

(No Model.)

S. D. STROHM.
SAFETY DEVICE FOR ELEVATORS.

No. 583,696.

Patented June 1, 1897.

Fig. 1

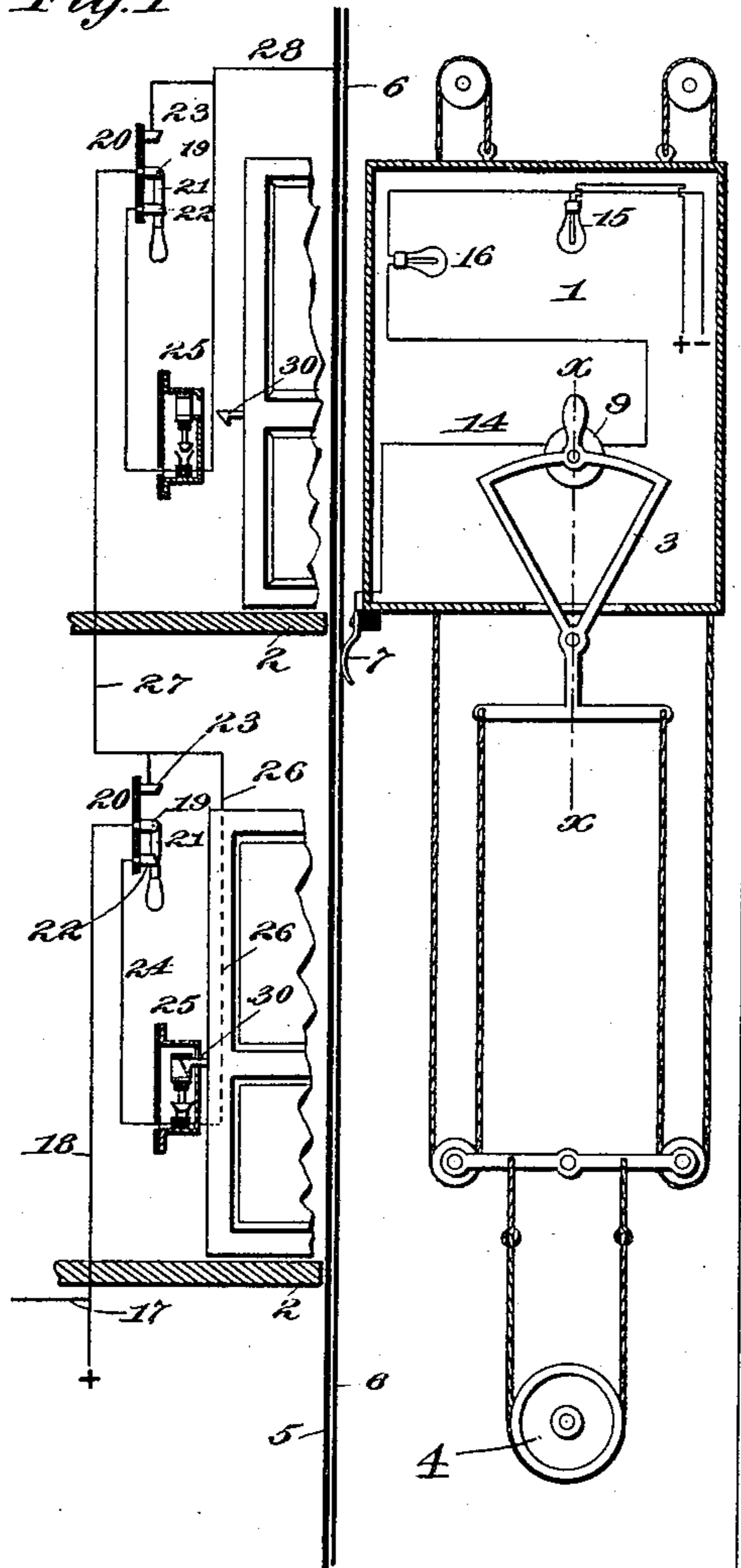


Fig. 2

