C. M. ALDRED.

ELEVATOR FLOOR SAFETY SWITCH.

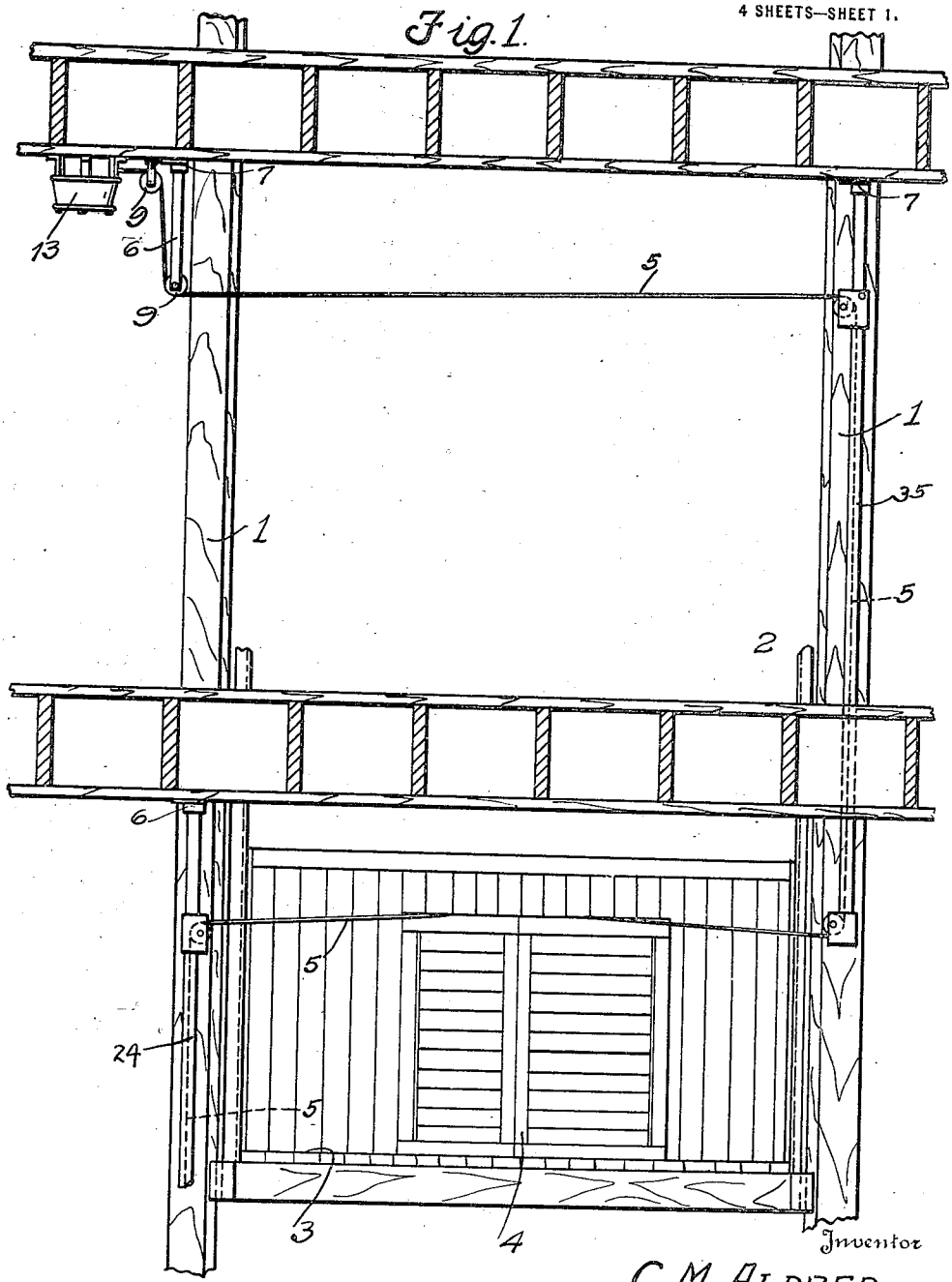
APPLICATION FILED DEC. 22, 1921.

1,436,137.

