

J. C. SCHMIDT.
DOOR CHECK.
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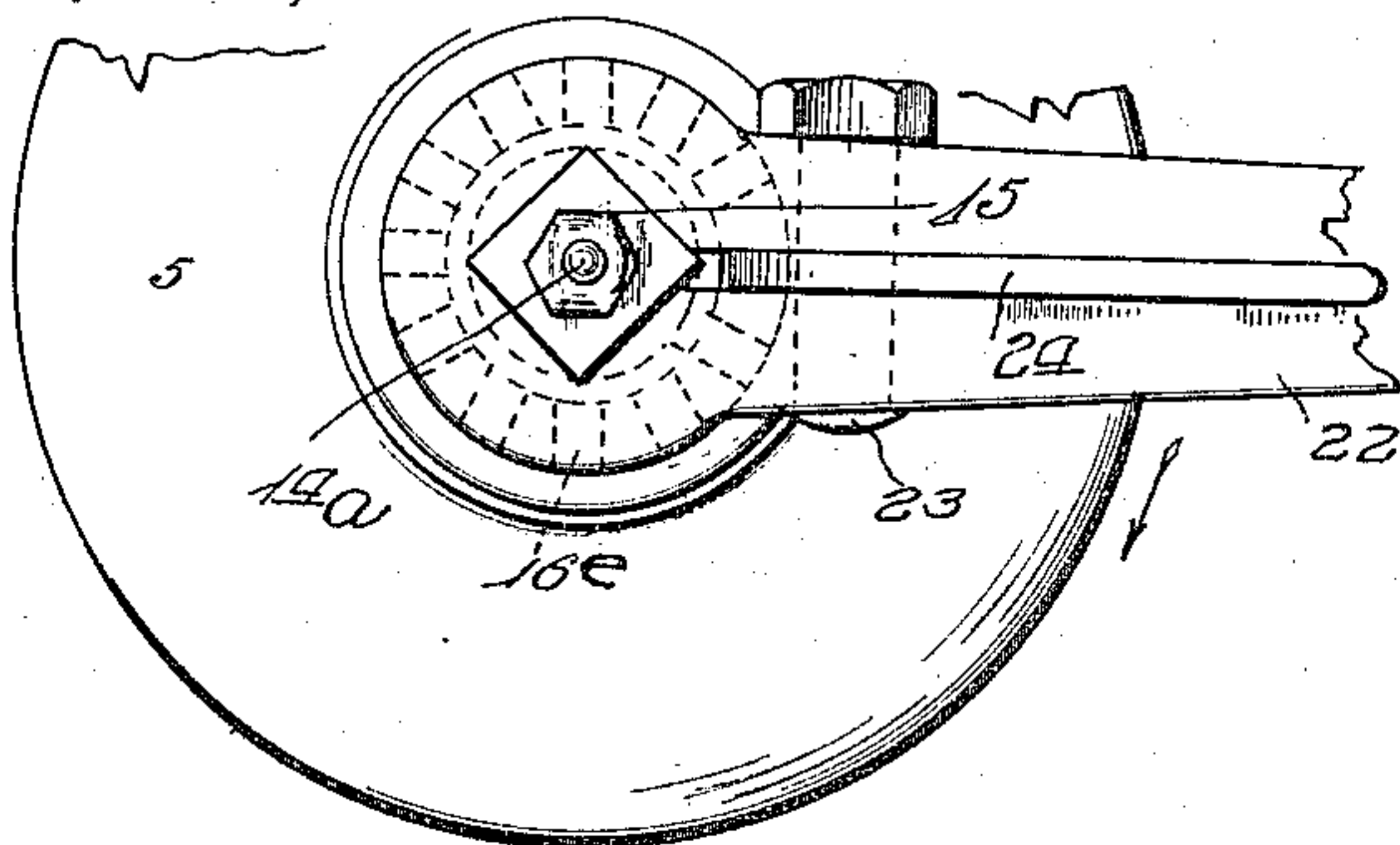


Fig. 1.

