

931,224.

Technical drawing of a mechanical device, showing two views: 1 (side elevation) and 2 (perspective view).

The device consists of a central frame (1) supporting two main assemblies, each mounted on a base (18 and 19). The left assembly (2) includes a lever (16) pivoted at 12, connected to a spring (10) and a pivot (14). The right assembly (1) includes a lever (17) pivoted at 15, connected to a spring (11) and a pivot (13). A central horizontal bar (34) is connected to the levers via pivots (21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36). A spring (20) is also shown at the bottom right.

Waller, Cath

Harold Rowntree Inventor  
By his Attorney Samuel E. Darby

# UNITED STATES PATENT OFFICE.

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## ELEVATOR CAR AND WELL DOOR OPERATING MECHANISM.

No. 931,224.

Specification of Letters Patent.

Patented Aug. 17, 1909.

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*To all whom it may concern:*

Be it known that I, HAROLD ROWNTREE, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have made a certain new and useful Invention in Elevator Car and Well Door Operating Mechanism, of which the following is a specification.

This invention relates to elevator car and well door operating mechanism.

The object of the invention is to provide means whereby the car door operating means cannot be put in operation until the car arrives adjacent an inclosure or well door.

A further object is to provide means whereby the door on the car, and a door of the inclosure or elevator shaft or well are operated in unison and neither can be operated alone.

A further object is to provide means which are simple and efficient for simultaneously controlling the operation of car and inclosure or well doors.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing and finally pointed out in the appended claims.

The single view of the drawing shows in elevation, and somewhat diagrammatically, a construction of cooperating car door and inclosure or well door operating mechanisms and their interconnections, and embodying the principles of my invention.

For clearness of illustration and description I have shown the car door operating mechanism at one side and the inclosure or well door operating mechanism at the other side of the view of the drawing, but it is to be understood that in practice when the car is in the required position for the door thereon to be opposite a shaft or well door, for the two doors to be simultaneously operated, the operating mechanism for the one door is directly behind that of the other door.

Where operating mechanism has been employed not only for the door on the car but also for the doors of the car inclosure or elevator shaft or well, it has hitherto been a common practice to so construct, arrange and install the mechanisms that the car door could be opened at any time. It has also

been a common practice to so arrange the inclosure door operating mechanism so that such door cannot be operated until the car arrives opposite or adjacent such door. The capability of the car door to be operated at any time whether the car is opposite a floor or landing or not, is objectionable and dangerous in that through the opening of such door before the car arrives at a floor or landing, or while the car is in motion, the danger is incurred of passengers on the car attempting to step through the car door opening and hence being caught or jammed between the floor of the car and the ceiling of the floor or landing, or other projecting ledge, in case the car is ascending, or the ceiling or roof of the car, and the floor or landing or other projecting ledge or shoulder of the shaft or well in case the car is descending. Serious and often times fatal accidents have occurred in this manner in the operation of elevators. It is among the special purposes of the present invention to provide means for avoiding the danger referred to and to render the operation of elevators more safe.

In accordance with the principles of the present invention I propose to provide means whereby when operating devices are employed for the elevator shaft, well or inclosure doors and also for the car door, through suitable connections controlled by the control mechanism for the car door operating mechanism, such car door operating mechanism cannot be operated until the car arrives adjacent the inclosure door, and approximately level with the floor or landing, and when the car arrives at the required point then the car door and inclosure door are simultaneously operated.

While I have shown and will now describe one construction and arrangement for accomplishing this result, and the best form in which I at present contemplate carrying my invention into practical operation, I desire it to be understood that my invention is not to be limited or restricted to the construction disclosed as the principles thereof may be embodied in a wide variety of different constructions without departure from the spirit and scope of my invention.

In the drawing reference signs 1 and 2 designate respectively the elevator car door and a landing or inclosure door.

The mechanisms for operating the doors may or may not be the same in construction

and arrangement, so far as the present invention is concerned. To illustrate the principles of my invention, however, I have shown the same construction of power mechanism for operating the doors. This mechanism consists of power cylinders 3, 4, to which power medium may be supplied, such medium, in the supply and exhaust thereof, being controlled by valve devices 5, 6, having operating arms 7, 8, connected by links 9, 10, to levers 11, 12. The pistons of the power cylinders operate cross heads 13, 14, which are connected by links 15, 16, to door operating levers 17, 18, pivotally mounted, and having suitable sliding connection as at 19, 20, with the doors 1, 2. The lever 11, of the car door operating mechanism is pivotally connected at one end to the cross-head 13, and at the other end, through suitable intermediate connections, to the control lever 21. Similarly, the lever 12 of the inclosure door is pivotally connected at one end to the cross-head 14, and at the other end through a link, rod or other connection 22, to a lever 23, the latter being acted upon by a spring 24, the tension of which operating through lever 23, rod 22, lever 12, link 10, and arm 8, normally tends to hold the control valve 6, in position to maintain the door 2, closed.

