

# UNITED STATES PATENT OFFICE.

FREDERICK F. JACKSON, OF CHICAGO, ILLINOIS.

DEVICE FOR AUTOMATICALLY CONTROLLING CLOSING HATCHWAY OR OTHER DOORS.

SPECIFICATION forming part of Letters Patent No. 554,517, dated February 11, 1896.

Application filed August 21, 1894. Serial No. 520,895. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK F. JACKSON, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Device for Automatically Controlling the Closing of Hatchway or other Doors, of which the following is a full, clear, and exact description.

My invention relates to a device for automatically controlling the closing of hatchway-doors or other forms of doors; and it has for its object to provide a system of wiring used in connection with thermostats, the wiring being connected with a lock mechanism through the medium of which the door or doors will be permitted to close by the action of heat upon the thermostats, and furthermore, if desired, to provide a retarding mechanism by means of which the doors may be prevented from closing for a predetermined length of time, although the thermostats, wiring system, and other operating mechanism connected with the doors have been set in operation, and furthermore, if desired, to provide an alarm to be sounded when the thermostats have been acted upon by a suitable degree of heat.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional view of a building, illustrating the application of the invention to the several floors thereof. Fig. 2 is a diagrammatic view illustrating the wiring of one of the floors and the arrangement of the various parts operated from the said wires. Fig. 3 is a detail view of the thermostat employed. Fig. 4 is a transverse section through the thermostat, illustrating it as applied to a ceiling. Fig. 5 is a front elevation of the mechanism of the alarm and retarding device. Fig. 6 is a side elevation of one of the gravity-locks. Fig. 7 is an edge view thereof. Fig. 8 illustrates in detail the lock for holding the door open and the manner in which the said lock is directly operated; and Fig. 9 is a sec-

tion through one of the doors with the lock in side elevation.

The invention may be said to comprise a shifting device connected with the bolts or locks proper of the doors, a gravity-lock connected with the shifting device, and thermostatically-controlled wires, which being affected by heat cause the gravity-lock to release the catch mechanism of the doors and allow them to close, but so constructed that when desired the thermostatically-arranged wires may be conducted to an alarm and retarding mechanism and thence to the gravity-lock.

In Fig. 1 I have illustrated each floor as provided with a gravity-lock, but it will be evident from the description to follow that if it is desirable an alarm and retarding mechanism may be employed, the wiring of all the floors in that event being connected with one alarm and retarding device.

The gravity locking device A is shown in detail in Figs. 6 and 7, and is adapted to be secured to the ceiling. The frame of the device usually consists of two brackets or hangers 10 and 11, the bracket 11 being longer than the bracket 10, and the two brackets are connected by one or more cross-bars 12. Bearings 13 are secured upon the cross-bars 12, and a shaft 14 is journaled in said bearings. Upon this shaft 14 a gravity-lever 15 is pivoted, provided with a segmental inner end surface 16, which segmental inner end usually consists of a plate riveted or otherwise secured to the lever. At the opposite end of the shaft 14 a trip-lever 17 is pivoted, and these two levers are usually connected by means of a cross-bar 18; but, when the levers are fast to the shaft and the shaft revolves, the cross-bar may be omitted. A weight 19 is connected by a link or otherwise to the outer end of the gravity-lever 15, and a wire 19<sup>a</sup> is secured to the outer end of the trip-lever 17, adapted to be carried to an alarm and retarding mechanism.

A retaining and releasing lever 20 is fulcrumed near its lower end between or upon the cross-bars 12 of the frame, as shown in Fig. 6. The said lever is hooked or curved at its lower end to receive a link 21, attached to a shifting-lever 23, fulcrumed preferably between its center and one end upon the extension of the hangers 11, and said shifting-lever

provided with a friction-roller 61 and secured upon what is the back of the door when in an upright position. The friction-roller of the latch when the door is upright is in engagement with the rear face of a substantially ring-like keeper 62, pivoted at its bottom portion to a wall or like support, and it is provided at its top with an attached arm 63, the said arm being passed through a guide-strap 64, and the said keeper is held normally in locking position by means of a spring 65. The keeper, however, is also connected, through the medium of its arm 63, with a shifting device D, which shifting device usually consists of an endless chain belt 66, which is carried alongside of the outer face of the hatchway from top to bottom of the building, passing over suitable drums or wheels 67 at its ends, as shown in Fig. 1, and the said chain is connected by short lengths of chain 68 with the shifting-levers 23 of the gravity-locks employed, and the opposite stretch of the shifting-chain has attached to it also short lengths of chain 69, each of said lengths being passed over a guide-pulley 70 to an engagement with a keeper 62 of a hatchway-door lock. Thus when the endless-chain shifting device is rotated by the movement of the lever 23 under the influence of the weight 22 the shorter chains 69 will draw upon the keepers 62 and release said keepers from engagement with the latches 60 of the doors, permitting said doors to close.

