(No Model.) 2 Sheets—Sheet 1.

L. N. REED.

OPERATING MECHANISM FOR ELEVATOR SHAFT DOORS AND SAFETY DEVICES.

No. 575,935. Patented Jan. 26, 1897.

FIG. 1.

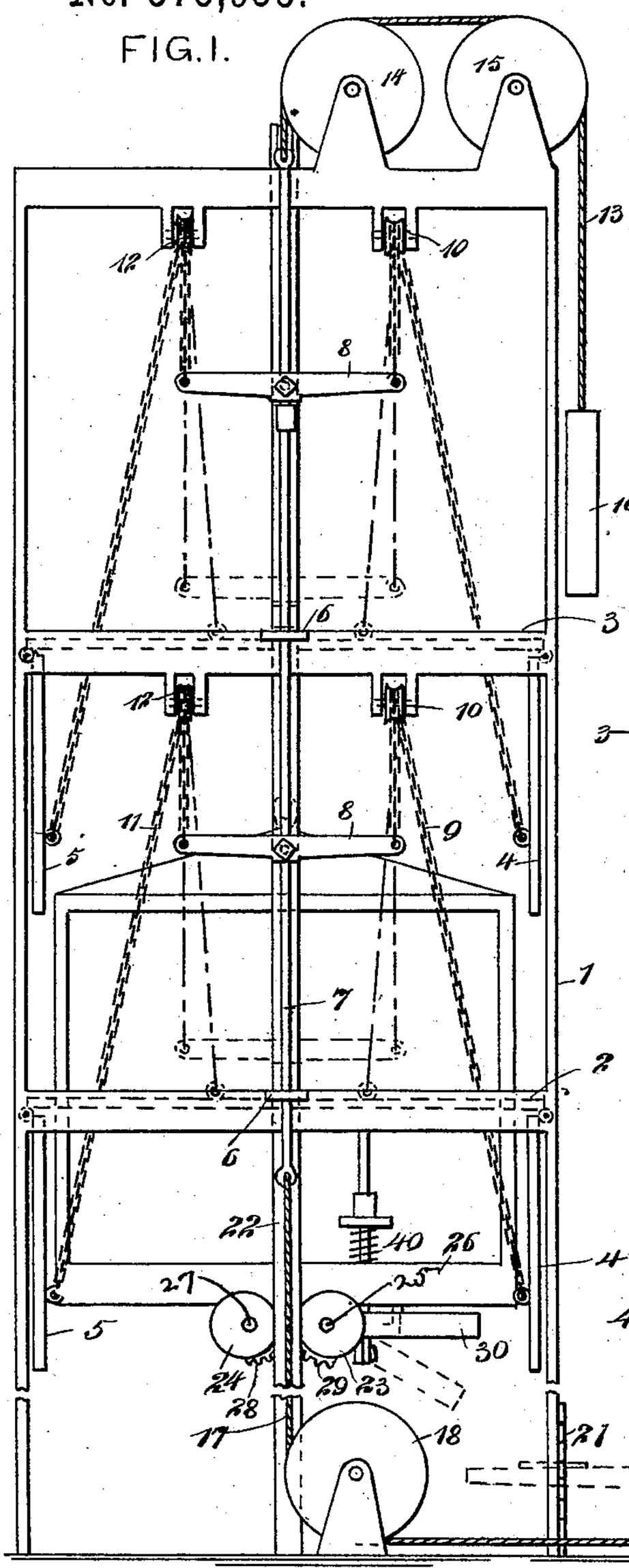


FIG. 2.

