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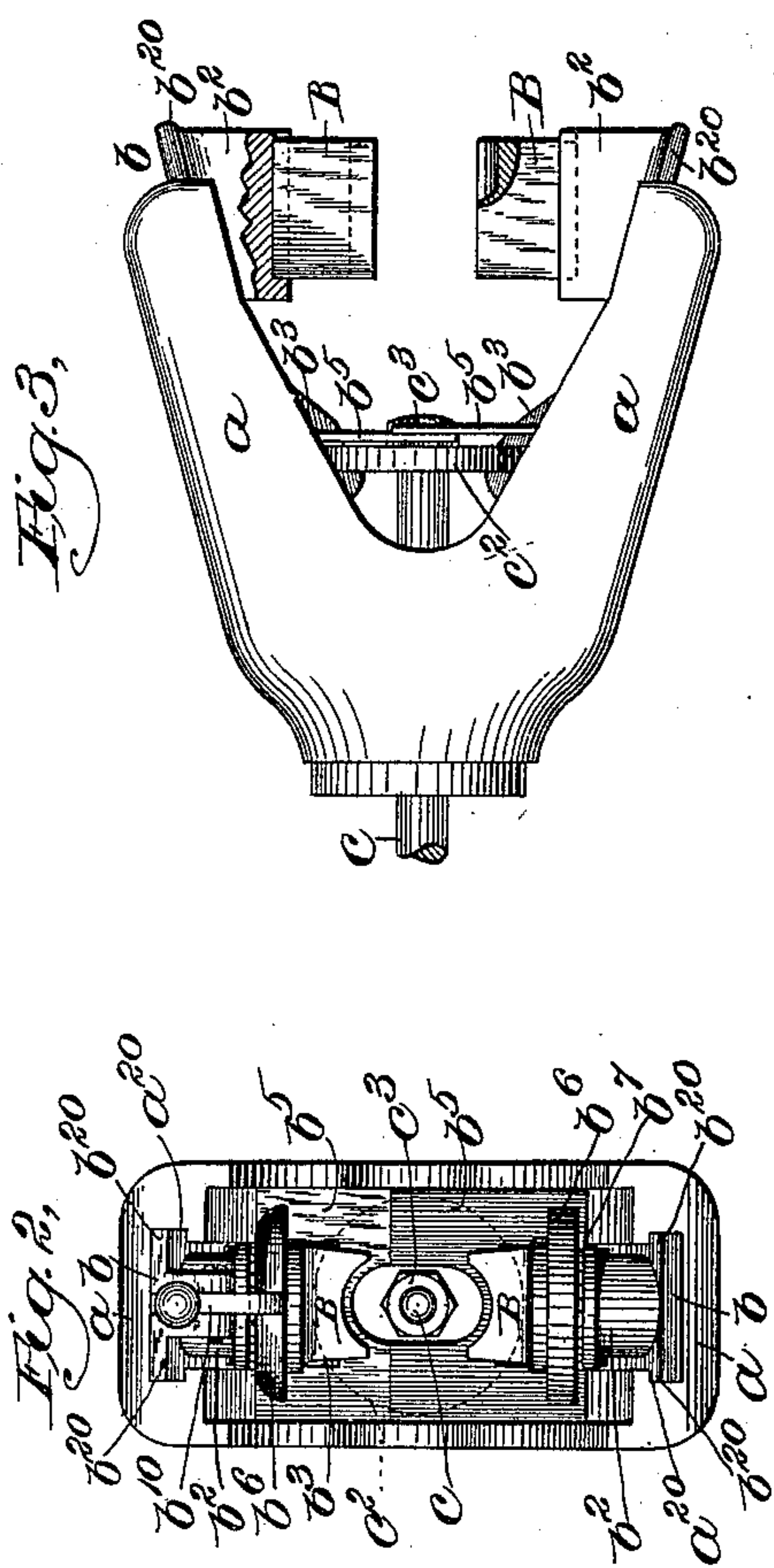
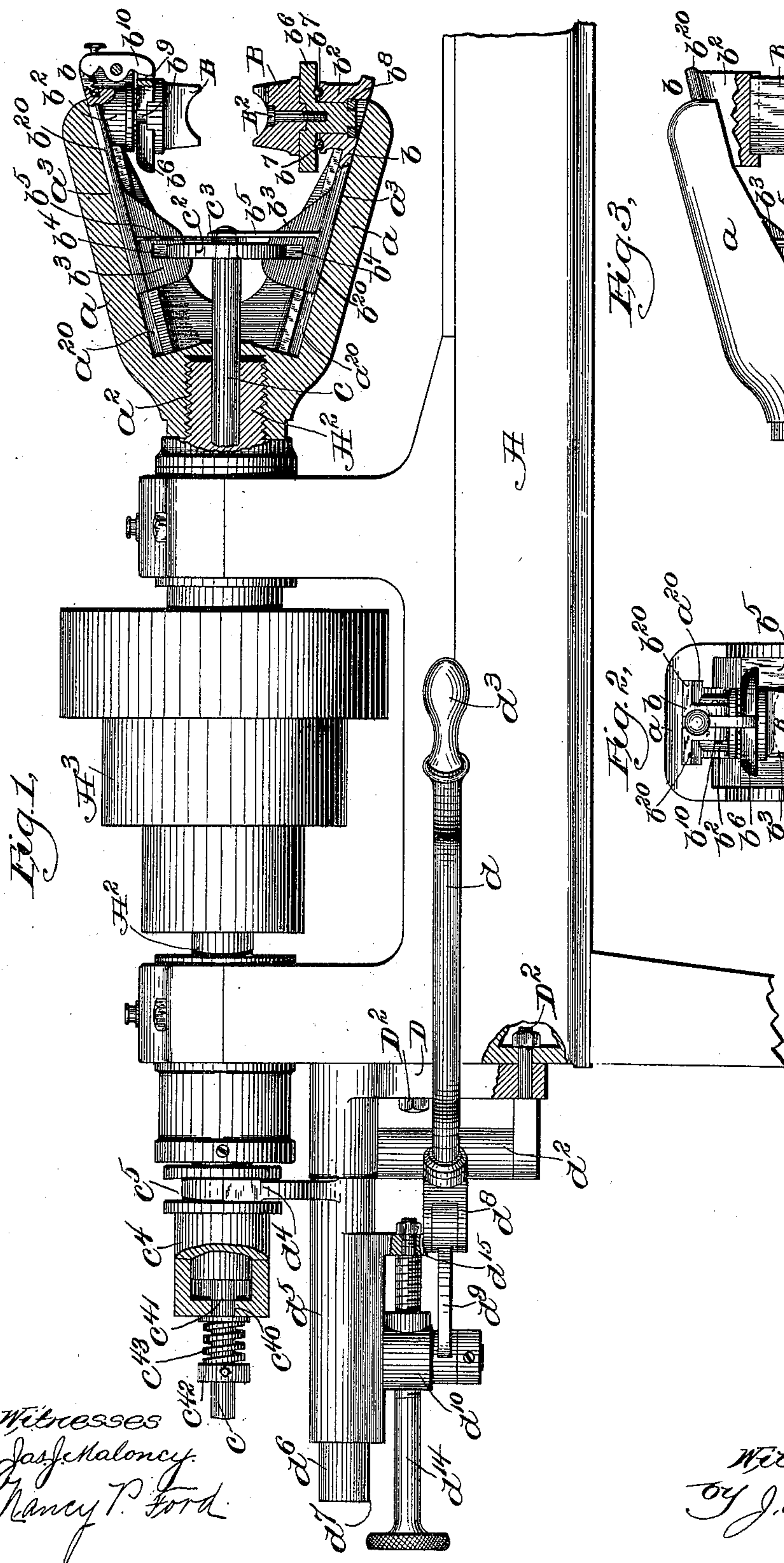
Patented Dec. 26, 1899.

