June 5, 1934. O. L. ALLEN ET AL 1,961,188

ELEVATOR DOOR

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Fig. 2.

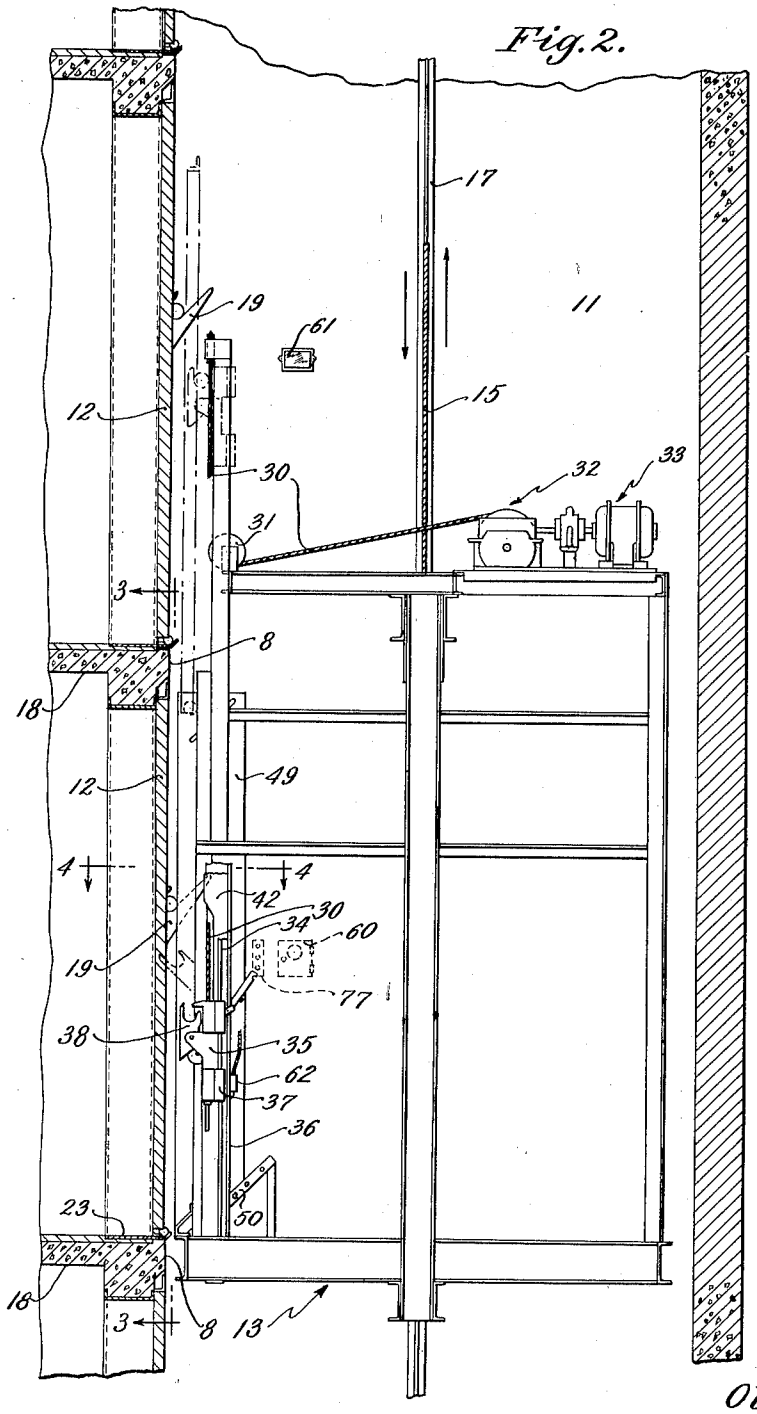

Fig. 1.

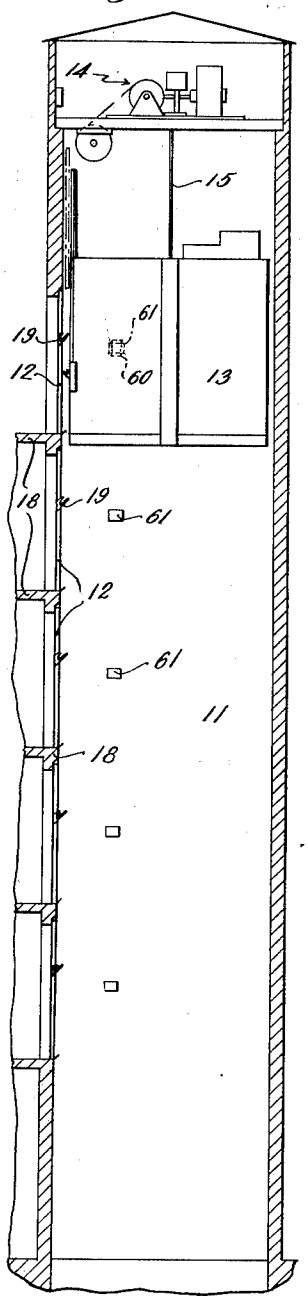

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Fig. 3.

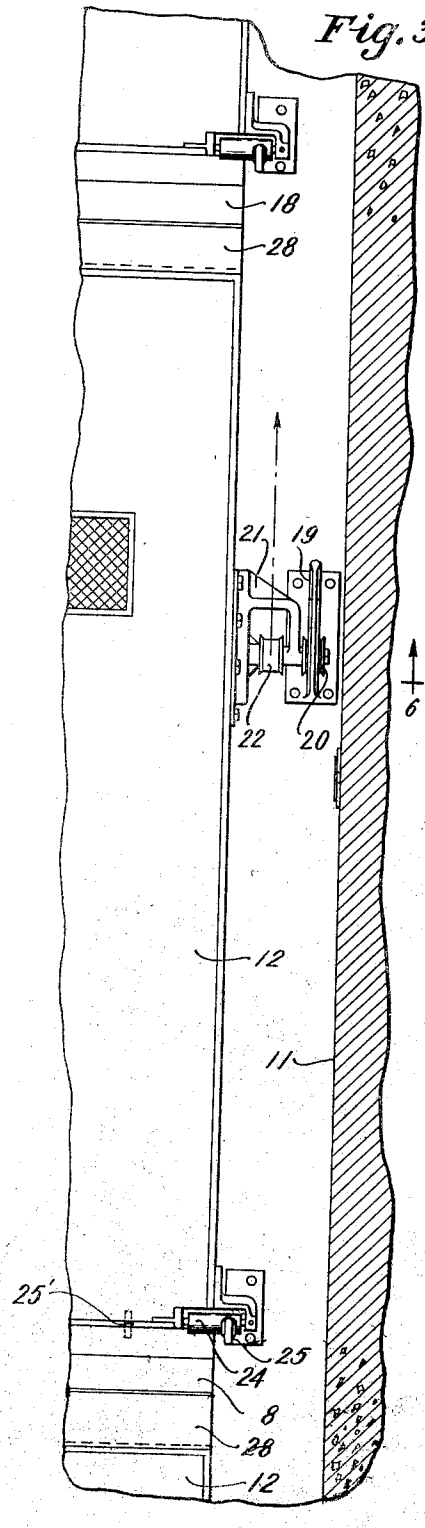

Fig. 4.