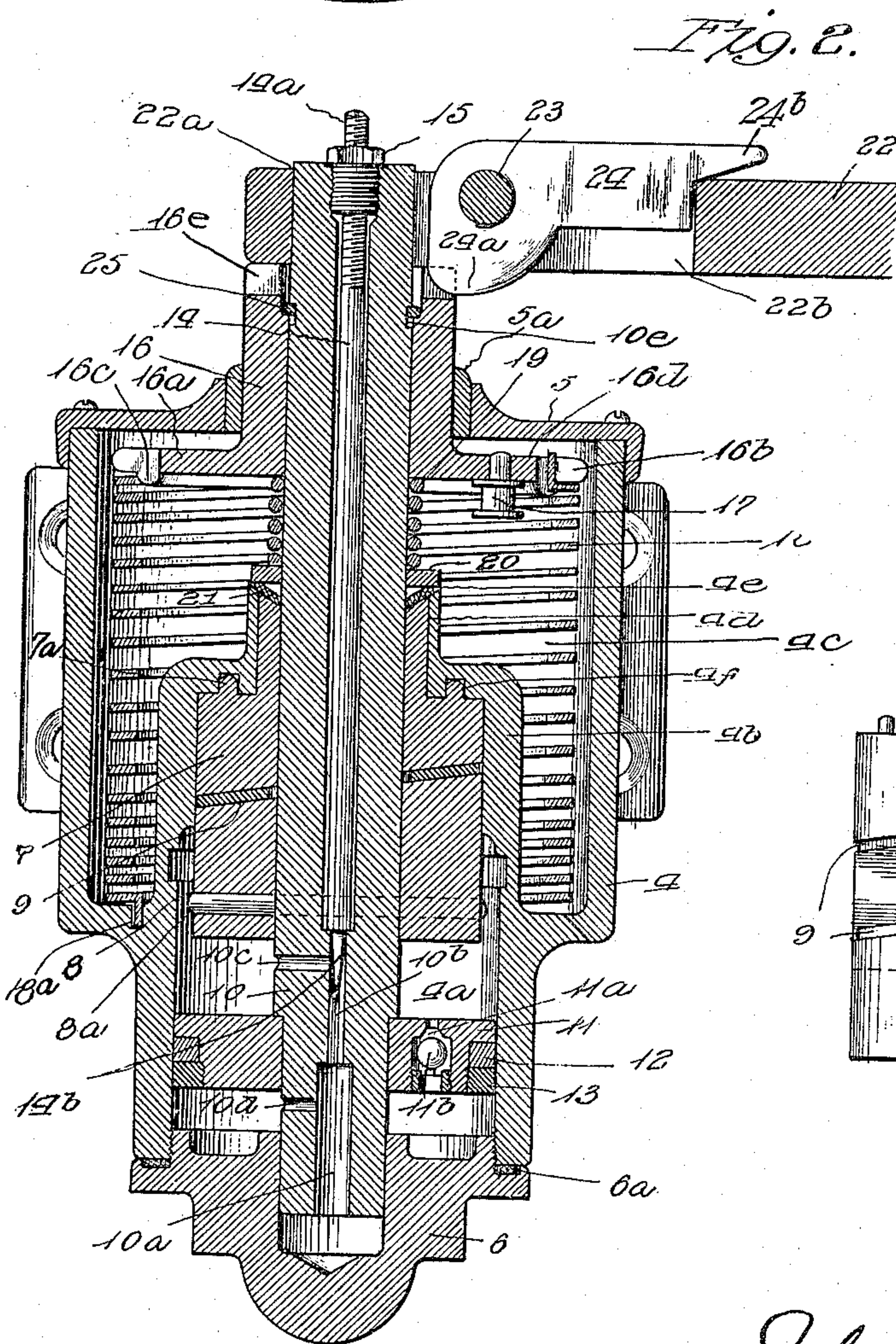
