

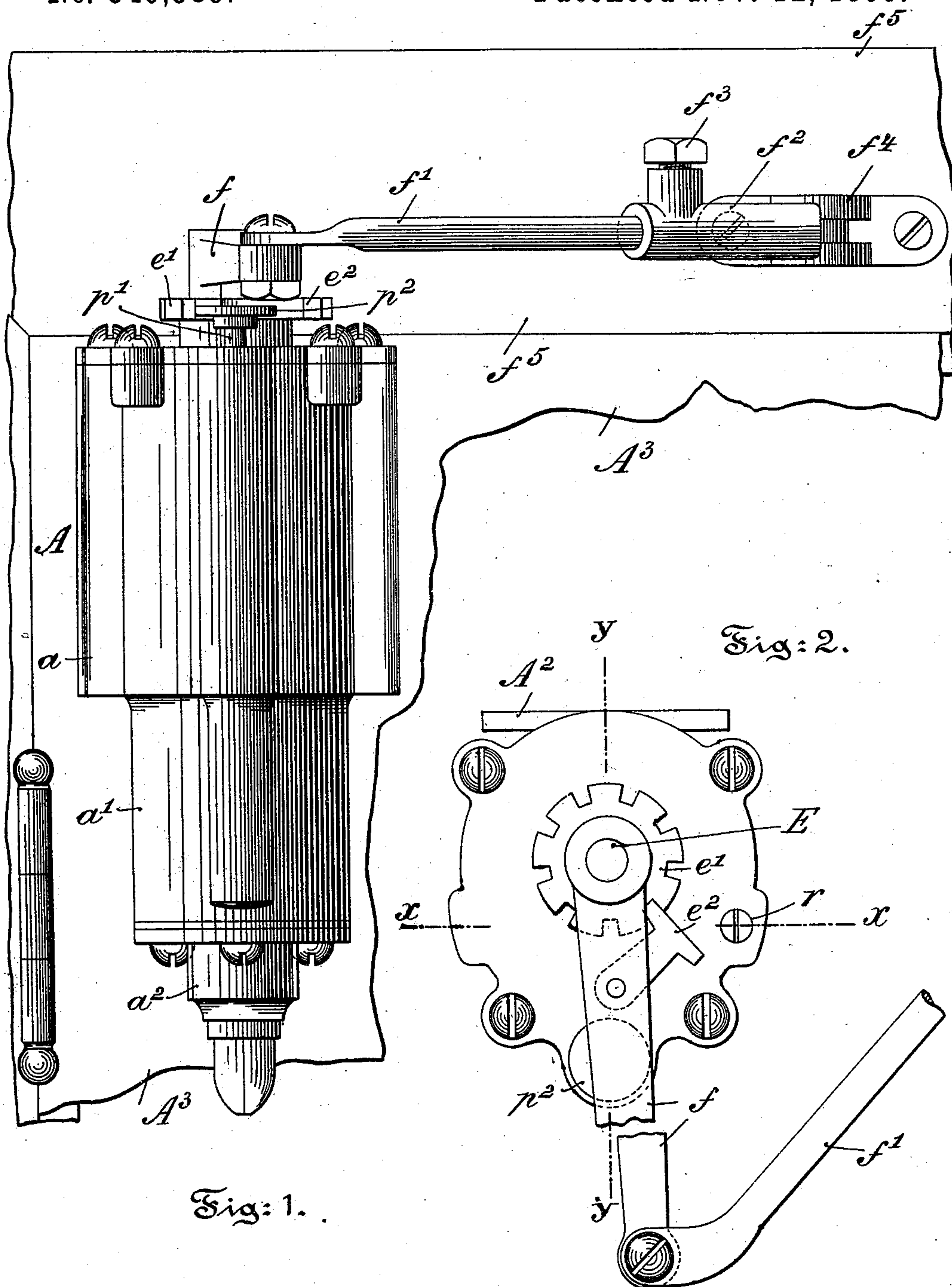
(No Model.)

3 Sheets—Sheet 1.

J. S. SHRAWDER.
LIQUID DOOR CHECK AND CLOSER.

No. 549,589.

Patented Nov. 12, 1895.



Witnesses:
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Richard C. Maxwell.

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(No Model.)

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Fig: 3.

