the threaded part of the sleeve and is bent outwardly to press frictionally against the internal threads of the part 19 and thus retain these parts in any of their relatively adjusted positions. The tongue 21 on the other hand is bent inwardly and lies in the groove or slot 23 of the sleeve 6. At the lower end of this groove there is a lip 24, which serves to prevent the sleeve 18 from slipping off the sleeve 6. In the lower end of the sleeve 18 is fixed an annular plug or cap 25, which has a bearing on the punch and is given a tight friction fit in the sleeve. It will be readily seen that by turning the sleeve 19 on 18, the distance between the upper edge of the former and the lower edge of the latter may be increased or diminished.

In using the device the punch 4 is first placed in the head of the staking tool and allowed to rest on the work; such being, for instance, a wheel 26 fitting friction tight on a pinion staff 27, and it being required to stake the wheel somewhat farther on the staff. When the punch rests easily on the wheel, (which is supported upon a stump or inverted punch 28, or may be held in one of the holes of the die 2), the micrometer attachment is placed on the protruding upper end of the punch and slipped downward until it rests on the head of the staking tool. The cap or plug 25 is the part which directly engages the staking tool, and the sleeve 6 slips downward within the nut sleeve 19 until the shoulder or clamp ring 7 rests on the upper end of the latter. The clamp is then tightened upon the punch by a turn of the handle 14. The nut sleeve 19 is then screwed down upon the intermediate sleeve 18 until a distance is left between the collar 7 and the top of the nut sleeve equal to the distance through which the member 26 is to be driven. This distance is measured by graduation marks 29 on the sleeve 6 and fractional graduation marks 30 on the nut sleeve or micrometer 19, these graduations 29 and 30 being similar in principle to those of the ordinary micrometer caliper and the circular graduations 30 being read in relation to a vertical index line 31 on the part 6. The punch is then struck to drive down the part on which it bears, and it is brought to rest when the clamp collar 7 which is firmly secured upon the punch abuts against the upper end of the micrometer nut or sleeve 19. The manner of use of the stop is illustrated in Figs. 10 and 11, where 10 indicates the position of the parts when the micrometer is first clamped upon the punch, and 11 the position after the micrometer sleeve has been screwed down a certain distance. In using the device it is, of course, necessary that the micrometer sleeve 19 should be screwed up above the bottom of the supporting sleeve, as this is necessary to permit separation of the upper edge of the sleeve 19 from the lower edge of the collar 7 when the micrometer is screwed down. When the supporting sleeve 18 rests on the head of the staking tool, it is prevented from rotating by means of the key tongue 21, and is, of course, supported by the staking tool. Hence any rotation of the micrometer sleeve 19 necessarily either lowers or raises the latter, hence, by means of the graduations thereon and on the innermost sleeve 6, the distance through which the punch is moved or is left free to be moved may be measured with great accuracy and the punch subsequently driven with absolute correctness.

Hitherto in staking parts of watches and other small articles off or on the practice has been to give light blows to the punch or other implement and measure the amount of motion given thereby after each blow. Thus it is frequently necessary to hammer and measure a number of different times in order to get one piece of work finished correctly, and sometimes even then mistakes would be made, as will be easily understood by all those skilled in the art. By the use of the attachment forming the subject matter of the present invention, absolute accuracy is insured and each entire staking operation may be performed in a single act, without requiring even the taking of a single subsequent measurement.

I desire it to be understood that the illustration of the pinion staff and wheel is given as merely an indication of the manner in which the device is to be used, without in any way limiting the uses to which it may be put. I desire it to be further understood that I do not limit the invention to the exact form and mode of construction here illustrated, but include within the scope of my claims any device whatever including a

clamp capable of being removably secured upon a staking tool implement, and a micrometrically adjustable stop for limiting the distance through which the implement having such clamp applied thereto may be moved.

Another mode of use of the implement is shown in Fig. 12. Here in place of the punch is shown a spindle 32 having a chuck 33, by which the cutting, boring or other rotating tool 34 is held. The clamp is applied to the upper end of the spindle 32 as heretofore described, but the handle 14, instead of being adjusted so as to extend downward when the clamp is tightened, is so adjusted as to extend in an upward direction to serve as a crank handle. By means of the handle the spindle and cutter 34 may be rotated and all operations involving a rotary cutting or other rotary movement such as recessing, end-shaking, jeweling and the like may be performed with great accuracy. The micrometer sleeve in this instance as heretofore governs the distance through which the tool may be advanced and limits the same to an accurately predetermined and measured amount.

