

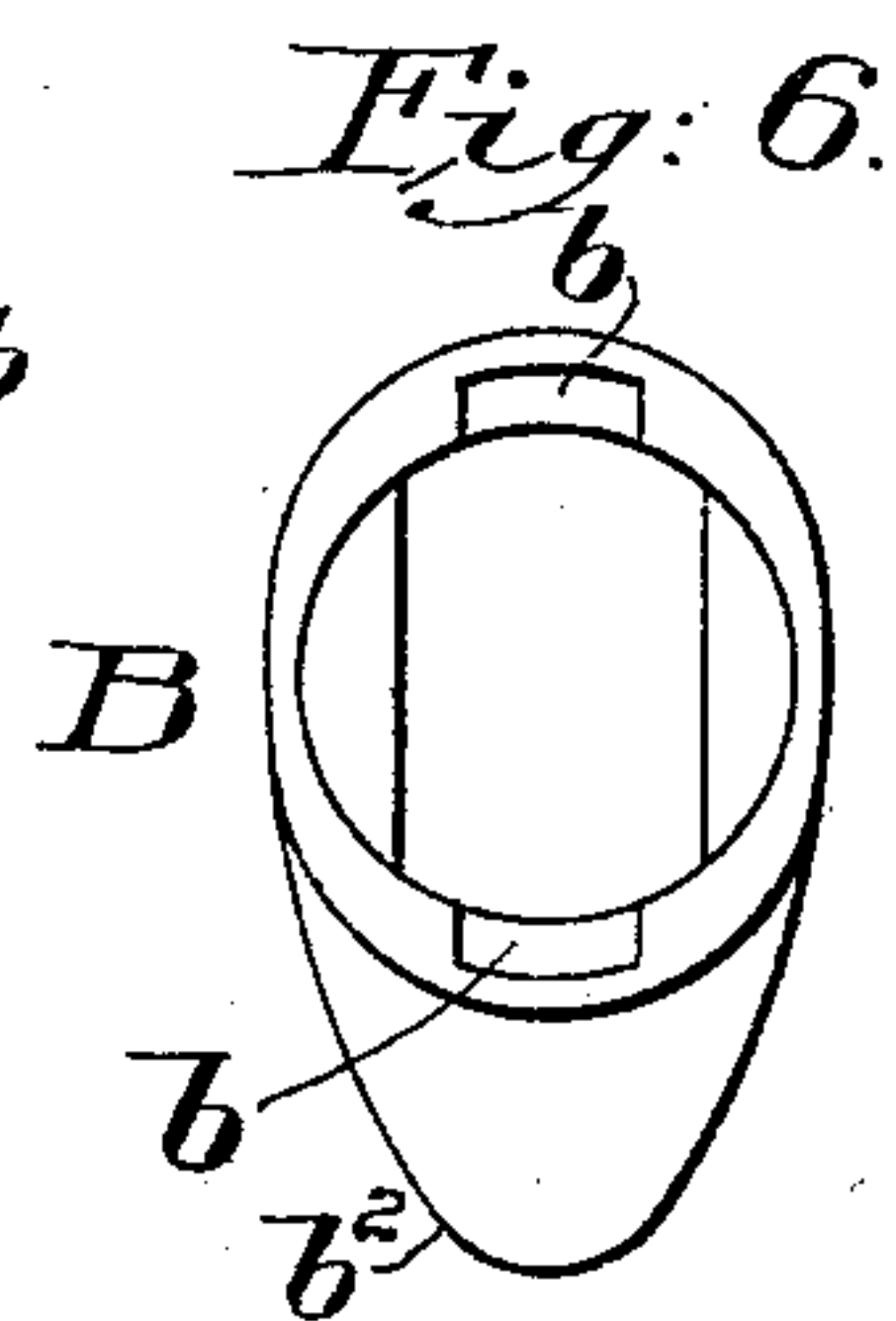
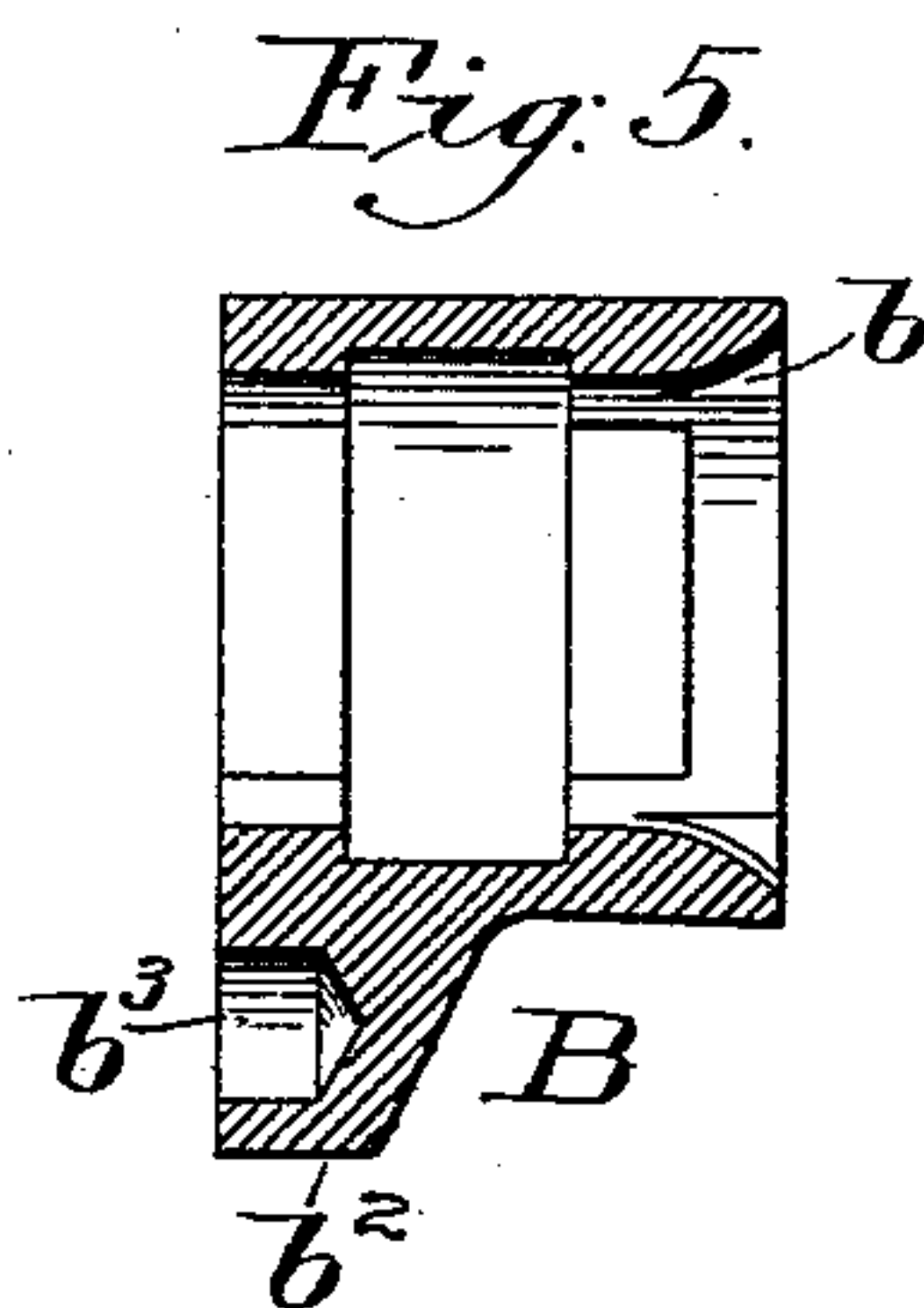