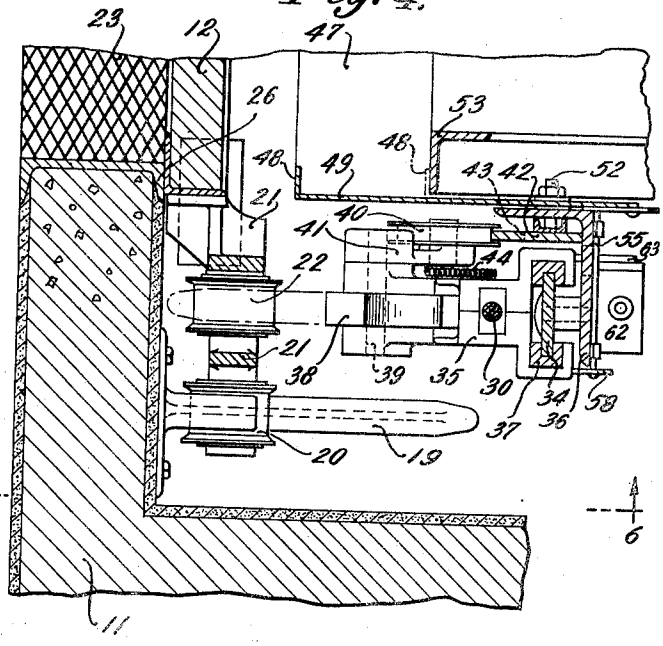

Fig. 5.

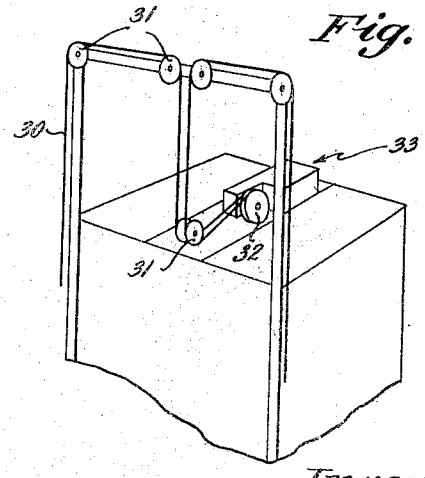

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Fig. 6.

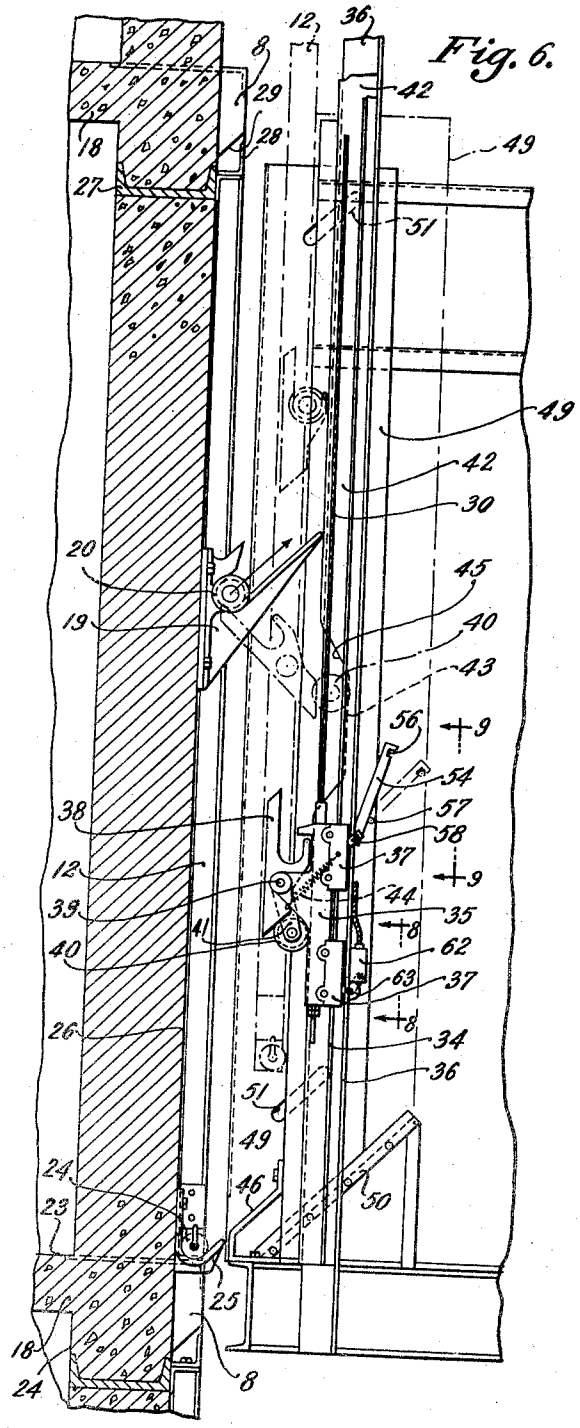


Fig. 7.

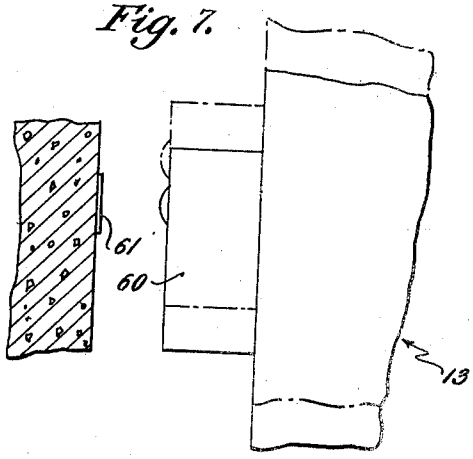


Fig. 8.

