

(No Model.)

E. H. VOGEL.
CHUCK.

No. 573,189.

Patented Dec. 15, 1896.

Fig: 1.

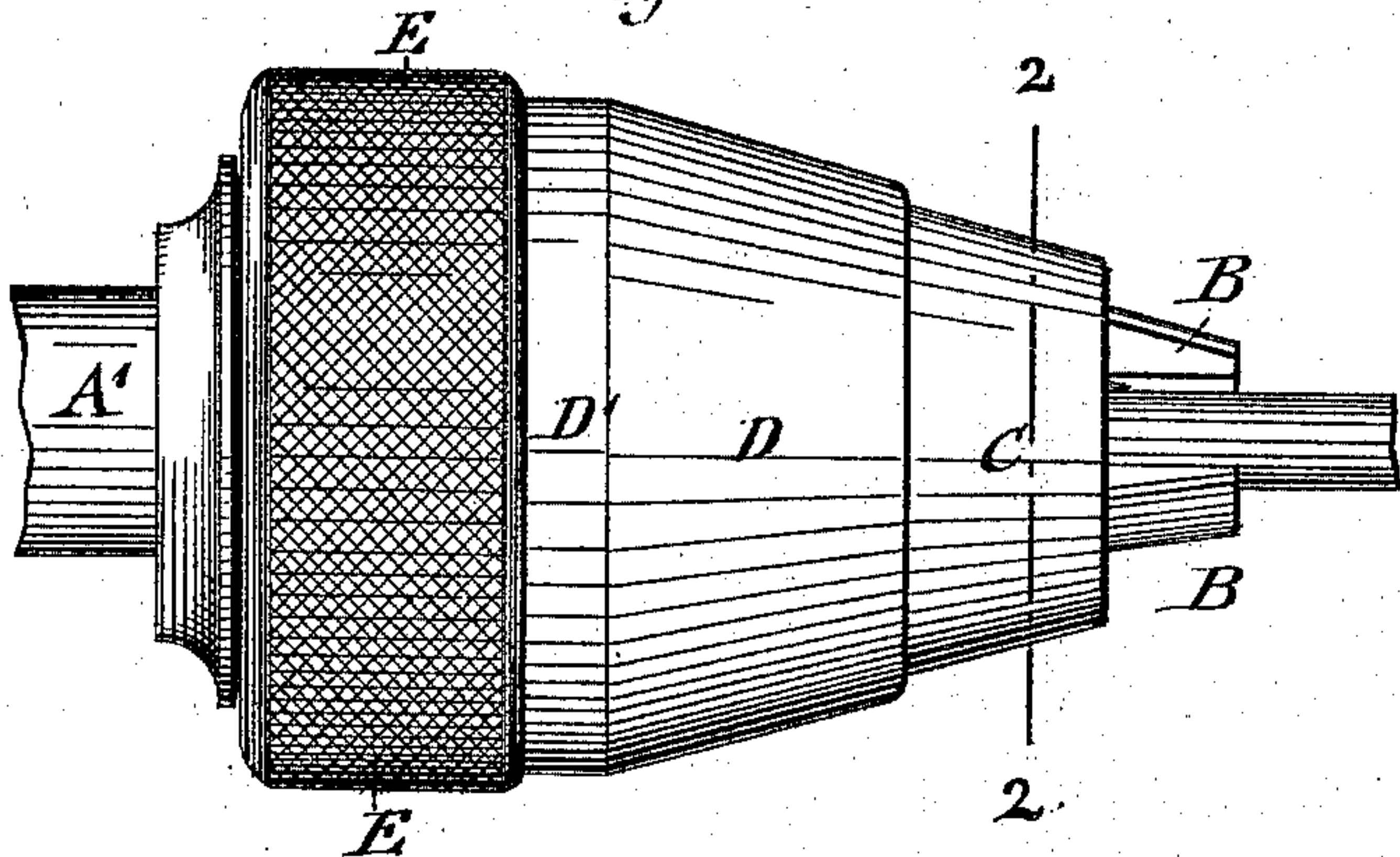


Fig: 2.

