

(No Model.)

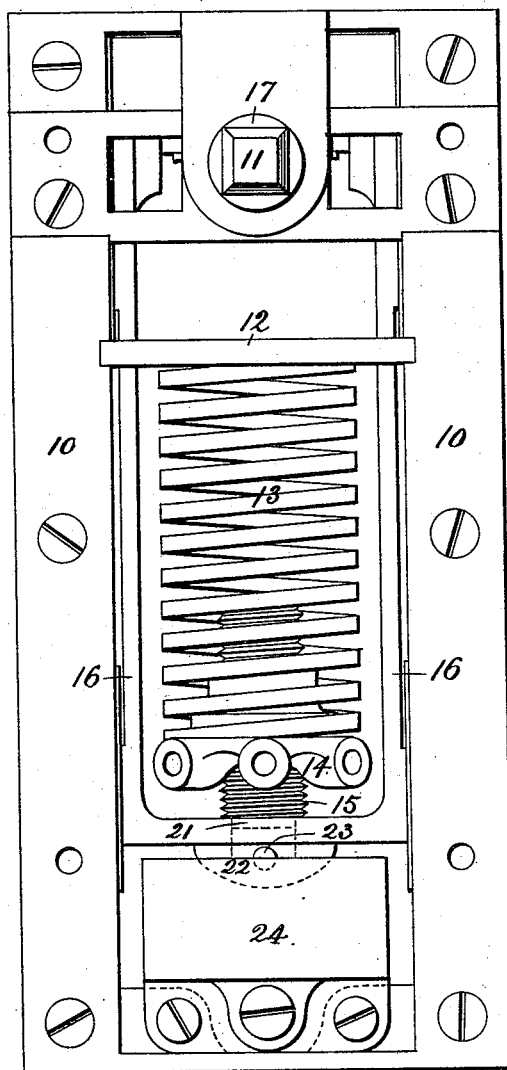
5 Sheets—Sheet 1.

R. ADAMS.  
DOOR SPRING.

No. 455,649.

Patented July 7, 1891.

FIG. 1.



Witnesses:  
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*Geo. H. Reed*

Inventor:  
*Robert Adams*  
By *James L. Norris*  
Attorney

(No Model.)

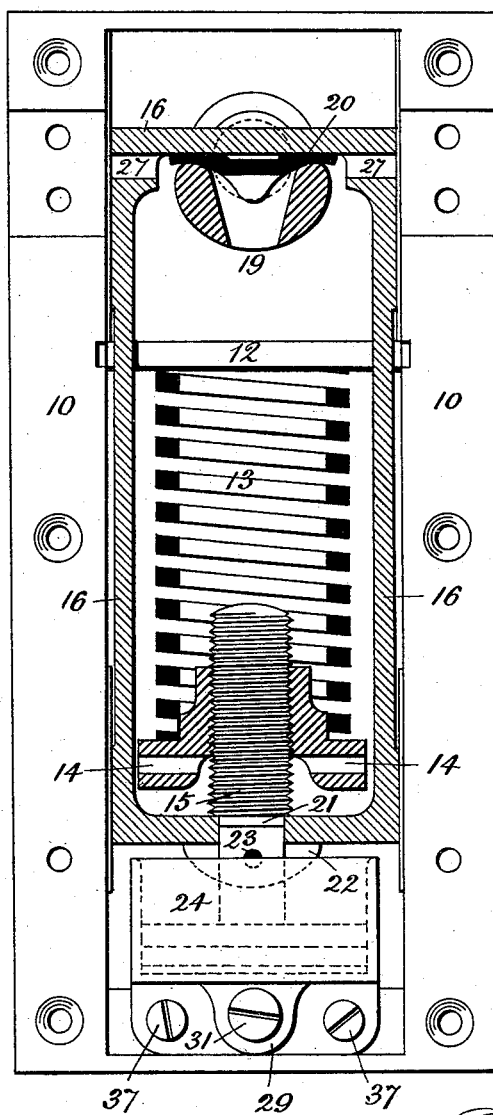
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R. ADAMS.  
DOOR SPRING.

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Patented July 7, 1891.

FIG. 2.



