H. W. SAYLES.

SAFETY APPLIANCE FOR ELEVATORS.

APPLICATION FILED APR. 22, 1910.

982,536.

Patented Jan. 24, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

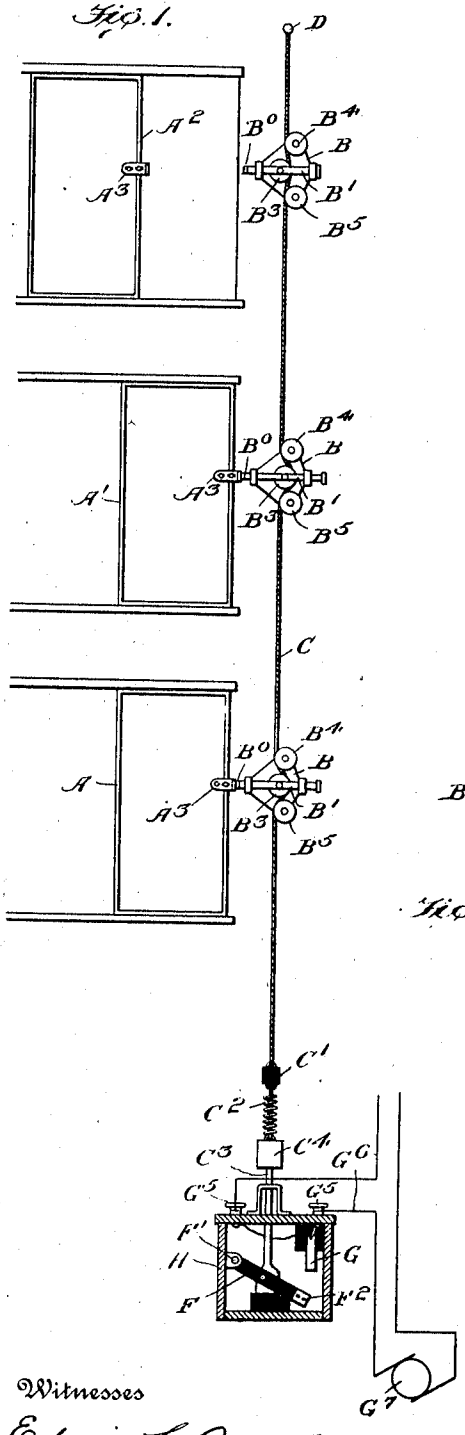


Fig. 2.

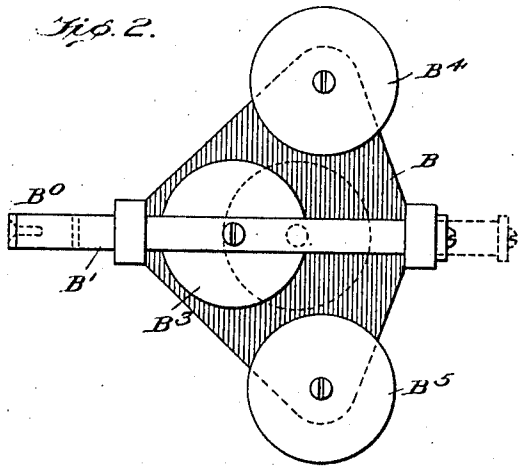


Fig. 3.

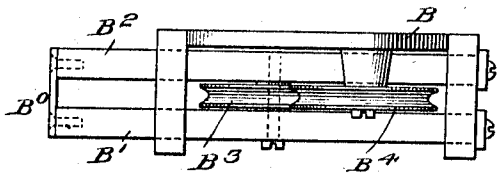
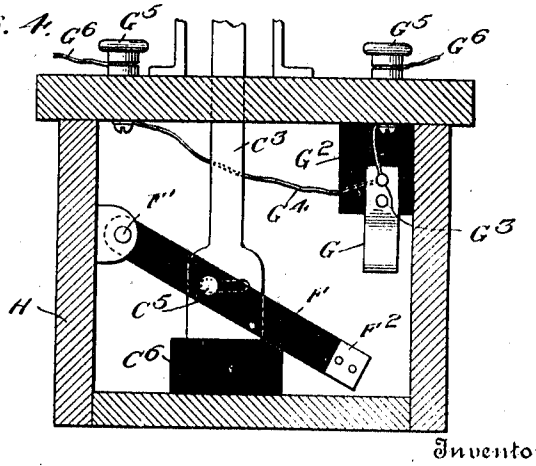


Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 7.

