

No. 729,151.

PATENTED MAY 26, 1903.

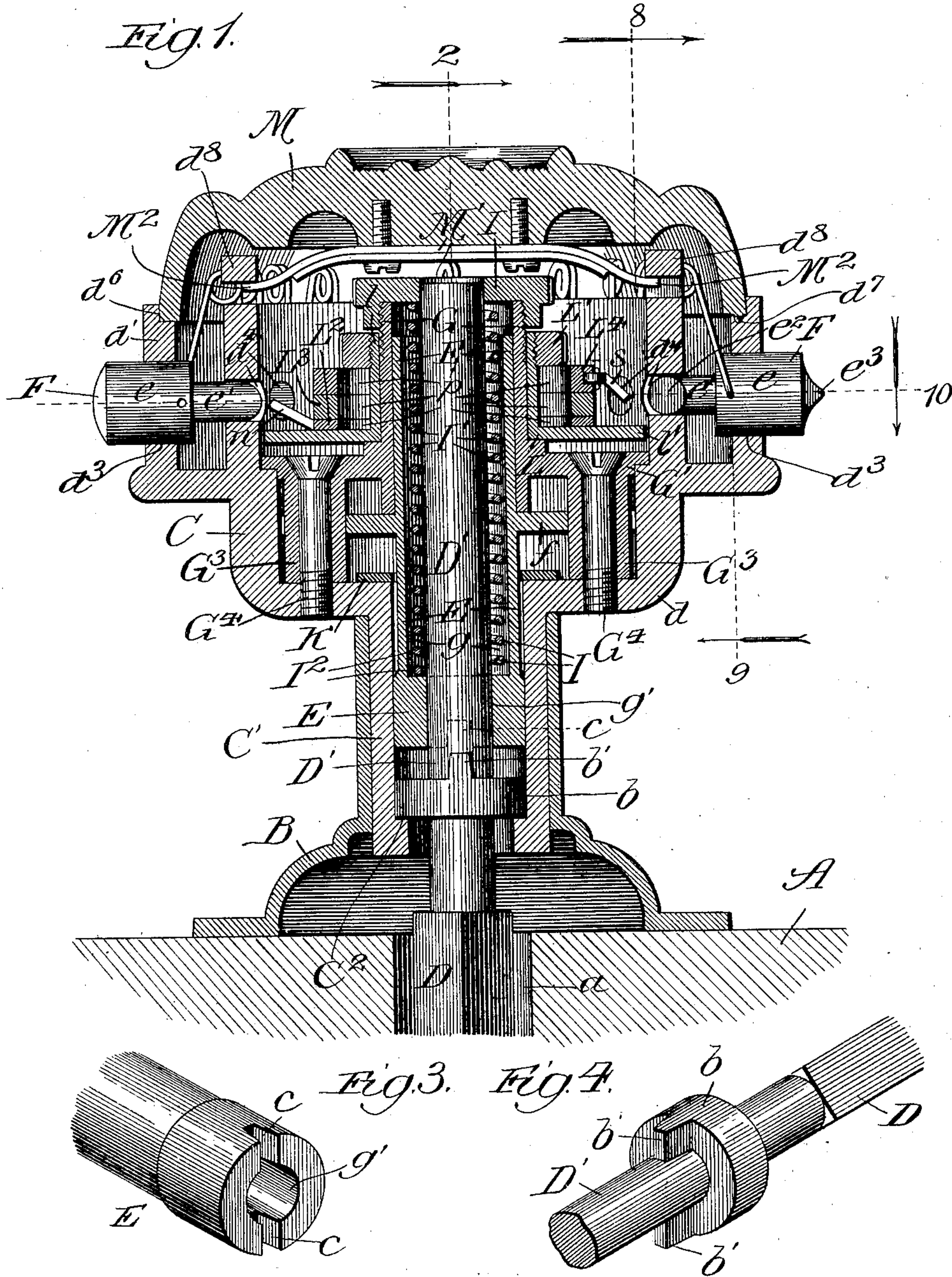
E. E. FLORA & J. L. CLOUGH.

DOOR KNOB LOCK.

APPLICATION FILED FEB. 13, 1903.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses:
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John Enders Jr.

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John L. Clough,
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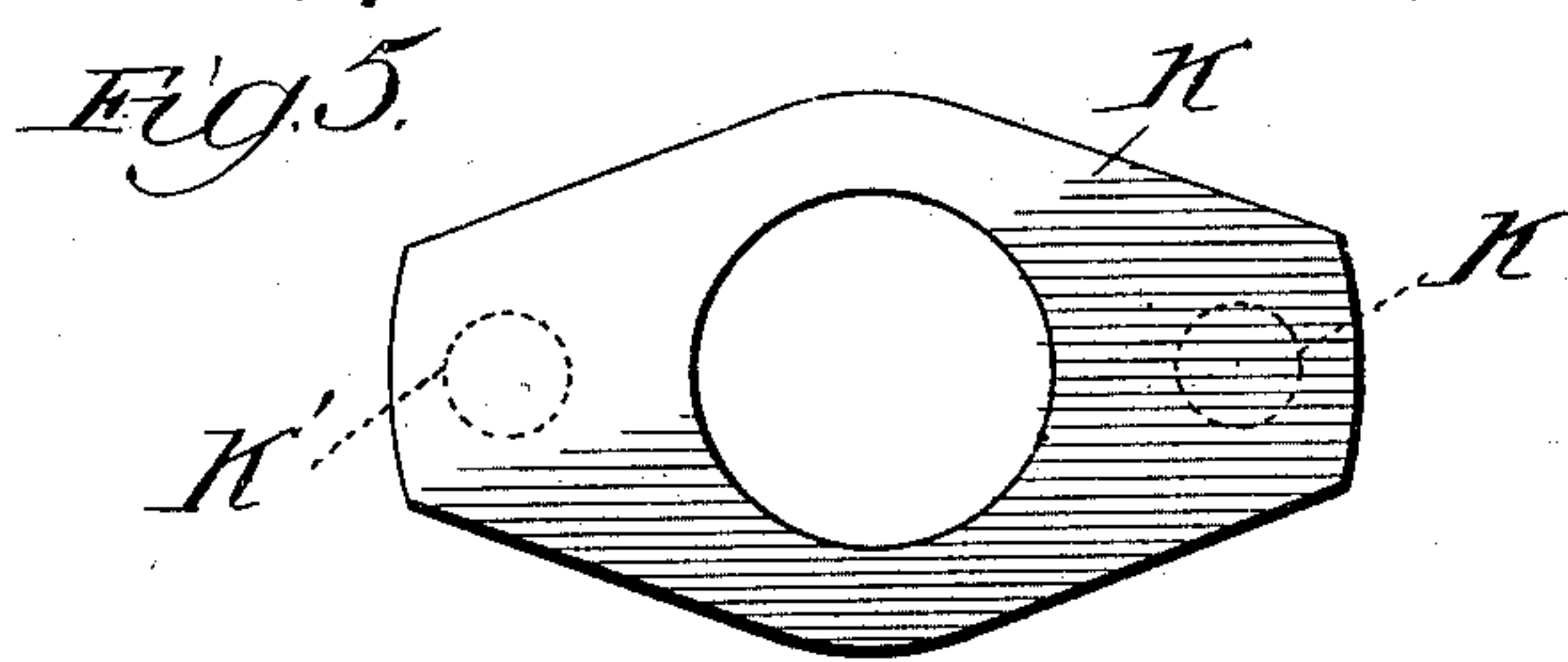
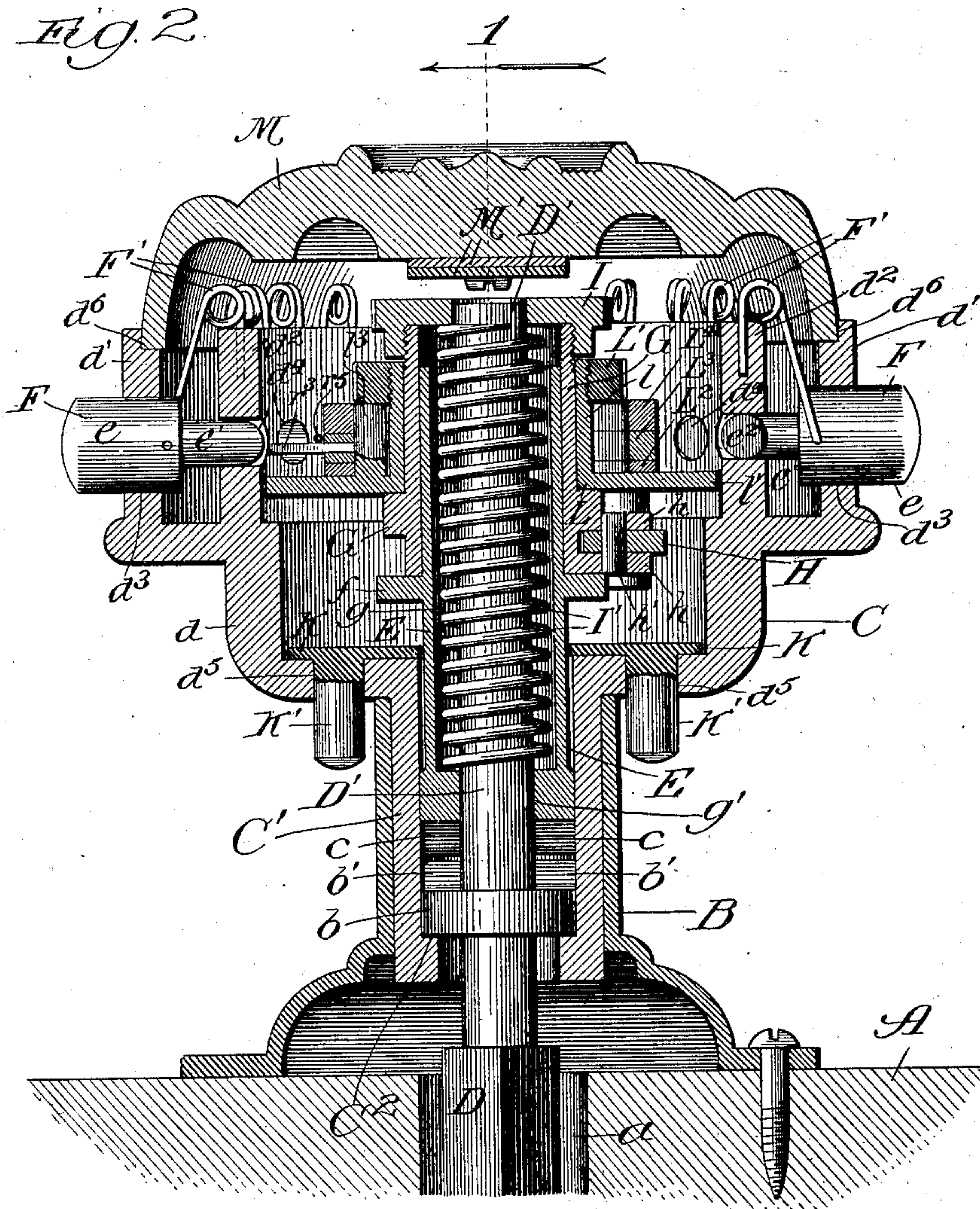
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5 SHEETS—SHEET 3.

Fig. 6.

