No. 686,069. Patented Nov. 5, 1901.

M. F. HINES.

DOOR CLOSING DEVICE.

(Application filed May 6, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

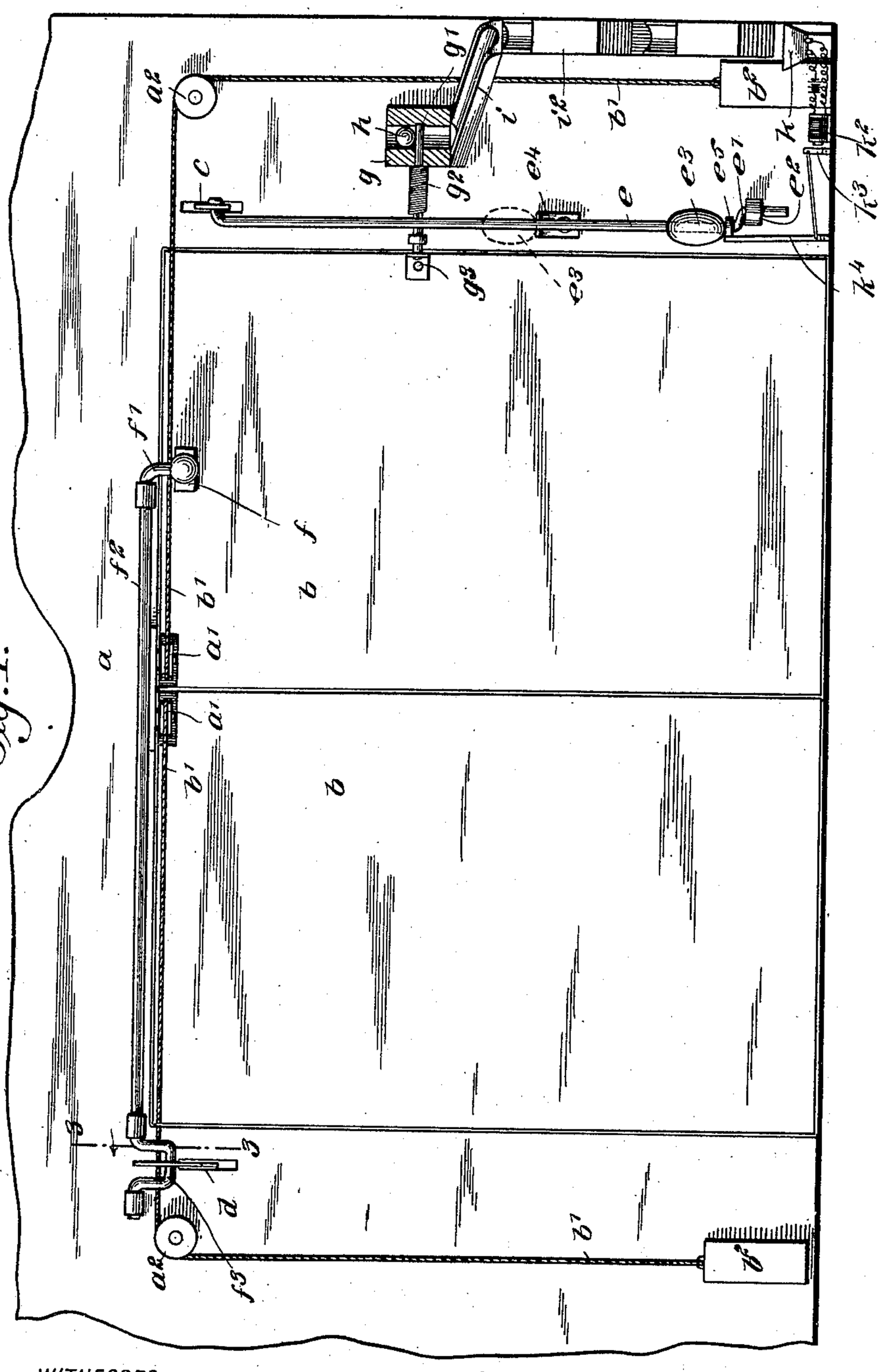

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Fig. 5.

