

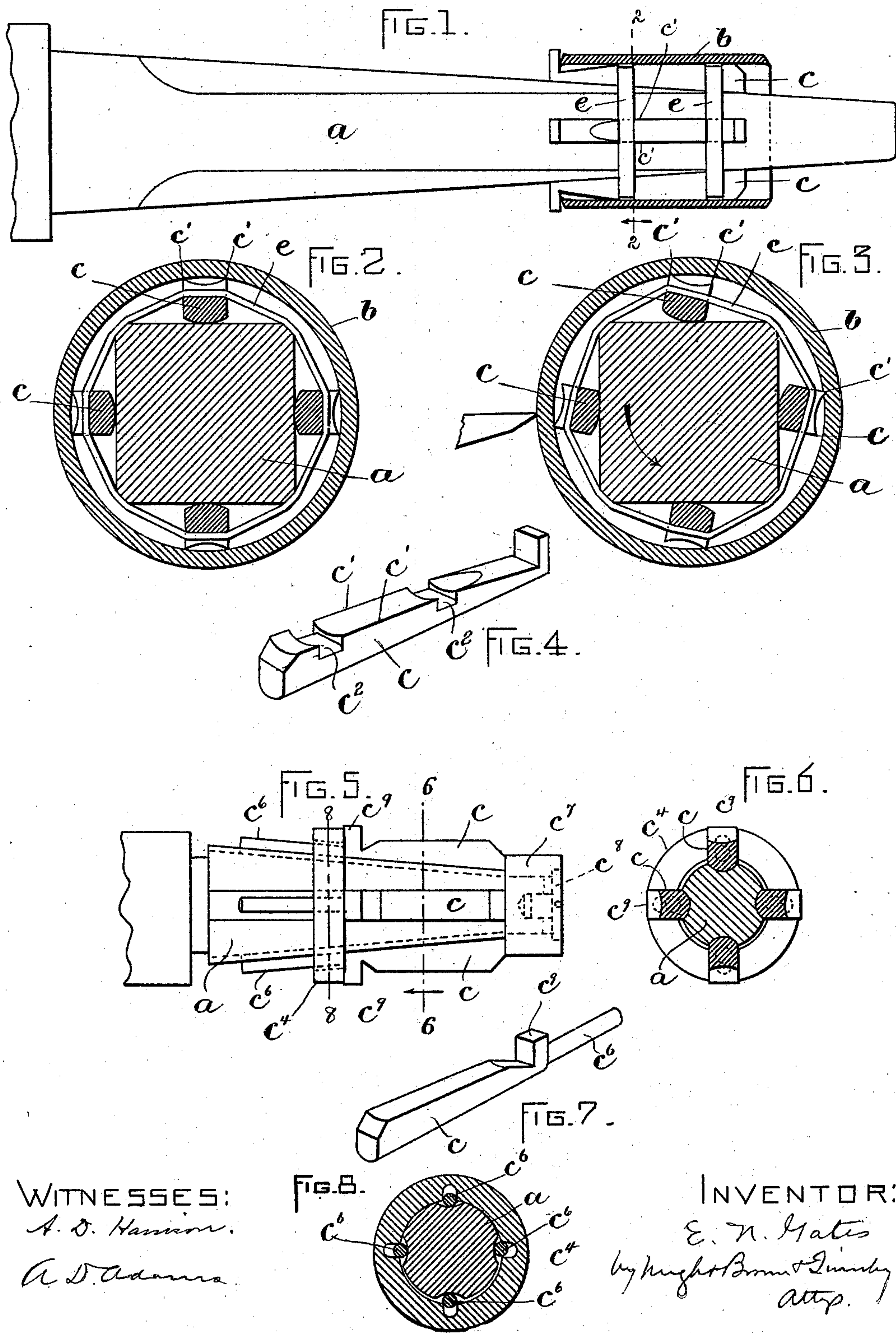
(No Model.)

2 Sheets—Sheet 1.

E. N. GATES.
WORK HOLDING DEVICE.

No. 573,325.

Patented Dec. 15, 1896.