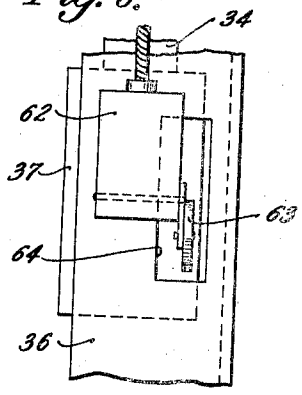
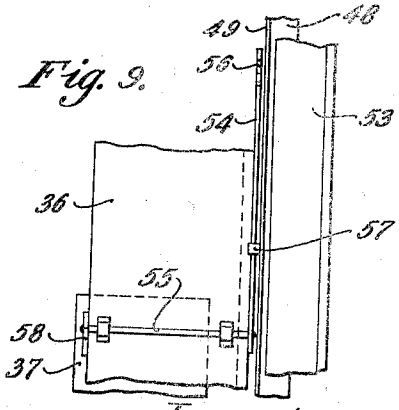


Fig. 9.



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ELEVATOR DOOR

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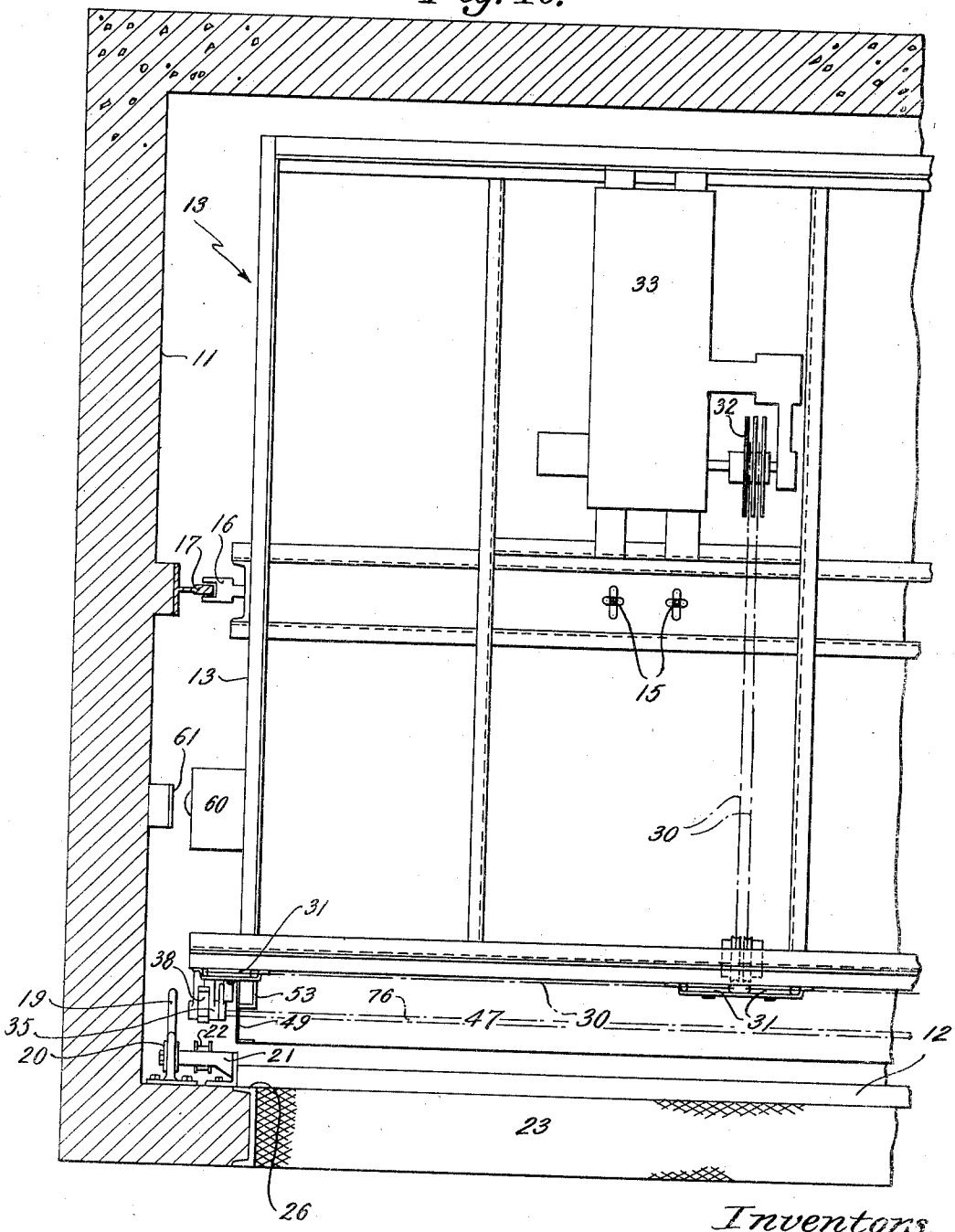
Fig. 10.



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ELEVATOR DOOR

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Fig. 11.

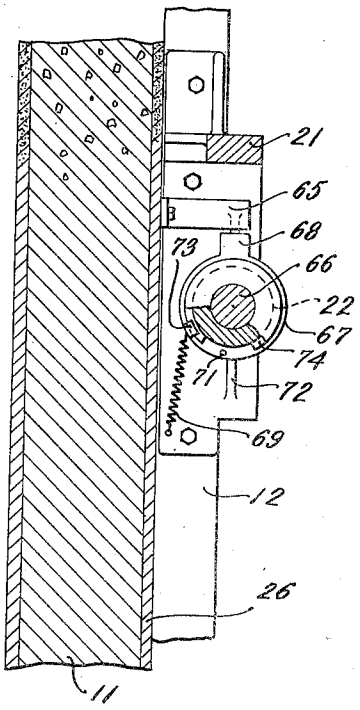

Fig. 12.