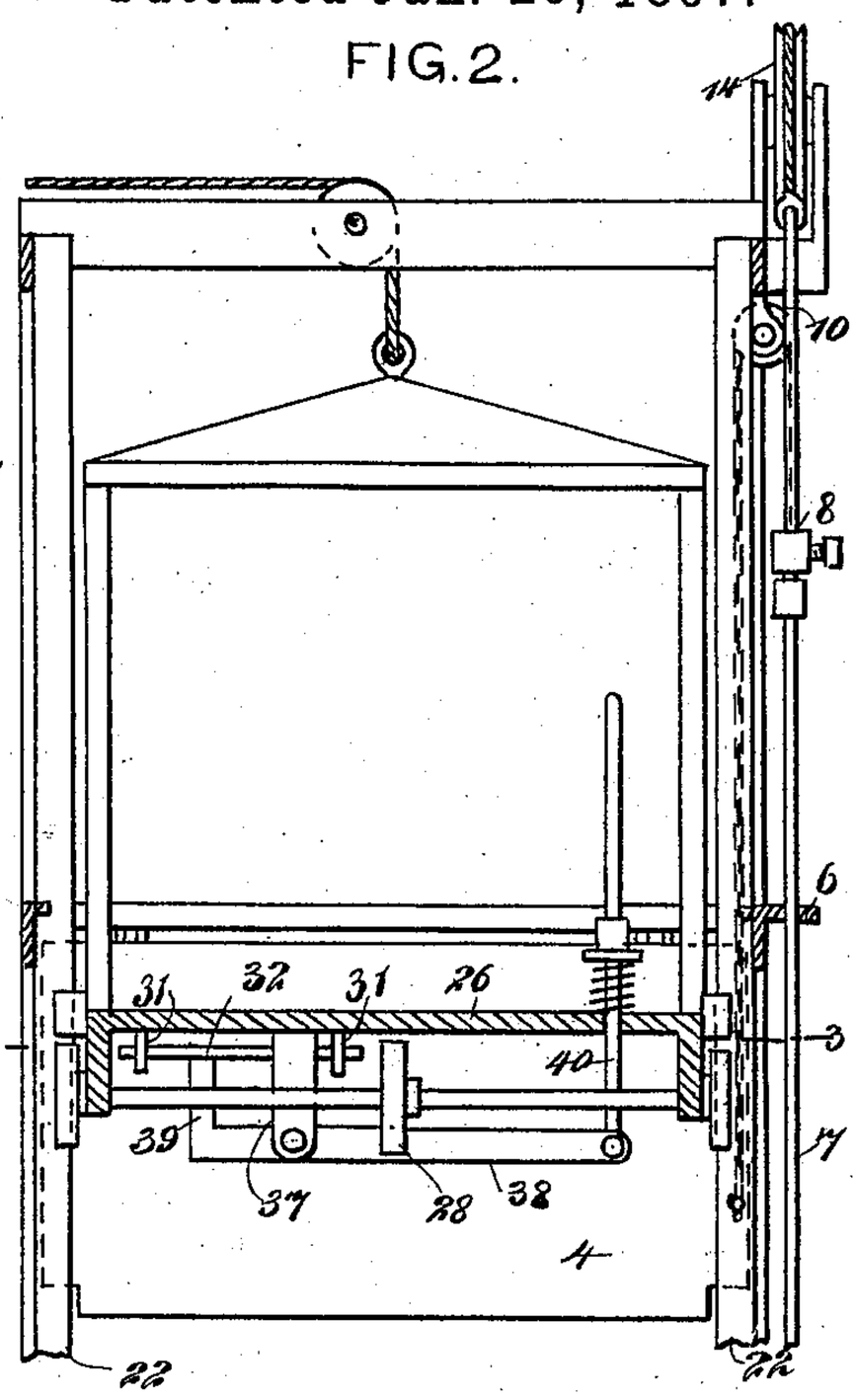


FIG. 3.

