

No. 632,149.

Patented Aug. 29, 1899.

F. T. RUSSELL.
DOOR CHECK OR CLOSER.

(Application filed Oct. 22, 1897.)

(No Model.)

Fig. 3.

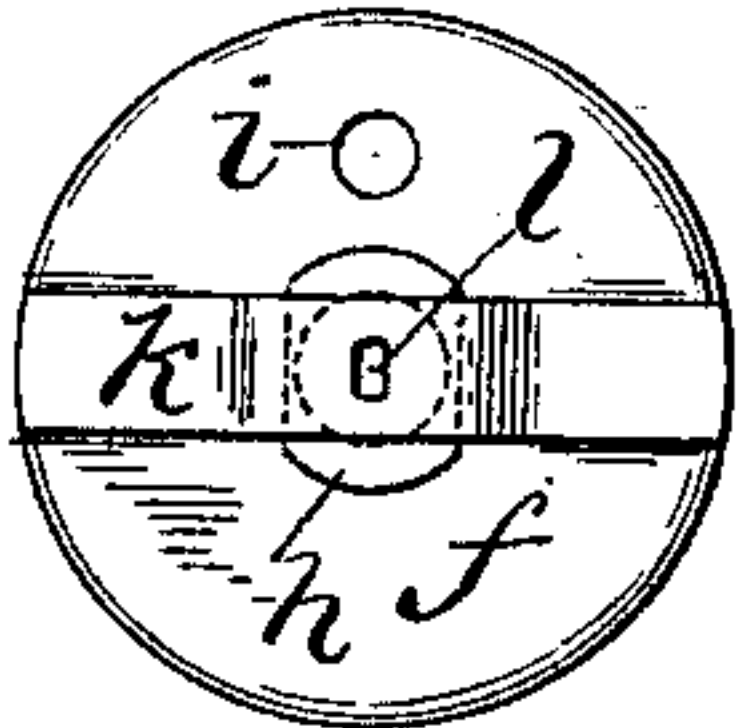
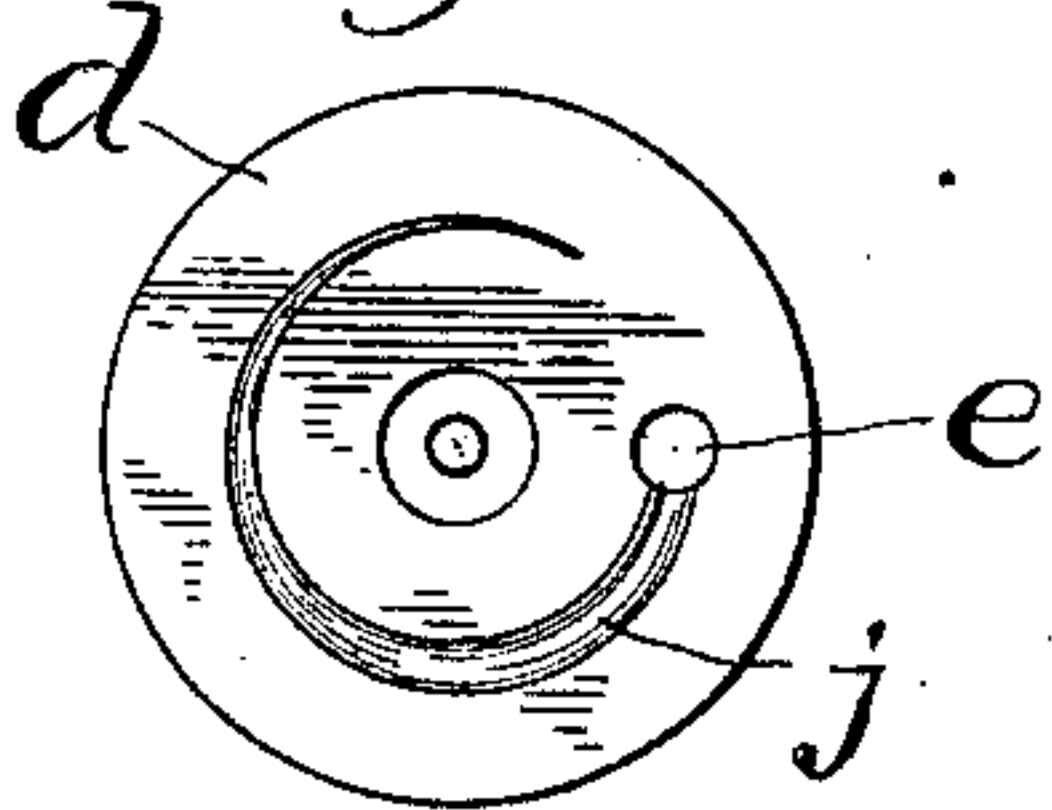