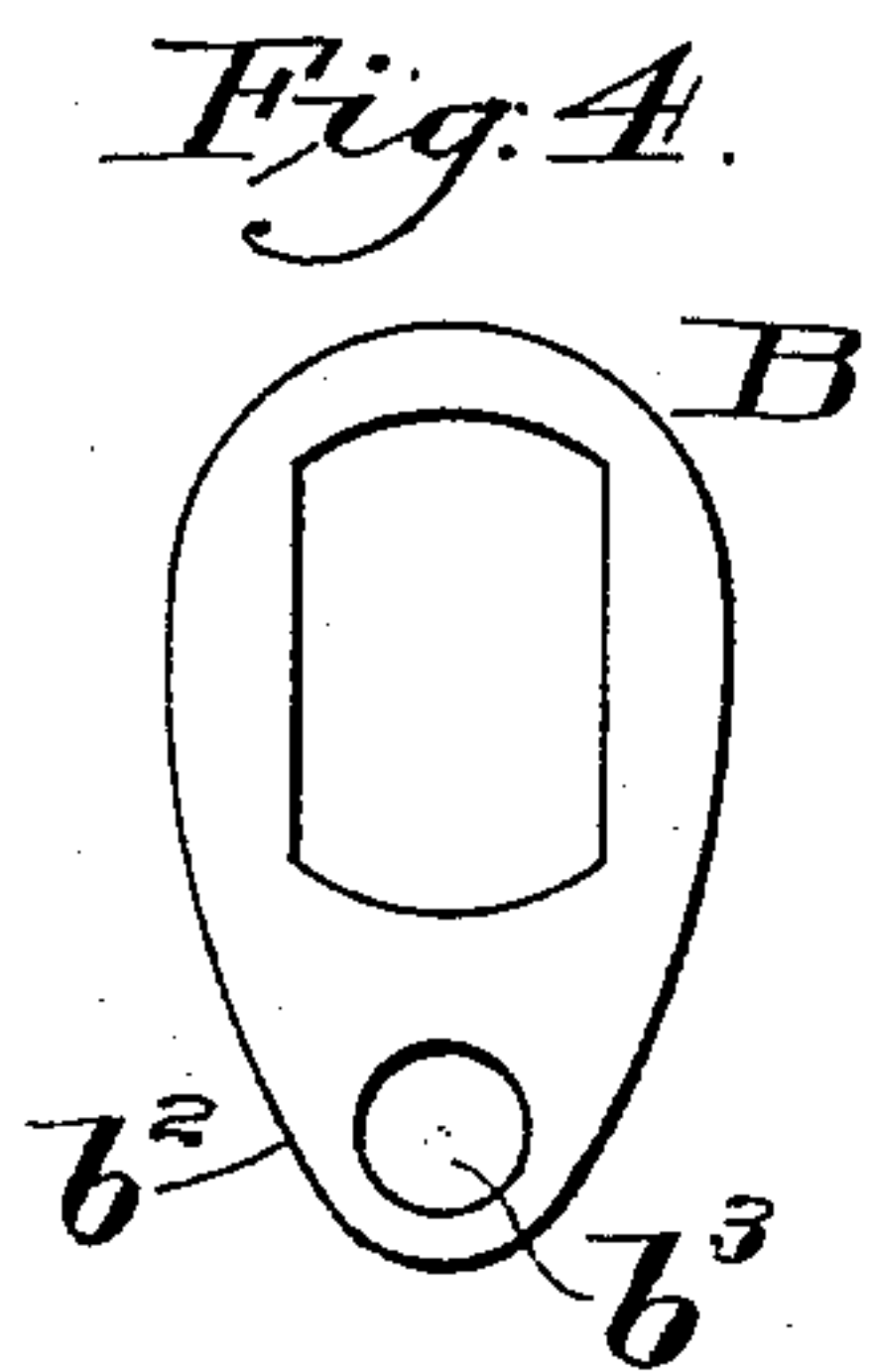