WITNESSES:
A. D. Hanson.
A. D. Adams.

INVENTOR:
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by Hugh B. Brown & Quincy
Atty.

(No Model.)

2 Sheets—Sheet 2.

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FIG. 9.

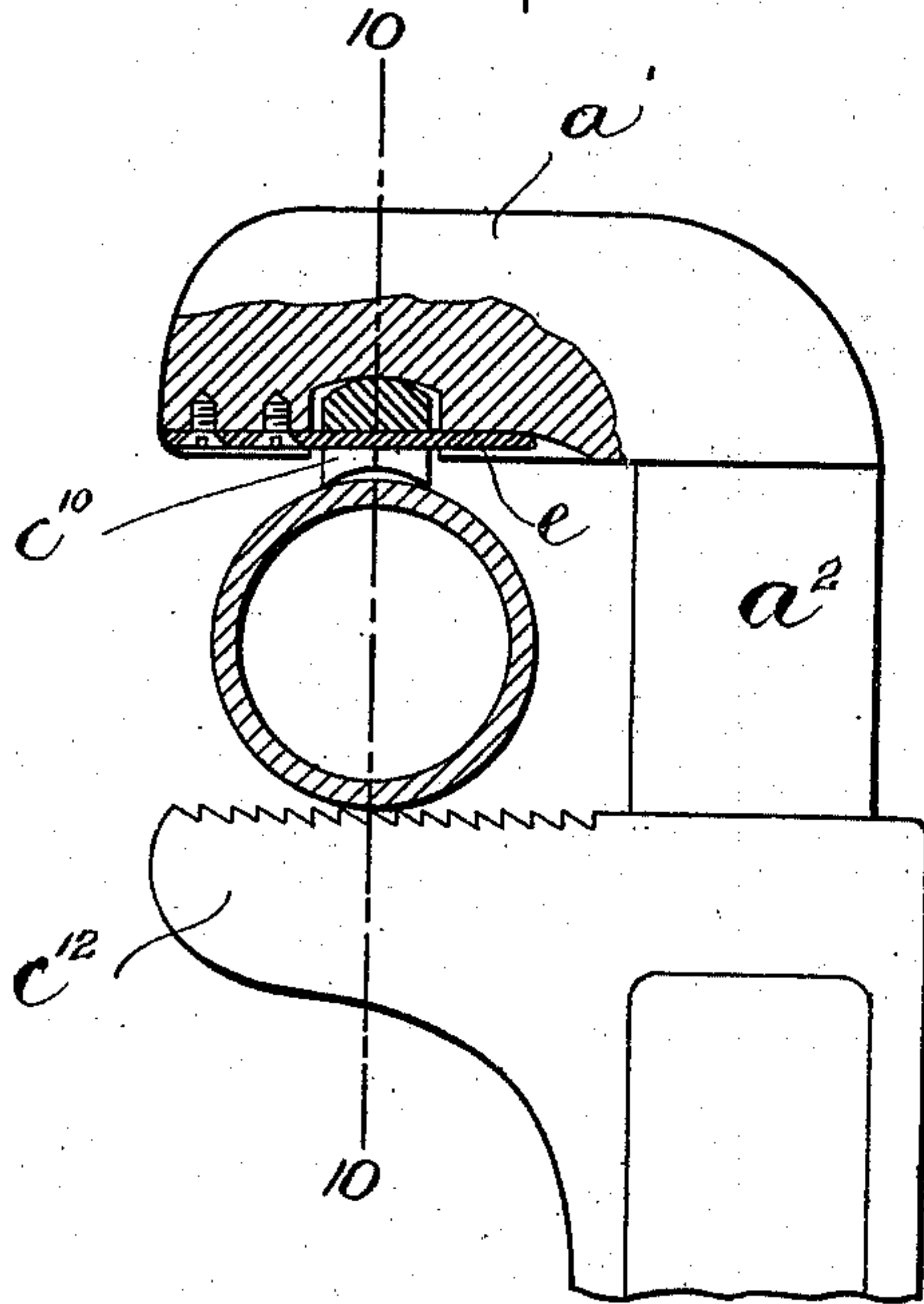
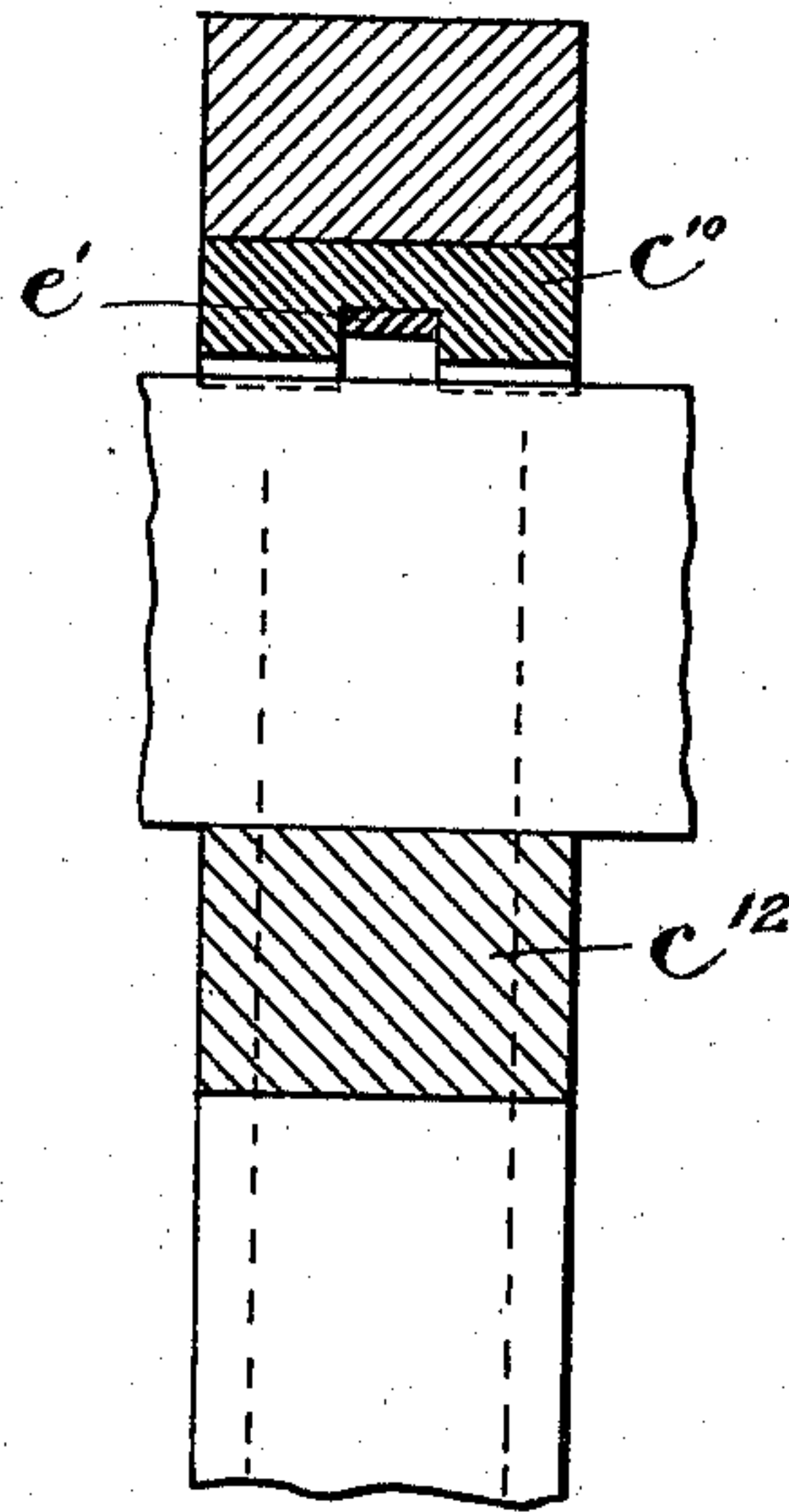


FIG. 10.



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UNITED STATES PATENT OFFICE.