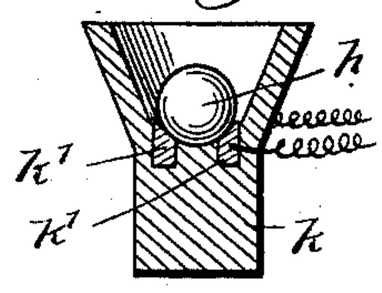


Fig. 2.

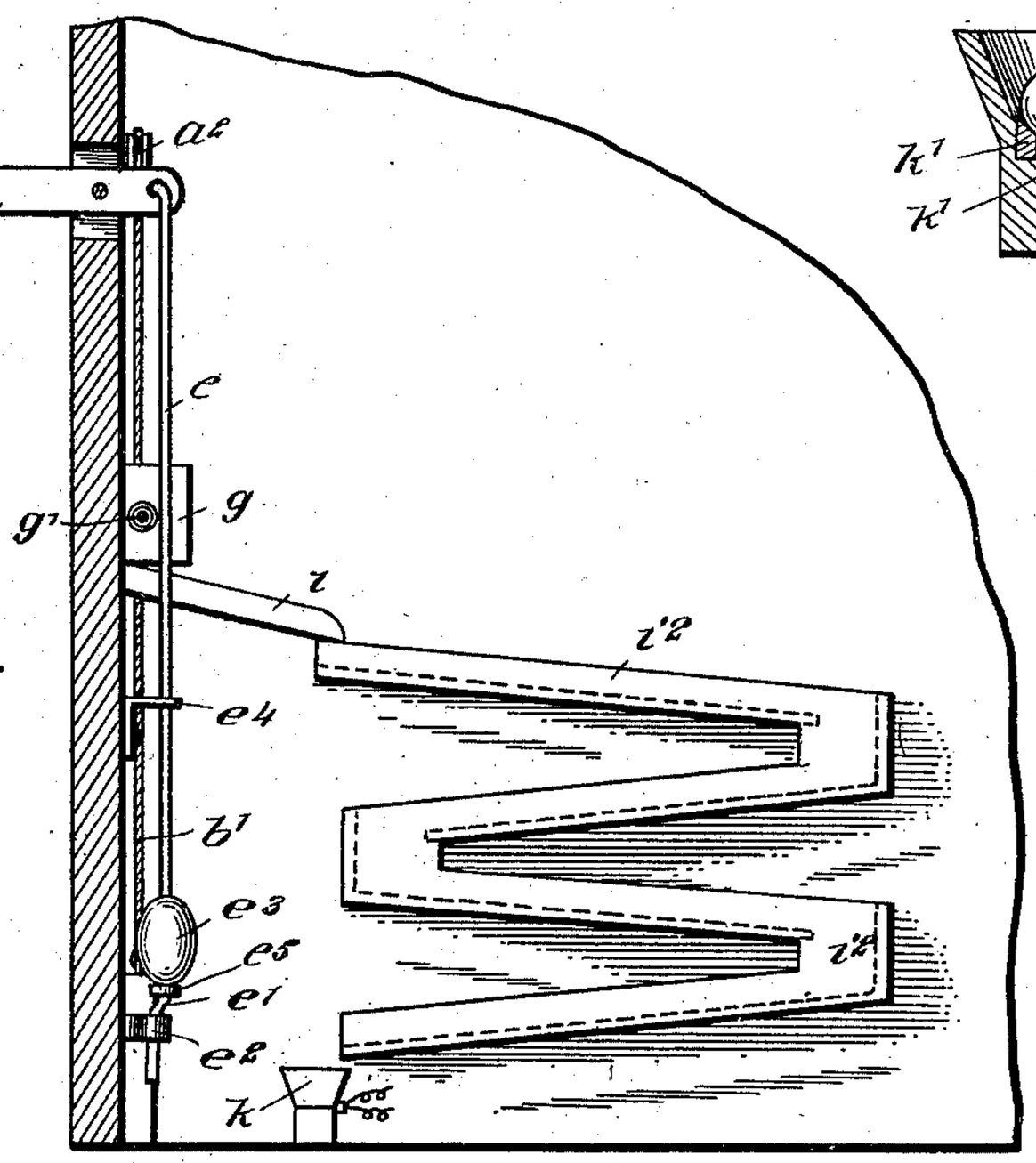


Fig. 3.

