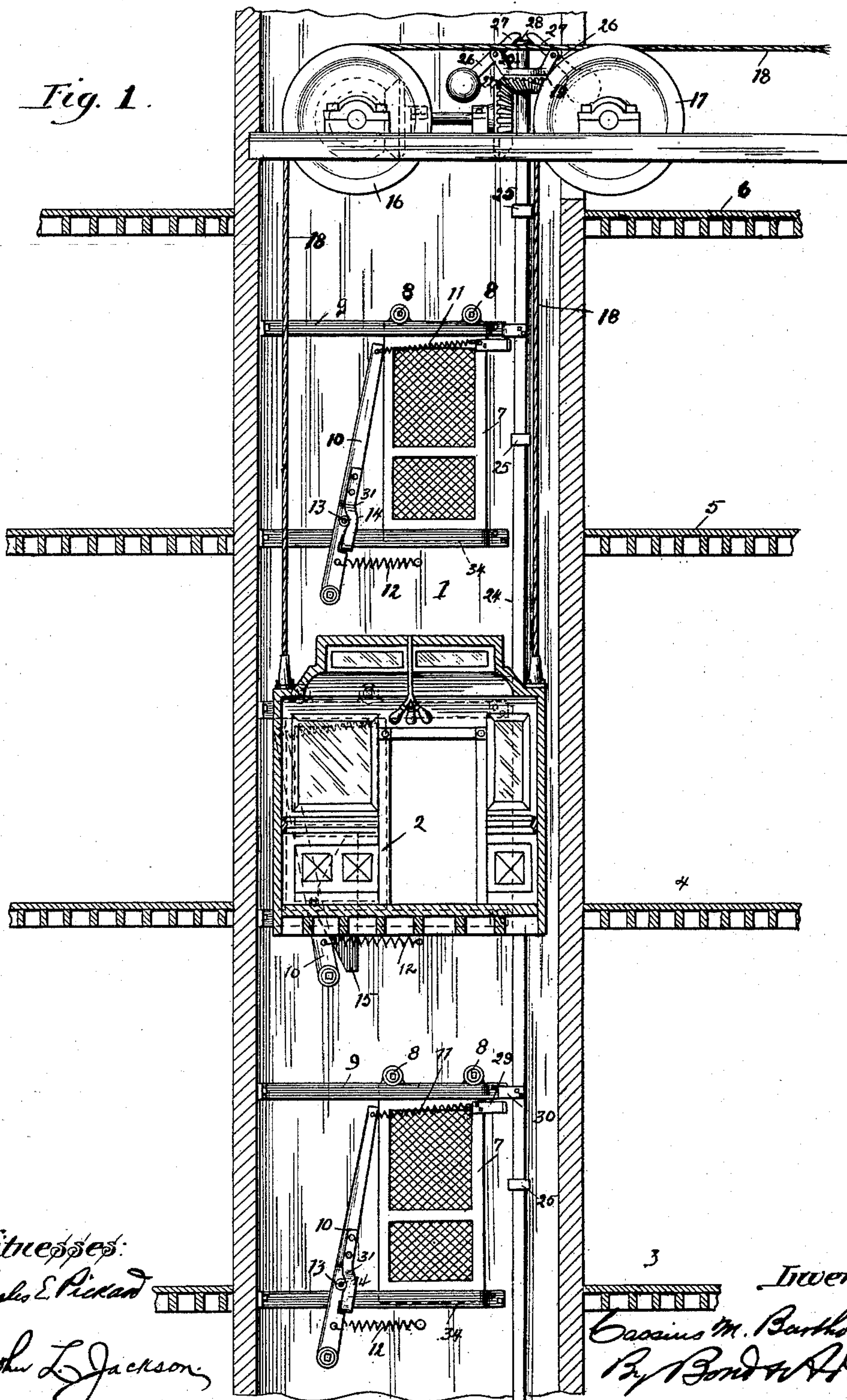



2 Sheets—Sheet 1.

No. 483,277.

Patented Sept. 27, 1892.

