

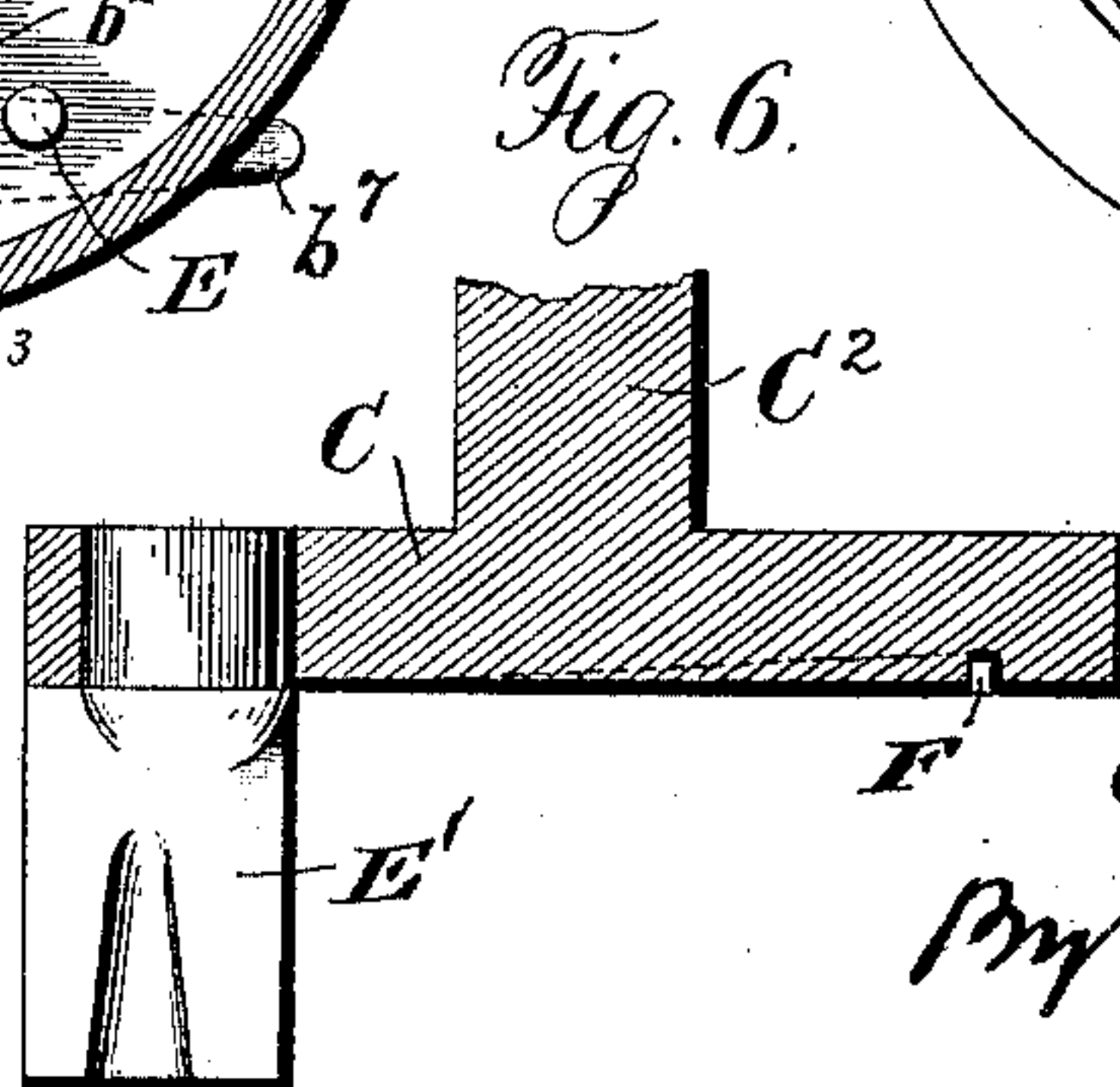
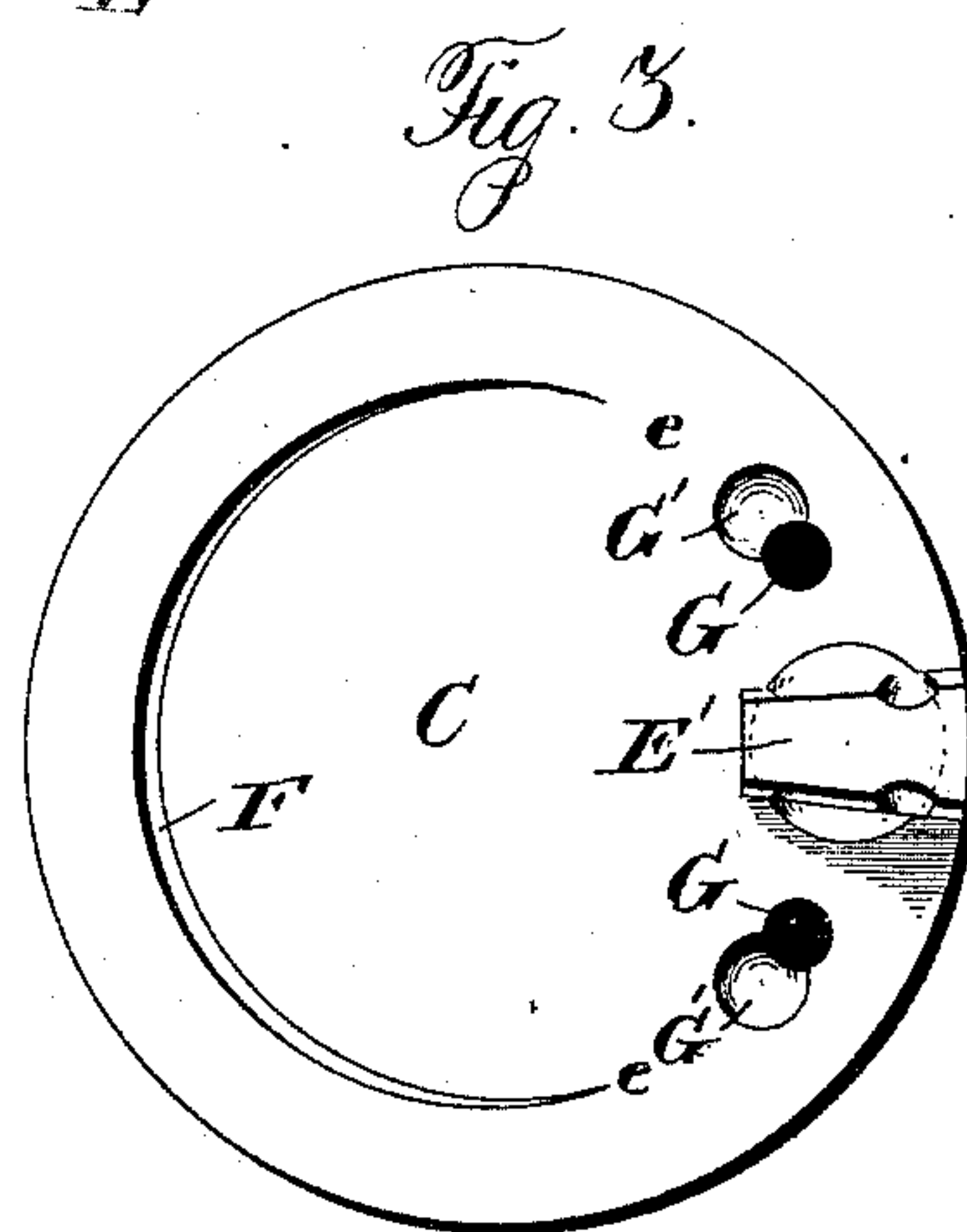