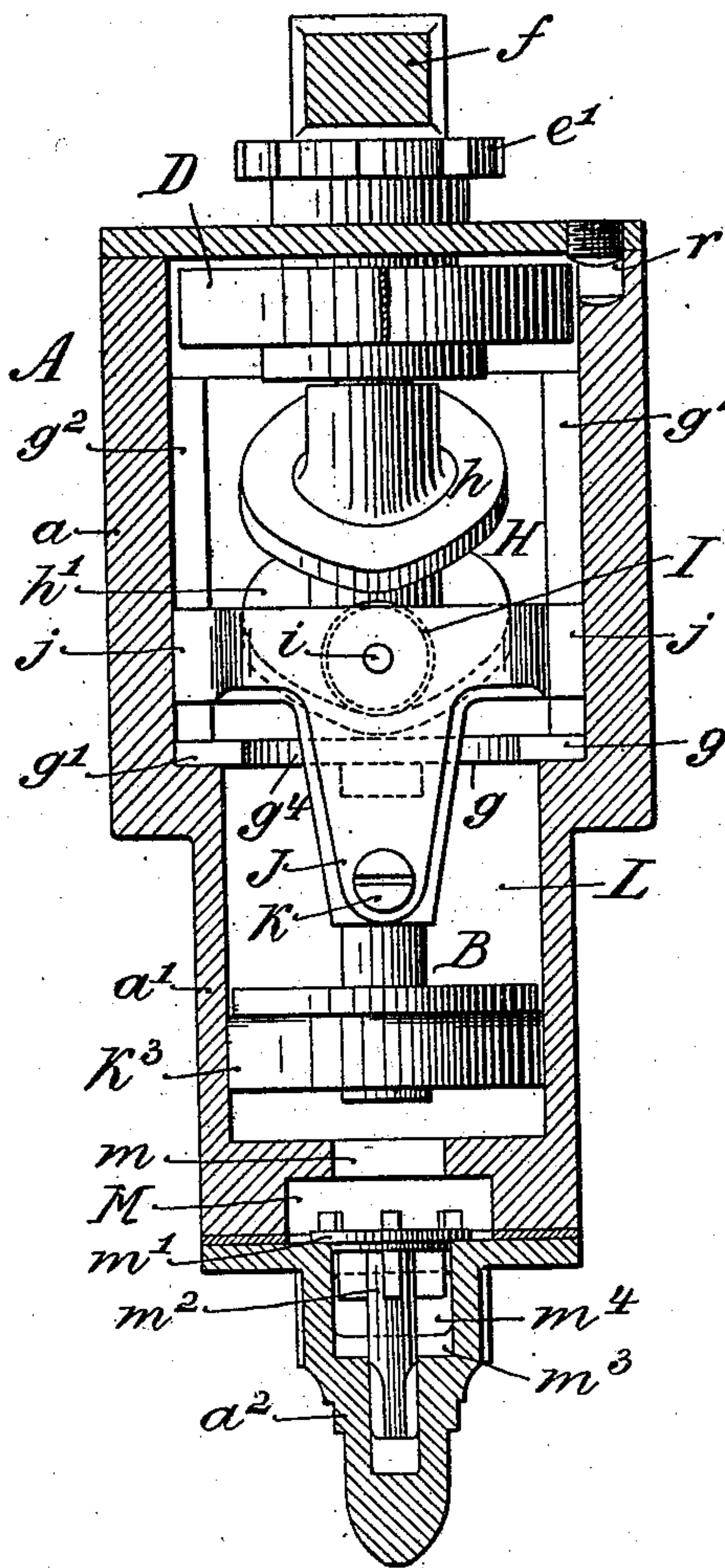
