C. G. CARPENTER.

SAFETY DEVICE FOR ELEVATORS.

APPLICATION FILED SEPT. 27, 1909.

975,018.

Patented Nov. 8, 1910.

2 SHEETS—SHEET 1.

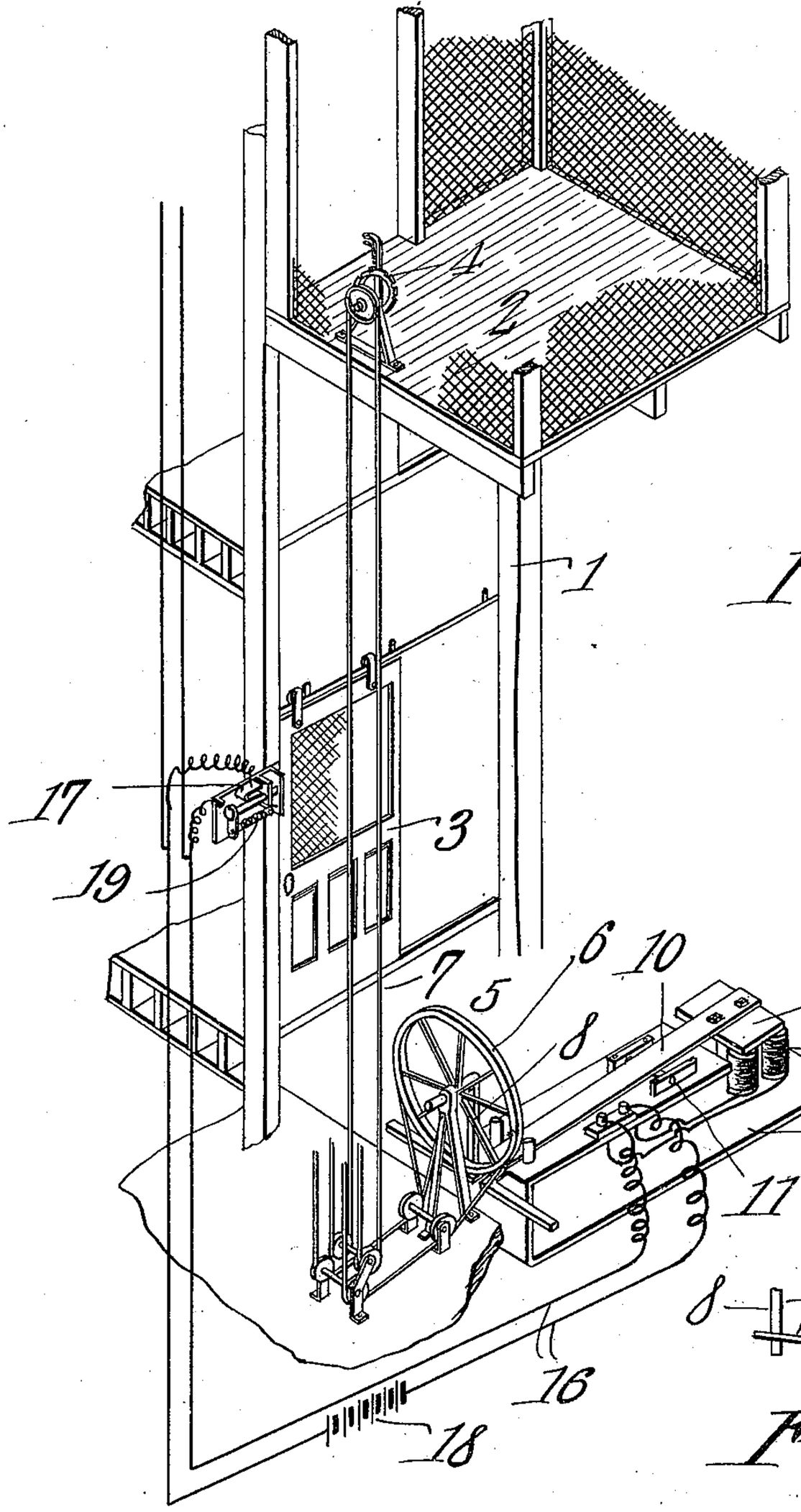



Fig. 1.

