(No Model.) 2 Sheets—Sheet 1.

R. ORR.

DOOR CHECK.

No. 515,923. Patented Mar. 6, 1894.

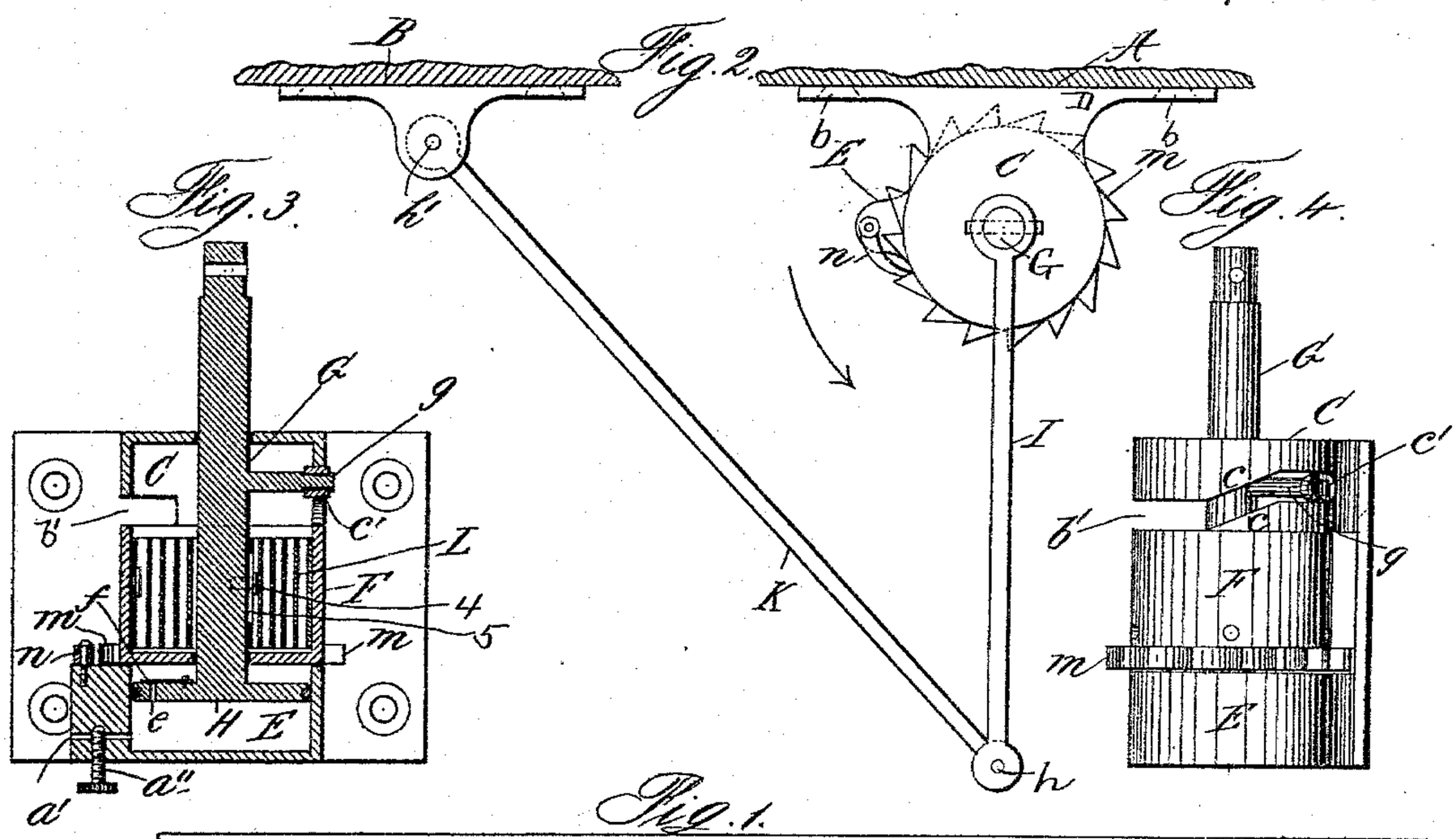
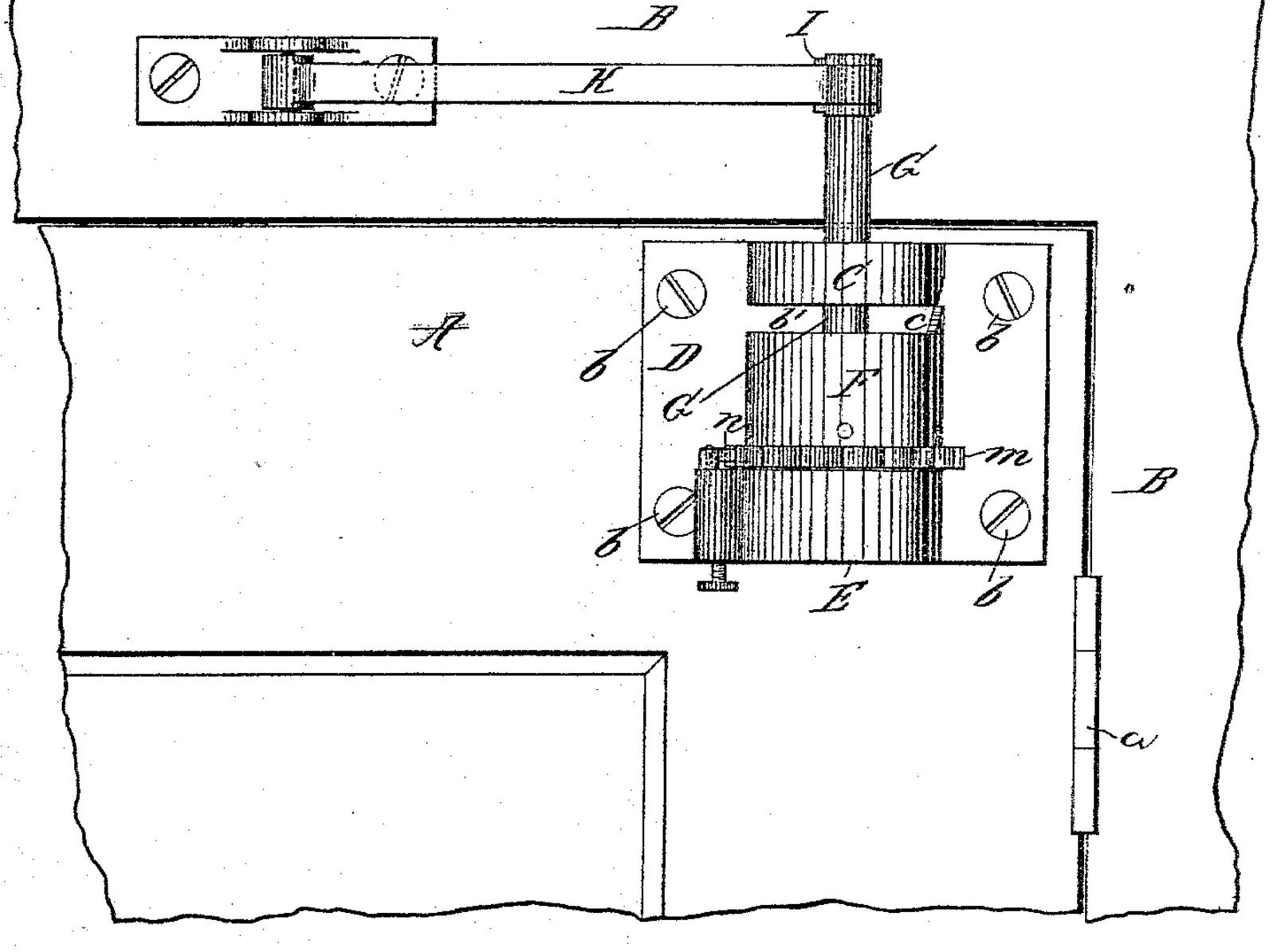


Fig. 1. Fig. 2. Fig. 3. Fig. 4.



