

(No Model.)

3 Sheets—Sheet 1.

C. H. BRADY.

CLAMP FOR HOLDING HOLLOW CYLINDERS.

No. 302,884.

Patented Aug. 5, 1884.

Fig. 1.

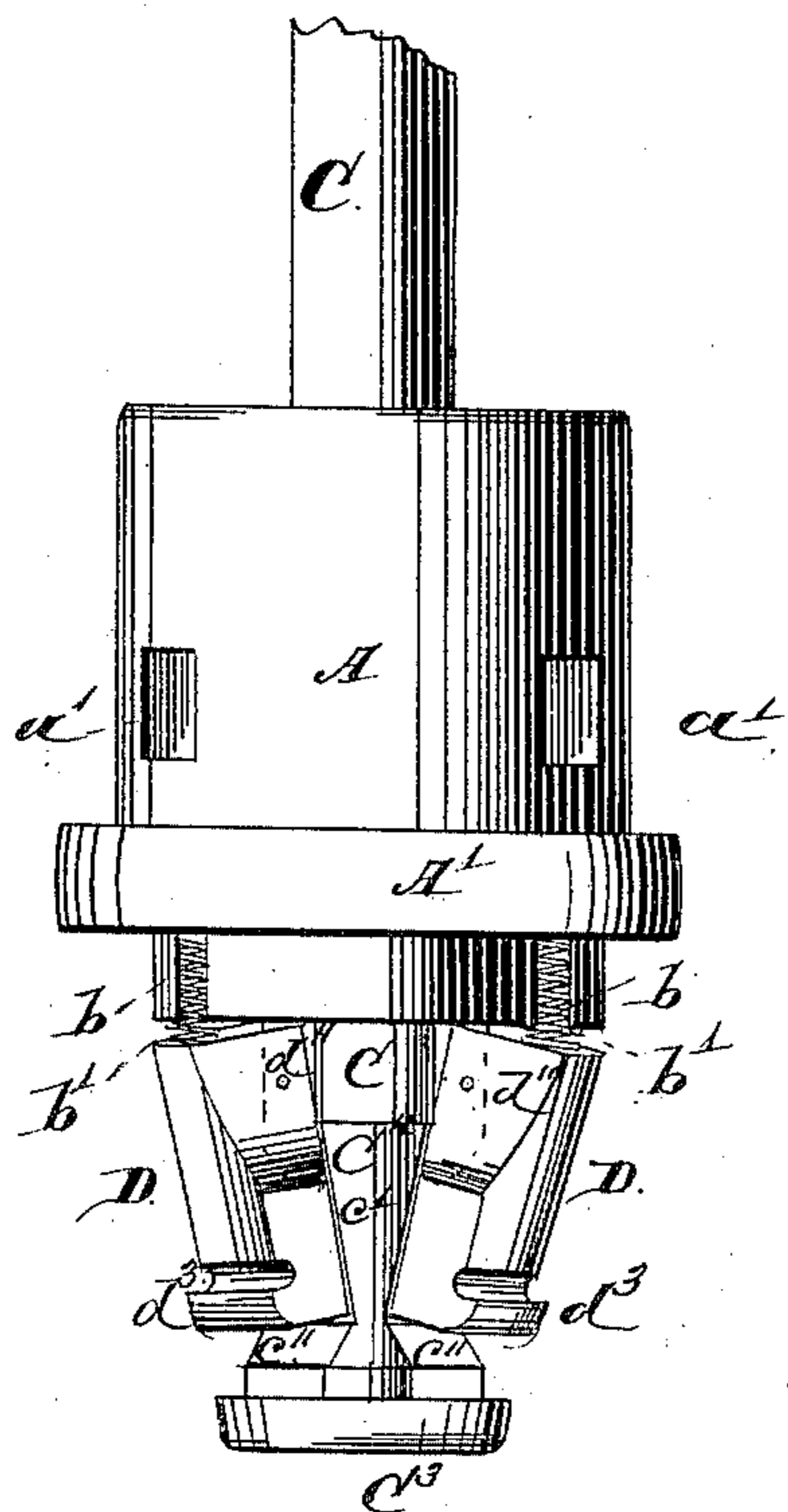


Fig. 2.