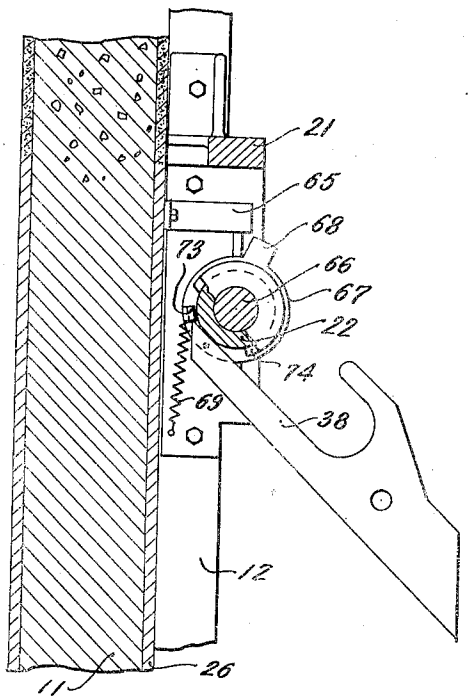

Fig. 13.

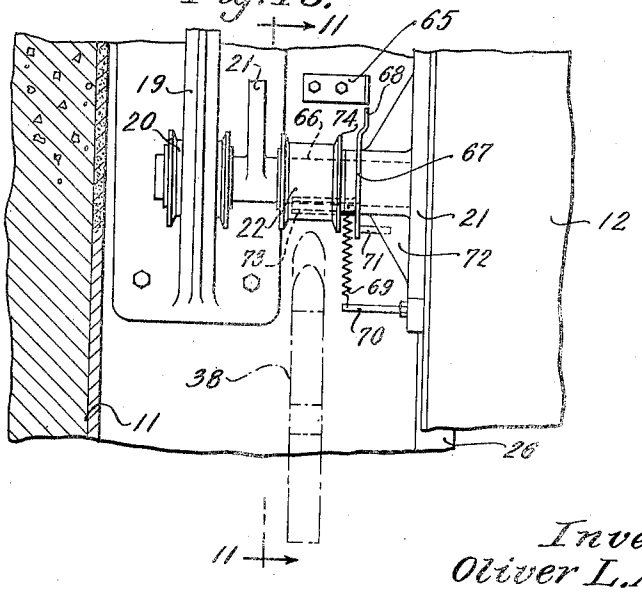

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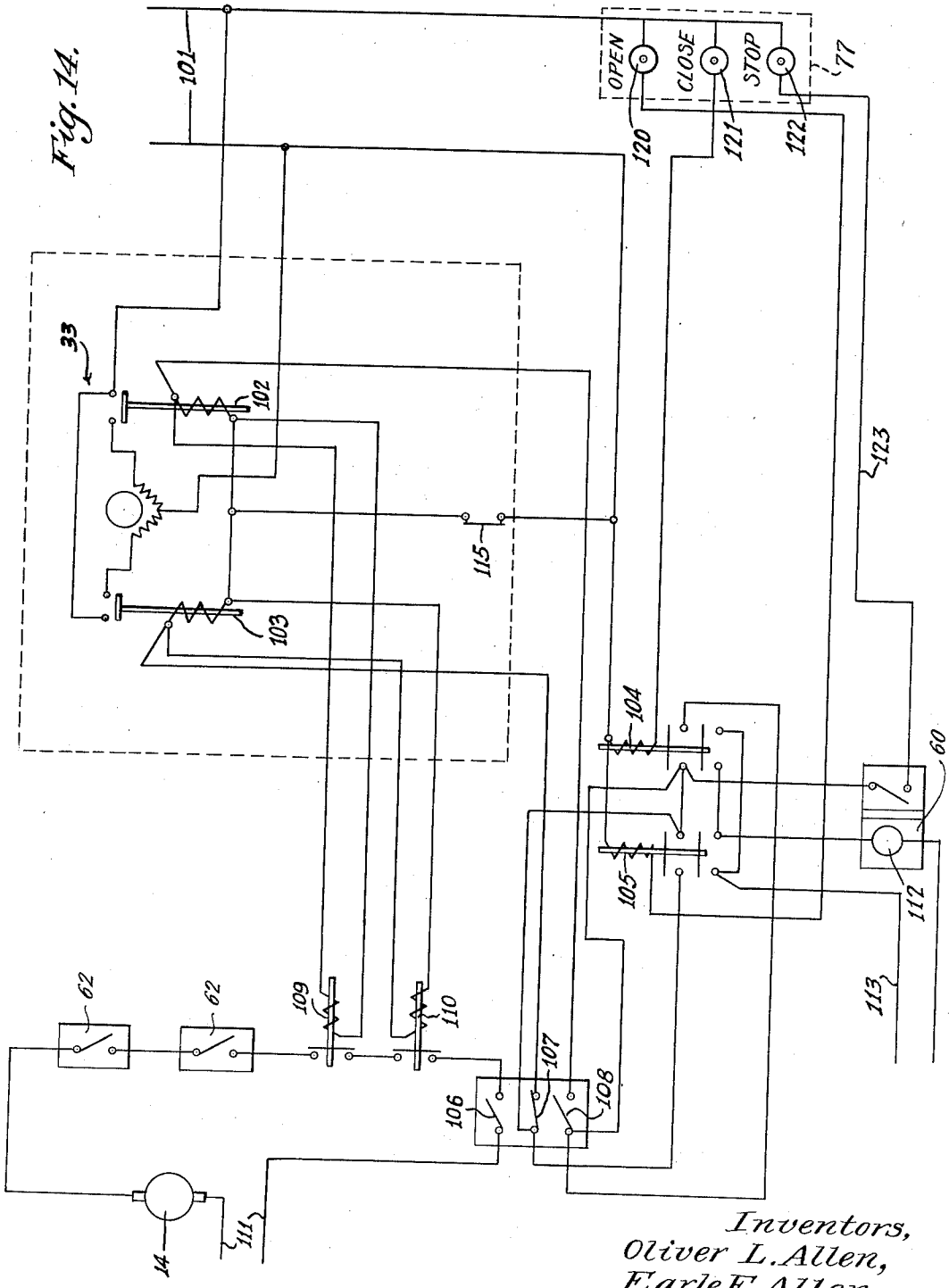
Fig. 14.



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Patented June 5, 1934 1,961,188

UNITED STATES PATENT OFFICE

1,961,188

ELEVATOR DOOR

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Application February 5, 1932, Serial No. 591,030

14 Claims. (Cl. 187—52)

This invention relates to elevator doors and pertains more particularly to improvements in the supporting and operating mechanism of the doors of heavy duty elevators such as freight or vehicular elevators in multi-story buildings.

The general purpose of the invention is to provide in the elevator well of a building, supporting means for holding a single panel door tightly against the sills, lintel and jambs of a doorway opening into the well from each story of the building, so that the walls of the well are substantially flush from top to bottom and have no projections or obstructions extending into the path of movement of the elevator car; and mechanism associated with the car and operable by motor power when the car is stopped at floor level for bodily lifting the door from its supports and carrying it away from the doorway.