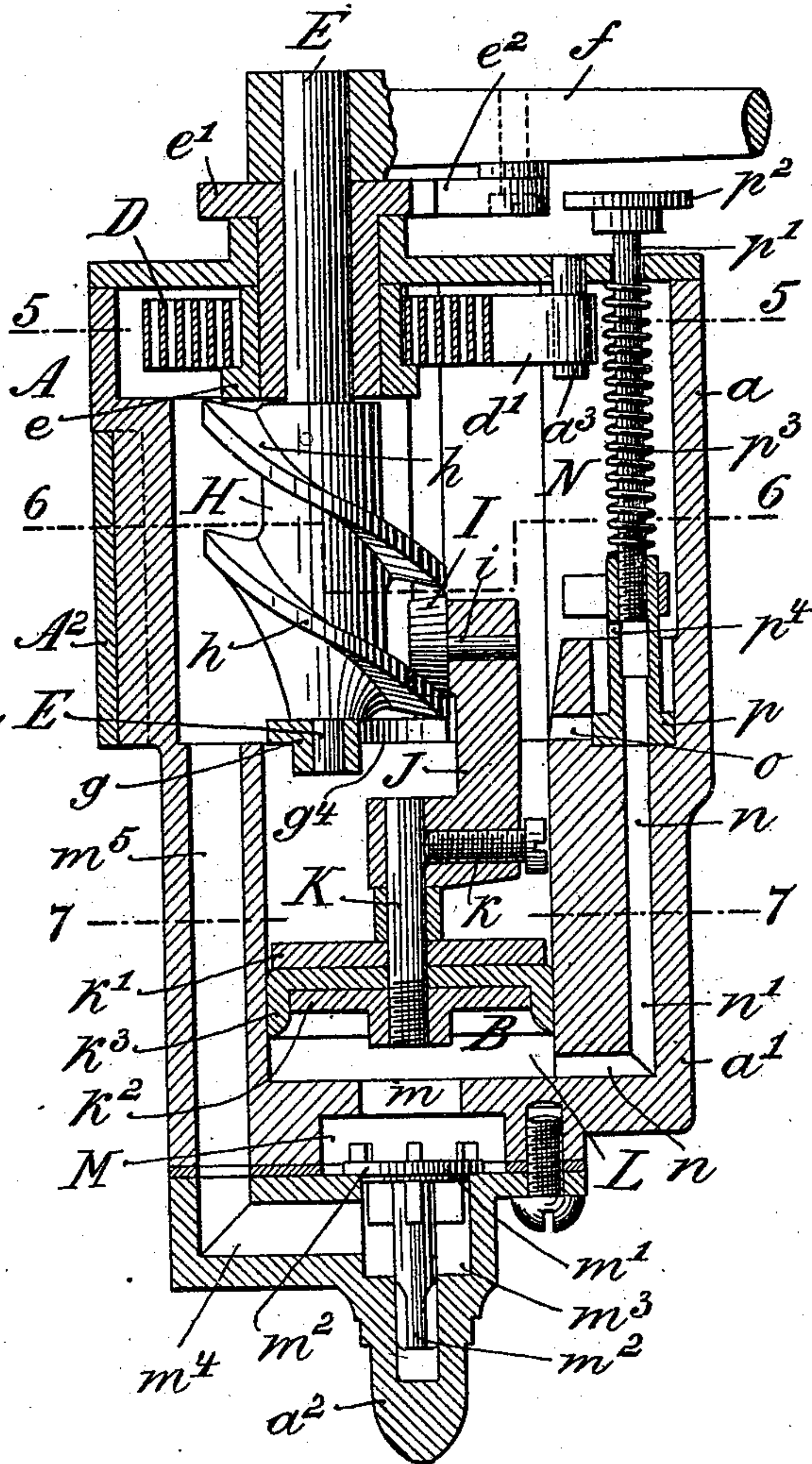