EUGENE N. GATES, OF HOLLISTON, MASSACHUSETTS, ASSIGNOR TO HENRY F. COGGSHALL AND W. E. PUTNEY, OF FITCHBURG, MASSACHUSETTS.

WORK-HOLDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 573,325, dated December 15, 1896.

Application filed March 18, 1896. Serial No. 583,726. (No model.)

To all whom it may concern:

Be it known that I, EUGENE N. GATES, of Holliston, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Work Holding or Grasping Devices, of which the following is a specification.

This invention relates to an appliance for holding or grasping a metallic piece or point for the purpose of controlling the same while some operation is being performed upon it, such as cutting a screw-thread, the work being either rotated or held stationary during said operation.

The principal embodiment of my invention here shown is a mandrel adapted to be rotated and to grasp and rotate a hollow piece of work, such as a collar or a length of tubing, by grasping its interior surface so that the piece will be rigidly connected with the mandrel and will be rotated thereby. The invention is capable, however, of application to a variety of analogous appliances; and it consists in a work holding or grasping appliance comprising a plurality of jaws or bearings adapted to coöperate in grasping a piece of work, and a support common to said jaws, one or more of the jaws being loosely connected with the support, adapted to rock thereon and provided with a grasping edge arranged to be thrown outwardly from the support into engagement with the work by a rocking movement of the jaw from its normal position.

The invention also consists in certain supplemental features employed when the invention is embodied in an expanding mandrel, all of which I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side view of an expanding mandrel embodying my invention. Fig. 2 represents a section on line 2 2, Fig. 1, the jaws being in their normal positions. Fig. 3 represents a view similar to Fig. 2, showing the jaws turned to grasp a tubular nipple or collar. Fig. 4 represents a perspective view of one of the jaws shown in Figs. 1, 2, and 3. Fig. 5 represents a side view showing somewhat different embodiment of my invention. Fig. 6 represents a section on line 6 6, Fig. 5. Fig. 7 repre-

sents a perspective view of one of the jaws shown in Figs. 5 and 6. Fig. 8 represents a section on line 8 8, Fig. 5. Figs. 9 and 10 represent views showing my invention embodied in a wrench.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents a support which is formed as a bar or mandrel adapted to enter a tubular piece of work, such as a collar or nipple *b*, on which a screw-thread is to be cut.

c c represent a plurality of jaws which are loosely connected with the support *a* and are adapted to rock or oscillate thereon, so that the outer portions of said jaws, which are formed with acute-angled edges *c' c'*, may be caused to grasp the work *b* by a rotary movement of the mandrel, one edge *c* of each jaw being forced outwardly from the axis of the mandrel by said rotary movement, the jaw rocking on the mandrel, as indicated in Fig. 3.

The means for loosely connecting the jaws with the mandrel or support may be variously modified. In Figs. 1, 2, and 3 I show springs or spring-bands *e* surrounding the support and jaws and engaged with grooves *c² c²* in the jaws and pressing the jaws yieldingly against the mandrel, the pressure normally holding each jaw in the position shown in Fig. 2, with both its edges *c² c²* practically equidistant from the axis of the mandrel. I have employed continuous rubber bands as the springs with good results, but do not limit myself thereto, as circular steel springs having free ends may be employed, if desired.

In Figs. 5, 6, and 8 I show the jaws loosely connected with the mandrel by means of a loose collar *c⁴* surrounding the mandrel and having recesses *c⁵* in its inner surface, which receive extensions *c⁶* on the jaws, and a collar *c⁷*, secured by a screw *c⁸* to the outer end of the mandrel and slightly recessed at its inner end to engage the beveled outer ends of the jaws. Shoulders *c⁹* on the jaws bear against the collar *c⁴* and prevent the latter from slipping endwise on the jaws.

The rocking movement of the jaws on the mandrel or support is facilitated by the rounded form of the inner surfaces of the jaws shown in Figs. 2, 3, and 6. Said rounded

surfaces may bear on flat faces on the mandrel, as shown in Figs. 2 and 3; or may enter grooves formed in the mandrel, as shown in Fig. 6.