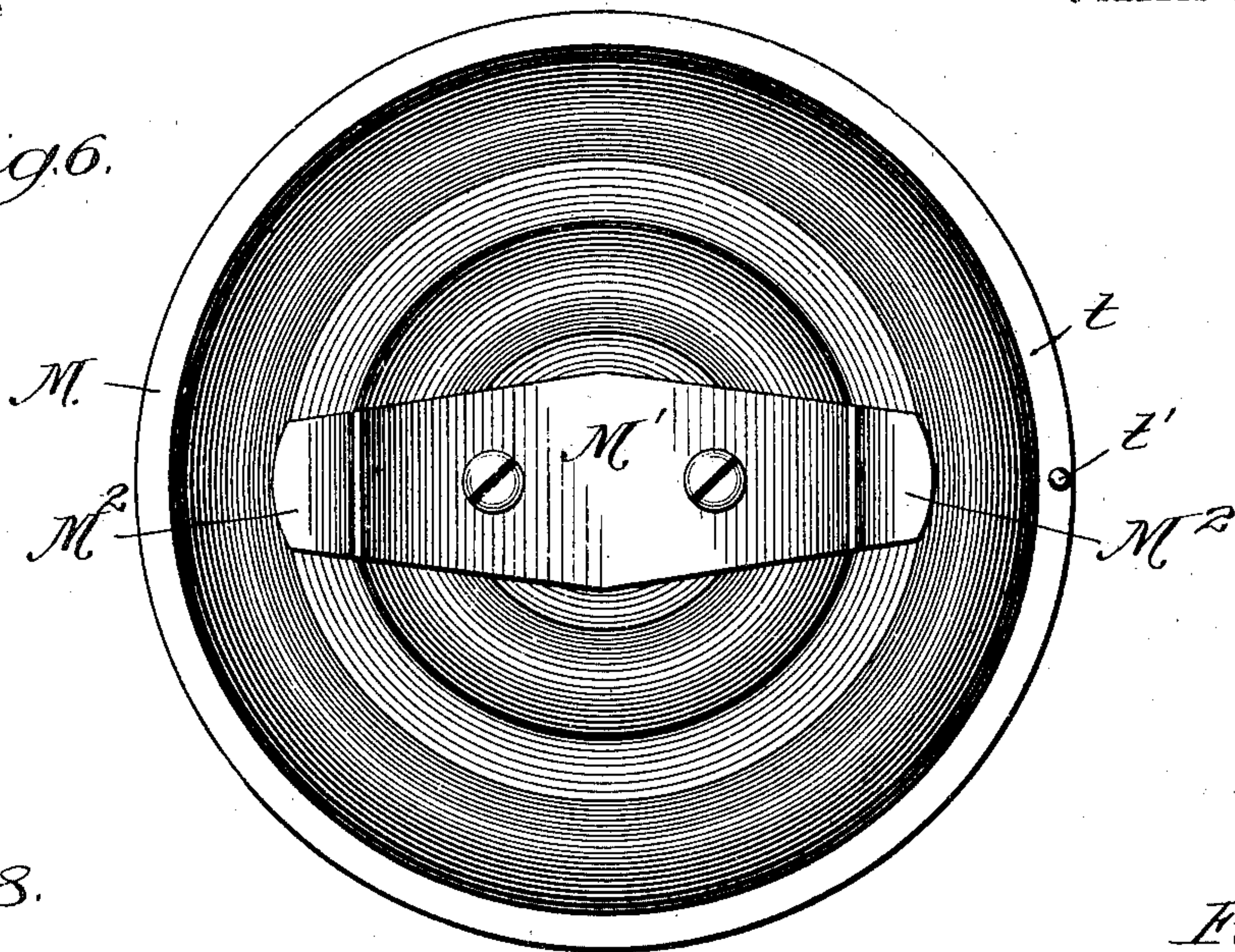


Fig. 8.

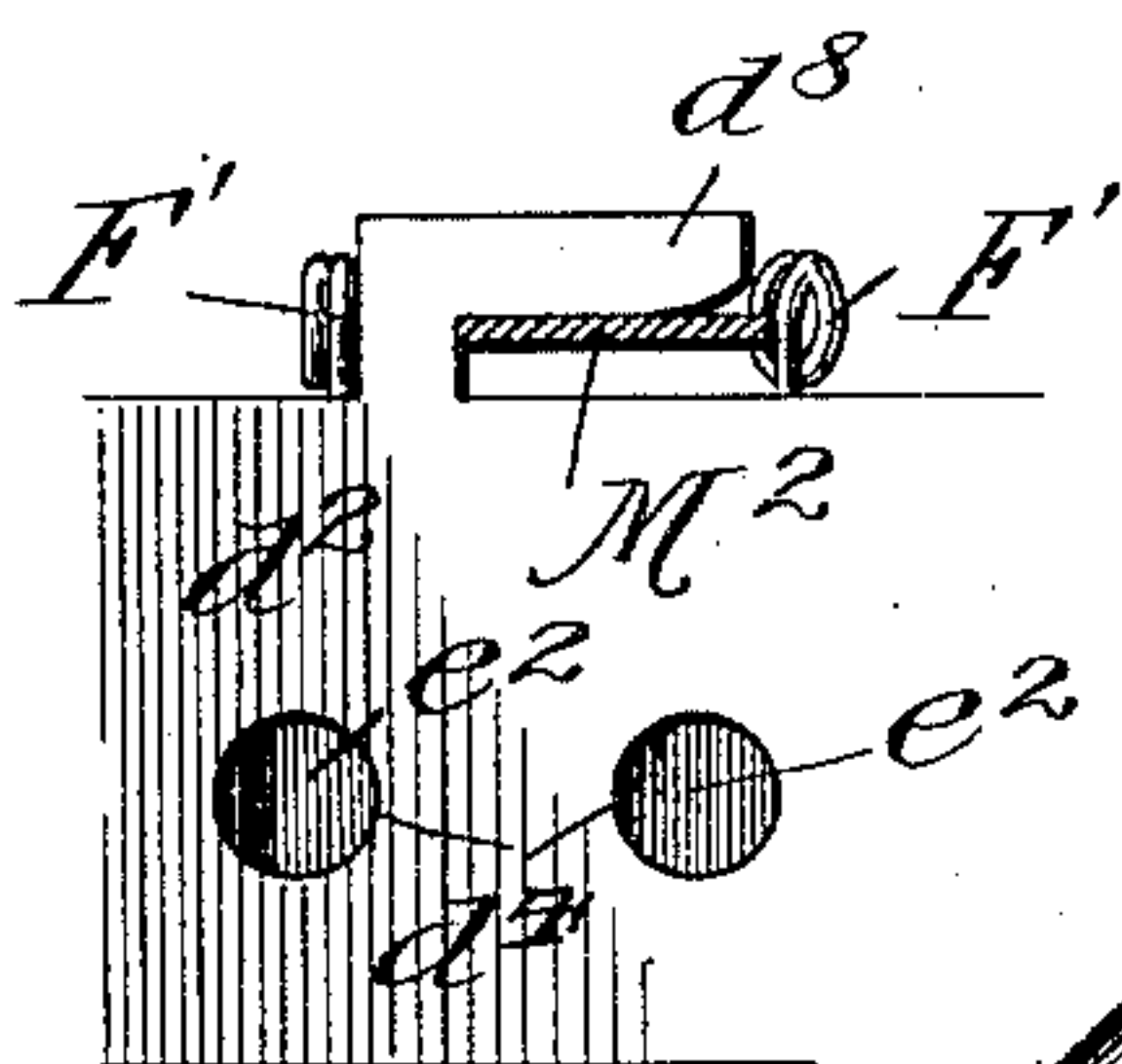


Fig. 7.