Witnesses:-

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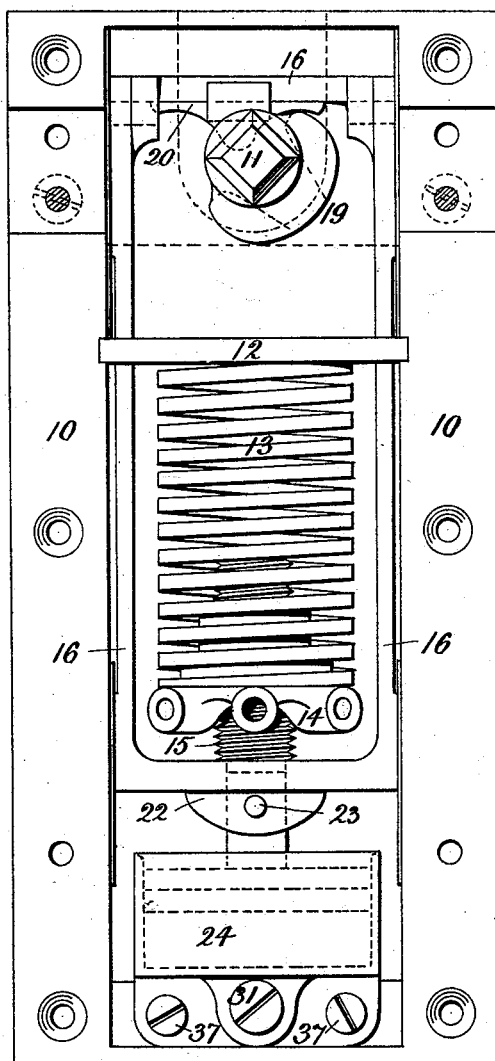
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DOOR SPRING.

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Patented July 7, 1891.

FIG. 3.



Witnesses:—

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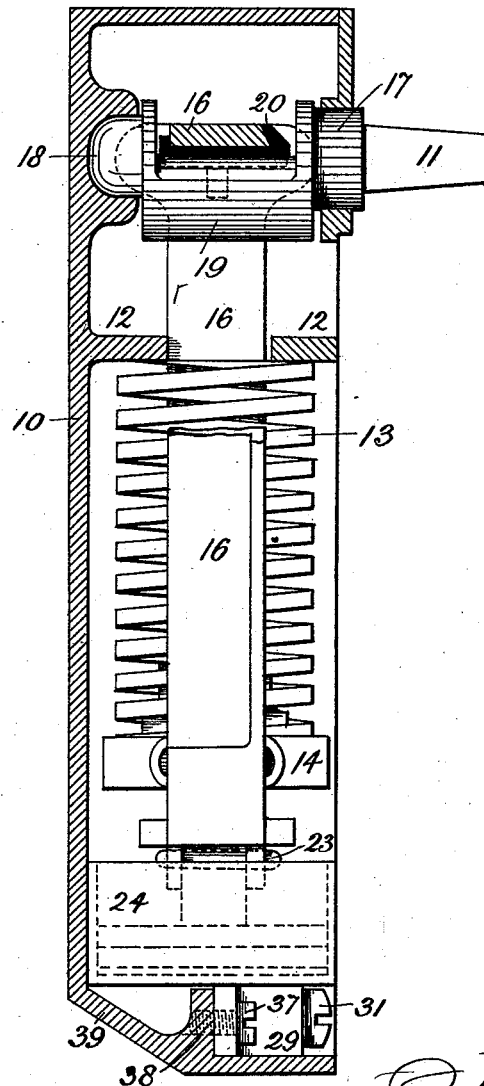
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Patented July 7, 1891.

FIG. 4.



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DOOR SPRING.

No. 455,649.

Patented July 7, 1891.

FIG. 5.

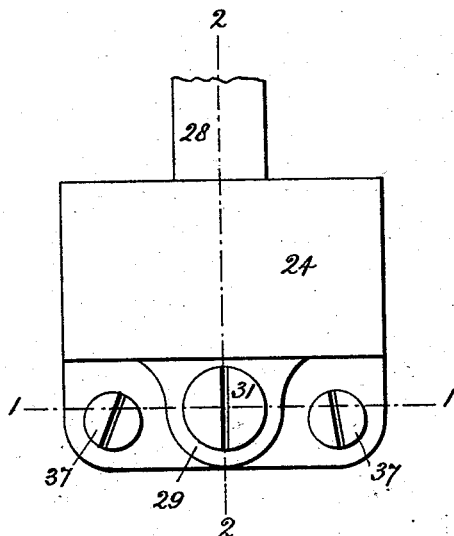


FIG. 6.

