(No Model.) 3 Sheets—Sheet 1.

W. E. NICKERSON.

DEVICE FOR OPERATING DOORS FOR ELEVATOR WELLS.

No. 407,110. Patented July 16, 1889.

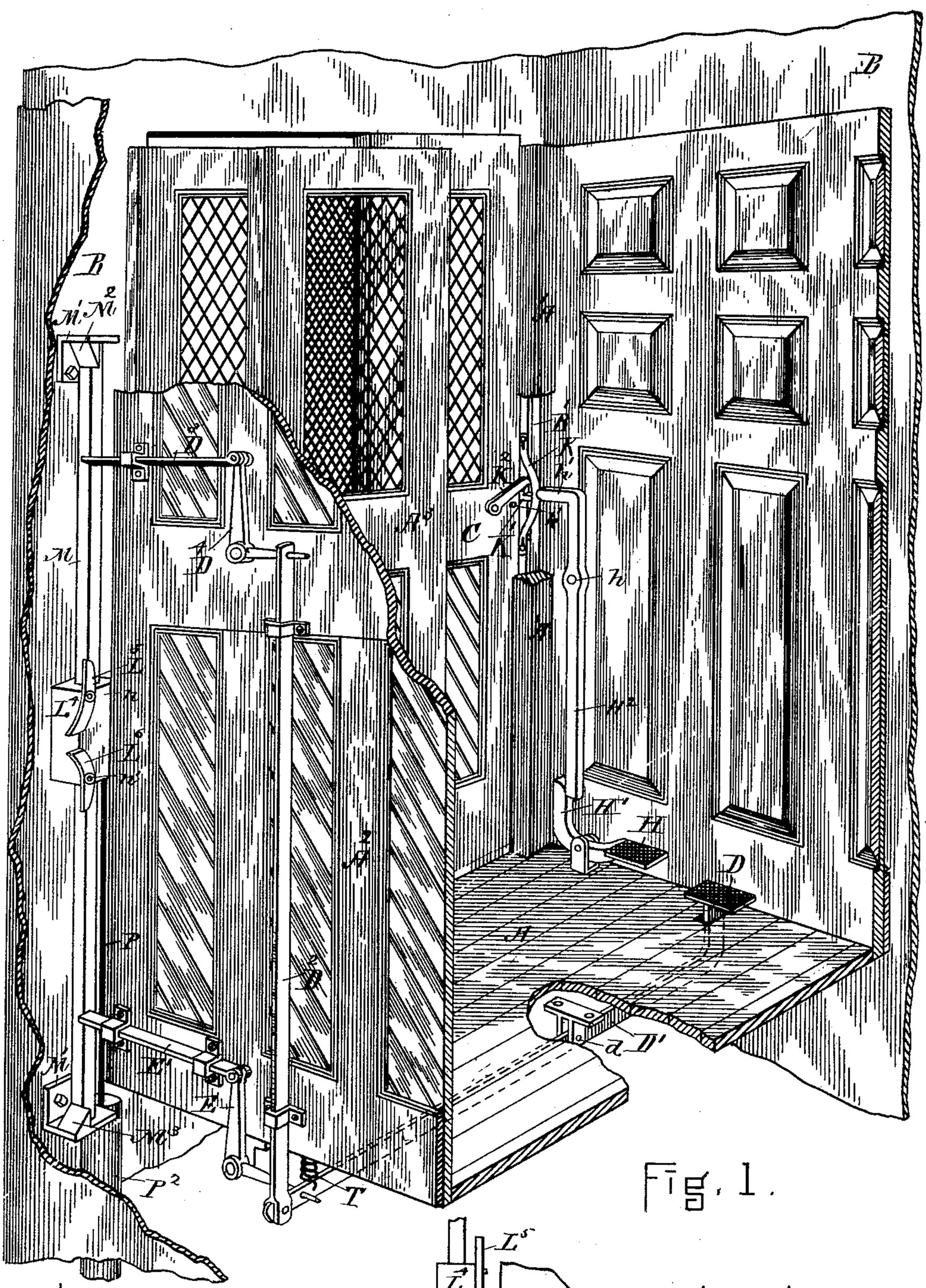

Fig. 1.

