

(No Model.)

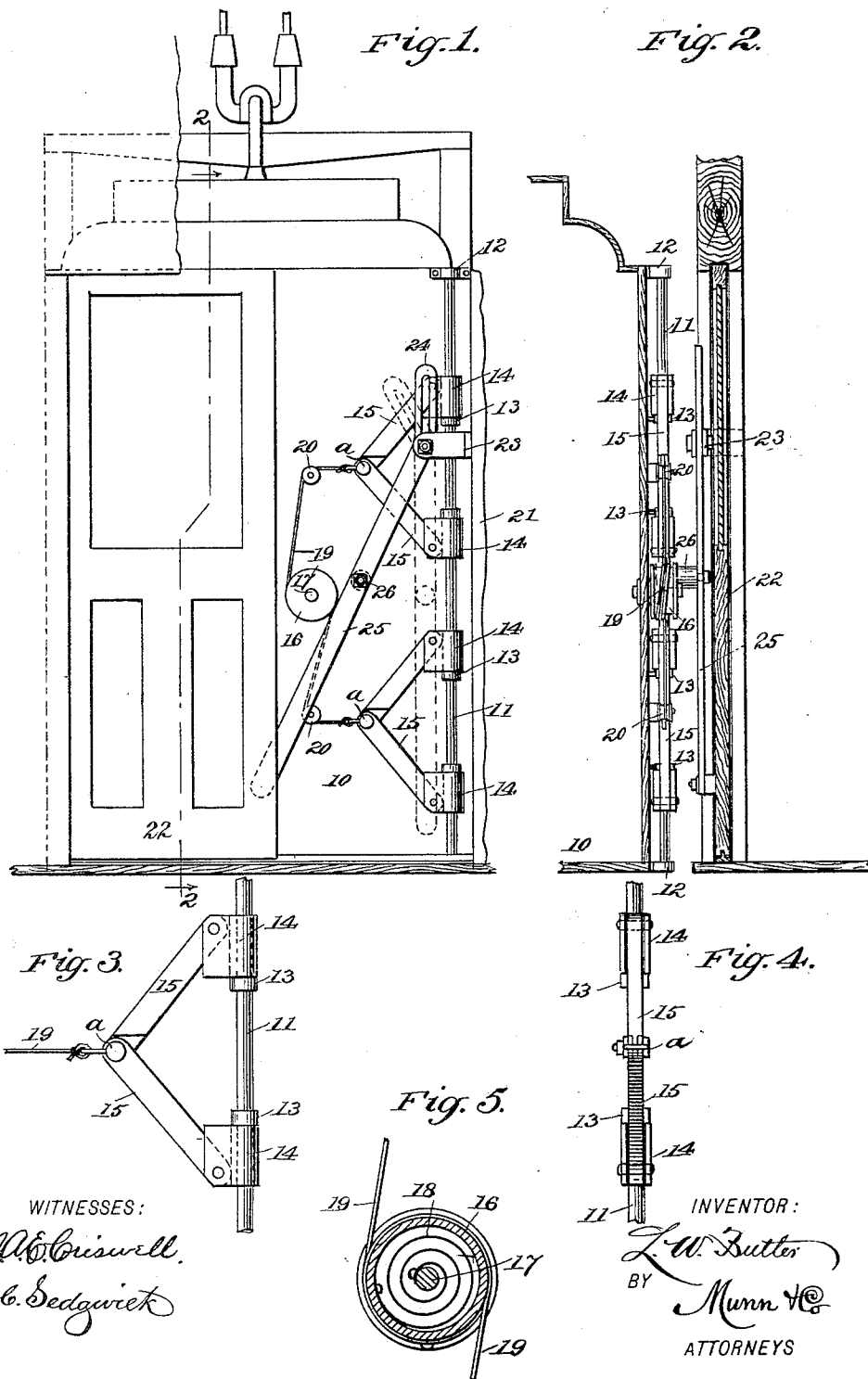
2 Sheets—Sheet 1.

L. W. BUTLER.

DEVICE FOR OPERATING DOORS TO ELEVATOR SHAFTS.

No. 462,200.

Patented Oct. 27, 1891.



(No Model.)

2 Sheets—Sheet 2.

L. W. BUTLER.

DEVICE FOR OPERATING DOORS TO ELEVATOR SHAFTS.

