T. T. BOYLE.

ELEVATOR SAFETY DEVICE.

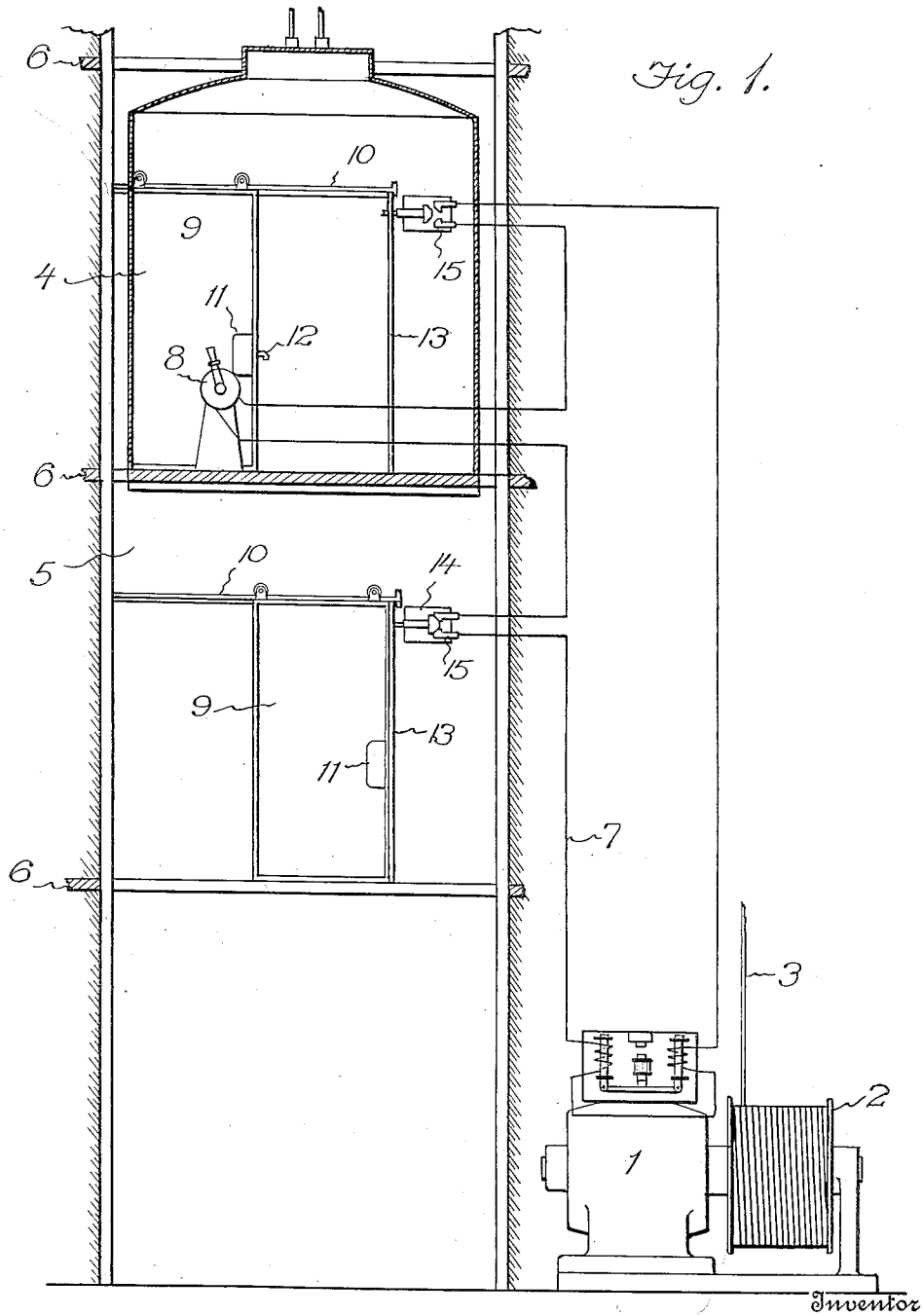
APPLICATION FILED AUG. 27, 1913.