Fig: 4.



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Fig: 5.

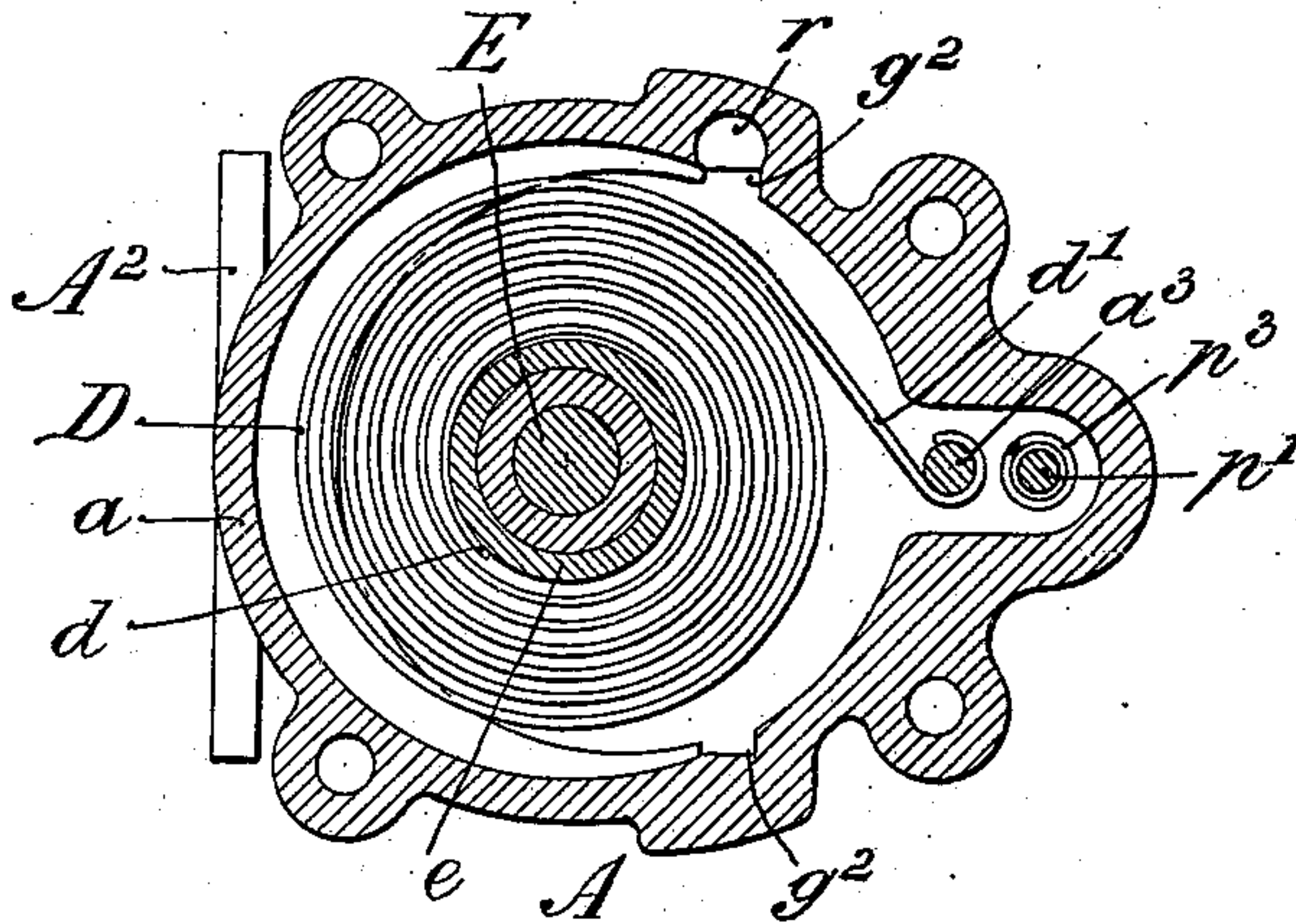


Fig: 6.