Patented Nov. 21, 1922.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

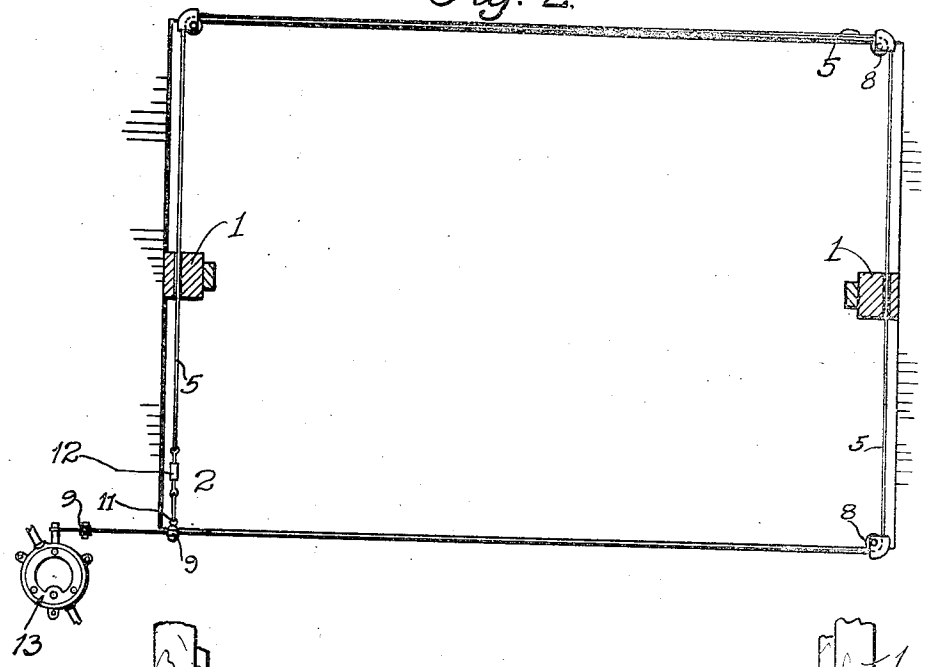
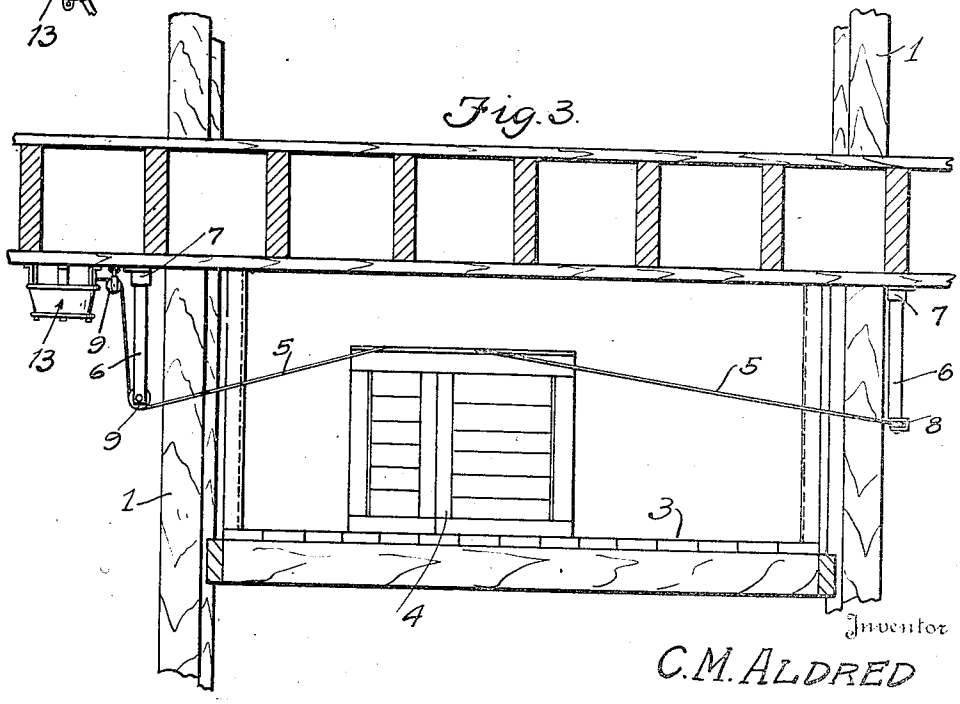


