

H. G. HILLMAN.
ELEVATOR SAFETY DEVICE.
APPLICATION FILED FEB. 18, 1910.

981,424.

Patented Jan. 10, 1911.

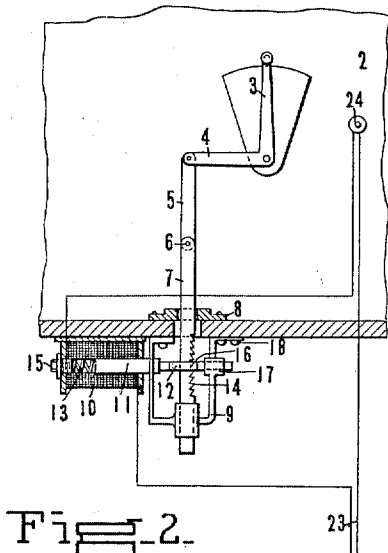


Fig. 2.



Fig. 3.

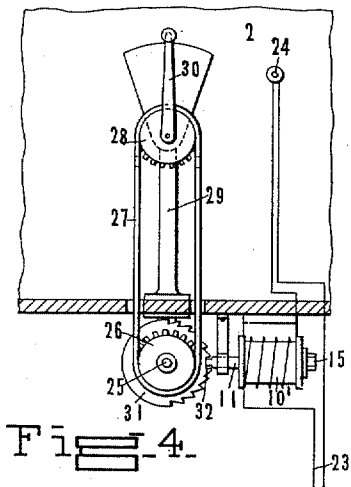


Fig. 4.

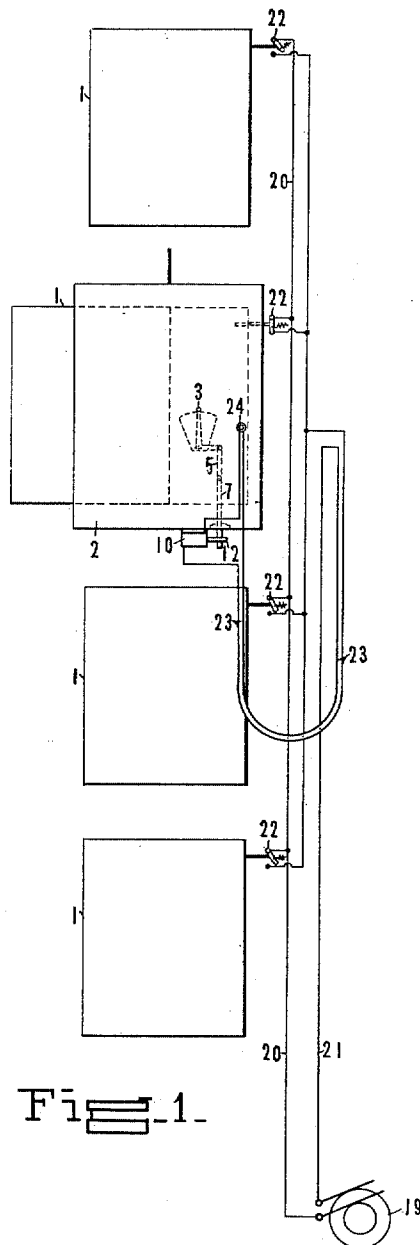


Fig. 1.

WITNESSES:

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ELEVATOR SAFETY DEVICE.

981,424.

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To all whom it may concern:

Be it known that I, HENRY GEORGE HILLMAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Elevator Safety Devices, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to safety devices for elevators, and with regard to the more specific features thereof, to devices for locking the power controlling mechanism in its neutral position.

One of the objects of the present invention is to provide a practical and reliable device of the above character.

Another object thereof is to provide an improved automatic mechanism for engaging the controlling mechanism of an elevator and holding the same in its neutral position, in case any of the elevator doors on the various floors are opened while the car is at rest.

A further object of the present invention is to provide a novel, simple and efficient means adapted to prevent the operator from increasing the speed of the car should any of the doors be opened while the car is in motion, and yet permitting the operator to return the controlling mechanism to neutral position and bring the car to a stop at any point.

A further object of the present invention is to provide an elevator car with a safety device at a point that will in no way interfere with the space within the car and yet act directly upon the controlling means.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings wherein is illustrated two of the various possible embodiments of the invention,—Figure 1 is a diagrammatic view of the entire system, illustrating one embodiment of the invention as applied thereto; Fig. 2 is a detail

view, showing the safety device; Fig. 3 is a detail view; and Fig. 4 is a modification, showing the device applied to a different form of controlling mechanism.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawing in detail, 1 denotes the several doors on the various floors of an elevator shaft, in which is positioned a car 2 adapted to operate in a well-known manner. This car 2 is provided with a controller handle 3, which is adapted to control the movement of the car either up or down, through suitable mechanism which is not shown in the drawings, for the sake of clearness. The controller handle 3 is in the form of a bell crank lever; that is, having an arm 4 at right angles thereto, to which is connected a link 5 jointed at 6 and adapted to pass through the bottom of the car. The joint 6 is for the purpose of enabling the lower part 7 of the link 5 to reciprocate in a vertical line through suitable guiding means 8 and 9 secured to the floor of the car above and below the same, respectively.

