

(No Model.)

2 Sheets—Sheet 1.

E. C. JENKINS.

ELEVATOR DOOR OPERATING MECHANISM.

No. 518,409.

Patented Apr. 17, 1894.

Fig. 2

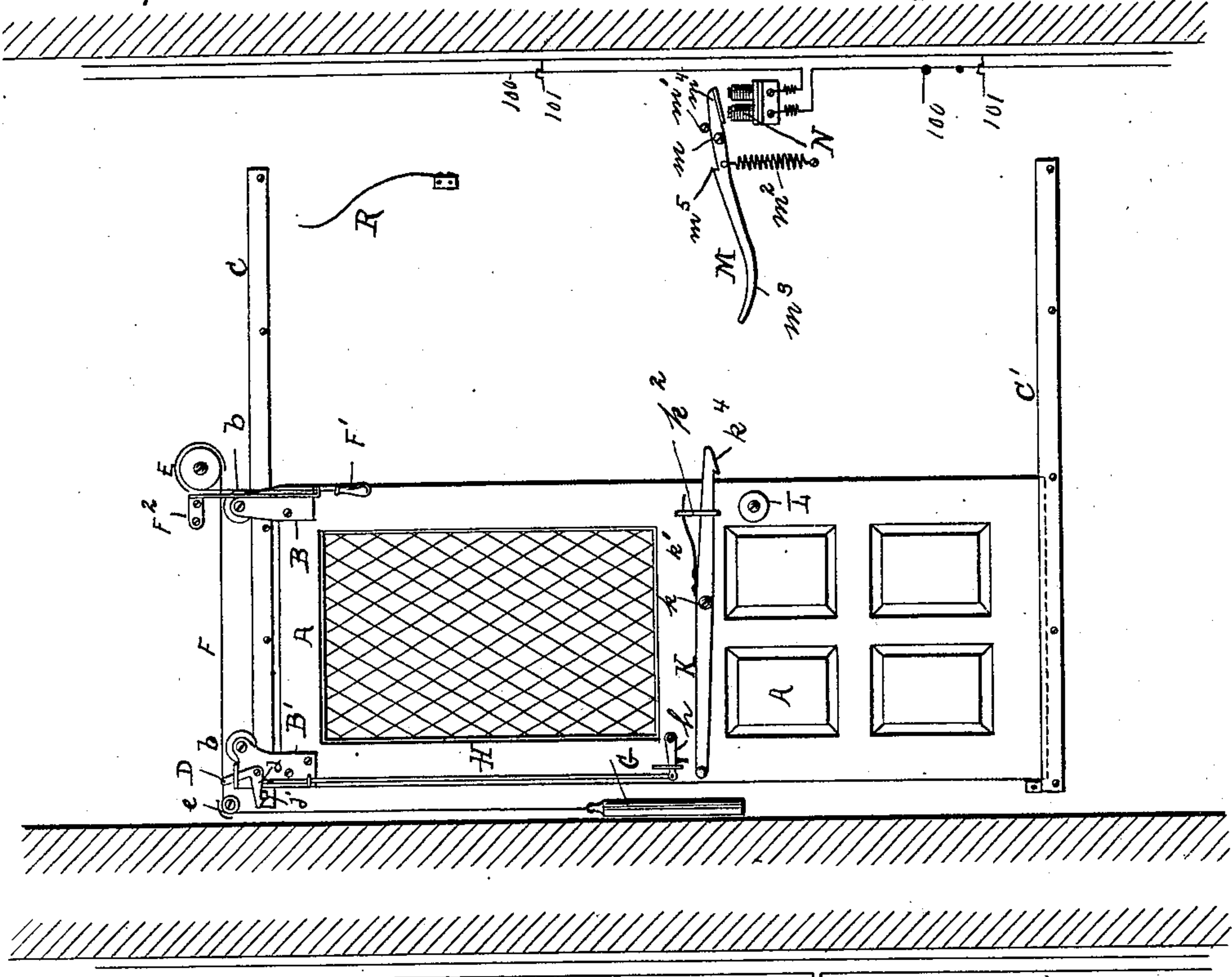