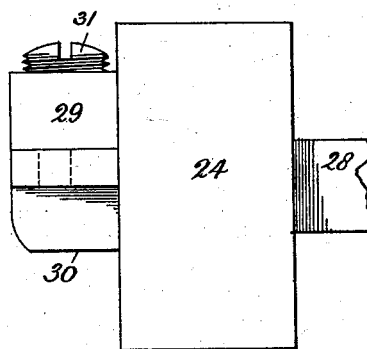


FIG. 7.

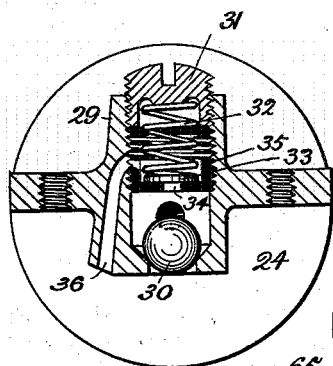


FIG. 8.

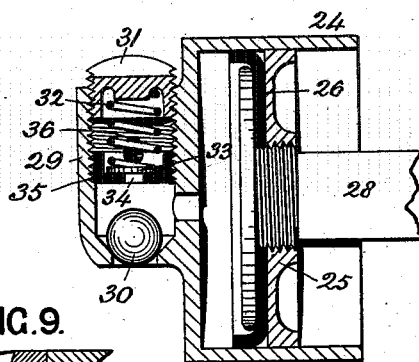
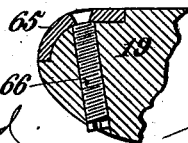


FIG. 9.



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# UNITED STATES PATENT OFFICE.

ROBERT ADAMS, OF LONDON, ENGLAND.

## DOOR-SPRING.

SPECIFICATION forming part of Letters Patent No. 455,649, dated July 7, 1891.

Application filed January 26, 1891. Serial No. 379,158. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT ADAMS, engineer, a subject of the Queen of Great Britain, residing at 67 Newington Causeway, London, in the county of Surrey, England, have invented certain Improvements in Springs for Doors and Analogous Articles and in Adjustments and Checks for Preventing Slamming, of which the following is a specification.

My invention relates to the fitting of doors and other structures with springs for closing and checks for preventing slamming, and in order that persons skilled in the art may understand the nature of my said invention, reference is hereby made to the accompanying drawings, in which similar figures of reference indicate corresponding parts.

Figure 1 is a plan, and Fig. 2 a sectional plan of Fig. 1. Fig. 3 is a plan of Figs. 1 and 2, showing the operation of the same; and Fig. 4 is a plan, partly in section, all illustrating my improved combined door-spring and check for double-action or swing doors and arranged to be sunk in the floor under the door. Fig. 5 is a plan; Fig. 6, a side view. Fig. 7 is a section on the line 1 1 of Fig. 5, and Fig. 8 is a section on the line 2 2 of Fig. 5, all illustrating my improved door-check for preventing slamming. Fig. 9 is a detail sectional view showing means for compensating for wear of the cams.

Referring to Figs. 1 to 4, 10 is the ordinary metal box, which is sunk in the floor. 11 is the pivot upon which the shoe of the door is dropped when placed in position. 12 is a plate extending across the box, and which plate sustains the forward thrust of the spring 13. 14 is a nut, and 15 is a screw fitting the nut, the nut 14 taking the backward thrust of the spring 13. 16 is a movable frame fitting the opening in the box and capable of sliding therein. By turning the nut 14 the spring 13 may be more or less compressed, and the power to close the door increased or diminished. The pivot 11 is socketed to the box at 17 and 18, as shown in Figs. 1 and 4. 19 is a cam, which forms the central portion of the pivot 11. The sectional form of the cam is shown in Fig. 2, and the side view is seen in Fig. 4. 20 is a sliding pressure-plate, which

