

Sept. 18, 1928.

1,684,704

H. HUBBELL

DOOR CONTROL

Filed Jan. 6, 1926

3 Sheets-Sheet 1

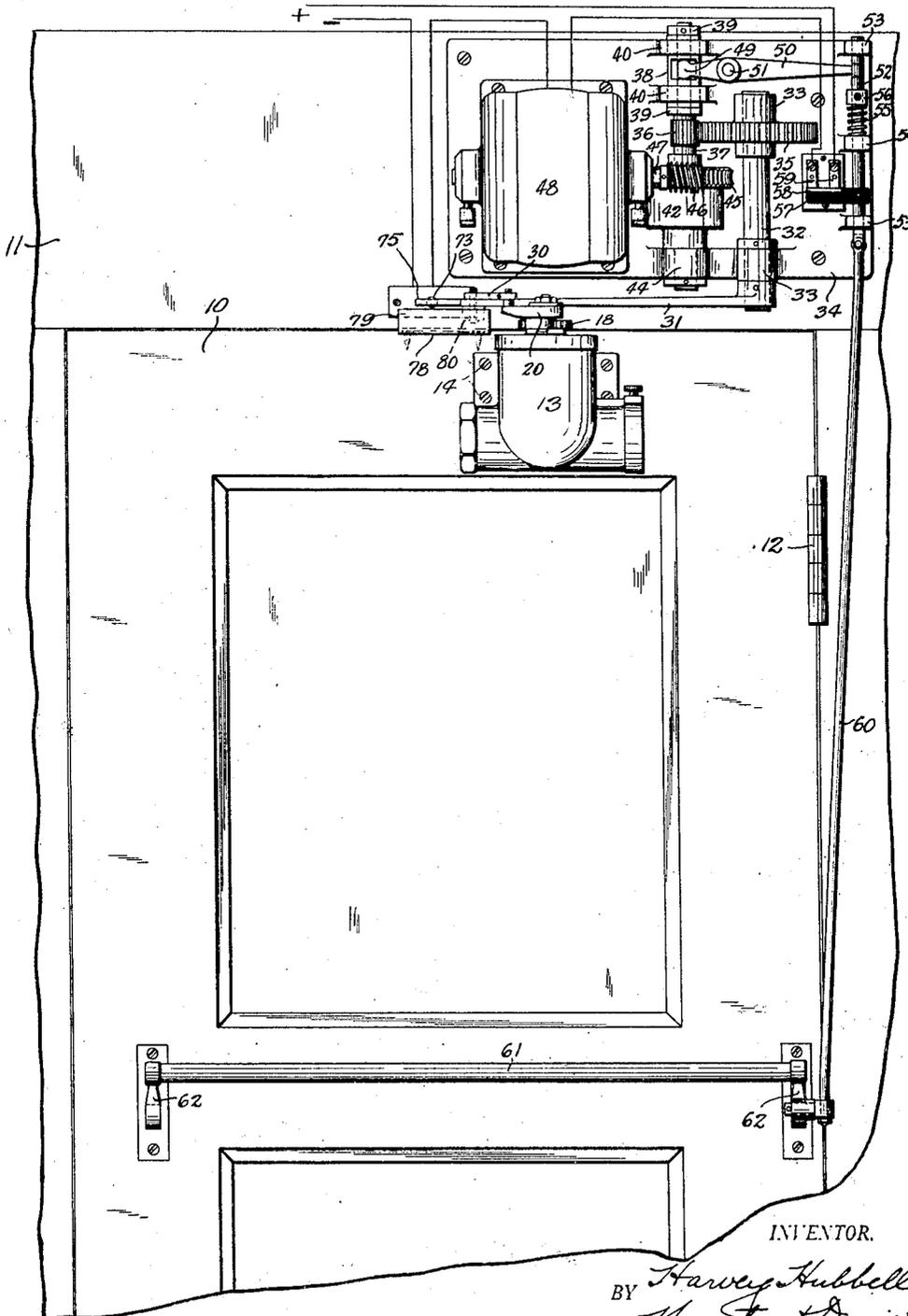


Fig. 1.

INVENTOR.

BY *Harvey Hubbell*  
*Hooster & Davis*  
ATTORNEYS.

Sept. 18, 1928.