It is to be understood that the door 2, and its associated power operating mechanism, including the link or rod 22, lever 23 and spring 24, are erected in the inclosure and at the floor or landing at which the car is to stop, and that each landing or inclosure, if so desired, is similarly equipped. It is also to be understood that the door 1, and its associated power operating and control mechanism, and, in fact, all the other devices and mechanism hereinafter to be referred to and constituting features of my invention, are mounted upon the elevator car. It is also to be understood that while I have shown and described a specific construction and arrangement of power and control mechanism for operating the doors in order to illustrate my invention, any other form and construction of such mechanism may be employed and may well answer the required purpose.

I will now describe a construction and arrangement whereby the operation of the car door is rendered impossible until the car arrives opposite or adjacent a landing or floor, but when the car is opposite or adjacent the landing or floor, then both the car and the inclosure doors are operated simultaneously, this being the important and valuable feature of my invention.

Interposed in the connection between the control lever 21, and the motor controller 5, is a spring 26, the tension of which normally tends to maintain the controller in position to keep the door 1, closed. In the particular form shown, to which the invention is not

to be limited or restricted, however, the spring 26, is connected to and acts upon one arm of a bell crank lever 27, said arm being connected by a link 28, to one end of a bar 29. The other arm of said bell crank lever 27, is connected by means of a link 30, with the end of lever 11. The other end of bar 29 is connected to a sliding rod 31, which is connected, through crank arms 32, with trip shoe 33. The bar 29, is connected intermediate its ends, through a rod or other connection 34, with the control lever 21, but is normally held by a spring 35, against back stops 36.

From the foregoing description it will be seen that in their normal positions, as shown in full lines, the bar 29 is held against its back stops 36, the doors 1 and 2 are held closed, and the trip shoe 33 is held retracted. Under these conditions the car may be operated up or down without incurring the danger of injury or accident due to the inopportune opening of the car door, the retracted position of the trip shoe 33, enabling said shoe to pass freely by the levers 23, of the inclosure door controlling mechanisms without operating the same. Now, suppose the car door control lever 21 is rocked into the position shown in dotted lines and before the car arrives opposite a floor or landing. In such circumstances the trip shoe 33 is free to be moved outwardly unrestrained by reason of the fact that there is nothing in front of it to oppose such movement. Any movement of the other end of bar 29, however, under the pull exerted by the rocking of control lever 21, is opposed by the tension of spring 26; the result, therefore, is that instead of bar 29 moving bodily and parallel to itself, it tilts or rocks about its point of pivotal connection with link 28, as a fulcrum and merely throws out the trip shoe 33, but does not operate the motor controller 5, and hence the car door remains closed. The throwing out of the trip shoe is not productive of any result since, under the condition assumed, the car is not opposite a landing or inclosure door. Now suppose the car is opposite a landing or inclosure door at the time the car door control lever 21 is rocked, then, instead of the trip shoe 33, being unopposed in its outward movement, it encounters the lever 23 and the tension of spring 24. The tension of this spring is arranged to equal that of spring 26. The result is that an equal resistance is imposed upon the respective ends of bar 29, and consequently, instead of said bar rocking or tilting about one end as before noted, it moves bodily and parallel with itself away from the back stops 36, and not only throws out the trip shoe, thereby operating the landing or inclosure door operating motor controller, but it also effects the operation of the car door motor

controller, and hence the two doors are operated in unison.

Of course it will be understood that if the control lever 21 is rocked to position indicated by dotted lines before the car reaches a position opposite a landing or inclosure door, and is held in such position, then, when the car reaches a position approximately level with the next floor or landing the projected trip shoe 33 will engage the lever 23, and the resulting tension imposed on the trip shoe and through it and its connections, to the bar 29, will cause said bar to move into such position as to cause the car door motor controller to operate, so that both the car door and the inclosure door will be operated to open position. From this it will be seen that it is not necessary to wait till the car reaches its position opposite or adjacent the floor landing or inclosure door before the control lever 21, is operated, but the operation of such lever, before the point is reached, will be ineffective and will remain ineffective until the car reaches the desired point when its operation becomes effective.

While I have described my invention as applied to elevator car and inclosure doors, it is to be understood that the same construction and principles may be applied to other doors as, for instance, to the doors on elevated railway cars, so that the door could not be opened until the car had reached a platform, or a certain part of a platform, if desired. The invention is also applicable to other uses and purposes and to other situations. It is also evident that instead of applying my invention to doors it is equally well adapted to other forms of closures or passage obstructions and similar purposes. It is also obvious that instead of applying the invention to sliding doors is is equally well adapted to hinged or pivoted or other construction of doors.