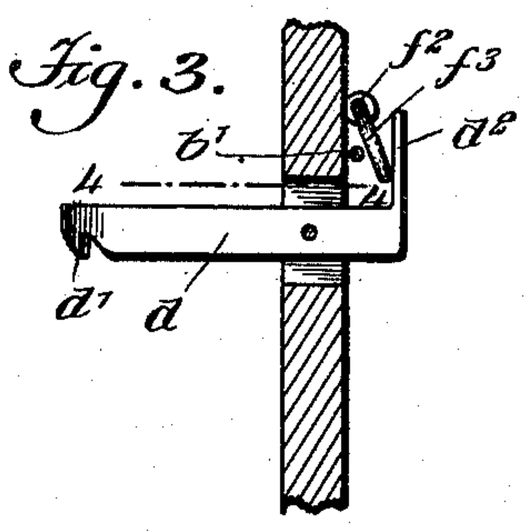
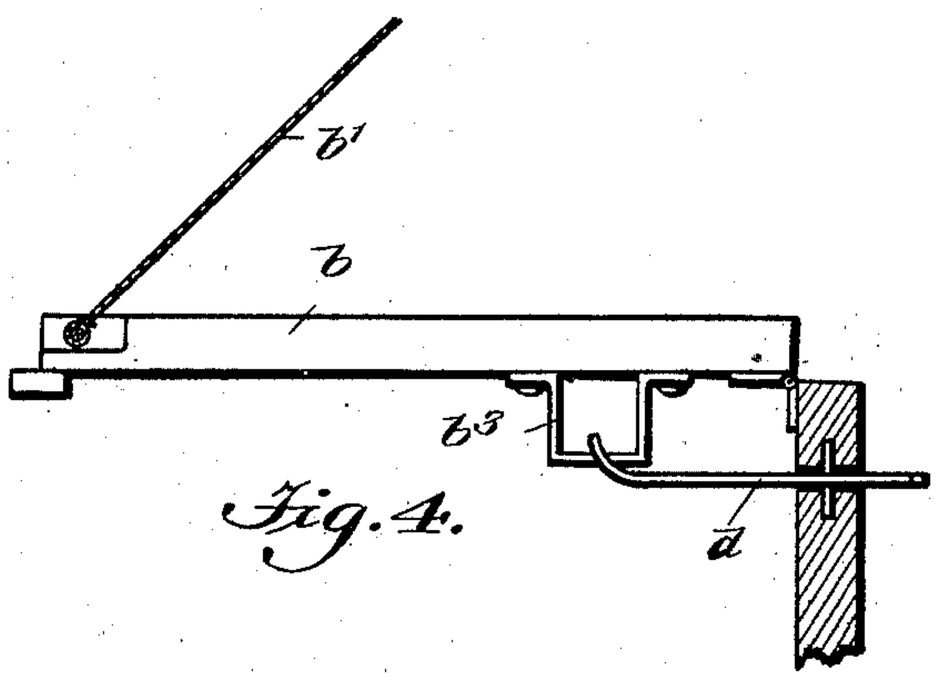


Fig. 4.



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UNITED STATES PATENT OFFICE.

MARTIN F. HINES, OF BROOKLYN, NEW YORK.

DOOR-CLOSING DEVICE.

SPECIFICATION forming part of Letters Patent No. 686,069, dated November 5, 1901.

Application filed May 6, 1901. Serial No. 58,918. (No model.)

To all whom it may concern:

Be it known that I, MARTIN F. HINES, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Door-Closing Device, of which the following is a full, clear, and exact description.

This invention relates to a mechanism for automatically closing a door or doors at a certain period after they have been opened.

The invention is useful in many connections, a notable example of which is in fire-engine houses, in which the doors are opened for the exit of the team and engine and in which it is desired to automatically close the doors at a certain time after the passage of the team and engine and the firemen.

This specification is a specific description of one form of the invention, while the claims are definitions of the actual scope thereof.