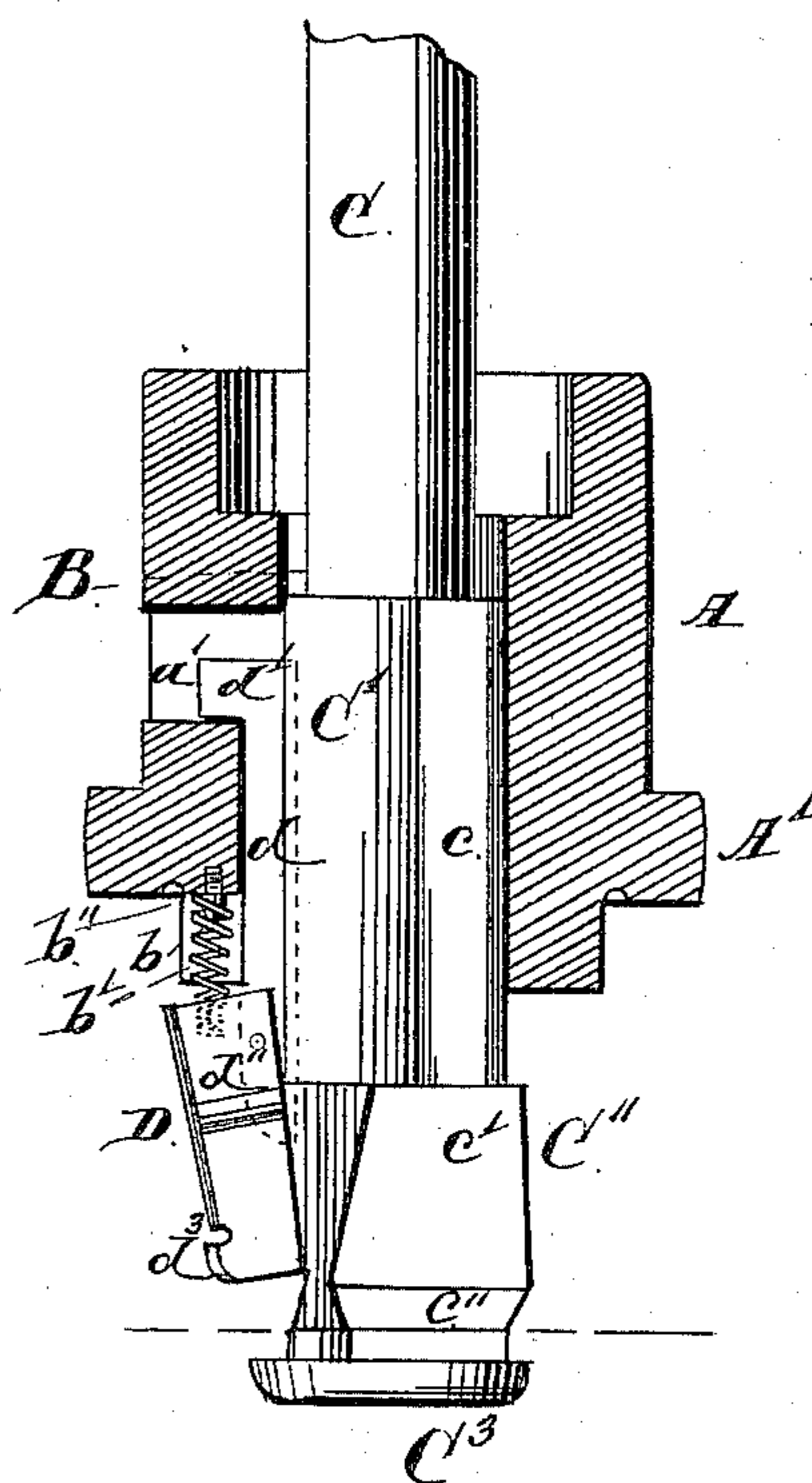


Fig. 3.

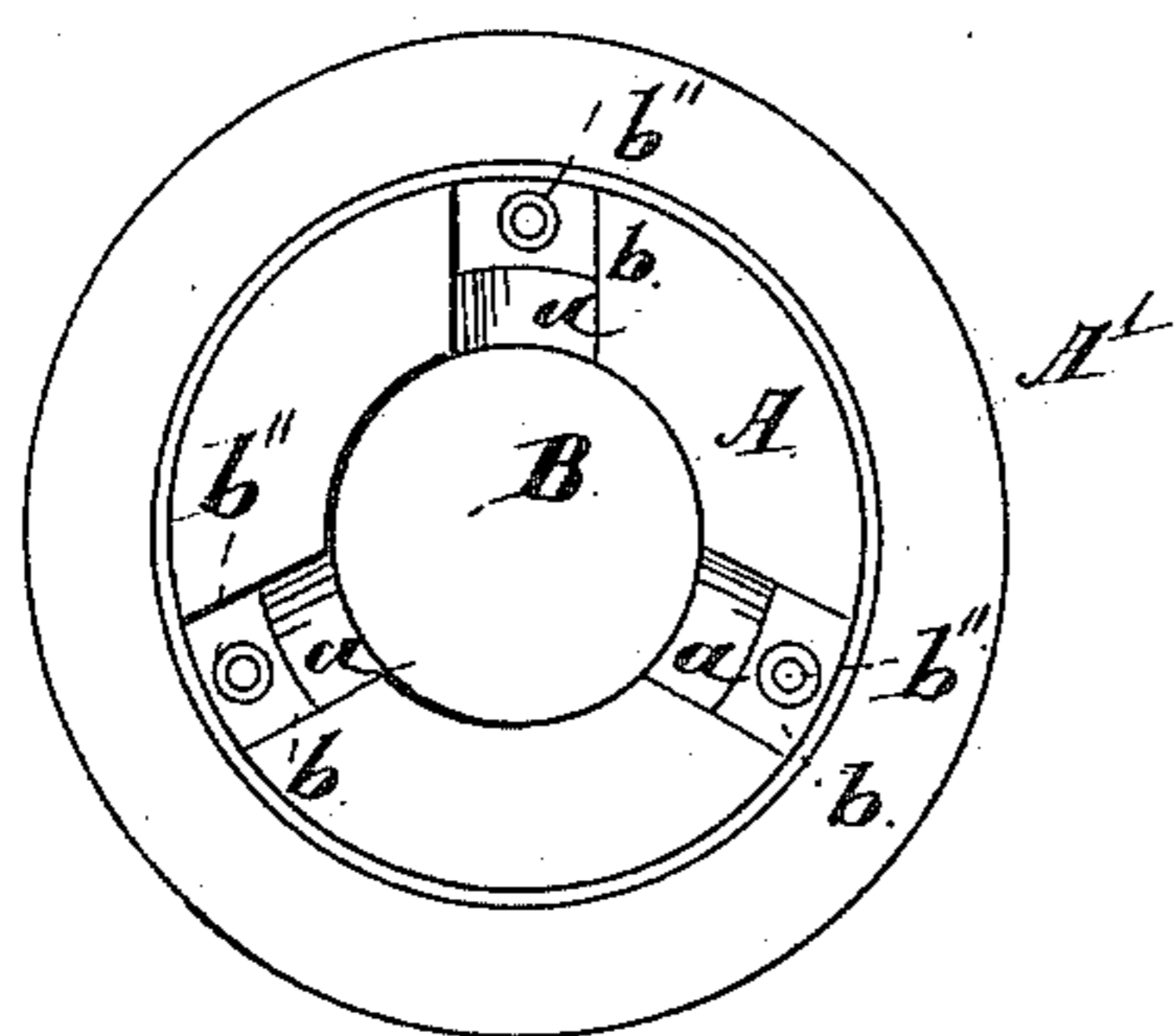
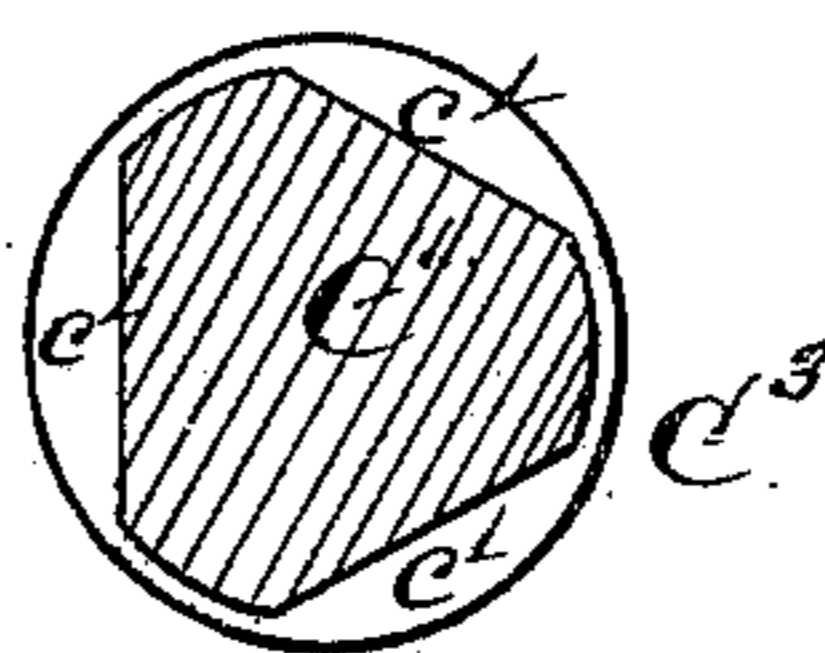