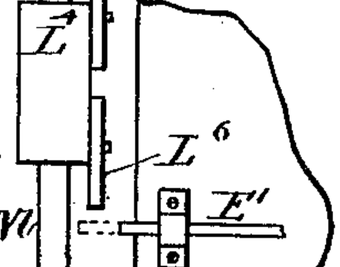

Fig. 2.

Witnesses.
Frank G. Parker.
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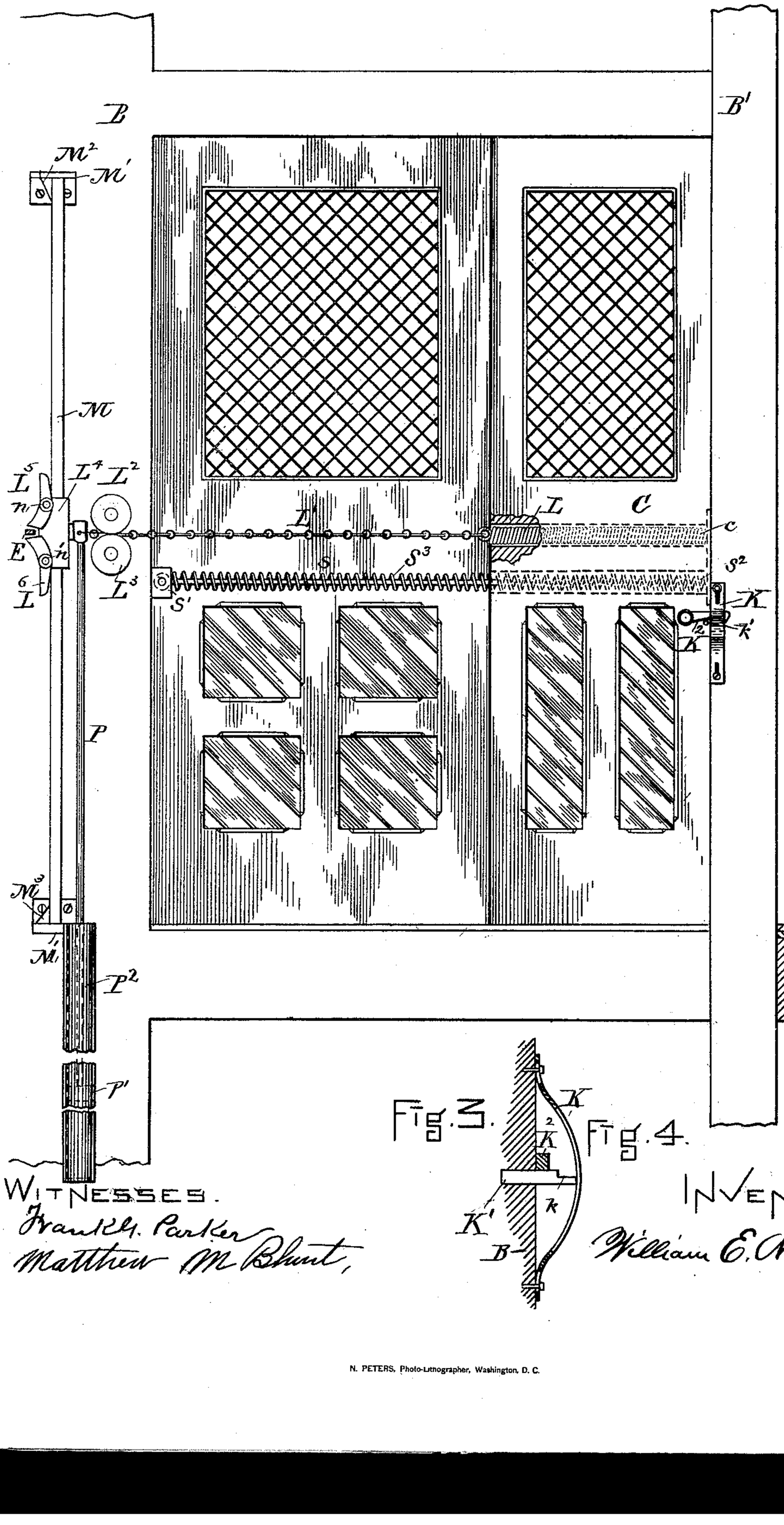
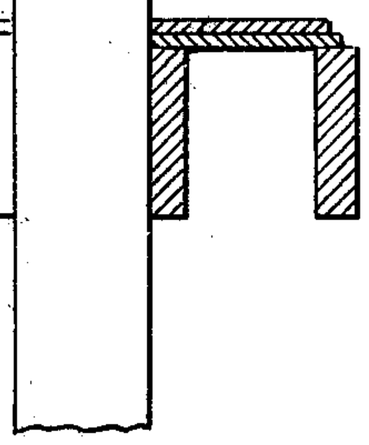