No. 462,200.

Patented Oct. 27, 1891.

Fig. 6.

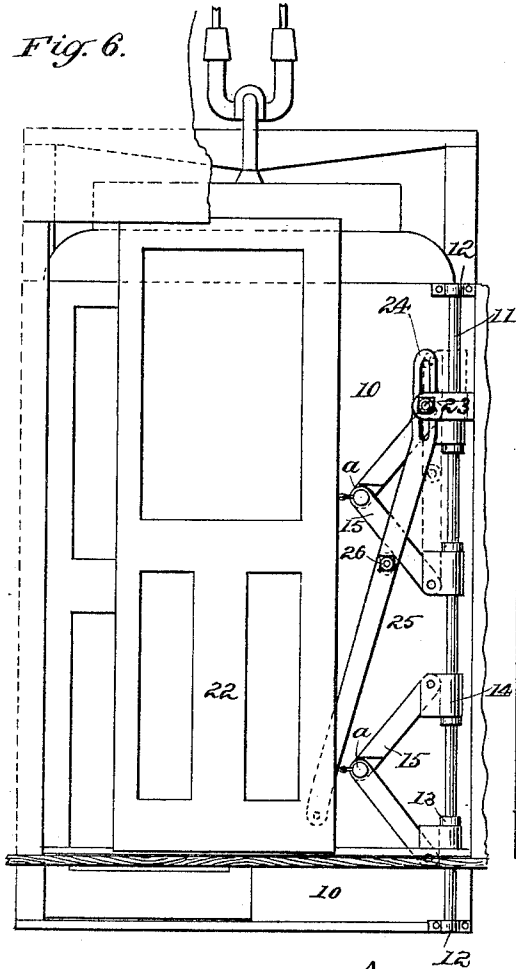


Fig. 7.

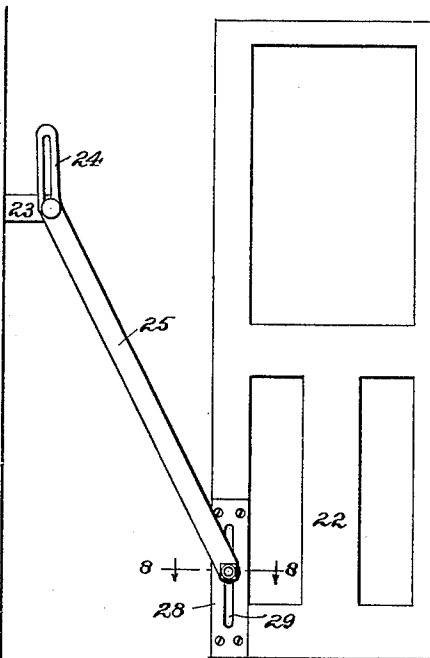


Fig. 9.

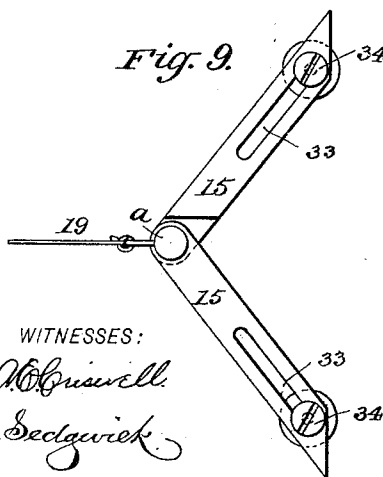


Fig. 10.

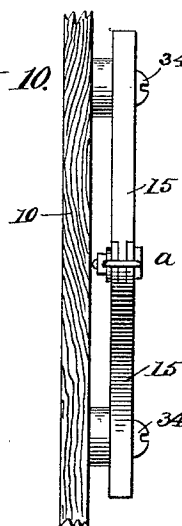
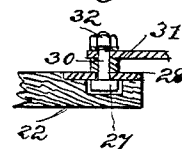


Fig. 8.



WITNESSES:

J. M. Griswold.
C. Sedgwick.

INVENTOR:

L. W. Butler
BY Munn & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE.

LOUIS W. BUTLER, OF BROOKLYN, NEW YORK.

DEVICE FOR OPERATING DOORS TO ELEVATOR-SHAFTS.