W. SCOTT.  
CHUCK.

(Application filed June 29, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses  
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Inventor,  
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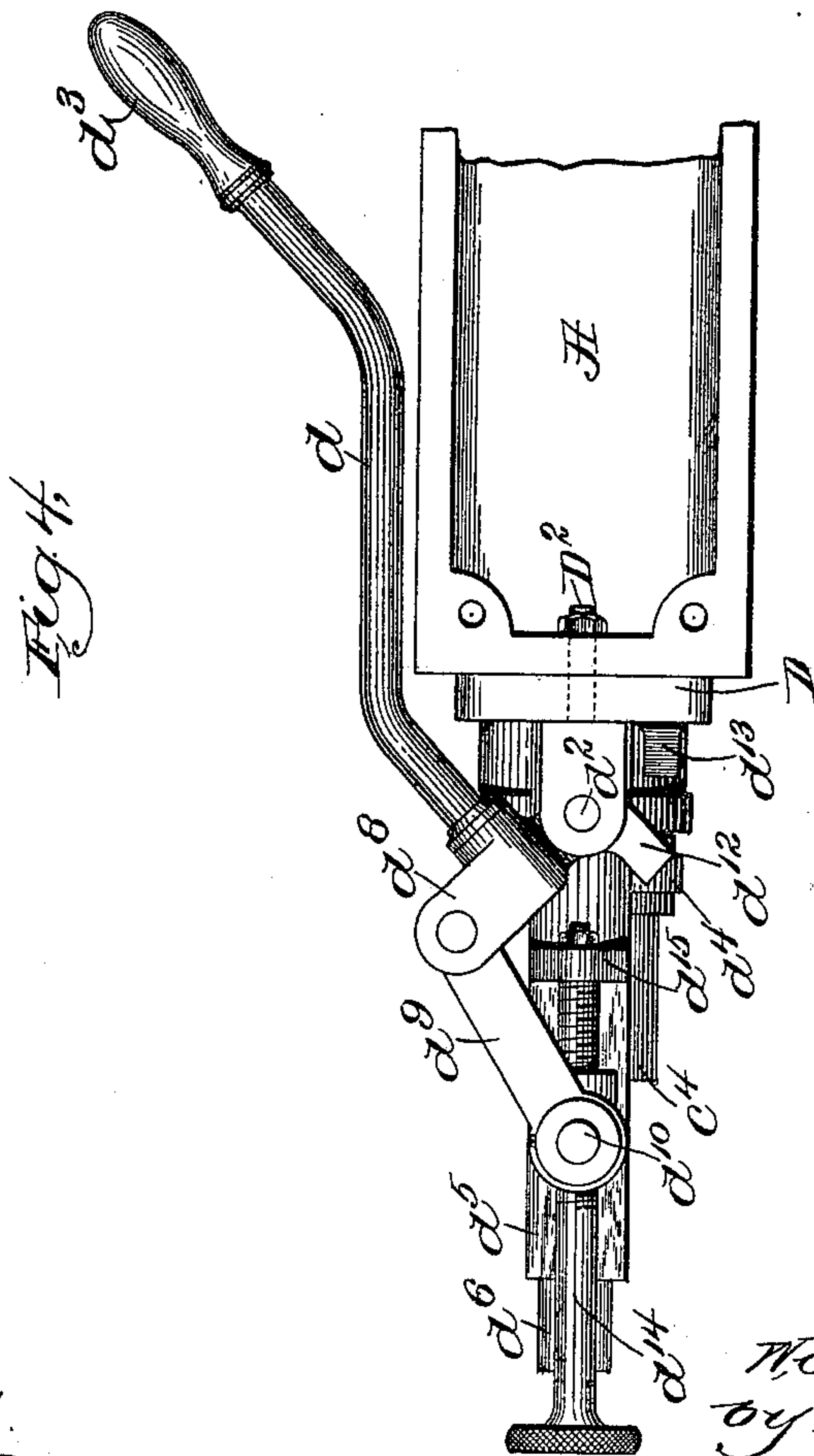
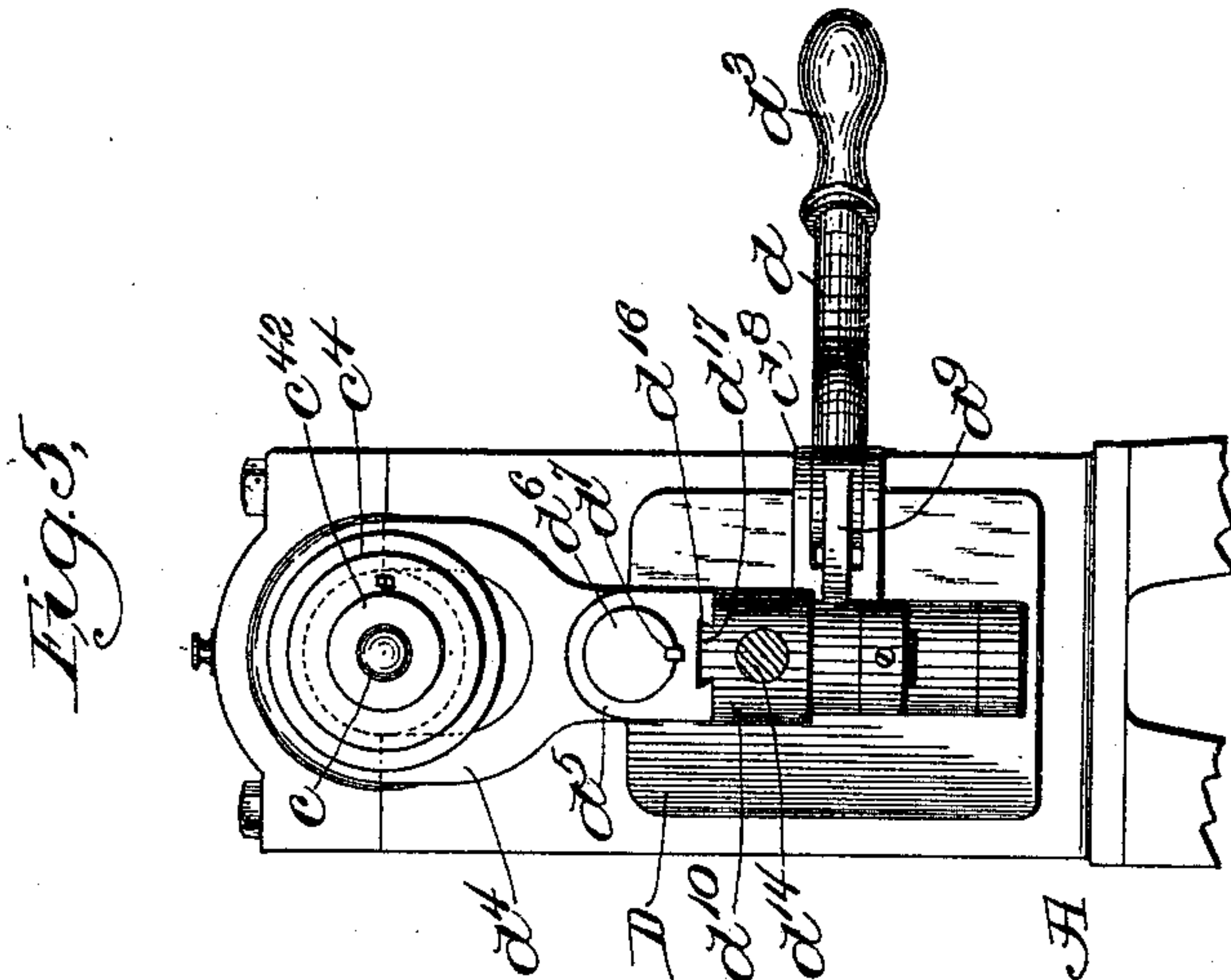
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3 Sheets—Sheet 2.



