

Nov. 17, 1925.

1,562,184

C. NORTON

MEANS FOR OPERATING ELEVATOR CAR AND SHAFT DOORS

Filed Jan. 17, 1925

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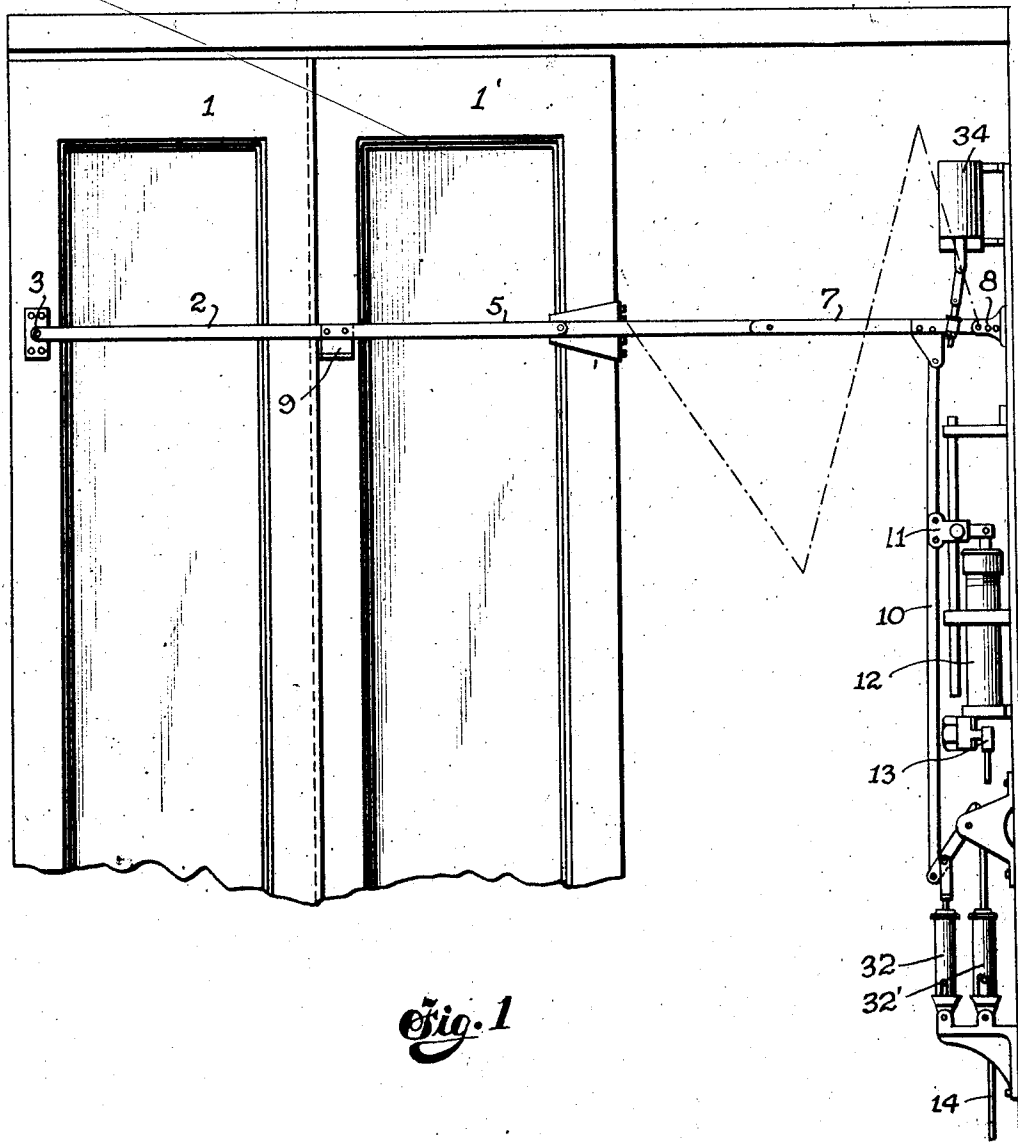