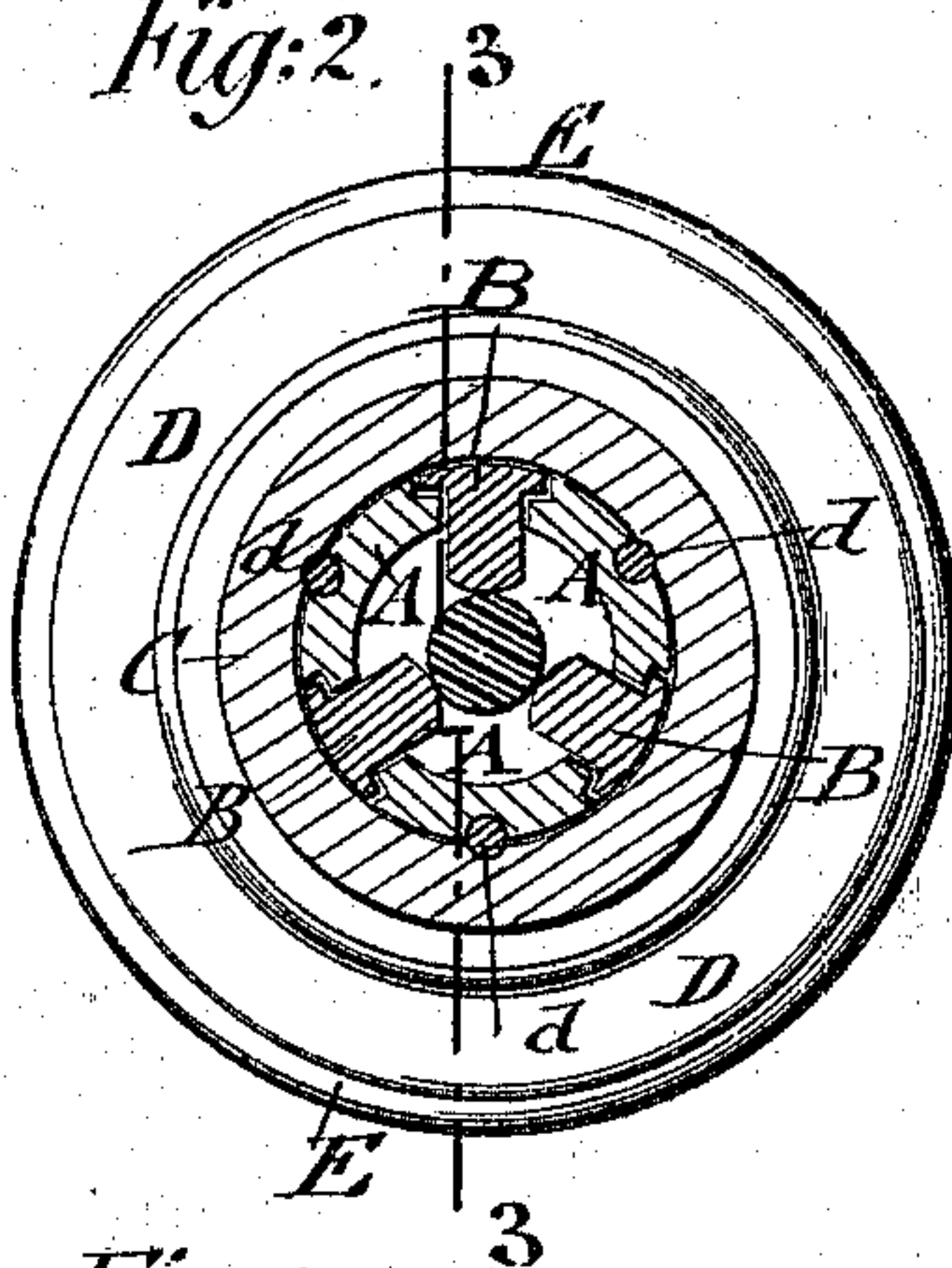


Fig: 3.