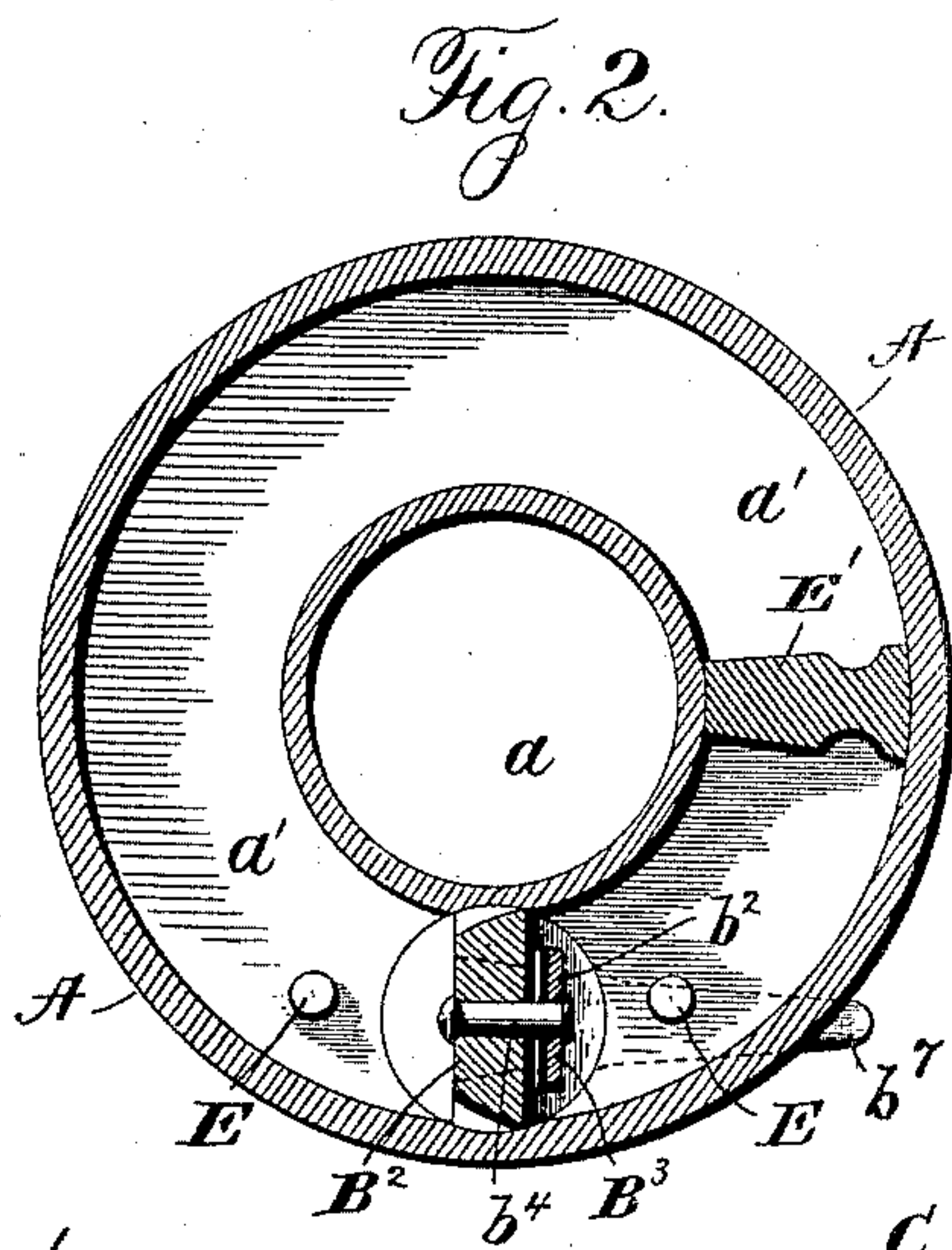
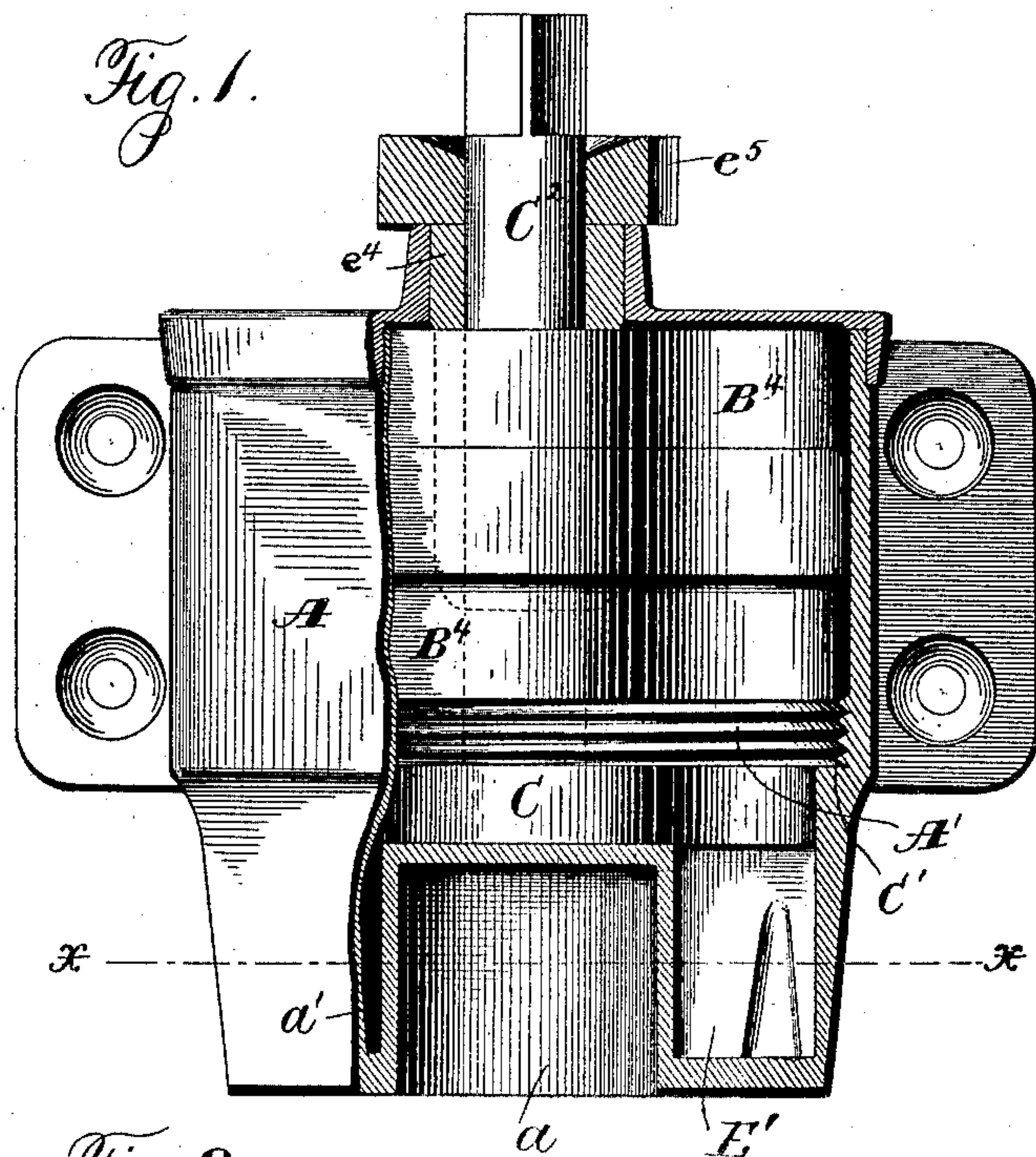
(No Model.)