Fig. 1

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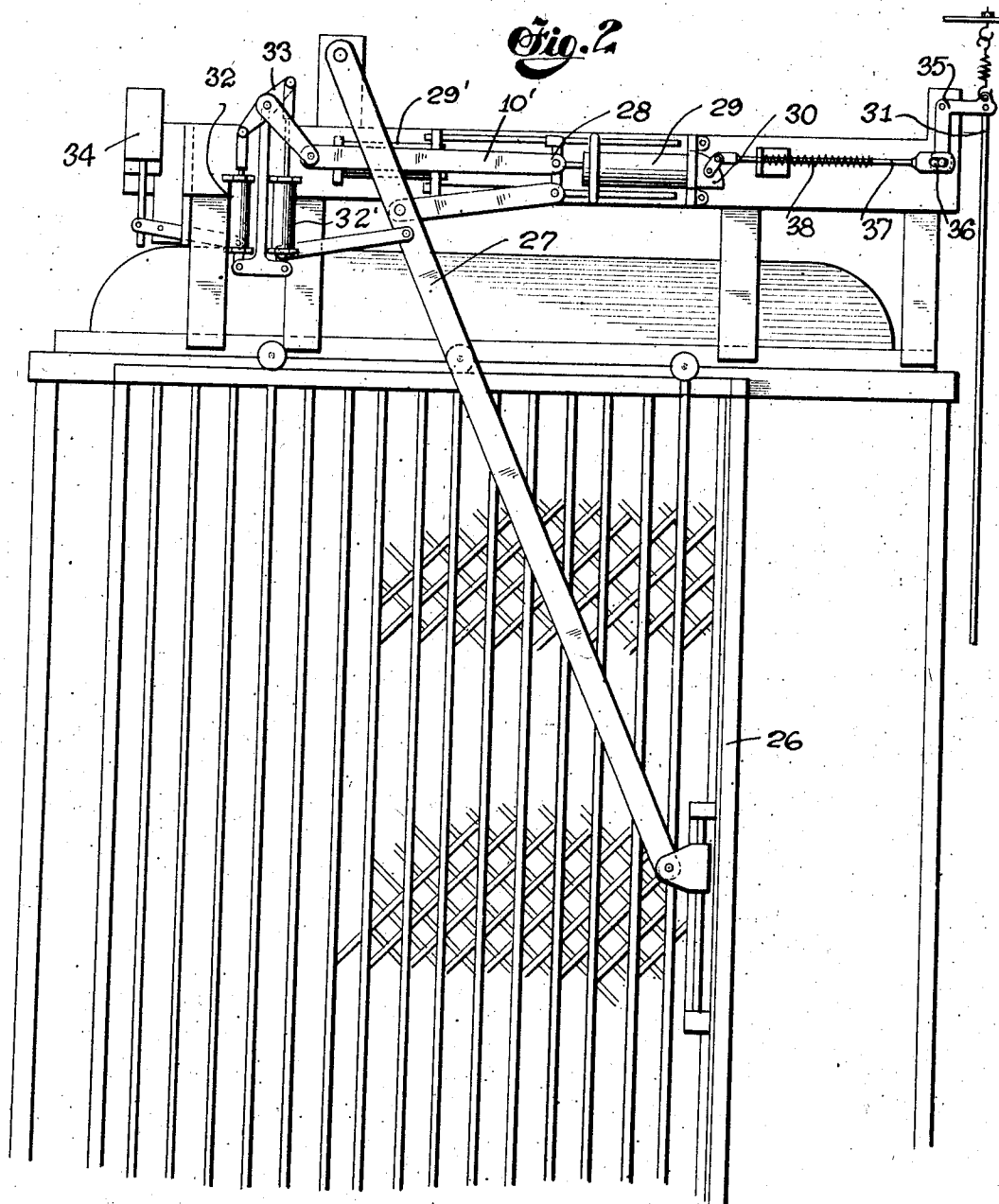
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MEANS FOR OPERATING ELEVATOR CAR AND SHAFT DOORS