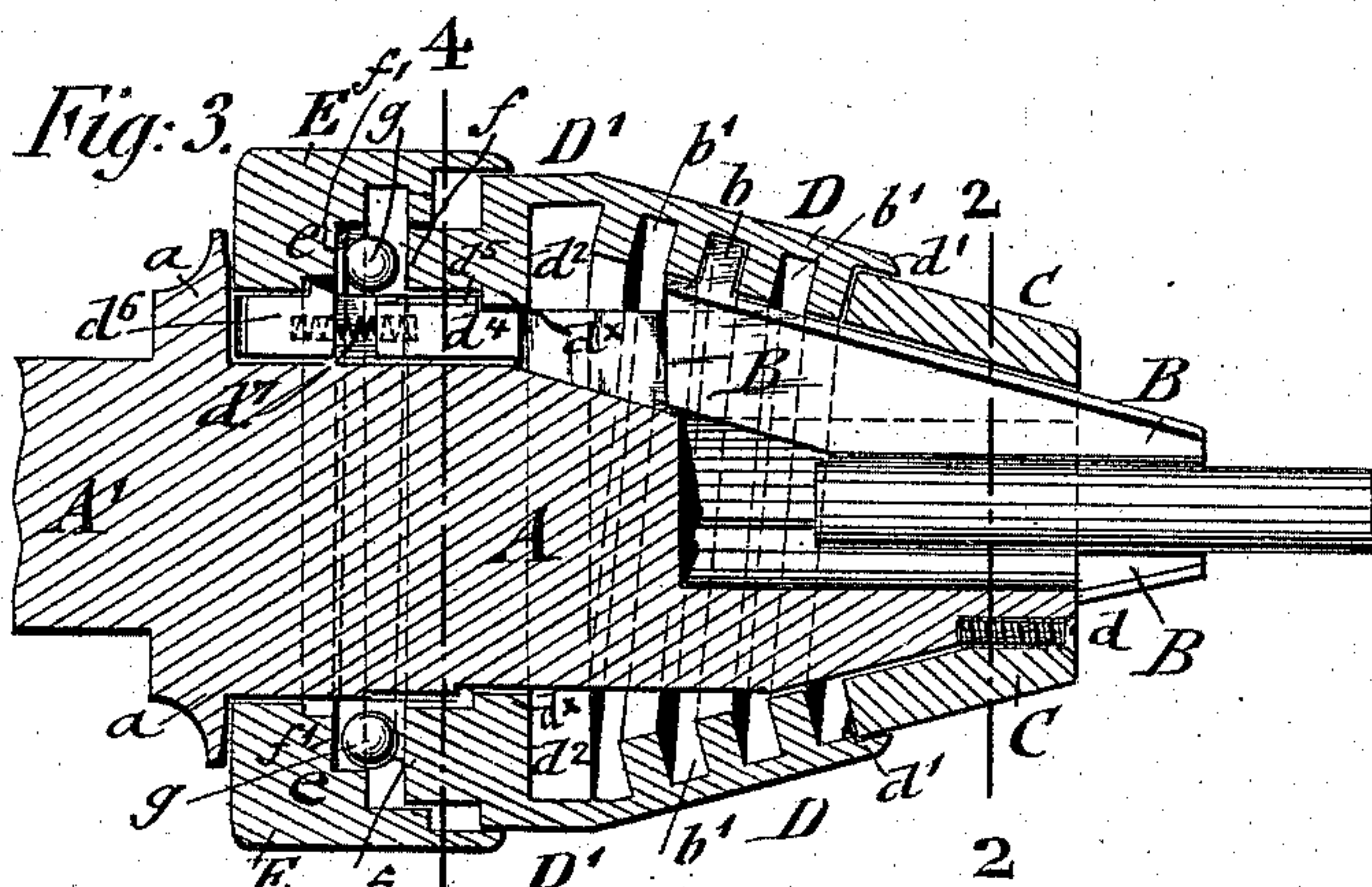


Fig: 4.

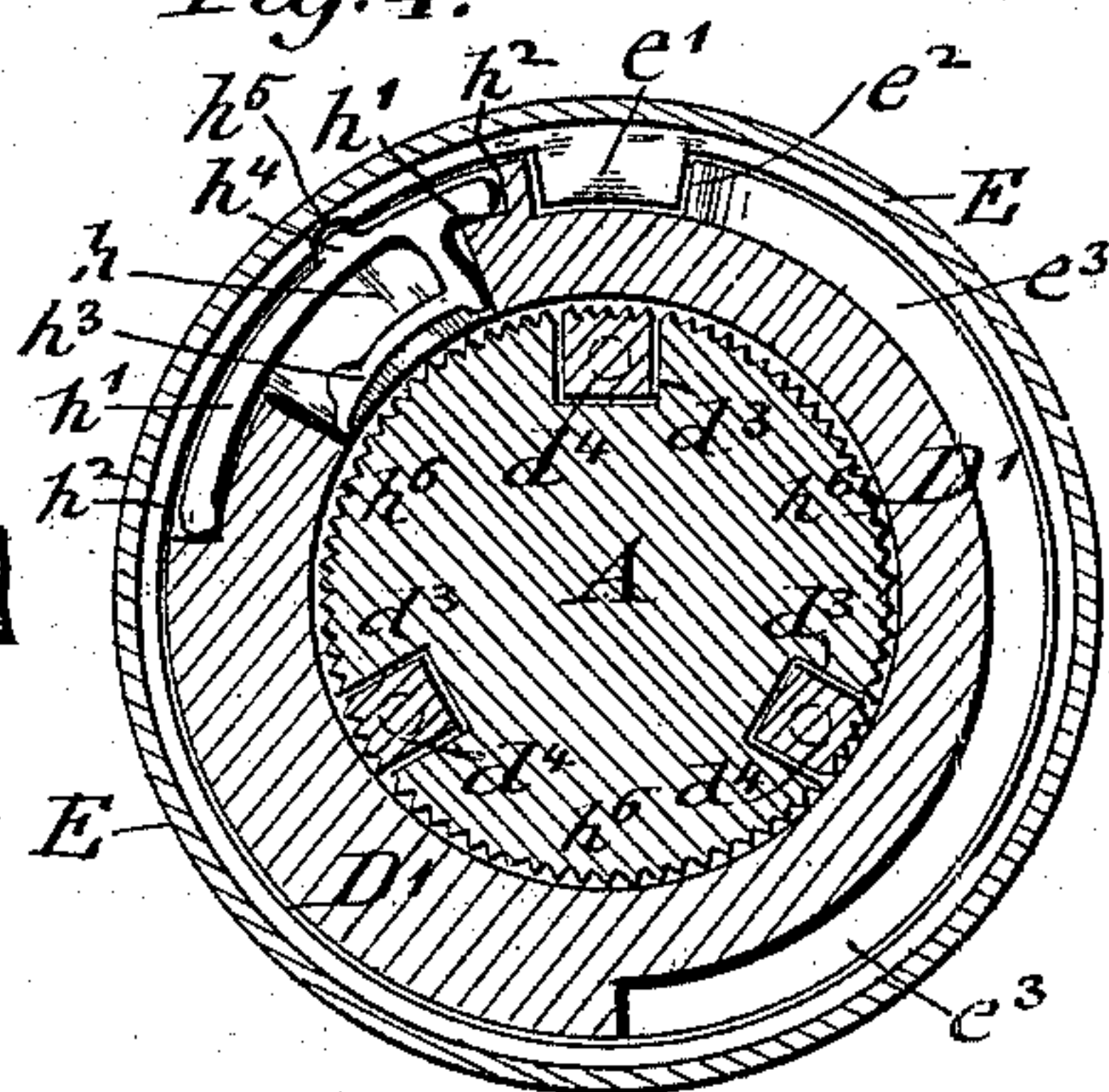


Fig: 6.