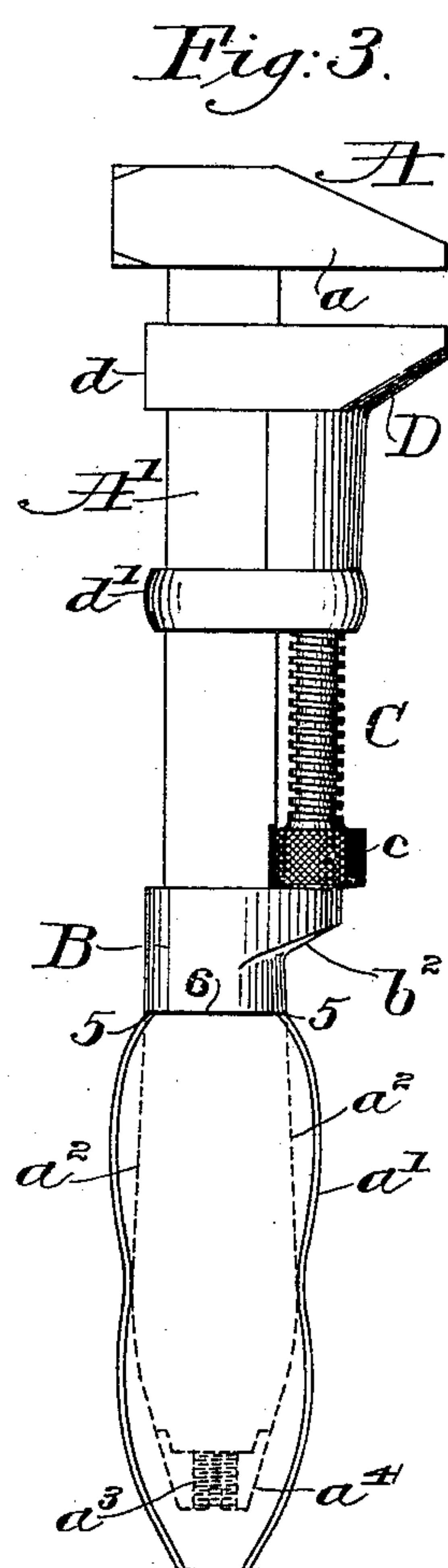
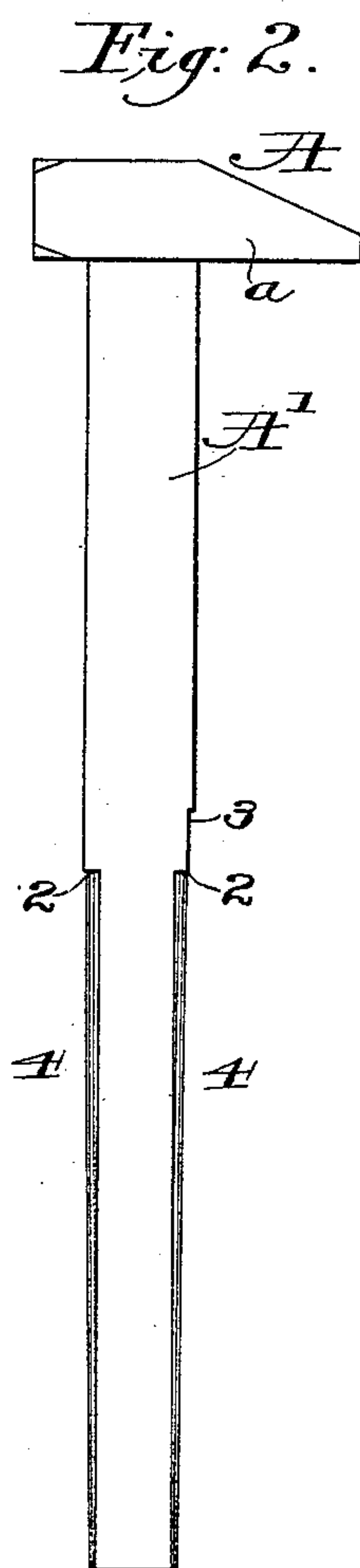