1,684,704

H. HUBBELL

DOOR CONTROL

Filed Jan. 6, 1926

3 Sheets-Sheet 2

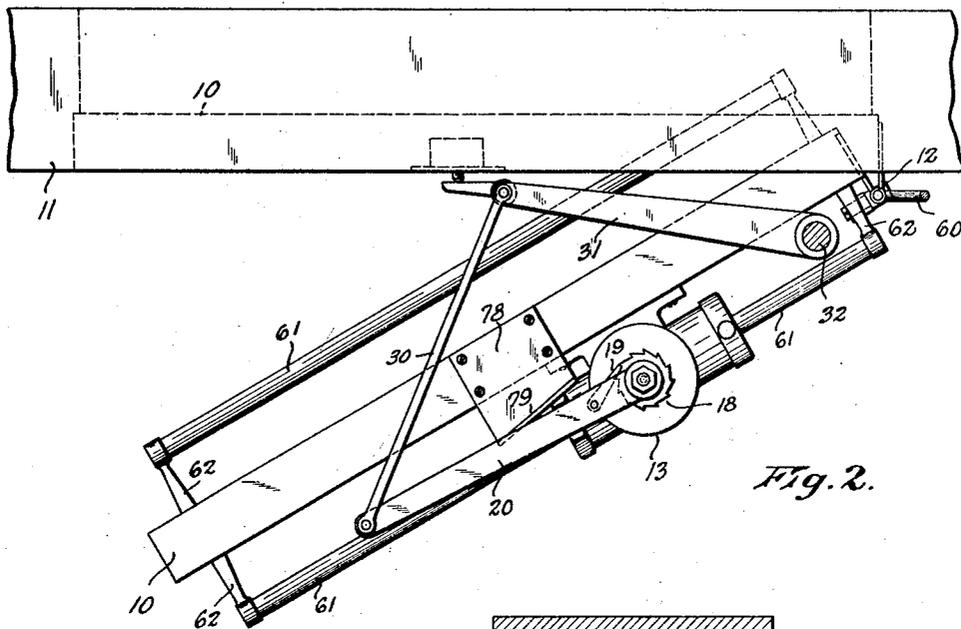


Fig. 2.

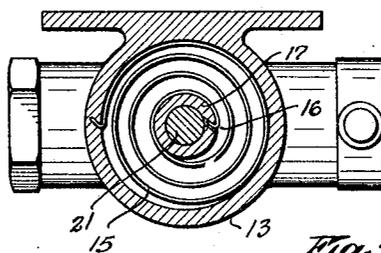


Fig. 4.

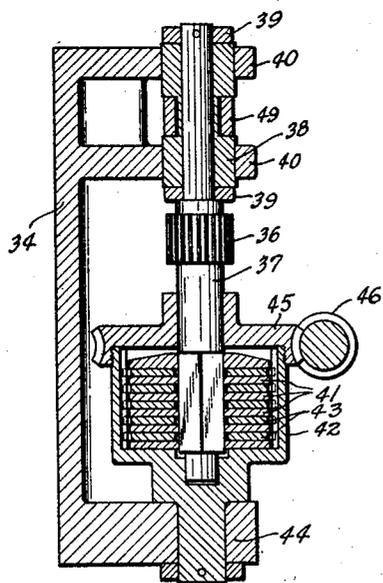


Fig. 3.

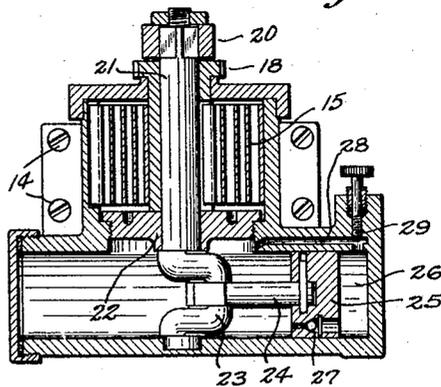


Fig. 5.

INVENTOR.

BY *Harvey Hubbell*  
*Hooper & Davis*  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

HARVEY HUBBELL, OF BRIDGEPORT, CONNECTICUT; LOUIE E. HUBBELL EXECUTRIX  
OF SAID HARVEY HUBBELL, DECEASED.

## DOOR CONTROL.

Application filed January 6, 1926. Serial No. 79,619.