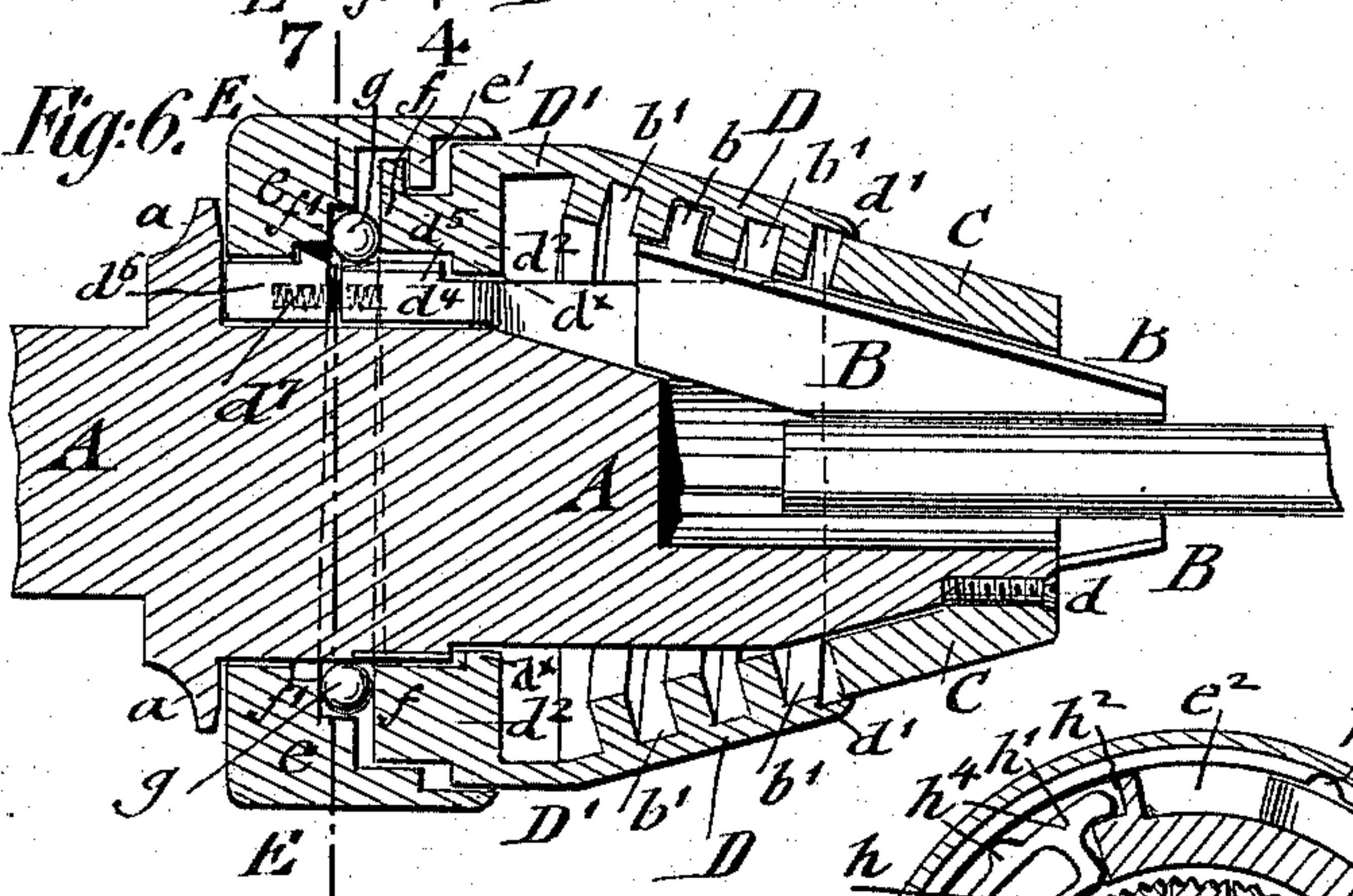
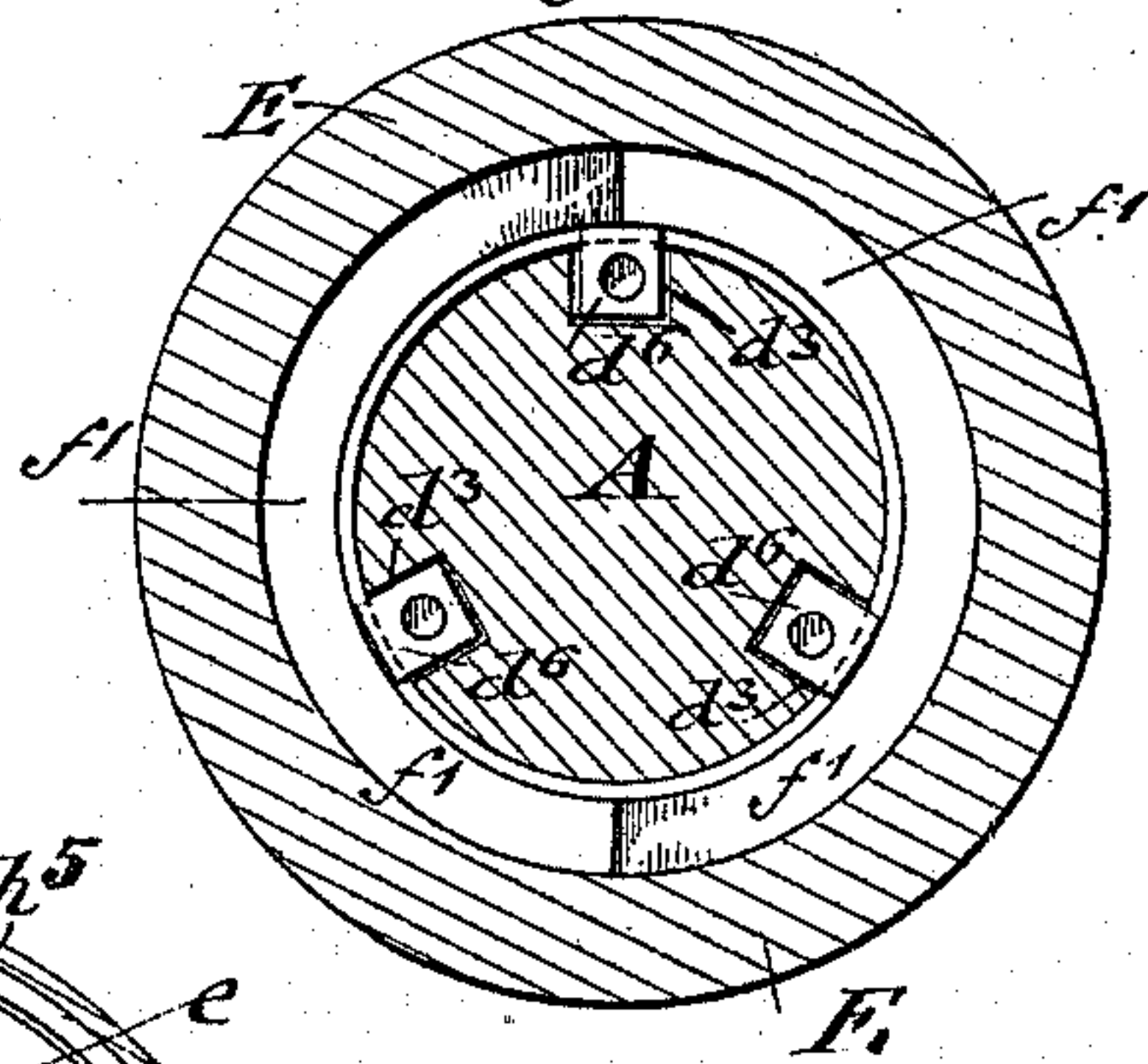