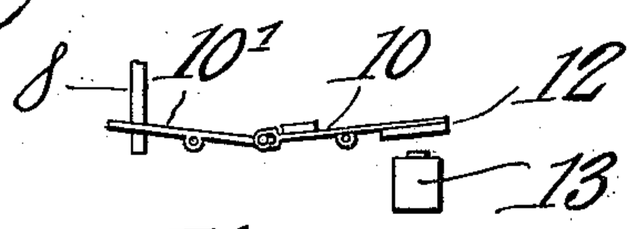



Fig. 4.

Witnesses

E. G. Clement

F. T. Chapman

Inventor

Claude G. Carpenter.

By C. A. Snow & Co.

Attorneys

C. G. CARPENTER.

SAFETY DEVICE FOR ELEVATORS.

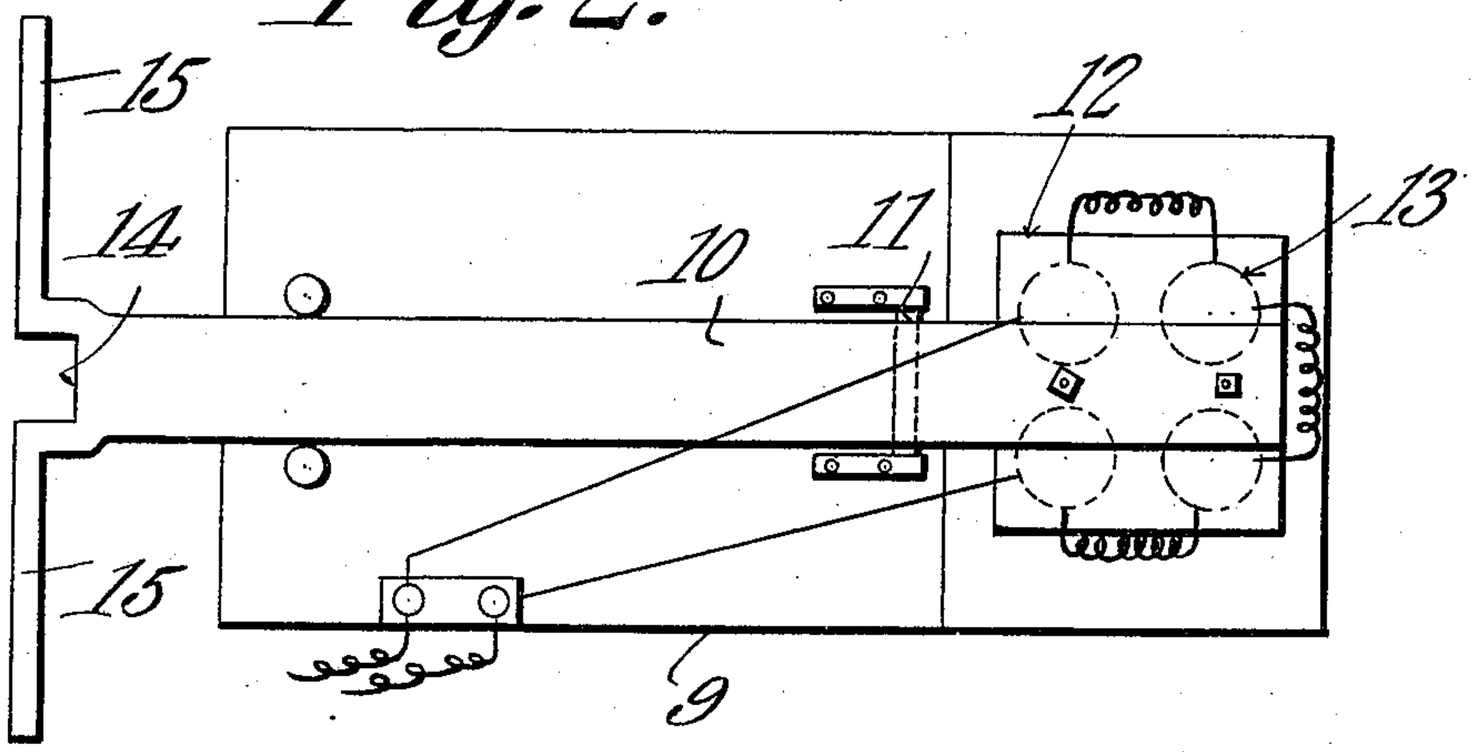
APPLICATION FILED SEPT. 27, 1909.