is retained in contact with the upper bar of the frame 16 and also with the cam by the pull of the frame 16. The pressure of the frame, acting on the sliding plate and cam, retains the door in a closed position and offers resistance to its opening. 27 27 are slots provided in the frame 16 to permit the sliding plate 20 to travel to either side. The screw 15 is formed with a short square end 21, which fits into a square socket in the frame 16, the pressure of the spring retaining it in position. Two lugs (numbered 22) forming part of the frame 16 are provided to receive a pin 23, whereby the piston-rod of the check 24 is connected with the frame 16. When the door is opened, the pivot 11 is turned round, thereby causing one side of the cam 19 to move the frame 16 and compress the spring, as shown in Fig. 3, the plate 20 being carried toward one side by the action of the cam 19. As the cam is turned the angle of incidence approaches a vertical line, and the leverage consequently becomes reduced, resulting in a decrease of resistance to opening as the door opens widely. The slide 20 supplies rolling-surfaces for the cam and provides a large bearing-surface against the end of the frame 16. The sectional form of the slide 20 is shown in Fig. 4, such form being preferred for sustaining the slide in its place.

Referring to Figs. 5, 6, 7, and 8, 24 is the cylinder of the fluid check. 25 is the piston fitted with a cup-leather 26. 28 is the piston-rod. 29 is the valve-box. 30 is the ball-valve opening inward. 31 is a regulating-nut, whereby the spring 32 is regulated. This spring impinges upon the disk 33, covering a small passage 34 in the screwed collar 35. 36 is the return-passage for the fluid flowing from under the piston 25 when the door is closing and the piston is returning on its in-stroke.

Assuming that the piston-rod 28 is attached to the frame 16, as shown in Figs. 1 to 4, on the door being opened the piston performs its out-stroke, the fluid (preferably oil) freely following the piston by lifting the valve 30. When the door commences to close by the action of the spring 13, the ball-valve 30 closes its passage and the fluid can only find egress from the

cylinder by lifting the valve 33 and passing through the passages 34 and 36, the spring 32 regulating its speed and causing the door to close quietly and without slamming. The valve 33 also acts as a relief-valve in case the door should be improperly pushed for the purpose of closing it quickly. The check may be secured to the box 16 by means of screws 37 entering the provision 38, or by any other suitable means. The box 16 is angled off at 39 for affording facilities in placing it in position in or under the floor.

The checks shown in Figs. 5, 6, 7, and 8 and hereinbefore described may be fitted to all or any of the door-springs herein described, or to doors fitted with other springs, and the springs herein described may in like manner be fitted to doors having other forms of checks or to doors without checks.

In Fig. 9 I exhibit means to compensate for wear of the cam 19, which consists of a steel strap 65, detachably secured to the cam by a screw 66.

For single-acting doors, or doors which open only in one direction, the cams and other devices are modified by eliminating one-half, or thereabout, of such cams in a manner well understood by persons skilled in the art.

I claim—

1. A door-closing apparatus consisting of the box 10, having the rigidly-attached cross-plate 12, the pivot 11, having the cam 19, the sliding rectangular frame 16, moving in the box and having its upper cross-bar extending over the cam, the screw 15, engaged with the lower cross-bar of the sliding frame, the adjusting-nut 14, mounted on the screw above the lower cross-bar of the sliding frame, and the spring 13, bearing at one end against the adjusting-nut and at the opposite end against

the rigidly-attached plate of the box, substantially as described.

2. A door-closing apparatus consisting of the box 10, having the rigidly-attached cross-plate 12, the pivot 11, having the cam 19, the sliding rectangular frame 16, moving within the box and having its upper cross-bar extended over the cam, the horizontally-sliding plate 20, arranged between the cam and the under side of the upper cross-bar of the sliding frame, the screw 15, engaging the lower cross-bar of the sliding frame, the adjusting-nut 14, mounted on the screw above the lower cross-bar of the sliding frame, and the spring 13, bearing at one end against the nut and at the opposite end against the rigidly-attached plate of the box, substantially as described.

3. A door-closing apparatus consisting of the box 10, having the rigidly-attached cross-plate 12, the pivot 11, having the cam 19, the sliding rectangular frame 16, arranged within the box and having its upper cross-bar extending over the cam, the screw 15, engaging the lower cross-bar of the sliding frame, the adjusting-nut 14, mounted on the screw above the lower cross-bar of the sliding frame, the spring 13, bearing at one end against the adjusting-nut and at the opposite end against the rigidly-attached cross-plate of the box, the fluid-check cylinder, and the piston having its piston-rod connected with the lower cross-bar of the sliding frame, substantially as described.

Dated this 8th day of December, 1890.

ROBERT ADAMS.

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