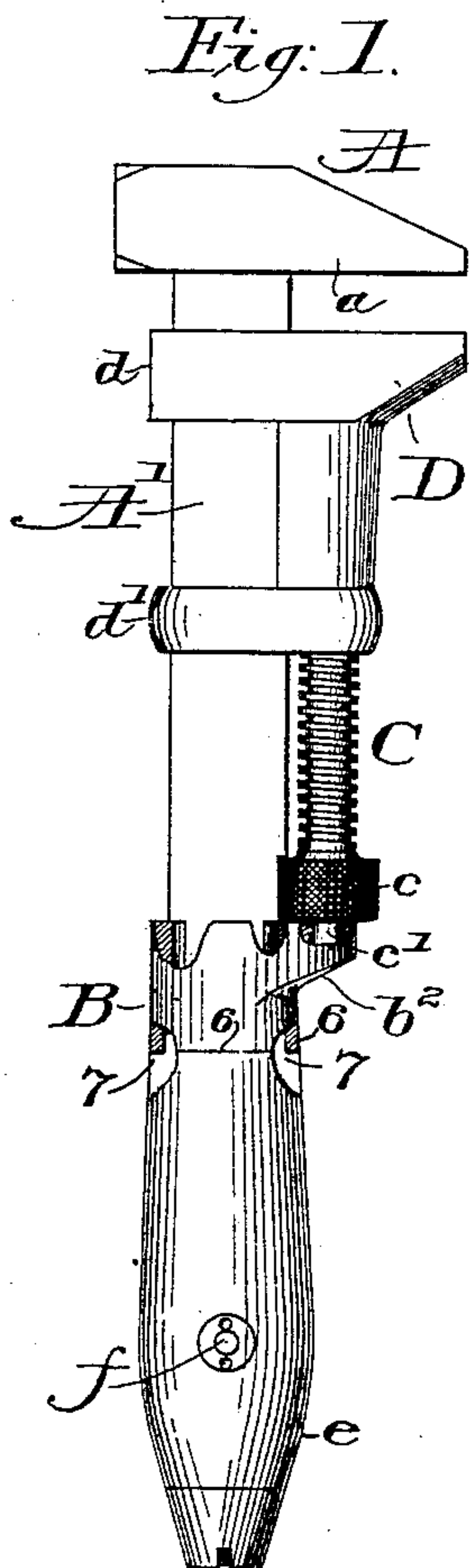
No. 618,026.