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3 Sheets—Sheet 3.

Fig. 7.

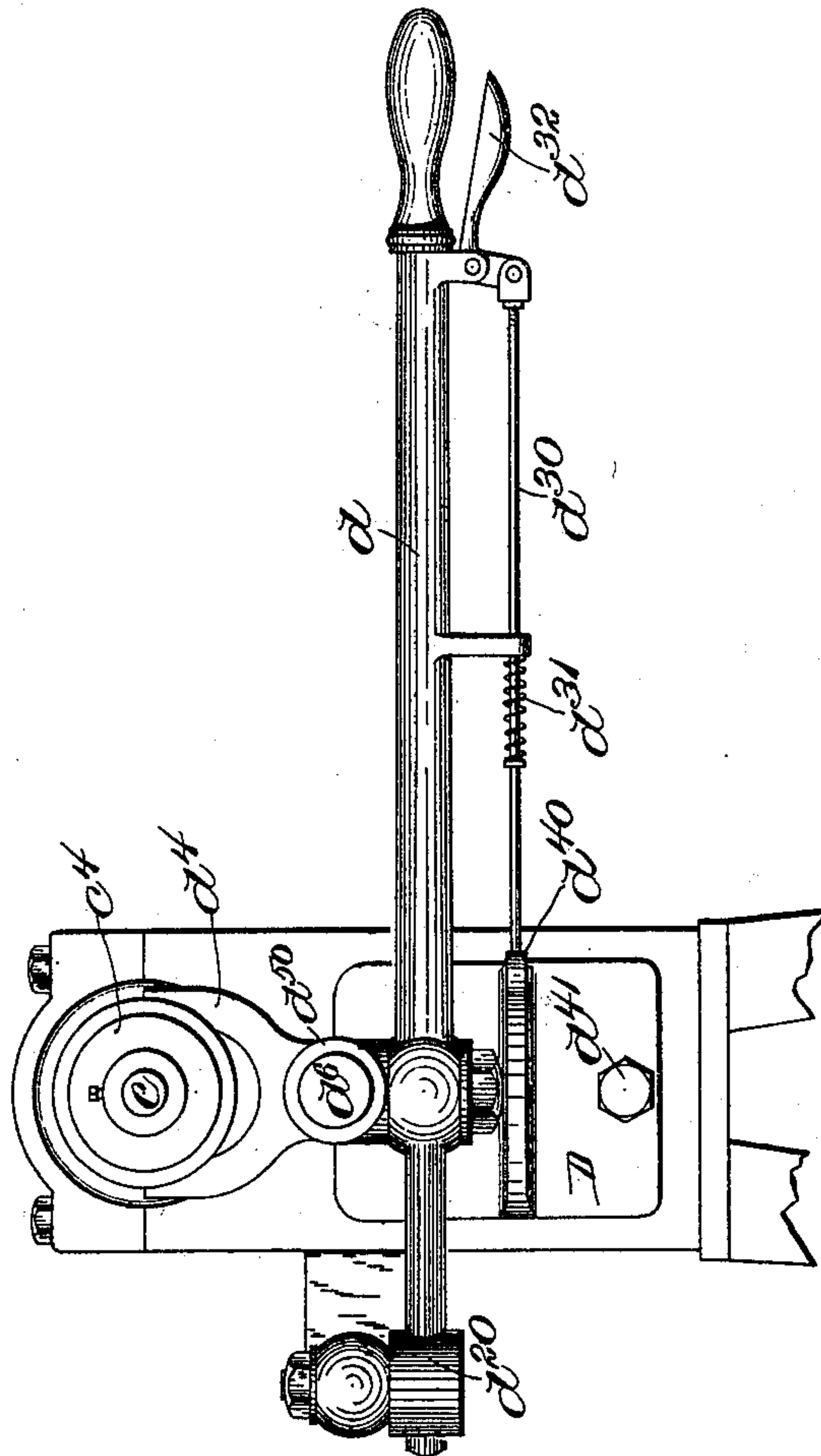
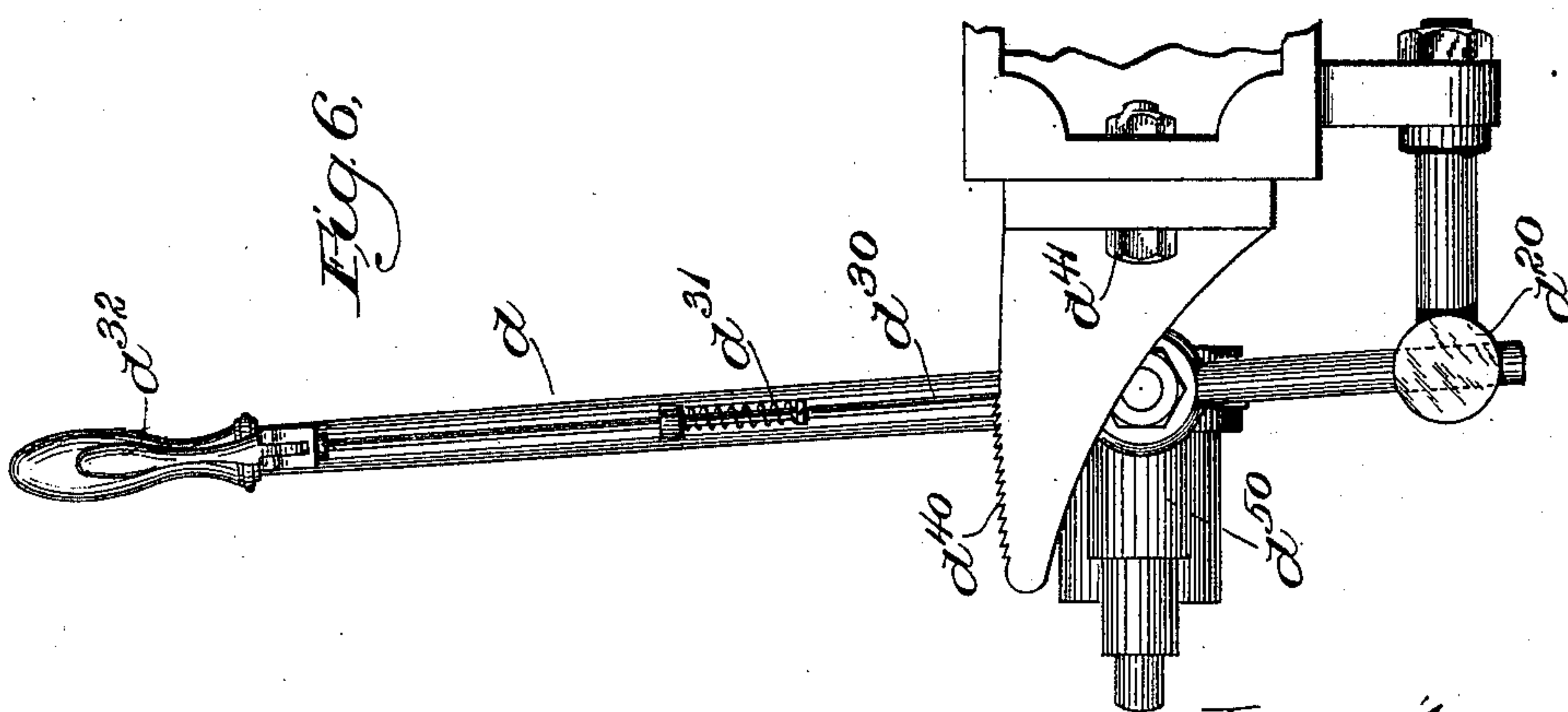