Fig. 3.

Fig. 4.



WITNESSES.

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Matthew M Blunt,

INVENTOR.

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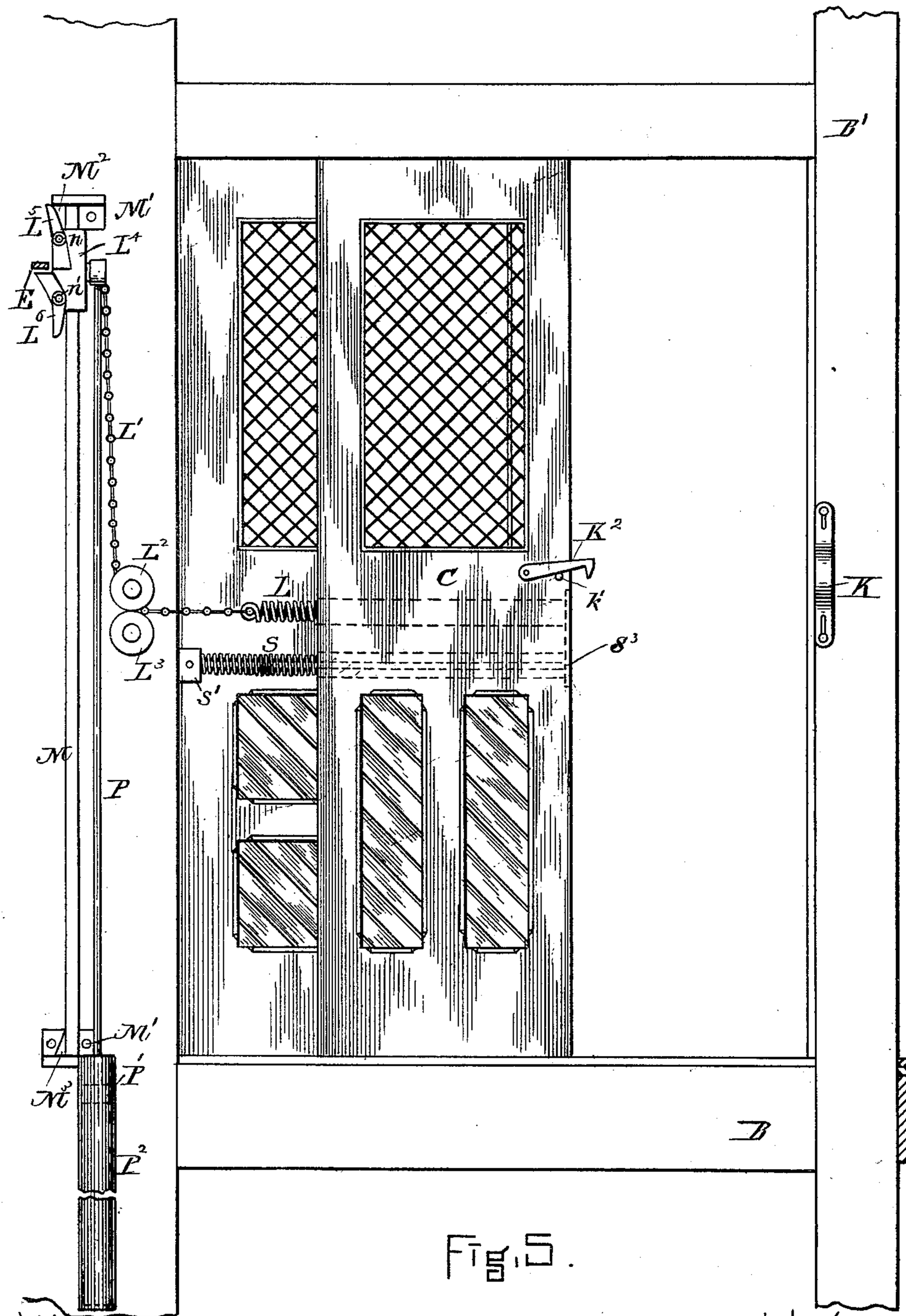