Secured to the under side of the car is a solenoid 10 provided with a core 11 adapted to reciprocate at right angles to the link 7. This core 11 is provided with an extension 12 in the form of a stirrup, adapted to surround the link 7, as clearly shown in Fig. 3. Within the solenoid 10 is a spring 13 normally tending to force the core 11 outwardly, to prevent the stirrup 12 from normally engaging with a rack 14 on the link 7. The tension of this spring may be adjusted as by means of a nut 15 at the end of the solenoid.

The rack 14 on the link 7 is provided with a central recess 16, the teeth on the opposite sides of which point in opposite directions and toward each other, so that if the stirrup 12 engages the rack while the link is depressed, for example, the controller being to one side of a neutral position, the operator may return the controller 3 to neutral position but cannot increase the speed of the car. The end of the stirrup 12 is adapted to pass through a suitable recess 17 in the upper part of the guide 9, secured to the floor of the car at 18 whereby these parts 7 and 12 are always held in a position to be actuated in the easiest possible manner.

A suitable source of electricity 19 is connected by means of main wires 20 and 21 passing up to the top of the elevator shaft with a suitable switch 22 opposite each door adapted to be opened when the door is closed, as shown in Fig. 1 at the "first floor," and automatically closes the circuit when the door is opened, as shown by the position of the door on the "third floor." The closing of the circuit at this point will permit the current to pass from one of the main wires across to the other through a flexible cable 23 connected with the car in a well-known manner, thence through the solenoid 10 and a switch or push button 24 within the car, back through the flexible cable 23 to the source of electricity 19. It is thus seen that when any door is opened, the solenoid 10 is actuated to draw the stirrup 12 into engagement with the rack 14 on the link 7, to lock the controller in neutral position or to engage it in such a manner as to permit a movement of the controller to only that position. The button 24 is for the purpose of breaking the circuit, if the operator should, for any reason, desire to move the car while the door is open.

The operation of this device is substantially as follows: Assuming all of the doors to be closed, the circuit will of course be broken, the solenoid deenergized, the core of which, under the action of the spring 13, is forced outwardly so that the stirrup carried thereby in no way interferes with the movement of the controller. As the car approaches the floor at which it is desired to stop, the operator frequently starts to open the door before the car is brought to a standstill. The instant the door is opened sufficiently to allow the switch 22 to act, the circuit is closed at that point, which energizes the solenoid 10, as above described, and immediately draws the stirrup 12 into engagement with the rack 14 to prevent a further movement thereof, except toward the neutral position. The controller remains locked in this position until the door is closed, breaking the circuit at the switch 22, unless for some reason the operator desires to press the button 24 and holds the same in pressed position while he starts the car. Such circumstances are, of course, unusual and in practice it is always inadvisable to break the current in this manner, as it would defeat one of the objects of the present invention.

Refer now to the modification of the device shown in Fig. 4: In some forms of elevators the controlling mechanism is beneath the floor of the car, the operating handle alone being within the car. In the case herein shown the controlling mechanism 25 is mounted beneath the body of the car and is provided with a sprocket wheel 26 connected by means of a chain 27 with

a similar wheel 28 mounted on a suitable standard 29 within the body of the car. An operating handle 30 is provided, and it is assumed that at least a half revolution is required to bring the car into full motion. The solenoid 10' beneath the car is connected with a circuit and source of electricity 19 as above described and acts in a somewhat similar manner on the opening and closing of the doors on the various floors of the shaft. On the same shaft with the controlling means 25 is mounted a wheel 31, part or all of which, if desired, is divided into a rack construction, provided with a central recess 32, the teeth on the opposite sides of which point toward the recess so that the core of the solenoid, when actuated, is permitted to engage either the central recess 32 or the teeth at opposite sides thereof, in a manner to permit a movement of the wheel 31 to neutral position. The operation of this device is substantially the same as that above described and need not be here repeated.

It may here be noted that the expression "neutral position" is used in the specification and claims to indicate the position assumed by the controlling mechanism when the elevator is at rest; and with reference to the rack on the link 7, the neutral point is that point in which the locking means will engage when the controlling mechanism is in neutral position.