Patented Jan. 17, 1899.

J. H. COES.
SCREW WRENCH.

(Application filed Oct. 29, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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SCREW-WRENCH.

SPECIFICATION forming part of Letters Patent No. 618,026, dated January 17, 1899.

Application filed October 29, 1898. Serial No. 694,859. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. COES, of Worcester, county of Worcester, State of Massachusetts, have invented an Improvement in Screw-
5 Wrenches, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

In the use of screw-wrenches the strain exerted by the jaws of the wrench when applied to a nut or other object to turn it is thrown on the collar surrounding the wrench-shank, the said collar having an ear which supports the screw employed for actuating
10 the movable jaw. In all instances known to me prior to the invention to be herein described this collar has been applied to the wrench-shank in such manner that when used sooner or later the collar gets loose and the
15 wrench is condemned or becomes valueless for accurate work.

In the manufacture of screw-wrenches the enlarged head of the screw rests upon a projection or ear extended from the collar, said
25 head because of its size forming a bearing capable of being used for a long time with but little wear. In wrenches of this class the face of the movable jaw must when closed contact uniformly with the face of the fixed
30 jaw, and the end of the movable jaw farthest from its acting face thus occupies in the wrench a determined position, which becomes and will be hereinafter treated in the description of the manufacture of the wrench
35 as one of two fixed points, the face of the ear, extending from the collar against which the head of the screw in the use of the wrench bears, forming the second fixed point. In
40 practice the screw must be so applied to the movable jaw as to close the face of that jaw against the face of the fixed jaw, and to effect this the head or end of the screw most distant from the fixed jaw must be supported
45 firmly by the fixed point at the collar, and at the same time the threaded end of the screw must have its threads operatively engaged with the threads cut in the movable jaw. If
50 the movable jaw should be applied to the shank with its face against the face of the fixed jaw and the collar should be applied to the shank and fixed thereto in its working po-

