No. 629,001.

Patented July 18, 1899.

C. O. CASE.

LIQUID DOOR CHECK.

(Application filed Apr. 27, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

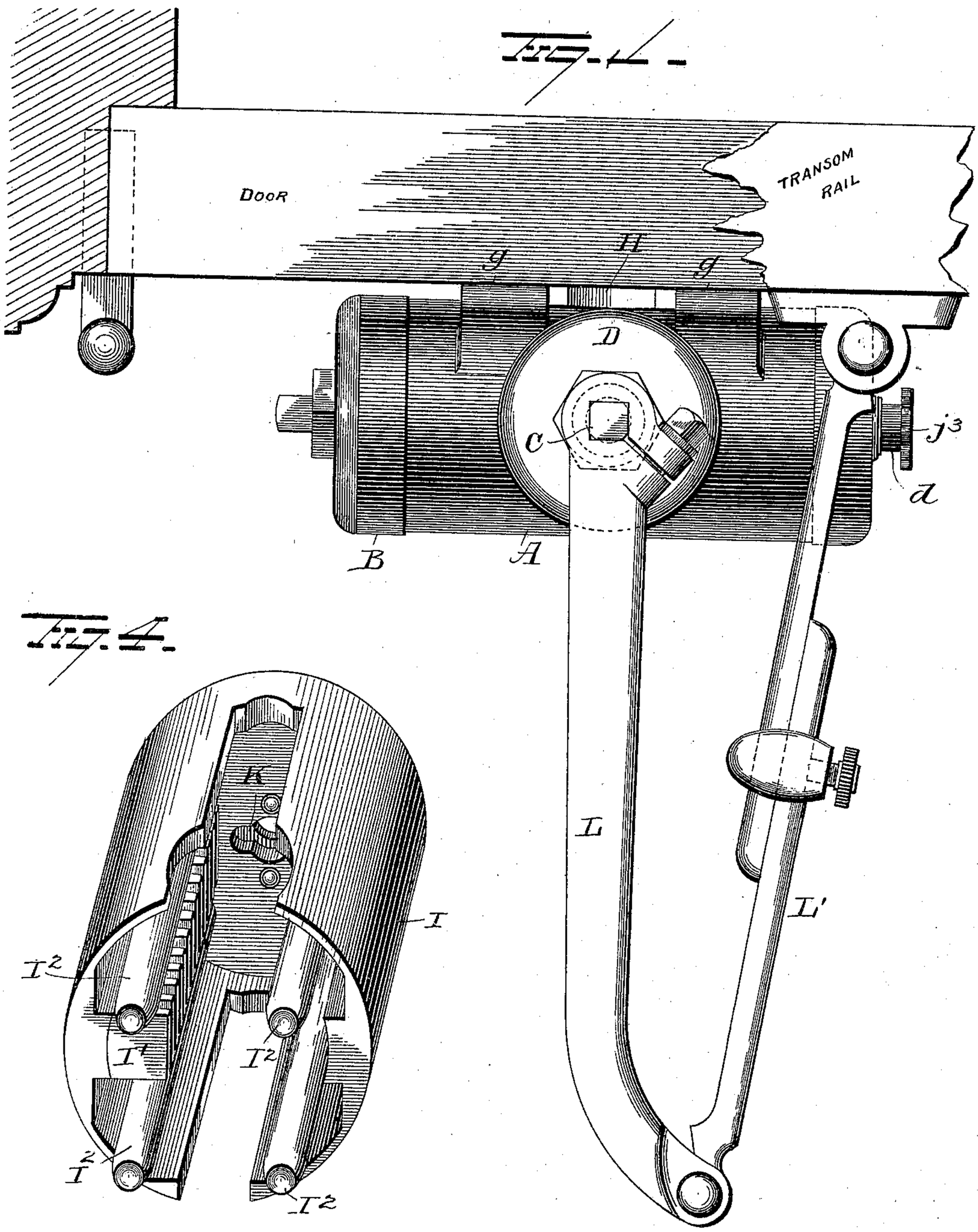

Fig. 4.

WITNESSES

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FIG. 2.