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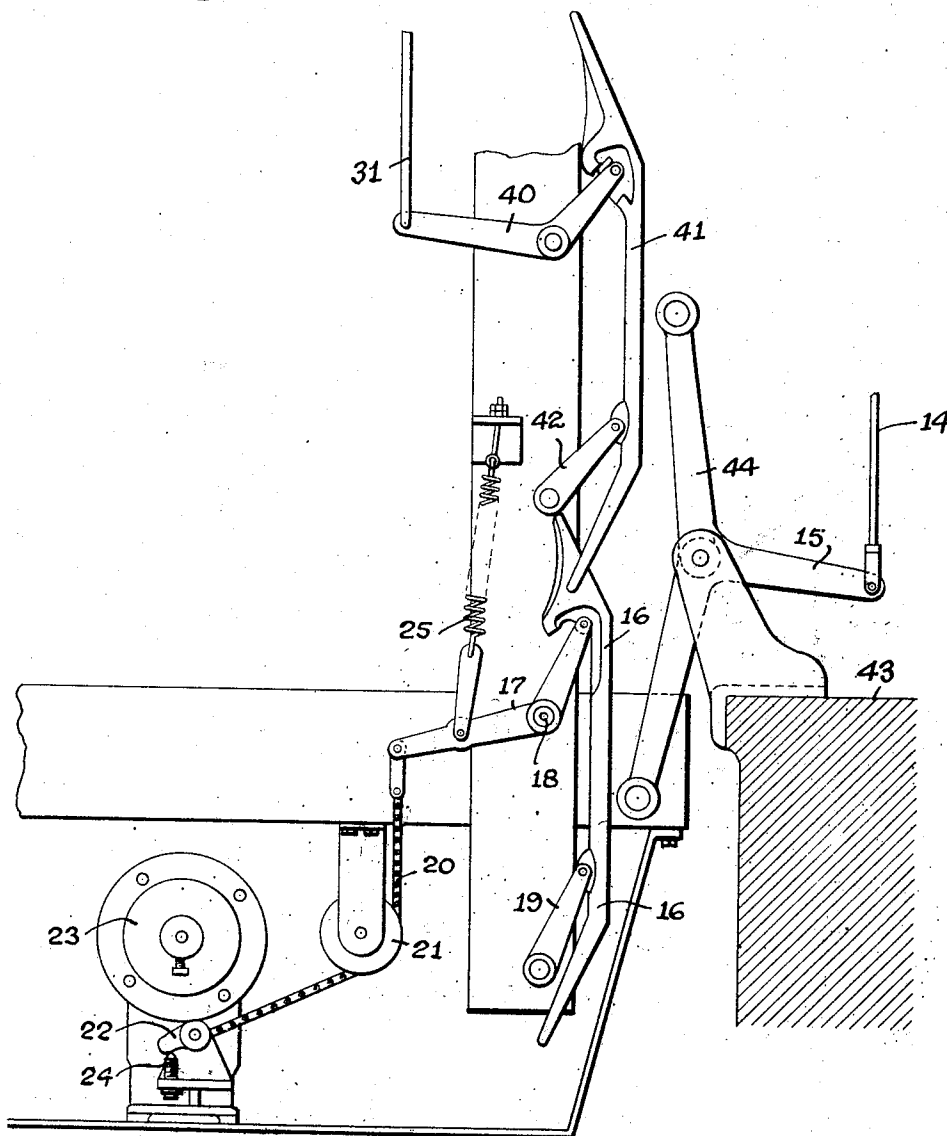
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MEANS FOR OPERATING ELEVATOR CAR AND SHAFT DOORS