sition to constitute one of the said fixed points, it will be seen that the screw is longer than the distance between the said two fixed points, and consequently it becomes apparent that
55 any screw to be put into working position between these two fixed points of the assembled wrench would have to be shorter than the distance between said fixed points, and such a screw if put into the wrench after the collar
60 is fixed in position will make a wrench which cannot be positively controlled in its fully-closed position, and so also, the movable jaw, when the threads at the point end of the screw
65 have been engaged with it to actuate it, will result in the production of a wrench in which the jaw and its screw are free to slide bodily together for a short distance on the wrench-shank, thus making a wrench having the fault
70 of looseness, and such a wrench is not desired by mechanics.

In my experiments I have aimed to provide the strongest possible wrench, one which shall be accurately fitted together, so that the movable jaw may always be under the control of
75 the screw, while the head end thereof rests on the fixed part of the collar. To make this kind of a wrench, I have found that the threads of the screw must be operatively engaged with the threads of the movable jaw before the
80 collar is put into its final working position, so that a part of said collar constitutes one of the said fixed points, and that thereafter the collar must be firmly and immovably
85 fixed upon the shank, so that under no possibility of wear can the collar have any looseness whatever on the shank.

I have found in practice that the collar surrounding the shank, for the best results and to insure accuracy of work and durability
90 thereof, must be positively and immovably clamped at its upper and lower edges on the shank of the wrench, and I have demonstrated practically the fact that it will not
95 answer to use any movable device whatever to hold or lock, as it were, the collar in place in order that its face may be put into one
100 of the fixed points hereinbefore referred to. I have consequently produced a wrench in which the upper and lower edges of the collar are clamped at both edges of the shank between fixed immovable shoulders made in

the metal of the shank, so that under no condition of strain, use, or wear can the collar move to any degree whatever on the shank, and said collar cannot be removed from the shank without splitting the collar open or distorting the shank.

In accordance with my invention I apply the movable jaw to the shank with the threads at the end of the screw caught in the threaded part of the movable jaw, and I then push the upper edge of the collar against a shoulder so located on the shank at both edges thereof that the collar when pushed against them will have the face of its ear put into position to constitute one of the fixed points hereinbefore stated. In this condition I heat that part of the shank extended through and beyond said collar from said shoulder, and I then subject said heated shank to the action of a suitable drop or hammer, which by its blows expands the shank beyond the interior diameter of the collar, causing the metal of the shank to be widened or expanded to constitute a shoulder at the lower end of the collar most remote from the shoulders referred to, said forged shoulders in the process of assuming their shape moving toward the shoulders of the shank, so that the said collar is, by a swaging operation, firmly and immovably grasped at both ends between four integral shoulders. After this the swaged part of the shank is duly trimmed, leaving its edges substantially flush with the parts of the collar with which the forged shoulders contact, and the forged shank is provided with a screw-thread, and thereafter suitable handle-shells may be applied in any usual manner. Preferably the collar has diametrically opposite notches facing the edges of the shank, so that the shank as it is extended by forging enters the said notches, thus forming also a positive locking means to restrain any possible liability of the collar to move about the shank. In this way I avoid the use of a pin by which to fix a collar in position or of a tang extended from the lower end of the collar and adapted when the collar is put in place to be struck by a hammer, so that its end moves in a circular path and enters a notch cut in the edge of the shank.

Figure 1 represents in side view an assembled wrench, the collar and part of one of the handle-shells being broken away to better illustrate my invention. Fig. 2 represents the shank of the wrench with its fixed jaw, it being in the form in which it is put preparatory to applying the movable jaw, its screw, and collar. Fig. 3 in full lines shows a shank and fixed jaw with movable jaw, screw, and collar applied thereto and the shank forged and swaged to produce the two shoulders which immovably fix the collar against the previously-formed shoulders of the shank, the dotted lines in said figure showing the shank trimmed and provided with a screw-thread, a nut being applied to the thread. Fig. 4 is a face view of the col-

lar; Fig. 5, a longitudinal section, and Fig. 6 an under side view of the collar.