Fig. 5.

WITNESSES.

Frank H. Parker.
Matthew M. Blunt.

INVENTOR.

William E. Nickerson

UNITED STATES PATENT OFFICE.

WILLIAM E. NICKERSON, OF CAMBRIDGE, MASSACHUSETTS.

DEVICE FOR OPERATING DOORS FOR ELEVATOR-WELLS.

SPECIFICATION forming part of Letters Patent No. 407,110, dated July 16, 1889.

Application filed March 23, 1889. Serial No. 304,521. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EMERY NICKERSON, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a certain new and useful Improvement in Elevator Well-Room Doors, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is to so construct an operating mechanism for elevator well-room doors that the force generated by the motion of the elevator-carriage may either directly or by accumulation be utilized at the option of the attendant for opening and closing the well-room doors at each floor or landing. This object I attain by the mechanism shown in the accompanying drawings, in which—

Figure 1 is a perspective view showing the mechanism that I use. This mechanism is shown as attached to parts of the walls of the well-room and to parts of the elevator-carriage, unimportant parts being represented as broken away for the purpose of better illustration. Fig. 2 is an elevation of a sliding block with its pawls (shown in perspective in Fig. 1) and a portion of the carriage, showing a part of an engaging-rod. Fig. 3 is a side elevation of the elevator well-room, looking from the inside, showing the door closed. Fig. 4 shows, partly in elevation and partly in vertical section, a portion of a latch-releasing device which is located on the door-casing of the well-room. Fig. 5 is the same as the view shown in Fig. 3, except that the door is represented as open.

In the perspective view, Fig. 1, I have shown nearly all the parts of my invention, and unless other figures are referred to Fig. 1 may be used in following the description.

The walls of the well-room are indicated by B.

A represents the floor of the elevator-carriage, and A^2 the side next to the observer.

A^3 represents the door of the carriage, and A′ the part of the carriage against which the door A^3 closes, B′ being the post forming a part of the elevator well-room, and is the part against which the door C of the elevator well-room closes.

The latch-hook K^2 of the elevator well-room door C is arranged to hook onto the sliding bolt K′ (see Figs. 1 and 4) when the door C is closed. The sliding bolt K′ is connected to a spring-plate K, (see Fig. 4,) and is provided with a recess *k*, through which the hook of the latch K^2 may pass in case the recess is in a certain position. Otherwise the hook is held by the bolt K′ and the door cannot be opened. When the attendant wishes the door to open, he depresses the lever foot-piece H. This action throws the upturned end of the lever H′ against the lever H^2, (pivoted at *h*,) and in throwing its lower end outward causes its upper end *h*′ to take a position in which it will, as the carriage reaches a floor, come in contact with the spring-plate K and force it and the bolt K^2 back, so as to cause the recess *k* to come opposite to the hook of the latch K′, and thus allow the door to be opened by any strain that may be brought to bear upon it. It will be observed that the latch K^2 cannot drop low enough, on account of the stop *k*′, for its hook to engage with that part of the bolt K′ that is at the bottom of the recess *k*.