*Fig. 1.*



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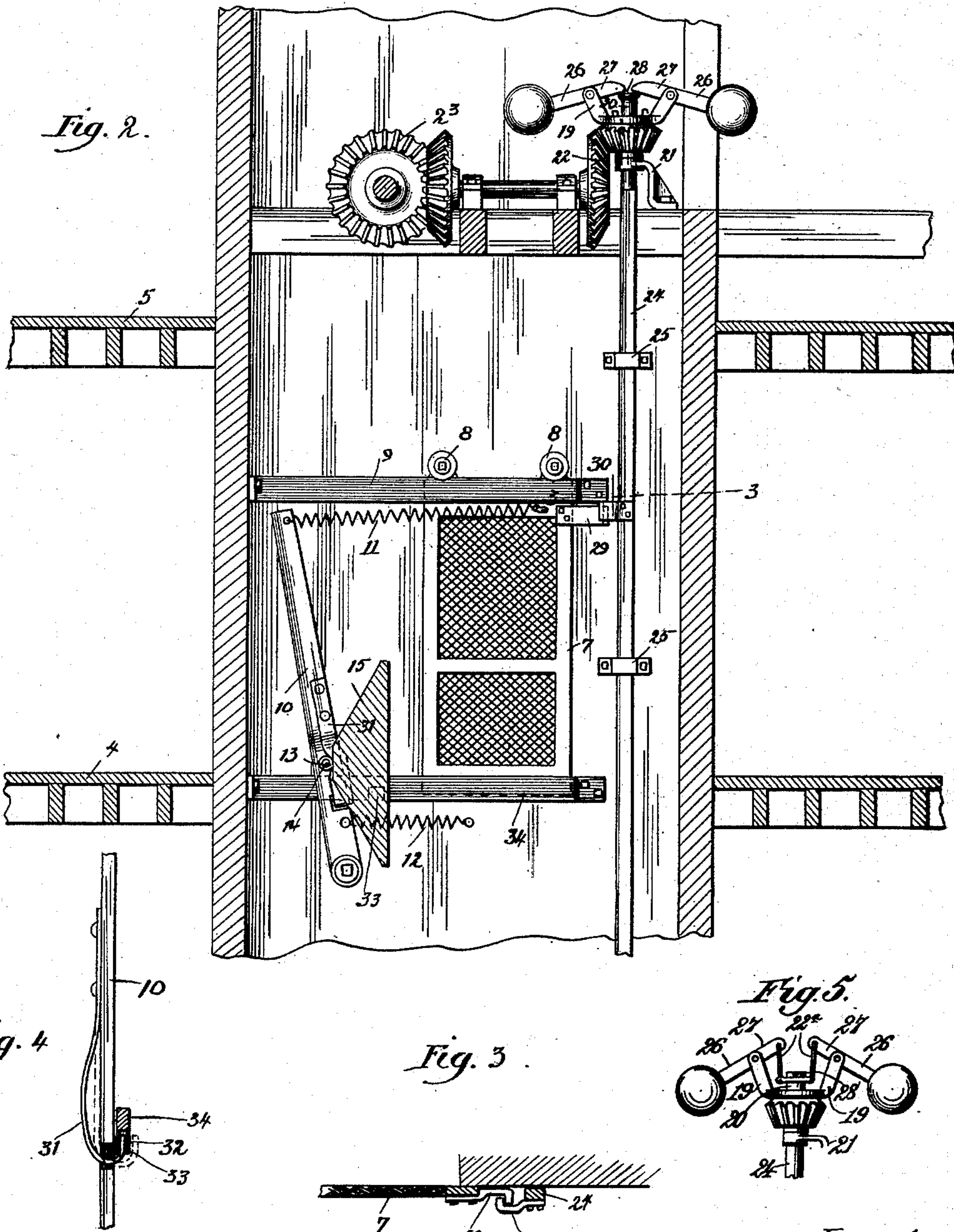
(No Model.)

2 Sheets—Sheet 2.

C. M. BARTHOLOMEW.  
ELEVATOR.

No. 483,277.

Patented Sept. 27, 1892.



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# UNITED STATES PATENT OFFICE.

CASSIUS M. BARTHOLOMEW, OF NEWARK, OHIO, ASSIGNOR TO HIMSELF AND  
JAMES ATHERTON, OF SAME PLACE.

## ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 483,277, dated September 27, 1892.

Application filed October 13, 1891. Serial No. 408,617. (No model.)

*To all whom it may concern:*

Be it known that I, CASSIUS M. BARTHOLOMEW, a citizen of the United States, residing at Newark, in the county of Licking and State of Ohio, have invented certain new and useful Improvements in Elevators, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section through a portion of a building, showing the interior arrangement of the elevator shaft and doors. Fig. 2 is an enlarged view of a portion of the elevator-shaft, showing the elevator-doors locked. Fig. 3 is a detail, being a partial cross-section on line 3 3 of Fig. 2. Fig. 4 is a detail view showing a form of device for locking the doors when the car is not in motion, and Fig. 5 is a detail view showing a link connection between the governor-arms and the shaft which operates the vertical locking-rod.

My invention relates to elevators, and more particularly to passenger-elevators.

The principal object of my invention is to provide new and improved devices for opening the doors leading into the elevator when the car stops at different floors and for closing the doors when the car leaves such floors.

Another object of my invention is to provide means for locking the doors opening into the elevator-shaft when the elevator is in motion. I accomplish these objects as hereinafter specified, and as illustrated in the drawings.

That which I regard as new will be pointed out in the claims.

In the drawings, 1 indicates an elevator-shaft, and 2 the car which is adapted to move in said shaft.