In practice I take a bar of metal and with suitable drops, by forging, form a fixed jaw A with an extended shank A', the lower end of the shank being reduced, by forging or turning, to leave two shoulders 2, they being so located with relation to the face *a* of the fixed jaw as to constitute registered points to receive against them the face of the collar B, said collar when it meets said shoulders 2 being put into position to occupy one of the two fixed points hereinbefore referred to. Just above the shoulder 2 one edge of the shank is notched, as at 3, to receive the peripheral edge of head *c* of the screw C.

The movable jaw D is forged or made in usual manner to present two loops *d d'* to surround the shank A', and a portion of the movable jaw D is threaded internally to be engaged by and receive the threads of the screw C.

In assembling the wrench I apply the movable jaw D to the shank, and either before or immediately after the said movable jaw is applied to the said shank I insert the small end of the screw C into the movable jaw, so that the threads of the screw engage the screw-threads of the movable jaw, and thereafter I apply the collar B, putting its upper end in contact with the shoulders 2 to thereby place the collar in registered position, exactly the position in which it will always remain, so that the face of the collar next the head *c* of the screw will form a fixed point of the nature hereinbefore referred to.

Referring to Figs. 5 and 6, it will be seen that the collar has notches *b* at diametrically opposite points, and said collar is so applied to the shank that the said notches come opposite the reduced edges 4 of the shank, and it will also be noticed that the ear *b*², projecting from the collar B, has a projection *b*³, in which enters the extremity *c'* of the screw extending from one side of the head *c*. Having applied the collar to the shank, as stated, I then heat the shank sufficiently to enable its form to be changed readily by the action of a drop or hammer, and at the same time I prevent the heating of the collar B, which may be made of malleable iron, to such an extent as will distort it or injure it. The shank, having been heated sufficiently, is, with the collar on it and its upper edge against the shoulders 2, subjected to the action of a drop or hammer, and the shank is extended or enlarged, as represented by the full outlines *a'*, Fig. 3, and during this enlargement of the shank by forging it will be noticed that the metal of the shank at the points 5 is expanded in the direction of the width of the shank, and the said expansion is effected close to the lower edge 6 of the collar, the expanded metal entering the notches *b* of the collar and being bulged outwardly to leave shoulders 7, (see Fig. 1,) which abut snugly and firmly against the lower end of

the collar, forcing the upper end of the collar firmly against the two defined shoulders 2 and immovably fixing the collar in position on the shank, so that under no possibility 5 can the collar rock, twist, or turn in any direction on the shank.

Holding the collar firmly at top and bottom between shoulders at both edges of the shank enables the collar, when subjected to the 10 strong thrust upon its ear of the screw C under great strains to which the wrench may be subjected, to bear downwardly against the shoulders and the latter to evenly receive and bear the strain of the collar, the shoulders 15 2 preventing any rocking of the collar under strain. The shank, having been forged to throw out its two shoulders, by which to fix the lower end of the collar in place, is then trimmed, substantially as represented by dotted lines a^2 , (see Fig. 3,) the said screw-threaded 20 portion having thereafter applied to it a suitable nut a^4 , which abuts against the lower end of the shells e , applied to the handle, the upper ends of the shells engaging the lower 25 edge 6 of the collar, and thereafter preferably a suitable bolt f is inserted through the shells and a hole made in the shank.