975,018.

Patented Nov. 8, 1910.

2 SHEETS—SHEET 2.

Fig. 2.



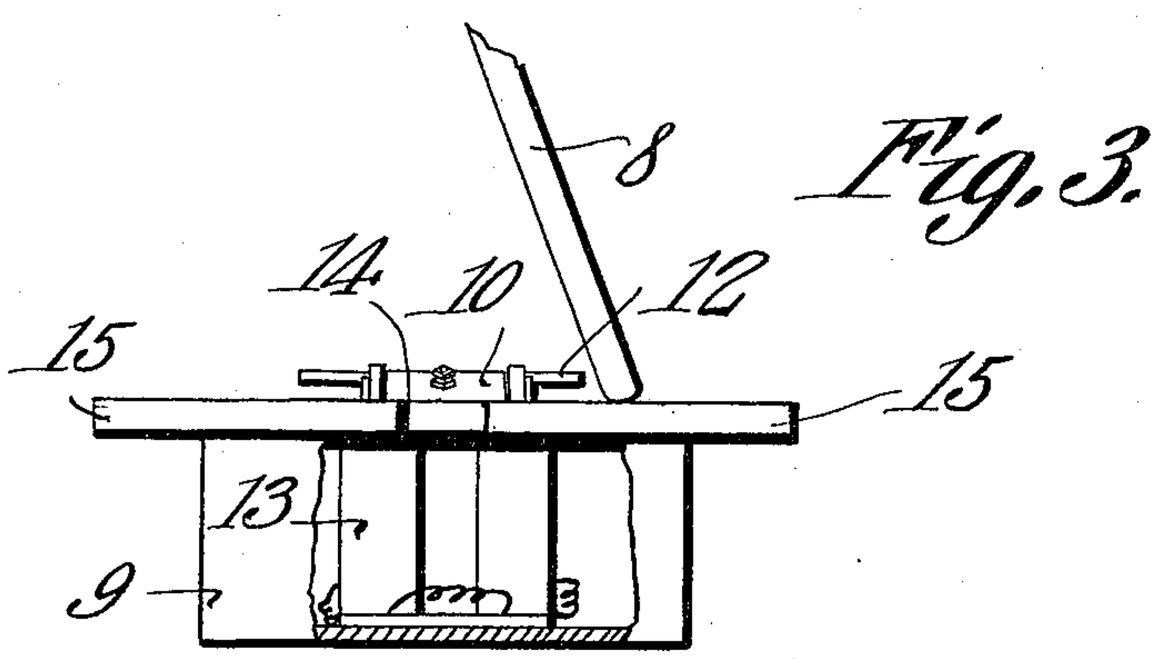




Fig. 3.

Witnesses

E. F. Clement

F. T. Chapman.

Inventor

Claude G. Carpenter.

By C. A. Snow & Co.

Attorneys

# UNITED STATES PATENT OFFICE.

CLAUDE G. CARPENTER, OF FINDLAY, OHIO.

## SAFETY DEVICE FOR ELEVATORS.

975,018. Specification of Letters Patent. Patented Nov. 8, 1910.

Application filed September 27, 1909. Serial No. 519,835.

*To all whom it may concern:*

Be it known that I, CLAUDE G. CARPENTER, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented a new and useful Safety Device for Elevators, of which the following is a specification.

This invention has reference to improvements in safety devices for elevators and its object is to provide a means whereby the controlling mechanism of the elevator is locked against action while the shaft door is open so that the door must be closed before the operator can regain control of the elevator thus preventing the running of the elevator with the shaft doors or door open.