WITNESSES:

John Buckler,

Francis A. Rodriguez.

INVENTOR

Robert Orr

BY

James A. Whitney

ATTORNEY.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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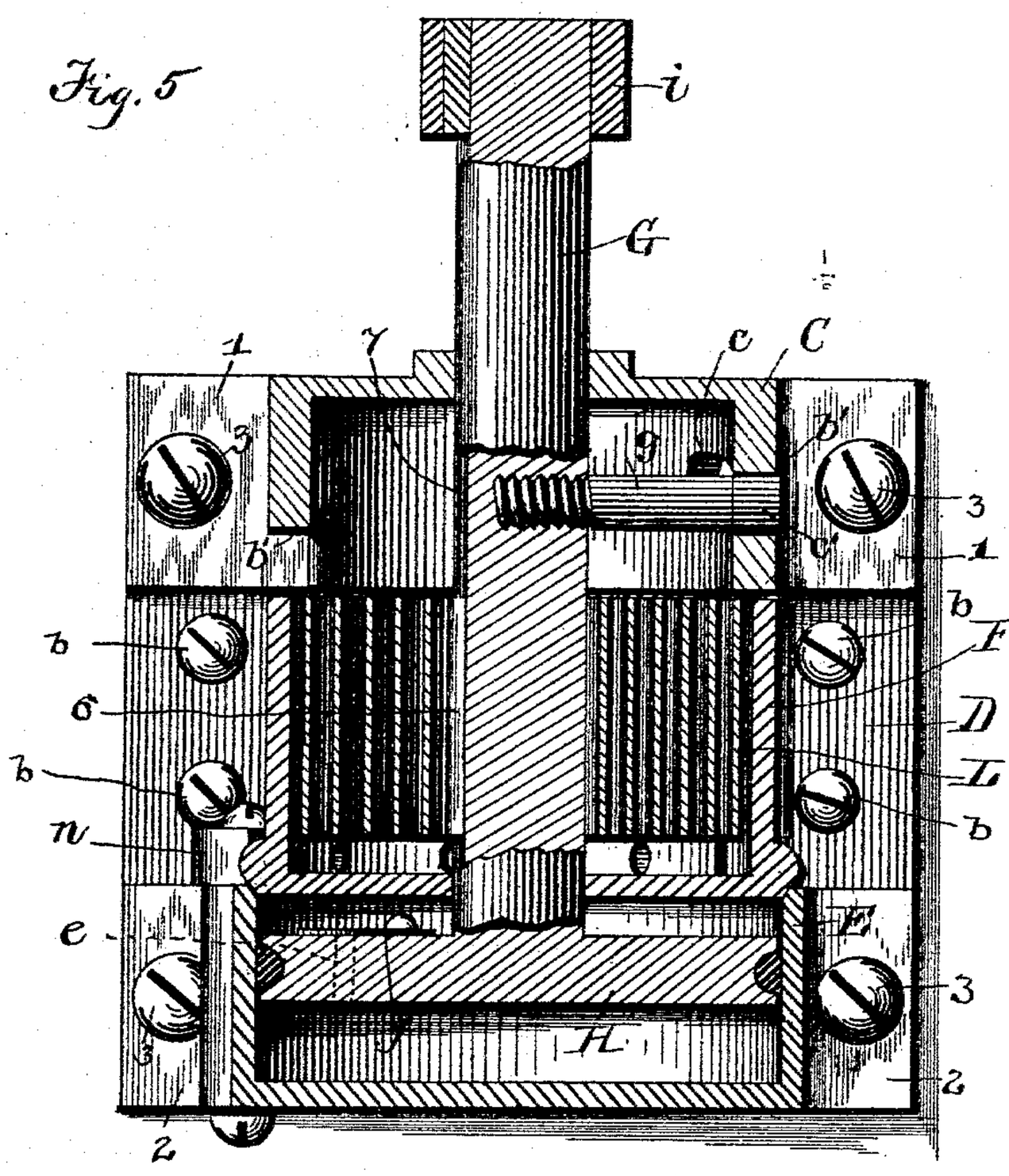
Fig. 5