It will thus be seen from the foregoing description that this invention is well adapted to attain the objects hereinbefore set forth in an efficient and reliable manner, it is characterized by a minimum number of parts liable to injury under the exigencies of usage, and that the said parts are inexpensive to construct and install. It is also to be noted that a great saving of space is accomplished by securing the safety device above described to the exterior of the car.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

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

1. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means for controlling the operation of said car adapted

to be moved from an operative to a neutral position, and means carried beneath the body of the car adapted upon said doors being opened to allow movement of the controlling means toward said neutral position but not away therefrom.

2. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, a controller within the car adapted to be moved to either side of a neutral position, and means directly connected with said controller, upon said doors being opened, to allow movement of the controlling means toward the neutral position but not away therefrom.

3. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, an electric circuit, and means carried beneath the car controlled by the opening and closing of said circuit adapted to allow movement of the controlling means toward the neutral position but not away therefrom.

4. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means for controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a circuit, means associated with the doors for opening and closing said circuit, and means carried by the car controlled through said circuit adapted to allow movement of the controlling means toward the neutral position but not away therefrom when said doors are open.

5. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a circuit, and locking means carried beneath the body of the car in said circuit controlled by the opening and closing of the doors adapted to allow movement of the controlling means toward the neutral position but not away therefrom when the doors are open.

6. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a circuit adapted to be opened and closed by the movement of said doors, a rack operatively associated with said controlling means and movable therewith, and means secured to the bottom of the car, controlled by said circuit, adapted to allow movement of the controlling means toward the neutral position but not away therefrom when said doors are open.

7. In an apparatus of the character de-

scribed, in combination, an elevator car, doors at the several floor, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a circuit adapted to be opened and closed by the movement of said doors, locking means operatively associated with and movable by said controlling means, a solenoid secured to the bottom of said car in said circuit, and means controlled thereby for engaging said locking means adapted to allow movement of the controlling means toward the neutral position but not away therefrom when said doors are open.

8. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a normally open circuit adapted to be closed when said doors are open, and locking means carried beneath the body of said car adapted to be actuated when said doors are open to allow movement of the controlling means toward the neutral position but not away therefrom.

9. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a normally open circuit adapted to be closed when said doors are open, locking means carried beneath the body of said car adapted to be actuated when said doors are opened to allow movement of the controlling means toward the neutral position but not away therefrom, and means adapted to open said circuit to release said locking means whereby the car may be moved at the will of the operator.

10. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a normally open circuit adapted to be closed when said doors are open, locking means carried beneath the body of said car adapted to be actuated when said doors are opened to allow movement of the controlling means toward the neutral position but not away therefrom, and a push button in said car for opening the circuit, whereby the locking means may be released to permit the movement of the car at the will of the operator.

11. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved from an operative to a neutral position, a circuit adapted to be closed when said doors are open, a rack associated with said controlling means, a solenoid, means

connected with the core of said solenoid adapted to engage said rack and allow movement of the controlling means toward the neutral position but not away therefrom, when said circuit is closed, and means for guiding the movement of said rack.

12. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved from an operative to a neutral position, a circuit adapted to be closed when said doors are open, a rack associated with said controlling means, a solenoid, means connected with the core of said solenoid adapted to engage said rack and allow movement of the controlling means toward the neutral position but not away therefrom when said circuit is closed, and means for guiding the movement of the core of said solenoid.

13. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a circuit adapted to be closed when said doors are open, a rack associated with said controlling means, a solenoid, means connected with the core of said solenoid adapted to engage said rack and allow movement of the controlling means toward the neutral position but not away therefrom when said circuit is closed, and means for guiding the movements of said rack and core and holding the same in operative relation.

14. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a circuit adapted to be opened and closed by the movement of said doors, a rack

operatively associated with and movable by said controlling means, a solenoid secured beneath the floor of said car, a movable core for said solenoid, and means connected therewith adapted to engage said rack and allow movement of the controlling means toward the neutral position but not away therefrom when said core is moved into engagement therewith.

15. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a circuit adapted to be opened and closed by the movement of said doors, a rack operatively associated with and movable by said controlling means, a solenoid secured beneath the floor of said car, a movable core for said solenoid, and spring means for holding said core out of engagement with said rack.

16. In an apparatus of the character described, in combination, an elevator car, doors at the several floors, means controlling the operation of said elevator car adapted to be moved to either side of a neutral position, a circuit adapted to be opened and closed by the movement of said doors, a rack operatively associated with and movable by said controlling means, a solenoid secured beneath the floor of said car, a movable core for said solenoid, spring means for holding said core out of engagement with said rack, and means for adjusting the tension of said spring.

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

HENRY GEORGE HILLMAN.

Witnesses:

H. M. SEAMANS,
P. A. BLAIR.