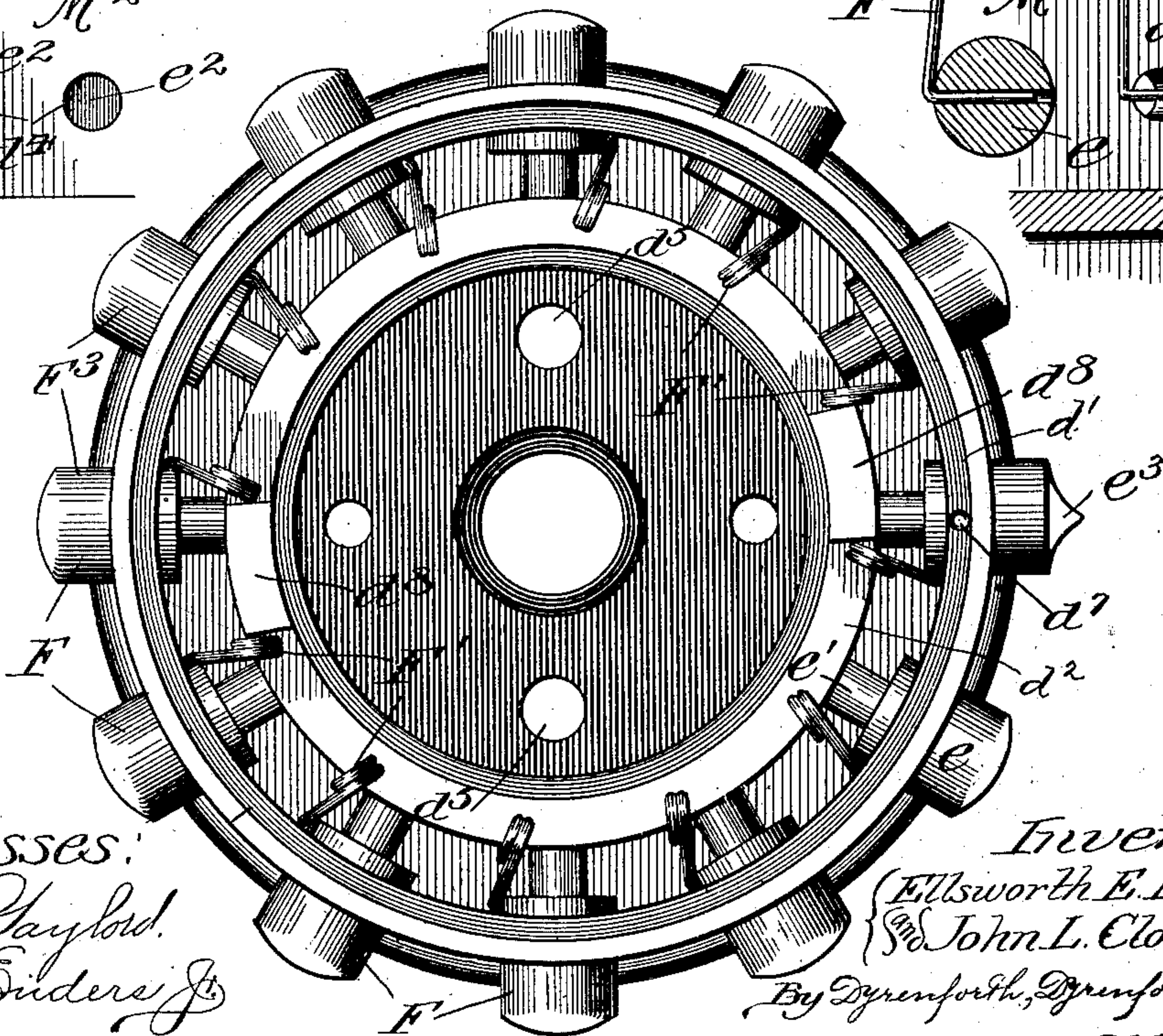
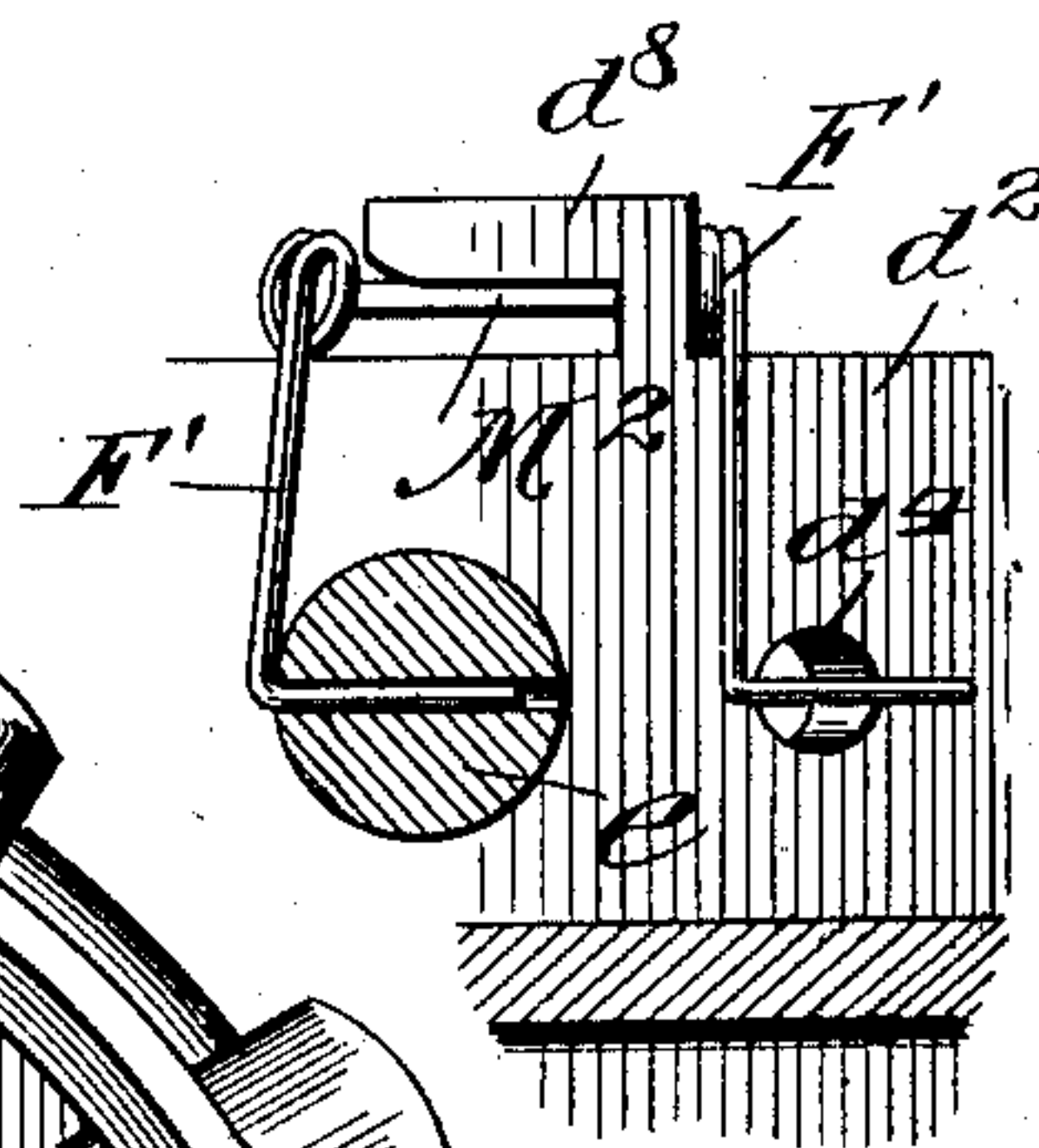


Fig. 9.