Witnesses:—
H. Sedgwick
Harry E. Davis

Inventor:—
Robert Orr.
by A. H. Harrison
Associate Attorney

THE NATIONAL LITHOGRAPHING COMPANY.
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT ORR, OF BROOKLYN, NEW YORK.

DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 515,923, dated March 6, 1894.

Application filed December 2, 1892. Serial No. 453,897. (No model.)

To all whom it may concern:

Be it known that I, ROBERT ORR, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Door-Checks; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1. is a front view showing the position and arrangement of my invention in place in connection with a door and door frame. Fig. 2. is a top view; Fig. 3. a vertical sectional view and Fig. 4. a side view further representing and illustrating my said invention. Fig. 5 is an enlarged vertical sectional view, illustrating one way of constructing the parts whereby they may be assembled for use.

This invention relates to that class of apparatus commonly termed door checks and designed to secure the automatic and noiseless closing of doors with a retarded or gentle movement of the door as it swings to its closed position.

My invention comprises certain novel combinations of parts whereby is provided a mechanism of the class specified which is simple and strong in construction, compact in form, easily applied in place for use, very effective in operation, not liable to get out of order from prolonged or severe use, and with which the softened or retarded movement of the door toward the close of its inward or closing movement is secured in a higher degree than has ordinarily been hitherto attained with this class of devices.

A. is the door hinged in the usual or any suitable manner as at, *a*. and, B, is the frame thereof. To the door is affixed a shell, C. The attachment of said shell to the door may be provided for by means of a base-plate, D, which may be fastened to the door by wood screws *b* and which base-plate supports the parts as hereinafter described. This shell of course moves with the door as the latter is swinging around its axis of movement, in other words upon the hinges by which it is attached to the door-frame, B. This shell is slotted as shown at, *b'*, in Figs. 1, 3, and 4. Said slot being shaped to provide a cam, *c*, as represented in Figs. 1 and 4. Also placed upon the door, and fixed in relation thereto is a cylinder, E, closed at the bottom. This cylinder is preferably provided with an outlet opening, *a'*, for occasional use, but which normally, is closed as, for example by means of a screw plug, *a'*, intercepting the same as shown in Fig. 3. The cylinder, E, is placed in line, or substantially so, with the shell, C. Interposed between the shell, C, and the cylinder, E, is a drum, F, which may have the same diameter as the said shell and cylinder. This drum is capable of being axially adjusted for a purpose herein presently explained. A stem or piston-rod, G, extends downward through an opening in the top of the shell, C, axially through the drum, F, and has at its lower end a piston, H, which works in the cylinder, E. This piston should be provided with suitable packing to insure its practically air-tight working in said cylinder. In said piston is an orifice or passage, *e*, over which is a flap-valve, *f*, which opens outward. Extended laterally from the stem, G, is an arm, *g*, which works in the slot, *b'*, and in especial relation with the cam, *c*. To diminish friction as said arm acts upon or is acted upon by the said cam, *c*, there may be provided upon the said arm an antifriction roller, *c'*.

