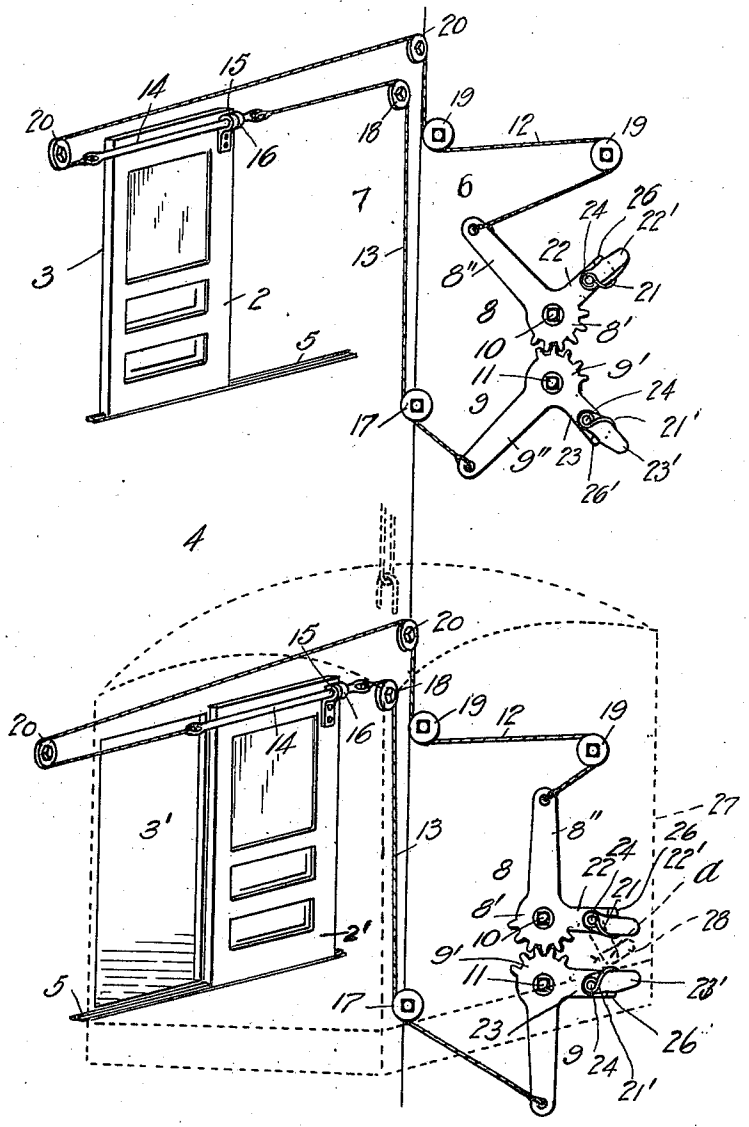
B. FORBES.

ELEVATOR DOOR SAFETY DEVICE.

APPLICATION FILED MAY 16, 1910.

989,774. Patented Apr. 18, 1911.



WITNESSES:

H. Barnes

E. Peterson

INVENTOR:

BYRON FORBES

BY

Pierre Barnes

ATTORNEY

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

BYRON FORBES, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-HALF TO E. C. FARLEY, OF SEATTLE, WASHINGTON.

ELEVATOR-DOOR SAFETY DEVICE.

989,774. Specification of Letters Patent. Patented Apr. 18, 1911.

Application filed May 16, 1910. Serial No. 561,666.

To all whom it may concern:

Be it known that I, BYRON FORBES, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Elevator-Door Safety Devices, of which the following is a specification.

This invention relates to elevators such as are employed in buildings for the conveyance of passengers or freight.

The primary object of the invention is the provision of devices which are actuated by the car in its movement from a floor to effect the positive closure of the door opening from such floor onto the elevator shaft in the event that the attendant within the car fails to close the same.

A further object of the invention is to provide means whereby the car will effect the closing, as the car travels thereby, of any doors which may have inadvertently been opened, as frequently happens.

The invention consists in the novel construction, adaptation and combination of devices as will be hereinafter described and claimed.

The accompanying drawing is a diagrammatic view illustrating the embodiment of my invention.

Referring to the drawing, the numerals 2 and 2′ designate doors respectively provided for the door-ways 3 and 3′ opening into the elevator shaft 4 from two floors of a building. These doors are suitably mounted upon track-rails 5 to be readily slid to and from the respective door-ways.

Located on the shaft wall 6, at right angles to the wall 7 which is provided with the aforesaid door-ways, there is provided for each door a pair of levers 8 and 9 which are respectively fulcrumed on pivot-pins 10 and 11. Each pair of such pins are disposed in vertical alinement. Each pair of levers have gear teeth provided upon the adjacent arms 8′ and 9′ and are in mesh with each other. The oppositely directed arms 8″ and 9″ of said levers are respectively connected by lines 12 and 13 with the opposite ends of horizontally arranged rods 14, one for each door, and extending through eye attachments 15 which are rigidly secured to the respective doors and in proximity to the advance edges thereof with respect to their opening movements.

