

(No Model.)

J. W. MORRIS.

COMBINED SPRING HINGE AND DOOR CHECK.

No. 424,614.

Patented Apr. 1, 1890.

FIG. 1

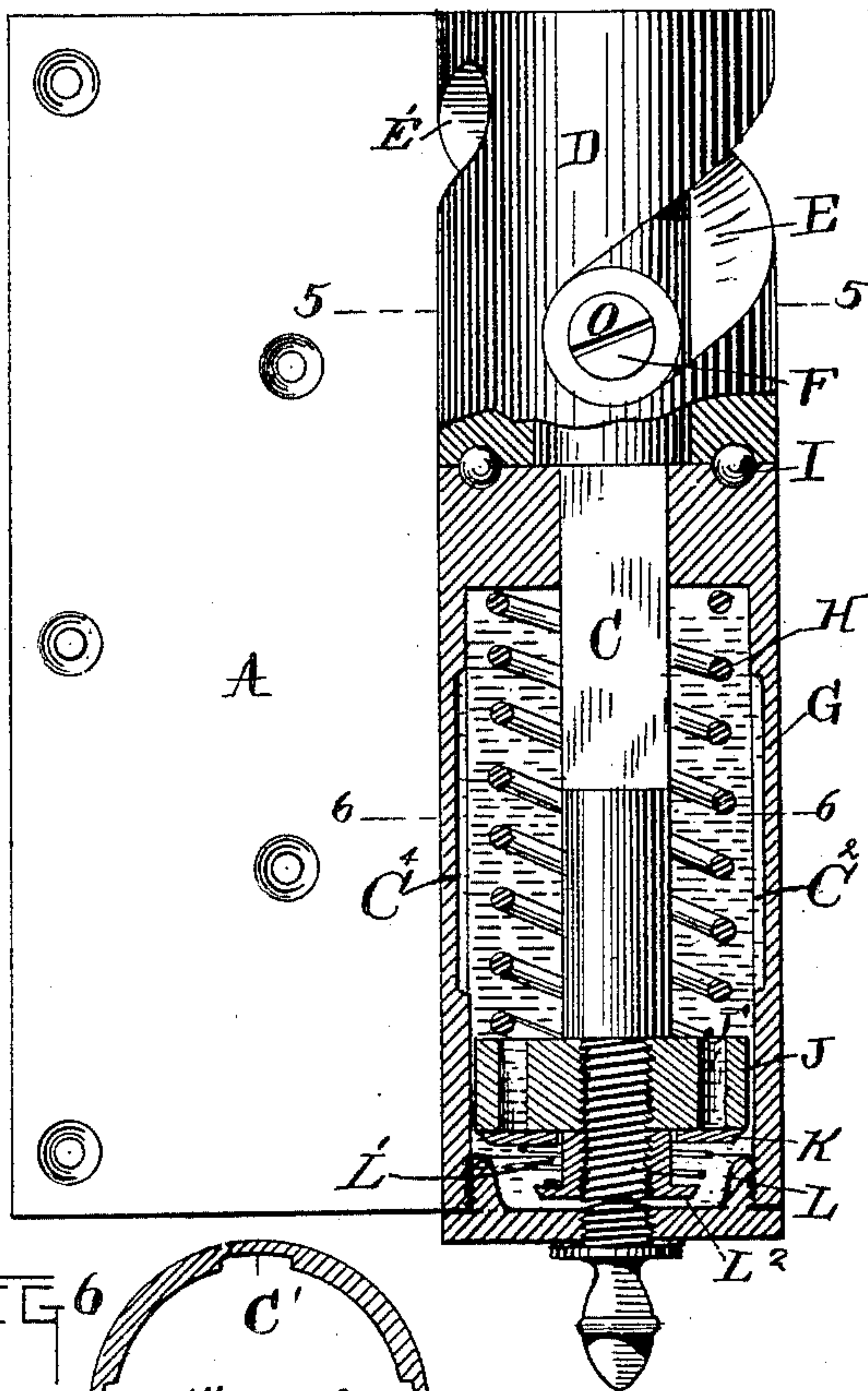