Fig. 4.



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Fig. 5.

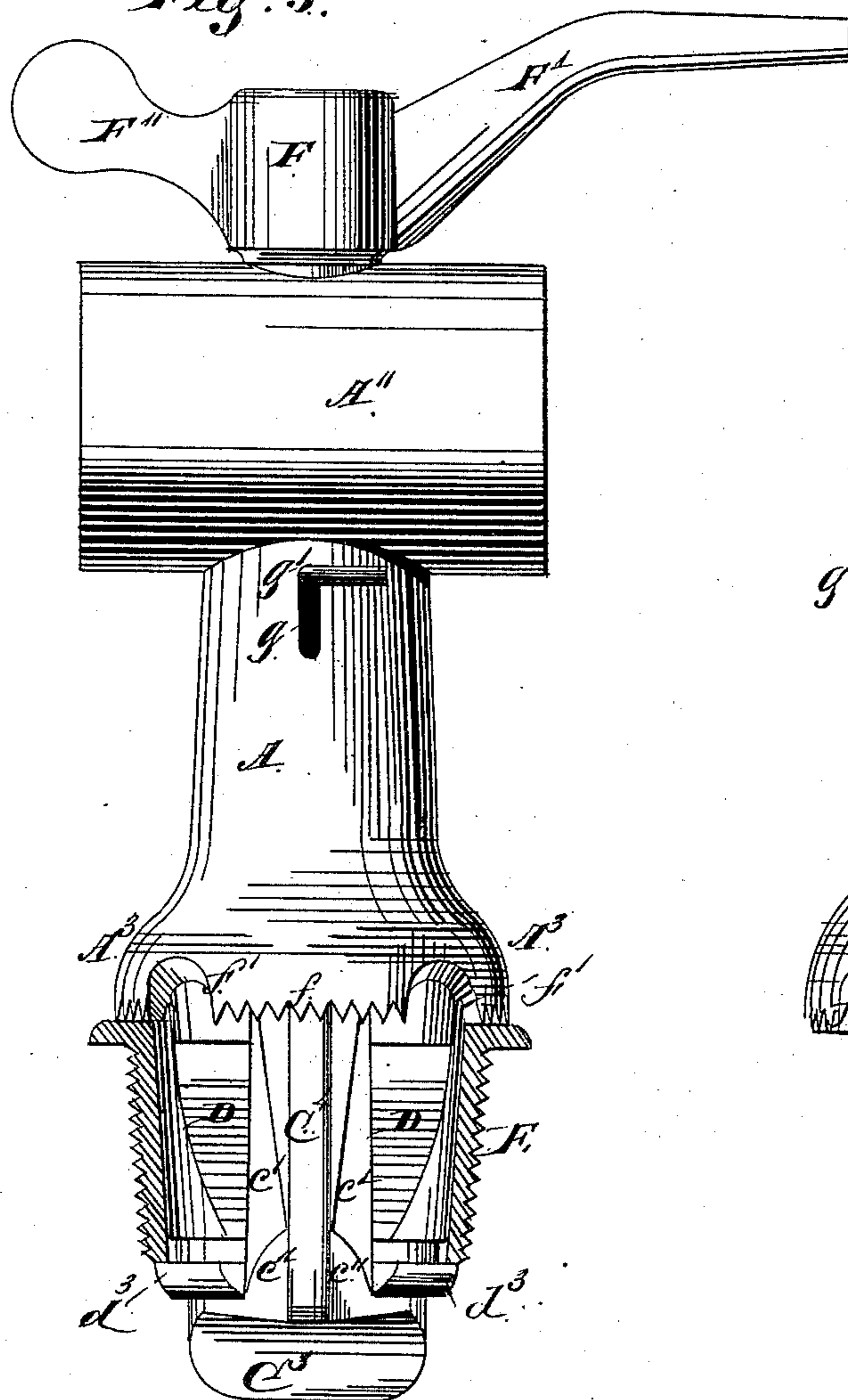


Fig. 6.