Among the more specific advantages of the improved construction hereinafter described in connection with the accompanying drawings illustrating a recommended embodiment of the invention, are the utilization of a permanent sill at floor level so that conveyors or vehicles do not travel across the edge of a movable door section or panel upon entering or leaving the car (as in the common arrangement of two-section, counterbalanced elevator doors); the relatively small clearance which is required between ceiling and floor at each story of the building or between the front wall of the well and the threshold of the elevator car; the several unique features of the door operating mechanism; and the several safety features, hereinafter specified, which prevent movement of the car while the door is open or in motion and also ensure that the door cannot be opened during operation of the car, thereby not only protecting the passengers from possible injury, but also safeguarding the mechanical structure and operating mechanism against damage.

In the drawings:

Fig. 1 is a diagrammatic sectional view of an elevator well and car equipped with a transportable door in accordance with the invention;

Fig. 2 is a similar view to larger scale illustrating two stories of the building and showing the open and closed positions of the door and its lifting mechanism;

Figs. 3 and 4 are enlarged sections taken on lines 3—3 and 4—4 respectively of Fig. 2;

Fig. 5 is a diagrammatic perspective of the top portion of the elevator car, showing the arrangement of operating cables for the door-lifting mechanism;

Fig. 6 is a fragmentary section to larger scale of a portion of Fig. 2, certain parts being shown in elevation;

Fig. 7 is a diagrammatic detail of a photoelectric switch, located in the electrical circuit of the door operating motor;

Fig. 8 is an enlarged view of a limit switch, taken at line 8—8 of Fig. 6;

Fig. 9 is a similar view of a latch element, taken at line 9—9 of Fig. 6;

Fig. 10 is a fragmentary transverse section through the well showing the elevator car in plan view;

Fig. 11 is a detail sectional view, taken on line 11—11 of Fig. 13, illustrating a modified construction in which means are provided for locking the door in closed position;

Fig. 12 is a similar view showing the manner of disengaging the lock;

Fig. 13 is an elevation looking to the left of Fig. 11; and

Fig. 14 is a wiring diagram of the electrical circuits and safety switches of the motor driving units.

The subject matter of our invention may be installed in an existing building or in a new structure specifically adapted for its use. In the latter case, substantial economies in space and in cost of erection are afforded, for the clearance between stories may be as little as six inches in flat slab construction and no cumbersome mechanism need be erected upon the wall of the elevator well. While our improved door may be provided at two or more sides of the elevator wall and so arranged that the operating mechanism for all doors is located upon the elevator car, the typical well indicated generally in the drawings by the numeral 11 has doors 12 located only at one side thereof, and the car 13 has but one set of motor driven lifting mechanism.

The car itself may be operated by any common type of propelling means, for example the driving unit shown at 14 (Fig. 1) and the counterbalanced cables 15. The car may have suitable guides 16 traveling on well tracks 17, and the well may be of any practical height, according to the number of stories to be served, as indicated for example by the floor levels or landings 18.

In the particular embodiment chosen for the purpose of illustration, the front wall of the elevator well is equipped with brackets 19 mounted at opposite sides of each doorway slightly above the horizontal center line of the opening. These brackets have approximately U-shaped jaws projecting into the well and inclining upwardly to receive and hold supporting rollers 20 fixed to the

opposite sides of the door 12. The rollers 20 are carried by arms or brackets 21 bolted to the door and also mounting a pair of lifting rollers 22 journaled upon the same axis as the supporting rollers 20. The bottom of the door rests upon the sill 23 and is preferably guided into closed position by bottom rollers 24 which engage hooks or guides 25 attached to the wall at opposite sides of the door sill. One or more downwardly projecting pins 25' (Fig. 3) may be fixed in the base of the door to enter complemental openings in the door sill, thereby to lock the bottom of the closed door against transverse displacement.

Thus the single-panel door is rigidly supported in closed position with its bottom seating against the sill 23 and its sides and top tightly abutting the jambs 26 and lintel 27 of the doorway (Fig. 6) which is preferably framed by channel members equipped with metal facing plates. Any suitable weather-stripping material (not shown) may be applied between the opposed faces of the door and door jambs to render the joint substantially smokeproof and fume tight. The upper end of the door overlaps the lintel and is preferably provided with an upstanding flush plate 28 constituting a continuation of the inner surface of the door and aligned with the inner end of the floor 18 which projects beyond the door jamb as at 8. The bottom surface of the floor projection 8 is inclined at 29 to allow for simultaneous inward and upward movement of the door, as hereinafter explained.

Hence, except for the projecting arms 19 and hooks 25 which are located at opposite sides of the doorway, the inner surface of the front wall of the elevator well is substantially smooth and flush when the doors are closed. The elevator car travels between these projecting members so that they lie outside of the path of movement of the car and can not obstruct its progress or injure its passengers. It is thus apparent that the car may be safely operated without the necessity of a gate or door on the moving car; but if a gate is required, it may be suitably provided as hereinafter described or in accordance with common practice.

The apparatus for lifting the doors from closed to open position and for returning the door to normal position, preferably comprises a pair of slides movable along upright tracks mounted at opposite sides of the forward end of the car and operable by suitable lifting means such as cables 30, the respective slides having pivoted hook or cam members arranged to engage the lifting rollers 22 of the door and to carry the transportable door inwardly and upwardly to open position above the entrance to the car. The lifting cables 30 travel over pulleys 31 to a windlass 32 driven by a motor unit 33 which may be mounted upon the top of the car frame (Figs. 2 and 5). It will be apparent, however, that any practical type of lifting or conveying mechanism may be employed for this purpose, as its construction is not material to this invention.

The guide rails 34 for the slides 35 are suitably mounted upon angle brackets 36 fixed to the opposite sides of the elevator car; and each slide preferably has a pair of shoes or jibs 37 mounted for sliding movement along the guide rail 34. The pickup cam 38 is pivoted at 39 to the slide and has a substantially U-shaped hook portion adapted to engage the pick-up rollers 22 when the pivoted cam is swung forwardly, as indicated by the broken line position of Fig. 6.