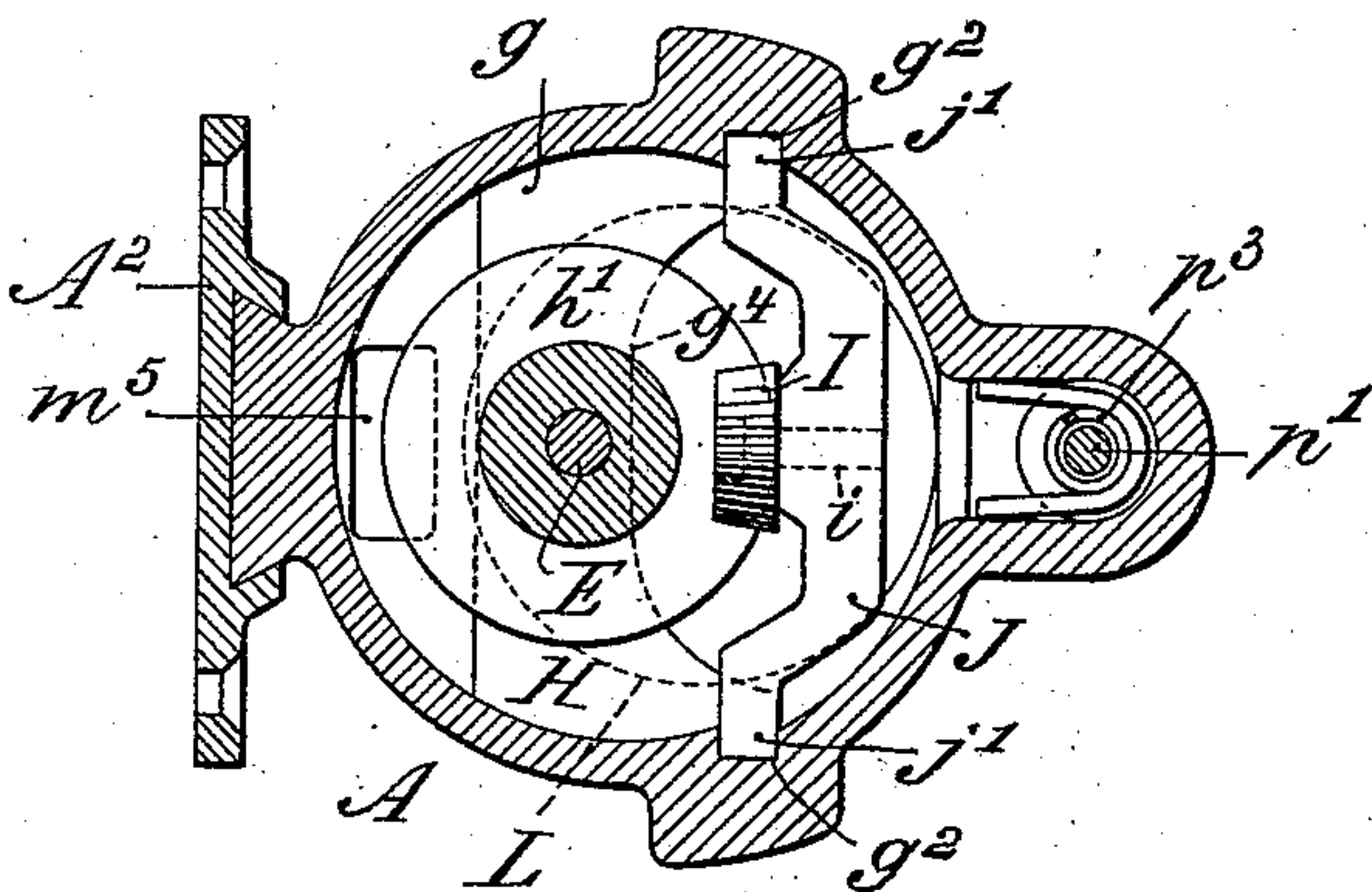


Fig: 7.