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Fig. 3



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MEANS FOR OPERATING ELEVATOR CAR AND SHAFT DOORS

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4 Sheets-Sheet 4

Fig. 4

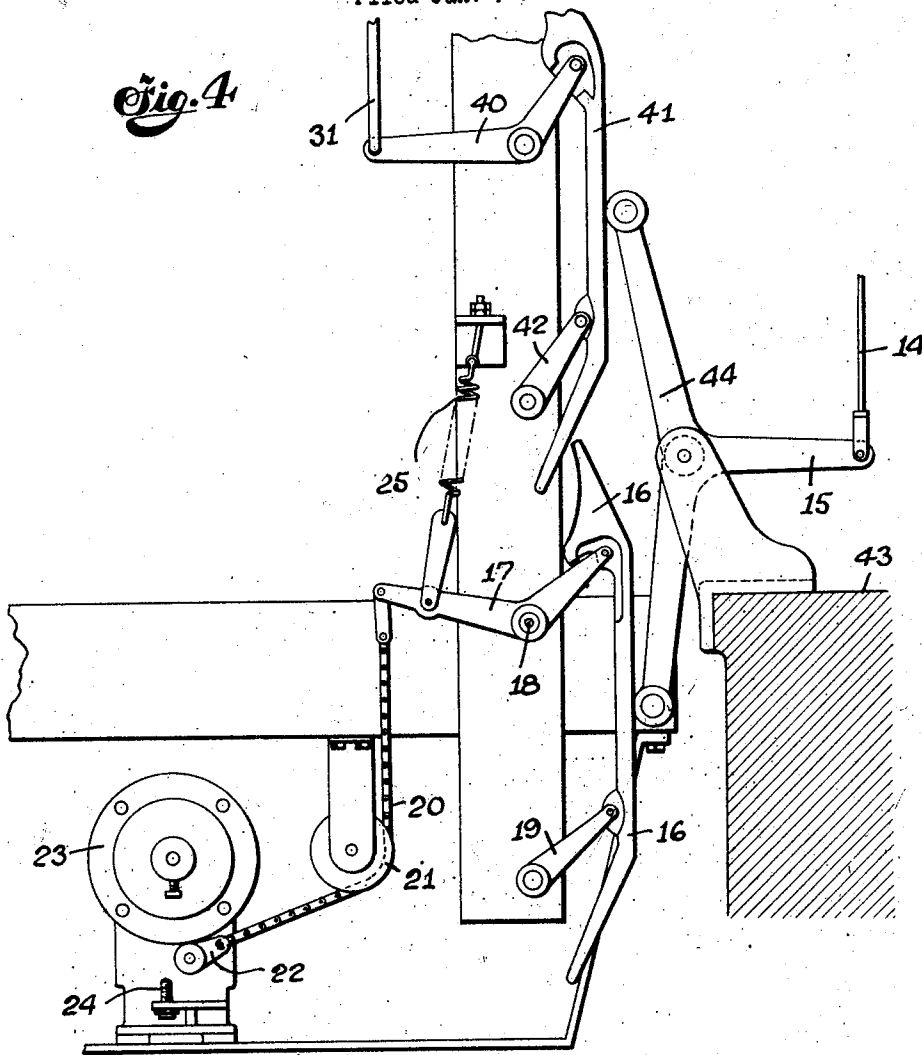
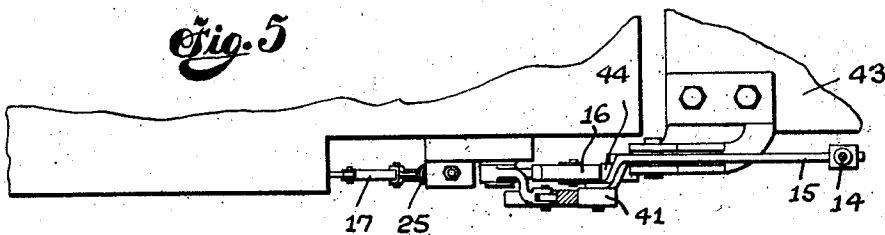


Fig. 5



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Patented Nov. 17, 1925.

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UNITED STATES PATENT OFFICE.

CLIFFORD NORTON, OF NEW YORK, N. Y., ASSIGNOR TO GRAHAM & NORTON COMPANY,
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MEANS FOR OPERATING ELEVATOR CAR AND SHAFT DOORS.

Application filed January 17, 1925. Serial No. 2,979.

To all whom it may concern:

Be it known that I, CLIFFORD NORTON, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Means for Operating Elevator Car and Shaft Doors, of which the following is a specification.

My invention relates to means for operating elevator car gates or doors and elevator shaft doors and more particularly to means wherein provision is made for controlling the action of the operating mechanism of both by the attendant on the car.