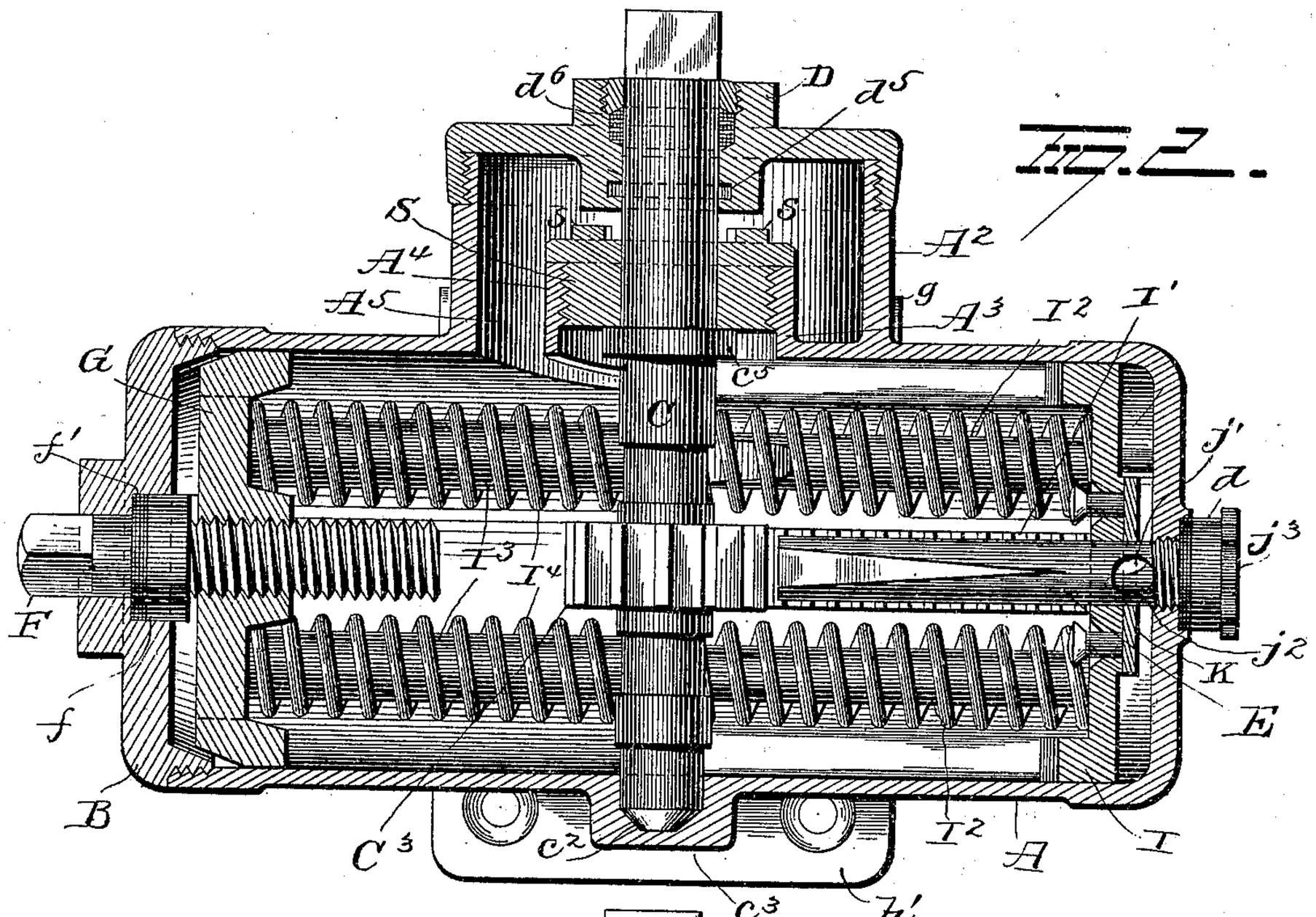