3, 4, 5, and 6 indicate different floors of the building.

7 indicates doors adapted to close the passages opening into the shaft from said floors. The doors 7 are the usual sliding doors and are suspended from hangers 8, adapted to slide upon guideways 9 in the usual manner.

10 indicates levers, one of which is pivoted at its lower end to the side of the elevator-shaft at one side of each door 7, as shown in Figs. 1 and 2. Each lever is connected at its upper end to the adjacent door by means of a spring 11, as shown.

12 indicates springs, one of which is secured at one end to the side of the shaft and at the other end to the lower portion of each of the levers 10. The arrangement of the levers 10 and springs 11 is such that as the levers are moved to the position shown in Fig. 2 the tension of each of the springs 11 will tend to open the door 7 to which it is attached. The upper end of each of the levers 10 is so arranged as to bear against the edge of the adjacent door 7, and the arrangement of the springs 12 is such that when the levers are in the position shown in Fig. 2 the tension of the springs will cause said levers to return to the position shown in Fig. 1. Owing to the fact that the levers bear against the doors, as described, such return motion of the levers will close the doors.

13 indicates rollers, one of which is mounted upon a pin 14, secured upon each lever 10 and projecting at right angles from it.

15 indicates a cam, which is secured upon the elevator-car at the side next to the levers 10. The cam 15 is of about the shape shown in Fig. 2, being somewhat wedge-shaped. Instead of making the sides straight, however, as there shown, they may be curved. The arrangement of the cam 15 is such that as the elevator-car approaches one of the floors of the building the cam 15 will engage one of the rollers 13 and will move the lever 10 to the position shown in Fig. 2, such position being assumed when the floor of the car is on a level with the floor of the building. If the doors are free to open, as the lever 10 moves back from the door by the action of the cam the tension of the spring 11 will cause the door to open gradually. When the elevator moves away from the floor, the tension of the spring 12 will throw the lever 10 back to the position shown in Fig. 1 and the pressure of the lever against the door will close it.

In order to provide for locking the doors closed when the car is in motion, the following mechanism is provided: 16 and 17 indicate the usual pulleys, over which run cables 18, which support the elevator-car. 19 indicates a governor, which is mounted upon a vertical shaft 20, which shaft is supported at its upper end by means of a bracket 21, suitably secured in the elevator-shaft. The gov-



ernor 19 is adapted to be operated by beveled gears 22 and 23, which communicate to the governor motion from the wheel 16. If desired, the governor may be geared to the wheel 17.

24 indicates a rod, which is mounted vertically in the elevator-shaft, being held in place by means of straps 25, as best shown in Fig. 2. The rod 24 is free to move vertically and is connected at its upper end to the lower end of the shaft 20. 26 indicates the arms of the governor, which are provided with inward extensions 27, which project over the upper end of the shaft 20 and are pivotally connected to a collar 28, journaled on said shaft through the medium of suitable devices. As represented in Fig. 5 the connection is made by means of links 27<sup>a</sup>. The collar 28 is journaled on the shaft 20, so that the governor can rotate on the shaft. The arrangement is such that when the outer ends of the arms 26 are raised by the rotation of the governor the pressure of the extensions 27 upon the shaft 20 will depress said shaft. When the governor is stationary, the arms 26 will be depressed and the shaft 20 and rod 24 will be raised, as shown in Fig. 1. 29 indicates hooks, one of which is secured to each door 7 at any convenient point along its inner edge, preferably near the upper part of the door. Each hook 29 is adapted to be engaged by a corresponding hook 30, secured to the rod 24 at a suitable point, as best shown in Fig. 2. The arrangement is such that by the vertical motion of the rod 24 the hooks 29 and 30 will be moved into or out of engagement with each other. When the hooks are in engagement with each other, the doors will be locked in their closed position. By this construction when the elevator-car is in motion the rotation of the pulley 16 will cause the governor 19 to rotate and the arms 26 will assume the position shown in Fig. 2. The shaft 20 will thereby be depressed and the hooks 29 and 30 will engage each other, locking the doors closed. As soon as the elevator-car stops, the arms 26 will drop and the hooks 29 and 30 will move out of engagement with each other. The doors will thereby be unlocked. If the elevator-car does not stop at any floor, the hooks 29 and 30 upon the door at that floor will remain in engagement with each other, as in Fig. 2, and as the elevator passes the lever 10 at that door will be moved to the position shown in Fig. 2, but the door will not open, and the lever will resume the position shown in Fig. 1 as soon as the car has passed the floor.

By the use of the above-described mechanism the door leading into the elevator-car will be opened as soon as the elevator stops at any floor and will be automatically closed and locked when the elevator is in motion.

