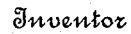


ELEVATOR DOOR OPERATING APPARATUS.

1,139,901.

2 SHEETS—SHEET 1.



Hood Pitts,

Witnesses:

Chas. L. Griebauer. My
A. B. Norton.

Watson E. Coleman
Attorney

H. PITTS.

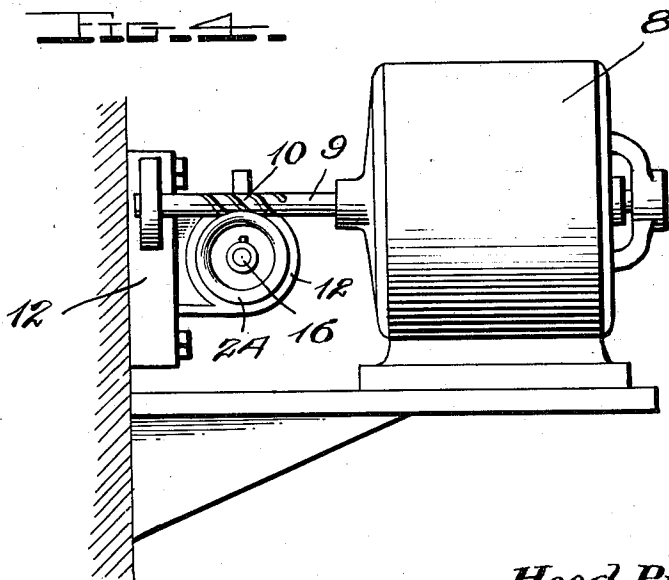
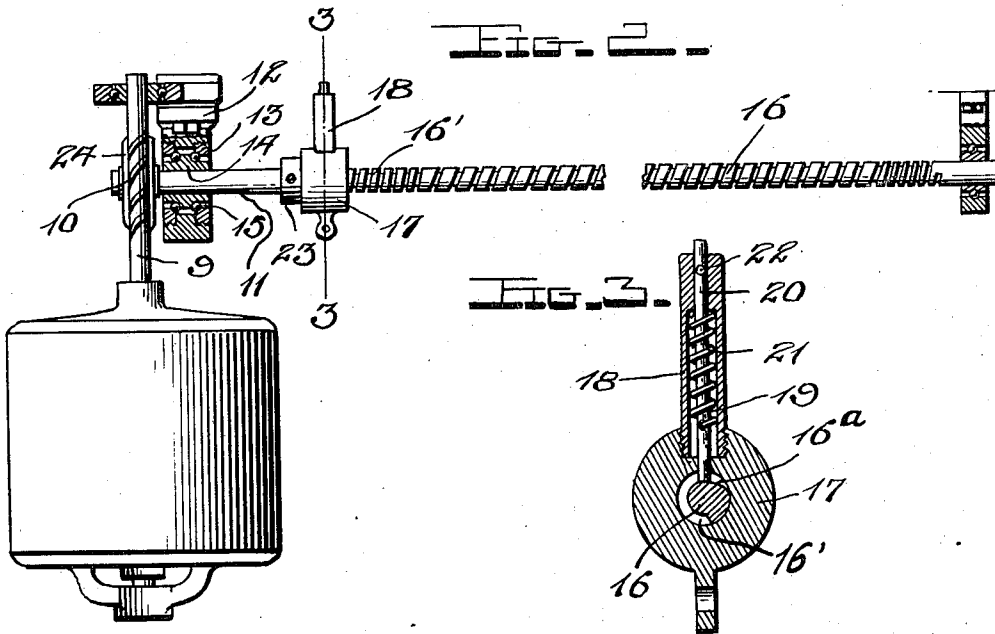
ELEVATOR DOOR OPERATING APPARATUS.

APPLICATION FILED MAY 13, 1912. RENEWED SEPT. 23, 1914.

1,139,901.

Patented May 18, 1915.

2 SHEETS—SHEET 2.



Inventor

Hood Pitts,

Witnesses

Chas. L. Griestauer.
A. B. Norton.

Watson E. Coleman
Attorney

UNITED STATES PATENT OFFICE

HOOD PITTS, OF AUSTIN, TEXAS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF
ONE-HALF TO FRANK M. COVERT.

ELEVATOR-DOOR-OPERATING APPARATUS.

1,139,901.

Specification of Letters Patent

Patented May 18, 1915.

Application filed May 13, 1912, Serial No. 697,011. Renewed September 23, 1914. Serial No. 863,218.

To all whom it may concern:

Be it known that I, HOOD PITTS, a citizen of the United States, residing at Austin, in the county of Travis and State of Texas, have invented certain new and useful Improvements in Elevator-Door-Operating Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to apparatus for operating elevator doors and has for its primary object to provide simple, efficient and durable electrically controlled means for automatically opening and closing the doors of the elevator shaft.

Still another object of the invention is to provide improved means to prevent slamming or banging of the door when moved to its open or closed position.

Another object of the invention is to provide a mechanism for the above purposes which is positive and reliable in its operation and may be installed in elevators of any well known construction at a minimum cost.

These and further objects will more fully appear from the following specification and accompanying drawings considered together or separately.