Fig. 6.



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# UNITED STATES PATENT OFFICE.

WILLIAM SCOTT, OF MEDFORD, MASSACHUSETTS.

## CHUCK.

SPECIFICATION forming part of Letters Patent No. 639,944, dated December 26, 1899.

Application filed June 29, 1898. Serial No. 684,762. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM SCOTT, of Medford, county of Middlesex, and State of Massachusetts, have invented an Improvement in Chucks, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a chuck for use in lathes and the like, the object of the invention being to obtain a chuck which can be easily operated by manipulating a handle or lever and at the same time one which is capable of grasping articles of different sizes and shapes and capable of locking securely articles of the same shape which may differ slightly in size, as is usually the case with rough castings.

The chucks now commonly employed are mainly of two classes, those in one class being provided with jaws mounted in a guideway and adapted to be drawn together by means of a rotatable member provided with right and left screw-threads and arranged to be operated by means of a key or wrench. Those in the other class, which are intended only for use with substantially straight articles, such as pipes or rods, are provided with a series of expanding and contracting jaws arranged to co-operate with an inclined or conical surface, so that a longitudinal movement of said jaws along said surface will clamp the same upon the object to be held. In the former class of chucks, which are commonly used for objects of various shapes and are provided for this purpose with interchangeable detachable jaws of suitable shapes and sizes, a wrench or key has to be applied after each article has been operated upon in order to loosen up the jaws, and the next article is then placed between the jaws and the key or wrench again applied, the operation being somewhat tiresome and requiring the expenditure of considerable time. In the other class of chucks, on the other hand, while the operation is accomplished ordinarily by a single movement of a lever, it is impracticable to secure in the chuck anything but a straight rod or pipe, and the chuck will only operate successfully on pieces which are very nearly uniform in size.

The chuck embodying the present invention is so arranged that detachable jaws, such

as are mentioned above, may be employed, while the chucking operation is accomplished by a single movement of an actuator or lever. Furthermore, the jaws are arranged to be moved to any desired position to properly grip the article and to be locked after it is fairly gripped, so that articles of different sizes may be placed in the chuck, while no time is wasted in the use of a key or wrench. The chuck is also arranged to compensate for minor variations in size, such as are commonly found in the rough castings which are to be operated upon.

In carrying out the invention one portion of the chuck is provided with guide-surfaces inclined toward each other and toward the axis of rotation of the chuck, while the other portion comprises clutch members supported and guided by said surfaces, one of said portions being arranged to move relatively to the other, so that the jaws are opened and closed by the action thereon of the inclined surfaces. The said movable portion is arranged to be operated upon by means of a suitable actuating device, such as a lever, and is adapted to have any desired range of movement and to be locked in any desired position with relation to the other portion, the chuck thus being capable of operating on articles of different sizes throughout a wide range of variation.