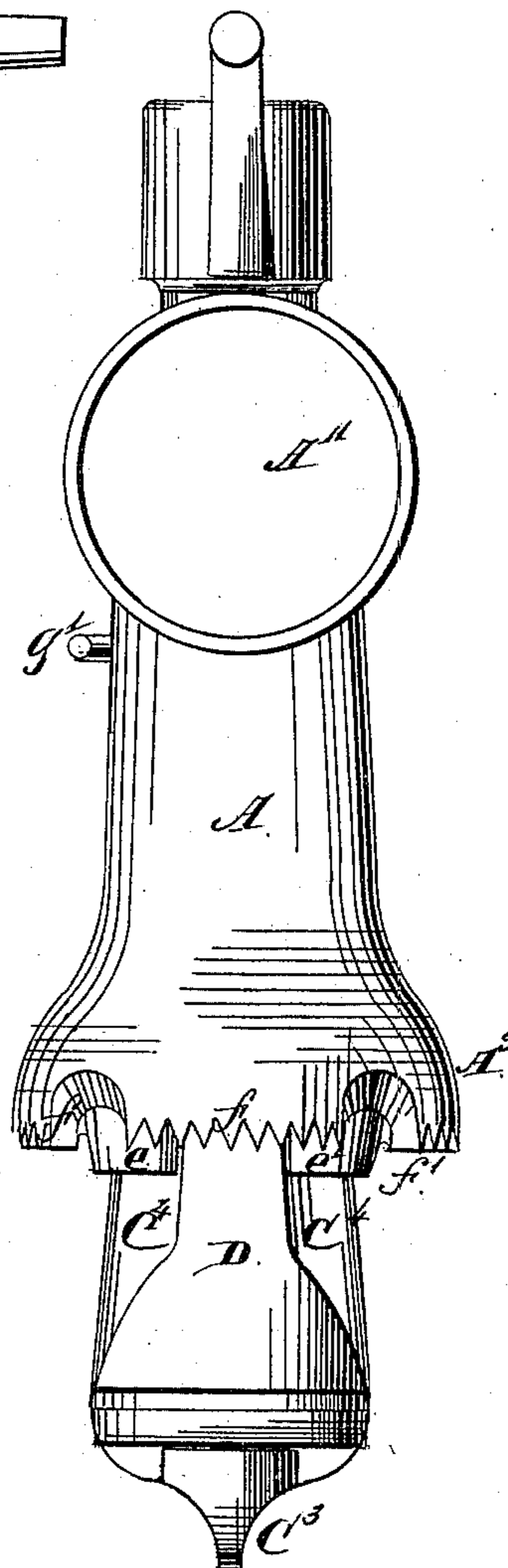
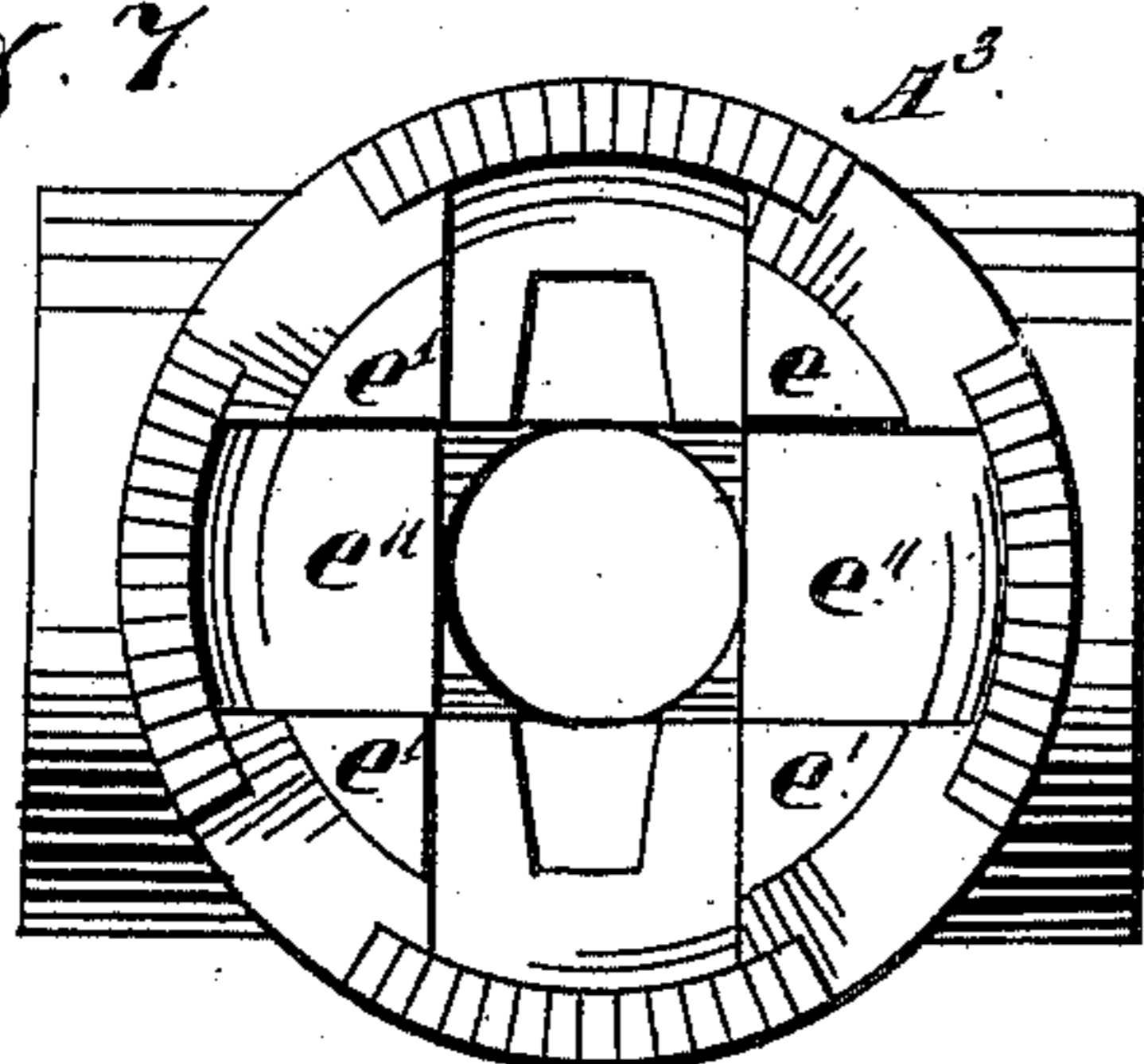


Fig. 7



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3 Sheets—Sheet 3.

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Fig. 8.