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

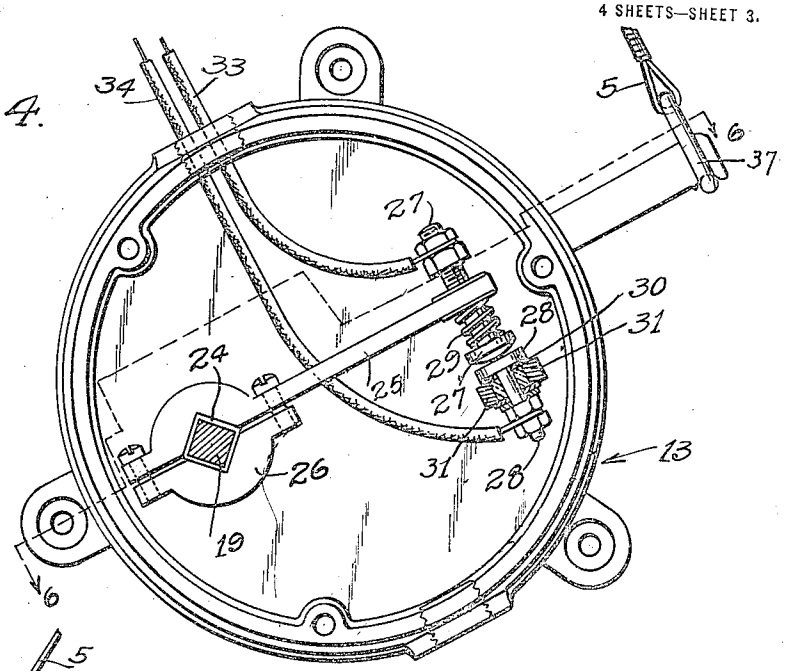
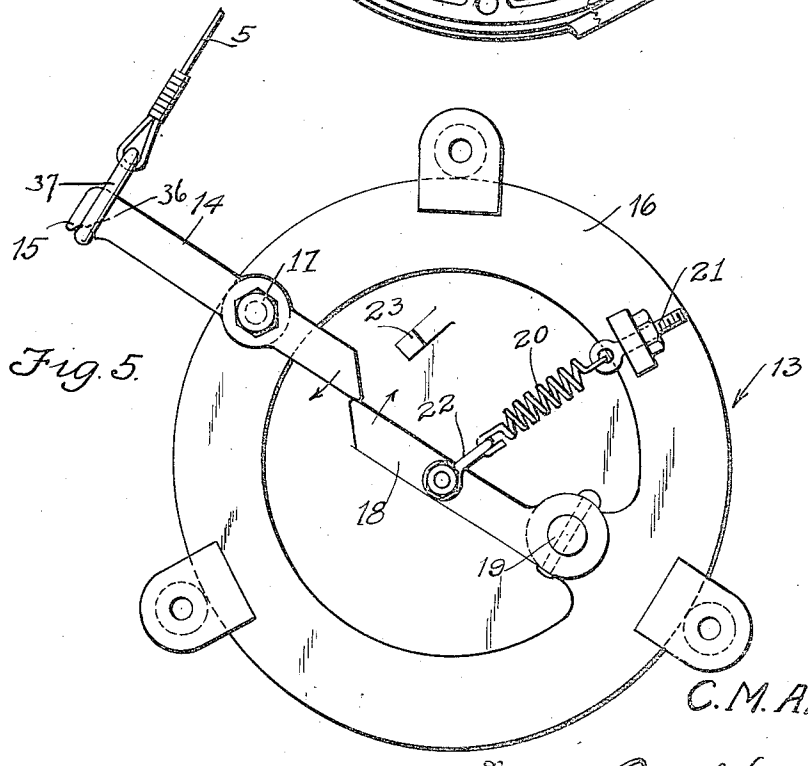


Fig. 5.



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4 SHEETS—SHEET 4.

Fig. 6.