A further feature of the invention consists in providing the chuck members with rotatable jaws to receive the detachable jaws, which are respectively shaped to receive the different articles, and providing said rotatable jaws with antifriction-bearings, whereby T's, elbows, and the like may be placed in the chuck and the chuck tightened, the different parts of such T's, &c., being successively presented to the tool-holder by rotating the chuck members without loosening the chuck. One of the said rotatable jaws is provided with a locking device, preferably in the form of a latch which is arranged to hold the same in any of a number of predetermined positions to which it may be rotated.

Figure 1 is a vertical longitudinal section of a chuck embodying the invention shown as applied to a lathe, a portion of which lathe is shown in elevation. Fig. 2 is a front elevation of the chuck proper. Fig. 3 is a side elevation, partly in section, showing a slightly different form of chuck-jaws. Fig. 4 is an



underneath plan view of the chuck-actuating mechanism. Fig. 5 is mainly an end elevation thereof, the adjusting-screw, however, being in section. Fig. 6 is an underneath plan view showing a modification, and Fig. 7 an end elevation of the same.

The chuck embodying the invention is shown as applied to a lathe, the frame A containing the bearings for the shaft or rotating member  $A^2$  being shown and the other parts of the lathe omitted, the shaft  $A^2$  being provided with a cone  $A^3$  in the usual way.

The chuck embodying the invention comprises guides  $a$ , shown as formed in a single casting and secured as by a screw-thread  $a^2$  to a portion of the driving-shaft  $A^2$  of the lathe, and chuck members  $b$ , supported and guided by said guides. The said guides  $a$  are provided with guide-surfaces  $a^3$ , which are inclined toward each other at an angle the apex of which is coincident with the axis of the shaft  $A^2$ , and the chuck members  $b$  are shown as arranged to slide along said guide-surfaces  $a^3$ , whereby the jaws  $b^2$  may be drawn together or separated, it being obvious that any article placed between the said jaws will be perfectly centered with relation to the shaft and finally gripped. While the chuck members are herein shown as movable and the guides as fixed, it is obvious that the said conditions may be reversed without changing the result. For convenience, however, the chuck members  $b$  will be hereinafter referred to as "movable" and the guides as "fixed," in accordance with the construction shown in the drawings to illustrate the invention. The jaws may be of any suitable form or construction and may be arranged to rotate as shown in Fig. 1, as will be hereinafter described, or may be stationary with relation to the movable members  $b$ , as shown in Fig. 3.

The movable members  $b$  are arranged to be held in contact with the guide-surfaces  $a^3$  during their movement in either direction and are herein shown as provided with wings or flanges  $b^{20}$ , fitting in undercut portions or grooves  $a^{20}$  along the sides of the said guide-surfaces. To secure an article in the chuck, therefore, it is only necessary to provide the movable portion of the chuck, herein shown as the members  $b$ , with means whereby said movable portion may be longitudinally moved to draw the jaws together. As herein shown, the said members are arranged to be acted upon by a rod  $c$ , which extends through a suitable bore in the shaft  $A^2$  and is acted upon by a lever  $d$ , shown as pivoted at  $d^2$  to a fixed portion of the lathe and provided with an operating-handle  $d^3$ , so that the attendant by moving the said lever after placing an article in a proper position to be engaged by the jaws can clamp the same. The movable members  $b$  may be connected to the said rod  $c$  in any suitable or usual way, but are herein shown as provided with wings  $b^3$ , having grooves or openings  $b^4$ , into which extends a disk  $c^2$ , secured, as by a nut  $c^3$ , to the end of

the rod  $c$ , the said disk preferably being circular in shape, so that if the rod  $c$  should accidentally be rotated independently of the shaft  $A^2$ , or vice versa, there would be no damage done. The movable members  $b$  are further provided with overlapping shields  $b^5$  to protect the inner portion of the chuck from chips of metal, dirt, or the like while the article in the chuck is being operated upon.

To connect the lever  $d$  with the rod  $c$ , the said rod is shown as provided with an intermediate connecting member, such as a sleeve or slide  $c^4$ , which is longitudinally movable upon the shaft  $A^2$ , but connected with the rod and provided with an annular channel  $c^5$ , arranged to be engaged by a yoke or projection  $d^4$ , suitably connected with the lever  $d$ , and herein shown as having a tubular guide  $d^5$ , supported upon and movable along a fixed support or rod  $d^6$ , properly secured to the lathe-frame, so that the said yoke is kept in alignment with the lathe-shaft and sleeve  $c^4$ . To prevent the tubular guide  $d^5$  from turning and causing the yoke  $d^4$  to bind in the channel  $c^5$ , the said parts may be provided with a spline  $d^7$ , as shown in Fig. 5.

To connect the rod  $c$  with the sleeve  $c^4$ , the latter is shown as having a closed end, which is provided with an opening  $c^{40}$  in its end, through which the rod  $c$  passes, and the rod is provided with a shoulder  $c^{41}$  to engage the end of the sleeve  $c^4$  and a collar  $c^{42}$  to lock the said rod in position, a spring  $c^{43}$  being shown as interposed between the collar and the sleeve to compensate for slight inequalities in size of the articles placed in the chuck, as will be hereinafter explained. The lever  $d$  being suitably connected with the guide  $d^5$ , therefore, so as to produce by its movement a longitudinal movement of said guide, the movement of said lever will draw the members  $b$  of the chuck toward each other until they engage the article placed between them and firmly grip the same. In order to hold the articles firmly in the chuck, the lever is provided with locking means to prevent the jaws from moving back after the said lever has been operated.