Each rod 14 is provided with an adjustable collar 16 disposed to that side of the complementary attachment 15 so as to be engaged by the latter in the opening of a door and cause the rod to be shifted endwise therewith. A line 13, as illustrated, is connected to a rod 14 from the end adjacent to which its collar is secured, whence it passes about guide-pulleys 17 and 18 to its connection with the associated lever arm 9″. A line 12 is connected to a lever-arm 8″ whence it passes about guide-pulleys 19 and 20 to be connected with the remote end of a rod 14 as shown.

Integral with, or rigidly connected to, the levers 8 and 9 are supplementary arms 22 and 23 which are directed at approximately right angles to the arms 8″ and 9″ and upon that side of a pair of levers to afford the proper movements to the levers to enable them to perform their functions when influenced by the elevator car as will be presently explained.

Intermediate the length of each of the arms 22 and 23 is a pin 24 serving as a pivot for limbs 22′ and 23′. The limbs 22′ connected with the upper levers 8 are swingable downwardly in opposition to springs 21; while the limbs 23′ are swingable upwardly in opposition to springs 21′, the reverse swinging movements of the respective limbs being limited by the interference of stops 26 and 26′ provided upon the respective arms 22 and 23.

The numeral 27 indicates the elevator car shown by broken lines in the view and which is provided with a stud 28 projecting from that side of the car which is adjacent to the shaft wall 6 and likewise in such horizontal position that as the car ascends or descends, it will encounter the limbs 22′ and 23′ of any pair of levers throughout its travel when the same are in the position in which the limbs will be held when the connected door is open, or corresponding to that in which they are represented at the bottom of the view.

The operation of the invention may be described as follows: As the car ascends or descends in the elevator shaft past a floor whereat the shaft-door is closed, the coöp-

erating levers 8 and 9 are positioned so as to have their arms 22 and 23, respectively, in the positions shown in the upper part of the view, and out of the path of the operating stud 28 of the elevator. In making a stop at a landing the said stud is arranged to come to rest with the car at about a medial position between said arms. As the said door is opened the attachment 15 of the door engages the collar 16 upon the rod 14 and through the connecting lines 12 and 13 influences the levers 8 and 9 to assume the positions indicated in the lower part of the view. In such positions of the said levers, the arms 22 and 23 are tilted into closer relation with each other and with the stud 28, and upon the starting of the car, the stud will engage one or the other of the said arms to close the door through the said connecting mechanism. That is to say, the collar 16 upon such connections will impart a reverse sliding movement to the door and close the same.

It is apparent that the described devices will operate to automatically close the doors of elevator shafts upon the car's departure from a landing. It is also apparent that the described devices will serve to cause the elevator attendant to exercise care and a degree of precision in making landings. A moderate amount of variation in the position of the car-floor above or below the doorstep and consequently the like variation of the stud 28 with respect to the arms 22 and 23 will not affect appreciably the opening of the door; but should undue carelessness be shown and the stop be made several inches above or below the floor of the landing, the said stud will interfere somewhat with the movement of one or the other of the said arms and therefore the full opening of the door will be impeded.

Assuming that a door upon a shaft has failed to close or has been inadvertently opened, the said arms 22 and 23 are thereby projected outwardly into the path of the ascending or descending car. Further assuming, in such an event, that the car is descending in the shaft, the stud 28 will strike upon the interfering limb 22′ of the arm 22 and will cause it to yield in opposition to the spring 21 allowing said stud to pass thereby. The further progress of the car forces the stud into engagement with limb 23′ which, through contact with the stop 26′ of the arm 23, effects the closing of the door.

Having described my invention, what I claim as new and desire to secure by Letters-Patent of the United States, is—

1. In apparatus of the class described, the combination with an elevator car provided with a stud projecting therefrom, of a door in the elevator shaft, a pair of levers fulcrumed upon a side of said shaft and provided with intermeshing gear teeth, cable connections with extremities respectively secured to said levers and operatively connected to said door to close the same, and arms upon said levers directed into the path of said stud when said door is open and adapted to be influenced by the movement of the car to close the door.

2. In apparatus of the class described, the combination with an elevator car provided with a stud projecting therefrom, of a door in the elevator shaft, a pair of levers fulcrumed upon a side of said shaft and provided with intermeshing gear teeth, cable connections with extremities respectively secured to said levers and operatively connected to said door to close the same, arms upon said levers directed into the path of said stud when said door is open and adapted to be influenced by the movement of the car to close the door, and means included in said arms to yieldingly allow the passage thereby of said stud in one direction only.

3. In an apparatus of the class described, in combination with a door in an elevator shaft, an elevator car, a stud carried by the car, a pair of levers of bell crank form fulcrumed upon the side of said shaft, and provided with intermeshing gear teeth, cable connections provided at the ends of one of the arms of each of the levers, spring pressed limbs pivoted to the opposite ends of said levers, and stops arranged to limit the movement of said limbs, said limbs being engaged by the stud carried by the car to influence the movement of said door.

Signed at Seattle, Wash., this 29th day of April, 1910.

BYRON FORBES.

Witnesses:
H. BARNES,
E. PETERSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."