Fig. 4.

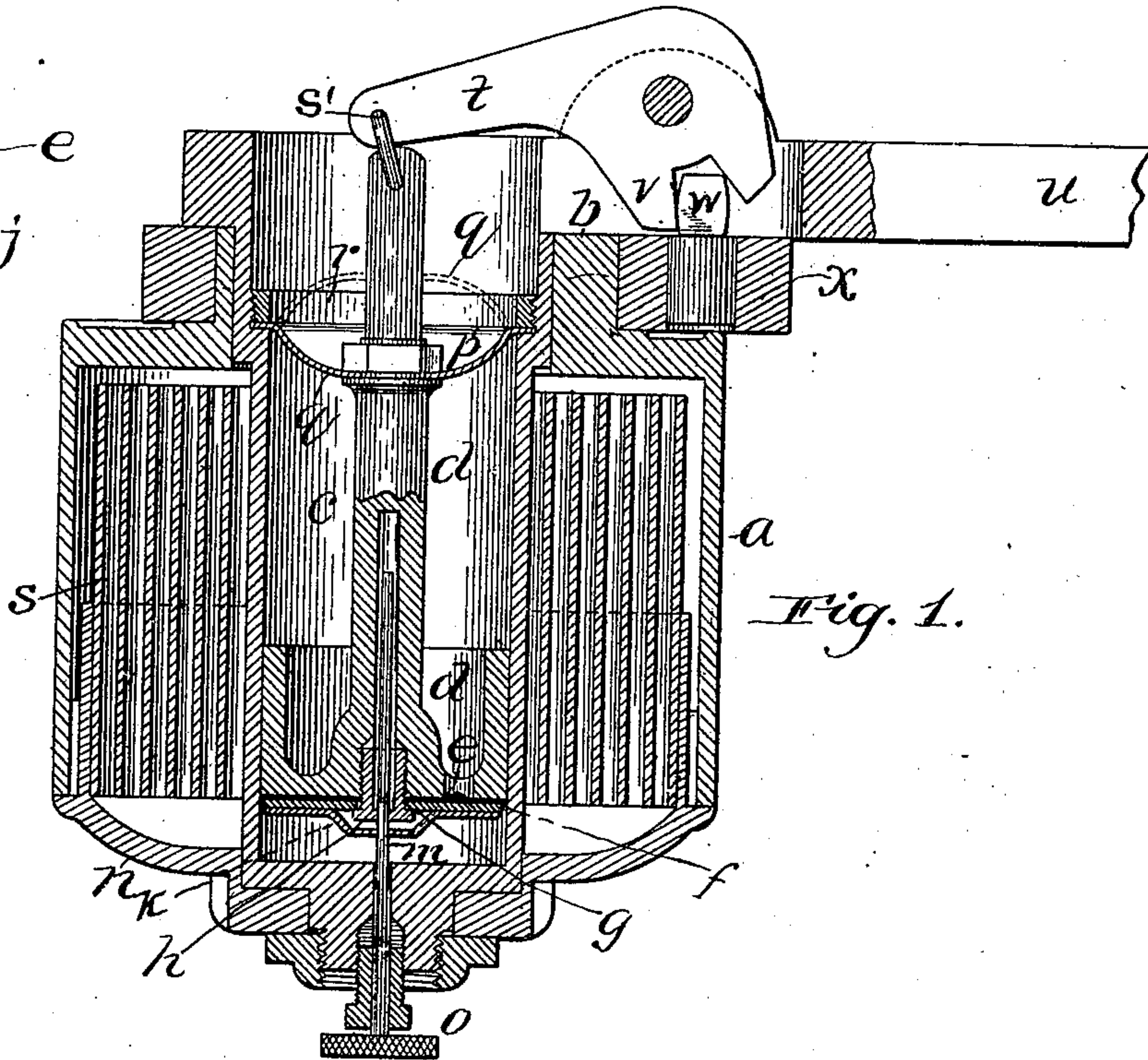