Swinging movement of the pickup cam is controlled by means of a roller 40 journaled upon an arm 41 of the pivoted cam and traveling along the forward edge of an upright guide plate 42. This plate has a recessed portion 43 located immediately beneath the hangers 19 (when the car is at floor level) so that cam 38 may swing outwardly when the roller arrives at the recess 43 of the guide or track 42 (see Fig. 6). The cam 38 is preferably counterbalanced so that it will automatically swing outwardly at this point without mechanical actuation, but a supplemental spring 44 may be provided to ensure proper movement of the cam. It will be understood that the U-shaped hook of the cam or lifting member 38 is normally held in vertical position by the engagement of roller 40 upon the straight edge of plate 42, and that after the cam has swung outwardly and has engaged the pickup rollers 22 the roller 40 rides over the beveled edge 45 at the upper end of the recess 43, thereby restoring the cam to normal position and at the same time carrying the door 12 inwardly and away from the door jamb as well as upwardly above the car. Hence, by this simultaneous inward and upward movement of the door, the door clears the inwardly projecting portion 8 of the floor 18 and moves upwardly against the front of the elevator car by operation of the slides. The extreme upper position of the door in the illustrated apparatus is indicated by the broken line position of Fig. 2.

Inclined brackets 46 preferably provided upon the projecting threshold 47 of the elevator car serve as guides for the bottom rollers 24 of the inwardly moving door; and, as the door moves upwardly these rollers travel along flanges 48 of slidable closing plates 49 which normally constitute the side walls of said threshold and thus guard the side openings at the front of the moving car, but which are moved inwardly of the car under pressure of the moving door. In order that the closing plates 49 may return to their normal position by action of gravity, the plates are preferably moved upwardly as well as inwardly upon inclined guides 50 mounted at opposite sides of the car frame; and auxiliary slots 51 may be provided in said plates to receive guide pins carried on the angle member 36, such as the bolts 52 of Fig. 4. In the extreme rearward position of the closing plates, the flanges 48 abut the upright angle members 53 of the car frame.

Each closing plate is preferably locked in raised position by a latch bar 54 which is pivoted by a shaft 55 to the angle bracket 36. The latch bar has a notch 56 for receiving a stop pin 57 fixed to the closing plate; and one end of the shaft 55 preferably has a cam member 58 engageable by one of the shoes 37 so that the latch is automatically tripped to release the closing plate when the slide 35 descends to cause said engagement. In normal position, the latch bar rests upon the pin 57 and slides along the pin until the notch drops over the pin by action of gravity as soon as the closing plate is fully retarded.

When a gate is provided at the front of the car, the closing plates may desirably be omitted; and the apparatus above described may be used for supporting a safety gate of this character. For example, the gate may be arranged on a crossbar 76 connected to the slides 35, as indicated in broken lines in Fig. 10, so that the gate is elevated when the slides are operated to open the door.

It will be understood that the door is restored

to its normally closed position by reversing the motor 33 to release the cables 30 and allow the slides 35 to travel downwardly along the guides 34. The pivoted lifting cams 38 guide the door downwardly and outwardly toward the doorway by the cooperative relation of the control arm 41 and its roller 40 with the recessed guide plate 42; the cams swing outwardly at the proper time to deposit the door supporting rollers 20 on the supporting arms 19, the bottom edge of the door being caught by the hooks 25; and the cams are then released and resume their normal position through operation of the control means 40 and 42.

As above indicated, the door operating mechanism is preferably actuated by the electric motor driving unit 33, and efficient safety devices are preferably provided to prevent the operation of such mechanism until the elevator car has been stopped at or very near the level of the door sill 23. For this purpose the electrical circuit of the motor preferably includes an automatic switch such as the photoelectric cell unit 60 which is mounted at one side of the car and arranged to cooperate with one of a series of mirrors or reflectors 61 upon the side wall of the elevator well 11. The size and position of the mirrors and the photoelectric device may be so regulated that the circuit of the motor 33 can only be closed when the floor of the car is within a range of approximately two inches above or below the sill 23 of the doorway, the range of the differential depending upon the vertical dimension of the reflector.

In order to prevent propulsion of the elevator car after the slides 35 have started their upward movement and/or while the door 12 is open, a pair of limit switches 62 are preferably provided in the circuit of the motor unit 14. One of these switches is mounted upon each of the angle frames 36 and carries an actuating roller 63 projecting through an opening 64 in frame 36 and normally engaging a portion of one of the slides (for example the shoe 37) when the door operating mechanism is inoperative; that is, when the slides are fully lowered. As the slide moves upwardly to engage and lift the door, the roller is released and urged outwardly by a spring or other suitable mechanism (not shown) to open the circuit of the limit switch 62, and hence prevent operation of motor 14.

A wiring diagram showing the arrangement of the photoelectric switch 60 and the limit switches 62 in suitable circuits for the elevator pilot motor 14 and the motor 33 of the door pilot mechanism, is shown in Fig. 14. The push button station 77 in the door operating circuit may be located inside the elevator car and may include the three push buttons indicated for opening the door, closing the door, and stopping movement of the door, respectively. The switch controlling the elevator car pilot circuit (not shown) may be of any common design.

In the particular wiring diagram shown in Fig. 14, the reversible door-operating motor 33 is connected to the power supply lines 101 through the relay actuated switches 102 and 103 which control the operation of the motor in one direction or the other. The operation of these switches is controlled by the relay-actuated switches 104 and 105 respectfully, all of which are normally held in open position. The limit switches 106, 107 and 108 are operated in the usual manner by the motor 33, the switch 106 being held open while the motor is operating in one direction or the other and when the door 12 is in raised position. The switches 62 are normally closed, as hereinbefore explained, and the relay-actuated switches 109 and 110 are likewise held closed so that the power circuit 111 through the elevator operating motor 14 is normally closed, the operation of this circuit being controlled by any suitable means (not shown) which may be conveniently located and operated from within the elevator car. The photoelectric switch 60 normally remains open and can only be closed when the car reaches the proper floor level, as heretofore explained. The lamp 112 which effects operation of the switch may be supplied by the circuit 113 which is controlled by the relay-actuated switches 104 and 105. If desired, a thermal overload switch 115 may be placed at any convenient point in the circuit connecting the switches 102 and 103 with the switches 104 and 105.