In the usual construction of apparatus for this purpose the car door operating mechanism may be brought into action at any position of the elevator whether at or between floors, the usual construction being such that the operation of the actuating means for bringing the well door operating mechanism into action will also, through suitable direct connections, effect the opening of the car door by its operating mechanism. The ability to thus open the car door at positions other than the position of the car opposite the landing is an objectionable feature of prior apparatus which it is the aim of my invention to overcome.

My present invention consists essentially in operating the car gate from the car through the intermediary of a mechanism placed and fixed at the car landing and engageable or operable from the car only when the car is at or near said landing, thereby confining the opening of the car gate to conditions where it is safe to permit it to be opened. Preferably intermediate mechanism through which the actuator on the car acts upon the car door operating mechanism is some part of the shaft door operating or controlling mechanism, the latter mechanism being capable of operation from the car only when the car is at or near the landing.

My invention consists also in the special combinations of devices and details of construction hereinafter described.

In carrying out my invention it is desirable to employ power actuated operating mechanism for both the car door and the shaft door. A type of apparatus of this character suitable for the purpose is de-

scribed in my prior applications for patent Serial Nos. 650,042 and 650,044, both filed on July 7th, 1923, wherein there is described door operating mechanism embodying a power controller such as a valve, in the case of doors operated in either or both directions by pneumatic or other fluid pressure, or other controller of a kind suitable for the particular motive power employed.

In order that the principles of my present invention may be better understood, the principal parts of said door operating mechanisms are indicated in the accompanying drawings Figures 1 and 2 and will be briefly described.

Fig. 1 is a fragmentary view of an elevator shaft door and the main portion of the mechanism for operating the same.

Fig. 2 is a fragmentary view of an elevator car guard door or gate and the main portion of the mechanism for operating the same.

Fig. 3 is a side elevation of the actuating mechanism mounted on the elevator car and adapted to act on the operating mechanism of both the elevator shaft door and elevator guard door.

Fig. 4 is a similar view to Fig. 3 showing said actuating mechanism in the actuating position.

Fig. 5 is a plan view of Fig. 4.

Referring first to Fig. 1, the two sections of a sliding, collapsible or telescoping door of the shaft opening at a landing, are indicated at 1, 1'. These are operable by means of the power actuated lever 7 having a fixed fulcrum at 8 and pivotally connected with a lever 5 pivoted on section 1' and at its end remote from lever 7 pivotally connected with a lever or arm 2 hinged at 3 on section 1. The usual handle employed as an accessory for moving the door in case the power fails is indicated at 9, the same being secured to either the member 5 or the member 2.

Attached to the lever 7 is a rod 10 extending from a cross-head 11 which is connected with the piston of the power cylinder 12, the latter, according to the construction described in my prior application Serial No. 650,044, containing a spring in which power is stored when pneumatic power is applied to the piston to open the door. The action of the spring on relief of the pres-

sure effects the closing movement. A suitable power controller comprising a valve in the case of pneumatic power is indicated at 13, said controller having an operating control rod 14 which may be raised or lowered to control the application of pressure or the relief of pressure as required. The control rod of the operating mechanism terminates preferably in a bell crank lever 15, as indicated in Figs. 3 and 4, pivotally secured to a fixed support as for instance the landing floor, and adapted to be itself engaged and actuated by a suitable actuating means or actuating device mounted on the car which actuator can engage with the bell crank 15 only when the car is at or near the landing.

The actuator 16 shown consists of the cam plate of usual form adapted to engage and ride against the vertical arm of the bell crank when said actuator is projected by some device on the car under control of the attendant or otherwise controllable. As an example of the means for projecting and withdrawing the actuator 16 I have shown a lever 17 pivoted at 18 on a sill or frame of the car and engaging at one end with the cam plate 16 which, in the projecting operation, is caused to move at its opposite ends on parallel lines by the use of a suitable parallel motion link 19. Said lever 17 is connected at its free end with a chain or cord 20 which passes over a pulley 21 and is attached at its opposite end to the crank 22 adapted to be turned in a clock-wise direction by the use of magnetic motive power supplied from an electric motor indicated at 23. While the motor is energized the crank is held in the position shown against a stop 24 and the free end of the lever 17 is drawn in, thus holding the cam plate 16 in position indicated in Fig. 3 so long as the motor is energized.