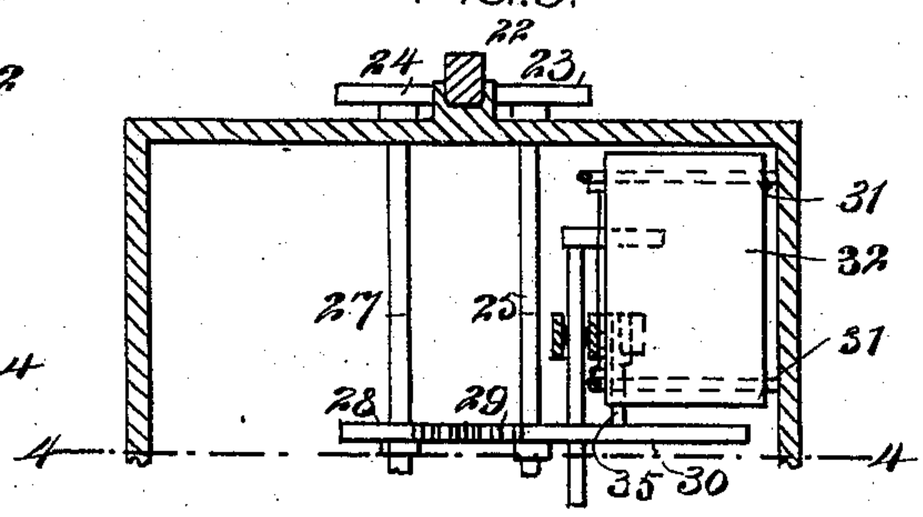
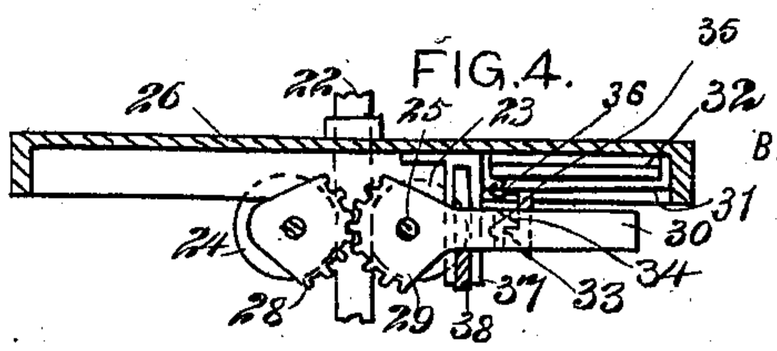


FIG. 4.



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(No Model.) 2 Sheets—Sheet 2.

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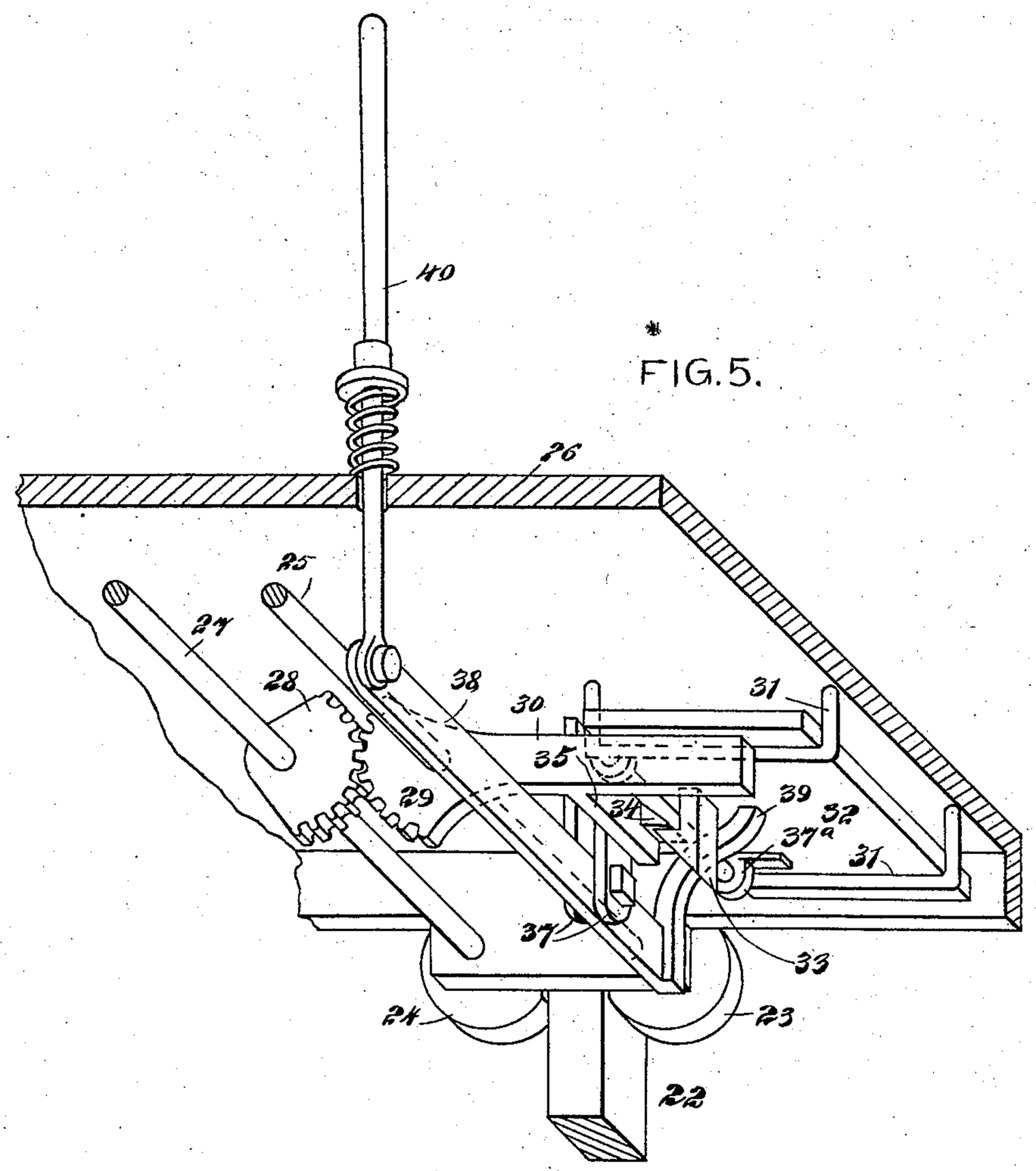
FIG. 5.