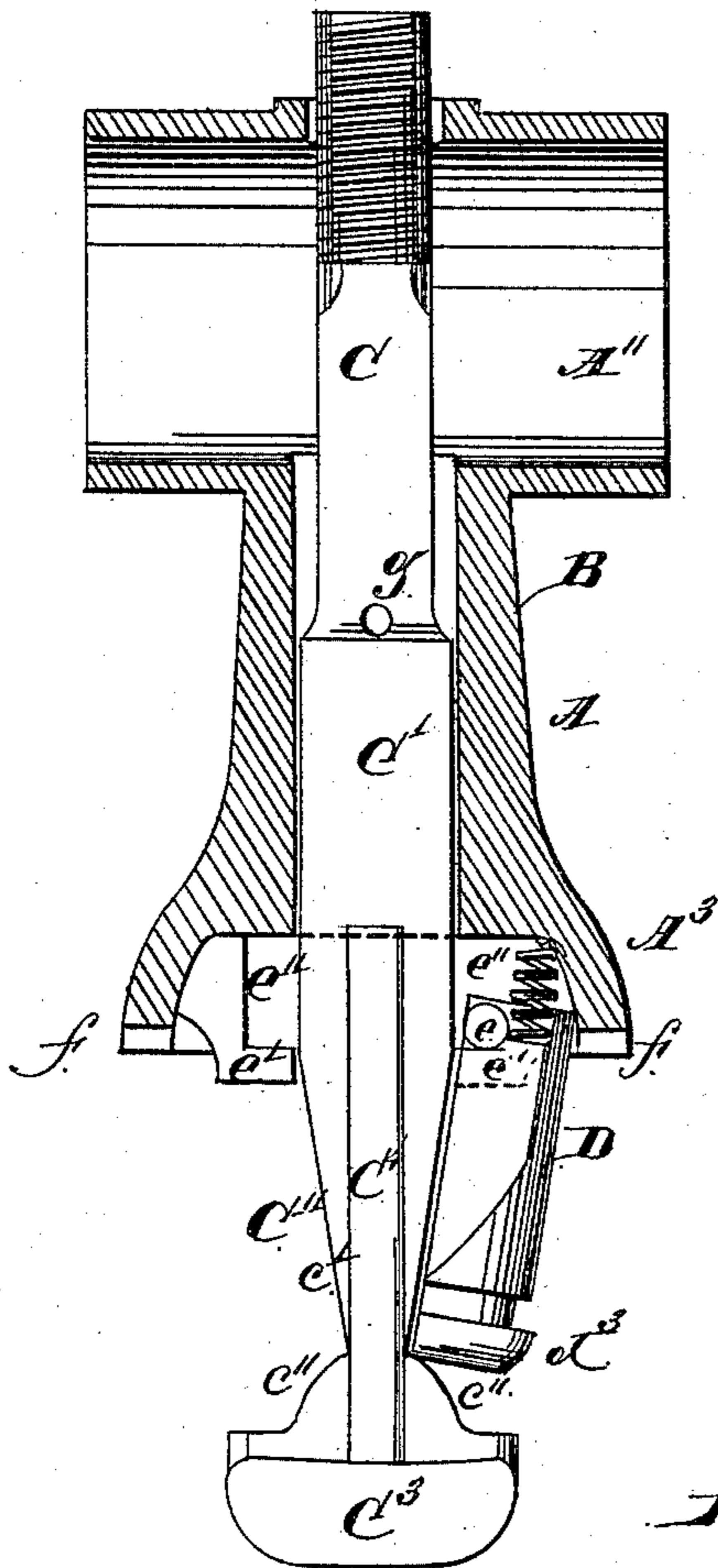


Fig. 9.