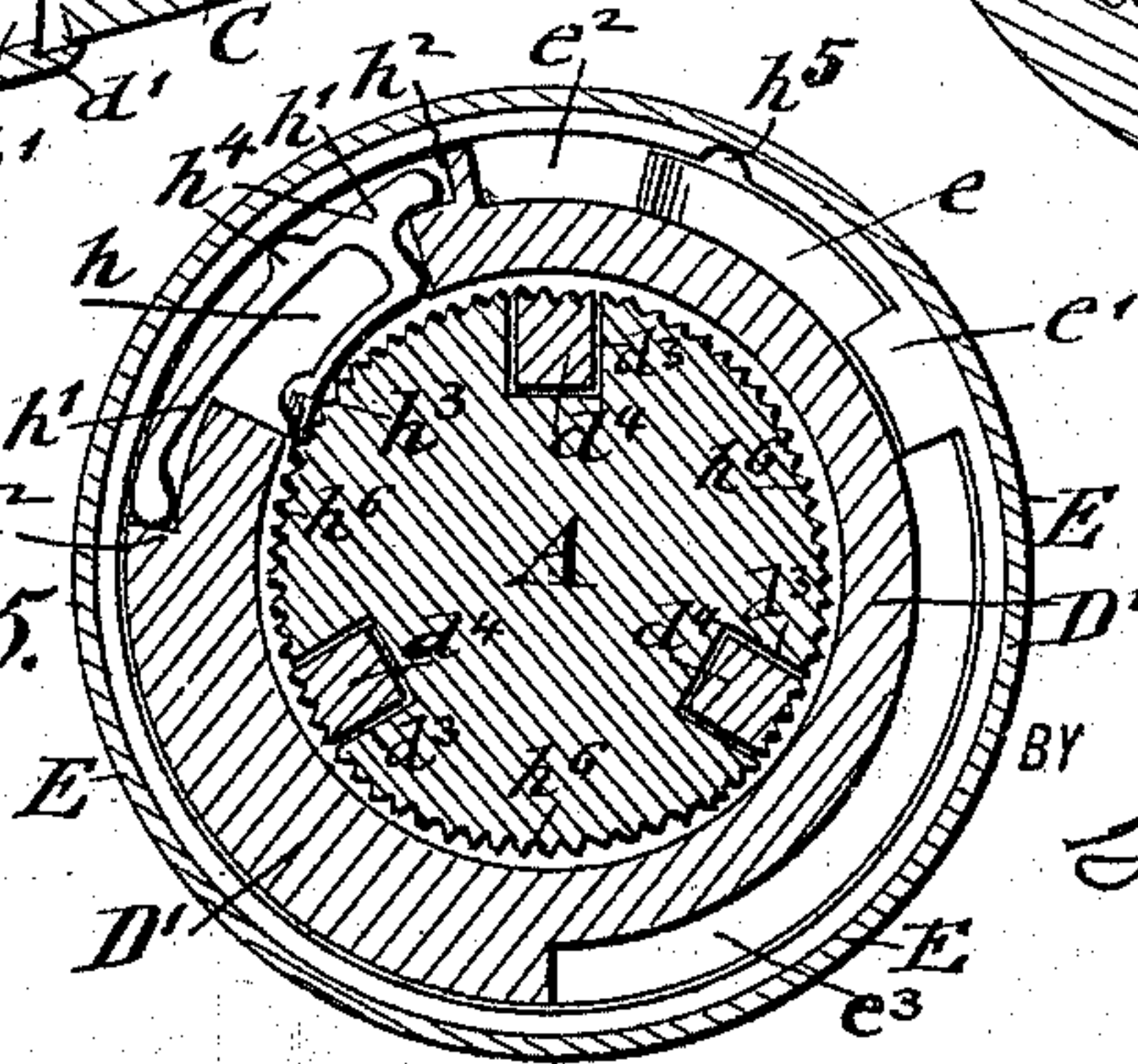
Fig: 7.