Referring to Figs. 3 and 5, L is a closely-wound spring adapted for tension and attached to the well-room door C at *c*. This spring may be inserted into the body of the door or incased on the surface of the door, as may be deemed desirable. L′ is a chain or cord, one end of which is attached to the spring L and the other end, after passing between the grooved pulleys L^2 L^3, to the sliding block L^4. This block L^4 slides on a square rod M, attached by bracket-pieces M′ M′ to the wall of the elevator well-room. On the sliding block L^4, I have two pawls L^5 L^6, pivoted at *n* and *n*′, and so balanced that they will rest normally in the position shown in Figs. 1 and 2—that is, in such a position that they will act as buttresses for the rods E′ and D^3 when either of them comes in contact. At each end of the rod M, upon which the block L^4 slides, I have stationary cam-pieces M^2 M^3, so made that when either of the pawls L^5 L^6 come in contact with its respective cam-piece then it (the pawl) will be tripped and the rod E′ or D^3, as the case may be, will be released.

To prevent a too abrupt return movement

of the sliding block L^4, caused by the recoil of the spring L on its release, I have attached to it a rod P and piston P′, Figs. 3 and 5. This piston P′ works in a narrow cylinder P^2 loosely, so that while it will offer but little resistance to its proper movement it will effectually prevent any tendency to abruptness.

The spring S rests with one end against a part of the door C at S^2 and with the other end against the block S′, attached to the wall of the well-room B. The spring S is provided with a rod S^3, (see Figs. 3 and 5,) extending within the coils of the spring from the block S′, to which it is fastened, to a point just within the edge of the door when taken in its closed position. This rod serves to keep that part of the spring which is without the door from lateral buckling. The tendency of the spring S is to extend itself—that is, to push the door to its closed position—as will be explained below.

For causing the block L^4 to slide up or down on the rod M and to bring a tension on the springs L and S by drawing the end of the chain L′ up or down past the pulleys L^2 L^3, I have the following device, (see Fig. 1:)

D is a foot-piece for the lever D′, the lever D′ being pivoted at *d*.

D^2 is a vertical rod adapted to slide up and down on the side of the elevator-carriage, as shown, and is operated by the lever D′ and foot-piece D.

E′ and D^3 are sliding rods attached to the sides of the elevator-carriage, and are both actuated by the foot-piece D, through the lever D′, rod D^2, and bent levers E and D^4.

The operation of my device is as follows: We suppose the carriage to be at the bottom, the attendant starts it and allows it to continue its motion without further attention until the carriage nears a floor at which it is desired to open the well-room. Now the attendant depresses the foot-piece D, thus causing the rod D^3 to slide so as to come in contact with the pawl L^5, which will cause the block L^4 to slide up on the rod M and draw the chain L′ and the attached end of the tension-spring L, so that although the door C will not be moved on account of the latch-hook K^2, the spring L will strain upon it and cause it to open as soon as released from the holding action of the latch-hook K^2. Upon the stopping of the carriage the attendant can, by pressing with his foot the piece H, free the latch-hook K^2, and allow the spring L, which is now under tension, to draw the door open. (See Fig. 5.) The act of drawing the door C open compresses the spring S, as shown in Fig. 5, the tension force exerted by the spring L being sufficient to overcome the extensive force of the spring S.