When the elevator motor 14 has brought the car to the proper floor level, the door 12 is raised by pressing the button switch 120 which closes the circuit through the relay-actuated switch 105, thus closing the circuits through switches 103 and 60, the switch 107 being normally closed. The motor is thus started and continues until the limit switch 107 is automatically opened at the expiration of a predetermined period (sufficient to raise the door to its upper limit), whereupon the circuit through switch 103 is broken, thus shutting off the motor. The door is closed by operating the button switch 121 which effects successive actuation of switches 104, 60 and 102, it being understood that the limit switch 108 closed simultaneously with the opening of switch 107. Closing the circuit through switch 102 reverses the motor and closes the door 12, whereupon the limit switch 108 automatically opens to break the circuit through the motor and the switch 107 closes. The switches are thus restored to their normal positions. It will be observed that the operation of either of the switches 102 or 103 necessarily effects operation of one or the other of switches 109 and 110, the latter being connected in parallel with the former, and thus the circuit through the elevator motor 14 is broken during the operation of the door-lifting motor 33. If desired, an emergency or stop button switch 122 may be inserted in the line 123, such switch being normally closed and operable to break the circuit from either switch 102 or 103 to the supply line 101. While we have herein shown and described one desirable arrangement, it is to be understood that this disclosure is for the purpose of illustration only, and that various changes and modifications may be made without departing from the scope of the invention.

The door locking apparatus illustrated in Figs. 11 to 13 is adapted for application to the door supporting members heretofore described, and particularly shown in Figs. 3 and 4; and said apparatus comprises essentially a bracket or stop member projecting inwardly from the front wall of the elevator well 11 over a part of the door bracket 21, and a complemental latch element carried by the door 12 and normally held in operative position to engage the stop in case of an attempt to pry the door from its supports; the latch being moved to inoperative position only when the pickup cam 38 has engaged the lifting roller 22. The stop member preferably comprises a bracket 65 fixed to the wall 11 and projecting inwardly over the shaft 66 which car-

ries the rollers 20 and 22. A washer-like disk or collar 67 is rotatably mounted about the shaft 66 at one side of the pickup roller 22, and this collar has an outstanding projection or latch 68 which is normally disposed in operative relation to the stop member 65 (Figs. 11 and 13); that is, in such position that elevation of the door would be prevented by mutual engagement of the latch and stop.

The latch may be held in operative position by means of a spring 69 connected to the collar and to an arm 70 mounted on the door, and a co-operating stop pin 71 which is carried by the collar and engages a web 72 of the bracket 21 under tension of the spring. For the purpose of releasing or moving the latch from said operative position, the collar 67 is provided preferably with an arm 73 extending transversely over the face of the roller 22 and normally disposed in the path of movement of the entering pickup cam 38. This arm may be bent around the side flange 74 of the roller, to ensure certain engagement of the arm by the forward end of the cam.

The displacement of the collar 67 to carry the latch away from operative position is shown in Fig. 12, where the arm 74 has been met by the entering tip of the cam 38 to rotate the collar against the action of the yielding spring 69. The roller 22 and its shaft 66 may then be moved inwardly and upwardly along the line indicated by the arrow in Fig. 6 to clear the end of the stop bracket 65 and allow the inward and upward movement of the door 12, as above explained. The latch will be held in its inoperative position until the door has been replaced and the cam has moved downwardly, when the collar will be restored to the position of Fig. 11 by action of spring 69 and stop pin 71. Locking mechanism of the type described may be provided at both sides of the door, and it is evident that the door can not be removed or displaced from its supports except by the operating mechanism carried by the elevator cam, and then only when the car is located approximately at floor level.

From the foregoing it is apparent that the elevator door is normally supported in tightly closed position against the doorway of the elevator well; that the door can not be opened except when the elevator car is at proper floor level; that the efficient means for bodily lifting the door from its supports and carrying it away from the car entrance affords unobstructed access to the car through the opened doorway which has a fixed, permanent sill at the level of the car floor; that the car-operating mechanism can not be set in motion except when the door is closed and its operating mechanism is restored to normal, inoperative position; and that the door supporting elements do not interfere with the movement of the car through the elevator well or materially limit the required size of the well itself. The safety devices above described are important features of the improved apparatus, but it will be understood that the precise arrangement thereof as well as the structural details of the other mechanism chosen for the purpose of illustration may be varied to suit particular purposes without departing from the essence of this invention as defined in the following claims.

We claim:

1. In an elevator well having a doorway leading to a floor level of a building, an elevator car having an entrance opposite the doorway when the car is stopped at proper level, a door normally closing the doorway, supports on the wall of the well for holding the door in closed position, and door-operating means carried by the car for lifting the door inwardly and upwardly away from the doorway and above the car entrance, said means comprising complementary interlocking members carried by said door and car respectively, the member carried by said car being vertically movable relative to the car and laterally movable from normal position into interlocking position with the member carried by said door, means for raising and lowering said movable member, and means constructed and arranged successively to move said movable member outwardly into position to interlock with the member carried by said door and then inwardly toward said car during raising and lowering movement thereof.

2. In an elevator well having a doorway leading to a floor level of a building, an elevator car having an entrance opposite the doorway when the car is stopped at proper level, a door normally closing the doorway, projecting arms carried by said door, supports on the wall of the well for holding the door in closed position, and door-operating means carried by the car for lifting the door inwardly and upwardly away from the doorway and above the car entrance, said means comprising upright tracks mounted at opposite sides of the car entrance, slides movable along the respective tracks, lifting cams pivoted to said slides, guide means constructed and arranged successively to swing said cams outwardly into position to engage said arms and then inwardly toward said slides during movement of said slides, and means for raising and lowering the slides, electrically operated means for propelling the car, and a switch operatively associated with one of said slides for opening the circuit upon upward movement of the slide.

3. In an elevator well having a doorway leading to a floor level of a building, brackets mounted upon the wall of the well at opposite sides of the doorway, a door normally closing the doorway and having oppositely directed arms normally resting in the respective brackets, an elevator car having an entrance located opposite said doorway when the car is stopped at proper level, and means on the car for engaging said arms and lifting the door inwardly and upwardly away from the doorway and above the car entrance.

4. In an elevator well having a doorway leading to a floor level of a building, brackets mounted upon the wall of the well at opposite sides of the doorway, a door normally closing the doorway and having oppositely directed arms normally resting in the respective brackets, an elevator car having an entrance located opposite said doorway when the car is stopped at proper level, and means on the car for engaging said arms and lifting the door inwardly and upwardly away from the doorway and above the car entrance, said means comprising a pair of vertically movable, pivotally mounted lifting cams, and guide means constructed and arranged successively to swing said cams outwardly to hook under the respective arms and then to swing said cams inwardly toward the car during vertical movement thereof.