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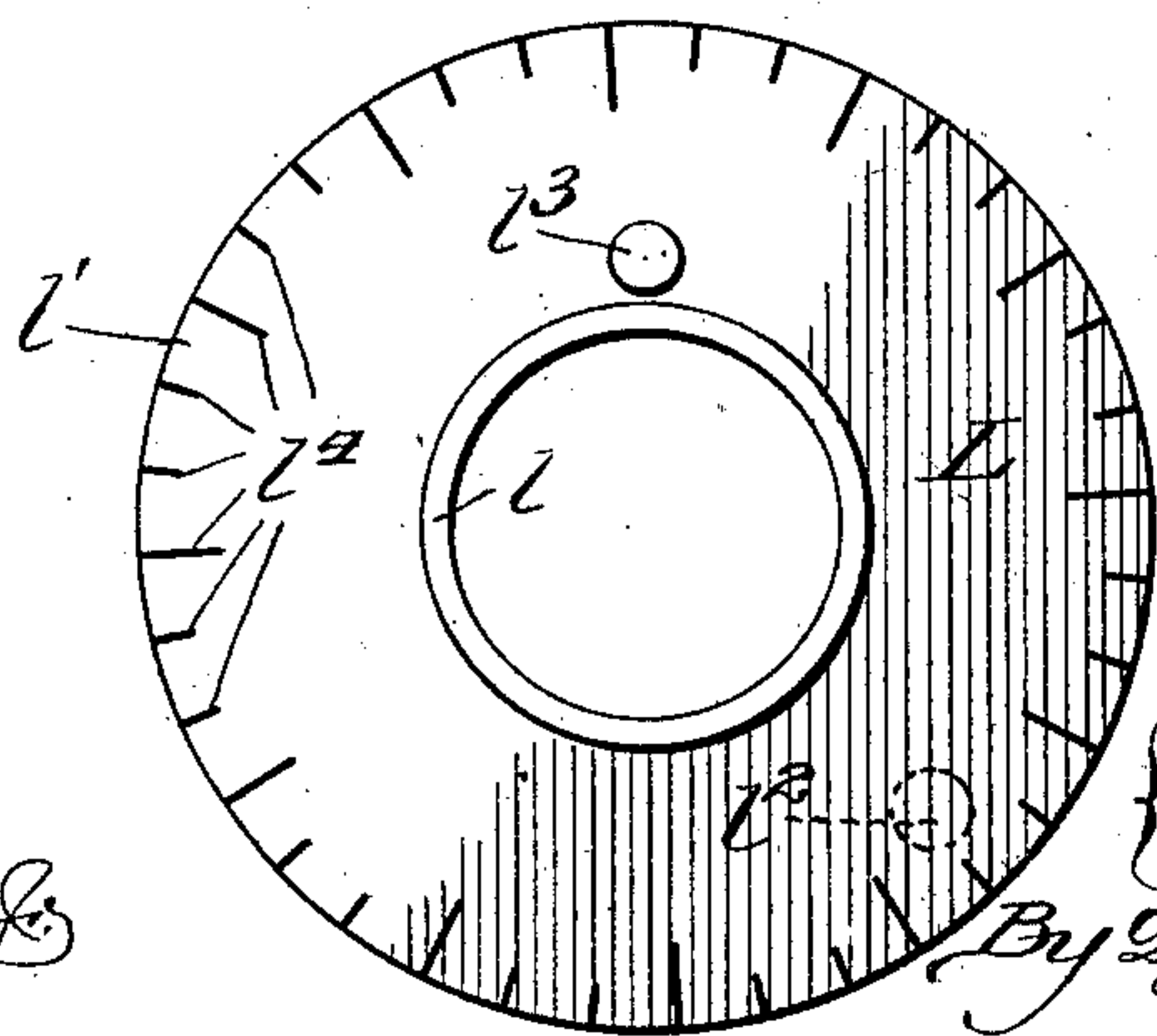
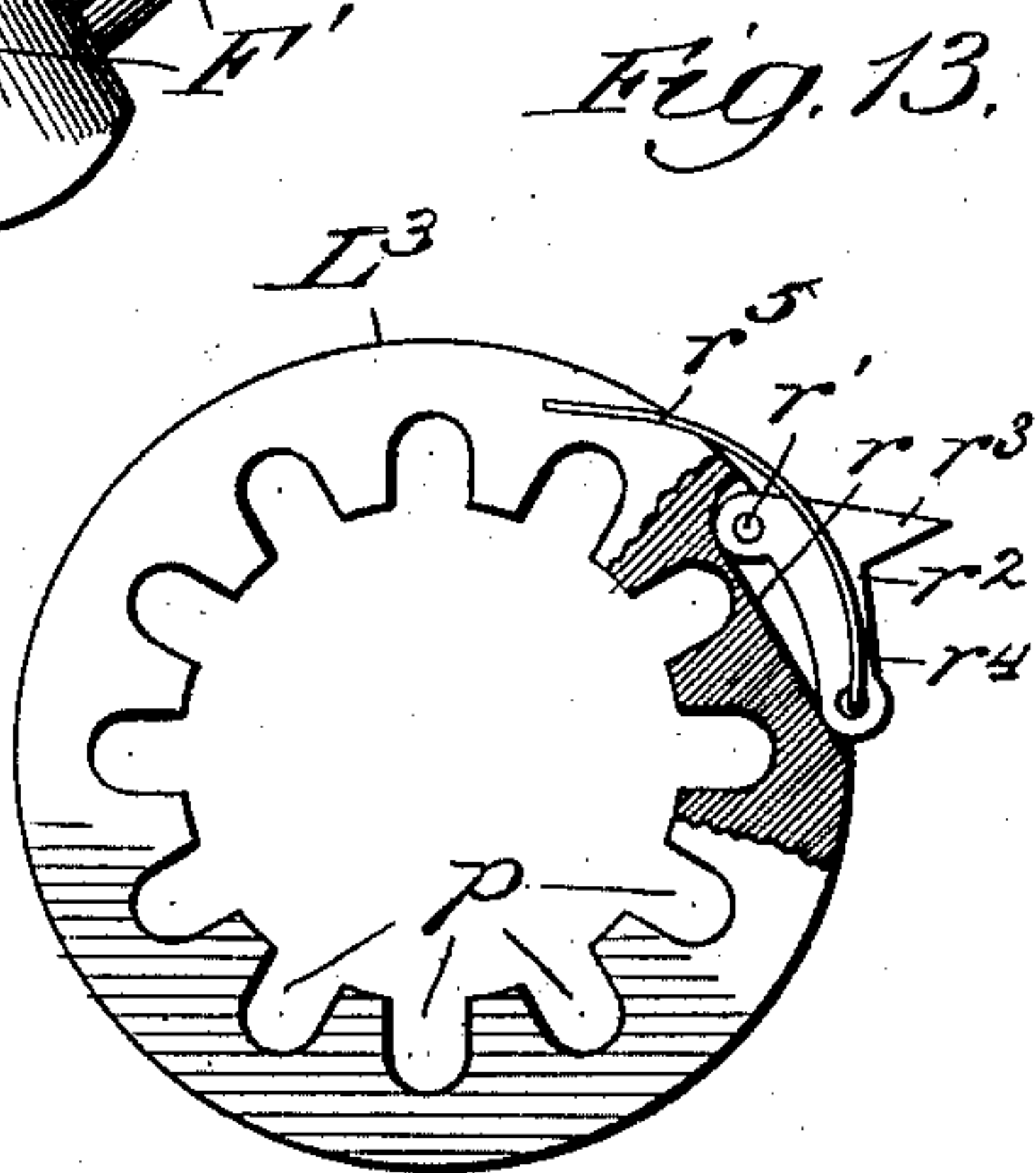
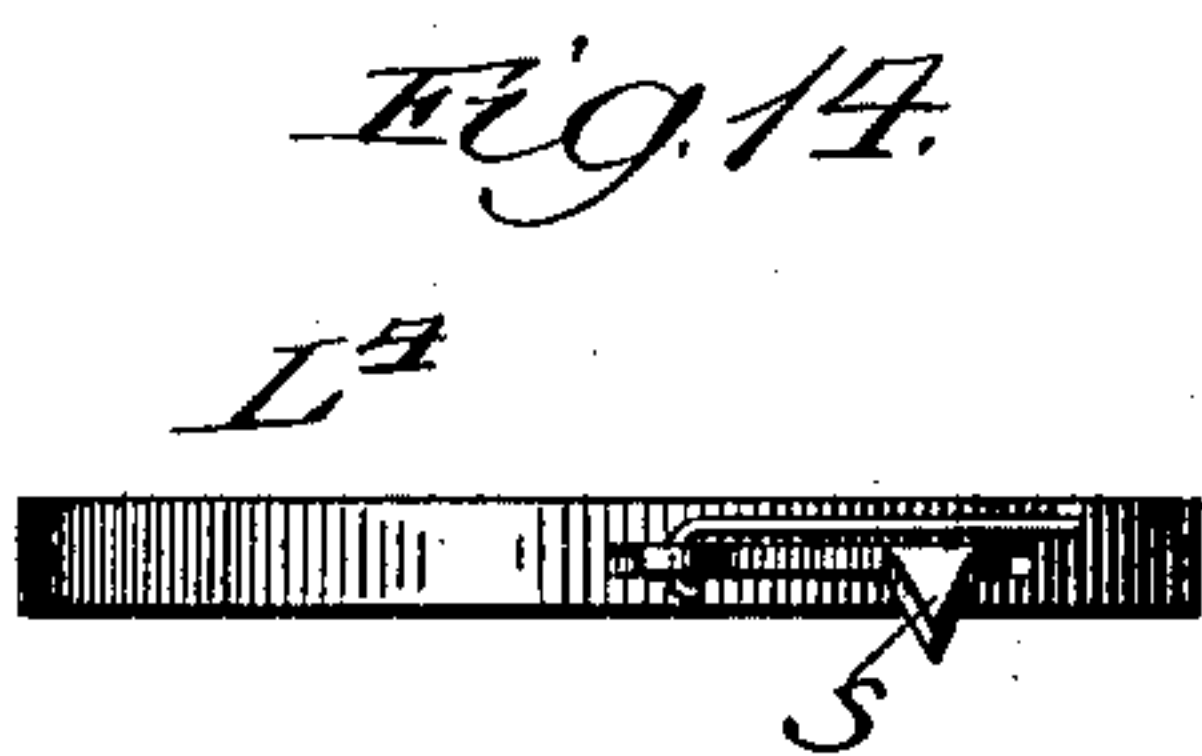
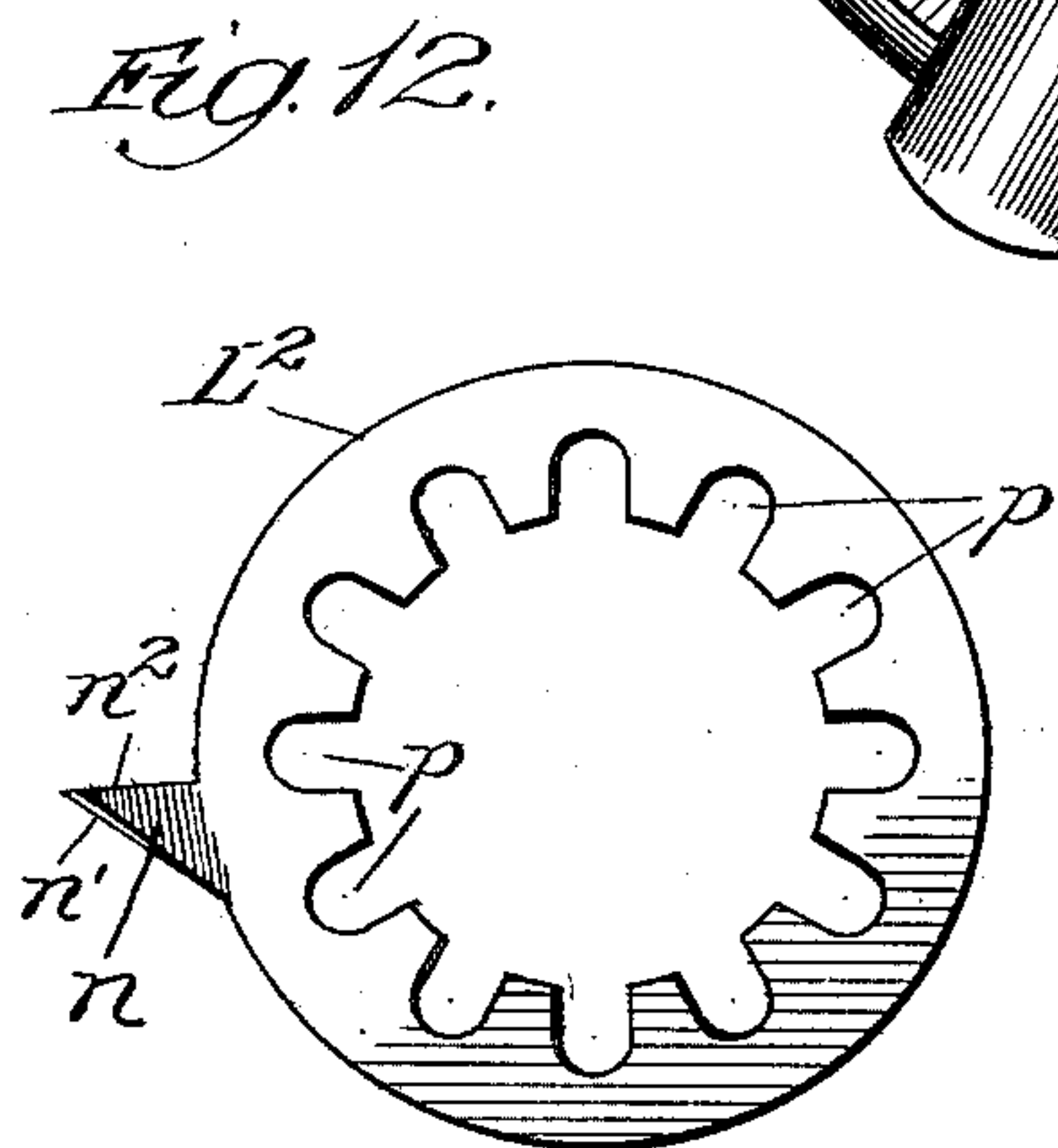
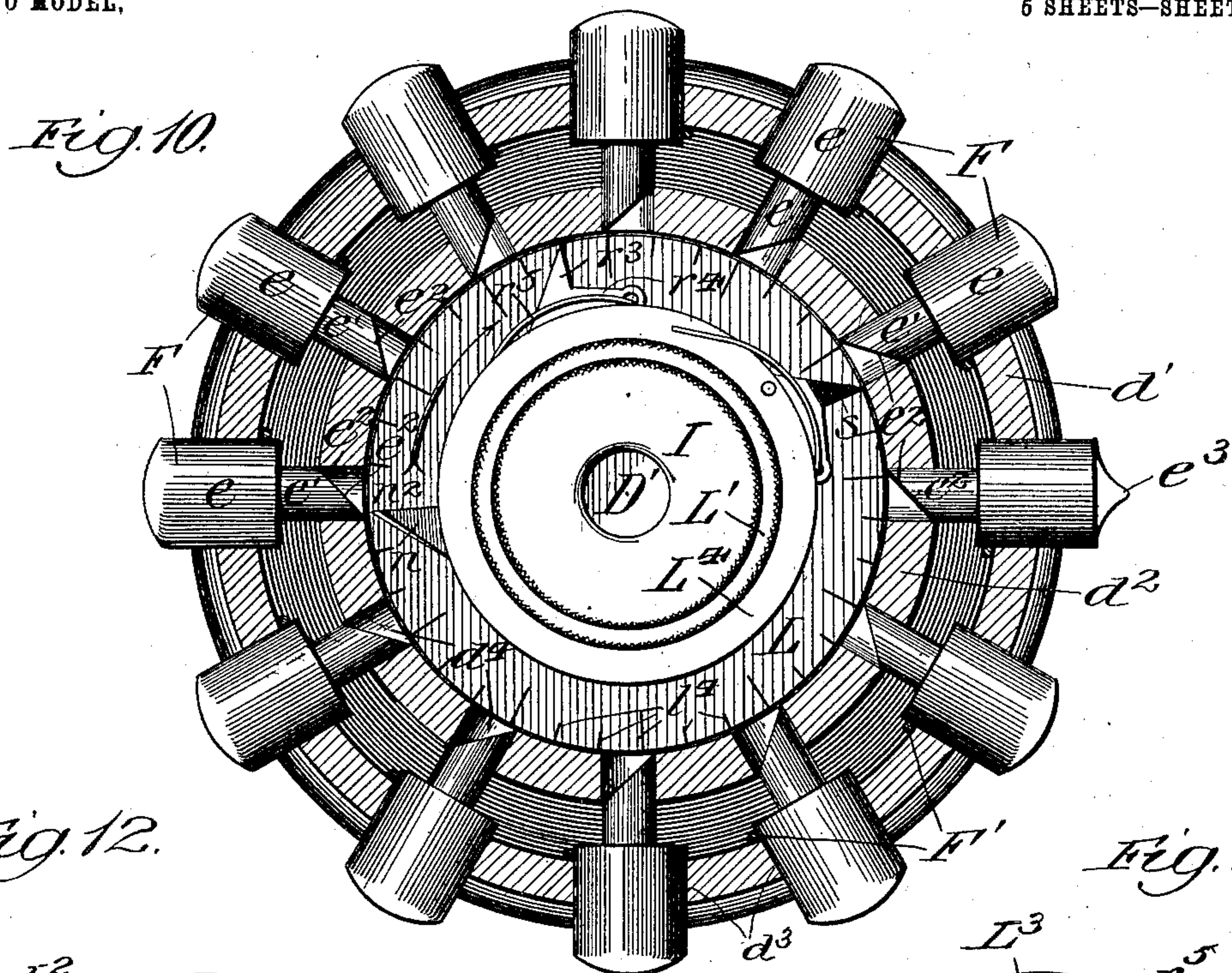
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6 SHEETS—SHEET 4.



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NO MODEL.

5 SHEETS—SHEET 5.

Fig. 15.