1,125,948.

Patented Jan. 26, 1915.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

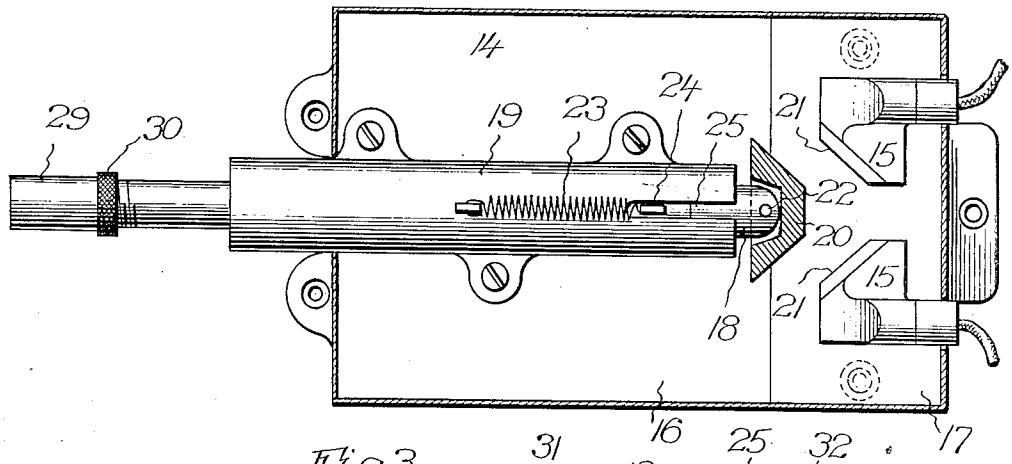


Fig. 3.

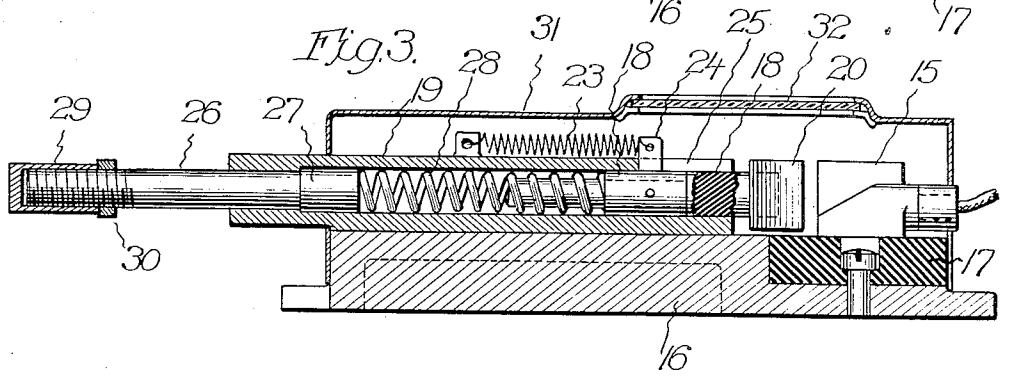


Fig. 4.

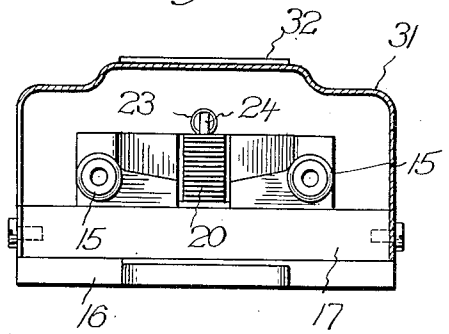
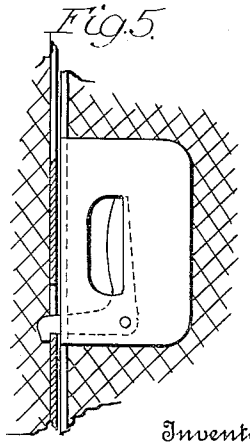


Fig. 5.