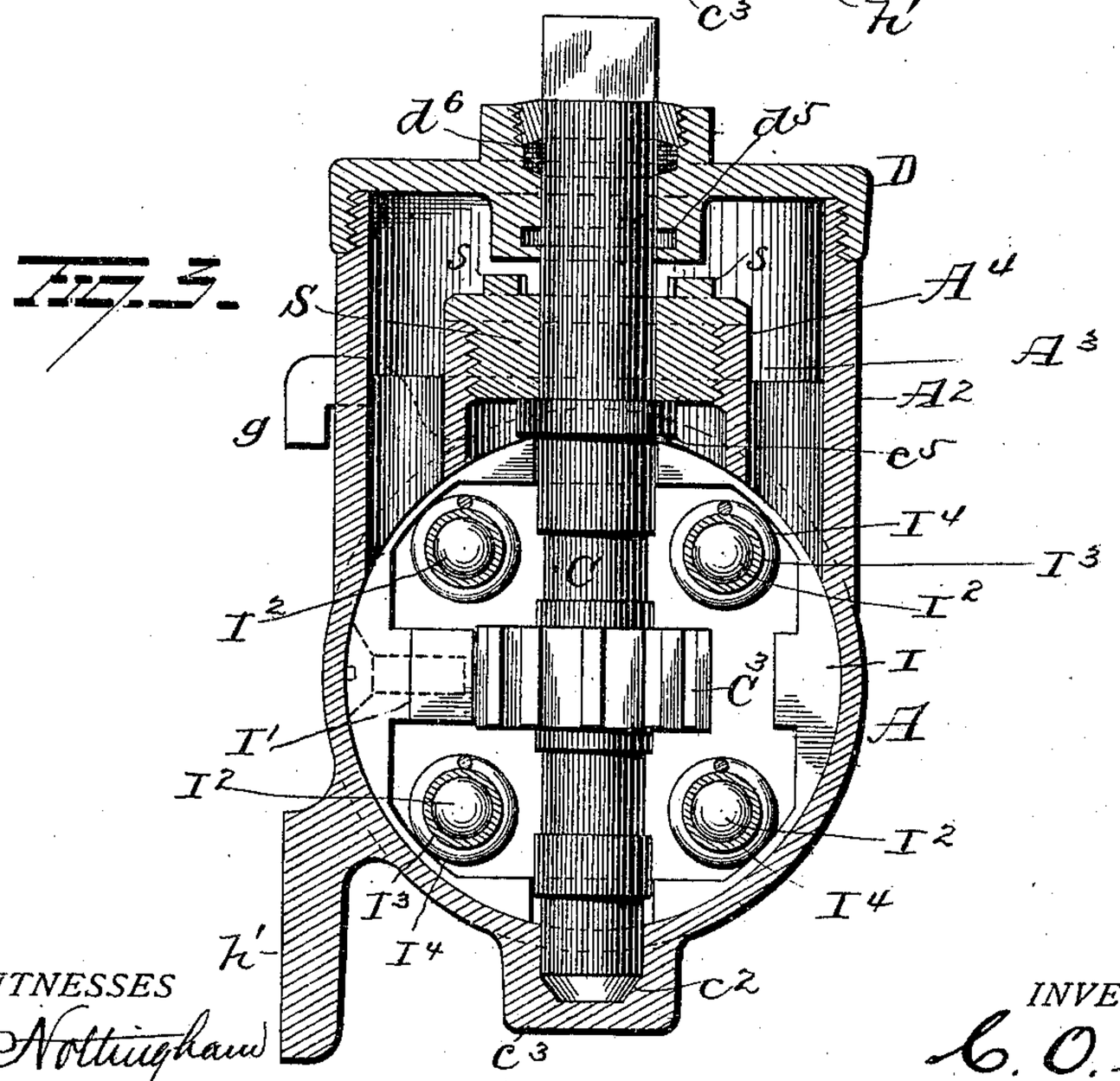