This invention relates to a control mechanism for doors. Often in public buildings, stores, office buildings and the like, relatively heavy doors are used and door checks are employed for closing the door after it has been opened. These checks are usually operated by springs which must be fairly heavy to give the required strength for operating the door, and also must often be strong enough to close the door and hold it closed against heavy winds. It will be obvious that under these conditions it often requires considerable effort to open the door against the check, and it is often difficult for elderly persons or persons in a weakened condition to operate the door.

It is, therefore, an object of my invention to provide a control mechanism which will obviate these objections, and which will have means to render the check ineffective so as to allow the door to swing free when a person wishes to open the door.

It is also an object of the invention to provide a power means for operating the door, especially for moving it to the closed position, and to provide manually operated means for controlling this power means.

It is a further object of the invention to provide a check for the door which may operate in the usual manner independently of the power means, and also a mechanism in which the power means may operate independently of the check, and both the check and power means will be controlled by manually operable means on the door.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawings forming a part of this specification, similar reference characters being employed throughout the various figures to indicate corresponding elements. In these drawings,

Fig. 1 is a front elevation of a door and my improved control mechanism therefor, the door being in the closed position.

Fig. 2 is a top plan view showing the door in a partially open position, and operating under the control of the check.

Fig. 3 is a vertical section through the clutch mechanism.

Fig. 4 is a transverse section through the check device.

Fig. 5 is a vertical section through the same.

Fig. 6 is a top plan view showing the door

partially open and operating under the control of the power device.

Fig. 7 is a detail elevation of one form of manual control.

Fig. 8 is a detail section through a portion of the door casing showing one of the control switches, and

Fig. 9 is a front elevation of a portion of this switch.

In the drawings 10 represents an upright door mounted in a casing 11 to swing in a vertical plane on the hinges 12. Mounted on one side of the door, as the inside thereof, and adjacent the top edge, is a door check comprising a casing 13 mounted on the door by any suitable means, as the screws 14, and this casing carries a convolute spring 15 secured at one end to the casing, and its other end is shown at 16 secured to a rotary sleeve 17. This sleeve has a ratchet 18 cooperating with a pawl 19 pivoted to the arm 20 mounted on the shaft 21, which shaft extends through the sleeve and a bearing 22 in the casing. The arm is rigid on the shaft so as to turn therewith. The shaft is offset to provide a crank 23 connected by means of a rod 24 with a piston 25 mounted to reciprocate in the cylinder 26. A check valve 27 is mounted in the piston and the cylinder is provided with a by-pass 28 around the piston and communicating with the cylinder on opposite sides of the piston, with a valve 29 to control the flow of liquid through the by-pass. This piston operates with oil in the cylinder to form the usual dashpot to control the speed of operation of the check in the well-known manner.

The arm 20 is connected by means of a link or rod 30 with an arm 31 which is rigidly secured on a shaft 32 mounted in stationary bearings 33 in a bracket 34 secured to the top of the door frame. This shaft also carries a gear 35 meshing with a pinion 36 mounted on a slidable shaft 37. This shaft 37 carries a sleeve 38 mounted between collars 39, the sleeve being free to rotate on the shaft and also being slidably mounted in the bearings 40 on the bracket. The shaft 37 carries a series of clutch discs 41 in the casing 42 and there are a series of discs 43 alternately arranged with the discs 41 and secured to the casing, which casing is mounted to rotate in a bearing 44. Secured to the casing is a worm gear 45 meshing with a worm 46 mounted on the armature shaft 47 of an electric motor 48. In the present construction

I have shown an electric motor, but it will be understood that other types of motors with a suitable control mechanism may be employed if desired.

5 The sleeve 38 is provided with flats to receive the fork 49 of a lever 50 pivoted at 51, and the other end of the lever has a rounded head extending into a bar 52 mounted for vertical reciprocation in the bearings 53 and  
10 54. A spring 55 embraces this bar and reacts at its opposite ends against the intermediate bearing 54 and a collar 56 secured to the bar so that the spring tends to shift the bar to its upper position. The bar also carries an  
15 arm 57 of insulating material which carries a contact 58 arranged to bridge the contact 59 which controls the flow of current to the motor 48. The bar 52 is connected by means of a rod 60 with manually operable means  
20 mounted on the door. In the present construction this manually operable means comprises handles or bars 61, one on each side of the door at proper height for convenient operation, and these bars are mounted on  
25 levers 62 pivoted to the door at 62'. The levers 62 of one set are provided with forks 63 interlocked with rounded heads 64 on the other set of levers 62 so that the two levers and the bars 61 will operate in unison, and  
30 the rod 60 is connected with one of these levers, as by the pivoted eye 65, so that this rod will be operated by either bar 61.