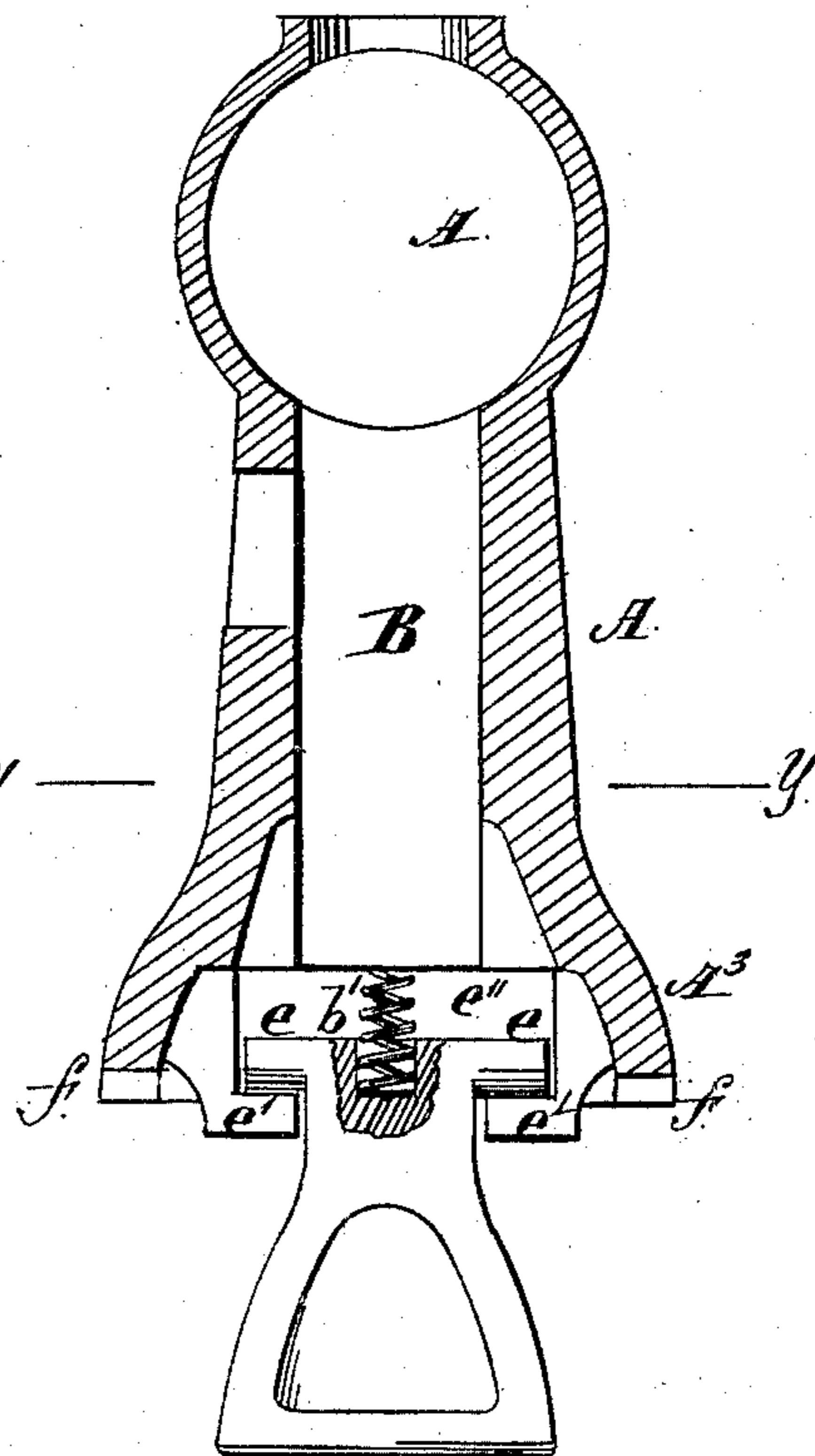
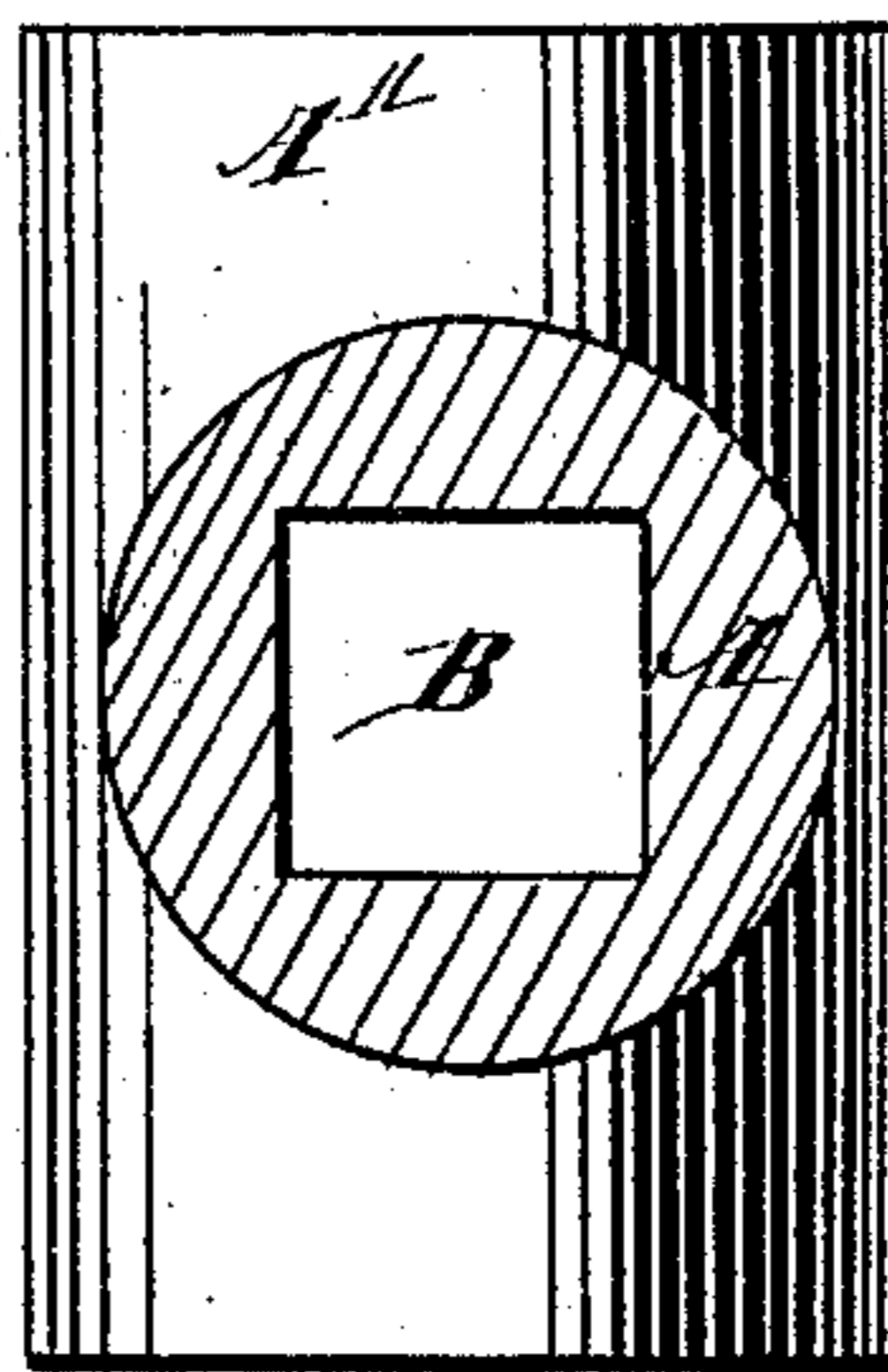


Fig. 10.



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UNITED STATES PATENT OFFICE.

CHRISTIAN H. BRADY, OF CHICAGO, ILLINOIS.

CLAMP FOR HOLDING HOLLOW CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 302,884, dated August 5, 1884.

Application filed August 6, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN H. BRADY, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Clamps for Holding Hollow Cylinders, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation showing the form of clamp designed for use with a lathe; Fig. 2, a longitudinal section of the exterior or head and an elevation of the leaves or jaws with their operating-cam, one leaf or jaw only being shown; Fig. 3, an elevation of the jaw end of the exterior or head; Fig. 4, a cross-section of the acting or cam end of the shaft or stem; Figs. 5 and 6, side elevations showing the form of clamp for use as a wrench; Fig. 7, an end elevation of the exterior or head shown in Fig. 5, with the jaws, the cam-stem, and the bushing removed; Fig. 8, a section on the exterior or head, with the cam shank or stem and the jaws in elevation, one jaw only being shown; Fig. 9, a section of the exterior or head, showing one of the jaws in position with the cam stem or shank removed; and Fig. 10, a cross-section on line *yy* of Fig. 9.