For a full understanding of the invention reference is to be had to the following description and accompanying drawing, in which—

Figure 1 is a diagrammatic view showing a series of elevator doors and operating mechanisms therefor, the electric circuit and the circuit connecting means whereby the current is transmitted to the motors. Fig. 2 is an enlarged elevation partly in section of the door operating mechanism; Fig. 3 is a section taken on the line 3—3 of Fig. 2; and Fig. 4 is an end view of the spirally grooved shaft showing the manner in which the same is actuated from the motor shaft.

Corresponding and like parts are referred to in the following description and designated in the accompanying drawing by like reference characters.

Referring in detail to the drawings, 5 designates a series of door openings which open into the shaft in which the elevator car indicated at 6 is movably arranged and actuated by means of any suitable mechanism under the control of the operator.

The door openings 5 are adapted to be

closed by means of suitable doors 7 which are mounted and supported for sliding movement in any approved manner. Adjacent to the door openings 5 the electric motors 8 are arranged, said motors each having its shaft 9 provided with a worm 10. Above the door opening a horizontally disposed shaft 11 is mounted in the bearings 12, said bearings including the boxes 13 and sleeves or collars 14 fixed upon the shaft. The boxes and collars are provided with raceways to receive the anti-friction balls 15. The shaft 11 between its ends is spirally grooved as indicated at 16, and the convolutions or turns of said groove at each end thereof are arranged in closely spaced relation as shown at 16' in comparison with the turns of the groove in the intermediate portion thereof. The purpose of thus forming the groove in the operating shaft will be fully pointed out in the following description.

Upon the upper edge of the door 7 and adjacent to one side thereof a sleeve 17 is rigidly secured. This sleeve is provided with a smooth bore through which the shaft 11 is loosely disposed. A cylindrical casing 18 is mounted upon the sleeve 17 and is provided with an internal chamber 19. A pin 20 is longitudinally movable through this casing and upon said pin a spring 21 is arranged within the chamber 19. One end of said spring is fixed to the pin while the other end thereof bears against the end wall of said chamber. This spring normally acts to force one end of the pin into the spiral groove 16 of the shaft 11. The base wall of the spiral groove 16' at each end thereof gradually merges into the periphery of the shaft 16 as clearly shown at 16^a in Fig. 3, of the drawings, so that the pin will ride out of said groove when the sleeve 17 moves to the end of the shaft in engagement with the collar 23, thereby eliminating the possibility of the motor being choked in the event that the same is not stopped by the disconnection of the circuit when the sleeve reaches the end of its travel upon the grooved shaft. The other end of the pin 20 is provided with an aperture 22 to receive a suitable key whereby the pin may be held in an inoperative position out of engagement with the groove of the operating shaft when it is desired to operate the elevator doors by hand. A collar 23 fixed

upon the shaft 11 is adapted for engagement by the sleeve 17 to limit the movement of the elevator door when the same is moved to its closed position. Upon one end of the shaft 11 a worm gear 24 is secured to mesh with the worm 10 of the motor shaft 9 whereby said shaft is rotated upon the operation of the motor. It is obvious that this connection between the shaft 11 and the motor shaft may also be effected by means of spiral or beveled gears or an endless chain and sprockets.

In Fig. 1 I have illustrated the electric circuit for the operation of the motors.

25 and 26 indicate the positive and negative conducting wires respectively, of the electric circuit which are connected to any suitable source of current supply. The joined wires 27 connect the negative circuit wire with the several operating motors, and the positive wire is connected to a reversing switch 28 arranged in the elevator car 6 to be actuated by the conductor. Wires 29 extend from a series of metallic contact strips 30 to each of the motors and a series of resilient contact plates 31 are suitably mounted upon the body of the elevator car for sliding contact with the strips 30. The plates 31 are connected by means of the wires 32 to binding posts of the switch 28. The strips 30 are so arranged with respect to the door openings 5 that the plates 31 on the car will contact therewith as the car approaches the door opening and thus connect the electric circuit through the current conducting wire 25, the switch 28, wires 32, the contact members 30 and 31, the wires 29, and through the motor 8 and wire 27 to the negative supply wire 26. Thus the shaft 11 is rotated in the proper direction to move the door 7 to its open position, the pin 20 in the sleeve secured to said door traveling in the spiral groove 16 of the shaft. When the conductor again starts the car, he reverses the operation of the motor 8 by throwing the switch 28, so that the door is again closed. It is understood of course that the metallic contact plates 31 are of such length that the contact strips 30 will remain in engagement therewith until the door has been fully closed. It will be noted that by providing the closely arranged turns of the spiral groove 16 at opposite ends thereof, the elevator door will not be subjected to shock or jar by violent contact of the same with the stops which limit its movement, as the speed of such movement will be decreased when the pin 20 enters the end portions 16' of the spiral groove 16, so that the door will slowly complete its opening or closing movements.

While I have described the wire 25 as the positive wire and 26 as the negative wire, it will be understood that the current may flow in the opposite direction if desired.

From the foregoing it is believed that the

construction and manner of operation of my improved door operating mechanism will be clearly understood.