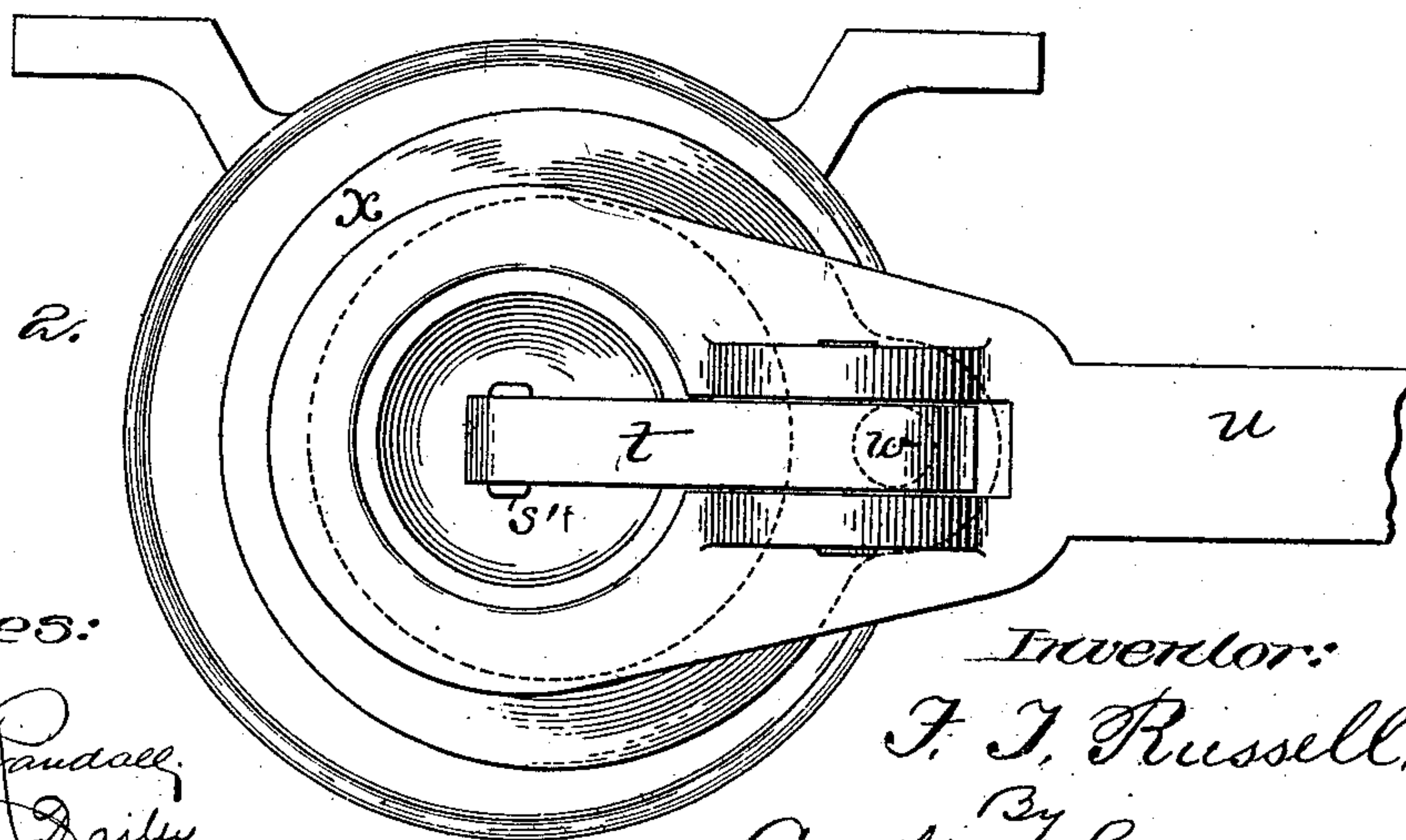


Fig. 1.