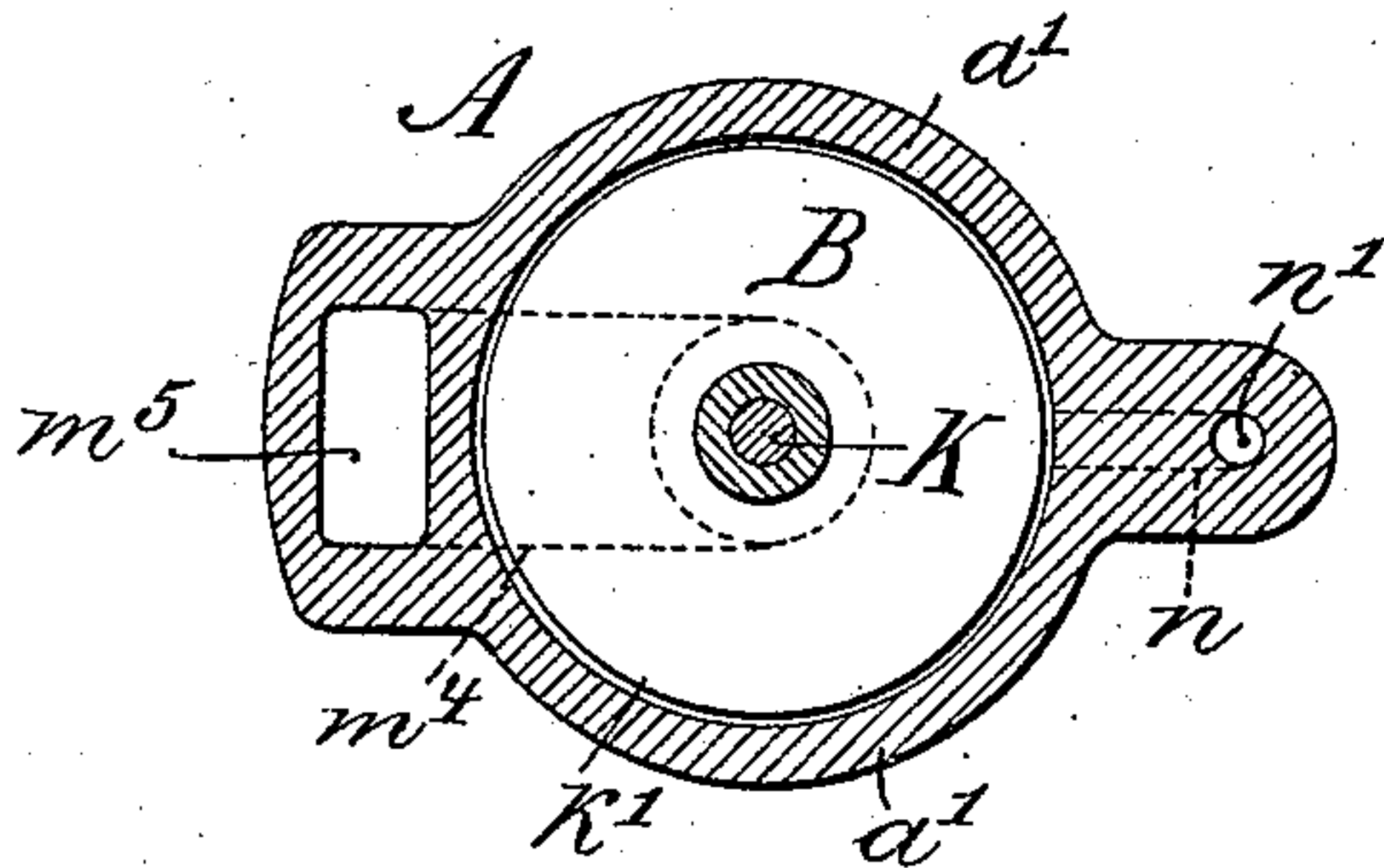
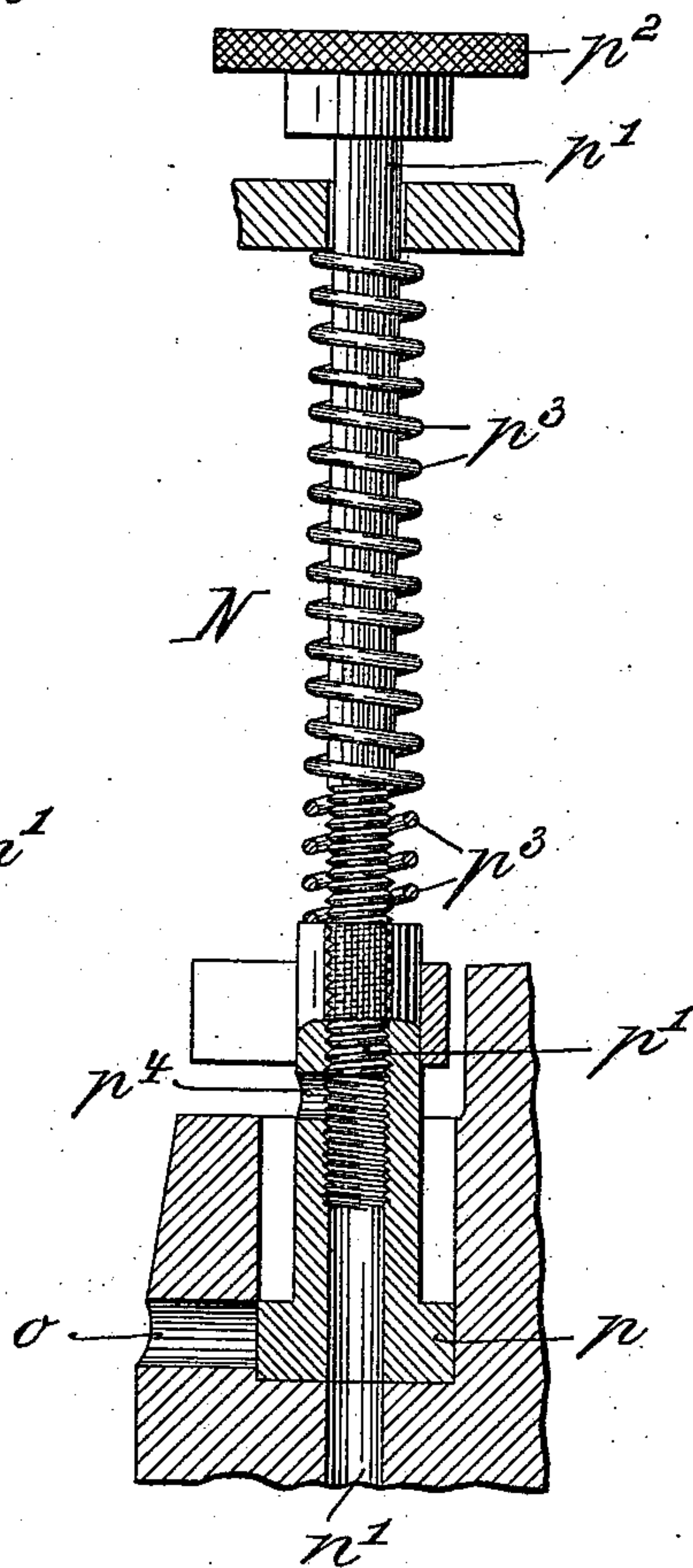