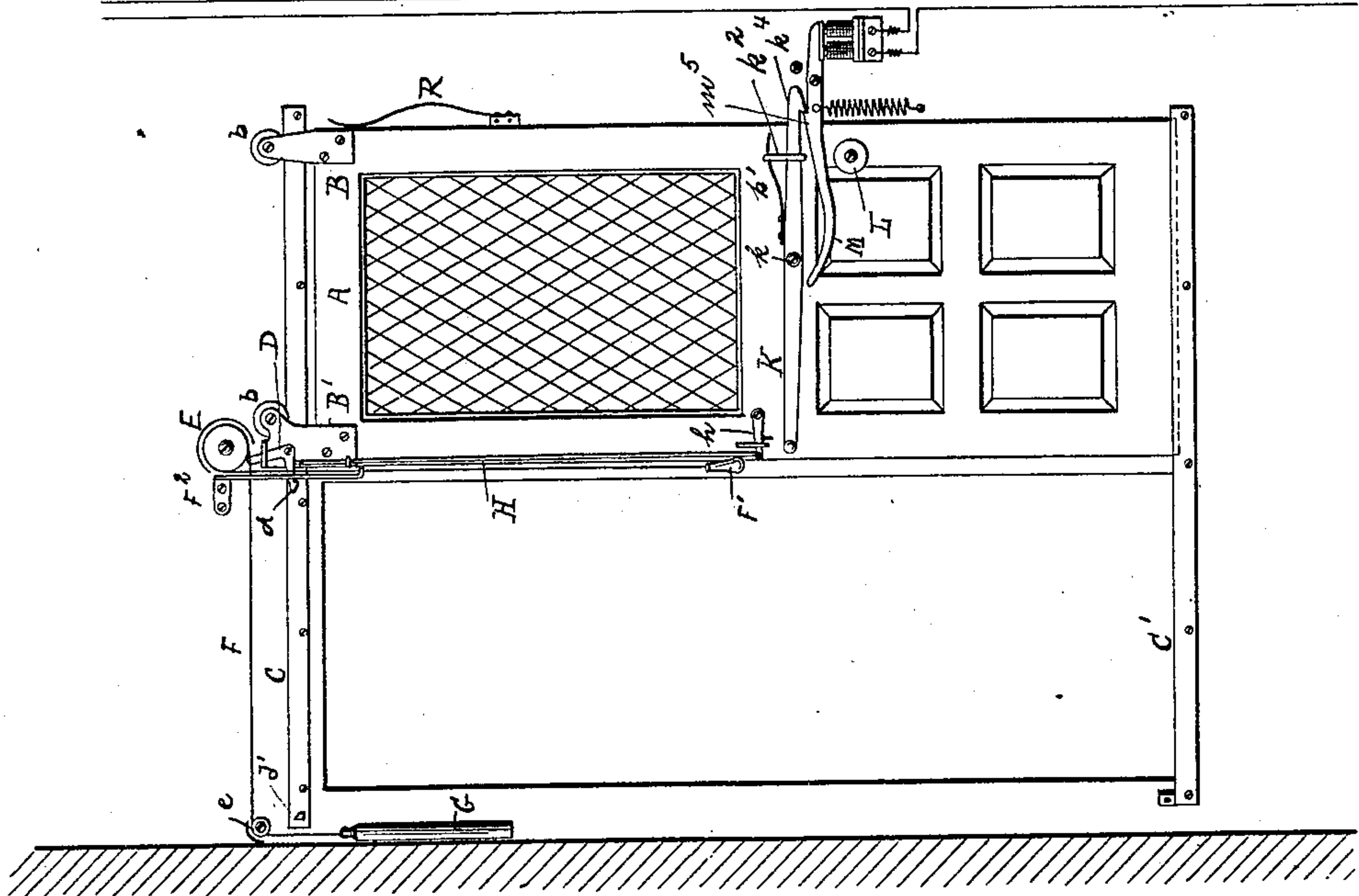


Fig. 1



Witnesses  
*Chas. H. Johnson*  
*James J. Rafferty*

Inventor.  
*E. C. Jenkins*  
By *his Attorney*  
*Louis W. Southgate*

(No Model.)