The action of the motor places a spring 25 connected to lever 17 under tension so that, when the power is cut off from the motor, the spring acts to project the cam plate 16 and thereby operate the lever 15 or place it in position for operating said lever as the car approaches position where its sill is level with the sill of the landing floor. When the cam plate is projected the well door operating mechanism is thereby caused to open the well door and when said cam plate is withdrawn the operating mechanism is caused to close the door in obvious fashion.

The principal parts of the car door or gate operating mechanism are indicated in Fig. 2. In this instance the gate of skeleton collapsible form is indicated at 26 and its operating arm 27 is linked to a cross-head 28 to which are secured the two pistons of the two power cylinders 29, 29'. Said cylinders act, as described in my prior application, under the influence of pneumatic pressure

or other applied power respectively to open and close the gate and their actions are controlled by means of a suitable power controlling valve or device 30 to apply pressure to the piston of one while relieving pressure on the piston of the other and vice versa according to the direction of movement required in the gate.

Operation of said valve forming a part of said elevator gate operating mechanism is controlled by a suitable valve operating rod or device 31 similar to the rod 14 already referred to in connection with Fig. 1. Dashpots operating to cushion the two movements of the door or of the gate respectively are indicated at 32, 32' in Figs. 1 and 2. The pistons of these dashpots reciprocate towards and away from the bottom of the dashpots of the cylinders alternately through the action of the rocking lever 33 which is operatively connected with the cross-head or with the bar 10 through power actuated pistons, through an extension of the rod 10, in Fig. 1, and through a link 10', Fig. 2, joined to the rock shaft carrying lever 33 in Fig. 2. The actions of these dashpots in co-operation with the power cylinders in cushioning the movements of the door is more particularly described in my applications above referred to but need not be further dwelt on inasmuch as they do not form a necessary part of my present invention.

In both Figs. 1 and 2 the numeral 34 indicates the casing of the electric power controlling switch that operates to shut off the motive power for the elevator car motor when the door or the gate, as the case may be, is in open position. The actuating member of said switch is properly connected with the mechanism to effect this result, the circuit of the power being restored by reverse movement of the switch when the door or the gate is fully closed. It is impossible to move the car when said switches are arranged in series with one another.

The power controlling rod 31 together with other parts of the gate operating mechanism are mounted on the car and said rod terminates in suitable means whereby it may be actuated to cause the gate or door on the car to be opened or closed according as said rod is lifted or lowered. The connection between said rod and the valve 30 may consist of the following parts:

35 indicates a bell crank lever to one arm of which the rod 31 is pivotally connected. The other or vertical arm of the bell crank is connected by a pin and slot connection at 36 allowing lost motion, with a rod 37 which is joined to the valve. At 38 is indicated a spring which tends to move the rod 37 in one direction opposite to that in which the rod is moved through the lost motion device 36 by the vertical rod 31 when the

latter is lowered by the action of the devices to be presently described. A spring is attached to the bell crank 35 or to the upper end of rod 31 to keep the same lifted.

As shown in Fig. 3, the control rod of the gate operating mechanism terminates in a bell crank 40, while connected to said bell crank is a cam or shoe 41 provided with a parallel motion link 42 so that, when the plate is pressed backwardly or to the left of Fig. 3, the rod 31 of the gate operating mechanism will be depressed by reason of the fact that the vertical arm of the bell crank is moved inwardly. The effect of this inward movement is to cause power to be applied to open the gate. Movement of said plate of other device connected to the power controlling rod 31 results in movement of the gate in the opposite direction or direction to close the same. The actuator for the valve rod 31 is mounted not upon the car but upon a fixed support at the landing, as for instance upon the landing sill 43. Said actuator is operated by the cam or actuator 16 already referred to upon the car and only when the car is at the landing. For this purpose said actuator may be a part of the shaft door operating mechanism and, for instance, may consist of an arm 44 extending from the rock shaft of the bell crank 15 or from a member of said bell crank lever itself and into position to engage and actuate the cam plate 41 and press the same inwardly when the bell crank 15 is operated by the projected actuating member 16 on the car in the action of bringing the shaft door operating mechanism into action to open the shaft door.