FIG. 2

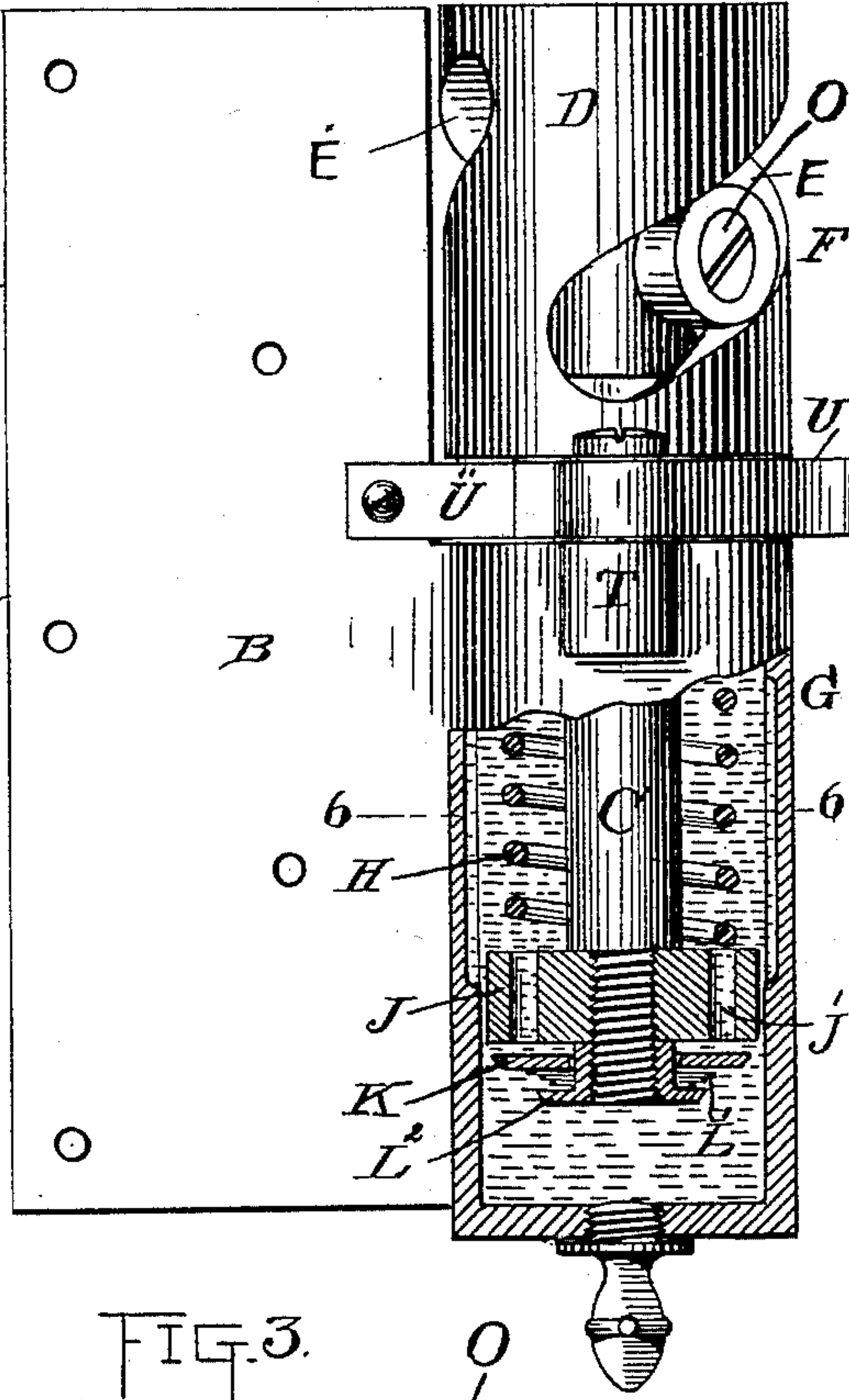


FIG. 6

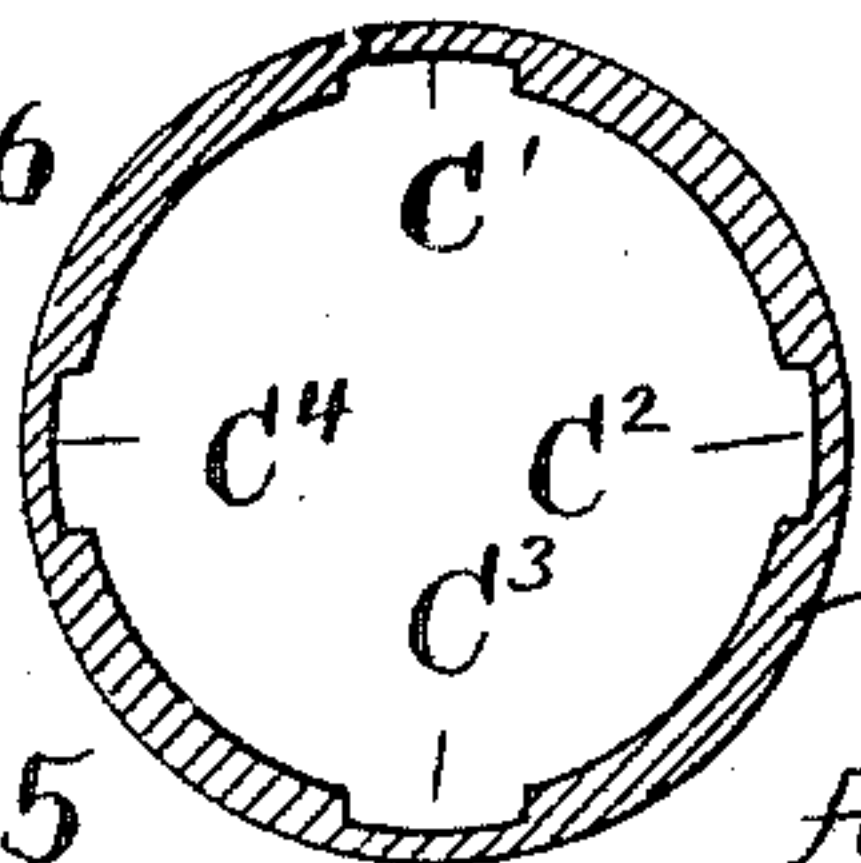