Fig: 8.



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UNITED STATES PATENT OFFICE.

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LIQUID DOOR CHECK AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 549,589, dated November 12, 1895.

Application filed June 15, 1895. Serial No. 552,887. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. SHRAWDER, a citizen of the United States, residing at Arcola, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Liquid Door Checks and Closers, of which the following is a specification.

My invention has relation to a liquid door check and closer operating by means of a piston working within a liquid chamber or cylinder, and it relates more particularly to the general construction and arrangement of such an appliance.

The principal objects of my invention are, first, to provide a liquid door check and closer in which the piston traverses a liquid-chamber in a direction parallel with the spring-controlled shaft of the check; second, to provide in a liquid door check and closer of the character described, in connection with a piston, a liquid-chamber having at its bottom an inlet controlled by a check-valve and an outlet controlled by a relief-valve; third, to provide in a liquid door check and closer of the character described a spring-controlled adjustable relief-valve to regulate the outlet from the liquid-chamber, and, fourth, to provide a liquid door check and closer having the parts of the same greatly simplified and reduced for the effective action thereof.

My invention, stated in general terms, consists of a liquid door check and closer constructed, arranged, and adapted for operation in substantially the manner hereinafter described and claimed.

The nature, general features, and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a front elevational view of a liquid door check and closer embodying features of my invention, showing the same secured in operative position to a door and the jamb thereof. Fig. 2 is a top or plan view of the check and closer, certain portions of the connection between the check and door being broken off. Fig. 3 is a transverse vertical section of the check and closer on the line xx of Fig. 2. Fig. 4 is a vertical section of the

check and closer on the line yy of Fig. 2. Fig. 5 is a cross-sectional view of the check, taken on the line 5 5 of Fig. 4. Fig. 6 is a similar sectional view on the line 6 6 of Fig. 4. Fig. 7 is a similar section taken on the line 7 7 of Fig. 4; and Fig. 8 is a front elevational view, enlarged, of the adjustable and spring-controlled relief-valve of the liquid-chamber.

Referring to the drawings, A represents a vertical cylinder consisting of the upper housing or casing a , within which the spring D and the operating mechanism for the piston are incased, the middle portion a' constituting the liquid-chamber L, which is traversed by a piston B. a^2 is the lower portion, constituting the inlet to the liquid-chamber, in which is located a check-valve m^2 . The spring D consists of a leaf-spring coiled around the shaft E, one end d of said spring being secured to a collar e , mounted on said shaft, while the other end d' of said spring is secured to a pin or projection a^3 of the casing a , substantially as illustrated in Figs. 4 and 5. Secured to the collar e and loosely mounted on the shaft E is a ratchet-wheel e' , the teeth of which are engaged by a pawl e^2 , pivoted to an arm f , which in turn is connected at one end with the shaft E, as illustrated in Fig. 2. Secured to the free end of the arm f is an adjustable link or connecting-rod f' , which is also secured in a hollow arm or sleeve f^2 by means of a set-screw f^3 . This sleeve f^2 is pivoted in a bearing f^4 , adapted to be secured to a door-jamb f^5 , as illustrated in Fig. 1. The cylinder A is provided with a back plate or bracket A^2 , adapted to be screwed or otherwise fastened to the door A^3 and to support the cylinder in operative position.

The shaft E extends within the casing a and is supported at its lower end by a plate g , the ends g' of which fit into the internal grooves g^2 of the casing a , substantially in the manner illustrated in Fig. 3 of the drawings.

Mounted on the shaft E and within the casing a is a cam device H, consisting of the upper and lower cams h and h' , and between these cams is located a conical-shaped roller I, the shaft i of which has a bearing in a bracket J, the ends j' of which are guided in the internal grooves g^2 of the casing a . The

bracket J carries at its lower end the piston-rod K, which may be secured to the bracket by means of a screw k or by any other suitable contrivance. On the piston-rod K and
5 clamped between the two disks k^1 and k^2 is a leather cup k^3 , fitting snugly in the liquid-chamber L, which is contained in the middle portion a' of the cylinder A. This leather or
10 similar cup k^3 constitutes the head for the piston-rod K.

Immediately below the liquid-chamber L, and having a centrally-located opening m , communicating therewith, is a chamber M, having a seat m' , on which the weighted
15 check-valve m^2 is adapted to rest. Below the seat m' is a compartment m^3 , communicating by means of the channel m^4 , at right angles to the compartment m^3 , with a liquid-way m^5 , parallel with the liquid-chamber L
20 and provided in one of the walls thereof. This way m^5 terminates at the upper end of the liquid-chamber L, substantially in the manner illustrated in Fig. 4 of the drawings.

At the side of the chamber L and at or near
25 its bottom is located an opening or channel n , communicating with a way n' , at right angles thereto, which way n' is parallel with the liquid-chamber L and provided in one of the walls thereof. The upper end of this way n'
30 terminates at the upper end of the liquid-chamber L, as illustrated in Fig. 4. The upper end of the way n' is controlled by a relief-valve N, the construction of which is illustrated in detail in Fig. 8 of the drawings.
35 This relief-valve consists of a hollow plug or stem p , fitting down upon the upper end of the way and closing the channel o , communicating between the chamber L and way n' . This hollow plug p is screwed to the end of
40 the spindle p' , which extends upward through the compartment a and terminates in a button p^2 outside of the cylinder A and at the top thereof.

Between the upper end of the hollow plug
45 p and the inner side of the upper wall of the chamber a and around the spindle p' is coiled a spring p^3 , which serves to seat the plug p down upon the way n' . In the side of the plug p is provided an opening p^4 , which may
50 be wholly or partially closed when the spindle p' is screwed down into the hollow plug p . This opening p^4 communicates with the chamber a above the liquid-chamber L. The chambers L and a are always in open communication with each other through the plate
55 g , which is cut away, as at g^4 , to permit of the up-and-down movement of the lower end of the bracket J, as clearly illustrated in Figs. 3 and 4.