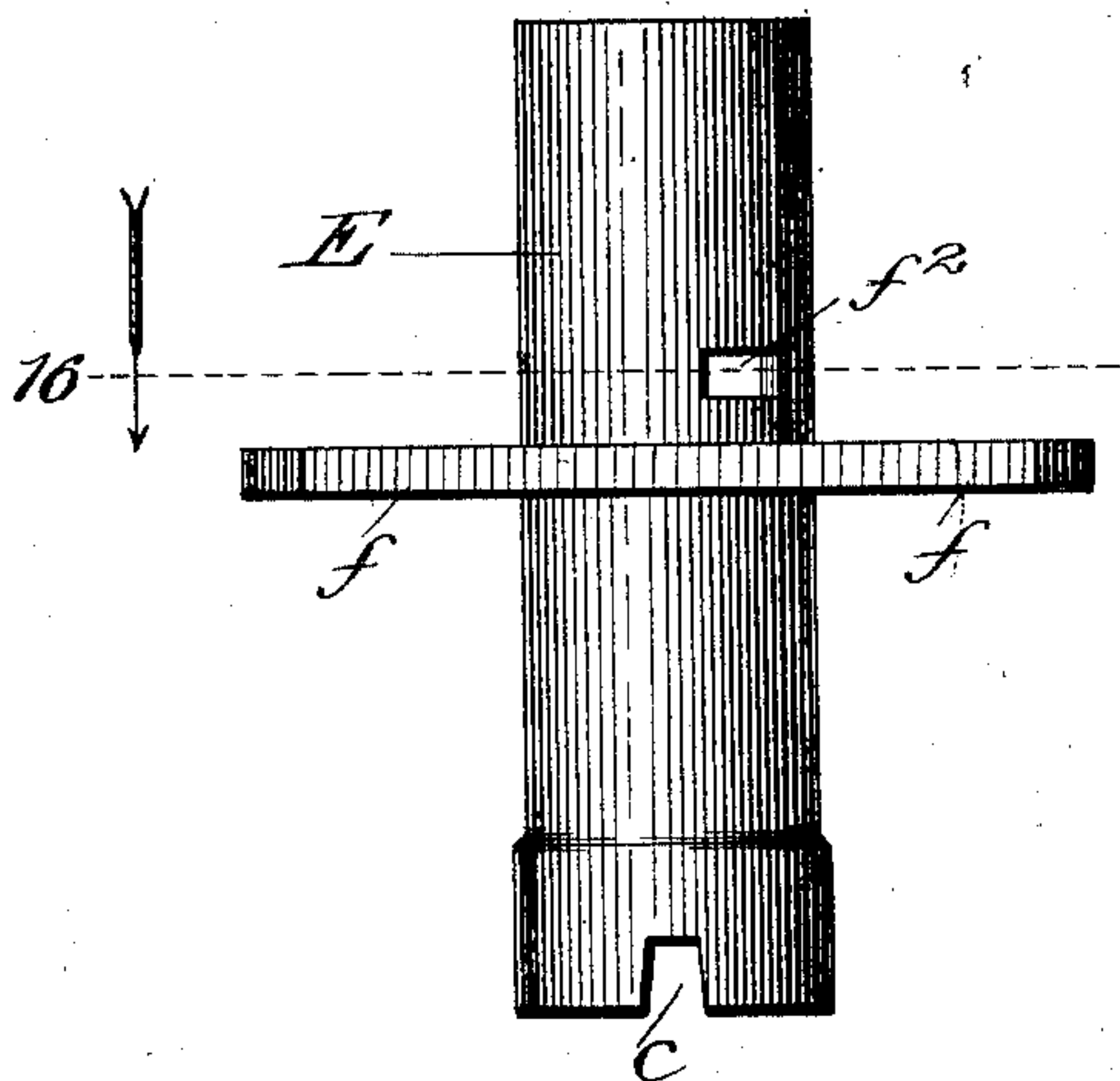


Fig. 16.

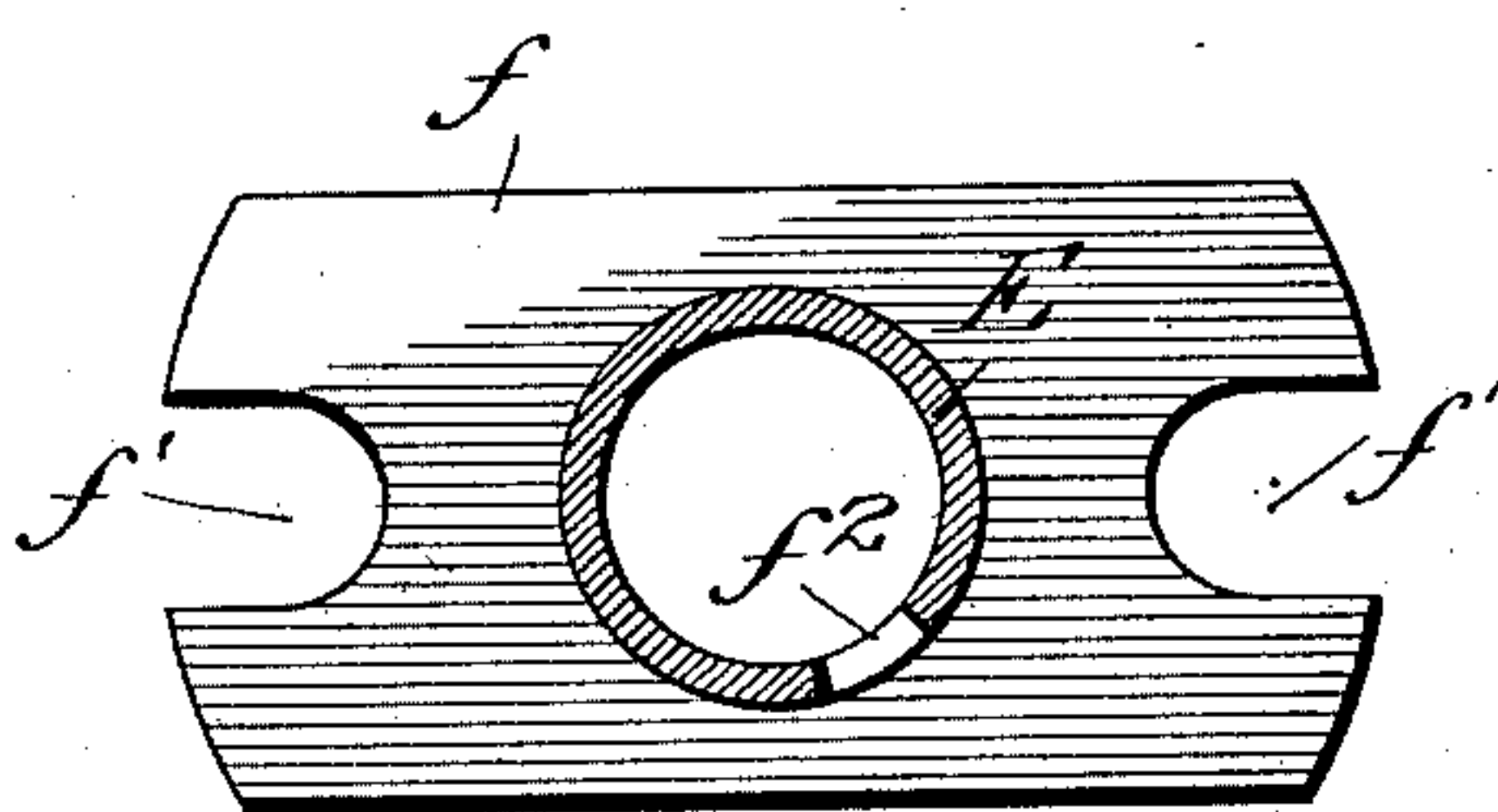


Fig. 17.

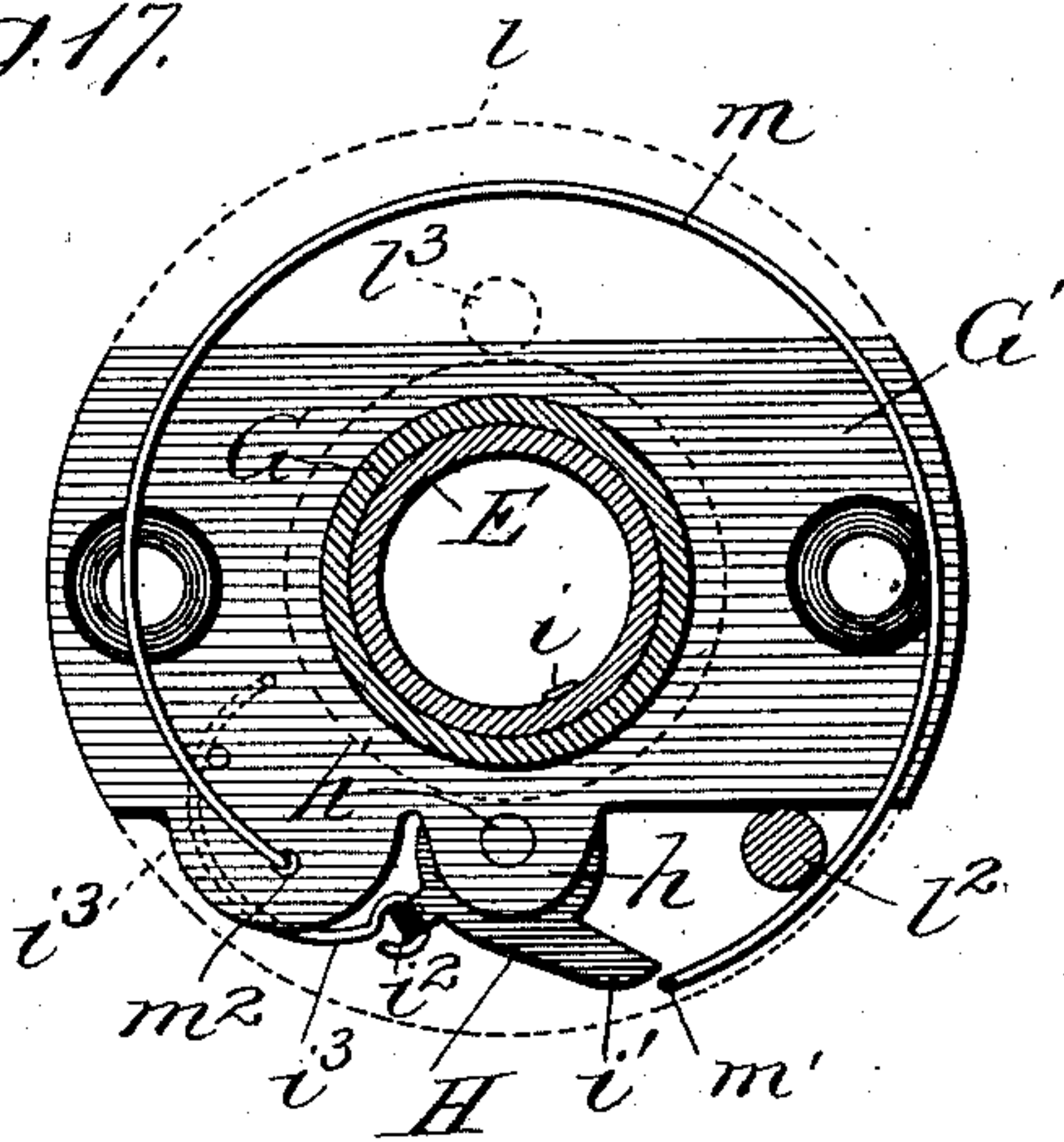


Fig. 18.