SPECIFICATION forming part of Letters Patent No. 462,200, dated October 27, 1891.

Application filed February 13, 1891. Serial No. 381,328. (No model.)

To all whom it may concern:

Be it known that I, LOUIS WENDELL BUTLER, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Device for Automatically Closing the Doors of Elevator-Shafts, of which the following is a full, clear, and exact specification.

My invention relates to a device adapted, in conjunction with an ascending or descending car, to automatically close the door of an elevator-shaft; and the object of the invention is to provide a mechanism simple, durable, and economic in construction, and capable of being conveniently applied to any elevator car and shaft.

A further object of the invention is to so construct the device that, while being possessed of sufficient power to close a door when the doorway is unobstructed, it will yield sufficiently to prevent material injury being done to a person caught by the door when the latter is being closed.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a front view of a car and a partial side elevation of an elevator-shaft, the said shaft being broken away and the door of the opening therein being closed. Fig. 2 is a vertical section taken practically on the line 2 2 of Fig. 1. Fig. 3 is a side elevation of a set of trip or toggle levers detached, and Fig. 4 is an edge view of said levers. Fig. 5 is a diametrical section through a spring-controlled drum used in connection with the levers. Fig. 6 is a partial side elevation of a car and shaft, the latter being partially broken away, illustrating the door of the shaft in the act of being closed. Fig. 7 is a detail view illustrating the connection of the mechanism with the door. Fig. 8 is a transverse section through the door on the line 8 8 of Fig. 7. Fig. 9 is a side elevation of a modified form of the trip or toggle levers, and Fig. 10 is an edge view thereof.

Upon the front of the elevator-car 10, preferably near one corner, a vertical rod 11 is located, held some distance outward from the car by end bearings 12 and intermediate bearings 13. The intermediate bearings are preferably four in number, and upon the rod preferably four sleeves 14 are held to slide, and to said sleeves, which are arranged in pairs, the ends of levers 15 are pivoted, the levers of each pair of sleeves being pivotally connected, as illustrated at *a* in Figs. 1 and 3. The pivotal connection of the levers is such that they are normally in a triangular position, but may be pressed in the direction of the rod, so as to assume a vertical position, as shown in dotted lines, Fig. 1, in which event the sleeves of each pair slide upon the rod, one upward and the other downward. The sleeves of the upper pair of levers bear at their adjacent or inner ends against the top and bottom, respectively, of the upper two intermediate bearings 13, and the same is true of the lower pair of sleeves and bearings. Thus the bearings constitute stops for the movements of the levers. If the lowermost lever of a pair is pressed, the upper sleeve moves upon the rod away from its bearing, while the lower sleeve is held stationary, and if pressure is exerted upon the upper lever of a pair the upper sleeve is pressed against its bearings and held stationary and the lower sleeve moves. The levers are normally maintained in their triangular position, primarily through the medium of a drum 16 which is pivoted near the rod upon a stud 17. The drum is spring-actuated, being provided with an interior coil-spring 18, one end whereof is fast to the spindle or stud 17 and the other to the interior peripheral surface of the drum. A cord, cable, or chain 19 is wound around the drum and one end of the cord, cable, or chain is connected with the pivotal point of the upper set of levers and the other end with the pivotal point of the lower set of levers. The cable, cord, or chain 19 also passes over guide-pulleys 20, which are arranged one above and the other below the drum a suitable distance therefrom.

Upon the inner wall of the elevator-shaft 21, preferably a slight distance above the center of the shaft-opening closed by a door 22,

a bracket 23 is rigidly attached, the said bracket being preferably an angular one, and one member thereof faces that portion of the car containing the rod 11. Upon this member of the bracket the slotted upper end 24 of a shifting rod 25 is adjustably secured. The shifting rod or lever 25 is provided at or near its center with a stud, upon which a friction-roller 26 is journaled, the said roller being made to face the car. The lower end of the shifting lever is adjustably secured to the rear edge of the door 22 near the lower end thereof. This connection is usually effected by creating in the inner face of the door a vertical recess 27, covered by a face-plate 28, containing a vertical slot 29. A pin 30 extends outward through the slot 29, the head whereof is in the recess 27 of the door, as illustrated in Fig. 8, and preferably a washer 31 is first placed upon the pin, then the lower end of the shifting lever is pivotally secured to the pin, and the pin and lever are held in connection by a suitable nut 32, secured upon the threaded end of the pin, as is also best shown in Fig. 8.