As will be obvious, the action of the member 44 on 41 brings about the opening of the car door simultaneously with the opening of the shaft door, but the opening of the car door cannot take place until the car is at or near the landing and in position where the actuator 16 thereon can bring the shaft door operating mechanism into operation. At other positions of the car, it is obvious that any operation of the actuator 16 on the car or parts connected therewith will be ineffective to produce any movement of the car door or gate.

The relative position of the parts prior to a movement of the actuator 16 is shown in Fig. 3 but when the same is projected the parts will take the position shown in Fig. 4 and the car door or gate and the shaft door will at such time be both operated and caused to open. When the car moves away from the landing, thereby disengaging the actuator 16, from the bell crank 15, or when said actuator is withdrawn by any means, as for instance by the power of the magnet 23, gravity or other power operates on the controlling valve of the rod portion of the door or gate operating mechanisms

to restore the same to position in which the controlling valves will be shifted to effect the closing of both doors or gates.

I do not limit myself to the special construction of the interconnecting device between the well door operating mechanism mounted on a landing and the elevator door operating mechanism mounted on the car, the essential principle of my invention, so far as concerns this feature thereof, being that the action of the well door operating mechanism being only controllable from the car when at or near the landing, the gate or door operating mechanism on the car itself can only operate at such position of the car.

What I claim as my invention is:—

1. The combination of elevator car door operating mechanism, elevator shaft door operating mechanism, means fixedly mounted at a landing operatively connected with the shaft door operating mechanism, an actuator on the car projectable to engage and actuate said fixedly supported means, and means connected with and actuated by said fixedly supported means for actuating the car door operating mechanism to effect an opening of the door when and only when the car is in position at the landing.

2. In an elevator well door and car door operating apparatus, the combination of an actuating member on the car, well door operating mechanism engaged and actuated thereby when the car is at a landing and car door operating mechanism engaged and actuated by said well door operating mechanism.

3. In an elevator shaft door and car door operating apparatus, the combination of shaft door operating mechanism, an actuating device on the car engaging the same when the car is at a landing, car door operating mechanism carried by the car and a co-operating actuator therefor fixed at the landing and operatively connected with the shaft-door operating mechanism.

4. The combination of elevator car door operating mechanism, shaft door operating mechanism and an actuating device on the landing operatively connected with the shaft door operating mechanism and adapted to engage and move a member of the car door operating mechanism when said actuating device is operated from the car at the landing thereby effecting an opening of the car door simultaneously with the opening of the shaft door effected from the car in position at the landing.

5. In apparatus for simultaneously opening and closing elevator car doors and shaft doors, the combination of a power controlling member for the car door mechanism, an operating member connected to said power controlling member and an actuator therefor mounted on a stationary support at the

landing and carried by a member of the shaft door operating mechanism operable from the car when the same is at the landing.

6. In apparatus for operating an elevator car door and an elevator shaft door simultaneously, the combination substantially as described, of power actuated operating mechanism for both said doors, each said mechanism having a power controlling member, an actuating member on the car adapted to be projected or extended to operate on the power controlling member for the shaft door, a second member mounted on the car and connected with the power controlling rod for the car door operating mechanism and an arm engaging the same when the car is at a landing, said arm being operatively connected with an arm engaged by the first-named member when projected.
7. In an elevator shaft door and car door operating apparatus, the combination with

two projectable cam plates on the car one operatively connected with the car door operating mechanism and the other projectable to operatively engage the shaft door operating mechanism when the car is at a landing to open the shaft door and means connected with the latter mechanism adapted to engage the first-named cam plate and simultaneously effect an opening of the car door.

8. The combination with an elevator car door operating mechanism of an actuator therefor fixed at the car landing and cooperating with said mechanism to effect the opening of the door and means on the car for operating said actuator when the car is at the landing.

Signed at New York, in the county of New York and State of New York, this 15th day of January A. D. 1925.

CLIFFORD NORTON.