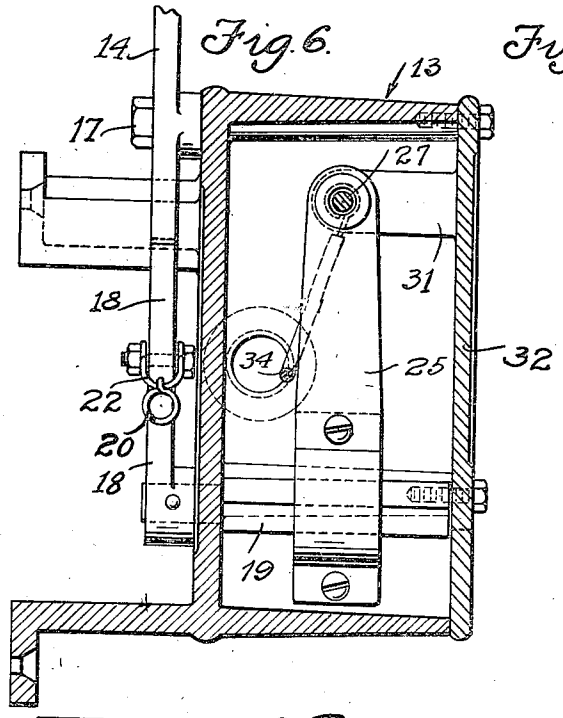
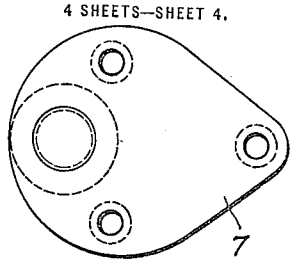


Fig. 7.



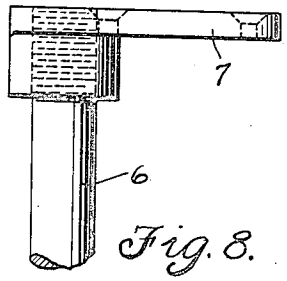
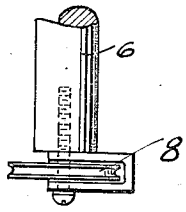


Fig. 8.



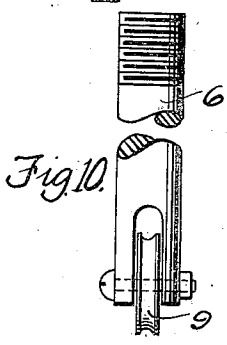


Fig. 10.

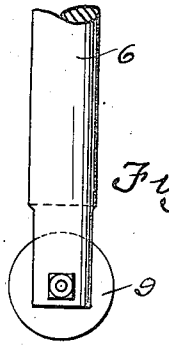


Fig. 11.

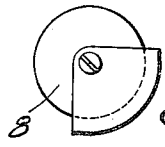


Fig. 9.

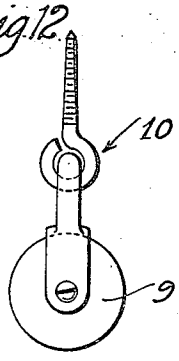


Fig. 12.

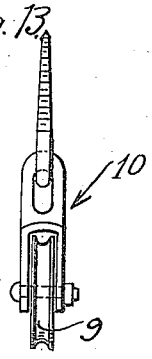


Fig. 13.

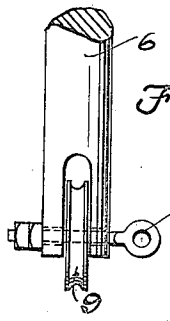


Fig. 14.

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UNITED STATES PATENT OFFICE.

CURTIS M. ALDRED, OF CHARLOTTE, NORTH CAROLINA.

ELEVATOR FLOOR SAFETY SWITCH.

Application filed December 22, 1921. Serial No. 524,241.

To all whom it may concern:

Be it known that I, CURTIS M. ALDRED, a citizen of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented a new and useful Elevator Floor Safety Switch, of which the following is a specification.

The object of my invention is to provide a novel apparatus for use in connection with elevators to protect both the elevator and freight or passengers on same, by causing the elevator to stop in the event that any object projects out of the elevator while it is operating; and it is an especial object of my invention to provide the novel safety switch disclosed and the novel arrangement of means for operating said switch. I attain these and other objects of my invention by the mechanism illustrated in the accompanying drawings, in which:—

Figure 1 is a front elevation of the apparatus installed for two or more floors;

Fig. 2 is a top plan of the apparatus arranged about the elevator hatch;

Fig. 3 is a front elevation showing how projecting freight on the elevator engaging the safety wire trips the switch to stop the elevator.

