

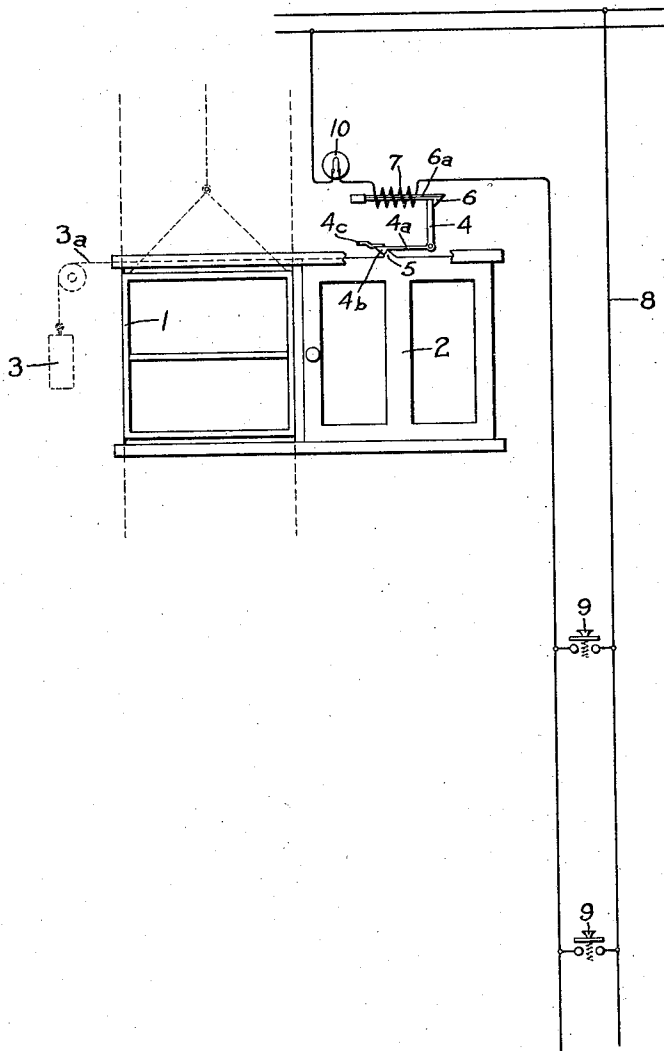
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J. EATON

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DOOR CLOSING DEVICE

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Inventor:
John Eaton,

by *Wm. S. Smith*

His Attorney

UNITED STATES PATENT OFFICE

JOHN EATON, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

DOOR-CLOSING DEVICE

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My invention relates to the moving of distant members, and more particularly to the closing of doors, gates or slides from a distance, as for example, the closing of the doors or gates of automatic elevators or dumb waiters in systems in which the car or box cannot be moved unless all or certain of the doors connected with the system are closed. It frequently happens in such systems that the floor door or the car gate will be left open by a careless or uninformed user to the considerable annoyance of persons who are thereupon unable to bring the car or box to the floor upon which they happen to be located.

One object of my invention is to provide simple means for enabling a door or gate at one floor to be closed by a person on another floor or on any other floor. Another object is to provide means for automatically delaying the closing of the door for a certain time after the action of the apparatus has been initiated at the distant station. Another object is to provide a signal at the door, which is effective as soon as the action of the closing system is initiated. Another object is to provide a system in which the closing of the door can readily be prevented by a person at the station where the open door is located in case this person has not finished with the car or box.

To attain these objects I provide of course means for closing the door or gate. A spring or weight in connection with a latching means for holding the door in open position may be used for this purpose. I also provide means for initiating the action of the door closing means operable from a distant station. Where a weight or spring is used for closing the door and a latch is used to hold the door open, an electrically operated latch releasing means operated by an electric circuit leading from the distant stations may be used for this purpose. Various means may be employed to secure a delay in the closing of the door or gate, depending on the nature of the means which are used to close the door. When the door is closed by a weight or spring and held open by a latch the latch releasing means may be one of many known delayed action devices usually called time element devices. The signal may, for example, be a lamp or buzzer. It may be set in operation by the closing of the circuit which initiates the action of the door closing or latch releasing means.