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UNITED STATES PATENT OFFICE.

THEODORE T. BOYLE, OF DETROIT, MICHIGAN, ASSIGNOR TO DEADLOCK ELEVATOR SAFETY COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ELEVATOR SAFETY DEVICE.

1,125,948. Specification of Letters Patent. Patented Jan. 26, 1915.

Application filed August 27, 1913. Serial No. 786,824.

To all whom it may concern:

Be it known that I, THEODORE T. BOYLE, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Elevator Safety Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

Elevator accidents frequently occur because of the carelessness of the operator in starting his car before the shaft door is fully closed, passengers being caught and injured in trying to leave or enter the car while it is moving. Many accidents also happen because it is possible for a careless operator to leave a door open or unlatched.

This invention relates to a safety device for elevators and its object is to provide a simple and convenient arrangement of electric circuit and devices therein so constructed and arranged as to preclude all liability of accidents due to the leaving of a door open or unfastened or due to the movement of the car while any door is open or unfastened.

To these ends the invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view indicating an elevator well and car, and safety mechanism embodying the invention indicated in operative position thereon; Fig. 2 is a plan view of a circuit breaker showing its casing in section; Fig. 3 is a longitudinal section through the same; Fig. 4 is an end elevation thereof with the casing in section; and Fig. 5 is a detail showing an elevator door latch and strike plate in elevation.

For convenience of illustration, an electric motor 1 is shown for actuating the winding drum 2 to wind the hoisting cable 3 thereon and lift the elevator car or cage 4 in the shaft or well 5 past the several floors 6 in the usual manner, but it will be understood that any electrically controlled power mechanism for actuating the elevator may be used, the motor being controlled by an electric circuit 7 arranged in any suitable manner and operating to stop and start the motor upon the breaking or making of said circuit.

The controller 8 on the elevator car is arranged in the circuit 7 in the usual manner so that the operator may control the movement of the car and stop the same opposite any one of the landings or floors 6 to discharge or take on passengers through the door openings which are closed by the well or shaft doors indicated at 9. These doors are mounted in the usual manner upon tracks 10 and are each provided with the usual latch or lock 11 having a catch bolt 12 to enter an opening in a striker plate 13 and fasten the door in closed position.

Mounted upon the wall of the elevator shaft, adjacent to the forward edge of each doorway, is a circuit breaker 14 the posts or terminals 15 of which are connected in the circuit 7, each post being insulated from the base 16 of the circuit breaker by means of an insulating block 17. These posts or terminals 15 are spaced apart and to electrically connect them and complete the circuit, a plunger 18 mounted in a suitable tubular guide 19 on the base 16, is provided with a head 20 of triangular form in plan view to engage between the inclined contact faces 21 of the posts and electrically connect them, the plunger 18 being formed of suitable insulating material to insulate said head from the guide in which it reciprocates. This head is preferably so attached to the end of the plunger that it may swing or turn thereon, the end of the plunger extending into a recess in the head which is larger than the diameter of the plunger and secured therein by a pin 22 extending transversely through the head and plunger. This plunger is normally held retracted, by means of a coiled spring 23, one end of which is attached to a stud 24 projecting laterally from said plunger through a slot 25 in the top of the casing 19. The opposite end of the spring is secured to a lug on

the casing, and thus the plunger is normally held retracted with its head 20 out of contact with the contact surfaces 21 of the posts 15.

Projecting into the end of the tubular casing 19 opposite that into which the plunger 18 extends, is a rod 26 having a head 27 on its inner end to engage the end of the tubular casing and to be engaged by a coiled spring 28 within the bore of the casing between it and the inner portion of the plunger 18. The outer end of the rod 26 is provided with a cap 29 having screw-threaded engagement with said end so that it may be adjusted thereon and is held in its adjusted position by a lock nut 30. By means of the cap, the overall length of the rod may be changed so that when the forward edge of the door is brought into contact with the cap in closing the door, the plunger head will be moved into contact with the terminal posts to close the circuit.