There is a second control switch for the motor 48 which is shown more in detail in Figs.  
35 8 and 9, and is mounted in the top of the door casing. In the form shown it comprises a movable switch member 66 pivoted at 67 and is operated with a snap action by means of a spring 68 to and from engagement with the  
40 stationary contacts 69 so as to bridge these contacts and close the circuit. The spring 68 is mounted on a bar 70 which has sliding engagement with the pivoted support 71 for the movable switch member, and this bar is  
45 pivoted at 72 to a reciprocating pin 73 which projects through the face plate 74 in position to be engaged by a finger 75 carried by the arm 31. A spring 76 is mounted on the pin 73 and tends to move it outwardly to swing  
50 the switch member 66 to the closed position. It is to be noted that this switch is in series with the switch 58 controlled by the bars 61 so that in order for the motor to operate both of these switches must be closed. When  
55 the door is in closed position the finger 75 will engage the pin 73 and push it inwardly so that the switch 66 is in the open position, but as soon as the arm 31 swings outwardly away from the door frame the spring 76 will  
60 push the pin 73 outwardly and close the switch 66.

The operation of the device is as follows: In Fig. 1 the door is shown in closed position, and in Fig. 6 it is shown in the closed  
65 position in dotted lines. If a party wishes

to open the door and does not grasp either of the handle bars 61 for instance, if he merely pushes against the outside of the door he will swing the door open against the action  
70 of the check 13 and the spring 15 therein, the check under these conditions operating in the usual manner of this type of check. In other words, the person opening the door will force the door open against the action of the  
75 check and as soon as he releases the door the spring of the check will close it in the usual manner. During this operation the lever 31 controlled by the motor 48 remains stationary in the full line position shown in Fig. 2 and  
80 it maintains the switch 66 open by holding the pin 73 in its innermost position. This operation is indicated in Fig. 2, the only elements moving with the door being the check, the arm 20 and link 30; and the spring 15 in  
85 the check operating through the sleeve 17, the pawl and ratchet 18 and 19, arm 20, and link 30 will swing the door to the closed position as soon as it is released.

Should a party wish to open the door either from the inside or the outside the usual  
90 operation is to grasp one of the bars 61 and push it downwardly. This operation through the rod 60, bar 52 and lever 50 will raise the shaft 37 and release the clutch 42. This will  
95 disconnect the shaft from the motor and will leave the arm 31 free to swing outwardly with the door. Therefore, the arm 31 and the arm 20 of the check together with the  
100 connecting link 30 will swing outwardly with the door, and as there is practically no relative movement between these arms and the door, the door will swing free or independently of the check. Therefore, the operator  
105 is not required to overcome the force of the spring in the check in opening the door, and the door swings open easily as it is required to overcome only the weight of the door. Due to the fact that the axis of the shaft 32  
110 is not coincident with the axis of the hinges about which the door swings there will be a very slight movement of these arms during the movement of the door, but it is so slight as to have practically no effect on the operation  
115 of the door and it is taken care of by providing a bracket 78 having an inclined guide 79 mounted on the top of the door which engages the outer side of a roller 80 carried by the arm 31 at the pivot 77. This guide and  
120 roller also insures that the arm 31 will not swing outwardly away from the door, and also insures that the switch 66 is held open when the door is closed.

It will, of course, be apparent that when the arm 31 swings away from the casing with  
125 the door it will release the pin 73 allowing the spring 76 to close the switch 66, but this will not operate the motor because the switch 58 was opened when the rod 60 was moved downwardly by operation of the bar 61. However, after the door is open and the bar  
130

61 is released the spring 55 will move the bar 52 upwardly and close the switch 58 and will engage the clutch 42. Both switches controlling the motor are now closed and the motor begins to operate, rotates the shaft 32 and swings the arm 31 back to its original position toward the casing, and of course swings the door with it to the closed position. As soon as the door is closed the finger 75 engages the pin 73 and opens the switch 66 and the door remains closed until the next operation, it, of course, being held closed by the check device and the spring 15 therein cooperating with the arm 31 which is held stationary by the clutch.