7
WITNESSES:

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Fig: 5.



INVENTOR

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BY

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

ERNEST H. VOGEL, OF NEW YORK, N. Y.

CHUCK.

SPECIFICATION forming part of Letters Patent No. 573,189, dated December 15, 1896.

Application filed February 11, 1896. Serial No. 578,829. (No model.)

To all whom it may concern:

Be it known that I, ERNEST H. VOGEL, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Chucks, of which the following is a specification.

This invention has reference to certain improvements in chucks of that class which can be set or unset without the use of a wrench and in which the jaws are guided in inclined grooves of a conical center piece in forward or backward direction and applied to the tool to be held by a primary setting action and retained thereon by a final setting action; and the invention consists of a chuck which comprises jaws guided in inclined grooves of the supporting center piece, an exterior conical sleeve that engages by an interior screw-thread lugs on the jaws, an axially-turning handle-ring engaging the cylindrical rear portion of the sleeve, spring-cushioned blocks arranged in recesses of the handle-ring and a shoulder of the rear portion of the conical sleeve, inclined cam-faces on the shoulders of the rear portion of the conical sleeve and of the handle-ring, and a pawl-and-ratchet mechanism interposed between the handle-ring, sleeve, and the center piece, so as to produce the locking of the sleeve after the final adjustment of the jaws has been accomplished, as will be fully described hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of my improved chuck. Fig. 2 is an end view of the same, partly in vertical transverse section, on line 2 2, Figs. 1 and 3. Fig. 3 is a vertical longitudinal section of the chuck on line 3 3, Fig. 2. Figs. 4 and 5 are vertical transverse sections on line 4 4, Fig. 3, showing the parts in position respectively before and after the final setting action is imparted to the jaws. Fig. 6 is a vertical longitudinal section of the chuck, showing the position of the parts after the final setting action of the jaws; and Fig. 7 is a vertical transverse section on line 7 7, Fig. 6.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the center piece, and B B the jaws, of my im-

proved chuck. The clamping-faces of the jaws B B are arranged parallel with the axis of the chuck, while the shank portions are arranged at an angle of inclination toward said axis and guided in correspondingly-inclined grooves of the conical end of the center piece A. A guide-cone C is attached by screws d d to the front end of the center piece A, as shown clearly in Figs. 2 and 3. Each jaw B is provided at its rear end with a lug b , which forms a portion of a screw-thread and which is engaged by the interior spiral groove b' of a conical sleeve D, that extends by a flange d' at its front end over the stationary guide-cone C, as shown in Figs. 3 and 6. The rear portion D' of the conical sleeve D is made cylindrical, said cylindrical portion D' being provided with an interior collar d^2 , having a semicircular groove c^3 .

The center piece A is provided with recesses d^3 , in which are arranged spring-cushioned blocks d^4 , that are provided with shoulders d^5 , that abut against a shoulder d^x of the collar d^2 of the cylindrical portion of the sleeve D. A second set of blocks d^6 is arranged in line with the blocks d^4 in the recess d^3 of the center piece, said blocks d^4 and d^6 being provided in their adjacent portions with sockets, in which helical cushioning-springs d^7 are placed, by which the blocks are forced in opposite direction to each other. A handle-ring E is guided on a fixed collar a of the center piece A and on the rear portion D' of the sleeve D and provided with an interior step-shaped collar e , against the innermost step of which the exterior shoulders of the block d^6 abut, so that said blocks d^6 are engaged by the handle-ring E in the same manner as the blocks d^4 by the cylindrical portion of the sleeve D. The collar a on the center piece A serves to guide the handle-ring E in its motion around the axis of the chuck. The rear end of the shoulder d^2 of the cylindrical portion D' of the sleeve D is provided with inclined cam-faces f , which are located opposite to corresponding cam-faces f' on the collar e of the handle-ring E, as shown in Fig. 7. Between the two cam-faces f f' of the collar d^2 of the sleeve D and collar e of the handle-ring E are interposed antifriction-balls g , by which the friction between the cam-faces f f' is reduced. The handle-ring E is pro-