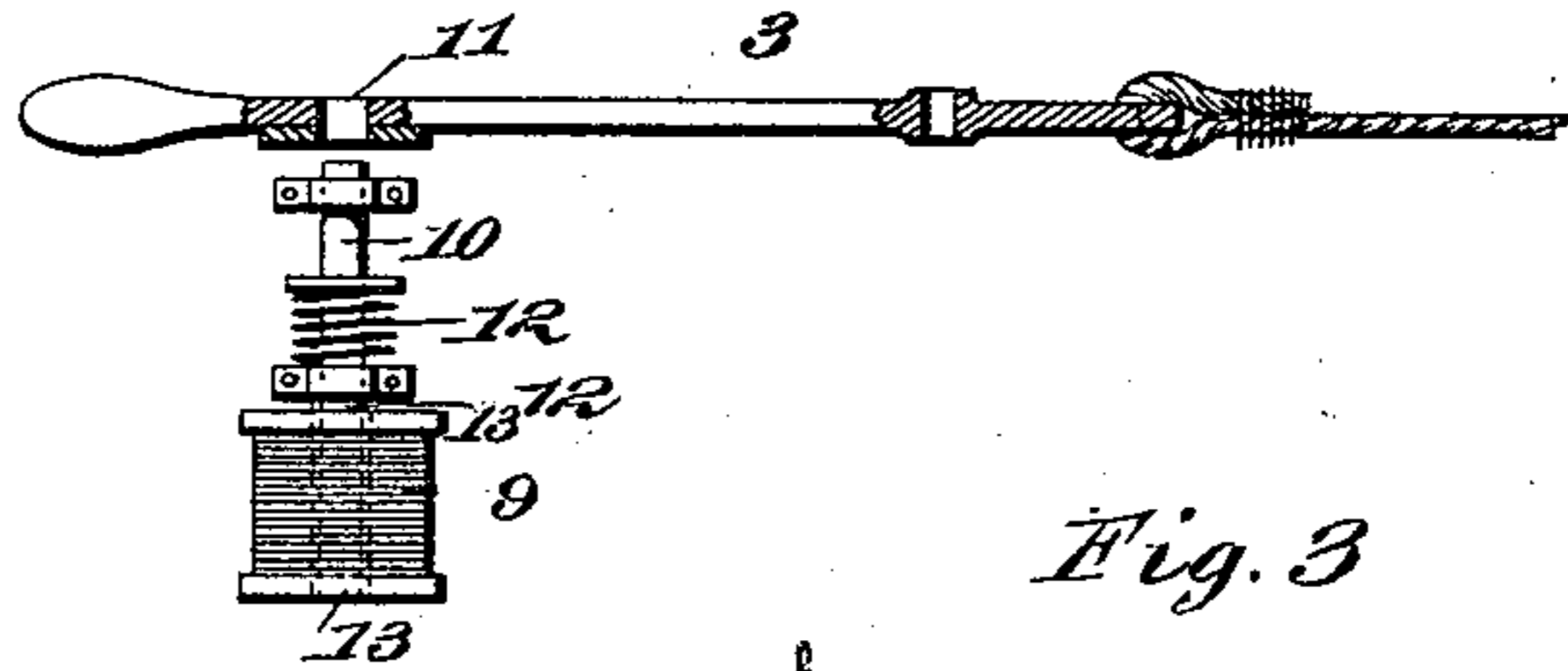


Fig. 3

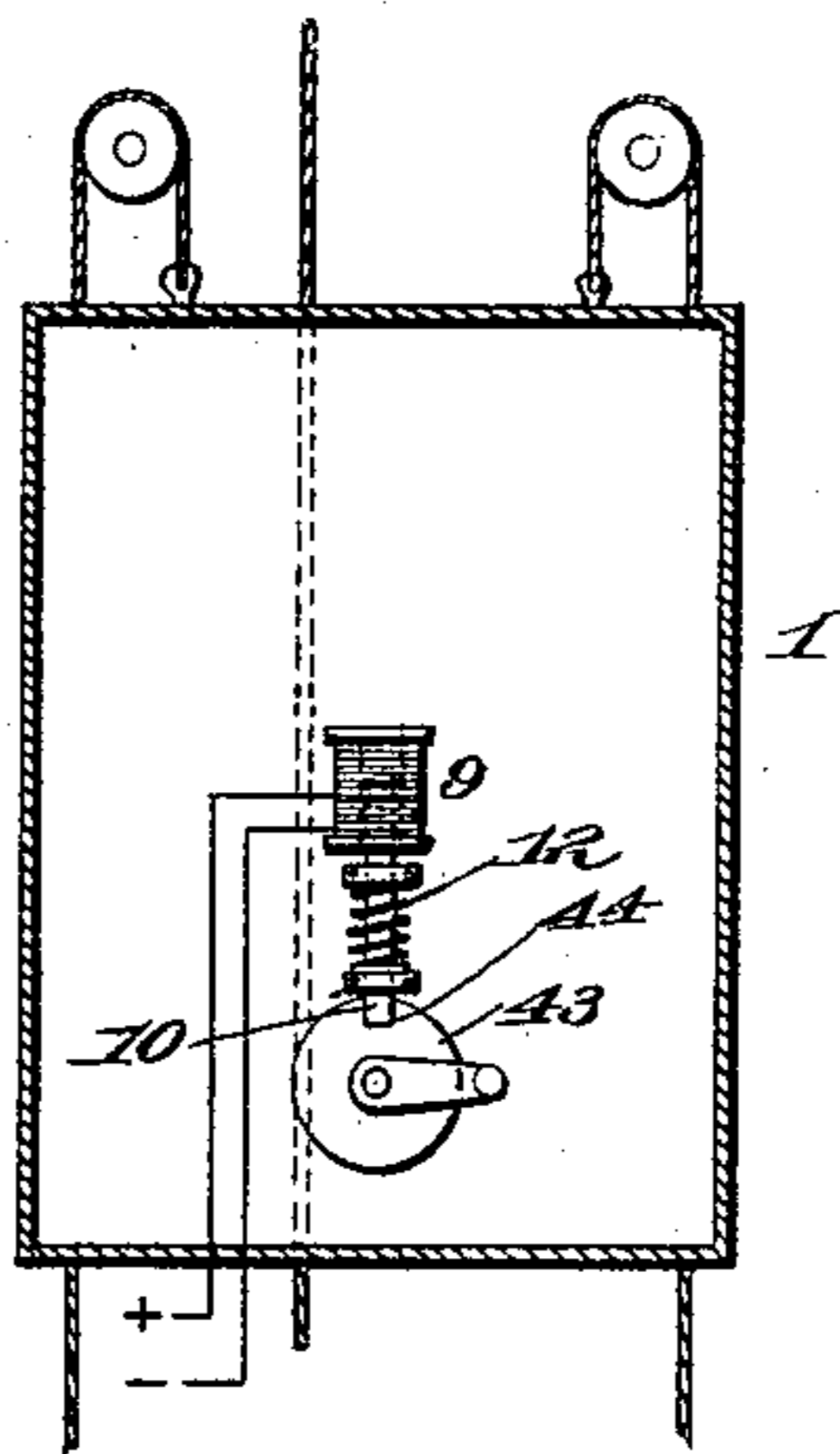