7 Sheets—Sheet 1.

W. GILFILLAN.
COMBINED DOOR SPRING AND CHECK.

No. 473,456.

Patented Apr. 26, 1892.



Witnesses:
Jas. C. Hutchinson
G. J. Downing.

Inventor:
William Gilfillan
By H. A. Symonds
Attorney.

(No Model.)

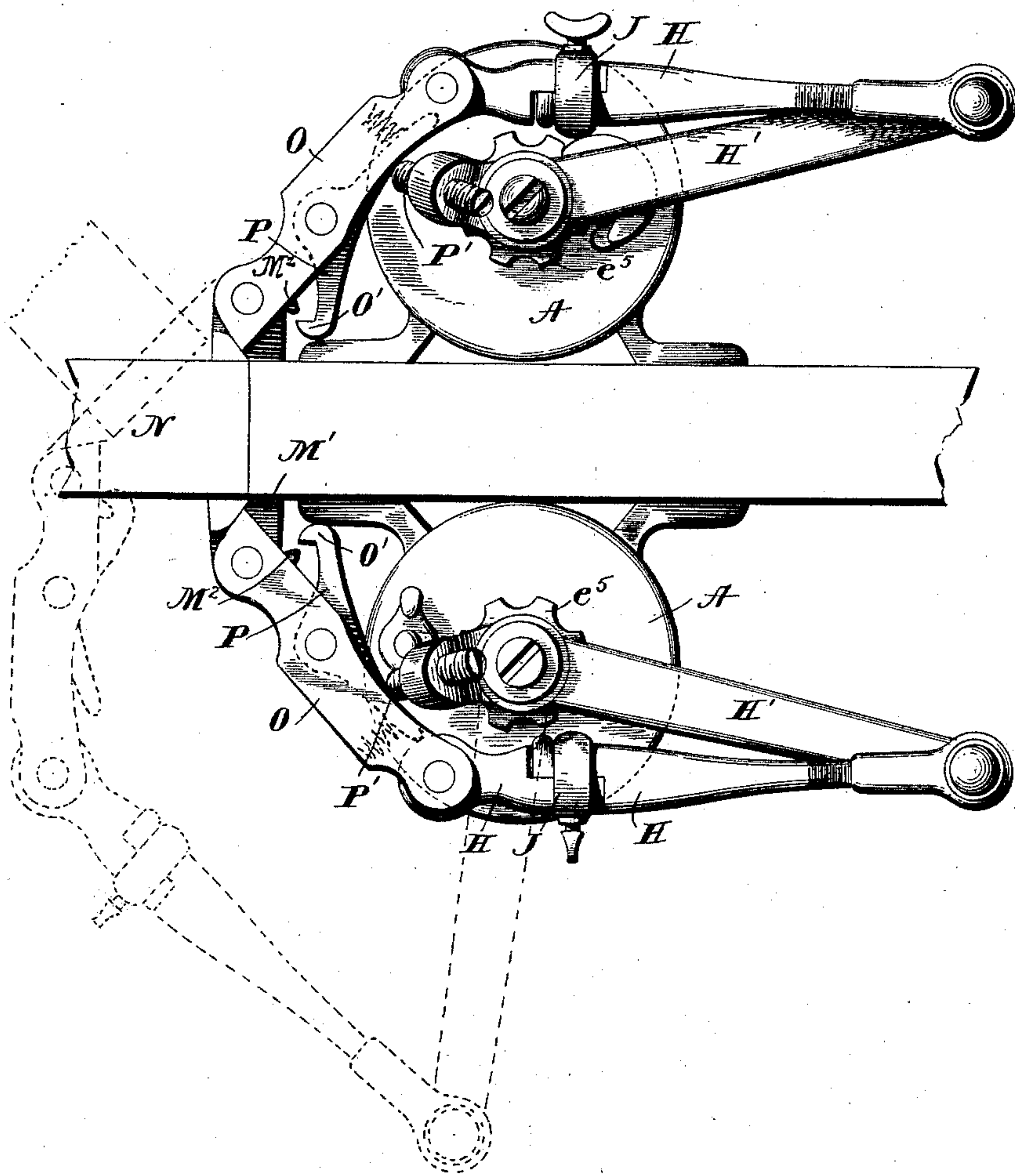
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Fig. 4.



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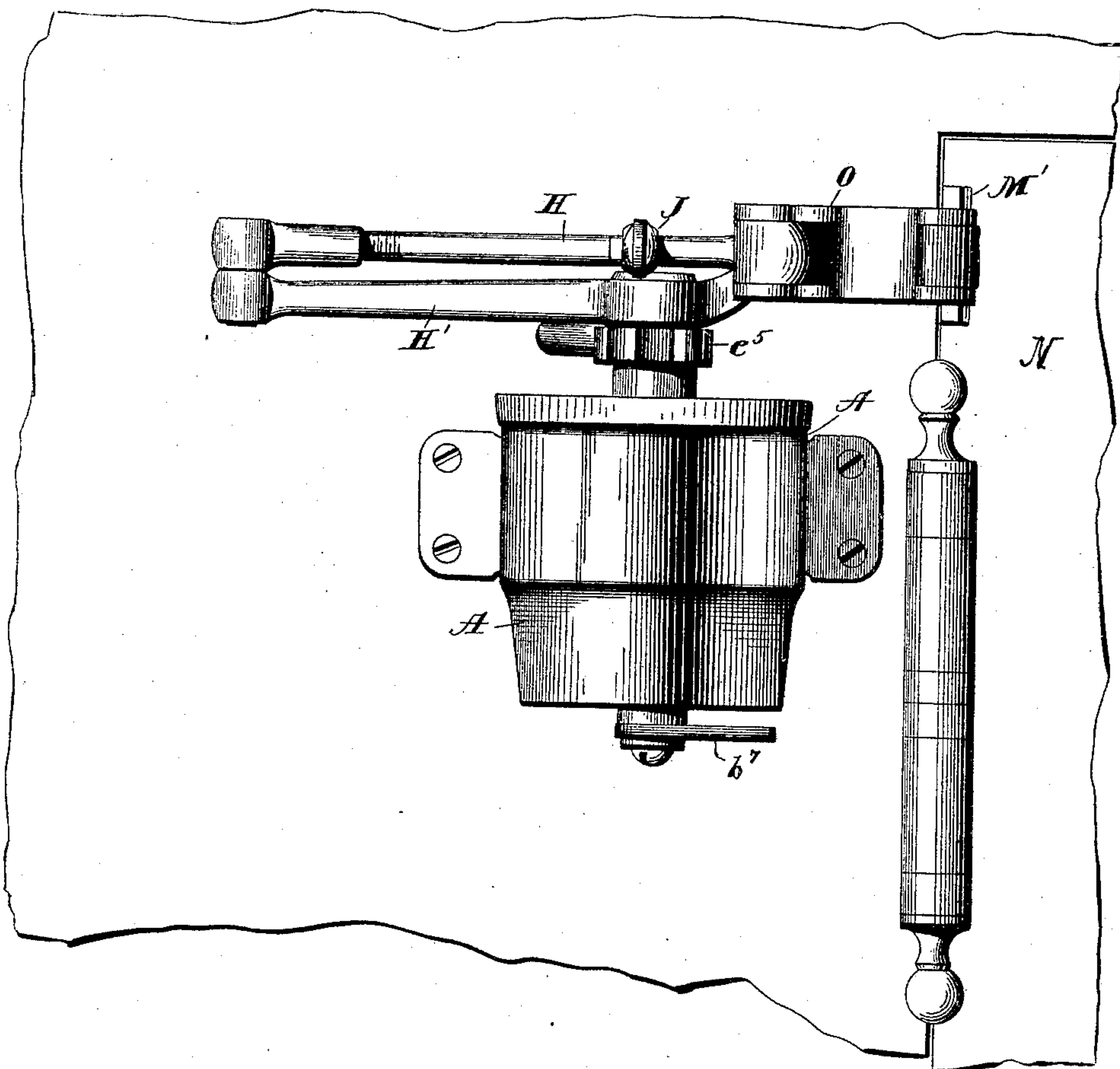
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Fig. 5.