FIG. 5

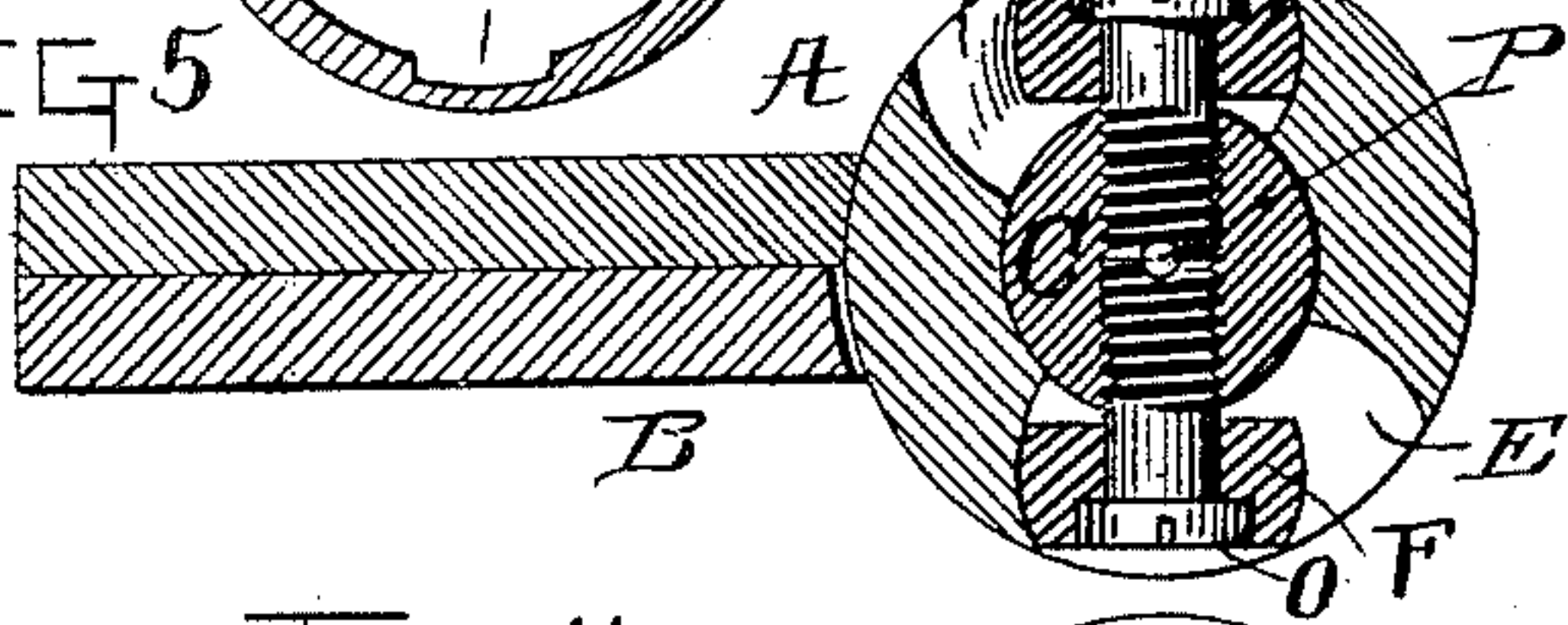


FIG. 4