Fig. 4

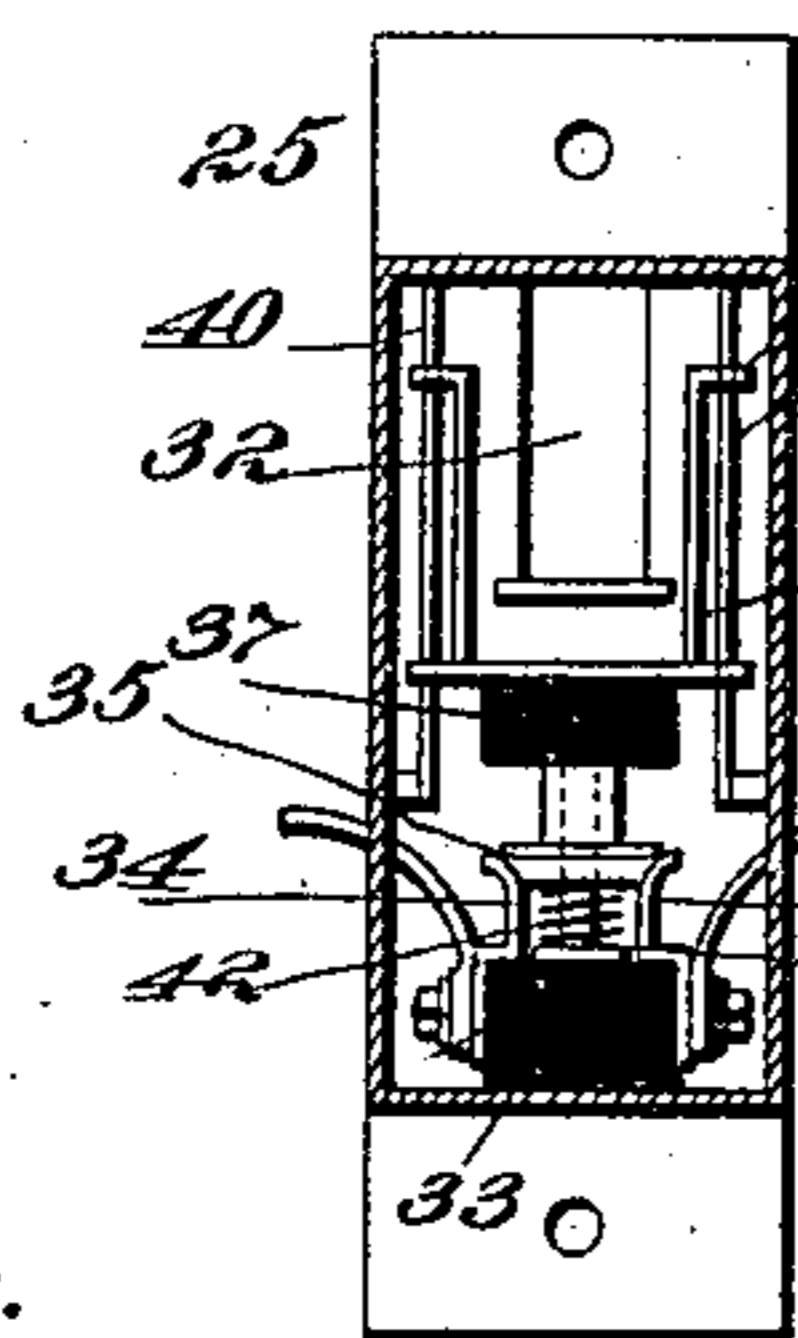


Fig. 5