The spring 18 in the drum has sufficient strength to normally force the door to a closed position when its passage is uninterrupted, and the friction-pulley 26 of the lever 25 is brought into engagement with any of the levers 15 of the cab or car; but the tension of the spring is such that should a person entering or leaving the car be caught between the door-jamb and the door while the latter is closing said person will not receive material injury, as the door may be readily forced back against the tension of the spring. If either of the connected levers 15, which virtually constitute toggle-levers, be forced outward to assume a vertical position, the spring in the drum will be wound so that it will exert all of its tension to restore the levers to their normal angular position.

In the operation of the device as the car moves up or down in passing a doorway the roller 26 contacts with the outer ends of the levers 15, which are easily pressed in thereby and allow the car to pass. When the car is brought to a halt at a floor, the friction-roller 26 stands between the two sets of levers, as shown in Fig. 1, whereby the door may be readily opened for the exit or for the entrance of passengers to or from the car. After the door is opened, as soon as the elevator commences to ascend the friction-pulley 26 will be brought into engagement with the upper lever of the lower set, and as said lever is under the tension of the spring 18 the upward movement of the elevator will cause the roller 26 to travel down its inclined surface, and thereby force the door to a closed position through the medium of the shifting lever 26. If the elevator is passing downward, the moment the elevator-car moves the friction-roller 26 will be brought into engagement with the lower lever of the upper toggle-set, and in travel-

ing up the inclined planes of the lever the friction-pulley and shifting lever to which it is attached will compel the door to close. When the car is traveling upward, the lower end of the shifting lever moves in the door-slot 29 and the fulcrum-pin at the upper end remains in the lower end of the lever-slot 24; but in the downward movement of the car the lever has movement at its upper and not at its lower end.

In Figs. 9 and 10 I have illustrated a slight modification of the toggle-levers. The levers themselves virtually remain the same, with the exception that each lever at its outer end is provided with a longitudinal slot 33 and the rod 11 is dispensed with, the levers being pivoted directly upon the car through the medium of suitable studs 34, secured to the latter and passing through the slots of the levers. The movements of the levers in the modified form are identical with those of the preferred form illustrated in Fig. 1.

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

1. In a device of the character described, the combination, with an elevator-car and the shaft in which the car has movement, of toggle-levers pivotally connected with the car, the levers of each toggle being adapted to move in opposite directions, a spring connected with the toggle-levers, a shifting lever adapted for connection with the elevator-shaft and also adapted for connection with a door of the shaft, and a projection upon one face of the shifting lever, adapted for engagement with the toggle-levers, as and for the purpose set forth.

2. In a device of the character described, the combination, with independent sets of levers triangularly arranged and adapted to have a sliding movement in opposite directions upon an elevator-car, of a spring controlling the movements of the levers, a shifting lever adapted for sliding attachment at one end to an elevator-casing and adapted for a like attachment at its opposite end to a door of the casing, and a projection formed upon one face of the shifting lever and adapted for engagement with the sets of levers, substantially as described.

3. In a device of the character described, the combination, with an elevator-car, the shaft in which the car has movement, and a door of the shaft, of a rod attached to the car, sleeves held to slide upon the rod, stops engaging the sleeves, levers arranged in pairs, pivoted at one end to the sleeves and to each other at their opposite ends, a spring controlling the movements of the levers, and a shifting lever adapted for engagement to the elevator-shaft and the door thereof, the said shifting lever being provided with a projection for engagement with the spring-controlled levers, as and for the purpose set forth.

4. In a device of the character described,

the combination, with an elevator-shaft, the car, and a sliding door in the shaft, of toggle-levers arranged in pairs, the levers of each toggle being capable of sliding in opposite
5 directions upon the car, a spring-controlled drum, a cable connection between the drum and the toggle-levers, a shifting lever having a sliding connection at one end to the elevator-casing and a like connection at its op-
posite end with the door of the casing, and a 10 projection formed upon one face of the shifting lever, adapted for engagement with the toggle-lever, as and for the purpose set forth.

LOUIS W. BUTLER.

Witnesses:

J. FRED. ACKER,
C. SEDGWICK.