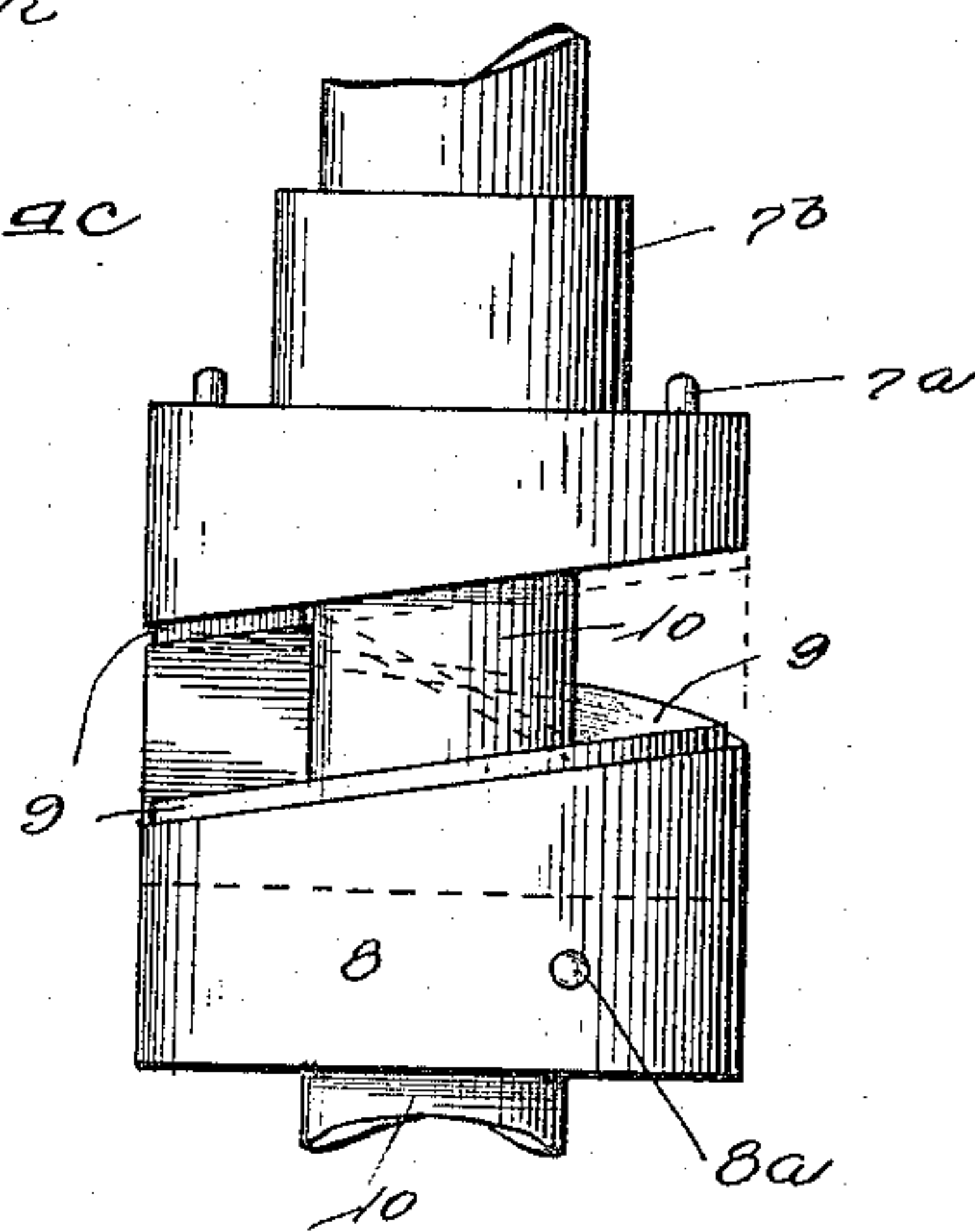