Fig. 4 is a front view of the switch with cover removed;

Fig. 5 is a rear view of the switch;

Fig. 6 is a section on line 6—6 of Fig. 4;

Fig. 7 is a top view of member 7;

Fig. 8 is a side elevation of members 6, 7 and 8;

Fig. 9 is a bottom plan of pulley 8;

Fig. 10 is a side elevation of members 6 and 9;

Fig. 11 is a similar view at right angles to Fig. 10;

Fig. 12 is an elevational view of member 10;

Fig. 13 is a similar view at right angles to Fig. 12; and

Fig. 14 is a detail elevational view of member 11.

Like characters of reference designate like parts in each of the several views.

Referring to Figs. 1, 2 and 3, there is illustrated an elevator shaft or hatch 2 having an elevator 3 which is guided by the guide posts 1, all of usual construction, an elevator of the freight-carrying type being illustrated. On elevator 3, in Figs. 1 and 3 is illustrated an article of freight 4 which has been carelessly placed on the elevator so that a corner of it protrudes beyond the elevator hatch in a position to contact with the switch-operating safety or guard wire or cable 5. It will of course be understood that member 5 may be either a wire, cable or chain of any suitable material. I provide suitable pipes 35 through which the wire 5 is run and which protects the wire. Attached to the ceiling by flanges 7 are suitable pulley hangers 6 carrying suitably arranged pulleys, such as the vertically arranged pulleys 9 and the horizontally arranged pulleys 8 as required by the particular installation conditions. I also provide suitable screw-eye pulleys 10 where it is necessary for the cable 5 to be positioned in proximity to the ceiling or wall. I also provide a turn buckle 12 as illustrated in Fig. 2 where desirable to effect a proper operation of the apparatus.

The end of wire or cable 5 is operatively connected with switch lever 14 in some suitable manner, preferably by the link 37 illustrated in Figs. 4 and 5, and which detachably engages the outer end 15 of lever 14. I provide a suitable casing 16 for the switch mechanism. Lever 14 is mounted on casing 16 by means of a suitable pivot 17. The inner end of lever 14 normally engages the free end of contacting lever 18, which latter lever is pinned on the square shaft 19. The lever 18 is held to its normal position by a suitable spring 20 which connects the lever 18 to the casing 16 under spring tension. Spring 20 is secured to casing 16 by any suitable means such as the adjustable fastening 21, and is secured to lever 18 by any suitable means such as the clevis 22. I also provide a suitable stop 23 on casing 16 positioned to engage lever 18 after it has been released by lever 14. I provide notch 36 for link 37 on the end of lever 14.

Referring to Fig. 4, I provide suitable insulations 24 for the square shaft 19 which is secured to the contact arm 25 by a suitable clamp 26. Mounted on the end of contact arm 25 is a suitable contact member 27 and which is provided with a cushion-spring 29 interposed between the head of the contact member 27 and the contact arm, whereby the member 27 has a degree of cushioning. The head of contact member 27 normally engages the contact member 28, which latter is connected with the electrical conductor 34 while contact 27 is connected with the electrical conductor 33

in the electric controlled circuit which operates the elevator in a suitable conventional manner. I provide insulated washers 30 on contact member 28, as shown in Fig. 4, to insulate same from the metal support 31, mounted on or integral with cover 32, as shown in Fig. 6.

Square shaft 19 is machined on each end and the switch casing and cover are drilled to receive the shaft, one end of which projects through the casing, as shown in Figs. 6 and 5.