Should I in the manufacture of a wrench apply the movable jaw and the collar to the 30 shank and then push the collar and said jaw toward the fixed jaw and then forge the shank to constitute shoulders to support the lower edge of the collar, it would be seen that the shoulders so formed by forging could 35 not be accurately controlled as to their position or distance from the face of the fixed jaw, but they might be made more or less distant from the face of said jaw. Then should I move the collar against the shoulders 40 so formed, leaving the face of the movable jaw against the face of the fixed jaw, and then apply the screw, it will be obvious that the space between the threaded end of the movable jaw and the face of the collar must be in excess of the entire length of the screw, plus its 45 head, or else the screw could not be inserted between the threaded end of the movable jaw and the face of said collar. Having put the screw into this space longer than its entire length, should I then rotate the screw 50 in order that the threads thereof might operatively engage the movable jaw, it will be seen that the screw, when resting with its head against the face of the collar and with 55 its thread in operative engagement with the movable jaw, would always leave a space between the face of the movable jaw and the fixed jaw, and the movable jaw might be slid on the shank to put its face against the face of 60 the fixed jaw; but if this was done by hand instead of by a screw the screw would follow with the movable jaw and the head of the screw would be taken away from its bearing on the top or face of the collar. To provide against 65 this looseness, I would after the thread end of the screw had operatively engaged the threaded part of the movable jaw have to move the

collar bodily toward the fixed jaw for a distance to contact with the head of the screw, 70 and then I might put a pin through the collar and the shank to lock the collar in this fixed operative position, but such operation would, it will be seen, immediately remove the lower end of the collar from the forged shoulders, 75 so that said shoulders would not thereafter constitute a locking and supporting means externally to the collar at its end most remote from the fixed jaw.

By applying a collar to the shank of the wrench, as herein provided for, I gain a 80 wrench having practically the same solidity and rigidity of parts as though the collar were forged integral with the shank, and a wrench made as herein provided for possesses great utility and durability, making the wrench 85 exceedingly desirable.

The projection c' , extended from the head of the jaw-moving screw, is of the greatest practical importance, for it maintains the screw in proper alinement with the threaded 90 foot of the movable jaw, and yet the said projection does not interfere in the least with or prevent the head of the said screw taking a solid bearing on the face of the ear extended from the collar. 95

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

1. A wrench composed of a movable jaw having a screw operatively connected there- 100 with, a collar to meet the head of said screw, and a fixed jaw having an extended shank provided with four shoulders, said movable jaw and collar being applied to said shank, the collar being immovably clamped between 105 said shoulders at both edges of the shank, the collar when in place preventing the removal of the screw from the movable jaw and forming a rigid abutment for the head end of the screw in operation, substantially as described. 110

2. In a wrench, a fixed jaw, a shank having four shoulders, and a collar having an ear, said collar being immovably clamped between said shoulders; combined with a movable jaw and a headed screw inserted therein opera- 115 tively to move said jaw, the head end of said screw being supported by said collar, the distance between the face of said collar and the threaded end of said movable jaw, when the face of the movable jaw is in contact with the 120 face of the fixed jaw, being less than the length of said screw and its head, substantially as described.

3. In a wrench, a fixed jaw, and a shank having shoulders at different distances apart 125 thereon, a collar having an extended ear, and notched at its interior at substantially diametrically opposite points, said collar being clamped immovably between said shoulders and being locked against twisting movement 130 on said shank by said shoulders entering said notches, combined with a movable jaw and a headed screw inserted therein operatively, the head end of the screw resting against said col-

lar when the face of the movable jaw is forced by said screw against the face of the fixed jaw, substantially as described.

4. In a wrench having a fixed jaw and a movable jaw controlled by an engaged screw, a collar to support the head of said screw, said collar being swaged fixedly in position on the shank of the fixed jaw between integral shoulders of said shank, said shoulders contacting with the upper and lower edges of said collar substantially as described.

5. In a wrench, a fixed jaw, a shank having four shoulders, and a collar having an ear provided with a pit, said collar being immovably clamped between said shoulders, combined with a movable jaw, and a headed screw inserted therein operatively to move said jaw,

the head of said screw having a projection to enter said pit, leaving the head of the screw, outside said projection, bearing on and supported solidly by the face of said ear, the distance between the face of said collar and the threaded end of said movable jaw, when the face of the movable jaw is in contact with the face of the fixed jaw, being less than the length of said screw and its head, substantially as described.

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

JOHN H. COES.

Witnesses:

GEO. W. GREGORY,

ALEX. C. PROUDFIT.