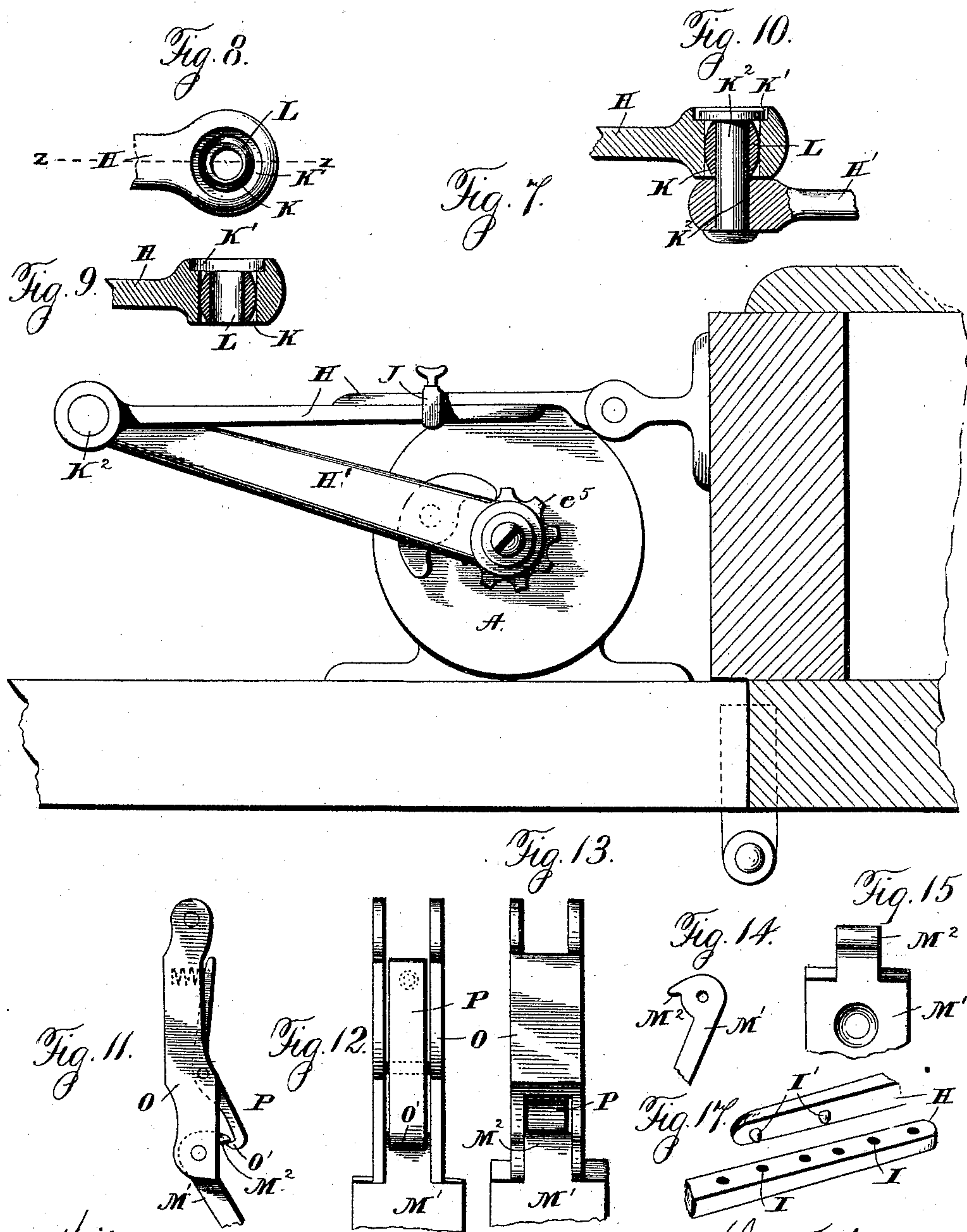
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Fig. 16.