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

Figure 1 is an interior elevation of the mechanism constituting my invention. Fig. 2 is an elevation of the ball-run and the parts adjacent thereto. Fig. 3 is a sectional view on the line 3 3 of Fig. 1. Fig. 4 is a section on the line 4 4 of Fig. 3, showing one of the sections of the door in elevation; and Fig. 5 is a detail section of the contact-points.

a represents a part of a building, and *b* the doors, which are here shown as of the double class.

b' represents cords which are attached, respectively, to the doors and pass over sheaves *a'*, carried in the door-framing, and thence over sheaves a^2, carried at the sides of the door. The ends of the cords *b'* have weights b^2 attached thereto, and these weights tend normally to close the doors.

c and *d* represent, respectively, catches for holding the doors open. These catches are pivotally mounted in the walls of the building and have hooks *c'* and *d'*, respectively, at their outer ends, these hooks engaging keepers b^3 on the doors *b*. (See Fig. 4.) The catch *c* projects into the building and has a rod *e* connected therewith. The catch is so mounted that it will normally swing downward at its outer end, thus lifting the rod *e*. This rod extends downward and is formed with a cranked lower portion *e'*, mounted to turn in a keeper e^2. Sliding on the rod *e* at points above the crank *e'* is a weight e^3. When the crank *e'* is thrown inward toward the wall of the building, the weight e^3 should be manually placed on a forked projection e^4, which straddles the rod *e*, so as to be sustained by said projection, and when the crank *e'* is thrown outward the weight e^3 will be disengaged from the projection e^4 and will thereupon fall to a collar e^5 on the rod *e*, located just above the crank *e'*. This will cause the heft of the weight e^3 to be transmitted to the rod *e*, and then the catch *c* will be thrown upward at its outer end, releasing the hook *c'* from its engagement with the corresponding door. The door which engages with the hook *c'* (the right-hand door in Fig. 1) carries a block *f*. (See Fig. 1.) As this door returns the block *f*, carried thereby, strikes against the downwardly-disposed crank *f'* on a horizontal shaft f^2, mounted to rock over the doors and extending to the catch *d*, where the shaft f^2 is provided with a crank f^3, engaging an upwardly-disposed projection d^2 on the catch *d*. As the block *f* strikes the crank *f'* it rocks the shaft f^2 and the crank f^3 outward, and when the crank f^3 engages the end d^2 of the catch *d* it throws up the outer end of the hook *d'* of the catch and releases the other door *b*, which immediately returns by the action of its weight b^2.

g indicates a tube or socket-piece which is adapted normally to contain a ball *h*, capable of forming an electrical conductor, as will be hereinafter explained. This tube *g* is normally closed to hold the ball *h* therein by a pin *g'*, which slides transversely in the tube and is pressed outward to open the tube by an expansive spring g^2.

g^3 indicates a stud on the right-hand door *b*, and when the door is closed this stud strikes the pin *g'* and presses it into the socket-piece *g* against the action of the spring g^2. When the right-hand door *b* is opened, the spring g^2 withdraws the pin *g'* and allows the ball *h* to roll from the socket-piece *g*. From the socket-piece *g* the ball *h* passes along an inclined plane *i* into a zigzag guideway i^2, which finally discharges the ball into a cup *k*. This

cup carries two electrical contacts k', which are connected with the terminals of an electric circuit. As the ball h rolls into the cup k it connects the contacts k' and closes the circuit. This circuit includes an electromagnet k^2, operating an armature k^3, and this armature is connected with a swinging arm k^4, attached to the collar e^5 of the rod e. As the armature k^3 is attracted it transmits a movement to the shaft e, turning outward the crank e' and dropping the weight e^3.

In using the apparatus the shaft e is adjusted to its inward position—that is to say, adjacent to the wall—and the weight e^3 is poised on the projection e^4, as indicated by dotted lines in Fig. 1. Assuming now that the doors are open, they will engage their keepers b^3 with the hooks c' and d', respectively, and the doors will then be held in open position. Simultaneously the ball h is released and it begins to travel down the zigzag way i^2. When it reaches the bottom of this way, it falls into the cup k and closes the circuit of the magnet k^2. This causes the shaft e to be rocked outward, and the weight e^3 is then disengaged from the projection e^4 and falls upon the collar e^5. This causes the rod e to be thrown downward, thus raising the outer end of the catch c and releasing the right-hand door. (See Fig. 1.) As this door swings closed the block f operates the shaft f^2 and causes the catch d to release the left-hand door, which then closes under the action of its weight. It is obvious that by lengthening the size of the inclined way i^2 the period which it takes the ball h to roll downward into the cup k may be regulated, and thus the doors may be closed at any time desired after they have been opened. By shortening the way i^2 the doors will be closed almost immediately, and by lengthening this way a greater period will elapse before the doors are closed. I desire it understood that any sort of electromagnetic mechanism may be employed for operating the rod e. That here shown is merely an example of the several mechanisms which may be employed.