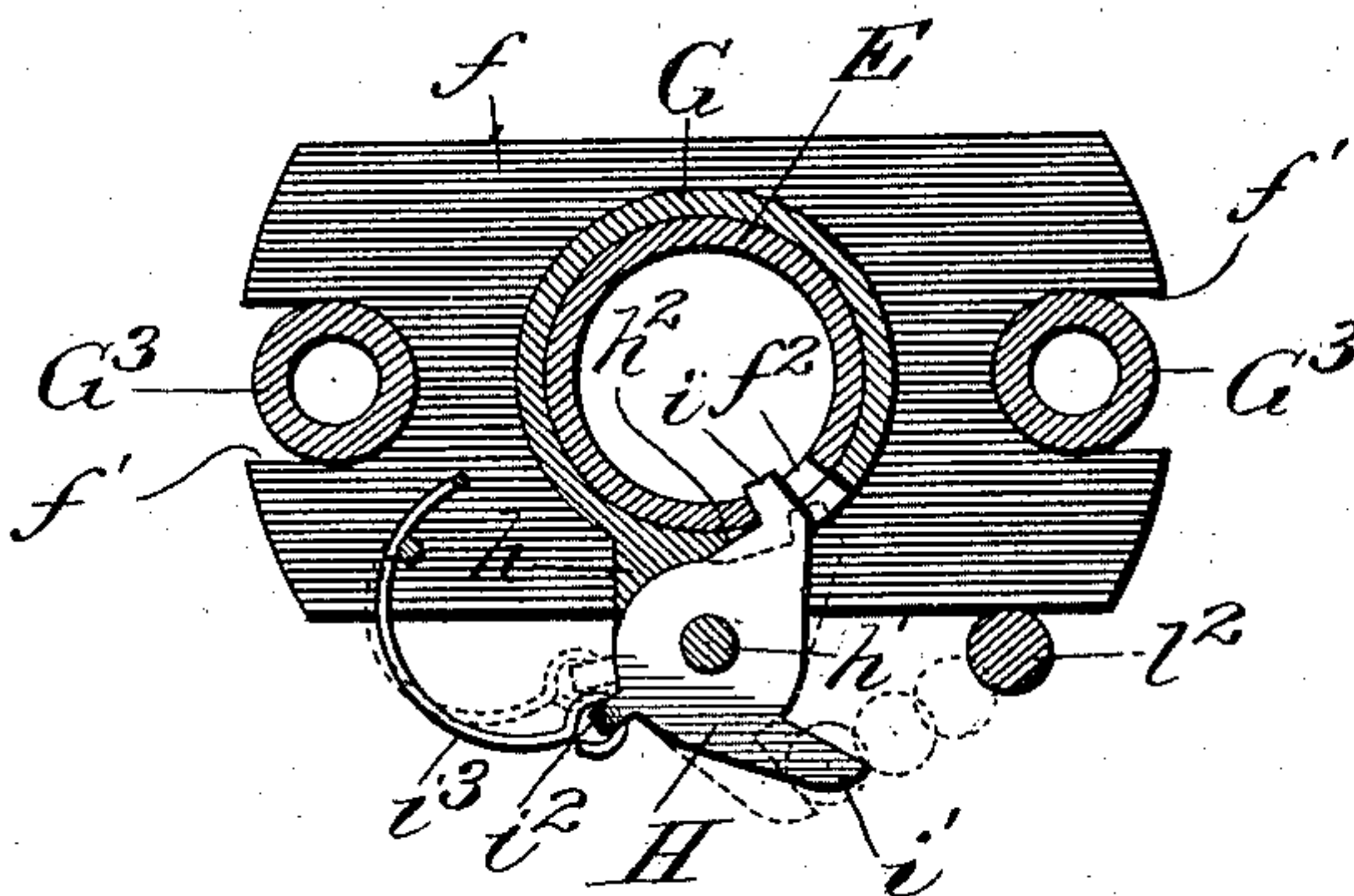
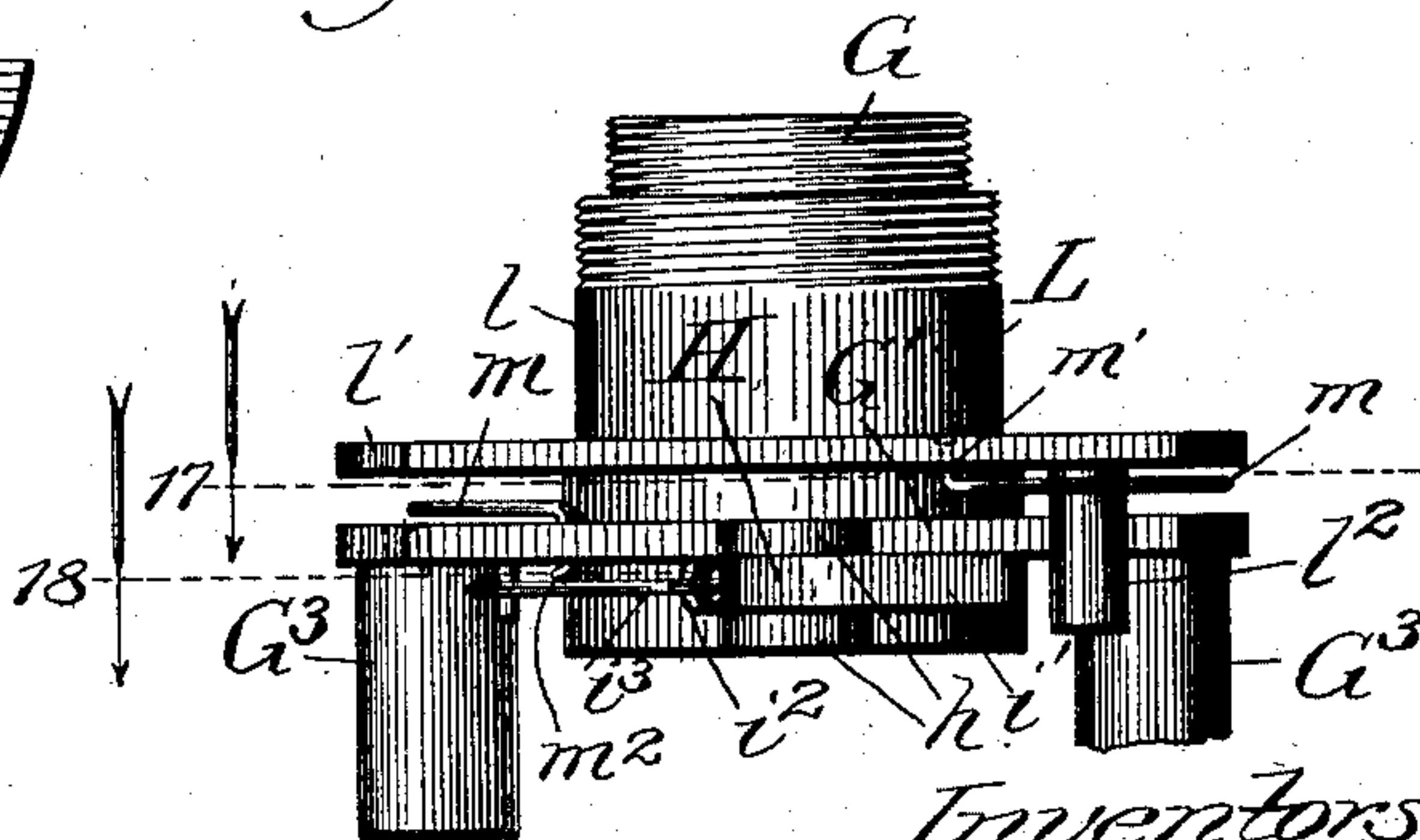


Fig. 19.



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UNITED STATES PATENT OFFICE.

ELLSWORTH E. FLORA, OF CHICAGO, ILLINOIS, AND JOHN L. CLOUGH, OF INDIANAPOLIS, INDIANA, ASSIGNORS TO KEYLESS LOCK COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION.

DOOR-KNOB LOCK.

SPECIFICATION forming part of Letters Patent No. 729,151, dated May 26, 1903.

Application filed February 13, 1903. Serial No. 143,183. (No model.)

To all whom it may concern:

Be it known that we, ELLSWORTH E. FLORA, residing at Chicago, in the county of Cook and State of Illinois, and JOHN L. CLOUGH, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Door-Knob Locks, of which the following is a specification.

10 This invention relates to improvements in door-knob locks of the class or character in which a knob or handle portion is or may be rendered normally incapable of actuating the door-latch, but contains housed within itself
15 clutch mechanism which when properly manipulated produces operative engagement between the knob and the latch-actuating mechanism, whereby it may be turned to retract the latch.

20 The primary purpose of a knob-lock such as described is to provide locking means for doors and the like, which locking means while as effective and secure as the better class of locks requiring portable keys for
25 their unlocking dispenses with the necessity of a key.

Our object is to provide certain improvements in the construction of a knob-lock of the above-defined class which shall adapt the
30 article for general use, render it particularly strong and durable, effective as a safeguard, and especially easy of manipulation by one possessing the secret of its particular combination and mode of operation.

35 Referring to the drawings, Figure 1 is a broken sectional view showing our improved knob-lock in operative position, the section being taken on line 1 in Fig. 2; Fig. 2, a section on line 2 in Fig. 1; Figs. 3 and 4, broken
40 perspective views of cooperating clutch members forming details of the construction; Fig. 5, a plan view of a lock-releasing plate; Fig. 6, an inner face view of a removable cap for the knob; Fig. 7, a view in elevation of
45 the outer end of the knob with the cap removed, all of the removable elements of the locking mechanism being absent; Figs. 8 and 9, broken sections taken on lines 8 and 9 of Fig. 1 in the directions indicated by the ar-

rows; Fig. 10, a section on line 10 in Fig. 1; 50 Fig. 11, an end view of a spool device forming one of the details of the construction; Fig. 12, an inner tumbler-ring; Fig. 13, an intermediate tumbler-ring with a part broken away to show a spring-pressed tumbler- 55 point; Fig. 14, an edge view of an outer tumbler-ring; Fig. 15, a view in elevation of a plunging clutch portion of the mechanism; Fig. 16, a section taken on line 16 in Fig. 15; Figs. 17 and 18, sections taken on lines 17 and 60 18 in Fig. 19 and viewed as indicated by the arrows, and Fig. 19 a stationary sleeve device and attendant parts forming details of the construction.

In Figs. 1 and 2 our improved knob-lock 65 is shown mounted in operative position, A representing the lock-stile portion of a door, having an opening α registering with the spindle-opening of a mortise-lock. (Not shown.)

B is an escutcheon, which, as shown, is 70 especially adapted to the present knob-lock; but, as will hereinafter appear, an escutcheon is not essential to the present invention, or, being provided, may be of any other suitable form.

75 C is the knob or casing which houses the lock mechanism and is mounted upon a bolt or spindle D upon one side of the door or the like A. The spindle D may carry an ordinary knob at the opposite or inner side of the 80 door, being squared, as usual, to actuate the latch mechanism mortised into the door. The spindle which we employ is of special construction, the stem or part D' thereof, which carries our knob, being cylindrical and pro- 85 vided with a fixed or integral collar portion b, carrying the lugs or clutch projections b'. Loosely surrounding the spindle D' is a cylindrical plunger E, provided in its end with sockets or clutch-recesses c, adapted to engage 90 the clutch projections b'. As will hereinafter appear, when the plunger E is moved to throw the clutch members c b' into engagement the spindle may be turned by turning the knob C; but when the clutch members are out of 95 engagement the knob turns loosely upon the spindle.