As herein shown, the lever is arranged to have a certain predetermined throw at each operation and is provided with an arm or projection  $d^8$ , connected by means of a link  $d^9$  with a stud  $d^{10}$ , connected with a tubular guide  $d^5$ . The said projection and link together constitute, as best shown in Fig. 4, a toggle-joint, so that when the lever is moved to such a position that the three pivotal connections are substantially in line the chuck will be securely locked and can only be unlocked by throwing the lever in the opposite direction. The said lever is further provided with a projection  $d^{12}$ , arranged to engage a stop  $d^{13}$ , fixed with relation to the lathe, the said projection and stop being arranged to come into contact with each other just after the connection between the lever and the link has crossed the line between the pivotal support  $d^2$  and the



connection between the link and the member  $d^5$ . To properly lock an article in the chuck, therefore, it is necessary only for the attendant to move the lever to its fullest extent, thereby producing a longitudinal movement of the rod  $c$  and causing the members  $b$  to slide along the jaws  $a$  until the article is engaged between the jaws.

As hereinbefore stated, the immediate connection between the rod  $c$  and the sleeve  $c^4$  is through the spring  $c^{43}$ , thus affording compensation for slight inequalities in size of castings of the same class.

To adjust the chuck for articles which differ materially in size, the device is provided with means for varying the range of movement of the jaws, this being accomplished, as shown in Figs. 1, 4, and 5, by adjusting the initial position of said jaws with relation to the lever  $d$ . To this end the stud  $d^{10}$  instead of being rigidly connected with the guide member  $d^5$  is adjustably connected therewith, the said member  $d^5$  being shown as provided with a dovetail groove  $d^{16}$ , cooperating with a dovetail projection  $d^{17}$  upon the said stud, one of the said parts being movable with relation to the other through the agency of an adjusting-screw  $d^{14}$ . The said adjusting-screw is shown as provided with a thread to cooperate with an internal thread in the stud  $d^{10}$  and as bearing in a projection  $d^{15}$  from the member  $d^5$ , the said screw being shown as provided with a shoulder at one end of the said bearing and a nut at the other, so that turning the screw will move the member  $d^5$  toward or from the stud  $d^{10}$  and will correspondingly adjust the chuck members. It is obvious that this preliminary adjustment is easily made when an article of a new size or shape is to be operated upon and is made once for all, the slight inequalities being compensated for by the spring  $c^{43}$ . It is to be noted, furthermore, that the jaws are closed by a movement away from the operating-tool, so that the pressure of the said tool in the operation has a tendency to tighten rather than to loosen the chuck. The means for locking the jaws in any desired position in order to accommodate articles differing in size may, however, be modified without departing from the invention. This may, for example, be accomplished, as shown in Figs. 6 and 7, by providing the lever  $d$  with means for locking it in any desired position, the yielding connection between the said lever and the jaw-actuating rod and the means for accomplishing the preliminary adjustment hereinbefore described being in this instance dispensed with.

In the construction shown in Figs. 6 and 7 the lever  $d$ , which is pivotally connected at  $d^{20}$  to a fixed portion of the frame, is arranged to act directly upon the sleeve member  $d^{50}$  and is provided with a locking device  $d^{80}$ , shown as a longitudinally-movable rod having an inclined face at its end arranged to cooperate with a ratchet-surface  $d^{40}$ , shown as formed on a bracket which may be se-

cured to the lathe-frame, as by a bolt  $d^{41}$ . In operating the chuck, therefore, the attendant will throw the lever  $d$ , the rod  $d^{30}$  traveling along the ratchet-surface  $d^{40}$  with a latching action, so that the lever and the jaws held thereby will be arrested in any position to which they may be moved. The rod  $d^{30}$  is shown as held in engagement with the ratchet-teeth  $d^{40}$  by means of a spring  $d^{31}$  and is provided with a gripping-handle  $d^{32}$ , pivoted, as best shown in Fig. 7, at a point adjacent to the handle of the lever  $d$ , so as to be easily grasped by the attendant to produce a longitudinal movement of the rod away from the ratchet-surface and release the lever when the chuck is to be loosened.

To adapt the chuck for articles of various shapes, the jaws  $b^2$  are provided with supports  $b^6$ , arranged to receive detachable jaws B of the kind commonly employed in lathe-chucks. The said detachable jaws B are shown in Fig. 1 as provided with screws  $B^2$  for attaching the same to the supports  $b^6$ . The means for securing the jaws, however, may obviously be modified, for example, as shown in Fig. 3, the jaws shown therein being provided with undercut tongues to enter corresponding recesses in the chuck members. To provide for successive operations on the several projecting portions of T's, elbows, and the like without loosening the chuck after the articles are placed therein, the said supports  $b^6$  are shown in Fig. 1 as rotatably mounted in the jaws  $b^2$  and provided with antifriction-bearings, herein shown as comprising balls  $b^7$ , interposed between said supports  $b^6$  and the said jaws  $b^2$ , the supports being longitudinally held by means of nuts  $b^8$  on stems which project through bores in the jaws  $b^2$ . When the rotating members are employed, it is essential that they should be securely held from rotation when in operative position, and for this purpose the upper member is shown as provided with notches  $b^9$ , arranged to cooperate with a spring-latch  $b^{10}$  or other fastening device of any suitable or usual construction.