vided at one point of its circumference with an inwardly-projecting lug e' , which is located in line with a recess e^2 at the circumference of the inner end of the cylindrical portion D' .
 5 The cylindrical portion D' is further provided adjacent to the recess e^2 with a recess h , in which is located a steel spring h' , of approximately U shape, the outermost ends of which are retained in elongations h^2 of the recess h ,
 10 while the inner leg of the U-shaped spring h' is made in the shape of a spring-pawl h^3 , as shown in Figs. 4 and 5. The shank of the spring h' is provided with an outwardly-projecting portion h^4 , which enters into a notch
 15 h^5 of the handle-ring E, as shown in Fig. 4. In this position of the spring h' the spring-pawl h^3 of the same does not project beyond the recess h in the cylindrical portion D' . As soon, however, as the handle-ring E is turned
 20 and its lug e' moved out of (the lug e') the recess e^2 of the cylindrical portion D' into the semicircular recess e^3 , (shown in Fig. 5,) the projection h^4 is made to clear the notch h^5 on the handle-ring E, so that the spring-pawl h^3
 25 of the spring h' is forced inwardly, as shown in Fig. 5, and placed into engagement with ratchet-teeth h^6 on the circumference of the center piece A and spring-blocks d^4 , holding thereby the sleeve D in the position to which
 30 it has been set, so as to prevent the return motion of the same.

The chuck is operated as follows: The jaws are opened to a sufficient extent by turning the handle-ring E in one direction until the
 35 shank of the tool to be clamped can be inserted into the jaws B. The handle-ring E is then turned in the opposite direction, the conical sleeve D being carried along with it by the action of the lug e on the recess e' in
 40 the cylindrical portion D' of the sleeve D. By the turning action of the sleeve D the interior spiral grooves b' of the same engage the lugs b at the rear ends of the jaws B and move the latter forward in the inclined guide-
 45 grooves of the center piece A and along the guide-cone C until the straight faces of the jaws take hold of the tool and clamp it firmly in position. The axially-turning motion of the handle-ring E is then continued in the
 50 same direction, and thereby the cylindrical portion D' of the sleeve D shifted slightly in backward direction by the lug e as the same is moved into the recess e^3 of the cylindrical portion D' , so that the contact of the inclined
 55 cam-faces $f'f'$ of the collars d^2 and e with the antifriction-balls g , interposed between said cam-faces, is provided. The spring-cushioned blocks d^4 are simultaneously moved toward the blocks d^6 , and the final setting of
 60 the jaws to the tool to be clamped is accomplished. Simultaneously therewith the notch h^5 of the handle-ring E is moved out of engagement with the projection h^4 of the spring h' , so that the spring-pawl h^3 is forced to en-
 65 gage the ratchet-teeth on the circumference of the center piece A and spring-blocks d^4 and to lock thereby the sleeve D firmly in po-

sition against being turned in the opposite direction by the back pressure of the jaws. The movement of the lugs e' into the circum-
 70 ferential recess e^3 of the cylindrical portion D' is accompanied by a distinct click due to the action of the spring h' and its pawl h^3 , which indicates that after the preliminary setting action of the jaws the final setting of
 75 the same to the tool to be clamped has commenced, which is then completed by continuing the turning of the handle-ring E as far as the antifriction-balls g and cam-faces $f'f'$ on the collars d^2 and e of the rear portion D' and
 80 handle-ring E will permit.

When it is desired to release the tool to be clamped, the handle-ring E is first turned in opposite direction until its notch h^5 arrives at the projection h^4 of the spring h' and its
 85 lug e^8 in line with the recess e^2 of the cylindrical portion D' . When the handle-ring is in this position, the projection h^4 of the spring h' reengages immediately the notch h^5 , while the spring-pawl h^3 is withdrawn from the
 90 ratchet-teeth on the center piece A and blocks d^4 of the sleeve D. As soon as the lug e' of the handle-ring E is in line with the recess e^2 of the cylindrical portion D' of the sleeve D the sleeve D is moved, under the influence of
 95 the helical cushioning-springs d^7 of the blocks d^6 d^4 , in forward direction, so as to bring the lug e' into the position shown in Fig. 3, so that it reengages the end shoulders of the recess e^2 , in which position of the lug e' the
 100 handle-ring E takes the sleeve D along, so as to produce the inward motion of the jaws and the release of the tool. By the described connection of the sleeve D and handle-ring E a continuous turning motion of the latter in
 105 one or the opposite direction produces the motion of the jaws into the required direction, so as to clamp or release the tool.