In operation, should any of the thermostats become affected by heat to such an extent as to loosen or slacken connecting-wire 55, the zigzag tension-wire 57 will in turn slacken tension-wire 19<sup>a</sup>, and the slack thus caused will relieve the trip-lever 17 of the gravity-lock from tension, whereupon the weight 19 of the lever 15 will draw the outer end of the said lever down and carry its segmental extension 16 from engagement with the releasing-lever 20 of the said gravity-lock, whereupon the link 21, which holds lever 23, carrying the weight 22, will slip from the releasing-lever and drop the shifting-lever 23 of said gravity-lock, elevating its short end, thereby drawing up the short stretch of chain 68 connected with that end and moving the endless-chain releasing device 66, and this movement of the endless chain 66 will cause the short sections of chain 69 upon the opposite side to operate upon the lock mechanism of the hatchway-doors in a manner to release the said doors from the locks, permitting them to close and thereby confining the fire to the compartment or apartment in which the fire originated.

As observed in the foregoing description of the operation of the doors, it will be seen that for effective service the system is complete without employing the alarm and retarding mechanism; but for convenience I have provided such an arrangement, and when desired the thermostatically-controlled wire 19<sup>a</sup> may be conducted to the lever or button 46 of the

alarm and retarding mechanism shown in Fig. 5, and when such mechanism is employed connection is made from the zigzag tension-wire 57 by wire 19<sup>b</sup> direct to lever 26.

When the alarm and retarding device is dispensed with, the wire or wires 19<sup>a</sup> will be connected directly with the thermostatically-controlled wire 57, as will be seen in the lower part of Fig. 1.

When the alarm and retarding mechanism is used, should any of the thermostats become affected by heat to such an extent as to loosen or slacken the zigzag tension-wire 57, the slack of the wire will permit the weighted lever 26 in the alarm and retarding device with which the tension device is connected to fall, carried down by its weight. Therefore the lever 29 in such device will drop at its free end, disengaging its hook 31 from the link 32 in the cable 33, and the weight 36 of this cable will therefore drop downward, unreeling the cable from the reel 40 and causing an alarm to be sounded, and the doors will close; but if an attendant upon hearing the alarm pushes in the button 44, the reel will be stopped from revolving, and if the button is pressed in before the button 48 on the cable 33 reaches the releasing-lever 47 the doors in the hatchway will remain open, and parties may escape by means of the elevator, if found expedient. The moment, however, that the push-button 44 is relieved from pressure, the weight 36 will continue to unreel the cable 33, and when the button 48 of said cable reaches the long end of the releasing-lever 47 it will raise said lever and will release the button 45 carrying the trip-wire 19<sup>a</sup>, and said wire will slip from said button and relieve the trip-lever 17 of the gravity-lock from tension, and the further operation of the mechanism will be as hereinbefore described.

It will be observed that this device is exceedingly simple and durable, entirely automatic and perfectly reliable, and that an alarm may be sounded, but provision is made for not dropping the doors until desired, at which time the doors will be automatically closed.

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

1. In a device for automatically operating doors of hatchways or other openings, devices for holding the doors in an open position, a shifting chain or cable, spring-controlled flexible connections extending from the said cable to the said devices, and a releasing device connected to the cable and operated through the influence of heat, substantially as described.

2. In a device for automatically operating doors of hatchways or other openings, a shifting device operatively connected with the doors, operating means for moving the shifting device, a retaining device for normally holding the said operating means inactive, a locking mechanism for holding the retaining

device in its normal position, a thermostatically-controlled connection secured to said locking mechanism and normally exerting tension thereon in one direction, and operating means likewise secured to the locking mechanism and permanently exerting tension thereon in the opposite direction to the thermostatically-controlled connection to so actuate the locking mechanism, upon the automatic operation of the thermostatically-controlled connection, as to release the retaining device and thereby allow the shifting device to be operated, substantially as described.

3. In a device for automatically operating doors of hatchways or other openings, a shifting device operatively connected with the doors, a weight for moving the shifting device, a retaining-lever for normally holding the said weight inactive, a locking-lever constructed to hold the retaining-lever in its normal position, a thermostatically-controlled connection secured to the locking-lever and exerting tension thereon in one direction, for holding the locking-lever in its normal position, and a weight likewise secured to the locking-lever and exerting tension thereon in the opposite direction to the thermostatically-controlled connection, for actuating the locking-lever to release the retaining-lever, upon the automatic operation of the thermostatically-controlled connection, and thereby release the weight which moves the shifting device, substantially as described.

4. In a mechanism for operating fire-doors, or doors for elevators, or for other openings, a releasing mechanism operated through the influence of heat, and a retarding device, whereby the operation of the releasing mechanism may be temporarily suspended, as and for the purpose set forth.