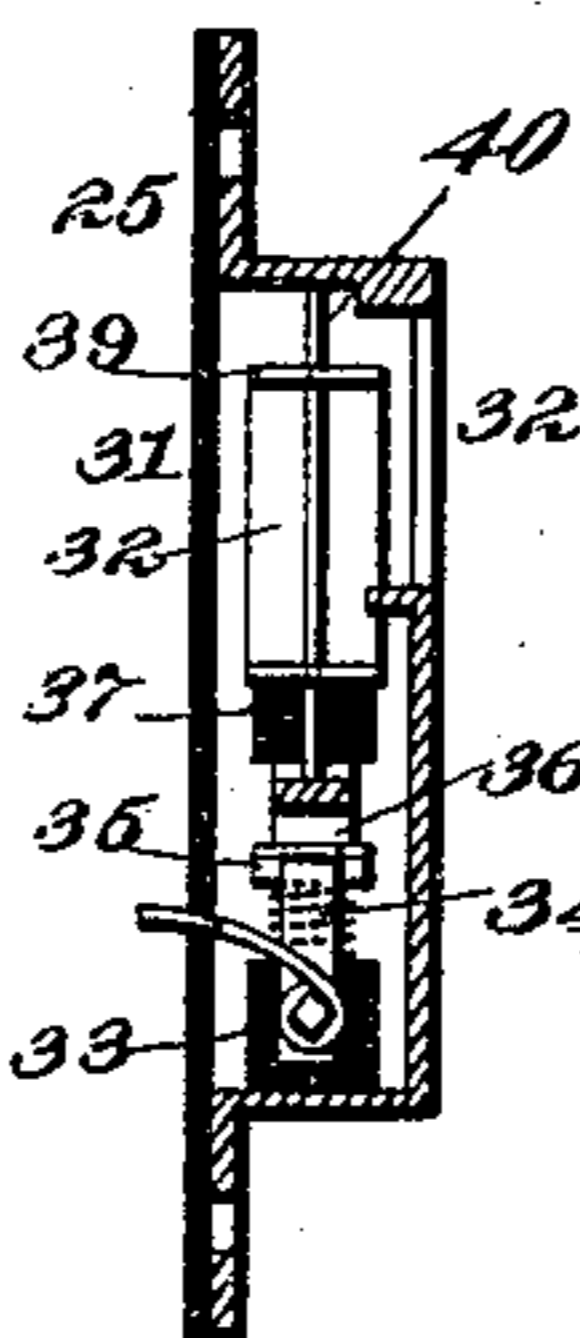
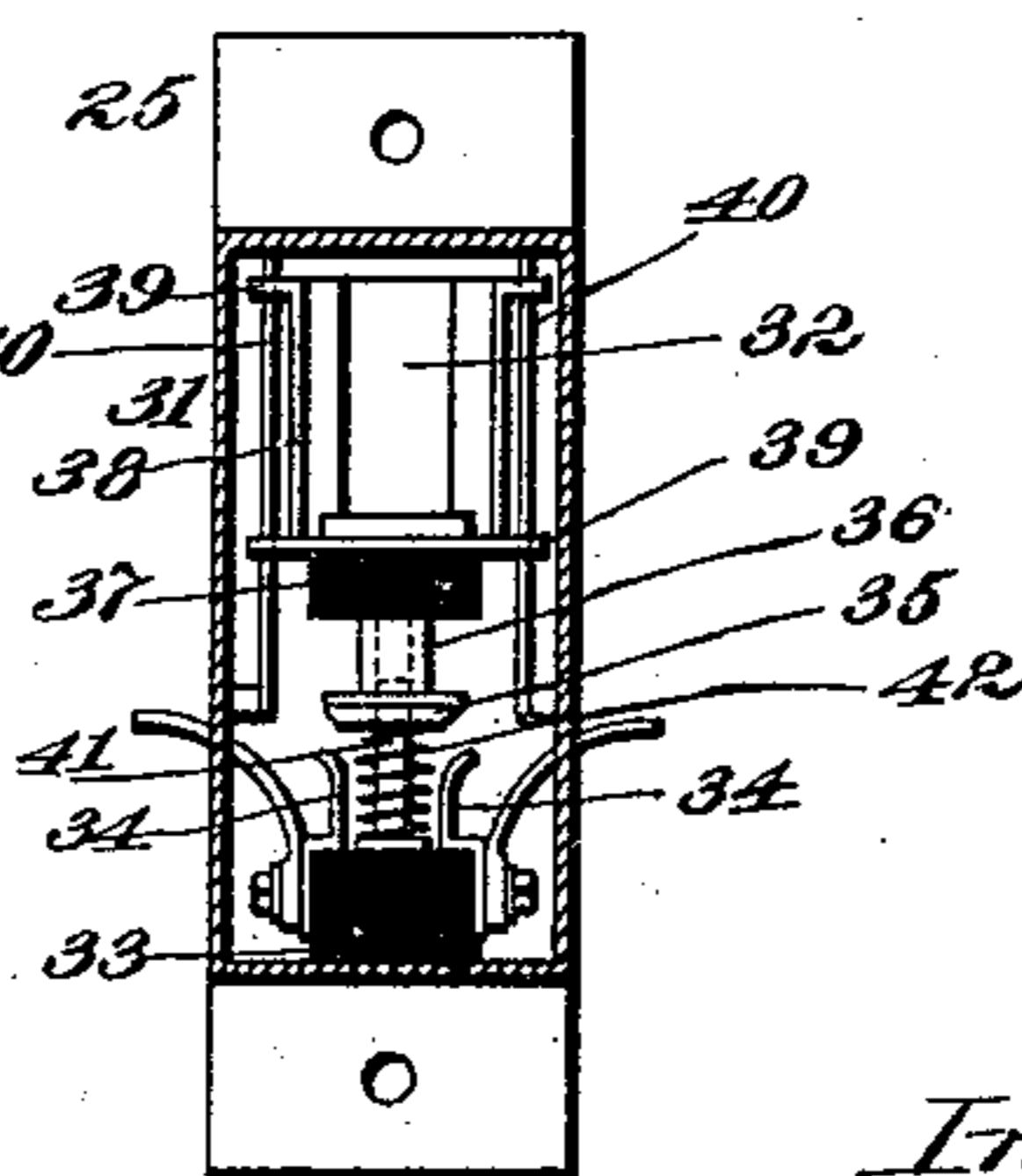