The advantages of my chuck are:

First, that after the preliminary clamping
 110 of the tool by the jaws is accomplished the final clamping of the same is obtained and simultaneously therewith the rigid locking of the parts, so that the jaws are prevented from releasing the tool.
 115

Second, the motion by which the jaws are set is accomplished by turning the actuating handle-ring in the same direction both for the preliminary and for the final setting of the
 120 jaws.

Third, the operation of the parts takes place easily and entirely automatically, and especially the final setting of the jaws, owing to the antifriction-balls interposed between the cam-faces of the handle-ring and the cylindrical portion of the jaw-operating sleeve.
 125

Fourth, the chuck can be operated entirely by hand without requiring a wrench for the final setting of the jaws, which in my improved chuck is produced by the final turn-
 130 ing of the handle-ring and the locking of the sleeve to the center piece by the pawl-and-ratchet mechanism described.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. The combination of a tool-chuck having clamping-jaws, means for operating said jaws to cause a preliminary clamping of a tool, and means for setting the jaws finally and simultaneously rigidly locking the parts of the chuck, said means being operated by the means which effect the preliminary clamping.

2. The combination of a tool-chuck having clamping-jaws, means for primarily setting said jaws, and automatic means for finally setting the jaws and simultaneously locking the parts of the chuck to clamp a tool in fixed position.

3. The combination of a chuck, having clamping-jaws, a hand-ring, mechanism actuated by said hand-ring for setting the jaws primarily, and mechanism for finally setting said jaws and simultaneously locking the parts also actuated by said hand-ring, said ring being turned in the same direction for both the preliminary and final setting of the jaws.

4. In a tool-chuck, the combination of a center piece, jaws guided in said center piece and provided with lugs, an exterior conical sleeve having interior screw-threads adapted to engage the lugs on said jaws, an axially-turning handle-ring adapted to engage said sleeve, and means for locking said sleeve after the final adjustment of the jaws.

5. In a tool-chuck, the combination of a center piece, jaws guided in said center piece and provided with lugs, an exterior conical sleeve having interior screw-threads adapted to engage the lugs on said jaws, an axially-turning handle-ring adapted to engage said sleeve, and means disposed between said handle-ring, sleeve and center piece for locking the sleeve in position.

6. In a tool-chuck, the combination of a center piece, jaws guided in said center piece and provided with lugs, a sleeve having interior screw-threads adapted to engage said lugs, an axially-turning handle-ring adapted to engage said sleeve, and a pawl-and-ratchet mechanism disposed between said handle-ring, sleeve and center piece for locking said sleeve after the final setting of the jaws.

7. The combination of a center piece, having a conical front end, and a stationary collar at the rear end, jaws guided in inclined grooves of said center piece and provided with lugs at the rear ends, a conical sleeve having a cylindrical rear portion and an internal grooved thread engaging said lugs, a handle-ring extending around said rear portion, means for connecting the handle-ring and rear portion, spring-cushioned blocks guided in recesses of the center piece and a pawl-and-ratchet mechanism interposed between the rear portion and the center piece and adapted to lock the sleeve when the jaws are finally set to the tool to be clamped, substantially as set forth.

8. The combination of a center piece hav-

ing a grooved conical front end and a stationary collar at the rear end, jaws guided in the grooves of said center piece and provided with lugs at their rear ends, a conical sleeve having a cylindrical rear portion and an internal grooved thread in the conical portion engaging the lugs on the jaws, a handle-ring extending around said rear portion, spring-cushioned blocks located in recesses of the center piece and acting on the sleeve and handle-ring, a lug at the interior of the handle-ring engaging a recess in the rear portion of the sleeve, inclined cam-faces at the rear end of said rear portion and front of the handle-ring, and antifriction-balls interposed between said cam-faces, substantially as set forth.

9. The combination of a center piece having a grooved conical front end and a stationary guide-collar at the rear end, jaws guided in inclined grooves of said center piece and provided with lugs at their rear ends, a conical sleeve having a cylindrical rear portion and an internal grooved thread engaging said lugs, a handle-ring extending around said rear portion, means for connecting the handle-ring and rear portion, spring-cushioned blocks guided in recesses of the center piece and engaging said sleeve and handle-ring, a spring-pawl located in the rear portion of the sleeve, and adapted to engage ratchet-teeth in the circumference of the center piece and spring-cushioned blocks, and means by which said spring-pawl is actuated by the handle-ring so as to lock the sleeve to the center piece when the jaws are set into their final clamping position, substantially as set forth.

10. The combination of a center piece having a grooved conical front end and a stationary guide-collar at the rear end, jaws guided in inclined grooves of said center piece, a conical sleeve having a cylindrical rear portion, means for clamping the jaws to the tool to be held, a handle-ring extending around the cylindrical rear portion of the sleeve, means for connecting the handle-ring and rear portion, spring-cushioned blocks located in recesses of the center piece and engaging the rear portion of the sleeve and the handle-ring respectively, cam-faces on the adjacent ends of said rear portion and handle-ring, antifriction-balls interposed between said cam-faces, and a pawl-and-ratchet mechanism interposed between the rear portion of the sleeve and the center piece and actuated by the handle-ring, so as to produce the locking of the sleeve and jaws when finally clamped to the tool to be held, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ERNEST H. VOGEL.

Witnesses:

PAUL GOEPEL,
GEO. W. JAEKEL.