The object of this invention is to construct a clamping device by which hollow cylinders will be held firmly and securely, so as to rotate with the clamp for various purposes; and it is primarily designed for use in threading bung-bushes, and for holding and inserting bung-bushes in barrels, casks, and other vessels; but can be used for various purposes where it is desired to hold hollow cylinders firmly to be operated upon or to be otherwise manipulated; and its nature consists in providing an exterior or head having a central longitudinal opening for the passage of a sliding shank or stem, which shank or stem at the acting end is provided with inclined or cam surfaces to act upon jaws or leaves hung or suspended from the exterior or head, and force such jaws or leaves outward to center the cylinder, and by such endwise movement of the shank or stem have the cylinder at the ends firmly caught and clamped, as hereinafter more specifically described, and pointed out in the claims.

In the drawings, the figures on Sheet 1 illus-

trate a form of clamp designed more particularly for holding a hollow cylinder to be operated upon by tools, either in a lathe or other machine, while the figures on Sheets 2 and 3 illustrate a form of clamp designed more particularly for use as a wrench for inserting bung-bushings and other hollow cylinders; but it is to be understood that either form can be used for either purpose.

The form illustrated on Sheet 1 will be first described.

A represents a head or support of a cylindrical form with a straight exterior, having at the acting or jaw end a flange or bead, *A'*, for clamping purposes, the acting or jaw end, as shown, being of a somewhat less diameter than the remaining portion.

B is a central longitudinal opening through the head, of a circular form, and adapted for the passage of a round stem or shank.

C is the stem or shaft, having the portion which enters the head enlarged somewhat, but corresponding in diameter to the diameter of the opening B, leaving, however, sufficient play for a free movement of this portion C' in the head endwise. The acting end C'' of this stem or rod is three-sided, or has three faces, *c'*, each face being inclined from the exterior downward and inward, and being provided at the terminus of its incline inward with a short outward incline, *c''*, forming a wedge or cam, and the exterior end of this acting end C'' is provided with a flange or rim, *C'*, of a greater diameter than the diameter of the end C'' through its widest part, to form a ledge which projects beyond the exterior of the end C''.

D is the jaws, each having a circular exterior face and a straight interior face and located to occupy the inclined faces *c'* of the acting end C'' of the rod or stem, a jaw being provided for each face *c'*, three jaws in all being used. Each jaw or leaf is provided at one end with a stem or support, *d*, to the end of which the jaw is pivoted by a suitable pin or pivot, *d''*. Each stem *d* on one side enters a groove, *e*, formed in the enlarged portions C' of the stem or shaft, and on the opposite side enters a groove, *a*, formed in the interior of the head A, three grooves, *e*, being provided in the portion C' and three in the head A, one for each of the stems, which grooves, when the parts are together, coincide, so as not to

interfere with the movement of the stem or rod by the binding or sticking of the stems in their grooves. The end of each stem which enters the head has a projection, d' , which enters a slot, a' , formed transversely in the head A, a slot being provided for each stem, and these slots are longer than the length of the projection d' , to permit limited end-play of each stem. Each jaw at its free end is provided with a flange or rim, d^3 , projecting somewhat beyond the exterior face of the jaw, and each jaw at its pivoted end is acted on by a spring, b' , one end of which bears against the end of the jaw and the other encircles a pin, b'' , in the bottom of a slot, b , formed in the end of the head A, in which slot the spring is located and held. The jaws are free to turn on their pins or pivots d'' , and are thrown inward by the action of the spring b' , and are forced outward by the engagement of the inclines or cams c'' with the free end of the jaws as the stem or shaft is moved endwise.

The parts are put together by inserting the stems d in their respective grooves a in the head A, with the ends d' of the stems in the openings a' , the springs b' being in their slots b , so as to bear on the end of the jaws D, which jaws are suspended by their stems d from the head. The shaft or stem C is then passed through the opening B in such manner as to bring the grooves c in the portion C' for the stems d to enter the grooves c , respectively, and it will be noticed that the grooves c and the grooves a , in conjunction with the stems d , form a lock by which the head A and the shaft or stem C are connected together, and when together the acting end C' of the shaft or stem will have one of its inclined faces, c' , in line with each jaw D, as shown in Figs. 1 and 2, which brings the cam or incline c'' of each face c' in position to engage the free end of the respective jaws D, so that as the rod or stem is forced inward these inclines or cams will act and force the jaws outward.

In use the shank or stem C, which is not shown of full length, but is broken off, is to be provided with a screw-thread to receive a nut, by means of which the rod or stem can be moved endwise. The hollow cylinder to be operated upon is placed in position around the jaws D, and these jaws are then forced outward by the action of the cams or inclines c'' , causing them to act and properly center and true the hollow cylinder in position around the jaws, to be clamped and firmly held between the ledge d^3 on the jaws and the flange or rim A' on the head by the force exerted on the end of the jaws from the sliding stem or rod. The lathe or other machine is then started, and the bushing or other hollow cylinder which is held by the clamp is screw-threaded, or otherwise operated upon, and when the operation is completed the shaft or stem is forced in the opposite direction, releasing the cams or inclines c'' from their contact with the free ends of the jaws, allowing the springs b' to act and throw the jaws in,

leaving the cylinder free to be removed, and another cylinder can be placed in position, and likewise locked and operated upon, and so on.