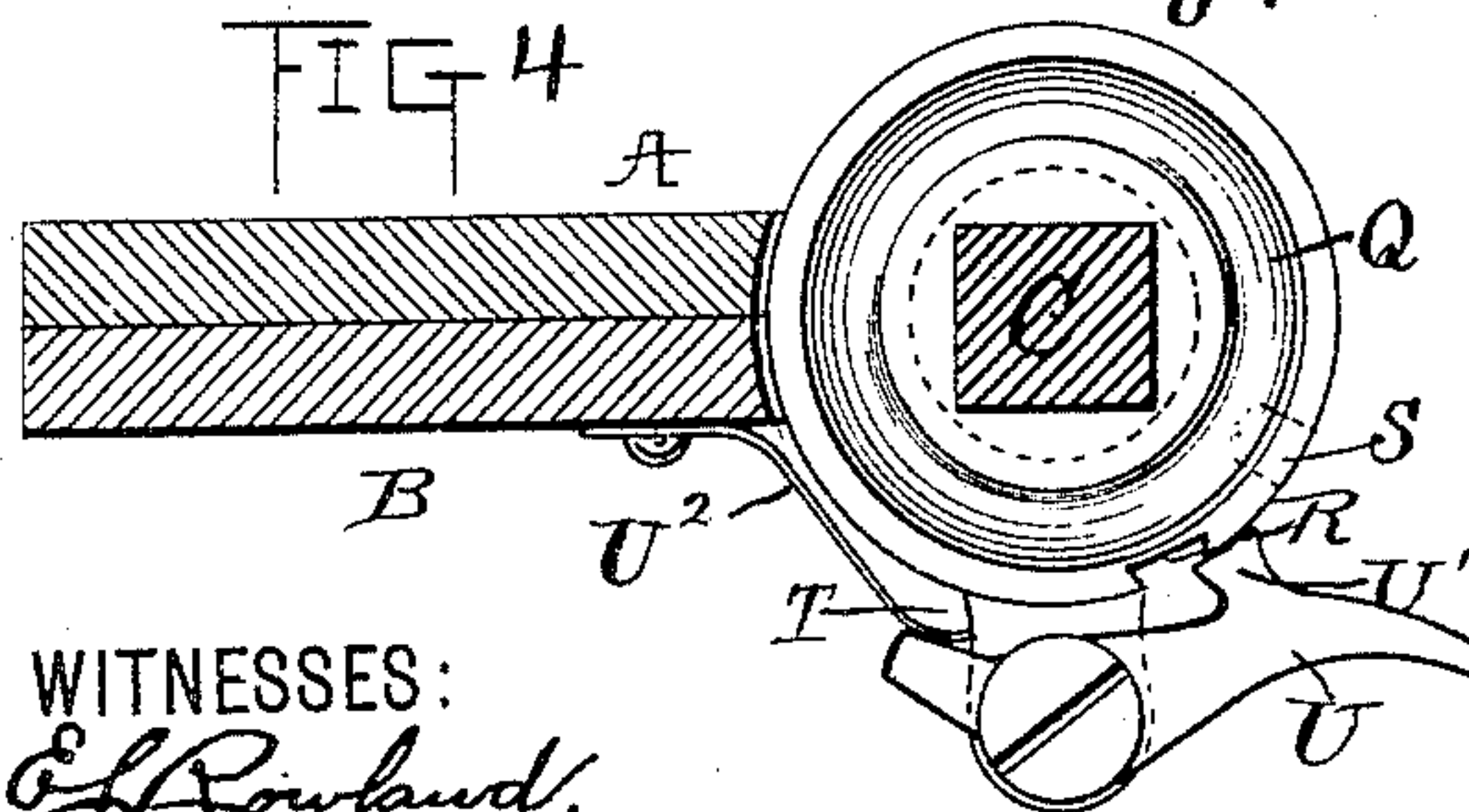
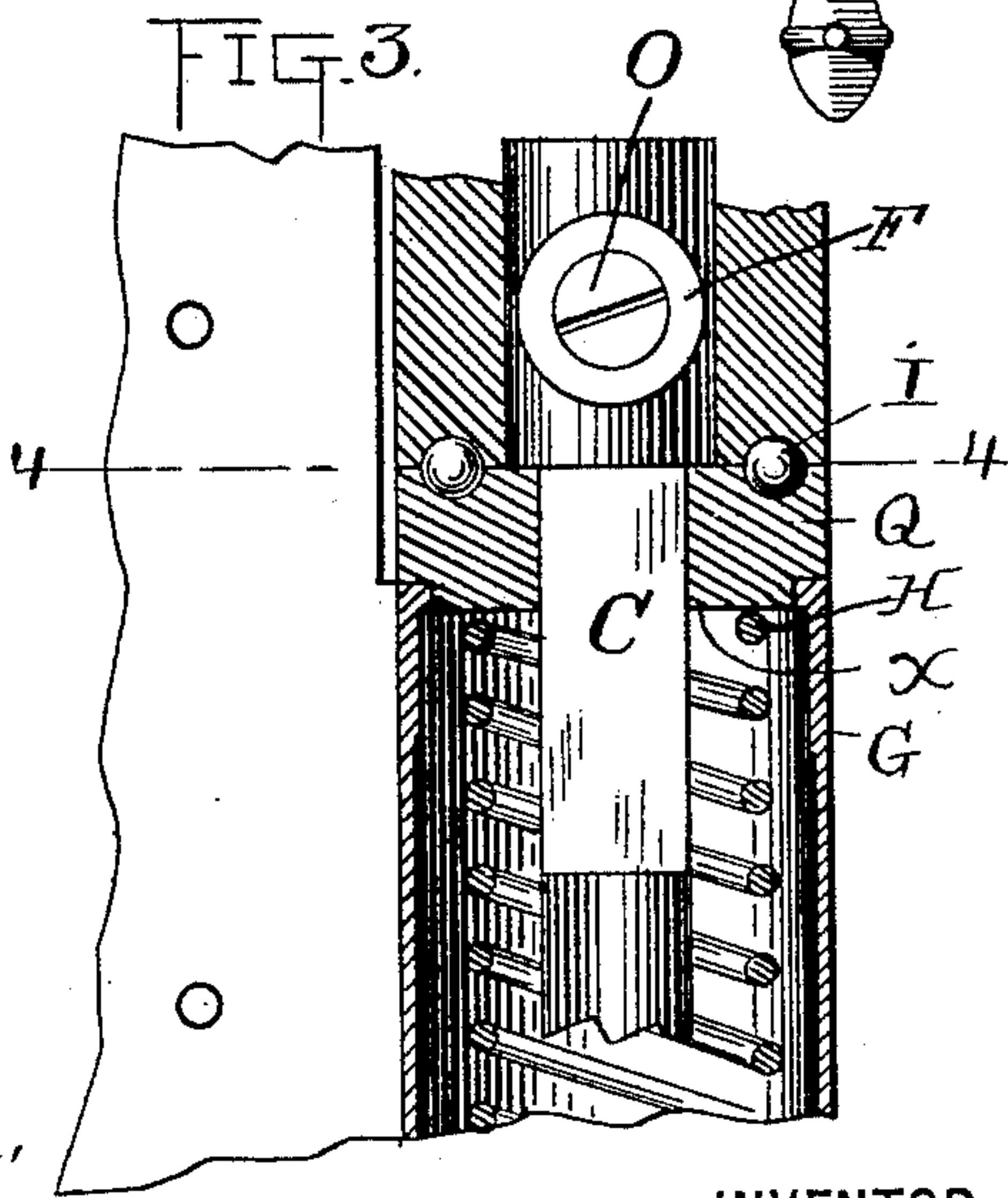