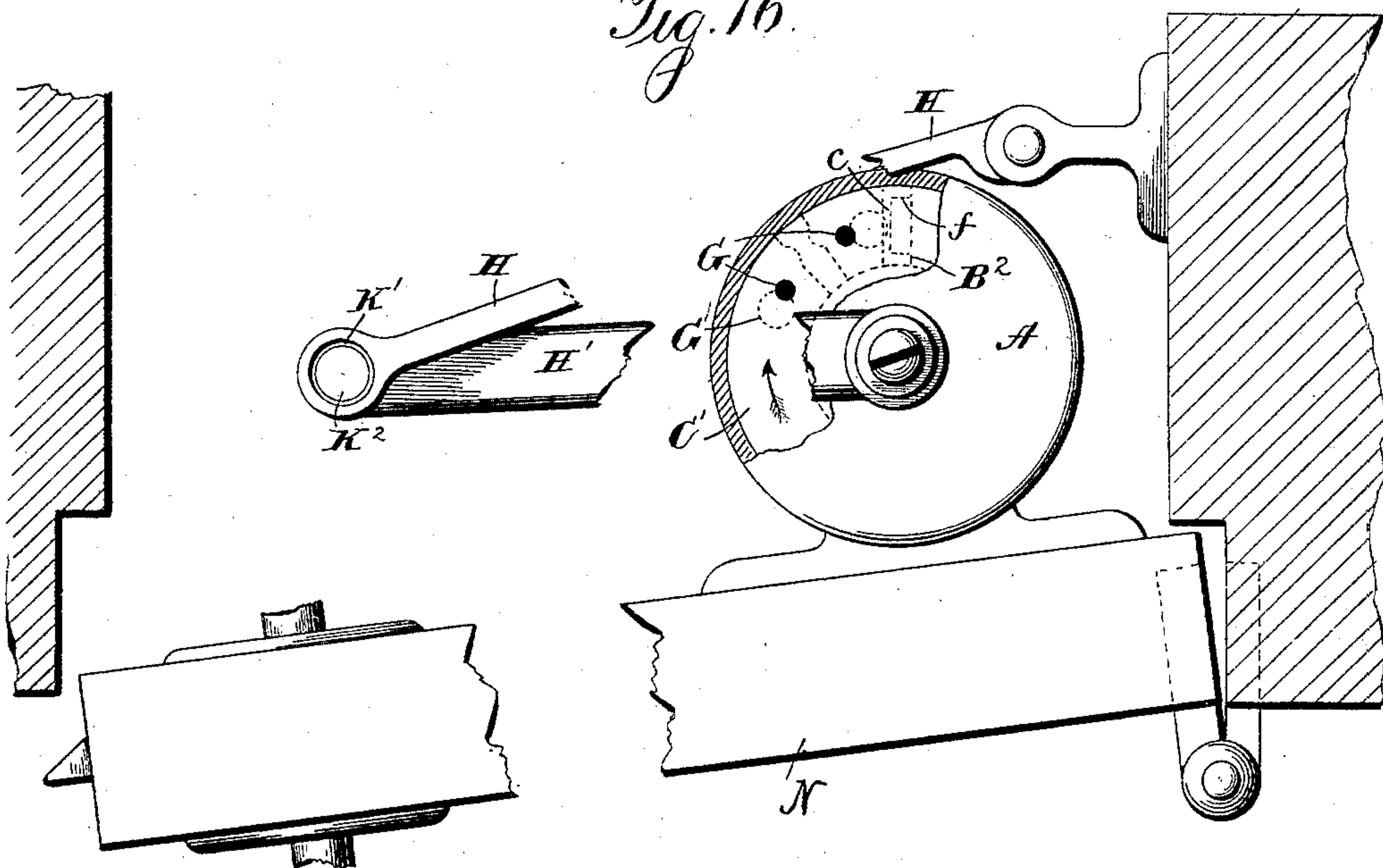


Fig. 18.

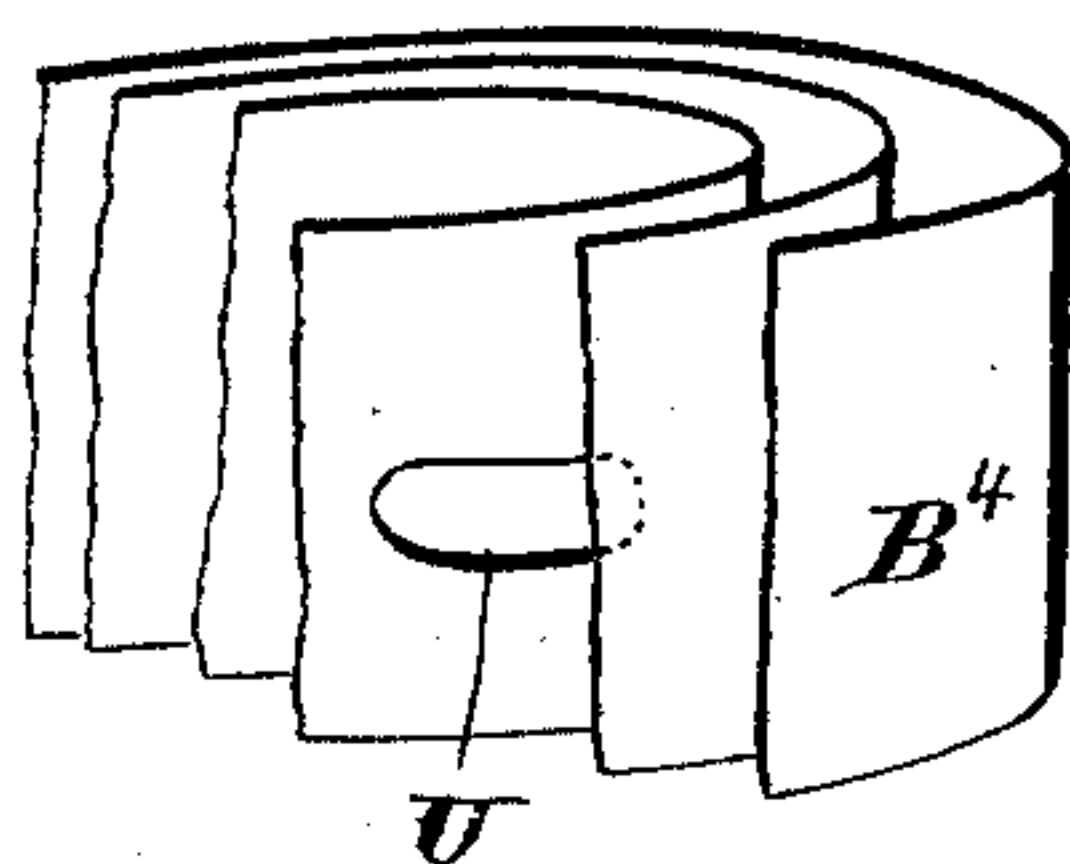
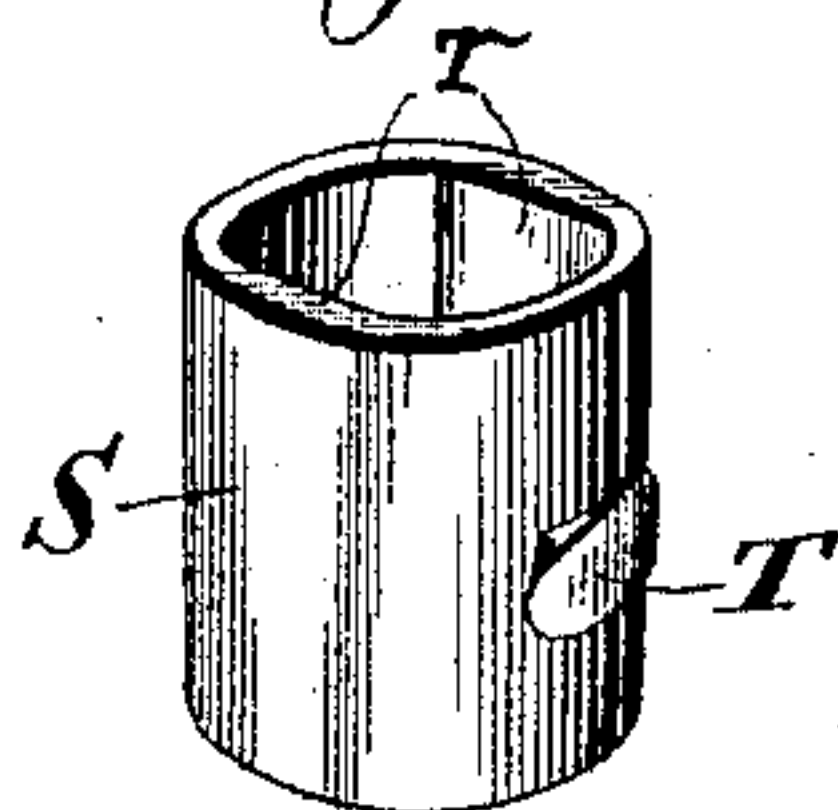


Fig. 19.