The knob C is formed with a cup-shaped

base portion d , an outer cylindrical wall d' , an inner cylindrical wall d^2 , all shaped as indicated in the figures, and a tubular shank C' , having an annular inward-projecting flange C^2 , presenting a shoulder engaging the collar b to hold the knob against withdrawal from the stem D' . In the wall d' is an annular series of openings d^3 , which in the present construction are twelve in number and equidistant apart. In the inner wall d^2 are twelve openings d^4 , smaller in diameter than the openings d^3 , but in direct radial line therewith.

F are a series of push-buttons having head portions e , fitting the openings d^3 , and shank portions e' , fitting the openings d^4 . The inner end portions of the shanks e' are beveled to present tumbler-engaging wedges e^2 . Springs F' , coiled between their ends, are fastened at one arm in perforations in the end of the wall d^2 , and their other arms pass through perforations in the push-buttons F , the springs operating to resist inward pressure against the push-buttons and to return them to their normal positions shown when released. On the plunger E in the position shown is a flange or plate f , (see Figs. 15 and 16,) provided in its opposite ends with guide-slots f' . The plunger E is hollow to afford a cylindrical chamber g , with an opening of its full diameter at the outer end and a reduced opening g' at the inner end just large enough to receive the spindle D' , as shown. Extending through the wall of the plunger E , adjacent to the plate f , is a catch-engaging socket f^2 .

G is a stationary sleeve provided near its inner end with an integral plate G' , from the inner side of which at opposite sides of the sleeve extend bolt-tubes G^3 . The sleeve-piece G is fastened rigidly in the casing by means of screws or bolts G^4 , (see Fig. 1,) the said screws or bolts being fastened at their ends in threaded openings in the base d of the knob C .

The sleeve G and the plate G' form the support for the clutch-controlling mechanism, which mechanism engages and holds the plunger or clutch member E when the latter is in the position shown in Figs. 1 and 2 and releases it to permit interlocking of the clutch members when the said controlling mechanism is moved step by step its full distance by the push-buttons when the latter are operated progressively in proper order, all as hereinafter described.

The plunger E slides longitudinally in the stationary sleeve-piece G . On the sleeve-piece, just within the plate portion G' , is a laterally-extending ear h , bifurcated as shown in Fig. 19. Pivotaly mounted upon a pin h' , passing through the bifurcated ear, is a catch H . (Shown most plainly in Fig. 18.) The catch has a tongue portion i , movable in an opening h^2 through the sleeve-piece G , and an arm i' for the purpose hereinafter explained.

On the catch is a perforated ear i^2 , engaged by a spring i^3 , fastened against the inner face of the plate G' . The spring i^3 operates to press the catch H normally to the position shown in full lines in Fig. 18 and resists movement thereof toward the position shown by dotted lines in said figure. When in the position shown by full lines in Fig. 18, the tongue i engages the opening f^2 in the plunger E . The outer end of the sleeve-piece G is threaded, as shown, to receive a screw-cap I , the said screw-cap having a central opening in it forming a bearing for the outer end of the spindle D' . In the chamber g of the plunger E and confined between the base of the plunger and the cap I on the sleeve-piece is a spring I' , which operates normally to press the plunger in the inward direction, whereby its clutch members c will engage the clutch members b' on the spindle. In the base portion of the knob is a releasing-plate K of the form shown in Figs. 2 and 5, provided with studs or projections K' , passing through openings d^5 in the base d of the knob. When the clutch members are in engagement and it is desired to release the lock, pressure exerted against the studs K' will press the plate against the plate portion f of the plunger E and move the plunger in the outward direction until its opening f^2 registers with the opening h^2 , when the tongue i of the latch H will engage the opening f^2 and hold the plunger in the position shown in Figs. 1 and 2 against the resistance of the spring I' and throw the clutch members out of engagement. As shown in Fig. 18, the notches f' in the plate f embrace the bolt-tubes G^3 , whereby the plunger is free to slide longitudinally, but held against turning.

L is a carrier or tumbler-spool comprising a sleeve portion l , fitting loosely around the sleeve-piece G , and a disk l' at the inner end of the sleeve portion l , marked on its outer face with a scale, as indicated in Fig. 11. The outer end of the sleeve l is provided with a screw-thread, as shown, to receive a nut L' . Extending from the inner face of the disk portion l' of the spool is a stud l^2 , movable into and out of engagement with the arm i' of the catch H , as hereinafter explained. The normal position of the stud l^2 is indicated by full lines in Fig. 18, where it rests against the edge of the plate f . A spring m , fastened at m' to the disk l' and connected at m^2 with the plate G' , tends to resist turning of the spool away from the position wherein the stud l^2 bears against the edge of the plate f and operates when the spool is released to return it to its normal position. On the outer side of the disk l' in the position shown is a post or pin l^3 . (See Figs. 2 and 11.)

L^2 is an inner tumbler-ring provided on its edge with a rigid tumbler-point n , having an inclined edge n' and an abrupt edge n^2 . In the inner peripheral edge of the ring L^2 are preferably twelve notches p , any one of which

is adapted to fit over the post or pin l^3 when the ring is in position upon the spool L.

L^3 is in an intermediate tumbler-ring provided on its inner periphery with twelve notches p like those of the inner ring. In the circumferential edge of the ring L^3 is a recess r of the shape shown in Fig. 13, and pivotally mounted at r' therein is a tumbler-point r^2 , having the wedge-shaped projection r^3 and arm r^4 . A spring r^5 , fastened at one end to the ring and at its opposite end to the free end of the arm r^4 , tends to hold the tumbler-point in the position indicated.

L^4 is the outer tumbler-ring, formed, like the tumbler-ring L^3 , with a yielding tumbler-point s , mounted and operated like the tumbler-point r^3 . The point n of the inner tumbler is bent outward, and the point s of the outer tumbler is bent inward, whereby the three wedge-shaped projections or tumbler-points $n r^3 s$ extend into the same plane between the inner and outer sides of the intermediate tumbler-ring.

The tumbler-rings may be placed in any arbitrary position with relation to each other and the disk l' and may be, for example, as shown in Fig. 10. One of the push-buttons F is provided with a projecting point e^3 , by means of which it may always be distinguished even in the dark by the touch of the operator, and this push-button will operate as the prime button, affording a ready means for finding the push-buttons which are to be operated in rotation to work the permutation-lock. Calling the push-button provided with the projection e^3 "No. 12" and the one to the right thereof "No. 1" and the one to the left thereof "No. 11," it will be seen by reference to Fig. 10 that the lock is so adjusted that by pressing No. 6, then No. 9, and then No. 12 the carrier L will be turned to produce engagement between the clutch members. To be more explicit, pressure against push-button No. 6, which is diametrically opposite the prime push-button carrying the point e^3 , causes its wedge e^2 to engage the inclined face n' of the inner tumbler-ring and force it along a distance approximating nearly the diameter of the shanks e' of the push-buttons. This forcing along of the tumbler-ring turns the spool L on its axis against the resistance of the spring m and causes the stud l^2 to move from the position shown by full line in Fig. 18 to the position shown by the next adjacent dotted circle. This turning of the spool brings the tumbler-point r^3 of the intermediate tumbler-ring into position to be engaged by push-button No. 9. Inward pressure upon the last-named push-button causes its wedge to engage the tumbler-point r^3 and move it, and consequently the spool, around to bring the stud l^2 to the position of the second dotted circle in Fig. 18, whereby the stud engages without moving the catch H. This turning of the spool carries the tumbler-point s into position for en-

gagement by the push-button No. 12. Inward pressure upon the last-named push-button causes its wedge e^2 to force the tumbler-point s , and consequently the spool, around to the last position, whereby the stud l^2 , engaging the arm i' of the catch H, turns the latter to the position indicated by dotted lines in Fig. 18, thereby withdrawing the tongue i from engagement with the opening f^2 of the plunger E and permitting the latter to be moved longitudinally by the spring I' against the collar b of the spindle. The movement of the plunger causes it as it strikes the collar b to give a perceptible click, which indicates to the operator that the plunger has been released. In the event that the clutch members c do not immediately engage with the clutch members b' a turning of the knob in either direction will soon cause them to register and engage. When they are engaged, the knob and spindle are clutched or locked together, whereby turning of the knob turns the spindle and retracts the latch of the door. While the clutch members are in engagement, the knob C operates as an ordinary door-knob. When it is desired to have the knob operate again as a lock, the operator by pressing the studs K' with his fingers forces the releasing-plate K against the plate f and moves the plunger E against the resistance of the spring I' until it is caught at its opening f^2 by the catch H. When the parts are in this position, the knob turns freely upon the spindle and will not retract the latch of the door-lock.

The knob or casing C is provided with a removable cap M to give access to the interior for the purpose of changing the combination of the tumbler mechanism. The cap has an annular meeting face t , at which it enters an annular socket d^6 in the outer end of the wall d' . On one part of the meeting face t of the cap is a short point t' , adapted to enter a shallow socket d^7 in the end of the wall d' . The inner wall d^2 is provided at opposite sides with projections d^8 , (see Figs. 8 and 9,) presenting shoulders parallel with the end of the wall. Fastened against the inner face of the cap M is a plate M' , having stiff springy ends M^2 , adapted when the cap is placed in position and turned to slide beneath the shoulders formed by the projections d^8 until the point t' enters the socket d^7 . The engagement of the point with the socket prevents turning and removal of the cap from the knob except when pressure is exerted against the spindle from the opposite end thereof when removed from the door. When it is desired to remove the cap, pressure is exerted against the inner end of the spindle. This causes the end of the spindle in the knob-lock to press against the inner side of the cap and force it outward against the resistance of the springs M^2 far enough to disengage the point t' from the socket d^7 . The cap may then be turned until the parts M^2 become disengaged from the

shoulders d^8 , when the cap may be removed. It will be seen from the drawings and foregoing description that the cap cannot be removed to give access to the lock except when
 5 the operator has removed the knob at the inner side of the door.

The operation of the knob is very simple for one conversant with the secret of the combination to which it has been set, and he can
 10 operate it as readily in the dark as in the light. By passing his hand along the keys or push-buttons he may readily locate the prime button, which we have designated as "No. 12," and by counting along or feeling
 15 in either direction can locate the push-buttons as they are to be actuated in rotation. It takes very little practice to render any one skilful in working the combination. In fact, after several trials it becomes practically in-
 20 stinctive. At the same time one not conversant with the combination might try indefinitely without success. It will be seen that to work the combination requires pressing the three selected push-buttons in proper
 25 rotation. The first must not be released until the second is forced inward, after which the first may be released, and the second may be released when the third has been started inward far enough to engage its tumbler-
 30 point. When the third push-button has been forced inward, the plunger is released, and the third push-button may be allowed to return to normal position, releasing the tumbler-point and permitting the spool, with the
 35 tumbler-rings, to be returned to initial position by the spring m .

In practice we prefer to provide springs F' of unequal tensions to prevent one unauthorized from finding out the combination by
 40 feeling a difference in resistance when the proper button is actuated, as he might if all the springs were of the same tension. There is an advantage in providing yielding tumbler-points upon the second and third tumbler-rings, as described, because in the event
 45 that an unauthorized person presses inward a number of buttons at once and the shank of one of the buttons is thus in the path of one of the yielding tumbler-points the latter
 50 will when engaging the said shank yield in the backward direction without causing apparent resistance to movement of the initial push-button to betray its location.