FIG. 3



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JAMES WILLARD MORRIS, OF NEW YORK, N. Y.

COMBINED SPRING-HINGE AND DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 424,614, dated April 1, 1890.

Application filed December 20, 1889. Serial No. 334,433. (No model.)

To all whom it may concern:

Be it known that I, JAMES WILLARD MORRIS, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a new and useful Improvement in an Automatic Combined Spring-Hinge and Door-Check, of which the following is a specification.

The main object of my invention is to simplify the construction, and thereby reduce the size and lessen the cost of the combined spring-hinge and door-check which is the subject of an application filed by me September 9, 1889, Serial No. 323,419.

A further object of my invention is to produce a combined spring-hinge and door-check which may be converted into a simple hinge without the removal of any of the parts by simply throwing the spring and checking mechanism out of action.

In my application above referred to the opening of the hinge tends to rotate the hinge-pintle relatively to the cylinder and to the inclined planes, whereby through such relative rotary movement the hinge-pintle is lifted. The construction shown to effect this in that application required the extending of the cylinder of the dash-pot below the hinge-leaves and the formation of the inclined planes on the same leaf as the cylinder, thus increasing the size and cost of manufacture of the hinge.

In my present invention the hinge-pintle does not rotate relatively to the cylinder and the inclined planes are not on the same hinge-leaf as the cylinder. By this construction I am enabled to lessen the size and cost of the hinge, as the cylinder or dash-pot thereof may be formed and arranged adjacent to and not below the hinge-leaves, and the lifting of the pintle may be effected directly relatively to the cylinder, which is a desirable feature, tending to economy in size and cost.

In the simple form of my present invention the hinge-pintle is prevented from rotating relatively to the cylinder by being squared or angularly formed for a portion of its length and caused to pass through a square or correspondingly-angular hole cut in the cylinder of the hinge. In the convertible form the hinge-pintle is squared, as before; but instead of being caused to pass through a square hole

in the top of the cylinder it is caused to pass through a square hole in a part which, when a simple acting hinge is desired, may be readily arranged to turn with respect to the cylinder, so as to oppose no resistance to the rotation of the pintle, but which may be locked to prevent the rotation of the pintle relatively to the cylinder when a combined spring-hinge and door-check is desired.

In both forms of my present hinge the lifting of the pintle is effected by the opening of the hinge directly, either by forcing an inclined plane under a projection of the pintle when the cylinder is stationary or by forcing the pintle directly up the inclined plane when the cylinder moves.

Of course it will be understood that it is immaterial to the operation of the device how it is applied—that is, whether the leaf carrying the cylinder is the moving leaf and the leaf carrying the inclines the stationary leaf, or vice versa.