2 Sheets—Sheet 2.

E. C. JENKINS.  
ELEVATOR DOOR OPERATING MECHANISM.

No. 518,409.

Patented Apr. 17, 1894.

Fig. 6.

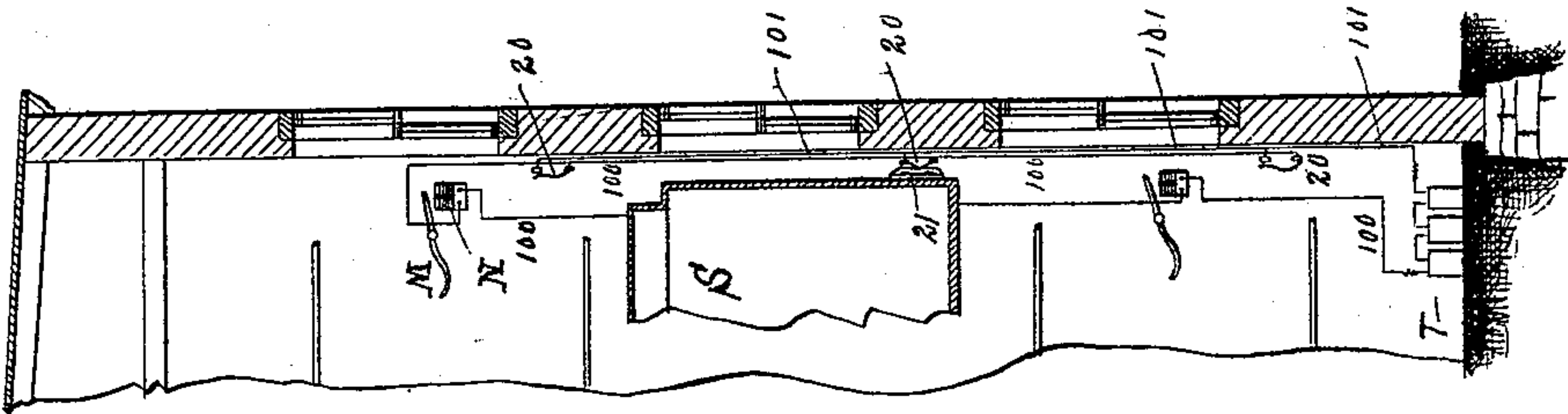


Fig. 5.