Fig. 6



Witnesses.

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SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 583,696, dated June 1, 1897.

Application filed April 4, 1896. Serial No. 586,213. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL D. STROHM, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Safety Devices for Elevators, (Case C;) and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to various new and useful improvements in safety devices for elevators, which are designed particularly for use with passenger-elevators, and the improvements are of such a character that they may be applied to and used in connection with any variety of elevators.

The object of the invention is to provide a safety device for elevators of such a character that absolute safety of operation of the elevator-car will be assured.

To this end the invention consists in the provision of electrically controlled or operated mechanism by means of which, should any one of the landing-doors be open or otherwise unsafe or insecure, so as to operate the closers and breakers in the safety-circuit, the operating mechanism of the elevator will be locked and can only be started when the said doors are properly secured.

In order that my invention may be better understood, attention is directed to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a diagrammatic view of a conventional form of elevator, showing the applicability thereto of my present improvements; Fig. 2, a section on the line $x x$ of Fig. 1; Fig. 3, a detail view of the preferred manner of applying an electrically-operated lock to the actuating-motor; Figs. 4, 5, and 6, detail views of the preferred form of circuit-closer at the landings, adapted to be operated by the actual securing of the landing-doors.

In all of the above views corresponding parts are represented by the same reference-numerals.

1 is an elevator-car movable in a suitable well or shaft past the landings 2 2.

3 is a controlling-lever for operating a pulley-wheel 4 by suitable appropriate intermediate connections, and to which pulley is connected the valve or other controlling element of the operating mechanism.

5 is an insulated strip secured to one side of the well or shaft, and which may be conveniently made of wood, and 6 is a metallic contact strip or track secured to said insulated strip.

7 is a sliding contact carried on the car 1 and making contact with said contact-strip 6.

9 is a solenoid or magnet carried in the car adjacent to the controlling-lever 3 and which is supported in any suitable way. If desired, said solenoid or magnet may be suitably incased.