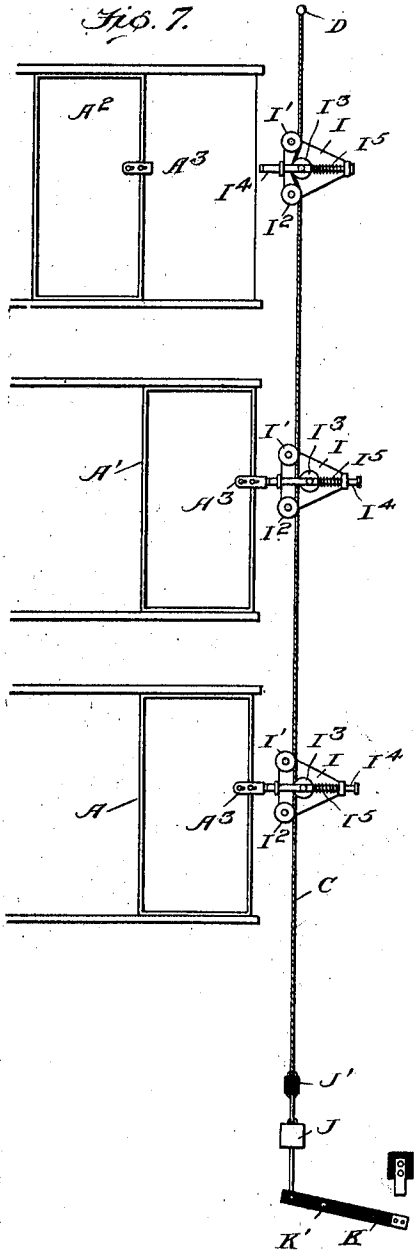


Fig. 5.

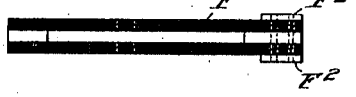


Fig. 6.

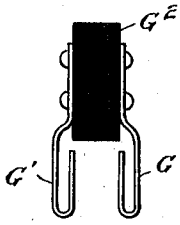


Fig. 8.

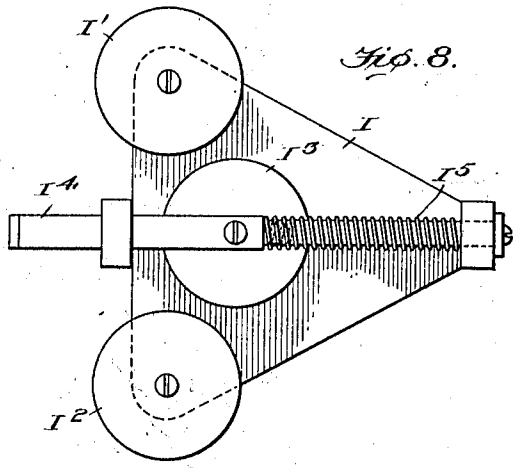
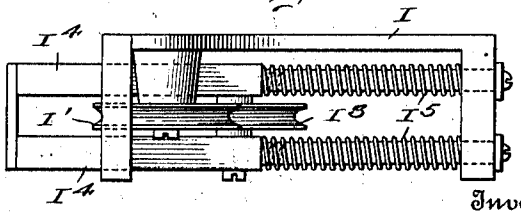


Fig. 9.



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Witnesses

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UNITED STATES PATENT OFFICE.

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SAFETY APPLIANCE FOR ELEVATORS.

982,536. Specification of Letters Patent. Patented Jan. 24, 1911.

Application filed April 22, 1910. Serial No. 556,984.

To all whom it may concern:

Be it known that I, HENRY W. SAYLES, citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Safety Appliances for Elevators, of which the following is a specification, reference being had therein to the accompanying drawing.

A large proportion of elevator accidents are due to doors being open when they should be closed, and the object of this invention is to make it impossible to start the elevator until the doors are properly adjusted. This object is attained by putting the elevator-operating motor out of commission so long as any door is open.

In the accompanying drawings, Figure 1 shows my devices in side elevation, the doors of three landings being shown diagrammatically and parts not essential to an understanding of the invention being omitted. Figs. 2 and 3 are enlarged views showing in elevation and plan respectively, certain cable deflecting devices, seen also in Fig. 1. Fig. 4 is an enlarged elevation of certain circuit opening and closing devices. Figs. 5 and 6 are detail views of the devices seen in Fig. 4. Fig. 7 is a view similar to Fig. 1, showing a slightly modified construction. Figs. 8 and 9 are enlarged views corresponding to Figs. 2 and 3 but showing the modified construction.