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

1. The combination of a door, means tending to close the same, a catch for holding the door open, a time-controlled operating device for releasing the catch, and means whereby said device may be set in operation by the opening of the door.

2. The combination of a door, means tending to close the same, a catch for holding the door open, a time-controlled operating device for the catch to release the same, a second door, means tending to close the same, a catch for the second door, and a connection between the last-named catch and the first-named door.

3. The combination of a door, means tending to close the same, a catch acting to hold the door open, a weight actuating the catch to release the same, a time-controlled mechanism for throwing the weight, and means whereby said mechanism may be set in operation by the opening of the door.

4. The combination of a door, means tending to close the same, a catch acting to hold the door open, means for actuating the catch to release it, and a time-controlled device for setting said actuating means in operation, and means whereby the time-controlled device will be set in operation when the door is opened.

5. The combination of a door, means tending to close the same, a catch acting to hold the door open, means for actuating the catch, a ball, a restraining device for the ball, said restraining device being released by the movement of the door, and a way along which the ball runs for operating the means for actuating the catch.

6. The combination of a door, means for closing the door, means for holding the door open, a releasing device for the door-holding means, and a ball and a way over which the ball travels for controlling the releasing device.

7. The combination with a door, means for closing the same, and means for holding the door open, of an inclined way, a ball adapted to run on the way, means controlled by the door for restraining and releasing the ball, and means operated by the ball for operating the door-holding means to release the door.

8. The combination with a door, means for closing the door, and means for holding the door open, of an inclined way, a ball adapted to run on the inclined way, a restraining device for the ball, said restraining device being operated by the door when it is opened to release the ball, a releasing device for the door-holding means, and means operated by the ball for operating the releasing device.

9. The combination with a door, and means for closing the same, of a latch for holding the door open, a releasing device for the latch, an inclined way, a ball adapted to roll down the said way and put into operation the releasing device, and means controlled by the door for holding and releasing the ball.

10. The combination with a door and means for closing the same, of a latch for holding the door open, a rod connected with the latch, a sliding weight on the rod, a support for the weight, and means for releasing the weight to allow it to operate the said rod.

11. The combination with a door, and means for closing the same, of a latch for holding the door open, a sliding and rocking rod connected with the latch, a sliding weight on the rod, a support for the weight, and means for rocking said rod to cause the weight to be disengaged from its support so as to operate said rod.

12. The combination with a door, and means for closing the same, of a latch for holding the door open, a sliding and rocking rod connected with the latch, a sliding weight on said rod, a support for said weight, and a time-con-

trolled means for rocking the rod to cause the weight to be disengaged from its support so as to operate the said rod.

13. The combination with a door, and means for closing the same, of a latch for locking the door open, a sliding and rocking rod connected with the latch, a sliding weight on the rod, a support for the weight, a time-controlled means for rocking the rod to cause the weight to be disengaged from its support so as to operate the said rod, and means whereby the time-controlled means will be set in operation by the opening of the door.

14. The combination with a door, and means for closing the same, of a latch for holding the door open, a sliding and rocking rod connected with the latch, a sliding weight on the rod, a support for the weight, an inclined way, a ball adapted to travel on said way, means for supporting and releasing the ball, an electro-magnet having its armature operatively connected with said rod to turn the same, and contacts adapted to be connected by the said ball.

15. The combination with two doors, and means for closing them, of a latch for holding each door open, a time-controlled operating device for releasing the latch of one door, and a connection between the latch of the other door and the first-named door, whereby the latch of the second door will be opened when the first door is opened.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARTIN F. HINES.

Witnesses:
I. B. OWENS,
JNO. M. RITTER.