The switch mechanism 13 is wired into electric connection with any controlled circuit of switch board or any electric apparatuses for controlling passenger or freight elevators. The switch is held in its normal position, as shown in Fig. 5, by the safety or guard wire 5 which is placed around the elevator hatch either plumb with the floor, or suitably spaced between the floor and elevator hatch so that projecting freight on the elevator that might otherwise catch or hang on the floor or ceiling, when the elevator is ascending or descending, would come into contact with the safety wire 5 with the result that the increased tension would swing lever 14 free from lever 18. The link 37 attached to the end of wire 5 will slip off from the notch 36 on the end of lever 14, thereby preventing the wire from being broken. Lever 18 being disengaged from lever 14 will move in the direction of the arrows in Fig. 5 under the tension of spring 20, and correspondingly move the shaft 19, which in turn will operate the contact arm 25 and the contact member 27 to break its electrical contact with contact 28, thereby opening the controlled circuit through the switch board or controlling system of the elevator and stopping the elevator automatically.

The length of rods 6 which carry the pulleys 8 and 9 over which the safety wire 5 is mounted is determined by the time required for the car to stop after the switch is thrown.

Whenever there is only one opening in the elevator, or the elevator is protected by an enclosure, except for one instance, the wire 5 will be arranged as shown in Fig. 1.

If the switch mechanism is not properly adjusted or if the safety wire 5 becomes slack or breaks, the elevator will not run. This result affords protection to both the elevator, freight, or passenger, as the safety wire holds the switch closed in running position under normal conditions. If the safety wire breaks it throws the safety switch to stop the elevator. The switch may be used for either D. C. or A. C. current, two phase and three phase and with any suitable contact elements and contact arms.

It is understood that I may make any suitable modification in the details of the mechanism disclosed not involving a departure of the principle of construction and operation disclosed and hereinafter claimed.

What I claim is:—

1. In a protective apparatus for elevators, the combination of a wire arranged around and in close proximity to an elevator hatch, means for supporting the wire in the desired relation to the hatch, an electric switch mechanism with which the wire is operatively engaged, the normal tension of the wire functioning to hold the switch in the normal running or closed position, the switch being arranged to operate the elevator controlling apparatus and stop the elevator when operated by any interference with the normal tension of the wire on the switch by a protruding object engaging the wire.

2. In a protective apparatus for elevators, the combination of a wire arranged around and in close proximity to an elevator hatch, means for supporting the wire in the predetermined relation to the hatch required to permit the stopping of the elevator before it reaches a floor after operation of the hereinafter mentioned switch mechanism, an electric switch having an operating lever releasably engaged by the aforesaid wire the normal tension of the wire functioning to hold the switch in the normal running or closed position, the switch being arranged to operate conventional elevator controlling apparatus to stop the elevator when the wire is engaged by any protruding object on the elevator.

3. In an elevator floor safety switch, the combination with contact members connected with electrical conductors in circuit with electrical elevator operating apparatus, a switch casing having a bracket support on which one of the contact members is rigidly supported, a swingable contact arm on which the other contact member is movably mounted, a shaft on which the contact arm is clamped, a lever affixed to said shaft to control its position and movement, a second pivoted lever operatively engaging the lever attached to the shaft and holding the latter in its normal position under a degree of tension, a spring regulating the tension, and a guard wire detachably engaged to the outer end of the second lever, said wire being suitably disposed around and in proximity to the elevator hatch, whereby any protruding object on the elevator will engage the wire and operate the switch, and whereby a similar result will follow if for any reason the wire becomes slack or is broken, thus stopping the elevator and permitting accidents.

4. In an elevator floor safety switch, the combination with contact members connected with electrical conductors in circuit with electrical elevator operating appara-

tus, means for supporting one of the contact members in stationary position, means for supporting the other contact member in movable position but normally in contact with the other contact member, adjustable spring tensioning means normally functioning to retain the movable contact member in contact with the stationary contact member, a pivoted lever engaging the means for supporting the movable contact member but releasable therefrom under increased tension, and a guard wire attached to said lever and arranged around the doorways of the elevator hatch in position to be engaged by any object protruding from the elevator, whereby to operate the switch under such conditions and stop the elevator and avert accidents.

5. In combination with the apparatus described in claim 4, rods mounted on the ceiling or floors of the building in proximity with the elevator hatch, said rods having suitably disposed pulleys for supporting the guard wire at a distance of predetermined extent from the floors or ceiling to allow time for the apparatus controlling the elevator to bring same to a stop before reaching the ceiling or floor following the tripping of the safety switch by the operation of the guard wire by any protruding object.

CURTIS M. ALDRED.