Having the spindle in one piece throughout
 55 with a bearing in the screw-cap I forms a very stable bearing for the knob, renders the construction particularly strong and durable, and makes it possible to dispense with an escutcheon. The springs F' are of a construction to permit full movement of the push-
 60 buttons to the wall d^2 , which is an advantage. They not only serve to return the push-buttons to their initial positions, but operate as means for holding them against angular move-
 65 ment and against removal from the knob.

The engagement of the push-buttons with the tumbler-points is positive and insures the desired degree of movement of the tumbler-carrying spool when properly pressed against. The construction as a whole presents a device
 70 which is particularly strong, durable, effective, and desirable for the purpose for which it is intended.

To change the combination, it is necessary first to remove the cap M , as described, to
 75 give access to the interior of the knob. The cap I' must then be removed to permit withdrawal of the spool L from the stationary sleeve-piece G . When the spool is withdrawn, its nut L' may be removed, permitting the
 80 tumbler-rings to be set at any of their notches p over the pin l^3 . The long marks on the scale l^4 , Fig. 11, represent primes. The tumbler-points should be so set with relation to
 85 each other that when any one of the tumbler-points, particularly the point n , registers with a prime-mark of the scale the other points should register with second and third marks, respectively, of the scale.

No undue limitation is to be understood
 90 from the detailed description above given of the knob-lock as it is shown in the drawings. The construction may be variously modified in the matter of details without departing from the spirit of the invention as defined by
 95 the claims.

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

1. In a knob-lock of the character described, the combination with the bolt and its engaging and releasing clutch, of step-by-step movable clutch-controlling mechanism and a plurality of push-buttons necessarily progressively movable to engage and advance the parts of said controlling mechanism in their
 100 paths, substantially as described.

2. In a knob-lock of the character described, the combination with the bolt and its engaging and releasing clutch, of permutable step-by-step movable clutch-controlling mechanism and a plurality of push-buttons necessarily progressively movable to engage and advance the parts of said controlling mechanism in their paths, substantially as described.
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3. In a knob-lock of the character described, the combination with the bolt and its engaging and releasing clutch, of clutch-controlling mechanism having rotary parts, and a plurality of push-buttons progressively movable to engage and advance the rotary parts of said controlling mechanism in their paths, substantially as described.
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4. In a knob-lock of the character described, the combination with the bolt and its engaging and releasing clutch, of clutch-controlling mechanism having rotary parts provided with projections, and a plurality of push-buttons presenting wedges at their inner ends and progressively movable to engage with their
 125 130

wedges the said projections in their paths, to move said clutch-controlling mechanism step by step, substantially as described.

5. In a knob-lock of the character described, the combination with the bolt and its engaging and releasing clutch, of clutch-controlling mechanism having permutable rotary parts provided with projections and a plurality of push-buttons presenting wedges at their inner ends, and progressively movable to engage with their wedges the said projections in their path to move said clutch-controlling mechanism step by step.

6. In a knob-lock of the character described, the combination with the bolt and its engaging and releasing clutch, of clutch-controlling mechanism having rotary parts provided with projections, some of which projections have the property of yielding in the backward direction, and a plurality of push-buttons presenting wedges at their inner ends, and progressively movable to engage with their wedges the said projections in their paths to move said clutch-controlling mechanism step by step.

7. In a knob-lock of the character described, the combination with the bolt and its engaging and releasing clutch, of clutch-controlling mechanism having rotary parts provided with backwardly yielding and unyielding projections, and a plurality of push-buttons presenting wedges at their inner ends, and progressively movable to engage with their wedges the said projections in their paths to move said clutch-controlling mechanism step by step, substantially as set forth.

8. In a knob-lock of the character described, the combination with the bolt and its engaging and releasing clutch, of clutch-controlling mechanism comprising a rotary carrier, a clutch-engaging catch in the path of said carrier, tumblers on said carrier, and a plurality of push-buttons progressively movable to engage and advance the tumblers in their paths to turn the carrier step by step.

9. In a knob-lock of the character described, the combination with the bolt and a spring-actuated, plunging, bolt engaging and releasing clutch member, of a rotary carrier, a catch in the path of said carrier engaging said clutch member when the latter is in its retracted position, tumblers upon said carrier, and a plurality of push-buttons progressively movable to engage and advance the tumblers in their paths to turn the carrier step by step to disengage said catch from said clutch member.

10. In a knob-lock of the character described, the combination with the bolt and a spring-actuated, plunging, bolt engaging and releasing clutch member, of a rotary carrier, a catch in the path of said carrier engaging the said clutch member when the latter is in its retracted position, tumblers upon said carrier, a plurality of push-buttons progressively movable to engage and advance the tumblers

in their paths to turn the carrier step by step to disengage said catch from the said clutch member, and a returning-spring for the carrier operating to move it back to normal position when released by the push-buttons.

11. In a knob-lock of the character described, the combination with the knob-casing, bolt, and a spring-actuated, plunging, bolt engaging and releasing clutch member, of a support in said casing, a rotary spring-returned carrier on the support, a spring-catch on the support, in the path of said carrier, engaging the said clutch member when the latter is in its retracted position, tumblers upon said carrier, and a plurality of push-buttons progressively movable to engage and advance the tumblers in their paths to turn the carrier step by step to disengage said catch from the said clutch member.

12. In a knob-lock of the character described, the combination with the knob-casing, bolt, and a spring-actuated, plunging, bolt engaging and releasing clutch member, of a support in said casing, a rotary spring-returned carrier on the support, a spring-catch on the support, in the path of said carrier, engaging the said clutch member when the latter is in its retracted position, permutable tumblers upon said carrier, and a plurality of push-buttons progressively movable to engage and advance the tumblers in their paths to turn the carrier step by step to disengage said catch from the said clutch member.

13. In a knob-lock of the character described, the combination with the knob-casing, bolt, and a spring-actuated, plunging, bolt engaging and releasing clutch member, of a support in the casing, a rotary spring-returned carrier on the support having a disk provided with a scale, a spring-catch in the path of said carrier engaging the said clutch member when the latter is in its retracted position, tumblers upon said carrier, means for changing the relative positions of the tumblers upon said scale to change the combination of the lock, and a plurality of push-buttons progressively movable to engage and advance the tumblers in their paths to turn the carrier step by step to disengage said catch from the said clutch member.

14. In a knob-lock of the character described, the combination with the knob-casing, of a latch-operating bolt on which said casing is journaled, a clutch member in fixed relation to said bolt, and a companion, plunging clutch member in the casing, a spring tending to force said plunging clutch member into locking engagement with said clutch member on the bolt, a catch operating to hold the plunging clutch member when retracted, catch-releasing mechanism, a plurality of push-buttons on the casing progressively movable against said catch-releasing mechanism to advance it step by step to release the said catch and bring about engagement between said clutch members, and a clutch-releaser

extending to the outside of the casing and movable to force the plunging clutch member into engagement with said catch.

15. The combination of a rotary spring-retained carrier, a post on the carrier and permutable tumbler-rings on the carrier, each having a plurality of openings to fit over said post, substantially as and for the purpose set forth.

16. The combination of a rotary spring-retained carrier formed with a central sleeve portion and with a disk portion, a post on said disk portion and a plurality of tumbler-rings surrounding said sleeve, each having a plurality of openings to fit over the said post, substantially as and for the purpose set forth.

17. The combination of a rotary spring-retained carrier formed with a central sleeve portion and with a disk portion, a post on said disk portion and a plurality of tumbler-rings surrounding said sleeve, each having a plurality of inner peripheral notches to fit over said post, substantially as and for the purpose set forth.

18. In a permutation-lock, a tumbler-ring provided on its periphery with a pivotal backwardly-yielding spring-retained tumbler-point, substantially as and for the purpose set forth.

19. In a permutation-lock, the combination of a carrier having a central sleeve portion and a disk portion marked with a scale, a post on the disk portion, tumbler-rings surrounding said sleeve, each provided with a plurality of openings to fit over said post, tumbler-points on said tumbler-rings, and a collar on said sleeve confining said tumbler-rings, substantially as and for the purpose set forth.

20. In a knob-lock of the character described, the combination with the knob-casing and bolt upon which the casing is journaled, of a clutch member on the bolt, a tubular plunger surrounding said bolt and provided with a clutch member, a support in the casing forming a guide for said plunger and forming a bearing for the outer end portion of said bolt, plunger-controlling-tumbler mechanism on said support, and operating means for the tumbler mechanism.

21. In a knob-lock of the character described, the combination with the knob-casing and bolt upon which the casing is journaled, of a clutch member on the bolt, a tubular plunger surrounding said bolt and provided with a clutch member, a support in the casing forming a guide for said plunger, a removable cap on said support forming a bearing for the outer end portion of said bolt, a spring surrounding said bolt and pressing in opposite directions against said plunger and said cap, respectively, plunger-controlling-tumbler mechanism on said support, and operating means for the tumbler mechanism.

22. In a knob-lock of the character described, the combination with the knob-cas-

ing, of an annular series of radially-arranged push-buttons projecting therefrom, one of said push-buttons presenting a characteristic engaging surface, whereby it may be readily distinguished by the touch from the other push-buttons of the series, substantially as and for the purpose set forth.

23. In a knob-lock of the character described, the combination with the knob-casing, of an annular series of radially-arranged push-buttons projecting therefrom, one of said push-buttons having a projecting point on its engaging surface, whereby it may be readily distinguished by the touch from the other push-buttons of the series, substantially as and for the purpose set forth.

24. In a knob-lock of the character described, the combination with the knob-casing and bolt engaging and releasing clutch mechanism housed within said casing, of rotary spring-retained clutch-controlling mechanism in the casing, comprising a carrier and tumbler-points upon the carrier, and a series of push-buttons extending through the wall of the casing and provided at their inner ends with wedges adapted to engage and advance said tumbler-points, substantially as and for the purpose set forth.

25. In a knob-lock of the character described, the combination of a casing having an outer wall d' and inner wall d'' , push-buttons having heads movable through openings in said outer wall and shanks movable through openings in said inner wall and springs F' coiled between their ends and connected at opposite ends respectively with said inner wall and said push-buttons, to operate substantially as and for the purpose set forth.

26. In a knob-lock, a knob-casing having a shank, base portion and perforated concentric inner and outer walls, all formed in one piece, substantially as described.

27. In a knob-lock of the character described, the combination with the hollow knob-casing body and bolt on which the said body is journaled, of a removable cap for the casing, shoulders in the casing-body, and a spring-attaching plate secured to the inner side of said cap and movable into engagement with said shoulders, substantially as described.

28. In a knob-lock of the character described, the combination with the hollow knob-casing body provided with shoulders and an annular cap-receiving recess, a removable cap fitting into said annular recess and a spring-attaching plate secured to the inner side of said cap and movable into engagement with said shoulders, substantially as described.

29. In a knob-lock of the character described, the combination with the knob-casing body having an outer annular wall, provided with a cap-receiving recess, and containing cap-retaining shoulders, of a bolt upon which said casing is journaled, a cap fitting

said recess and in the path of said bolt, and
a spring-attaching plate fastened against the
inner side of said cap, said cap and annular
wall being provided with an interengaging
5 socket and projection, whereby when the cap
is placed in position in said recess and turned,
the spring-attaching plate engages said shoul-
ders and the projection and socket engage to
lock the cap in position, and the cap can only
10 be removed by forcing the bolt against it to
release the projection from the socket and

permit turning of the cap-attaching plate
out of engagement with said shoulders.

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