60 In the casing a , at the top, is provided an opening r , which is adapted to afford a means for filling or replenishing liquid in the check. This opening is normally closed by a screw-plug, as illustrated in Figs. 2, 3, and 5.

65 The mode of operation of the liquid door check and closer hereinbefore described is as follows: The check and closer is secured to

the door A^3 and the bearing f^4 is applied and secured to the door-jamb f^5 . The arm f and link f' are then secured to the hollow arm f^2 70 of the bearing f^4 . When the door is opened inwardly, the shaft E will be revolved and the coiled leaf-spring D will be tightened or compressed. By the revolution of the shaft E the cam device II in turning will elevate the
75 piston k^3 in the liquid-chamber L, this being accomplished by means of the bracket J and its roller I. During the upward movement of the piston k^3 in the liquid-chamber the liquid therein is elevated until it overflows in a
80 downward direction through the way m^5 and into the compartment m^3 under the check-valve m^2 . The liquid, in conjunction with the suction produced by the piston in its upward travel, will suffice to lift the weighted check-
85 valve m^2 from its seat, permitting the liquid to enter the chamber M and then to pass into the liquid-chamber L below the piston through the central opening m . After the
90 door has been opened to its widest extent the leaf-spring D in unwinding will turn the shaft E in the opposite direction, and the shaft E, through the cam device II, roller I, and bracket J, will depress the piston k^3 in the
95 liquid-chamber L. The downward movement of the piston will, however, compress the liquid in the chamber L, thus closing the check-valve m^2 on its seat and preventing return of the liquid through the way m^5 . The liquid is
100 then compelled to escape through the way n' , the outlet of which may be controlled in two ways by the relief-valve N. If the opening p^4 is entirely closed by screwing down the spindle
105 p' into the plug, the liquid when forced through the way n' will lift the plug and spindle against the influence of the spring p^3 until the passage o is open, when the liquid
110 will escape into the liquid-chamber above the piston k^3 . If, however, the opening p^4 is not obstructed by the spindle p' , or only partially so, the liquid will partially elevate the
115 plug of the way n' at the beginning of the return of the door, and the liquid will thereafter escape through the hollow plug and the opening p^4 into the chamber a , and then into
120 the liquid-chamber L. By combining the regulation of the valve N—that is to say, regulating the size of the opening p^4 by screwing the spindle p' ,—and regulating the tension of the spring p^3 in the same manner—that is to
125 say, compressing the spring p^3 between the casing a and the plug by advancing the spindle into the plug—the closing force of the coiled leaf-spring D may be easily and readily compensated for; and, moreover, no mat-
130 ter what the weight of the door may be or the distance it has to travel the closing thereof will be accomplished in a complete and gradual manner, with all slamming or jarring avoided.

The mechanism for operating the piston forms no part of the present invention, for it is manifest that mechanism other than that shown and described may be devised for rais-

ing and lowering the piston in the liquid-chamber. The placing of the cup-shaped piston-head k^3 between clamping-washers k^1 and k^2 enables me, by simply screwing the washer k^2 on the piston-rod K , to expand the head k^3 , so that the same may fit tightly against the walls of the chamber L , and thus compensate for wear and tear on the piston-head.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A liquid door check and closer, comprising a liquid chamber having an inlet and an outlet, a spring controlled shaft, a piston adapted to traverse the liquid chamber in a direction parallel to said shaft when said shaft is rotated, a check valve controlling the inlet to the liquid chamber to permit of the flow of liquid therein when the piston is actuated in one direction by said shaft and to close the inlet when the piston is actuated in the reverse direction, a hollow plug provided with an opening constituting a relief valve for the outlet of said liquid chamber, a spindle adjustable in said plug and regulating the opening thereof, and a spring coiled about said spindle to normally close said plug down upon the outlet of the liquid chamber, substantially as described.

2. A liquid door check and closer, compris-

ing a cylinder arranged in three vertical sections, a piston, mechanism placed in the upper section of the cylinder adapted to operate said piston vertically to cause the same to traverse the second section or liquid chamber of the cylinder, a spring controlled shaft placed in said upper section parallel with the line of travel of the piston, a check-valve placed between the second and lower sections to control the inlet to said second or liquid chamber, a way provided between and connecting the liquid chamber with the upper section, a hollow plug provided with an opening and controlling the outlet of said way to constitute a relief-valve for said liquid chamber, a spindle adjustable in said plug and adapted to control the opening therein, a spring coiled about said spindle and adapted to be compressed or released when the spindle is advanced in or drawn out of said plug, said spring adapted to seat the plug upon the outlet of the way to close the same, substantially as described.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN S. SHRAWDER.

Witnesses:

THOMAS M. SMITH,

RICHARD C. MAXWELL.