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LUCIUS N. REED, OF FULTON, ILLINOIS.

OPERATING MECHANISM FOR ELEVATOR-SHAFT DOORS AND SAFETY DEVICES.

SPECIFICATION forming part of Letters Patent No. 575,935, dated January 26, 1897.

Application filed August 7, 1896. Serial No. 601,965. (No model.)

To all whom it may concern:

Be it known that I, LUCIUS N. REED, of Fulton, in the county of Whiteside and State of Illinois, have invented new and useful Improvements in Operating Mechanism for Elevator-Shaft Doors and Safety Devices for Elevators, of which the following is a full, clear, and exact description.

This invention relates to devices for operating the vertically-swinging doors of elevator-shafts and to means for automatically locking an elevator should its hoisting-rope be accidentally broken; and the object is to provide a simple device whereby the several doors of an elevator-shaft may be simultaneously closed or opened by the operation of a lever at the base of the shaft, and, further, to provide a simple and automatic means for locking an elevator in the shaft should it by accident move too rapidly downward.

I will describe a mechanism embodying my invention and then point out the novel features in the appended claims.

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 a side elevation of an elevator-shaft and elevator, showing my invention. Fig. 2 is a partial section and partial elevation at right angles to Fig. 1, showing only the upper portion of the shaft. Fig. 3 is a section on the line 3 3 of Fig. 2. Fig. 4 is a section on the line 4 4 of Fig. 3; and Fig. 5 is a perspective view, on an enlarged scale, of the automatic locking means.

I will first describe the elevator-shaft doors and the operating mechanism therefor.

In the drawings, 1 designates an elevator-shaft extended upward through the several floors 2 and 3. At the opening through each floor I provide doors 4 and 5, respectively hinged to opposite sides of the elevator-shaft and designed to meet at the center thereof when swung to a horizontal or closed position. Arranged at one side of the elevator-shaft and movable through guide-pieces 6 is an operating-rod 7, provided between each floor or between each pair of doors with a cross-head 8. From one end of the cross-head 8 a flexible connection, such as a chain 9, extends over a sheave 10 to a connection with the door 4, and from the opposite end of said cross-head 8 a flexible connection 11 extends over a sheave 12 to a connection with the door-section 5. The sheaves 10 and 12 are of course located at a point above the door or door-sections to which the chains are connected, and of course the several doors throughout the length of the shaft will be connected to the operating-rod 7 in the same manner.