In these views, A, A′, A^2 represent the usual laterally sliding well doors, or doors of the elevator shaft, each provided upon one side with an adjustable push-bar A^3. To the wall of the shaft, or other suitable support, and opposite the push-bars, respectively, are fixed frames B, each provided with a sliding member B^0 made up of two parallel bars B′, B′, in the same horizontal plane and connected together at their ends. Each member B^0 alines with the corresponding push-bar and slides in ways in its frame. Between the two bars a pulley B^3 is rotatably mounted to move with the bars, and upon the frame, above and below the sliding member, respectively, two pulleys B^4, B^5 are rotatably fixed, in the plane of the pulley B^3 and at a greater distance from the door opening. A cable C, fixed at D, above, in the plane of the pulleys, passes downward between the pulleys B^3 on the one side and the sets of pulleys B^4, B^5 on the other, the pulleys being so located relatively that when the cable is straight it is tangent to all. The parts are so arranged that when any door is closed its push-bar forces the sliding member from the door opening and thus moves its pulley between the two companion pulleys deflecting the cable and, since the upper end of the same is fast, virtually shortening it or drawing its lower portion upward. The lower end of the cable is connected to a circuit breaker which, so long as all the doors are closed, holding the cable deflected at each set of pulleys, is held in circuit closing position, but moves from that position whenever owing to the opening of any door the cable is permitted to straighten at the corresponding point. As shown, this circuit breaker or switch is mounted in a suitable frame H and consists of an insulating arm F pivoted at F′ near one end and having at its opposite end and upon opposite faces of the arm electrically connected contact pieces F^2 which when the arm is swung upward on its pivot are pressed between spring contact pieces G, G′ of phosphor bronze fixed to two opposite faces of a fiber block G^2 secured in the frame H. These contact pieces are connected, respectively, by wires G^3, G^4, and binding posts G^5 with the ends of the divided conductor G^6, as shown, of the circuit including the motor G^7 which operates the elevator, but obviously the circuit thus broken may be any circuit which controls the operation of the motor.

The cable C is preferably connected with the switch arm, between its ends, through an insulator C′, a coiled spring C^2, and a rod C^3, the latter being provided with a weight C^4, and having its lower end flattened and slotted to receive a pivot C^5 fixed in the switch arm. Preferably, this rod when in its lower position rests upon a fiber block C^6 fixed in the frame.

Obviously, the cable is virtually longer or shorter according as any door is open or closed, and when all the doors are closed, its length is such that it holds the switch closed, while if any door be open, its length is increased allowing the switch arm to fall by gravity, the force of which is increased by adding the weight. It follows that when any door is open, the motor controlling circuit is broken and consequently the motor is ineffective for moving the elevator, regardless of the opening or closing of any circuit

by the operator. It is to be noted that the doors themselves are free from all mechanism other than the push-bars, which are provided in order that the extent of the cable's deflection may be conveniently adjusted, if desired. Indeed, the apparatus is fully operative without push bars if the sliding bars be placed in position to be actuated directly by the doors themselves or by any attachment forming a part of the door member of the combination.

Figs. 7, 8, 9 illustrate a sort of reverse construction wherein the switch is operated by the virtual shortening of the cable. In this form, the frames B of the primary form are replaced by frames I, and the pulleys I′, I², I³ so placed that when the door is closed they do not deflect the cable. The compound bar which carries the movable pulley is urged toward the door opening by springs I⁵, whereby when the door is open the bodily movable pulley is pressed between the other two, deflecting the cable, but when the door is closed the sliding bar, I⁴, is pushed back with its pulley allowing the cord to straighten. In this form, the switch arm K, is centrally pivoted at K′, and the cable, which is provided with the insulator J′ and weight J, is attached or connected to the end of the arm. Thus when any door is open the cable is deflected at the corresponding point, and the motor controlling circuit is broken; but when all the doors are closed, gravity closes the circuit putting the motor into commission, so that it may be controlled by the operator in the usual way.

Throughout this application, the term cable is used generically to designate a chain, wire, or other cable.

What I claim is:

1. The combination with a door member of an elevator shaft, of an elevator operating electric motor, a circuit controlling the operation of the motor, a circuit breaker in said circuit, a weighted cable connected with said circuit breaker and extending upward alongside the door opening, a frame fixed alongside the door opening, pulleys rotatably fixed to said frame on one side of the cable, a horizontally sliding member mounted in said frame and projecting into the path of the door member, and a pulley mounted upon said sliding member in position to change the course of the cable between the companion pulleys when the sliding member moves in the proper direction.

2. The combination with a series of elevator-shaft doors, of an elevator-operating electric motor, a circuit controlling the operation of the motor, a circuit breaker in said circuit, a vertical cable, fixed above, passing alongside the sides of all the door openings and connected below to said circuit breaker, frames fixed alongside the path of said cable and opposite said doors, respectively, horizontally sliding members mounted in said frames, respectively, pulleys rotatably fixed to each of said frames on one side of the cable and respectively above and below said sliding member, a pulley rotatably mounted on said sliding member and upon the opposite side of the cable, and an adjustable push-bar mounted upon each door in alinement with the corresponding sliding member.

3. The combination with the door of an elevator shaft, of an elevator operating electric motor, a circuit controlling the operation of the motor, a vertically swinging circuit breaker in said circuit, a weight tending to open the circuit breaker, a cable connected with the circuit breaker and extending upward alongside the door opening, a frame fixed alongside the door opening, a sliding member mounted on the frame to slide toward and from the door member, and pulleys mounted upon the frame and sliding member upon opposite sides of the cable and in position to hold the cable deflected when the door is closed, whereby the weight is prevented from opening the circuit breaker.

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

HENRY W. SAYLES.

Witnesses:
E. MITGER,
GEO. B. SUCHER.