5 The mandrel or support a is tapering in form, so that by moving the jaws endwise on the mandrel they may be adjusted to fit pieces of work of different internal diameters, the jaws being correspondingly tapered, 10 so that their edges c' are always substantially parallel with the axis of the mandrel.

In the construction shown in Figs. 5, 6, and 8 a spring may be substituted for the collar c^4 to permit the endwise movement of the 15 jaws on the mandrel, the collar c^7 being made longitudinally adjustable.

In Figs. 9 and 10 I show my invention embodied in a pipe-wrench. In this embodiment there is or may be but one rocking jaw 20 c^{10} , which is loosely connected with a support a' , formed as an arm or jaw on the shank or body a^2 of the wrench and may be yieldingly held by a spring. An adjustable jaw c^{12} , which may be moved and held at any point 25 on the shank a^2 by means such as are ordinarily employed in pipe or other wrenches, coöperates with the rocking jaw c^{10} in grasping the work, the action of the jaw c^{10} in engaging the work being the same as in the construction first described. 30

It is obvious that the improvement may be embodied in a vise and in other appliances of like nature without departing from the spirit of the invention.

35 It will be seen that by providing each working jaw with two grasping edges and yieldingly holding said edges in their normal position, both being substantially equidistant from the support, the appliance is adapted 40 to be operated in either direction, so that a mandrel provided with the invention can be rotated in either direction, and when the invention is embodied in a wrench the latter can be swung or moved either to the right or 45 to the left with the same result, the two grasping edges being alternately operative.

I claim—

1. An appliance of the character specified, comprising a plurality of jaws or bearings 50 adapted to coöperate in grasping a piece of work, and a support common to said jaws, one or more of the jaws being loosely connected with the support, adapted to rock thereon, and provided with two alternately-operative grasping edges, each of which is arranged to be thrown outwardly from the support by a rocking movement of the jaw thereon, one grasping edge being thrown outwardly by a movement of the jaw in one direction, 60 and the other by a movement of the jaw in the opposite direction.

2. An appliance of the character specified, comprising a plurality of jaws or bearings adapted to coöperate in grasping a piece of work, a support common to said jaws, one or 65 more of the jaws being loosely connected with the support, adapted to rock thereon, and provided with two alternately-operative grasping edges, each of which is arranged to be thrown outwardly from the support by a rocking 70 movement of the jaw thereon, and means for yieldingly holding said rocking jaw with its grasping edges practically equidistant from the support.

3. An appliance of the character specified, 75 comprising a support formed as a bar or mandrel, a plurality of jaws loosely connected with said support, adapted to rock thereon, and each provided with two alternately-operative grasping edges, each of which is arranged to be thrown outwardly from the support by rocking movements of the jaws, and means for yieldingly holding said jaws with their grasping edges practically equidistant 80 from the support. 85

4. An appliance of the character specified, comprising a support formed as a bar or mandrel, a plurality of jaws loosely connected with said support, adapted to rock thereon, and each provided with two alternately-operative 90 grasping edges, each of which is arranged to be thrown outwardly from the support by rocking movements of the jaws, and a spring surrounding the support and engaged with the jaws to yieldingly hold the grasping 95 edges in their normal positions and practically equidistant from the support.

5. An appliance of the character specified comprising a tapering mandrel, a plurality of tapering jaws adapted to oscillate and move 100 lengthwise on the inclined surfaces of the mandrel, said jaws having grasping edges which are parallel with the axis of the mandrel, and means for loosely holding the jaws upon the mandrel. 105

6. An appliance of the character specified comprising a tapering mandrel, a plurality of tapering jaws adapted to oscillate and move lengthwise thereon, and provided with grasping edges which are parallel with the axis of 110 the mandrel, a collar surrounding the mandrel and engaged with the jaws to hold them loosely against the mandrel, a collar engaged with the outer ends of the mandrel and jaws.

In testimony whereof I have signed my 115 name to this specification, in the presence of two subscribing witnesses, this 12th day of March, A. D. 1896.

EUGENE N. GATES.

Witnesses:

F. A. CURRIER,
J. M. SARGENT.