Fig. 2.



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JOHN C. SCHMIDT, OF CHICAGO, ILLINOIS.

DOOR-CHECK.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN C. SCHMIDT, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Checks, of which the following is a specification.

This invention relates to door-checks and closers of the type in which the torsional tension of a coiled spring serves to close the door, and the action of the spring is modified or controlled by the flow of liquid from one side to the other of a reciprocating plunger, all arranged within a cylindrical casing.

Among the special objects of the improvements for which I ask a patent, are:—a form of plunger which, upon being rotated, is given a longitudinal movement; a combination of coiled spring and plunger elements which compensates for the wear between the co-acting plunger members so that lost motion and resultant pounding of the parts is eliminated; a plunger and casing construction whereby the former is supported at three points, thus overcoming the tendency of the plunger to buckle or bend when excessive strains are applied thereto, a simple and economical construction generally which secures ease of operation and durability.

A preferred embodiment of my present invention is illustrated in the accompanying drawing, in which:—

Figure 1 is a partial top-plan view of the casing and the arm which engages the upper end of the plunger; Fig. 2 is a longitudinal section on the median line of the complete door check and closer; and—Fig. 3 is a detail in elevation of the plunger cam-members, showing them separated or in a position opposite to that indicated in Fig. 2.

Referring to the details of the drawing, the reference numeral 4 indicates a cylindrical casing open at both ends, 5, a cover plate secured to the upper end of the casing by screws, and 6, a cup-shaped plate screwed into the lower end of the casing and forming a closure therefor. The lower portion of the casing is of less cross-diameter than the upper part, and is machined to provide a smooth-walled liquid receiving chamber 4^a. Extending into the upper chamber, 4^c, the casing is cast with an annular wall 4^b, the upper portion of which terminates in a neck 4^d, the end of which is beveled to afford a seat for a felt washer 4^e. Where the wall 4^b contracts to form the neck 4^d, two small

holes 4^f are countersunk in the inner face, to receive or seat corresponding studs 7^a, on the adjacent face of the upper cam 7, which fits snugly and non-rotatively within the annular chamber circumscribed by the wall 4^b. The cam 7 is cast with an annular extension 7^b, which fits snugly within the neck 4^d, and has its end beveled to receive the washer 4^e.

Arranged below the cam 7, is a complementary cam 8, the face of which inclines oppositely to the face of the former, so that the rotation of the latter relative to the cam 7, which is non-rotatable, causes a longitudinal movement of the cam 8, and the members connected therewith.

To effect desirable wearing conditions, I place between the cam-faces of the two cams, a ring 9, of phosphor-bronze, brass or other suitable material.

The cam 8 is pinned to the plunger stem 10, by a pin 8^a which passes through holes provided therefor in the cam and stem.

The plunger stem 10, is a cylindrical bar of steel, with a bore 10^a extending its entire length, which bore is reduced, as at 10^b, to provide a seat for the needle-valve 14^b, which extends upwardly through the bore 14. The valve stem is threaded at its upper end 14^a, to receive a nut 15, which is also externally threaded to engage the threaded counterbore in the upper end of the plunger stem 10. The stem 10 has attached thereto by a driving fit, a piston, made up of a disk 11, an expansion ring 12, fitted to the disk and a brass or bronze ring-nut 13 which has a threaded engagement with the disk. The disk has an opening 11^a, which serves as a passageway for liquid from one side of the piston to the other, and said opening is provided with seats for a ball-valve 11^b loosely arranged therein. Above and below the piston, the stem 10 is provided with horizontal ports 10^c, 10^d, respectively, which extend from the outer surface to the bore 10^b, 10^a, and with the latter, form a passageway for the liquid as it flows from one side of the piston to the other. The inner end of the port 10^c is partially covered by the tapered lower end 14^b of the valve 14, so that the rapidity of the flow of liquid is controlled by the vertical adjustment of said valve, though it cannot be entirely cut off.

16 represents a collar which fits between the stem 10 and the bushing 5^a, and is formed with circular plate extension 16^a adapted to extend across the upper portion

of the casing 4 below the cover-plate 5. The plate has oppositely placed notches 16^b in its periphery, and on its under surface is formed with a rib, 16^c. A stud 17 is fixed in an opening 16^a, and projects downwardly from the plate 16^a. Said rib and stud serve as guides for the upper end of a helically coiled spring 18, which is arranged in the chamber 4^c, and has one end engaging one of the notches 16^b, while the opposite end engages a recess 18^a in the lower end of the wall of the casing.

A small expansion coil-spring 19 surrounds the plunger stem 10 below the plate 16^a by which it is held under compression, and in turn serves to maintain a washer 20 in close engagement with the felt washer 4^c fitted to the upper edge 21 of the extension 4^d.

22 represents the inner member of the two levers which connect the plunger with a door, and it is not shown in full because the general form and the functions of such members are well understood. The features which I have modified are in slotting the end of the lever-arm to provide a rectangular socket 22^a to receive the squared upper end of the plunger, and as at 22^b to receive a latch 24 which is pivoted on a pivot bolt 23 extending transversely of the slot adjacent the stem. The latch is formed with a cam extension 24^a, which is adapted to engage radial teeth 16^e on the upper edge of the collar 16, when the latch is in the horizontal position shown. The latch is also formed with an extension 24^b at its free end which facilitates the lifting of the latch when it is desired to disengage it from said teeth.

At a short distance below its upper end, the plunger stem is formed with an annular groove 10^e, which is adapted to receive a two-piece collar 25, which serves as a key and is held in place by abutting shoulders on the stem and collar 16 respectively.