It will be seen from the foregoing description that the chuck embodying the invention is adaptable for articles of any size, is equally efficient for all articles even though they vary materially in shape and size, and is capable of manipulation substantially by a single movement and without the use of a wrench or tool. Further than this, the article placed in the chuck is unfailingly centered without care or attention, while T's or elbows may have projecting portions successively operated upon by revolving the engaging portions without loosening the chuck.

The chuck embodying the invention is arranged so as to be easily attachable to existing lathes, the actuating-lever and the parts carried thereby being shown as mounted on a bracket-piece D, arranged to be secured to the frame of the lathe, as by bolts  $D^2$ . To attach the chuck, therefore, it is only necessary



to pass the rod *c* through a suitable bore in the shaft *A*<sup>2</sup> and then screw the guide portion of the chuck upon the threaded end of the shaft, as shown in Fig. 1, the sleeve *c*<sup>4</sup> then being applied and the spring *c*<sup>43</sup> and collar *c*<sup>42</sup> placed in position to hold the rod. The bracket *D*, which has the other parts of the device connected therewith, may then be secured to the lathe-frame, after which the device is ready for use.

It is not intended to limit the invention to the specific construction herein shown, since modifications may be made without departing from the invention.

I claim—

1. A chuck comprising one member consisting of two or more guides inclined toward each other and another member consisting of jaws guided and supported by said guides, one of said members being movable with relation to the other; an intermediate connecting member secured to one of said members and movable with relation to the other; an actuating-lever connected with said intermediate member and adapted to move the same in either direction; and locking means cooperating directly with said actuating-lever to lock the same after the jaws are drawn together, as set forth.

2. A chuck comprising one member consisting of two or more guides inclined toward each other and another member consisting of jaws guided and supported by said guides, one of said members being movable with relation to the other; an intermediate connecting member adapted to move one of said members with relation to the other; a spring interposed between said intermediate member and the member which it is adapted to move; an actuating-lever connected with said intermediate member and adapted to move the same in either direction; and locking means cooperating directly with the said lever, as set forth.

3. In a lathe-chuck, the combination with the chuck members or jaws movable along guide-surfaces inclined to each other; of a rod concentric with the lathe-shaft and connected with said chuck members; a sleeve movable along said lathe-shaft and connected with said rod to produce a longitudinal movement thereof; an actuating-lever connected with said sleeve; and locking means cooperating directly with said lever, as set forth.

4. A chuck comprising guides inclined toward each other, chuck members guided and supported by the said guides, an actuating device for positively changing the position of said chuck members with relation to said guides, means for locking the said actuating device, and a rotatable jaw connected with each of said chuck members and provided with antifriction-bearings, substantially as and for the purpose described.

5. A chuck comprising guides inclined toward each other, chuck members guided and supported by the said guides, an actuating

device for positively changing the position of said chuck members with relation to said guides, means for locking the said actuating device, a rotatable jaw connected with each of said chuck members and provided with antifriction-bearings, and means for locking said jaws after they have been rotated to the desired position, substantially as described.

6. A chuck comprising guide members arranged at an angle to each other; chuck members guided and supported by said guide members; an intermediate connecting member secured to one of said sets of members to move the same with relation to the other; a lever connected with said intermediate member and adapted to move the same in either direction; an adjusting device for varying the position of the said intermediate connecting member with relation to said lever; and locking means cooperating directly with said lever to lock the same after the chuck members have been drawn together, as set forth.

7. In a chuck for lathes, the combination with a pair of guide members adapted to be connected with the lathe-shaft, the surfaces of said guide members being inclined toward each other and toward said shaft; chuck members movable along said guide members; a longitudinally-movable rod connected with said chuck members; a connecting member yieldingly secured to said rod and arranged to move the same with relation to the lathe-shaft; an actuating device for producing the movement of said connecting member; and means for locking the said actuating device, as set forth.

8. In a lathe-chuck, the combination with the chuck members movable along guide-surfaces inclined toward each other, of a rod concentric with the lathe-shaft and connected with said chuck members, a sleeve movable along the said lathe-shaft and having a yielding connection with said rod, and an actuating-lever connected with said sleeve by a toggle-joint, substantially as described.

9. A chuck comprising one member consisting of two or more guides inclined toward each other, another member consisting of jaws guided and supported by said guides, one of said members being movable with relation to the other; overlapping shields connected with said jaws; an actuating-lever connected with one of said members and adapted to move the same with relation to the other; and means for locking said actuating-lever after it has been moved in a direction to close the said jaws, substantially as described.

10. In a lathe-chuck, the combination with the chuck members movable along guide-surfaces inclined toward each other; of a rod concentric with the lathe-shaft and connected with said chuck members; an intermediate connecting member consisting of a sleeve movable along the lathe-shaft and having a yielding connection with said rod; an actuating-lever connected with said sleeve so as



to positively move the same in either direction and to thereby produce a corresponding movement of said rod; and locking means co-operating directly with said lever to lock the  
5 same after the chuck members have been drawn together, as set forth.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

WILLIAM SCOTT.

Witnesses:

H. J. LIVERMORE,  
NANCY P. FORD.