In accordance with the present invention there is provided a locking device preventing the active manipulation of the elevator controlling devices and this locking is electrically controlled so that when one or more of the doors of the shaft are open the operator has no power over the controlling devices to start the elevator in motion.

Where elevators are used frequently the locking device becomes active on the closing of the electric circuit by the opening of the shaft door, but where elevators are used infrequently and it is desirable that the door should remain open for considerable periods of time, the locking device becomes active upon the opening of the electric circuit and is moved to the inactive position on the closing of the circuit.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings:—

Figure 1 is a perspective view, with some parts shown disproportionately large and other parts diagrammatically represented, of an elevator and its shaft with the invention applied thereto. Fig. 2 is a plan view of the locking device forming a part of the present invention. Fig. 3 is an end view with parts broken away of the structure of Fig. 2 showing a phase in the operation of the device. Fig. 4 is a diagram illustrating the manner, of constructing the locking device for movement to the inactive position on the closing of the electric circuit.

Referring to the drawings there is shown a portion of an elevator shaft 1 and a portion of an elevator cage 2 and there is also shown a door 3 such as is commonly used at each floor through which the elevator shaft is continued. The parts used may be all of the ordinary construction and require no special description. It will be understood that the door 3 may be of the type sliding to and fro across the opening leading into the shaft and the door when closed will lock in the usual manner.

On the elevator cage there is located a controller operating device 4 of any approved type and in the bottom of the shaft, in the particular showing of Fig. 1, or elsewhere if desired, there is provided a controlling device 5 such as is frequently used in hydraulic or other like elevator actuating mechanisms. The controller 5 is provided with a sheave 6 around which there extends a cable 7 leading to the manipulating device 4 of the car of the elevator so that by turning the sheave 6 the actuating power for the elevator may be put into and out of service as desired and the direction of movement of the elevator car may be caused in either direction as the operator wills. The shaft of the sheave 6 carries a radial arm 8 the purpose of which will hereinafter appear.

Adjacent to the sheave 6 there is located a suitable frame or support 9 illustratively shown in the drawings since this support may assume a variety of forms as the designer may wish.

Mounted on the frame 9 is a lever 10 extending to each side of its pivot 11. The shorter arm of the lever carries an armature 12 in operative relation to electro-magnets 13, these magnets being shown in the drawings as comprising two sets of horseshoe magnets, but the number and disposition of the magnets may vary as found expedient. The other end of the lever is formed at its extremity with a notch or recess 14 and projecting laterally from this end of the lever on the two sides of the notch 14 are oppositely directed arms 15 in the same plane one with the other. The lever 10 is so disposed with relation to the arm 8 of the sheave 6 that when the controller mechanism is in the neutral or off position the arm 8 is directly over the recess 14 and when the sheave 6 is moved to either active position the arm 8 has its free end then over one or the other of the lateral arms or extensions 15 of the lever 10.

The magnets 13 are included in circuit with conductors 16 leading up the elevator shaft and at each door 3 branch off to a switch 17. One of the conductors 16 includes a battery 18 or other suitable source of electric current.

The switch 17 may be of the type commonly used in connection with doors where the closure of the door causes the rupture of the circuit at the switch while the opening of the door will release the switch to the action of a spring 19 causing the switch to move to the active or closed position.

It will be understood of course that the switch may be reversed in action so that when the door is closed the circuit is closed and when the door is open the circuit is ruptured. The purpose of this will appear hereinafter.

The longer end of the lever 10 overbalances the shorter or armature end thereof so that this longer end is normally in the lowered position and in such lowered position is out of the path of the free end of the arm 8. Under these conditions the operator in the elevator car 2 may manipulate the device 4 to actuate the controller 5 in the usual manner to cause the car to move up or down or to stop as the operator may will.