10 is a locking-bolt adapted to engage an opening 11 in the controlling-lever 3 when said controlling-lever is brought to its central position to close the elevator-valve and stop the car, said latch being normally forced into engagement with said opening by means of a spring 12. Said bolt 10 is connected with the core or armature 13 of the solenoid or magnet 9 and may conveniently be an extension of said core or armature, as shown in Fig. 2. In the arrangement shown the solenoid or magnet 9 is in a circuit 14 between the brush and one side of the circuit of the elevator-lamp 15 for lighting the car, and, if desired, a resistance 16 for cutting down the current flowing through said solenoid or magnet may be included in said circuit. Instead of employing as the source of electric supply the lighting-circuits of the building a primary or storage battery or other source may be availed of, with which the electric connections are to be suitably made.

In carrying out my invention I interpose between the other side 17 of the current-supply and the magnet 9 suitable circuit making and breaking devices controlled by the landing-doors or other door or doors opening on the elevator-shaft, so that unless said doors are closed and preferably secured current will be prevented from passing to said solenoid or magnet for unlocking the elevator-actuating mechanism, as will be explained. A convenient arrangement for doing this is illustrated in Fig. 1 and will be described.

Extending from one side of the source of current-supply is a wire 18, which leads to the pivoting-point 19 of a switch 20, carried on the first landing, and which preferably is incased, so that it cannot be tampered with. The switch-lever 21 of this switch makes contact with the contact-plates 22 and 23.

Extending from the contact-plate 22 is a wire 24, which passes through a circuit-breaker 25 of any suitable construction. From said circuit-breaker a wire 26 extends to the other contact-plate 23 of the switch. From the latter contact-plate 23 a wire 27 extends to a switch 20 on the floor above, where similar electric connections are made, and from the plate 23 of the switch at the extreme upper floor of the building a wire 28 connects with the contact-strip 6, with which the brush 7 is constantly making contact.

The operation of the apparatus described above, and which is shown in Fig. 1, will be readily understood and is as follows: When all the landing-doors are closed, the circuit from the lamp 15 to the other main 17, or through any other source of supply, is closed through the circuit-breakers at the landings and the solenoid or magnet 9 on the car, so as to retract the core or armature 5 and withdraw the bolt 10. Whenever the car is stopped and the lever is brought to its central position, so as to close the elevator-valve, and the landing-door at which the car is stopped is opened, so as to break this circuit, the solenoid or magnet 9 will be deenergized, allowing the spring 12 to force the bolt 10 into the recess 11 of the controlling-lever, and said lever will thereby be locked against movement. It will therefore be impossible to start a car in this position, and said car can only be started by closing the landing-door, completing the circuit, thereby energizing the magnet or solenoid, retracting the bolt 10, and freeing the controlling-lever 3. If for any reason any one of the circuit-breakers at the landings is out of order, the switch-lever 21 of the switch at that floor may be thrown over into contact with the upper contact-plate 23, so as to cut out the circuit-breaker at that floor. This will allow the car to be operated, and the said circuit-breaker may be repaired without affecting the operation of the car.

I have found from experience that when the current obtained is supplied from the electric-light circuit of a building it is necessary that all parts be carefully insulated, as any ground through the iron work of the elevator-shaft is very objectionable and often fatal to correct operation, and by means of the construction shown this result is obtained, it being noted that the bases of the switches 20 and other parts are mounted on heavy insulated blocks.

Preferably the circuit-breakers at the landings are controlled by the actual securing of the doors, or, in other words, the circuit through said circuit-breakers is closed by the

latch 30 of the landing-doors. It is to be understood, however, that other forms of circuit-breakers may be employed, as will be suggested to those skilled in the art.

In Figs. 4, 5, and 6 I illustrate a convenient form of circuit-breaker of the first class, to which attention is now directed.

31 is the body of the lock, mounted on a heavy insulated block and having an opening or slot 32 therein, into which the latch 30 passes.

33 is an insulated block made, preferably, of hard rubber secured within the plate 31 and carrying contact-springs 34 34 at each side thereof.