Fig. 2.



Witnesses:

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Inventor:

F. T. Russell,
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UNITED STATES PATENT OFFICE.

FREDERIC T. RUSSELL, OF GARDNER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO MILTON M. FAVOR, OF SAME PLACE.

DOOR CHECK OR CLOSER.

SPECIFICATION forming part of Letters Patent No. 632,149, dated August 29, 1899.

Application filed October 22, 1897. Serial No. 656,079. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC T. RUSSELL, of Gardner, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Door Checks or Closers, of which the following is a description sufficiently full, clear, and exact to enable those skilled in the art to which it appertains or with which it is most nearly connected to make and use the same.

This invention has relation to door checks and closers generally, and particularly, as herein shown, to that kind of door checks and closers illustrated and described in United States Letters Patent No. 584,273, dated June 8, 1897.

It is the object of the present invention to provide, first, improvements in the means for controlling the flow of the liquid from one side to the other of the piston in the operation of closing the door; second, improvements in means for preventing the escape of liquid from the liquid-cylinder in the operation of the piston, and, third, to provide improved means for actuating the means whereby the piston is reciprocated.

To these ends my invention consists of a door check and closer embodying in its construction a liquid-holding cylinder in which a piston operates, the latter being provided with a rotary clapper-valve adapted to control the port in the piston in an efficient and readily-operated manner and the port being of a peculiar form with a view to graduating the flow of liquid from side to side of the piston as conditions or circumstances may suggest.

My invention also consists in connecting the piston-rod with a diaphragm and also connecting the latter with the cylinder, so that as the piston operates the diaphragm will yield accordingly and there will be no possibility of leakage between the piston-rod and the parts with which it coöperates.

My invention also consists in forming an eccentric hub on the upper end of the cylinder, fitting a ring around the said hub, so as to be rotated therearound, and connecting the ring through intermediate means with the piston-rod, so as to reciprocate the piston as the door is opened and closed, all as I will proceed to

set forth in detail hereinafter and then point out with particularity in the appended claims.

Of the drawings, Figure 1 is a longitudinal vertical central sectional view of a door check and closer constructed in accordance with my improvements. Fig. 2 is a top plan view of the same. Fig. 3 is a bottom view of the piston as it may be constructed in carrying out my invention. Fig. 4 is a bottom view of the clapper-valve as it may be constructed for use in connection with the piston shown in Fig. 3.

In the drawings, *a* designates the spring-cylinder, which is provided on its upper end with the eccentric hub *b*.

c is the liquid-cylinder, supported in the spring-cylinder so as to have a rotary motion therein. Within the cylinder *c* there is arranged a piston *d*, provided with a port *e*, through which the liquid in the cylinder may flow from side to side of the piston.

f designates a clap-valve arranged on the face of the piston to regulate the flow of the liquid through its port. The valve is connected with the piston by a screw *g*, tapped therein, between the head *h* of which screw and the face of the piston the said valve plays. A port *i* is formed through the valve, which port matches with the port *e* in the piston, so that when the said ports are brought into registering position the liquid in the cylinder may flow through the ports as freely as may be when the piston is moved. On the face of the piston there is formed a circular groove *j*, extending from the port *e* around so as to nearly connect again with the said port. The said groove is quite deep at its point of connection with the port and gradually grows shallower until it vanishes at its opposite end. A bridge *k* is arranged on the lower side of the valve, and a squared hole *l* is formed there-through, through which extends a squared rod *m*, on the lower end of which (extending through the cap *n* on the lower end of the casing) there is a head *o*, so that by the turning of the said rod through the medium of its head the valve can be adjusted to regulate to the greatest nicety the freedom of or the obstruction to the flow of the liquid through the port *e*, as will be readily understood without further description. Of course the graduated groove might be made in the valve in-

stead of in the face of the piston and have the same effect as that described, and in some cases I may employ this construction.