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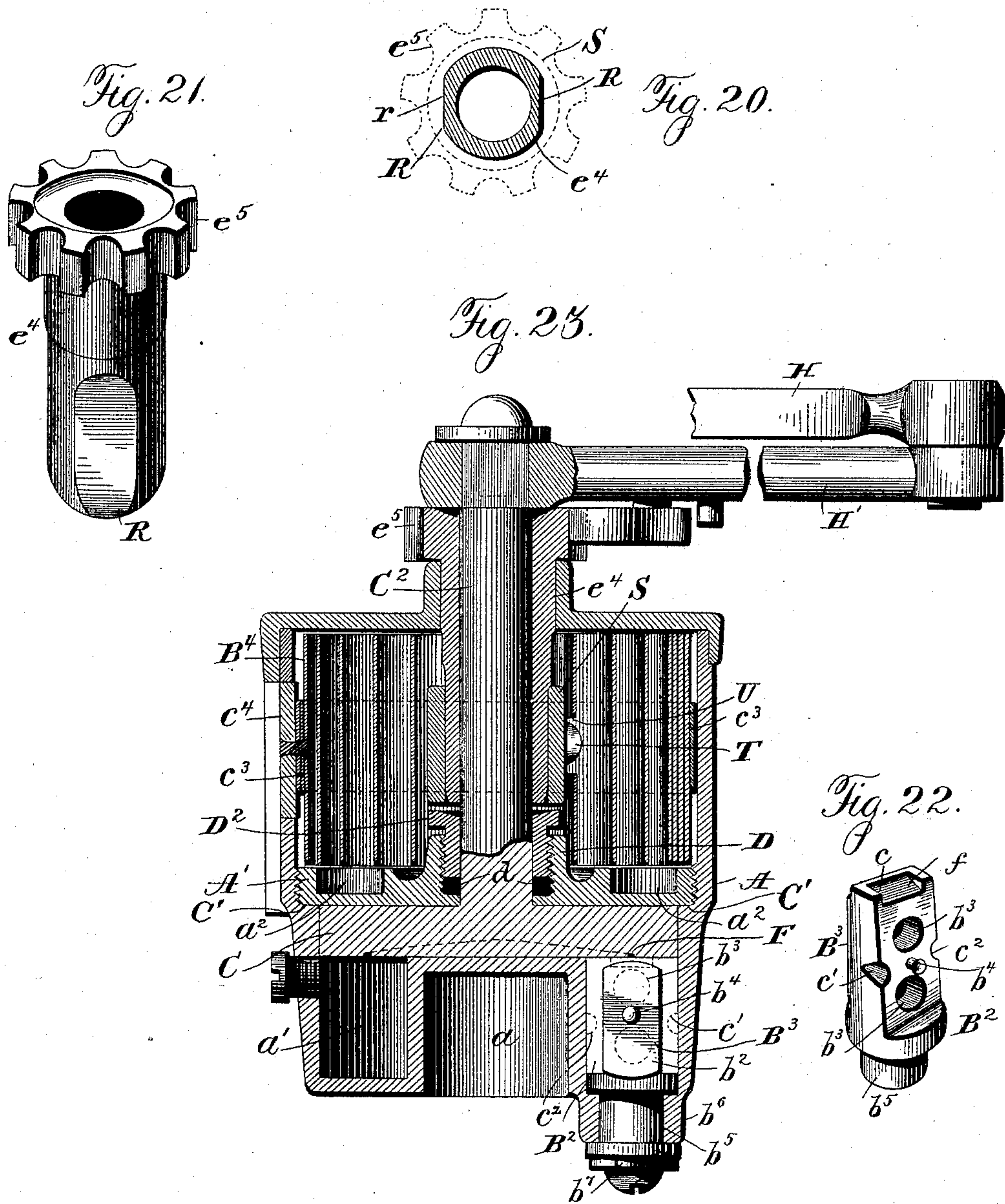
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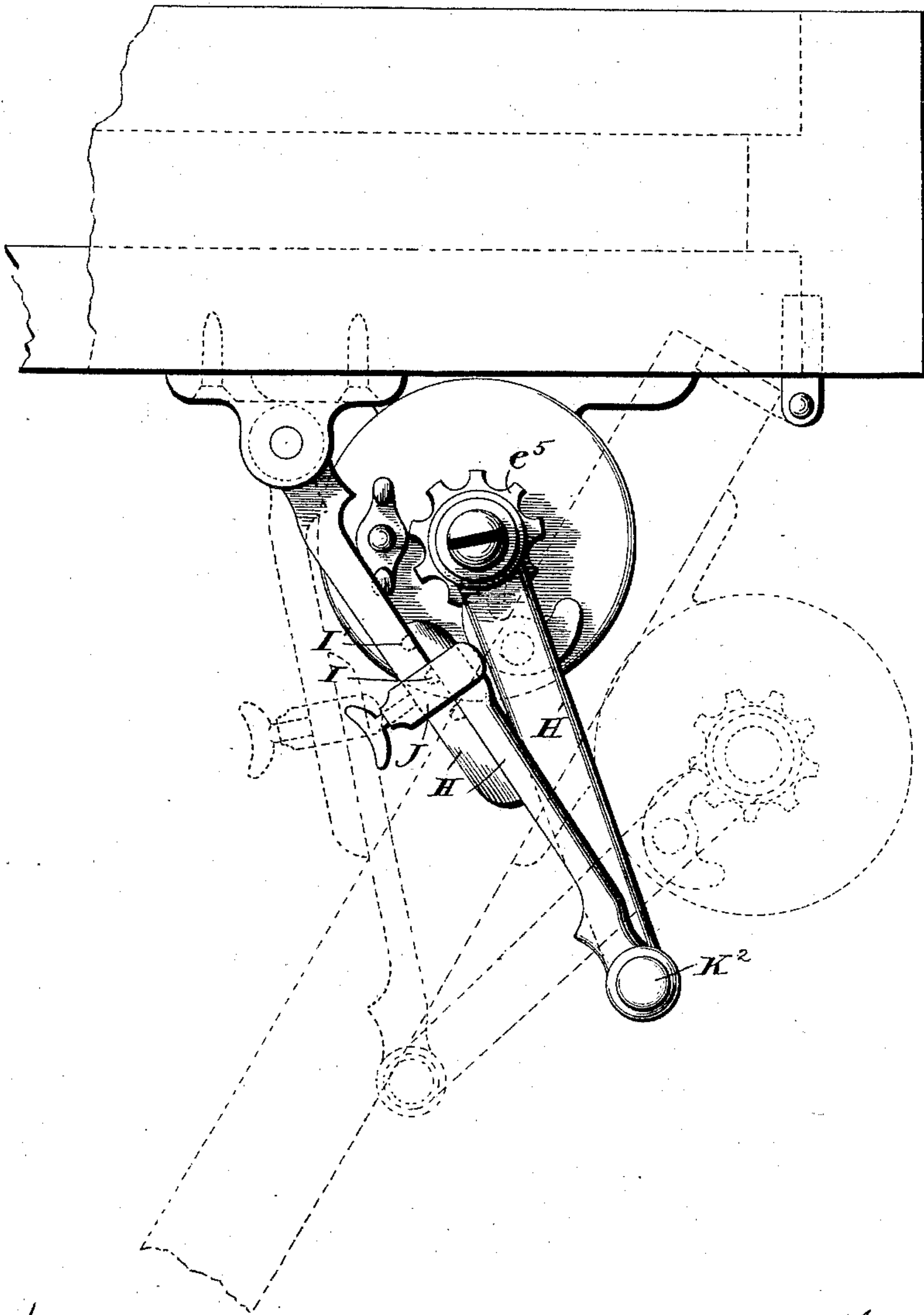
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Fig. 24.