When the car is brought to a standstill at a floor, the controller 5 and the manipulating device 4 are both in the neutral position, and in this position the arm 8 is in a vertical plane in the particular structure shown in Fig. 1. The operator may now open the door 3 for the entrance of passengers into the car or the exit of passengers therefrom and this will cause a movement of the switch 17 to the closed position thus completing the circuit to the magnets 13 and the energization of the latter and thereby causing the attraction of the armature 12 and the turning of the lever 10 on its pivot 11. This movement of the armature and the lever will cause the elevation of the other end of the lever and because of the position of the notch 14 in line with the arm 8 the corresponding end of the lever is caused to straddle the arm 8 in a manner to prevent rotative movement of the sheave 6 by the manipulating device 4 so that the controlling mechanism 5 is effectually locked against operation and this is effective so long as the door remains open. As soon as the door 3 is closed then the circuit is broken at the switch 17 and the magnets 13 become deenergized when the superior weight of the longer end of the lever 10 will cause a downward movement of such end of the lever and the movement of the notched end of the lever out of the path of the free end of the arm 8 so that now the operator may cause the movement of the controller as he wills. It is thus outside of the volition of the operator to cause the movement of the elevator car when the door has been opened for passengers or for other purposes and before the door has been again closed.

It sometimes happens that a door is closed but not latched and afterward becomes open, or from some accidental reason the door becomes open when the elevator is not opposite the door. Under these circumstances the magnets 13 become energized as before and the lever 10 is moved about its pivot, but the arm 8 is no longer coincident with the recess 14 and is engaged by one or the other of the arms 15, this position being indicated in Fig. 3. Under these circumstances the controller 5 is not locked against movement by the energization of the magnets 13 and only becomes locked when the arm 8 is again brought into coincidence with the recess 14, this being possible by the cam action of the arm 8 on the side extensions 15 moving the lever 10 against the attraction of the magnet 13. The operator may therefore bring the car to a door 3 even though some other door in the elevator be in the open position. The inability of the operator to again start the car even though the door coincident with the car be in a closed position will notify the operator that some other door in the elevator shaft is at the time open and this trouble must be remedied before the elevator can again be put into service.

It will be noted that the overbalancing of the lever 10 may be due to the elongation of the longer arm or suitable counter weights may be applied to the lever as may be found convenient.

It sometimes happens that elevators make infrequent trips but remain at a landing with the door open to receive passengers, and to provide for such condition without the necessity of having the magnet 13 energized during the long wait and so consume power, the switch 17 may be of a type which opens when the door is opened and closes when the door is closed thus energizing the magnet 13 upon the closure of the door and deënergizing it when the door is opened. For this purpose the lever 10 may be made of two sections 10 and 10′ attached together so that when the armature end of the lever is attracted the notched end will move downwardly instead of upwardly while the normal position of the lever is such as to lock the arm 8 against movement. This is diagrammatically indicated in Fig. 5 which figure is to be taken as illustrative of any other means for accomplishing the same purpose. When the magnets 13 are energized then the controller is unlocked and when the magnets 13 are deënergized then the lever 10 with its extension 10′ moves into locking position.

What is claimed is:—

1. In a safety device for elevators, ele-

vator controlling means and an electrically controlled lever having one end notched or recessed longitudinally, the controlling mechanism for the elevator having an arm movable into and out of coincidence with the notched end of the lever about an axis substantially parallel with said lever.

2. In a safety device for elevators, an electrically controlled lever having one end longitudinally notched or recessed and provided with lateral extensions on each side of the notch, and a controlling mechanism for the elevator having an arm movable into and out of coincidence with the notched end of the lever and into operative relation with the side extensions of said lever about an axis substantially parallel with said lever.

3. In a safety device for elevators, an electrically controlled lever carrying at one end an armature and at the other end overbalancing the armature end and provided with a longitudinal notch at the extremity and side extensions at the notched extremity, and a controlling mechanism for the elevator having an arm movable into and out of coincidence with the notched end of the lever and into operative relation to said side extensions thereof about an axis substantially parallel with said lever.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CLAUDE G. CARPENTER.

Witnesses:

MARION G. FOSTER,

EDNA C. STANTON.