When the operator brings his car to a landing, and opens the door, first unlatching it and then moving it longitudinally away from the side of the door opening adjacent to which the circuit breaker is located and out of contact with the head of the plunger rod 26, the spring 23 will at once act to retract the plunger 18 and move its head 20 out of contact with the contact surfaces of the posts 15. The electrical circuit 7 will thus be broken and the breaking of this circuit will at once stop the motor, provided it is running, or will prevent its being started by means of the controller 8 if it is standing still. Any movement of the elevator car will therefore be prevented as long as the circuit is open, and the operator will be unable to move his car away from a landing or to move his car at all if any one of the doors is open.

The closing of a door brings its forward edge against the end cap of the rod 26 forcing said rod into its casing and pressing the spring 28 against the end of the plunger 18 which in turn is forced out of the casing against the action of the light spring 23, bringing the head 20 into contact with the terminal posts 15. The length of the rod 26 is so adjusted by means of its cap, that the spring 28 will be under compression when the head of the plunger 18 is in contact with the posts 15 and the door is fully closed and latched. The device thus forms a sort of spring buffer for the door which will act to throw or rebound the door to open position should the latch fail to catch and lock the door. The strength of the spring 28 is such that it will move the door backward, unless said door is held closed by the latch 11 and it will therefore be impossible for the operator to move his car unless every door is closed and locked as well. This spring acts at once to open the door if it is not latched and the pressure on the plunger being relieved thereby, the spring 23 will immediately draw the head 20 out of contact with the terminal posts and break the circuit. The operator is therefore precluded from moving his car at all until the door is not only fully closed but locked.

As shown in the drawing the movable parts of the circuit breaker may be inclosed within a suitable metal casing 31 secured to the base 16 in any suitable manner. The parts are thus protected from dust or dirt as well as oil and water, and are out of sight except the contact members which may be seen through an opening 32 in the top of the casing closed by a suitable glass or other transparency.

Obviously, changes may be made in the construction and arrangement of parts without departing from the spirit of my invention and I do not therefore limit myself to the form or arrangement shown.

Having thus fully described my invention what I claim is:—

1. A circuit breaker comprising a base member, terminals carried thereby, a casing on said base member, a head supported from said casing and movable relatively thereto to engage said terminals, an extensible rod movable in said casing and adapted to shift said head, a casing upon said base member inclosing said terminals and said head and provided with a transparent plate, whereby a movement of said head can be observed.

2. A circuit breaker for elevators, adapted to be closed by a door comprising a longitudinally movable plunger, a spring for actuating the plunger in one direction, a longitudinally movable member arranged in axial alinement with the plunger, said member being adapted to be engaged by the edge of a door and moved thereby, and yielding means interposed between the end of said member and the adjacent end of the plunger.

3. A circuit breaker comprising terminals, a tubular guide casing, a longitudinally movable plunger in the casing having a head at one end that is adapted to engage the terminals, a spring to normally hold the plunger moved with its contact head out of engagement with the terminals, a member slidable within the casing, and a coiled spring within the casing between the inner end of said member and the inner end of the plunger.

4. A circuit breaker comprising a base member, a tubular casing on the base member, an insulating block on the base member, terminal members in the electrical cir-

cuit upon the insulating block, a plunger slidable within the casing and having a head adapted to engage the terminal members, a spring for normally holding the plunger moved out of engagement with the terminal members, a rod slidable in the tubular casing in axial alinement with the plunger, and a coiled spring within the tubular casing between the inner end of the rod and the inner end of the plunger.

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

THEODORE T. BOYLE.

Witnesses:
ANNA M. DORR,
G. E. MCGRANN.