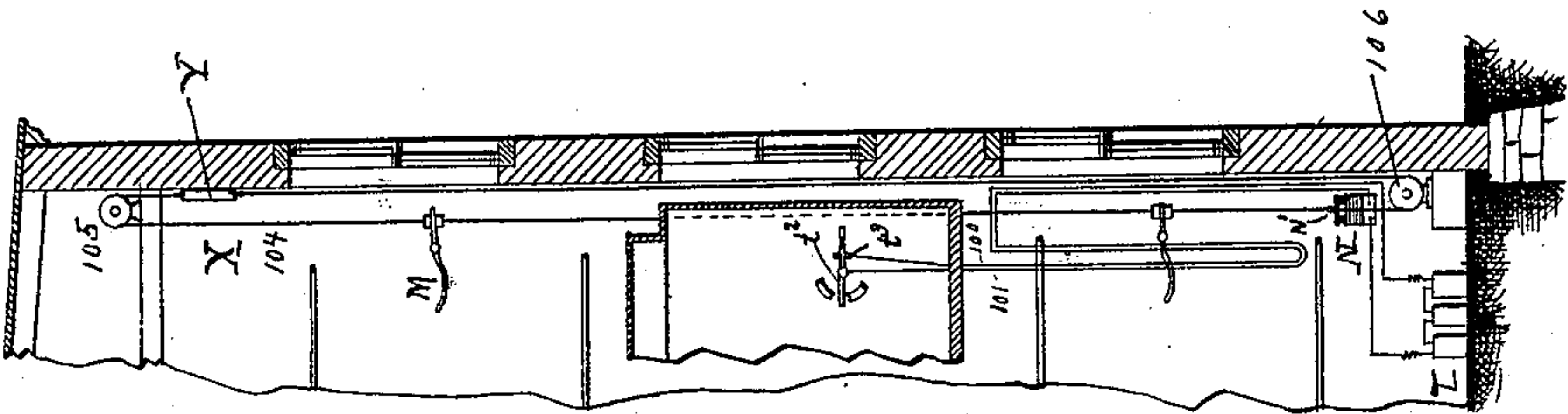


Fig. 4.

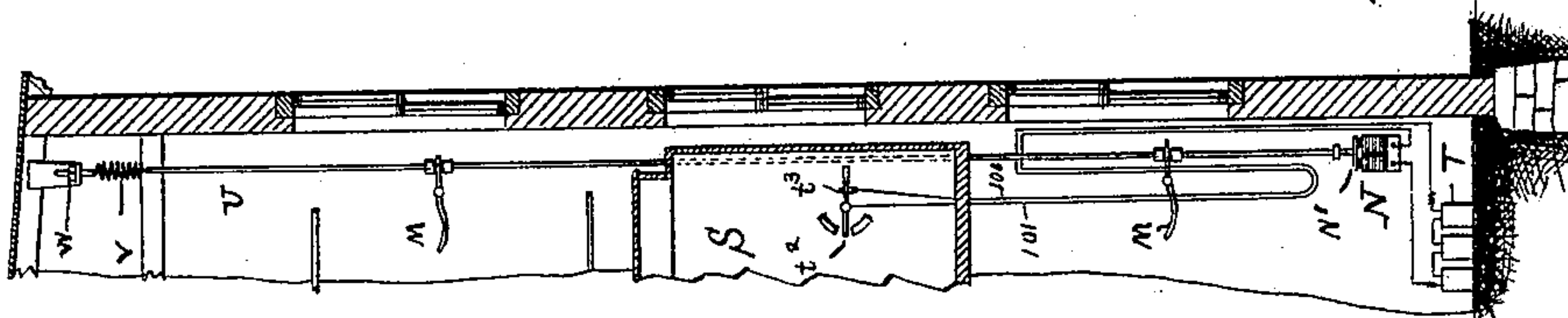
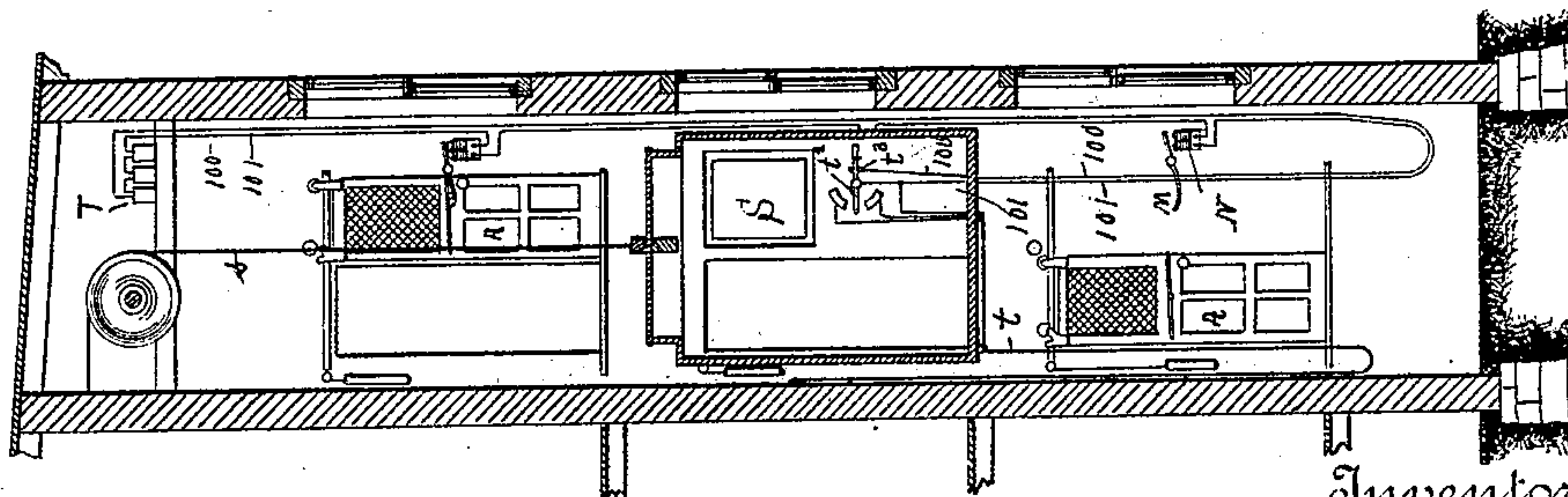