Secured to the upper end of the stem, G, is an arm, I, to which is pivoted one end, *h*, of a rod, K, the opposite end of which, as shown at, *h'*, is pivoted to the door-frame, B. Within the drum, F, and surrounding the stem, G, is a coiled or volute spring, L, represented in Fig. 3, one end of which is attached to said stem while the other end of said spring is attached to the drum in such manner that the tension of said spring,—the drum being fixed in its relation to the door during the operation of the spring,—which has a tendency to swing the door toward its closed position. To provide for bringing the spring to the requisite tension the drum is loose from the shell, C, and cylinder, E, and thereby capable, on occasion, of an axial movement. Said drum is provided with a circumferential system of ratchet teeth, *m*, into which plays a pawl, *n*, which may be pivoted to an adjacent part of the cylinder, E, as shown in the drawings. By turning the drum in the proper direction the spring is coiled or tightened to the proper tension, any reverse axial move-

ment of the drum being prevented by the pawl holding upon the ratchet teeth, *m*.

As indicated in Fig. 5, and in order that the parts may be readily assembled for use, I may form the shell C with lugs or wings 1 and the cylinder E with wings 2, through which wings screws 3 pass into the base plate D. The drum F is mounted so as to rotate as hereinafter described and may be guided in its rotation by having its lower end fitted slightly within the cylinder E. The arm *g* may have its inner end screw-threaded to fit a similar threaded recess in the stem G. To permit the stem to move longitudinally without disturbing its connection with the spring, I may attach the inner end of the spring to the stem by means of a screw 4, passing through a vertical elongated slot 5 into the stem, as indicated in Fig. 3, or I may bend the inner end of the spring inward as at 6 in Fig. 5, to enter an elongated groove 7 in the side of the stem.

The drawings represent the parts of the apparatus in the position occupied by them when the door is closed.

The operation of the apparatus is as follows:—The door being swung open the shell, C, drum, F, and cylinder, E, are together carried around by the movement of the door as indicated by the arrow in Fig. 2. The immediate effect of this is to wind to a greater tension the spring, L, the stem, G, being held by the rod, K, holding upon the arm, I, of said stem. The continued opening or outward movement of the door permits the piston, H to descend in the cylinder, E, by reason of the movement of the cam, *c*, with reference to the arm, *g*, of the stem, G, any air which may have found its way into the cylinder underneath the piston being permitted to escape through the orifice, *e*, by the yielding of the valve, *f*. The return or closing movement of the door is insured by the reaction of the spring, L, when the door is released from the force which brought it to its opened position. This return or inward movement of the door causes the cam, *c*, to act upon the arm, *g*, of said stem to lift the latter. As a consequence the piston, H, is lifted in the cylinder against the pressure of the atmosphere, there being created a substantial vacuum within said cylinder as the piston rises, and as this affords an added, but cushioned and yielding, resistance to the force exerted by the spring, it follows that the inward swing of the door is checked and softened when the piston is lifted against the pressure of the atmosphere and, the parts being so arranged that the door reaches its closed position at substantially the same time that the piston reaches the upward limit of its movement the door is closed softly and without jar or concussion. The weight of the atmosphere upon the piston constituting the yielding resistance by which the action of the spring is graduated to the degree requisite to the gradual and moderated movement of the door as it is brought back to its closed position with reference to its frame, B.

What I claim as my invention is—

1. In a door check, the combination with a stem having a lateral projecting arm and having a piston at one end adapted to rotate and reciprocate with said stem, a cylinder to which said piston is fitted, a spring for rotating the stem and piston, and a cam engaged by said arm, whereby the stem and its piston is given a longitudinal movement when rotated by the spring, substantially as described.

2. In a door check, the combination with the shell C having a slot consisting of two horizontal portions and an inclined connecting portion to form a cam, a cylinder E, a stem G having an arm *g* entering said slot, and having piston H fitted to the cylinder E and formed to rotate and reciprocate with said stem, and a spring connected with the stem to rotate it, substantially as described.

3. In a door check, the combination with the shell C having cam slot *b' c*, the cylinder E, having a passageway connecting its interior with the external atmosphere, the intermediate drum F, the stem G having arm *g* and the piston H formed to rotate and reciprocate with said stem, and the spring L connecting the stem G with the drum F, substantially as described.

ROBERT ORR.

Witnesses:
GRAHAM MCADAM,
FRANCIS A. RODRIGUEZ.