In the accompanying drawings, forming a part of this specification, Figure 1 is an elevation, partially in section, of a combined spring-hinge and door-check embodying my invention. Fig. 2 is an elevation, partially in section, of a convertible spring-hinge and door-check. Fig. 3 is a vertical section of a portion of the device of Fig. 2, certain of the parts being in elevation. Fig. 4 is a cross-section taken on the plane of the line 4 4, Fig. 3, with the anti-friction balls removed. Fig. 5 is a cross-section taken on the plane of the lines 5 5, Fig. 1; and Fig. 6 is a cross-section of the cylinder of the dash-pot, taken on the plane of the line 6 6, Figs. 1 and 2.

As shown in the drawings, A is the moving leaf of the hinge, B the stationary leaf, and C the pintle, which combines the two parts of the hinge.

The moving leaf of the hinge is provided with a socket D, cored to receive the pintle and provided with spiral grooves E and E', adapted to receive rollers F F', carried by said pintle.

The stationary leaf of the hinge is provided with the socket, knuckle, or cylinder G, which receives the pintle, the coiled spring H, and the supply of fluid which acts as the cushion.

In Fig. 1 the socket or knuckle D is supported upon the cylinder G, as shown, and to

reduce the friction between those parts anti-friction bearing-balls I are introduced into the circular groove formed by matching the semicircular channels in each part.

5 The pintle C is squared for a portion of its length and passes through a square hole in the top of the cylinder G in Fig. 1, whereby it is prevented from turning relatively to said cylinder. At its end the pintle is provided
10 with a head J, having passages J' therein. A valve K, surrounding a collar L, is afforded a spring-seat by the coiled spring L', and between the head J and the upper end of the cylinder the spring H is coiled around the
15 pintle. For the purpose of combining the head J and parts below it with the pintle I form a shoulder on the pintle, as shown, and turn a screw-thread on the reduced portion below the shoulder. The head J and collar
20 L are internally screw-threaded and are easily adjusted to place, the collar L acting as a jam-nut for the head. The spring L' and valve K are held in place by the flange L² of the collar. The cylinder G is formed with
25 channels for a portion of its length, as shown at C' C² C³ C⁴, Fig. 6.

I prefer to mount the rollers F F' on the pintle C by passing a screw O through each, countersinking the heads in the rollers, the
30 screws being of such length that their ends will abut at the center line of the pintle. A screw P is then inserted from the top of the pintle and passed through the ends of each of the screws O, as shown at Fig. 5. By this
35 construction the rollers may be readily combined with the pintle, the screw P preventing the turning of screws O, whereby the parts will remain in place.

The operation of the parts above described
40 is as follows: Preferably the rollers F F' are so arranged with reference to the spiral grooves E and E' that when the door is closed they will be raised somewhat from the bottom thereof. The object of this is to provide room
45 for the expansion of the closing-spring H to effect the latching of the door after the door is brought to the closed position. Fluid will be supplied to the cylinder, so as to fill or nearly fill the same. On opening the door
50 the lower wall of the grooves E and E' will act as wedges, and will, in proportion to the extent they are forced under the rollers F F', lift them and the pintle with them. By carrying the grooves nearly around the section
55 or knuckle D, which is preferably circular, the door may be opened to more than ninety degrees. The lifting of the pintle C compresses the spring H, which, when the door is released, acts to force the pintle to the bot-
60 tom of the cylinder G. During the upward movement of the head J the passages J' therein will remain open until the bottom of the head has just passed the lower end of the channels C', C², C³, and C⁴. The fluid, which
65 up to this point flowed through the passages J', will now flow around the periphery of the head in the said channels freely, and the

valve K will be forced by its spring to its seat, thus closing the passages J'. The re-
turn movement of the pintle or piston will
70 be free from check until the head J closes the channels C', &c. This occurs at the moment the bottom of the head is at the bottom of the channels. The free passage of the
75 fluid being thus cut off, a check results. After the check has operated the continued closing movement of the door is permitted, but more gradually, by the liquid flowing
80 around the periphery of the piston-head in the more restricted space which now occurs between the cylinder and head below the channels C', &c. By a proper proportioning of the parts the check may be effected at any
85 desired point in the closing movement of the door.