In order to lock the doors when the elevator-car is not in motion, spring-catches 31 are provided, one of which is secured upon each lever 10 in the manner shown in the drawings. The lower portion of each spring-catch

is bent to form a hook 32, as best shown in Fig. 4, which hook is adapted to fit into a notch 33, cut in a bar 34, which forms a guide for the lower portion of the sliding door 7. Each catch 31 extends a short distance from the side of the lever to which it is attached in such position that it will come in contact with the cam 15 when the elevator-car moves up or down and will be pressed inward toward the lever 10, as indicated by dotted lines in Fig. 4. The tension of the spring-catch is such that the hook 32 will normally be held in the notch 33, and the lever 10 will thereby be prevented from being moved to open the door. The door will thereby be normally locked shut. When the cam 15 bears upon the spring portion of the catch 31, the hook 32 will be pressed inward to the position shown by dotted lines in Fig. 4 and the lever 10 will be free to move back, and the door will then be opened by the action of the cam. By this construction the doors can only be opened when the elevator-car is opposite to them.

That which I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with an elevator-shaft and a car, of sliding doors, devices operated by the car to automatically slide the doors open, and locking mechanism operated by the motion of the car to automatically and simultaneously lock all the doors in their closed position, substantially as described.

2. The combination, with an elevator-shaft and a car, of sliding doors, lever-and-spring mechanism operated by the car to automatically slide the doors open, and a rising-and-falling locking-rod moved by the motion of the car and having devices which engage and lock all the doors in their closed position while the car is in motion, substantially as described.

3. The combination, with an elevator-shaft, an elevator-car adapted to move therein, and pulleys and cables for operating the car, of a governor adapted to be rotated by the rotation of one of the pulleys and mechanism operated by the governor for locking the doors leading into the elevator-shaft, substantially as described.

4. The combination, with an elevator-shaft, an elevator-car adapted to move therein, pulleys 16 and 17, and cables 18 for operating the car, of a governor 19, having arms 26, said arms having inward extensions 27, a shaft 20, rod 24, and devices carried by said rod for locking the doors opening into the elevator-shaft, said extensions 27 being connected with the upper end of the shaft 20, substantially as and for the purpose specified.

5. The combination, with an elevator-shaft, an elevator-car adapted to move therein, and pulleys 16 and 17 and cables 18 for operating the car, of a governor 19, having arms 26, said arms having inward extensions 27, a shaft 20, rod 24, hooks 30, carried by said rod, adapted to engage corresponding hooks 29



upon the doors opening into the elevator-shaft, and collar 28, journaled upon the upper end of the shaft 20, said collar being connected to the inward extensions 27, substantially as and for the purpose specified.

6. The combination, with an elevator-shaft, a car 2, adapted to move therein, and doors 7, opening into said shaft, of swinging levers 10, door-opening springs 11, connecting the levers with the doors, springs 12 for moving the levers in one direction, and devices carried by the car for moving the levers in the opposite direction to cause the door-opening springs to pull the doors to their open position, substantially as described.

7. The combination, with an elevator-shaft, a car 2, adapted to move therein, and doors 7, opening into said shaft, of swinging levers 10, door-opening springs 11, connecting the levers with the doors, springs 12 for moving the levers in one direction, and a cam 15, mounted on the car for moving the levers in the opposite direction to cause the door-opening springs to pull the doors to their open position, substantially as described.

8. The combination, with an elevator-shaft, a car, and doors opening into the shaft, of a main locking mechanism operated by the motion of the car to automatically lock all the doors in their closed positions, supplementary locks for locking each of the doors shut, and devices for unlocking the supplementary lock at each door when the car stops opposite such door, substantially as described.

9. The combination, with an elevator-shaft, a car, and doors opening into the shaft, of a movable vertical locking-rod having locking devices to engage the doors and lock them in

their closed positions and gearing operated by the motion of the car to move the locking-rod into position to engage its locking devices with the doors, substantially as described.

10. The combination, with an elevator-shaft, a car, and doors having hooks, of a vertically-movable locking-rod having hooks and mechanism operated by the motion of the car to move the rod lengthwise and cause its hooks to engage the hooks on the doors, substantially as described.

11. The combination, with an elevator-shaft, a car adapted to move therein, a door 7, lever 10, and spring 11, of a catch 31, having hook 32, bar 34, having a notch 33, and devices for operating said lever and catch, substantially as and for the purpose specified.

12. The combination, with an elevator-shaft, a car adapted to move therein, a door 7, lever 10, and spring 11, of a catch 31, having hook 32, bar 34, having a notch 33, and a cam 15, carried by said car, said cam being adapted to operate the lever 10 and the catch 31, substantially as and for the purposes specified.

13. The combination, with an elevator-shaft, car 2, adapted to move therein, a door 7, lever 10, springs 11 and 12, and devices for locking said lever to hold the door shut, of devices carried by said car adapted to operate the lever to open the door, substantially as described.

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