As shown in Fig. 2, the spring 18 is under partial compression and the plunger in its raised position, thus bringing the cams 7, 8, together. Now if the arm 22 is moved in the direction indicated by the arrow in Fig. 1, the spring will be given a torsional or winding-up movement by the rotary movement of the plate 16^a, and will also be increasingly compressed by the longitudinal movement of said plate incident to the movement of the cam 8 downwardly relative to the cam 7. If the chamber 4^a is filled with glycerin or other suitable liquid, it is obvious that the vertical movement of the piston will cause said liquid to flow from one side to the other of said piston, through the passageways 11^a, 10^c, 10^b and 10^d. The same liquid will also lubricate the cam 8 and its bearings.

As the cams 7—8 are constantly held in

close frictional contact with the ring 9, by the compressed spring 18, it will be obvious that all wear of said parts will be automatically taken up, and thus there will be no possibility of the lost motion and resultant pounding above alluded to as common to many forms of door checks. It will also be seen that by providing co-acting cam surfaces of relatively great area as distinguished from cam edges, I am enabled to increase the wearing qualities of the cam while reducing the tendency of the frictional surfaces to bind, and at the same time, permit the use of a cam-ring of material having low frictional qualities.

By extending the cam and oil chamber up into the spring chamber, I am enabled to shorten the casing while using a relatively large spring, and the walls 4^b form a guide for the spring.

Having thus described my invention in one of its forms, what I claim is:—

1. In a door check and closer, a casing having a spring compartment and a liquid compartment, a cap for said spring compartment having a central opening therein, a spring disk having a flange therein adapted to extend through and having its bearing in the opening in said cap, a spring within said spring compartment secured respectively to said compartment and said disk, a rotatable and reciprocable stem journaled centrally of said spring cap and extending to and through said fluid chamber, a cap adapted to close said fluid chamber having a central aperture therein into which the lower end of said stem extends and which is adapted to form a bearing for the movement thereof, a cam faced disk arranged in said liquid chamber and around said stem and through which said stem is adapted to reciprocate, a second cam faced disk fixedly arranged on said stem within the liquid compartment and adapted to co-act with said first mentioned cam, a piston arranged on said stem within said liquid compartment, said plunger stem having a passageway therein opening respectively above and below said piston, a needle valve extending longitudinally of said stem and adapted to control the size of said passageway.

2. In a door check and closer, a casing having a spring compartment and a liquid compartment, a cap for said spring compartment having a central opening therein, a spring disk having a flange therein adapted to extend through and having its bearing in the opening in said cap, a spring within said spring compartment secured respectively to said compartment and said disk, a rotatable and reciprocable stem journaled centrally of said spring cap and extending to and through said fluid chamber, a cap adapted to close said fluid chamber having

a central aperture therein into which the lower end of said stem extends and which is adapted to form a bearing for the movement thereof, a spring actuated collar surrounding said stem for separating said liquid chamber from said spring chamber, a cam faced disk arranged in said liquid chamber and around said stem and through which said stem is adapted to reciprocate, a second cam faced disk fixedly arranged on said stem within the liquid compartment and adapted to coact with said first mentioned cam, a piston arranged on said stem within said liquid compartment having a passageway therethrough and a valve in said passageway adapted to close same against the passage of liquid upwardly therethrough, said plunger stem having a passageway therein opening respectively above and below said piston, a needle valve extending longitudinally of said stem and adapted to control the size of said passageway.

3. In a door check and closer, a casing having a spring compartment and a liquid compartment, a cap for said spring compartment having a central opening therein, a spring disk having a flange therein adapted to extend through and having its bearing in the opening in said cap, a spring within said spring compartment secured respec-

tively to said compartment and said disk, a rotatable and reciprocable stem journaled centrally of said spring cap and extending to and through said fluid chamber, a cap adapted to close said fluid chamber having a central aperture therein into which the lower end of said stem extends and which is adapted to form a bearing for the movement thereof, a cam faced disk arranged in said liquid chamber and around said stem and through which said stem is adapted to reciprocate, a second cam faced disk fixedly arranged on said stem within the liquid compartment and adapted to coact with said first mentioned cam, a piston arranged on said stem within said liquid compartment, said plunger stem having a passageway therein opening respectively above and below said piston, a needle valve extending longitudinally of said stem and adapted to control the size of said passageway, and means for normally holding the above mentioned spring under partial compression.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN C. SCHMIDT.

Witnesses:

WM. HAROLD EICHELMAN,
M. A. MILORD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."