Fig. 3.



Witnesses

Chas. F. Schuch  
James J. Rafferty.

Inventor

E. C. Jenkins

By his Attorney

Louis W. Southgate



# UNITED STATES PATENT OFFICE.

EBENEZER CURTIS JENKINS, OF SHREWSBURY, MASSACHUSETTS.

## ELEVATOR-DOOR-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 518,409, dated April 17, 1894.

Application filed April 30, 1892. Serial No. 431,322. (No model.)

*To all whom it may concern:*

Be it known that I, EBENEZER CURTIS JENKINS, a citizen of the United States, residing at Shrewsbury, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Elevator-Door-Operating Mechanisms, of which the following is a specification.

The aim of this invention is to produce a new and improved means for operating doors, especially adapted to the doors in elevator wells, which will be extremely efficient, simple, and safe in operation.

To this end, the invention consists of the device described and claimed in this specification, and illustrated in the accompanying two sheets of drawings, in which—

Figure 1 is a view from the inside of the well, of a door with my improvements applied thereto, the door being open. Fig. 2 is a similar view, the door being closed. Fig. 3 is a view of the elevator well showing a number of doors, and the electrical connections to control the door operating mechanism. Figs. 4, 5, and 6 are similar views illustrating modifications of the electrical connections.

Referring to the drawings and in detail, A represents a door which is mounted to slide in any convenient manner, and the same may be hung from brackets B and B', and trolleys b on the guide way C. Another guide-way C' may be used to guide the door at the bottom, if desired. On the bracket B' is pivoted the bell-crank latch D, which has an arm d that has a catch adapted to engage the stationary projection d' on the way C to hold the door closed.

A suitable cord or wire F is passed around pulleys E and e having suitable guards fixed to the wall and through a suitable guide F<sup>2</sup>, and on one end of the rope is attached a handle F', and on the other, a weight G. Pivoted on the bracket B' is the bell-crank catch D which has catch d adapted to engage the stationary pin or hook d', and the catch D is connected to the cord F as shown.

The tendency of the weight G is to pull on the latch D to close the door, and to pull the catch d down so as to engage the projection d', but it will be seen that if the handle F' is pulled when the door is closed, as shown in Fig. 2 that the latch d will be raised off the

projection d', and thus unlocked, and as the pull is continued, the door will be opened. This is an extremely efficient mechanism because the same pull on the handle F' that unlocks the latch, will open the door.