While the invention is primarily designed for use in connection with elevator doors, it will be understood that the same is not limited to said use but may be adapted to other purposes for which an apparatus of this character may be found desirable or advantageous. Owing to the comparatively few elements employed in the construction of the apparatus, it will be appreciated that the same is highly durable, efficient and positive in operation and may be manufactured and installed at small cost. The doors leading into the elevator shaft will be absolutely held in their closed position so that liability of the same being inadvertently left open by carelessness on the part of the conductor and thus endangering the lives of occupants of the building, is entirely avoided. By simply lifting the pins 20 to disengage the same from the spiral groove of the shaft 11, the door may be opened or closed by hand when the electrically operating means becomes unserviceable from any cause.

While I have shown and described the preferred construction and arrangement of the various parts, it will be obvious that the invention is susceptible of considerable modification without departing from the essential features or sacrificing any of the advantages thereof.

Having thus described the invention what is claimed is:

1. In a door operating apparatus, an operating shaft having a spiral groove, a sleeve surrounding the shaft, and means for imparting relative rotative movement of the sleeve and shaft, of a device carried by the sleeve for imparting relative longitudinal movement of the sleeve and shaft, and means carried by the shaft for raising the last mentioned means from engagement with the groove.

2. In a door operating apparatus, a threaded operating shaft, a sleeve surrounding the shaft and means for imparting relative rotative movement of the sleeve and shaft, of a device carried by the sleeve for engaging the threads and causing relative longitudinal movement of the sleeve and shaft, and means carried by the shaft for automatically raising the device from the thread.

3. The combination with a door, a threaded shaft, a sleeve surrounding the shaft, and means for imparting relative rotative movement of the shaft and sleeve, of a pin carried by the sleeve for engagement with the thread to impart relative longitudinal movement of the sleeve and shaft, connections whereby the door will partake of the longitudinal movement and means carried by the shaft for raising the pin from the thread

and stopping the longitudinal movement without stopping the rotative movement.

4. In a door operating apparatus, an operating shaft having a spiral groove, a sleeve surrounding the shaft, means for imparting relative rotative movement to the shaft and sleeve, means carried by the sleeve to engage the groove to impart relative longitudinal movement to the sleeve and shaft, the depth of the groove decreasing at the end thereof to force the groove engaging means from the groove and arrest the longitudinal movement.

5. In a door operating apparatus, an operating shaft having a spiral groove, a sleeve surrounding the shaft, means for imparting relative rotative movement to the shaft and sleeve, means carried by the sleeve to engage the groove to impart relative longitudinal movement to the sleeve and shaft, the depth of the groove decreasing at each end thereof to force the groove engaging means from the groove and arrest the longitudinal movement.

6. In a door operating apparatus, an operating shaft provided with a spiral groove, a sleeve surrounding the shaft, means carried by the sleeve for engaging the groove, means carried by the shaft to raise the groove engaging means from the groove at a predetermined point on the shaft, and means for rotating the shaft.

7. In a door operating apparatus, an operating shaft, a sleeve surrounding the shaft, means for rotating the shaft, means for engaging the sleeve with the shaft to impart longitudinal movement to the sleeve, and means for automatically disengaging the sleeve and shaft at a predetermined point on the shaft.

8. In a door operating apparatus, an operating shaft provided with a spiral groove, a nut secured to the door to travel longitudinally upon said shaft, a spring-held pin, mounted in the nut and normally engaged in the groove of the shaft, said shaft being provided with means to force said spring-held pin out of the groove when the same arrives at one end thereof in the travel of the nut, and means for rotating said shaft.

9. In a door operating apparatus, an operating shaft, provided with a spiral groove,

a nut secured to the door to travel longitudinally upon said shaft, a casing threaded in the nut, a pin arranged in said casing and loosely movable in said nut, a spring in the casing surrounding said pin and normally holding the same yieldingly in engagement with the groove of said shaft, the base of the spiral groove in the shaft being provided at its ends with cam surfaces merging into the periphery of the shaft, to engage said pin and force the same out of the groove at the end of the travel of said nut in each direction, means for securing said pin in a retracted position against the action of said spring, and means for rotating said shaft.

10. In an apparatus for operating elevator doors, the combination with a car and doors to close the door openings leading into the car shaft, of means associated with each of the doors, to move the same to their open or closed position, a motor for actuating said operating means, an electric circuit for the motors, a series of contacts for each motor, a series of contacts carried on the car and adapted to engage the motor contacts, a reversing switch on the car, connections between the switch and source of current supply, and connections between the switch and car contacts.

11. In an apparatus for operating elevator doors, the combination with a car and doors to close the door openings leading into the car shaft, of means associated with each of the doors to move the same to their open or closed position, a motor for each of said operating means geared thereto to actuate the same, an electric circuit for the motors including a series of contact strips for each motor and connections between the same and the motor, a series of resilient contact plates carried by the car to engage said strips, a reversing switch on the car and connections between the same and the source of current supply, and wires connecting said switch to the contact plates.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HOOD PITTS.

Witnesses:

W. NEAL WATT,
W. L. WITSCHKE.