The upward movement of the block L^4, as above set forth, is not so great (before the carriage stops) at the landing as to bring the pawl L^5 in contact with the cam-piece M^2 and thus release the block L^4. If the carriage stops and the rod D^3 is not withdrawn from the pawls L^5 L^6, then the door, if not released, remains closed, but under the tension of the spring L, and consequently under strain that tends to open it; but as soon as the elevator-carriage starts up again the block L^4 will be moved up on the rod M, so as to cause the pawl L^5 to come in contact with the cam-piece M^2, which will, by throwing the lower end of the pawl off from the rod D^3, allow the block L^4 to return to its normal position—that is, to the position shown in Fig. 1—the spring L having returned to its unstrained condition.

If we assume that the carriage has stopped at a floor and that the door C has been opened by the action of the block L^4 through the chain L′ and spring L, and that the attendant wishes to close the door C, he removes his foot from the foot-piece D. This allows the rod D^3 to be drawn back by the action of the spring T on the lever D′ and to release the block L^4, which, returning to its normal position, removes the strain on the spring L and allows the spring S to close the door by its expansive force.

In case the elevator-carriage does not stop at any intermediate floor, but ascends to the top, then the attendant need not actuate either lever until the carriage nears the last floor. Then he will press the foot-piece D down, so as to bring the rod D^3 into contact with the pawl L^5, and thus cause the block L^4 to ascend and to draw on the chain L′ and set the spring L at tension ready to draw the door C back when released, as has already been set forth.

In the descent of the elevator-carriage all of the parts operate the same, except that the rod E′ takes the function of the rod D^3, and the block L^4 descends instead of ascends, and that the pawl L^6 and cam-piece M^3 are brought into action.

It will be understood that there is a block L^4 at each floor, and that it is adapted to slide up and down on its rod M, and that the controlling cams and pawls operate the same way at each floor. At the lower floor the cam-piece M^3 may be dispensed with, and at the upper floor the cam-piece M^2 may be dispensed with.

The subject-matter of my invention may be briefly stated thus: Mechanism by which the power generated by the moving carriage of an elevator is by accumulation utilized at the option of the attendant to open and close the doors of an elevator well-room.

I claim—

1. In an elevator, the combination of the well-room door C, having a spring L and a spring S of less force, said springs being adapted to respectively open and close said door C, substantially as described, with an elevator-carriage having upon it rods adapted to operate at the option of the attendant the said spring L by means of a movable block L^4, and a chain connecting the block and spring, substantially as described, and for the purpose set forth.

2. In an elevator, a door C, having counteracting springs of different forces adapted to operate in opposition to each other, as described, with a movable block attached to the walls of the elevator well-room and operated by the movement of the elevator-carriage, and a latch-hook K^2, adapted to be released by a lever under the control of the attendant, substantially as described, and for the purpose set forth.

3. In an elevator, the combination of the door C, spring S, spring L, sliding block L^4, and an elevator-carriage having rods adapted to engage with the sliding block L^4, substantially as described, and for the purpose set forth.

4. In an elevator, the combination of the door C, the spring L, chain L′, block L^4, having pawls L^5 L^6, the rod M, and cams M^2 M^3, with the elevator-carriage having engaging rods E′ and D^3, substantially as described, and for the purpose set forth.

5. In an elevator, the combination of the foot-lever D′, rod D^2, lever D^4, rod D^3, with sliding block L^4, having pawls L^5 L^6, chain L′, spring L, and door C, having a retractor-spring S, substantially as and for the purpose set forth.

6. In an elevator, the combination of the latch-hook K^2, the sliding bar K′, having a recess *k*, with the spring-plate K and actuating-lever H^3, substantially as and for the purpose set forth.

7. In an elevator, the combination of the door C, spring L, chain L′, and block L^4, adapted to be moved by the carriage, as described, with the piston-rod P, piston P′, and cylinder P^2, substantially as described, and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 21st day of March, A. D. 1889.

WILLIAM E. NICKERSON.

Witnesses:
FRANK G. PARKER,
MATTHEW M. BLUNT.