A rod H is mounted on the door, and is arranged so as to bear on the arm d, and the rod H is connected to a small arm or lever h, and by means of a key or any other suitable device, the latch d may be operated and the door opened from the outside.

Pivoted as by screw k on the door in a convenient position to be manipulated by the operator, is an arm or lever K which has a spring k' fastened to the top of the same, and the arm K and the spring k' are arranged in a bracket k<sup>2</sup> so that the normal tendency of the right-hand end of the arm K is against the lower side of bracket k<sup>2</sup>. Any suitable handle may be placed at any convenient point on the lever, so that the same can be manipulated by the operator.

On the right hand end of the arm K is arranged a catch k<sup>4</sup>. Pivoted at m is a latch M, which has a curved projecting arm m<sup>3</sup>, and a spring m<sup>2</sup> is arranged so as to normally pull the right hand end of the latch against a stop m', and on the same end of the latch is arranged an armature m<sup>4</sup> that is adapted to co-act with the magnet M. A roll as L is fixed to the door, so that as the door is opened, the roller L will run or bear on the curved projection m<sup>3</sup> and will push the armature m<sup>4</sup> against, or nearly against the magnet, but if the magnet is not energized, the armature will move away from the magnet before the catch k<sup>4</sup> can engage the catch m<sup>5</sup> of the arm M, so as not to lock the door in its open position. A buffer-spring R is arranged to take the impact of the door, as the door is opened, and to aid in the action of said catches, and also store up energy to overcome the inertia of the door in closing. Thus it will be seen that by pulling on the handle F' the door may be opened, and that as the door opens, the roller L will cause the armature m<sup>4</sup> to move against magnet M, but if magnet M is not energized, the catches k<sup>4</sup> and m<sup>5</sup> will not engage, but if the magnet is energized, the catches k<sup>4</sup> and m<sup>5</sup> will engage, and thus hold the door open; and when the magnet is de-energized, the catches will be released by



means of the spring  $m^2$ , and the door will be closed by the action of the weight G and spring R. Also, it will be seen that the catches can be disengaged by the manipulation of the handle K.

I provide means whereby when the car is at any landing the magnet M will be energized, but the instant the car is started or moved away from the landing, that the magnet will be de-energized, and thus the door automatically closed.

Referring to the preferred form of electrical connections, as shown in Fig. 3, it will be seen that upon the car S is mounted a switch or handle  $t^2$ , by means of which through electrical or any other suitable connections the action of the motor, that raises or lowers the car can be controlled. Also, it will be seen that upon the handle  $t^2$  is mounted a contact piece  $t^3$ , and that the handle  $t^2$  and the contact piece  $t^3$  connect by wires 101 and 100 respectively through battery T to the magnet M at the various landings. Thus it will be seen that when the handle  $t^2$  is in its central position on the piece  $t^3$ , a current will be sent through all the magnets M and thus the same will be energized, whereby the catches of any of the doors may engage if the door is opened. If now, the handle  $t^2$  is moved in either direction to raise or lower the car, the contact with piece  $t^3$  will be broken, and thus the circuit through the magnet M will be released and any door that is open will be automatically closed.

In Fig. 4 instead of using a magnet for every catch, I have used a single magnet N and have arranged a vertical rod U which has an armature  $N'$ , and the weight of the rod is counter-balanced by the spring V, and the tension of the spring is adjusted by nut W. On the rod are mounted stops, as shown, which engage all the arms M so that if any door is opened, the armature  $m'$  will be forced toward the magnet, and if the circuit is completed through the contact piece  $t^3$ , the magnet M will be energized, and the door will be held open, but the instant the car is started by the manipulation of the handle  $t^2$ , the circuit through magnet M will be broken, and hence the armature  $m'$  will be released by the magnet M and all the latches released so that all the open doors will automatically close.

In Fig. 5, I have shown another modification, which is very similar to the modification shown in Fig. 4 except that instead of a vertical rod U, and counterbalancing spring V I use a cable or wire rope 104 passing over suitable pulleys 105 and 106, and I place a weight Y on the back side of said cable which will act the same as the spring V of the previous device. The operation of this modification is thought to be apparent.