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UNITED STATES PATENT OFFICE.

WILLIAM GILFILLAN, OF NEW BRITAIN, CONNECTICUT.

COMBINED DOOR SPRING AND CHECK.

SPECIFICATION forming part of Letters Patent No. 473,456, dated April 26, 1892.

Application filed January 9, 1892. Serial No. 417,513. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GILFILLAN, of New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Door Springs and Checks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide a door-check of such construction that it will gradually check the speed of the door in closing and when the door has nearly closed will release the door to the action of the spring and thereby insure the latching of the door.

A further object is to provide means for adjusting the latching movement of the door by causing the release of the check at any desired point in its range of action.

A further object is to balance the pressure on the rotary disk and thereby reduce the friction and wear of the parts to the minimum.

A further object is to provide the arms of the check with self-adjustable joints to insure their perfect freedom to action.

A further object is to provide door-checks for use on the opposite sides of partition or swinging doors.

A further object is to improve the details of construction of liquid door-checks.

With these several ends in view my invention consists in the several features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of my improved door-check, a portion of the casing being cut away to show the interior arrangement of parts. Fig. 2 is a horizontal section through line xx of Fig. 1. Fig. 3 is a plan view of the under side of the rotary disk. Fig. 4 is a plan view of two door-checks attached to a swinging or partition door. Fig. 5 is a side view of the same. Fig. 6 is a vertical section of the spindle and disk. Fig. 7 is a plan view of a door-check attached to the door and to the door-jamb. Fig. 8 is a plan view of the jointed end of the link. Fig. 9 is a section taken through z of Fig. 8. Fig. 10 is a vertical sec-

tion of the link and arm at their joint. Fig. 11 is a side view of the hinged yoke used on swinging doors. Fig. 12 is a front view of the yoke. Fig. 13 is a rear view of the yoke. Fig. 14 is an edge view of the bracket to which the yoke is attached. Fig. 15 is a face view of the bracket. Fig. 16 is a top view of the check with a portion of the casing cut away to show the relative arrangement of the arm and wing when the door is in position for latching. Fig. 17 is a detached view of the adjustable sections of the check-arm. Fig. 18 is a section of the spring. Fig. 19 is a view in perspective of the thimble S . Fig. 20 is a cross-section of the sleeve encircling the spindle. Fig. 21 is a view in perspective of the same. Fig. 22 is a view in perspective of the plug. Fig. 23 is a view in vertical section of the door-check. Fig. 24 represents the door-check as ordinarily applied to a door and its casing.

A represents the casing, which is cast in a single piece, its bottom being provided with an inverted-cup-shaped projection a , the circular wall of which constitutes the inner wall of the annular liquid-chamber a' , the casing forming its outer wall. An annular ledge C' , formed on the inside of the casing, constitutes a seat for the packing-disk A' , which latter is constructed with a screw-threaded periphery which engages corresponding screw-threads on the inner wall of the casing located immediately above ledge C' . Packing-disk A' is provided on its upper side with recesses a^2 for the reception of a wrench to secure it in place. By screwing disk A' tightly against the annular ledge C' any liquid that may flow past or through the openings in the rotary disk, which latter constitutes a top or cover for the liquid-chamber, will be prevented from flowing into the spring-chamber. On the upper face of the packing-disk A' is formed a stuffing-box D , within which is placed any suitable packing d , which is forced against the lower end of spindle C^2 by the gland D^2 , and thus any leakage past the spindle to the spring-chamber is prevented. The rotary disk C is formed integral with or secured to the lower end of spindle C^2 , and, as has been stated, constitutes the top or cover of the liquid-chamber a' . To the lower face of the rotary disk is secured a wing or blade

E', the opposite edges of which engage or move in close proximity to the inner and outer walls of the annular liquid-chamber.

B² is a reversible plug provided with a valve B³, which latter consists of a metal plate b², which is placed over the through openings b³ in the plug and is attached to a guide-pin b⁴, which passes through the plug, whereby the valve is allowed a limited movement toward and away from its seat. The lower end of the plug is constructed with a shank b⁵, which extends downwardly through a boss b⁶, formed on the bottom of the casing. To the projecting end of the shank is fastened a handle b⁷ for adjusting and reversing the plug. The upper end of the plug is beveled, as at c, and its side edges are grooved, as at c' c², for a purpose hereinafter explained.

In the bottom of the annular liquid-chamber and at each side of the reversible plug is located a stop-pin E, which serves to arrest the movement of the wing E' and prevent it from coming in contact with the plug, thus guarding the latter against undue strains or breakage.

For the purpose of automatically regulating the movement of the check I provide the lower face of disk C' with a circular groove F, which has its greatest depth at a point opposite the wing E', from which point it gradually diminishes in depth toward its opposite ends, which latter merge or vanish into the plain flat spaces e e, located between the opposite ends of the groove and the enlarged ports G', connected with the holes G at either side of the wing E'. As the upper and beveled edge of the plug engages the under face of the rotary disk, the escape of liquid past the plug through the channel or groove F, formed in the rotary disk, will be regulated and controlled by the depth of the channel, which, as has been stated, constantly varies throughout its length. The depth or cross-sectional area of the channel is so varied that when the door commences to close the deepest portion of the channel is located above the plug, and hence provides for the maximum escape of liquid past it. Hence as the door commences to close it will have a quick movement imparted to it by the spring, due to the escape of the liquid-resisting medium through the deepest portion of the channel or groove F. As the door continues to close, the escape of liquid is gradually checked, owing to the gradually-diminished depth of the circular groove, with the result that the movement of the door is gradually retarded and checked until its movement nearly ceases, and this point is reached when the door has nearly closed and when the reversible plug engages the plain flat surface e between the end of the groove and the port G'. In Fig. 16 I illustrate the position of the door at the point of greatest retardation. It will be observed that when the door is not yet latched and while in this position the ledge of the port G', which communicates with the hole G through the

disk, is at the plug B², and a little farther movement will bring the port G' over the plug and permit the liquid to flow freely over the plug and to its opposite side. This action results in suddenly releasing the checking action of the liquid and permitting the spring to exert its full force to suddenly close the door. However, the door having nearly closed before the release of the checking action, it will close without slamming, though with sufficient force and certainty to insure its latching. The port G' is of sufficient length or area to allow the liquid to escape over the plug throughout the final closing and latching of the door. The holes G G, formed through the rotary disk on opposite sides of the wing or blade, serve the purpose of permitting a portion of the liquid under pressure in the liquid-chamber to flow through the disk and between its upper surface and the lower surface of the packing plate or disk A'. In the absence of any such openings the rotary disk would be forced upwardly against the packing-disk by the upward pressure of the liquid, thereby causing an undue amount of friction and wear between their engaging surfaces. By allowing a small portion of the liquid under pressure to flow above the rotary disk and exert its pressure against the fixed packing-disk and downwardly against the entire surface of the rotary disk the latter is retained out of actual contact with the packing-ring and insured perfect freedom of action. By locating the holes G in close proximity to the blade or wing this balancing action is insured throughout the entire range of movement of the rotary disk. For the purpose of simplicity in construction the lower ends of the holes G are enlarged to form ports for the escape of the liquid past the plug to insure the release of the checking action and the positive latching of the door. However, it is obvious that as the function of the ports and holes are separate and distinct they may be made separate in the disk. It being desirable to provide a plug of considerable thickness of metal to insure it the desired strength and stiffness and also to furnish comparatively wide bearings to its side edges I employ a comparatively thick plug, but bevel its top off, as at c, in order that the ports G' in passing over the thin upper edge of the plug may provide an escape for the liquid for a sufficient length of time to permit of the closing and latching of the door. The edges of plug are furnished with tapering grooves c' c², so that by a slight rotary adjustment of the plug the escape of the liquid past the plug may be delicately adjusted and regulated.