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, and having described such construction, its purposes, function and mode of operation, what I claim as new and useful and of my own invention and desire to secure by Letters Patent is:

1. In an elevator door operating mechanism, a car door, and a landing door, power mechanisms respectively arranged to move said doors, means for controlling said power mechanisms, and means for rendering said controlling means inoperative until the car arrives adjacent a landing or inclosure door.

2. In an elevator door operating mechanism, a car door, and a landing door, independent power mechanisms for operating the same, and means for rendering both power mechanisms idle until the car arrives adjacent a landing or inclosure door.

3. In an elevator door operating mechanism, a car door, a landing door, independent power mechanisms for operating the same, a controller for said power mechanisms and means for rendering said controller inoperative until the car arrives adjacent a landing or inclosure door.

4. In an elevator door operating mechanism, a car door, power mechanism for operating the same, a controller for said power mechanism, an operating lever for said controller, and means whereby the said lever is free to operate without operating said controller until the car arrives adjacent a landing or inclosure door.

5. In an elevator door operating mechanism, a car door, power mechanism normally operating to maintain said door closed, controlling mechanism therefor, and means for rendering the operation of said controlling mechanism ineffectual until the car arrives adjacent a landing or inclosure door.

6. In an elevator door operating mechanism, an inclosure door and a car door, independent devices for simultaneously operating said doors and a single control mechanism for said devices, said control mechanism being inoperative except when the car door is adjacent the inclosure door.

7. In an elevator door operating mechanism, an inclosure door and a car door, independent means for moving said doors and a common means normally inoperative and rendered operative when the car door is adjacent the inclosure door, for controlling the operation of the moving means for both doors.

8. In an elevator door operating mechanism, an inclosure door and a car door, independent devices for operating said doors in unison and means normally inoperative and rendered operative when the car door is adjacent the inclosure door for rendering said devices operative to open both doors.

9. In an elevator door operating mechanism, an inclosure door and a car door, independent power mechanisms for operating said doors, and means normally inoperative and rendered operative when the car door arrives adjacent the inclosure door for controlling said power mechanisms to simultaneously open both doors.

10. In an elevator door operating mechanism, an inclosure door and a car door, independent devices for operating said doors, and means for rendering said devices simultaneously effective to open said doors when the car door arrives adjacent the inclosure door.

11. In an elevator door operating mechanism, an inclosure door and a car door, independent motors for operating said doors, and devices for simultaneously controlling said motors when said doors are adjacent each other.

12. In an elevator door operating mechanism, a car door, a landing door, independent power mechanisms for operating the same, a controller for said power mechanisms and means for rendering said controller inoperative until the car arrives adjacent a landing or inclosure door.

anism, an inclosure door and a car door, independent motors for operating said doors, said motors normally operating to maintain said doors closed, and means for controlling said motors simultaneously to open said doors when said doors are adjacent each other.

13. In an elevator door operating mechanism, an inclosure door and a car door, independent means for moving said doors, means carried by the car for controlling the inclosure door operating means, said means also operating to simultaneously control the car door operating means when said doors are adjacent each other.

14. In an elevator door operating mechanism, an inclosure door and a car door, independent motors for operating said doors, means for controlling the inclosure door motor, said means also controlling the car door motor when said doors are adjacent each other.

15. In an elevator door operating mechanism, an inclosure door and a car door, independent motors for operating said doors, a controller for each motor and means rendered operative when said doors are adjacent each other for simultaneously operating said controllers.

16. In an elevator door operating mechanism, an inclosure door and a car door, in-

dependent motors for operating said doors, a control lever for both motors, and connections intermediate said lever and motors for controlling the latter said connections being effective when said doors are adjacent each other.

17. In an elevator door operating mechanism, an inclosure door and a car door, independent motors for operating said doors, a control device for each motor, a bar having connections at its respective ends to operating devices for said controllers and a lever for moving said bar.

18. In an elevator door operating mechanism, an inclosure door and a car door, independent motors for operating said doors, a trip shoe for controlling the inclosure door operating motor, a control lever for the car door operating motor, connections between said lever and trip shoe, and means arranged to be engaged by said trip shoe when said doors are opposite each other, whereby both motors are simultaneously operated.

In testimony whereof I have hereunto set my hand in the presence of the subscribing witnesses, on this 10th day of September A. D., 1907.

HAROLD ROWNTREE.

Witnesses:

FRANK JOHNSON,  
L. M. SHIELDS.