In the following description and annexed drawing, I describe and show one embodiment of my invention applied to the door of one of the stations of a dumb waiter. Referring to the drawing, 1 designates the box of a dumb waiter and 2 a sliding door closing the opening to the dumb waiter shaft at one of the floors. The weight 3 connected to the door 2 by the cord 3^a, returns the door to closed position when the door is free to close. A bent lever 4 has a spring arm 4^a which is provided at one end with a latch 4^b, adapted to engage a projection 5 on the door. A latch 6 engages the other arm of the lever 4 so that the latch 4^b is normally held in engagement with the projection 5 when the door is open and the door is thus held open notwithstanding the closing pull thereon of the weight 3. The forward and rear surfaces of the latch 4^b and projections 5 are sloped so that the projection 5 can lift the latch 4^b and pass thereunder when the door is pushed open by hand and also when the latch 6 releases the lever 4 and the door is closed by the weight 3.

While the latch 6 and its operating mechanism may obviously have any of many different forms, I prefer to use a bimetallic thermostatic member 6^a as the arm of the latch 6 and to provide a heating means such as the coil 7 surrounding or otherwise thermally related to this arm. A circuit 8, when closed, gradually heats the coil 7 and causes the bimetallic arm of latch 6 to bend or curve until the lever 4 is released and the door 2 is thereby permitted to close in response to the pull of the weight 3. The circuit 8 can be closed when desired by a person at any of a number of distant stations by means of switches or buttons 9. After the latch 6 has been released by the heating of the coil 7, and the projection 5 has passed under the latch 4^b, the lever 4 immediately returns to its normal position and is again en-

gaged by the latch 6 when the thermostatic bar 6^a cools off and resumes its normal position. The device is thus automatically reset.

5 The signal 10, here shown as a lamp, is set by the closing of the circuit 8.

The heating coil 7 and the bimetallic arm 6^a of latch 6, or other means which may be used for holding and releasing the lever 4 or latch 4^b, may be so proportioned as to delay the release of the latch for as long or as short a time after the closing of the circuit 8 and setting of the signal 10, as may be considered desirable. The purpose of this delay is to enable a person at the door to avoid being struck by the door as it closes, and to enable this person to block or hold the door so that it cannot be closed, if he so desires, as by holding down the latch 4^b by hand.

20 When the door is pushed open, the latch 4^b rides over the projection 5, the spring arm 4^a yielding so as to permit this to be done without releasing the lever 4 from the latch 6. The door may be closed without releasing the lever 4 from the latch 6, this being accomplished by lifting the latch 4^b by means of the thumb piece 4^c, the spring arm 4^a bending to permit this to be done. The door may also be closed by forcing it until the projection 5 lifts the latch 4^b.

30 While I have described only one embodiment of my invention, I do not wish to be limited to the particular form shown and described as it will be apparent that many modifications therein may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

40 1. In combination, a door, a signal adjacent the door, means for closing said door, a time element device for initiating the action of said closing means, and means operable at a distance from said door to set said signal and to initiate the action of said time element device.

2. In combination, a door, means biasing said door to its closed position, a latch for holding said door in its open position, a signal at the door, a time element device for releasing said latch, and an electric circuit controllable at a distance from the door to set the signal and actuate the time element device.

55 3. In combination, a door, an electric signal at said door, means biasing said door to closed position, a latch for holding said door open, a heating coil, means moved by the heat of said coil to release said latch, an electric circuit through said signal and heating coil for quickly setting said signal and gradually heating said coil, and means for closing said circuit at a point remote from said door.

60 4. In combination, a door, means biasing said door to its closed position, a latch for

holding said door in its open position, a signal at the door, a time element device for releasing said latch, an electric circuit controllable at a distance from the door to set the signal and actuate the time element device, said latch comprising a yielding member to permit the opening and closing of the door without moving the time element device.

In witness whereof, I have hereunto set my hand this 8th day of February, 1926.

JOHN EATON.