FIG. 3.



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UNITED STATES PATENT OFFICE.

CROMWELL O. CASE, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO THE P. & F. CORBIN, OF SAME PLACE.

LIQUID DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 629,001, dated July 18, 1899.

Application filed April 27, 1898. Serial No. 679,011. (No model.)

To all whom it may concern:

Be it known that I, CROMWELL O. CASE, a resident of New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Liquid Door-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.

My invention relates to an improvement in liquid door-checks, and is designed more particularly as an improvement on the construction disclosed and claimed in Patent No. 577,917, granted to William Gilfillan March 2, 1897, the object of the invention being to provide means for absolutely preventing the liquid from working up or being forced through the packing or bearings in which the upper end of the spindle is supported.

With this object in view the invention consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in elevation of my improved check. Fig. 2 is a view in longitudinal section of same. Fig. 3 is a view in transverse section, and Fig. 4 is a view of the plunger.

A represents a cylindrical casing provided with an integral head at one end and screw-threaded at its other end for the attachment of the removable head B. This cylinder is provided centrally on its upper side with a cylinder A^2 at right angles to cylinder A. Cylinder A^2 is screw-threaded externally at its upper end, and the base of cylinder A^2, which is formed by the wall of the cylinder A, is provided with a centrally-located opening A^3, having a flange A^4 screw-threaded internally, and with a port A^5, leading into the lower cylinder A, so that any liquid that is forced or otherwise gets into the cylinder A^2 can gravitate back into the main cylinder A.

The integral head of cylinder A is provided centrally with a small threaded opening for the attachment of the gland *d*, carrying the vent-tube E, while the removable head B of the cylinder is provided with a centrally-located opening for the passage of the head of the screw F, on which the tension-disk G is mounted. The rear face of the cylinder is provided with two bosses *g*, separated a suitable distance and provided with undercut lower faces adapted to receive the flange *h* of the locking or fastening plate H. This plate H is provided with screw-holes for its attachment to a door or jamb, and its upper edge is offset outwardly, forming the upwardly-projecting flange *h*, which latter, as before stated, is adapted to enter the recess in the lower faces of the bosses *g* and support the casing in position while the screws are passed through the lower flange *h'* integral with the casing A.

I is an elongated cylindrical piston or plunger open at one end and closed at the other end and cut away on its top and bottom, as shown, to permit its open end to straddle the spindle as the piston or plunger is moved toward the springs, as in opening the door. It is provided interiorly with a rack-bar I', extending from the inner face of the head of the piston to the open end of the latter, and is also provided on its inner face with a series (four in the present instance) of rods or lugs I^2, which project beyond the rear or open end of the piston and are adapted to register with and enter the tubes I^3, carried on the tension-disk G. The disk G is mounted on the screw F, which latter is provided with a shoulder *f*, adapted to rest against a shoulder *f'*, formed on the removable head of the casing, a gasket or washer being interposed between the two sections to form a tight joint and prevent leakage of the liquid. The end of this screw F passes through the removable head B of the cylinder and is provided with an angular end for turning same. By turning the screw in one direction the disk is moved toward the piston or plunger and the springs I^4 thereby compressed and the tension increased. By moving the disk in the opposite direction the springs are permitted to elongate, and thus decrease the tension. By means of the movable disk the springs can be given tension just sufficient to close the door.

Located centrally in and at right angles to the cylinder is the spindle C, the lower end of which is seated in the recess c^2, formed in the lower face of the cylinder, the cylinder

being enlarged externally at this point by the boss c^3 for the purpose of the recess. The spindle is provided with the pinion C^3, which latter engages the rack I′ and moves the piston or plunger I against the action of the springs I^4 in opening the door and is moved by the rack I′ while the springs I^4 are forcing the piston to its normal position. The upper end of the spindle is made angular for the attachment of the arms L L′ ordinarily employed, the arm L being loosely connected at its outer end to the extensible sectional arm L′, which in turn is attached at its free end to the door or jamb, as the case may be.

The spindle C is provided with the collar c^5, which latter is adapted to overlap the side walls in the top slot of the piston or plunger and rest on the piston or plunger and take a portion of the wear and strain from the lower end of the spindle, while the top face of the collar rests immediately under and in contact with the lower face of the sleeve S, which latter is secured within the screw-threaded flange A^4.

Secured to the integral head of the cylinder is the vent-tube E. This tube is provided at a point adjacent to the head of the cylinder with an opening j', and located within the tube is a cut-off valve j^2, actuated by the thumb-wheel j^3, located outside the cylinder. By turning the valve to close more or less of the opening the liquid between the head of the cylinder and the piston is permitted to escape slower or faster through the opening into the tube and through the tube to the cylinder in front of the piston or plunger.

The tube E passes through an opening in the piston-head and is preferably tapered or grooved throughout its length, so as to permit the fluid to move rapidly and escape from behind the piston as the door starts to close, gradually checking the flow until, as before stated, the door reaches a nearly-closed position.