Spring B⁴ is provided with a retaining-barrel c³, to which is secured a plate c⁴, which engages in a slot formed in the casing, so that the position of the spring may be readily reversed, as fully set forth in my application, Serial No. 407,398.

In my present invention I have improved the method of connecting the spindle with

the inner end of the spring, which I will now describe. Encircling the spindle C^2 is a sleeve e^4 , which has a ratchet-wheel e^5 , formed integral with its upper end. The lower portion of the sleeve is formed with flattened sides R , which engage similarly-flattened sides r , formed on the inside of the thimble S , whereby the latter may be rotated by the sleeve. On the periphery of the thimble is formed an inclined tooth T , which engages in the hole U , formed in the inner end of the spring. When the sleeve and thimble are turned in one direction—that is, in a proper direction to wind up the spring—the tooth on the thimble engages in the hole in the inner end of the spring; but should the sleeve be turned by mistake in the opposite direction the tooth on the thimble is disengaged from the spring and the latter is preserved against injury. The thimble is readily removed and replaced, so that it may be easily adjusted for use in a spring arranged for use on a right or left hand door-check.

To secure the requisite adjustment of the parts, I form the link H in two sections, one of which is provided with a series of holes I and the other with a series of projections I' . The link may be lengthened or shortened by disengaging the projections on one section from the holes in the other section and, when adjusted to the desired length, fastening the two sections together by engaging the projections on one section in the holes in the other, and securely fastening the two together by means of the screw-clamp J .

Another feature of my improvement relates to the joints in the link and its oil-receptacle. It is frequently the case that, owing to the warping of the door jamb or casing or to a slight twisting of the parts of the door-check out of alignment in putting them up, the opening and closing of the door causes a twisting or lateral strain on the joints of the link. To provide for this, I drill a hole K through the arm H' and provide a counter-bore K' on the opposite side. Into this hole I force a steel tube L , having a rounded exterior surface. A pin is inserted through the steel tube and is turned or oscillated, so as to seat the tube securely in place. A pin K^2 passes through the steel tube and the joined end of the arm and is riveted or otherwise secured. The counter-bore channel K' serves as an oiling-chamber to retain the lubricant for the joint, while the play at the joint allows for a slight twisting movement, so that the check will operate perfectly well though arm and link are not in perfect alignment.

When it is desired to provide a door adapted to swing in both directions with a check, it is necessary to secure a check on each side of the door; but since the spring of one check would act in opposition to the spring of the other provision must be made for cutting out the spring on one side when the door is swung

in one direction and cutting out the other spring when the door is swung in the opposite direction. I accomplish this in the following manner: On the inner edge of the door N , I secure a bracket M , each end of which has a projecting ear M' , to each of which one end of a swinging yoke O is hinged, the opposite end of the yokes being pivotally connected to the ends of the links H . Each yoke has pivoted within it a latch or dog P , one end of which is provided with a hook O' , which is adapted to engage a corresponding hook M^2 on the end of the bracket M' . The opposite end of the dog is engaged by an adjustable screw P' on the arm H' . When the door is swung in one direction, the screw P' on one arm will be swung out of contact with its dog, thereby releasing it to the action of its spring, which will cause it to engage the hook on the end of the ear M' and thereby firmly lock the dog thereto and practically make the yoke a rigid extension of the ear. Thus it will be observed that the force of the spring in opening and closing the door is exerted through the link against the outer end of the yoke, as represented in Fig. 4. The screw P' on the opposite door-check not being swung away from its dog retains the latter out of engagement with the bracket M' on the opposite end of the bracket, so that the yoke swings on the bracket, the ears of which are in alignment with the pintles of the double hinges.

In Fig. 7 I have shown the door-check as applied to the door and the link secured to the door-jamb, while in Fig. 24 the check is illustrated as applied to the upper edge of the door and the link secured to the door-casing.

As it is evident that my invention is susceptible of many forms of embodiment I would have it understood that I do not restrict myself to the particular construction and arrangement of parts shown and described; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a door-check, the combination, with a receptacle for the checking medium and a wing or piston arranged to move within said receptacle, of a passage or groove for the escape of the checking medium, so constructed and arranged that it is gradually restricted in area as the door is closed and thereby serves to check the door in closing until it has nearly reached its closed position, and a port arranged to suddenly release the checking medium and thereby release the door to the action of the spring and thus insure the latching of the door, substantially as set forth.

2. In a door-check, a rotary disk provided with an opening for the passage of liquid to counterbalance the pressure on the disk, substantially as set forth.

3. In a door-check, the combination, with a liquid-chamber and a plug located therein, of a rotary disk provided with a wing movable

in said chamber, said disk having releasing-ports on opposite ends of its wing, substantially as set forth.

4. In a door-check, the combination, with a liquid-chamber and a plug located therein, of a rotary disk provided with a wing or blade movable in said chamber and having a counterbalancing-hole on each side of the wing, which extends through the rotary disk, substantially as set forth.

5. The combination, with a door adapted to swing in both directions, of a door-check attached to each side of the door and means for automatically cutting either one of the door-checks out of operation when the door is opened to the right or the left, substantially as set forth.

6. The combination, with a bracket and a yoke, of a door-check and means for automatically locking the yoke to the bracket and for disengaging it therefrom, substantially as set forth.

7. In a door-check, a link made in sections, one portion having a series of projections which engage a corresponding series of holes in the other section, and a clamp for securing the sections together, substantially as set forth.

8. In a door-check, the combination, with a liquid-chamber and a rotary disk provided with a wing or blade movable in said chamber, of a tapered groove formed in the face of the rotary disk, the ends of the groove terminating on opposite sides of the wing, and re-

leasing-ports located between the wing and the ends of said groove, substantially as set forth.

9. In a door-check, the combination, with a link having a counterbore formed in one end thereof, of a pin extending through said counterbore and forming an oil-chamber between the pin and walls of the counterbore, substantially as set forth.

10. In a door-check, the combination, with a coiled spring, of a thimble provided with an inclined tooth adapted to engage in a hole in the inner end of the spring when the thimble is turned in one direction and to be disengaged therefrom when turned in an opposite direction, and a sleeve on the spindle constructed to engage the thimble, substantially as set forth.

11. The combination, with a bracket, a yoke pivoted to each end of the bracket and spring-actuated dogs for locking the yokes to the bracket, so as to be rigid therewith, of a door-check connected with each one of the yokes, and means for automatically disengaging the dogs from the bracket, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM GILFILLAN.

Witnesses:

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G. ERNEST ROOT.