I claim,—

1. The combination with a staking tool of a punch or similar implement movable endwise through the head of such staking tool, and a micrometer stop comprising a clamp having an abutment and adapted to be secured upon the end of the punch, and a micrometrically adjustable member between said abutment and the head of the tool for limiting the possible movement of the latter to a predetermined and measured extent.

2. A micrometer stop, comprising a sleeve adapted to be clamped upon a tool or implement and having a shoulder, a composite stop sleeve mounted upon the aforesaid sleeve adapted to lie between said shoulder and a stationary abutment, the parts thereof being adjustable to vary the total length of said stop sleeve, and means for measuring the adjustments of said parts.

3. A micrometer stop comprising a clamp having a shoulder, said clamp being adapted to be detachably secured upon a tool, a stop member adjustable in length supported slidingly upon said clamp and adapted to engage said shoulder to limit the movement of said clamp, and means for measuring the length adjustments of said stop.

4. The combination of a staking tool, an implement contained movably in the head of said tool, a clamp adapted to be secured on said implement above the head of the tool and having a shoulder, and an adjustable stop interposed between said shoulder and the adjacent end of said head.

5. The combination of a staking tool, an implement contained movably in the head of said tool, a clamp adapted to be secured on said implement and having a shoulder, and a stop member between said shoulder and the adjacent end of said head, adapted to be adjusted in length and having provisions for measuring the extent of its adjustment, said clamp and stop member being removable with the implement from the staking tool.

6. The combination of a staking tool, an implement contained movably in the head of said tool, a clamp adapted to be secured on said implement, and having a shoulder, and a sleeve adjustable in length between said shoulder and the adjacent end of the staking tool head.

7. The combination of a staking tool, an implement contained movably in the head of said tool, a clamp adapted to be secured on said implement and having a shoulder, and a sleeve adjustable in length between said shoulder and the adjacent end of the staking tool head, said sleeve consisting of two members, one of which is threaded upon the other, and being provided with graduations for measuring the amount of its rotation.

8. A micrometer stop comprising a split sleeve adapted to be secured detachably upon the shank of an operating tool, a two-part sleeve mounted upon said split sleeve, being movable longitudinally thereon, and restrained from relative rotary motion, and one of said parts being threaded upon the other, whereby the total length of the composite sleeve may be varied.

9. The combination of a split sleeve having clamping wings, a bolt passing through said wings and threaded into one of them for securing said sleeve upon a tool, and a separate handle engaged with said bolt, the latter and the handle having interengaging teeth.

10. The combination of a clamp adapted to be placed upon the shank of an operating tool, a bolt for securing said clamp upon such a tool, a screw threaded into the end of said bolt, and a handle supported upon said screw and adapted to be clamped by the latter against the bolt, said clamp and handle having intermeshing teeth by which the handle is enabled to rotate the bolt.

11. The combination of a sleeve, a tool shank contained rotatively within said sleeve and also movable axially through the same and adapted to carry a rotary cutting tool, a clamp mounted upon said tool shank, a bolt threaded into said clamp for securing the same in place upon the shank, a handle engaged with the bolt and extending transversely to its axis, means for securing the handle to the bolt adjustably and rigidly so that the handle may serve both as a means for rotating the bolt to tighten the clamp and as a crank for revolving both the bolt and the tool shank about the axis of the latter, and a micrometrically adjustable

stop interposed between the clamp and a part of the sleeve for arresting the axial movement of the shank and thereby limiting the feed of the tool to a measured amount.

12. A micrometer stop device consisting of a sleeve having a series of graduations extending axially, a collar formed upon said sleeve and having a projecting shoulder, means for securing said sleeve and collar detachably upon an operating tool or implement, a threaded sleeve having an engagement upon said first sleeve in such a manner as to be movable axially thereof and restrained from movement rotarily, and a stop sleeve having internal threads engaging the threads of said threaded sleeve and adjustable thereon, said stop sleeve having a circular series of graduations to measure the extent of its angular movement.

13. A micrometer stop device adapted to be mounted upon the shank of a staking tool implement, comprising a longitudinally slotted sleeve having a shoulder and a line of graduation marks, means for detachably and adjustably clamping said sleeve upon a punch or other staking tool implement, and a composite stop sleeve consisting of two members, one of which members is mounted to slide upon the first-named sleeve and is provided with a tongue entering the slot in the latter to prevent relative rotation, and the other member of said composite sleeve being threaded upon the exterior of said first member and having a circular series of micrometer graduations at one end thereof and adjacent to the line of graduation upon said first sleeve.

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

FRANK R. CUNNINGHAM.

Witnesses:

J. H. BROCKWAY,

C. ELBERT DOLE.