It will thus be apparent that the door is free to be operated against the check in the usual manner, and the check will operate in the usual manner to close the door as soon as the door is released. On the other hand if the person opening the door pushes downwardly on one of the bars 61 the clutch 42 is disconnected and the check is rendered ineffective so that the door may be swung open independently of and free from the check without the necessity of overcoming the force of the spring in the check, but as soon as the bar 61 is released the motor 48 will operate to swing the door to the closed position. Thus I have produced a mechanism in which the door may be closed and kept closed under the operation of the check device in the usual manner, but I have provided means controlled by the usual operating handle for in effect disconnecting the check and rendering it ineffective during the opening movement of the door so that the operator is not required to overcome the force of this check device, but still there is a power means which will close the door as soon as the handle is released.

Having thus set forth the nature of my invention, what I claim is:

1. In combination, a movable door, a door check including a spring tending to move the door to closed position, and manually operable means carried by the door for rendering said check ineffective and permit the door to move independently thereof.

2. In combination, a movable door, a check including a spring tending to close the door, manually operable means carried by the door for rendering said spring ineffective and allow the door to move independently thereof, and means for rendering said spring effective when the operator's hand is removed from the manual means.

3. In combination, a movable door, a check for controlling the door including a pivoted arm mounted on the door and a spring tending to swing said arm about its pivot, a stationary support, an arm pivotally mounted on said support, a connection from the arm on the door to the arm on the support, power means for swinging the arm on the support,

and means controlled by said handle for controlling the power means.

4. In combination, a movable door, means for controlling the door including a pivoted arm mounted on the door and a spring tending to swing said arm to close the door, a stationary support, an arm pivotally mounted on said support, a connection from the arm on the door to the arm on the support, a motor, a driving connection from the motor to the second arm including a clutch, a control means for the motor controlled by the second arm, a movable handle mounted on the door, a second control means for the motor, and a connection from said handle to the clutch and the second control means.

5. In combination, a movable door, means for controlling the door including a pivoted arm mounted on the door and a spring tending to swing said arm to close the door, a stationary support, an arm pivotally mounted on said support, a connection from the arm on the door to the arm on the support, an electric motor, a driving connection from the motor to the second arm including a clutch, a switch for controlling the motor controlled by the second arm and arranged to be held open by said arm when the door is closed, means for closing said switch when the arm is moved from its normal position, a movable handle mounted on the door, a second switch in series with the first switch, and an operative connection from the handle to the clutch and the second switch.

6. In combination, a movable door, a check including a spring tending to close the door, manually operable means carried by the door for rendering said spring ineffective and allow the door to move independently thereof, power means adapted to operate the door, and means operated by said manual means to control the operation of said power means.

7. In combination, a movable door, a check including a spring tending to close the door, means carried by the door for manual operation thereof, a power means for operating the door, and means operable by the manual means for controlling the operation of the check and also the operation of the power means.

8. In combination, a movable door, a check including a spring tending to close the door, manually operable means carried by the door for rendering said spring ineffective and allow the door to move independently thereof, a motor adapted to move the door to closed position, and means operated by said manual means to control the operation of said motor.

9. In combination, a movable door, a check including a spring tending to close the door, a motor, means operable by the motor cooperating with said spring to permit said spring to function, a clutch drive between the motor

and said means, a control for the motor, and manually operable means carried by the door for controlling said clutch and said control means.

- 5 10. In combination, a movable door, a check including a spring mounted on the door, a motor mounted on a stationary support, a clutch connection from the motor  
10 with said spring whereby the spring may become effective to close the door, said connection being also operable by the motor to close the door, a movable handle on the door, and means controlled by said handle for controlling said clutch.
- 15 11. In combination, a movable door, a check including a spring mounted on the door, a motor mounted on a stationary support, a clutch connection from the motor

with said spring whereby the spring may become effective to close the door, said connection also forming a driving connection from  
20 the motor to the door for operating the door, a movable handle carried by the door, means controlled by the handle for controlling said clutch, and a control switch for the motor  
25 operated by said handle.

12. In combination, a movable door, a check including a spring tending to close the door, power means connected to the spring  
30 to operate the door through said spring, a releasable driving connection between the power means and the spring, and manually operable means on the door for controlling said driving connection.

In testimony whereof I affix my signature.

HARVEY HUBBELL.