Within the cylinder, toward its upper end, there is formed a ledge *p*, upon which the outer edge of a diaphragm *q* is arranged, the central portion of the said diaphragm being secured to the piston-rod *d'*. A ring *r* is screwed down upon the outer edge of the diaphragm to hold it in place with the greatest needful security. The said diaphragm may be made of suitably-tanned leather, rubber, or other material adapted to the purpose, so as to permit of the reciprocation of the piston-rod and piston without allowing any escape of liquid between the piston-rod and any of its associated parts. The full and dotted lines representing the diaphragm in Fig. 1 will show how the functions mentioned may be accomplished. This is an important feature of the invention, and I do not confine it to the precise form and arrangement herein shown, since it may be employed in connection with piston-rods of other forms of door checks and closers and similar contrivances without departing from the nature or spirit of this part of the invention. It will be noticed that the flexible diaphragm is clamped to the piston-rod at a point between the piston and the upper end of the rod, which has connection with the operative means. Thus the diaphragm, in connection with the piston-rod itself, forms an imperforate end wall which prevents the escape of the liquid and also prevents the movement of the piston-rod through the diaphragm itself, thus avoiding the gumming or oiling of the part of the rod which projects through the diaphragm, and which, when so coated with oil, soon becomes covered with dust and dirt, which dirt or grit passing to and fro through the diaphragm quickly wears the bearing or packing, so as to cause a leakage. In short, the diaphragm forms both a means for preventing the escape of the liquid from the inside of the cylinder and also a perfectly tight packing for the piston-rod.

It is understood, of course, that the spring *s* is connected at one end to the casing *a* and at the other end to the cylinder *c*, so that as the door is opened the spring will be put under tension to close the door when the latter is released. It will also be understood that the opening and closing of the door will impart a rotary motion to the cylinder.

To reciprocate the piston in the cylinder, the upper end of the piston-rod is connected by means of a link *s'* with the inner end of an arm *t* of a lever fulcrumed on the arm *u*, connected through other well-known means with the door or upon a part connected with the cylinder. The other arm *v* of the said lever has a loose connection with the upper end of

a pin *w*, which pin extends into a hole in a ring *x*, surrounding the eccentric hub *b*. Under this construction as the arm *u* is moved around and back the piston will be raised and lowered. This last-described construction is such as to secure an easy movement of the parts, avoid undue friction, and prevent liability of binding.

The operation of the device as a whole and the advantages of its functions have been so fully described hereinbefore and have been made so far apparent or obvious as not to need further explanation.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made or all of the modes of its use, it is declared that what is claimed is—

1. A door check and closer comprising in its construction a liquid-cylinder, a reciprocating piston in the cylinder provided with a port and with a circular groove in its face graduated in depth leading from the port, to a vanishing point, and a circularly-adjustable valve provided with a port registering with the said port and groove in the piston, and means substantially as set forth for adjusting the valve.

2. A door check and closer comprising in its construction a liquid-cylinder, a reciprocating piston-rod and piston in said cylinder, and a flexible diaphragm, *q*, connected at its edge to the cylinder, and having a fluid-tight connection at its center to the piston-rod at a point between the piston and the end of the rod, to prevent the latter from moving in the diaphragm.

3. The combination with the cylinder having a ledge, *p*, of the piston-rod, a diaphragm having its edge resting upon said ledge, a ring, *r*, secured upon the edge of the diaphragm to clamp it between the said ledge and screw-ring, the said diaphragm being tightly connected at its center with the piston-rod intermediate of its ends to prevent the latter from moving in the former.

4. In a door check and closer the combination with the casing and its eccentric hub, of the ring surrounding the said hub, the liquid-cylinder, the piston and piston-rod therein, the pin *w* in the ring, the arm *u*, and the lever connecting the piston-rod with the pin.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 14th day of October, A. D. 1897.

FREDERIC T. RUSSELL.

Witnesses:

GEO. R. WARFIELD,
JOHN EDGELL.