5. In an elevator well having a doorway leading to a floor level of a building, brackets mounted upon the wall of the well at opposite sides of the doorway, a door normally closing the doorway and having oppositely directed arms normally resting in the respective brackets, an elevator car having an entrance located opposite

said doorway when the car is stopped at proper level, and means on the car for engaging said arms and lifting the door inwardly and upwardly away from the doorway and above the car entrance, said means comprising a pair of vertically movable lifting cams pivoted to swing outwardly to hook under the respective arms and then to swing inwardly toward the car, and control mechanism for governing the swinging movement of the cams.

6. In an elevator well having a doorway leading to a floor level of a building, brackets mounted upon the wall of the well at opposite sides of the doorway, a door normally closing the doorway and having oppositely directed arms normally resting in the respective brackets, an elevator car having an entrance located opposite said doorway when the car is stopped at proper level, upright tracks located at the front of the car on opposite sides of the entrance, slides movable along said tracks, guides adjacent the tracks, lifting cams pivoted to the respective slides and having control portions traveling on said guides to regulate the swinging movement of the cams, and means for elevating the slides so that the cams engage under the arms of the door and lift the door inwardly of the doorway and upwardly above the car entrance.

7. In an elevator well having a doorway leading to a floor level of a building, brackets mounted upon the wall of the well at opposite sides of the doorway, a door normally closing the doorway and having oppositely directed arms normally resting in the respective brackets, an elevator car having an entrance located opposite said doorway when the car is stopped at proper level, upright tracks located at the front of the car on opposite sides of the entrance thereto, slides movable along said tracks, guides located adjacent said tracks, lifting cams pivoted to the respective slides, the cams having arms traveling along said guides, and the respective guides having recesses therein for controlling the swinging movement of the cams, and means for elevating the slides so that the cams engage under the arms of the door and lift the door inwardly of the doorway and upwardly above the car entrance.

8. In an elevator well having a doorway leading to a floor level of a building, brackets mounted upon the wall of the well at opposite sides of the doorway, a door normally closing the doorway and having oppositely directed arms normally resting in the respective brackets, an elevator car having an entrance located opposite said doorway when the car is stopped at proper level, upright tracks located at the front of the car on opposite sides of the entrance thereto, slides movable along said tracks, guides located adjacent said tracks, lifting cams pivoted to the respective slides, the cams having arms traveling along said guides, and the respective guides having recesses therein for controlling the swinging movement of the cams, means for elevating the slides so that the cams engage under the arms of the door and lift the door inwardly of the doorway and upwardly above the car entrance, and closing plates mounted at the sides of the car entrance and engageable by the inwardly moving door, the plates moving inwardly under pressure of the door.

9. In an elevator well having a doorway leading to a floor level of a building, brackets mounted upon the wall of the well at opposite sides of the doorway, a door normally closing the doorway and having oppositely directed arms normally resting in the respective brackets, an elevator car having an entrance located opposite said doorway when the car is stopped at proper level, upright tracks located at the front of the car on opposite sides of the entrance thereto, slides movable along said tracks, guides located adjacent said tracks, lifting cams pivoted to the respective slides, the cams having arms traveling along said guides, and the respective guides having recesses therein for controlling the swinging movement of the cams, and means for elevating the slides so that the cams engage under the arms of the door and lift the door inwardly of the doorway and upwardly above the car entrance, closing plates mounted at the sides of the car entrance and engageable by the inwardly moving door, the plates moving inwardly under pressure of the door, guides causing said plates to move upwardly upon inward movement thereof, whereby the plates are restored to their normal, outward position by action of gravity, and means for locking the plates in upward position when the door is open.

10. In an elevator well having a doorway leading to a floor level of a building, an elevator car having an entrance opposite the doorway when the car is stopped at the proper level, a door normally closing the doorway, supports on the wall of the well holding the door in closed position, means for lifting the door inwardly away from the doorway and then upwardly from the car entrance, an electric circuit including a motor for operating said lifting means and a photoelectric switch for opening and closing said circuit, said photoelectric switch being operable in response to the position of said car to effect closing of said circuit.

11. In an elevator well having a doorway leading to a floor level of a building, an elevator car having an entrance opposite the doorway when the car is stopped at the proper level, a door normally closing the doorway, supports on the wall of the well holding the door in closed position, means for lifting the door inwardly away from the doorway and then upwardly from the car entrance, an electric circuit including a motor for operating said lifting means, and a photoelectric switch for opening and closing said circuit, said photoelectric switch being operable only when said car is substantially at floor level to close said circuit.

12. In an elevator well having a doorway leading to a floor level of a building, an elevator car having an entrance opposite the doorway, brackets mounted upon the wall of the well at opposite sides of the doorway, a door normally closing the doorway and having oppositely directed projections normally engaging the respective brackets, releasable means carried by said brackets for normally locking said door in closed position, and means carried by said car for releasing said locking means and engaging said projections to lift said door inwardly and upwardly away from the doorway and above the car entrance.

13. In an elevator well having a doorway leading to a floor level of a building, an elevator car having an entrance opposite the doorway when the car is stopped at the proper level, a door normally closing said doorway, means on the wall of the well for holding the door in closed position, releasable means operable to lock said door in closed position, said means comprising a stop member mounted in fixed position relative to said door and a rotatable member having an outstanding projection normally disposed in cooperative relation to said stop member and oper-

able in such position to hold said door locked, and means carried by said car for rotating said rotatable member thereby to release said locking means and for carrying said door away from the doorway and car entrance.

14. In an elevator well having a doorway leading to a floor level of a building, an elevator car having an entrance opposite the doorway when the car is stopped at the proper level, a door normally closing said doorway, said door having a bracket provided with an arm, means on the wall of the well for holding the door in closed position, releasable means operable to lock said door in closed position, said means comprising a stop member mounted in fixed position relative to said door, a collar rotatably mounted on said bracket and having an outstanding projection cooperable with said stop member to hold said door locked, and resilient means acting on said collar and normally holding said projection in cooperative relation with said stop member, and door operating means for releasing said locking means and lifting said door upwardly away from the doorway and above the car entrance, said door operating means comprising a slide member carried by said car and vertically movable relative thereto, a cam pivotally mounted on said slide member, means constructed and arranged to swing said cam outwardly in a position successively to engage said collar, thereby effecting rotation thereof, and to engage said arm, thereby to carry said door away from the doorway and car entrance.

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