5. In a mechanism for operating fire-doors, or doors for elevators or other openings, zigzag tension-wires located upon a predetermined support, thermostats controlling said wires, a shifting device adapted for operation upon the fastenings of the doors, an alarm and retarding mechanism operated by the action of heat upon the thermostatically-controlled zigzag tension-wires when released by the thermostats, and a trip connection between the alarm and retarding device and the said shifting device, substantially as and for the purpose specified.

6. In a mechanism for operating fire-doors, or doors for elevators or other openings, a thermostat, zigzag tension-wires controlled by the said thermostat, an alarm and retarding device operated by the zigzag tension-wires when released from tension, a shifting device connected with and adapted to oper-

ate the locking mechanism of the doors, a trip connection between the alarm and retarding device and the shifting device, and the trip connection between the alarm and retarding device and the shifting device formed when slack occurs in the zigzag tension-wire, substantially as shown and described, as and for the purpose set forth.

7. In a mechanism for operating fire-doors, or doors for elevators or other openings, a shifting device adapted for operating the lock of the door, an alarm, a trip connection between the alarm and the shifting device, a releasing mechanism operated from the zigzag tension-wires and adapted to operate the said trip connection, and a retarding mechanism, whereby the action of the releasing device may be temporarily suspended, as and for the purpose set forth.

8. In a mechanism for operating fire-doors, or doors for elevators or other openings, a shifting device adapted for connection with the said doors, an alarm thermostatically operated, a trip connection between the alarm and the shifting devices, and a retarding mechanism, whereby the action of the said connection may be temporarily suspended, as and for the purpose specified.

9. In a mechanism for operating fire-doors, or doors for elevator or other openings, a device consisting of an alarm and a retarding mechanism, the said alarm being thermostatically operated, and a trip mechanism operated from the alarm, controlled by the retarding mechanism and adapted for connection with the latches of the doors under control, as and for the purpose specified.

10. In a device for controlling fire-doors, elevator-doors, or the equivalents thereof, a shifting mechanism connected with the locking devices of the doors, a gravity-lock connected with the shifting mechanism, an alarm thermostatically operated, and a trip connection between the said alarm and the gravity-lock, substantially as shown and described.

11. In a device for controlling fire-doors, elevator-doors, or the equivalents thereof, a shifting mechanism connected with the locking devices of the doors, adapted to operate the same, a gravity-lock connected with the shifting mechanism, a thermostatically-operated alarm and a retarding mechanism, and a trip connection, substantially as shown and described, between the alarm and the gravity-lock, as and for the purpose specified.

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Witnesses:

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(No Model.)

C. F. FELLOWS.  
CARTRIDGE LOADING IMPLEMENT.

No. 555,237.

Patented Feb. 25, 1896.

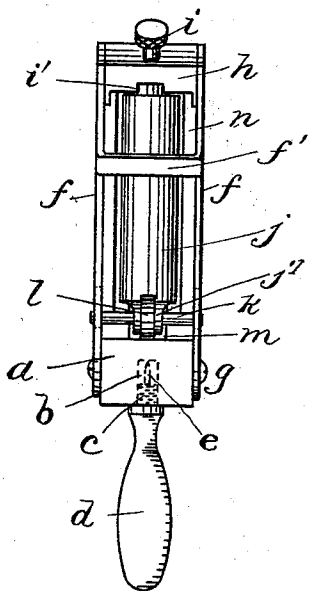


Fig. 1.

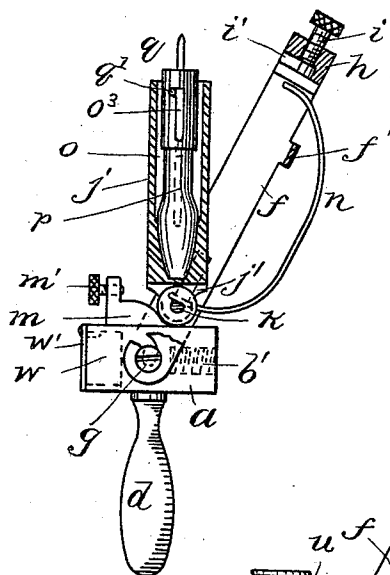


Fig. 2.

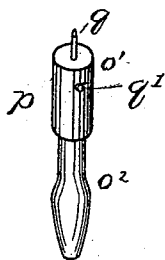


Fig. 4.

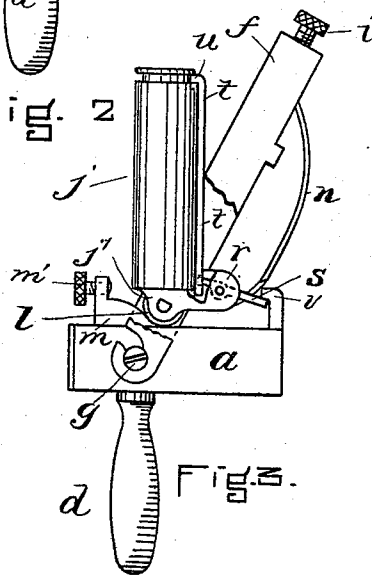


Fig. 3.

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