Surrounding the opening in the head of the piston or plunger is the valve K. This valve is simply a disk having an opening just large enough for the passage of the vent-tube and is provided with two rivets, which pass loosely through the head of the piston, thus permitting the valve to move a slight distance toward and away from the valve-head. The opening in the piston or plunger head is somewhat larger than the tube, while the opening in the valve is of practically the same diameter as the large end of the vent-tube. Thus it will be seen that as the piston or plunger is moved in the direction of the springs to compress them, as in opening the door, the fluid to the front of the piston opens the valve carried by the piston and surrounding the vent-tube and flows freely back behind the piston or plunger. As soon, however, as the door is released and the springs permitted to exert their pressure on the piston or plunger the valve is closed by the pressure of the fluid thereagainst and the closing action of the door checked. As the tube is tapered or grooved from its free end rearward, it will be seen that the closing movement of the door is gradually retarded. This closing movement permitted by the tapered or grooved vent-tube can be accelerated to a greater or less degree by the valve within the vent-tube. By opening the valve to its limit the door closes at its greatest possible speed, and by closing the valve the speed is reduced. By this arrangement the closing speed of the door can be regulated as desired.

All the features above referred to except the cylinder A^2, having a port leading to the main cylinder, and the spindle, having a collar between the plunger and the sleeve S, are shown and described in the Gilfillan patent above referred to, and my invention, as previously stated, is confined to the cylinder A^2 and its connection and relation to the main cylinder A, the sleeve S, and the gland D and the spindle having a collar located between the plunger and the sleeve, which features are designed, primarily, to provide against the leakage of any liquid up around the spindle. The spindle C is supported at its upper end above the plunger by the sleeve S and the gland D. The sleeve S is screwed into place within the flange A^4 and closely embraces the spindle and is provided with projections s thereon for engaging a wrench or other tool employed for turning it. This sleeve prevents the racing, or any material creeping, of the liquid up around the spindle, and any liquid that should crawl or work its way up enters the cylinder A^2, and, as there is no pressure therein, it is free to and does gravitate back through port A^5 into cylinder A in rear of the plunger, and as there is no pressure of the liquid in cylinder A^2 against gland D it will be seen that the latter has to provide simply against the crawling of the liquid up around the spindle. This creeping or crawling of the liquid is absolutely prevented by the packing d^6 and also by providing the gland D with a small annular groove d^5, forming an air-space, which in practice I have found forms an excellent check against the escaping upward of any liquid.

The check-case can be attached to and connected with the door or door-jamb in the usual manner, and as the door is opened the spindle is turned, thereby compressing the springs, and when the door is released the piston action on the spindle causes the door to assume its normal position.

The cylinder A is filled or partly filled with a liquid, and Fig. 2 represents the positions of the parts when the door is closed. By now opening the door the plunger is moved rearwardly, thus compressing the spring, and the liquid behind the piston passes around and through the vent-tube. As soon as the door is released the springs tend to force the plunger or piston back; but the free movement of the latter is retarded by the liquid in front of the plunger. The valve on the head of the

plunger is held closed by the pressure of the liquid thereagainst. Hence all the liquid must pass to the rear of the plunger through and around the tube. At the commencement of the closing movement of the door the small or reduced end of the vent-tube permits of the comparatively free passage of the liquid; but as the door nears its closed position the size of the opening is gradually reduced, thus reducing the speed of the door and bringing the door to a closed position without shock.

It is evident that numerous slight changes might be made in the general form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I would have it understood that I do not wish to limit myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. A door-check comprising in its construction a main cylinder closed at one end and provided with a removable cap at its other end, a plunger located in said cylinder, means whereby the liquid may escape from in front of the plunger, a spring supported at one end by the cylinder and bearing at its other end against the plunger, a cylinder located on top and approximately to the center of the main cylinder and at right angles to the main cylinder, a port leading from the upper cylinder at a point behind the head of the plunger to the lower cylinder, a spindle having a pinion engaging an internal rack on the plunger and a sleeve and gland supporting the upper end of the spindle.

2. A door-check comprising a main cylinder a smaller cylinder at right angles thereto, a port leading from the smaller to the main cylinder to a point behind the head of the plunger, a valved plunger in the main cylinder, an internal rack on the plunger, a spindle carrying a pinion engaging the rack, a sleeve secured in the base of the smaller cylinder and a gland secured in the upper end of the latter, the said sleeve and gland forming bearings for the spindle.

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

CROMWELL O. CASE.

Witnesses:

ALBERT N. ABBE,

C. A. BLAIR.