From the upper end of the rod 7 a rope or cable 13 extends over pulleys 14 and 15, having journal-bearings in standards at the upper end of the elevator-shaft, and to the free end of this rope or cable 13 is attached a counterbalance-weight 16. From the lower end of the rod 7 a rope or cable 17 extends around a pulley 18, arranged at the side of the elevator-shaft, and thence to a connection with a pulley 19, arranged outside the elevator-shaft. Obviously the pulleys 18 and 19 will be arranged at the lower end of the elevator-shaft.

On the shaft of the pulley 19 is a lever 20 of sufficient length to be engaged with rack-teeth 21, which are here shown as attached to a portion of the elevator-shaft, although these rack-teeth may be placed in any other convenient position, their office being merely to form a holder for the lever 20 to support the doors in a closed position.

In the drawings the several doors are shown in an open position. When it is desired to close the doors, the elevator-car must be either in the lowest section of the elevator-shaft or in the top section thereof, so as not to interfere with the upward or downward movement of the door-sections. When it is desired to close the door, the lever 20 will be turned to the position shown in dotted lines in Fig. 1. This movement will draw the rod 7 downward, consequently drawing the cross-head 8 downward and drawing upon the chains 9 and 11 to close the door-sections, where they may be held rigidly by engaging the lever 20 or a metal plate thereon underneath one of the teeth of the rack 21. Of course in opening the doors the lever 20 will be turned to the opposite position, or that indicated in full lines in Fig. 1, thus allowing the doors to fall by gravity and assisted somewhat by the counterbalance-weight 16.

It may be here stated that as the doors may fall to an open position by gravity the counterbalance-weight 16 is not necessary to an operative device. Therefore I do not limit my invention to the use of such counterbalance-weight.

I will now describe a safety mechanism for the elevator-car.

At each side of the elevator-shaft and extending the entire length thereof is a guide or brake strip 22, preferably consisting of hard wood, and adapted to engage with opposite sides of each strip 22 are eccentrics 23 24. The eccentrics 23 are mounted on a shaft 25, having bearings in the elevator-car below its floor 26, and the eccentrics 24 are mounted on the ends of a similar shaft 27, mounted in the elevator-car below its floor. To the shaft 27, near one of its ends, is secured a segment-gear 28, meshing with a similar segment-gear 29 on the shaft 25. The segment-gear 29 has an extension 30, which serves as a weight when released to turn the segment-gears and consequently turn the eccentrics 23 and 24 into engagement with the strip 22.

Supported on the under side of the elevator-car floor 26 are rods 31, and to the inner ends of these rods 31 one edge of an air-pressure plate 32 is pivoted, as at 37ª. This air-pressure plate is designed to be operated by atmospheric pressure to release the extension or weight 30 should the elevator descend too rapidly.

To the under side of the air-pressure plate 32 and extended downward therefrom is secured a hook 33, normally in engagement with a hook 34 on an arm 35, extended inward from the extension 30 of the segment-gear 29. As here shown, the upper portion of the arm having the hook 33 is connected with and depends from the plate 32.

To hanger 37, depending from the floor 26, is fulcrumed a lever 38, having one end 39 extended upward and loosely engaging with the under side of the air-pressure plate 32. From the opposite end of the lever 38 a rod 40 extends upward through the elevator-car floor 26, supported by springs at floor-line. By means of this lever 38 and rod 40 it is obvious that the air-pressure plate 32 may be forced upward by an operator within the elevator-car should said air-pressure plate fail to operate automatically. This lever mechanism is also designed to return the parts to their normal positions. As here shown, the lever 38 extends across the under side of the extension 30 from the segment-gear 29, so that by raising the rod 40 the said extension will be raised to a horizontal position, consequently rotating the segment-gears and throwing the eccentrics out of engagement with the strips 22.