The convertible form of hinge is substantially similar in construction and mode of operation to the simple form above described, differing from it, however, in the following
90 particulars: Between the section D and cylinder G a steel ring Q is interposed, said ring being provided with an annular flange X, which enters a circular opening in the head of the cylinder G, whereby said ring is seated
95 so that it may turn freely when unlocked. Said ring is also provided with a semicircular groove corresponding with the groove in the section D. Anti-friction bearing-balls are inserted between these two parts in the circular
100 groove, as was done between the section D and cylinder. On the periphery of this steel ring a notch R and hole S are cut, and its center is formed with a square hole to receive the square portion of the pintle C. Upon a lug
105 T, projecting from the cylinder, a dog U is pivoted in such position as to adapt a tooth U' on its end to enter the notch R and lock the ring Q from rotating. A spring U² acts to throw and hold the tooth in its notch. The hole S is adapted to receive a pin or other
110 implement by which the ring may be turned when effecting the engagement or disengagement of the tooth U' and notch R.

It will be obvious that when the steel ring is locked from turning by the dog U the open-
115 ing of the door will effect the lifting of the pintle and the action will be the same as described for the simple form of hinge; but when the steel ring is free to turn by reason of the tooth on the dog being out of the notch
120 the result will be that the pintle C will be turned relatively to the cylinder and not lifted, and of course the spring and checking mechanisms will not be operated.

In operation at the moment the check is ef-
125 fected there is a tendency for the hinge-leaves to separate vertically. This may readily be provided for in several ways—as, for instance, by locating my device on a door be-
130 tween two ordinary hinges, or by placing two of my devices on the same door, one with the cylinder stationary and the other with the cylinder movable.

What I claim is—

1. In a combined spring-hinge and door-check, the combination of a reciprocating pintle, means for moving said pintle directly in each direction, and a check for retarding the movement of the pintle in one direction, substantially as set forth.

2. In a combined spring-hinge and door-check, the combination of a pintle held from rotating, a turning part of the hinge adapted to engage with and move said pintle in one direction, a spring for returning said pintle, and a check for retarding the return movement of the pintle, substantially as set forth.

3. In a combined spring-hinge and door-check, the combination of a pintle held from rotating, a turning part of the hinge adapted to engage with and move said pintle in one direction, a spring for returning said pintle, and a dash-pot of which the pintle forms part, substantially as set forth.

4. In a combined spring-hinge and door-check, the combination of a pintle squared for a portion of its length to adapt it to slide through a square hole in a fixed part of the hinge, a moving part of the hinge adapted to engage with and move said pintle in one direction, a spring for returning said pintle, and a dash-pot of which the pintle forms part, substantially as set forth.

5. In a combined spring-hinge and door-check, a pintle held from rotating, a projection or projections on said pintle, an incline surface on a moving part of the hinge engaging with said projections, a spring for returning said pintle, and a check for retarding the return movement of the pintle, substantially as set forth.

6. The combination, in a combined spring-hinge and door-check, with the stationary and

moving hinge-leaves, of a cylinder attached to said stationary leaf and forming the support for the moving leaf to turn on, and a pintle entering said cylinder and said moving hinge-leaf, substantially as set forth.

7. In a convertible combined spring-hinge and door-check, the combination, with the spring and checking mechanism, of means for throwing said mechanism out of action, substantially as set forth.

8. In a convertible combined spring-hinge and door-check, the combination, with a pintle and means for reciprocating it, of a dash-pot of which the pintle forms the plunger and means for throwing the reciprocating mechanism out of action, substantially as set forth.

9. In a convertible combined spring-hinge and door-check, the combination of a pintle, means for reciprocating the pintle, and means for throwing the reciprocating mechanism out of action, substantially as set forth.

10. In a convertible combined spring-hinge and door-check, the combination, with the pintle squared for a portion of its length, of a piece having a square hole through which said pintle passes, a dog to lock said piece, and means for releasing said dog to permit the piece to turn, substantially as set forth.

11. The combination, with the hinge-pintle, of two rollers, a screw for securing each of said rollers on said pintle, and a third screw, substantially as set forth.

This specification signed and witnessed this 14th day of December, 1889.

J. WILLARD MORRIS.

Witnesses:

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D. H. DRISCOLL.