35 is a contact-plate adapted to make contact between said springs 34 34, said plate being carried on a sleeve 36, secured to an insulating-block 37. Said block is carried in a light frame 38, having slotted arms 39 thereon, which arms engage with and are guided by small guide-bars 40, secured within the casing 31.

41 is a guide-piece secured to the sleeve 36 and working within a hole in the insulating-block 33, and 42 is a light spiral spring, interposed between said insulating-block and said contact-plate 35 for normally elevating the same from the springs 34 34. With this form of circuit-closer the latch 30 entering the slot 32 will come into contact with the top of the insulating-piece 37 and will force the contact-plate 35 downward, so as to complete the circuit between the springs 34 34. When said latch is elevated to unlock the door, the spring 42 will force the contact-plate 35 upward to break the circuit at the landing, as will be understood. This form of circuit-breaker I have found to be very convenient in practice and it possesses the advantages of being simple and reliable.

Instead of locking the controlling-lever 3 when it has been brought to a central position, as illustrated in Fig. 1, the controlling-wheel 43 may be used, as shown in Fig. 3, provided with a slot 44 therein, which will be engaged and locked by a bolt 10 when said wheel is brought to its central position to close the elevator-valve.

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

1. In a safety device for elevators, the combination with an element connected with and operating the hydraulic valve or other controlling mechanism of the car, a latch or bolt for locking said element when the same has been brought to a position to hold the car at rest, a solenoid or magnet for operating said latch or bolt, a safety-circuit through said solenoid or magnet, landing-doors adjacent to which extends said safety-circuit, a plurality of closers and breakers in said safety-circuit operated by the latches of the landing-doors, and an insulating-piece interposed between each closer and breaker and the latch for operating the same, whereby the latches

will at all times be insulated from the safety-circuit, substantially as and for the purpose set forth.

2. In a safety device for elevators, the combination with an element connected with and operating the hydraulic valve or other controlling mechanism of the car, a latch or bolt for locking said element when the same has been brought to a position to hold the car at rest, a solenoid or magnet for operating said latch or bolt, a safety-circuit through said solenoid or magnet, a plurality of closers and breakers in said safety-circuit operated by the landing-doors, and a switch at each landing with connections for cutting out the circuit closer and breaker thereat, substantially as set forth.

3. In a safety device for elevators, the combination with an element connected with and operating the hydraulic valve or other controlling mechanism of the car, a latch or bolt for locking said element when the same has been brought to a position to hold the car at rest, a solenoid or magnet for operating said latch or bolt, a safety-circuit through said solenoid or magnet, a plurality of closers and breakers in said safety-circuit operated by the landing-doors, and a switch at each landing with connections for cutting out the circuit closer and breaker thereat, said switches and closers and breakers being mounted on insulated blocks so as to be insulated from the iron-work of the elevator-shaft, substantially as set forth.

4. An improved circuit-breaker for use with

electric safety devices, comprising a casing adjacent to the landing-door and having an opening therein in which the latch of the landing-door extends, an insulated block inside of said casing, two contact-springs secured to said block, a contact-plate adapted to make contact with said contact-springs, a frame carried on said contact-plate but insulated from the same, said frame being arranged immediately below the opening in said casing so as to be engaged by the latch of the landing-door, a guide-rod for said frame, and a spring for normally elevating said frame so as to break the circuit between said contact-springs, substantially as set forth.

5. An improved circuit-breaker, comprising a casing 31, an insulated block 33 therein, contact-spring 34, 34, secured to said block, a contact-plate 35, adapted to make contact with said contact-springs, a sleeve 36 carrying said contact-plate, an insulated block 37 to which said sleeve is secured, a frame 38 carrying said sleeve, guide-lugs 39 on said frame, guide-bars 40 with which said frame engages, and a spring 41 beneath the contact-plate 35, normally tending to elevate the same from the contact-springs 34, substantially as set forth.

This specification signed and witnessed this 12th day of March, 1896.

SAMUEL D. STROHM.

Witnesses:

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