As shown in the figures on Sheets 2 and 3, the head or support A is of a cylindrical form, having a tapering exterior, with a flaring portion, A³, at the acting or jaw end. The opposite end of this head is provided with a socket, A'', to receive a handle or lever for operating the clamp as a wrench. As shown, the acting or jaw end of the head is provided with serrations or teeth f , and with notches f' , the serrations being for the purpose of biting against the end of the bushing or cylinder, and the notches being for the purpose of removal in case of binding or sticking between the clamp and the object operated on. If desired, however, this edge of the head might be left straight and plain. As shown in this form of construction, the opening B in the head A is square, and the stem or shaft C is of like shape, but may be round, with that portion C' which enters and fits the opening B square in cross-section, corresponding to the opening B; and by making the opening and the portion C' square the stem and head are thereby locked together, so as to rotate one with the other. The acting end C' of the shank or stem in this form of construction is provided with two inclined faces, c' , located on opposite sides of the end C'', each inclined face c' having an outward incline or cam, c'' , and, as shown, the two sides of the end C'' which are not inclined are each provided with a rib, C', for strengthening purposes, and the extreme end of the end C'' is provided with a flange, C³, of greater diameter than the size of the portion C' in cross-section. In this form of construction two jaws, D, only are employed, one for each face c' , and these jaws, instead of being pivoted to and suspended by a stem, d , are provided on their inner end with journals e , which, when the parts are together, rest upon ledges e' , formed on the interior of the head A, as shown in Figs. 7, 8, and 9, the pivoted end of the jaw entering the opening e'' , of sufficient width and depth for the location of the journals and the end of the jaw, and in this opening is located the spring d' , one end of which bears on the end of the jaw, and the other bears against the face of the head in the opening e'' . These jaws are similar in construction to the jaws on Sheet 1, except that they are somewhat wider at the receiving end, for the purpose of covering more of the interior surface of the cylinder than would a jaw of the size shown on Sheet 1.

E, Fig. 5, is a bung-bushing located in position on the clamp ready for insertion, the jaws being extended to center and true the bushing.

F is a nut working on the screw-threaded end of the stem C, and having, as shown, a handle, F', and a thumb-piece, F'', by means of which it is operated. This nut works against the upper face of the socket A'' when turned

in the proper direction, and draws the stem or shank inward, forcing the jaws D outward by engagement of the inclines c'' with the free end of the jaws. As shown, the head A has a slot, 5 g , through which a pin, g' , passes, the end of which pin enters an opening, g'' , in the stem or shank C, and is for the purpose of preventing the stem or shank from slipping out of the head or dropping too far in case the nut F is 10 removed or turned backward farther than required for the inclines to pass away from the jaws.

The parts are put together by inserting the journals of the jaws in the recess or cavity e'' 15 therefor, so as to rest upon the ledges or supports e' , and the stem is passed between the jaws and through the opening B in the head and the nut F, screwed onto the threaded end of the stem.

20 In use the bush to be inserted is placed around the jaws D, and the jaws forced outward by turning the stem endwise by means of the nut F, which causes the inclines c'' to engage the free end of the jaws and guide the 25 bush evenly around the jaws, to be held firmly by the ledges d^3 and the end of the head A, as shown in Fig. 5. A handle or lever is inserted in the socket A'', and the device turned, thereby screwing the bushing to place. The 30 jaws in either case can be suspended in some other manner than that shown, so long as they are free to be forced outward at one end to center and true the cylinder, and a square stem or rod could be used with the form of 35 construction shown on Sheet 1, and a round stem with the form of construction shown on Sheets 2 and 3; or that portion of the stem which enters the head could be of some other form than round or square in cross-section; 40 and where the round stem is used a spline or other device must be used to lock the head and stem together; and by using a stem, d , to pivot the jaws to, and having such stem enter grooves in the head and shank or rod, such 45 stem forms splines by which the head and shank are interlocked; and the exterior form of the head and the locating of the springs, and the form of springs by which the jaws are thrown in, can be varied from those shown 50 without departing from the spirit of the invention, which is combining a body or head and a sliding shank or stem having at its terminal end inclines, with jaws pivoted or hung from the head to be acted upon by the terminal 55 inclines as the shank or stem is moved endwise and forced outward to center and true the cylinder, without producing a straining pressure on the interior of the bush that will burst or break it, but simply to form a 60 guide and support or backing to keep the cylinder properly centered.

The force by which the cylinder is held firmly is produced by the pressure exerted from the sliding stem or shank, which clamps 65 the bush between the ledges d^3 on the ends of the jaws and the end face of the head or the flange A'; and it will be noticed that this force

is applied to the ends of the cylinders, and it cannot produce any expansion that will burst the cylinder, and can only be injurious when 70 it is of sufficient power to crush the cylinder bodily, which amount of power will never be required for holding purposes.

As shown, the clamping-ledge d^3 is continuous on the exterior of the jaw; but it is evident that lugs or projections could be used in 75 place of a continuous ledge; and it is also evident that the ledge or projection on the end of the jaw might be dispensed with and the enlarged flange or head C³ of the stem or shank 80 be made to engage the end of the cylinder and do the clamping.

The cavity e'' in the head, which receives the journaled end of the jaws, and the slot a' in the head, which receives the end of the stem 85 d when the stem is used, should be of sufficient depth to allow an end play of the jaws and stem or shank, to firmly impinge the ends of the cylinder against the contact-faces by which it is held. 90

What I claim as new, and desire to secure by Letters Patent, is—

1. A clamp for centering and holding hollow cylinders, combining in its structure a head, A, having an end face, a sliding stem, 95 C, having its end C' provided with inclines c'' , and jaws D, pivoted to the head, said inclines acting to spread the jaws for centering the cylinder, and jaws constructed at their free ends to clamp the cylinder endwise against 100 the end face of the head by the end-pressure between said head and the free ends of the jaws, substantially as described.

2. The combination, in a clamp for centering and holding hollow cylinders, of a head, 105 A, a sliding stem, C, having its end C' provided with inclined faces c' , and cams or inclines c'' , jaws D, pivoted to the head, and each provided with a flange, d^3 , at its free end, and springs b' , acting on the jaws, said inclines 110 acting to spread the jaws for centering the cylinder, and the flanges on the free ends of the jaws acting to clamp the cylinder endwise against the end face of the head by the end-pressure between the flanged ends of the jaws 115 and the end of the head, substantially as described.

3. The combination, in a clamp for centering and holding hollow cylinders, of a head, A, a sliding stem, C, having its end C' provided 120 with inclines c'' , jaws D pivoted to the head, and each provided at its free end with a flange, d^3 , and springs b' , acting on the jaws, said inclines acting to spread the jaws for centering the cylinder, and the free ends of the jaws acting 125 to clamp the cylinder endwise by the end-pressure between the flanged ends of the jaws and the end face of the head, substantially as described.

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