In Fig. 6 I have shown the wires 100 and 101 connecting the source of electrical energy as battery T, as provided with switches 20 at the various landings and a cam 21 on the car that is adapted to close said switches when

the car is at any landing, and thus when the car is at any landing, any door may be opened and held open by the catches, as the circuit will be completed through one of the switches 20, but should the car move away from the landing in either direction, the current will be broken, and the magnets M will release their armatures, thereby the latches will be released and all the doors that are opened will be automatically closed.

Of course, instead of using a battery T as the source of electrical energy to control the magnets, I could use any other suitable source, as for instance, a shunt from an electrical motor used to raise or control the elevator car. Thus it will be seen that I have invented a simple and efficient means for controlling all the doors in an elevator well, and one by which, when the car starts to move in either direction that all the open doors will be automatically closed. Further, it will be seen that with my device, the car can be controlled from any landing, and all the open doors closed without an attendant. Also, that the door can be partly opened by hand without engaging the catch, and thus a considerable saving of time is effected, as for example, when it is desired to again open the door to take on another passenger. Also, as the doors all close automatically as the car starts, the same will act as a safety device, and warn any persons in a landing or partially on the car, who would be liable to be struck or hurt by the car.

The details and arrangements of parts herein shown and described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a sliding door, and a latch adapted to keep the same locked, of a weight connected by a cord to said latch so as normally to keep said latch in its locked position, said cord projecting beyond said latch and having a handle whereby by pulling on said handle the latch may be raised and the door opened, and by releasing said handle, the door will be closed, and the door locked by action of said weight, substantially as described.

2. The combination of a sliding door, means as a weight connected to keep the same in one position, said door having a pivoted arm as K, having a catch  $k^4$  of the arm M having a curved portion  $n^3$  at one end, and an armature  $n^4$  at the other end of the magnet N co-operating with armature  $n^4$ , and a roller L adapted to bring the armature  $m^4$  in contact with the magnet, so that the said catch  $k^4$  can engage said arm M, and electrical connections to said magnet, substantially as described.

3. The combination of a catch, and armature controlling and connected to said catch,



of a magnet controlling said armature, a co-  
operating catch or latch with which the first  
named catch is adapted to engage, and means  
for bringing the armature mechanically  
5 against the magnet, as one of said catches  
approaches the other, so that the catches will  
engage if the magnet is energized, substan-  
tially as described.

4. The combination of the elevator car, of  
10 the sliding elevator door A having an arm or  
latch K, an arm M pivoted to the wall, hav-  
ing a catch as  $m^5$  adapted to engage and hold  
said arm K, of a spring as  $m^2$  for holding the  
catch  $m^5$  out of engagement with the arm K,  
15 of an armature as  $m^4$  on said arm M, and a  
magnet as N controlling the said armature,  
a roller as L mounted on the door, adapted  
to bring said armature mechanically into con-  
tact with the magnet as the door is opened,  
20 so that the catches will engage only if the  
magnet is energized, of electrical connections

extending to said magnet, and a switch  
mounted on the car, to which said electrical  
connections pass, substantially as described.

5. An elevator arranged in an elevator well 25  
in the usual manner, of a plurality of doors  
opening into said well, each door having a  
latch, a catch adapted to engage each of said  
latches to hold each of said doors open, means  
for automatically closing said doors, a mag- 30  
net controlling said catches, a source of elec-  
tric energy, and connections to said magnet,  
and normally opened circuit breakers, con-  
trolled from the movement of said car, sub-  
stantially as described. 35

In testimony whereof I have hereunto set  
my hand in the presence of two subscribing  
witnesses.

EBENEZER CURTIS JENKINS.

Witnesses:

LOUIS W. SOUTHGATE,  
E. M. HEALY.