In operation, should the hoisting rope or apparatus of the elevator-car be accidentally broken and the car start downward with a considerable velocity, the air-pressure against the plate 32 will rock said plate on its pivots and draw the hook 33 out of engagement with the hook 34, thus allowing the extension 30 to operate the segment-gears and throw the eccentrics into engagement with the strip 22. A slight continued downward movement of the elevator-car will of course cause the eccentrics to engage more tightly against the strip 22 and stop the downward movement of the car.

As before stated, the air-pressure plate may be moved upward by means of the rod 40 and the lever 38, if such operation be required.

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

1. A mechanism for operating elevator-shaft doors, comprising a vertically-movable rod at one side of the elevator-shaft, a chain or similar flexible connection between said rod and a door, a sheave over which said chain or flexible connection passes, a pulley arranged at the base of the elevator-shaft, a cable extended from the operating-rod around said pulley, another pulley arranged at the base of the elevator-shaft and to which the end of said cable is attached, and an operating-lever on the shaft of the last-named pulley, substantially as specified.

2. In an elevator-shaft, a series of doors for the floor-openings thereof, each door consisting of two sections, a rod extended upward and movable through guideways at one side of the elevator-shaft, cross-heads on said rod, flexible connections between said cross-heads and the door-sections, sheaves arranged above the door-sections and over which said flexible connections extend, a pulley arranged at the lower end of the shaft, another pulley arranged outside the shaft, a cable extended from the rod around the first-named pulley to a connection with the last-named pulley, and an operating-lever for said last-named pulley, substantially as specified.

3. The combination, with an elevator-shaft and doors for the floor-openings thereof, each door consisting of two hinged sections, of an operating-rod extended upward at one side of the elevator-shaft, cross-heads secured to said rod, chain connections between the cross-heads and the door-sections, sheaves over which said chains extend, pulleys arranged at the upper end of the shaft, a cable extended from the upper end of the operating-shaft over said pulleys, a counterbalance-weight at the opposite end of said cable, a pulley arranged at the base of the shaft, another pulley arranged at the base of the shaft, but outside thereof, a cable extended from the lower end of the operating-rod around the first-named pulley at the base of the shaft to a connection with the last-named pulley, an operating-lever on the shaft of the last-named pulley, and a locking device for said lever, substantially as specified.

4. The combination, with an elevator-shaft and a car therein, of brake-strips extended upward at opposite sides of the elevator-shaft,

rotary shafts carried by the elevator-car, eccentrics on said shafts, for engaging with the brake-strips, segment-gears on said shafts meshing one with the other, a weighted extension on one of said segment-gears, and a holding device for said extension, comprising a pivoted plate operated by atmospheric pressure, substantially as specified.

5. The combination, with an elevator-shaft and a car therein, of brake-strips arranged at opposite sides of the shaft, eccentrics mounted on shafts carried by the car and adapted for engagement with the brake-strips, a segment-gear on each of said shafts and meshing one with the other, a weighted extension on one of said segment-gears, a latch or hook carried by said extension, an air-pressure plate pivoted at one edge to rods extended along the under side of the car, and a latch-hook depending from said plate and adapted for engagement with the latch-hook carried by the extension of the segment-gear, substantially as specified.

6. The combination, with an elevator-shaft and a car therein, of brake-strips arranged at opposite sides of the shaft, eccentrics mounted on shafts carried by the car and adapted for engagement with the brake-strips, a segment-gear on each of said shafts and meshing one with the other, a weighted extension on one of said segment-gears, a latch or hook carried by said extension, an air-pressure plate pivoted at one edge to rods extended along the under side of the car, a latch-hook depending from said plate and adapted for engagement with the latch-hook carried by the extension of the segment-gear, a lever fulcrumed to a hanger depending from the bottom of the car and having one end in free engagement with the under side of the pivoted plate, and a rod extended from the opposite end of said lever to the floor of the car, substantially as specified.

LUCIUS N. REED.

Witnesses:
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JOEL W. FARLEY.