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L. J. ADAMS.

AUTOMATIC SAFETY CUT-OFF FOR ELEVATORS.

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Fig. 1.

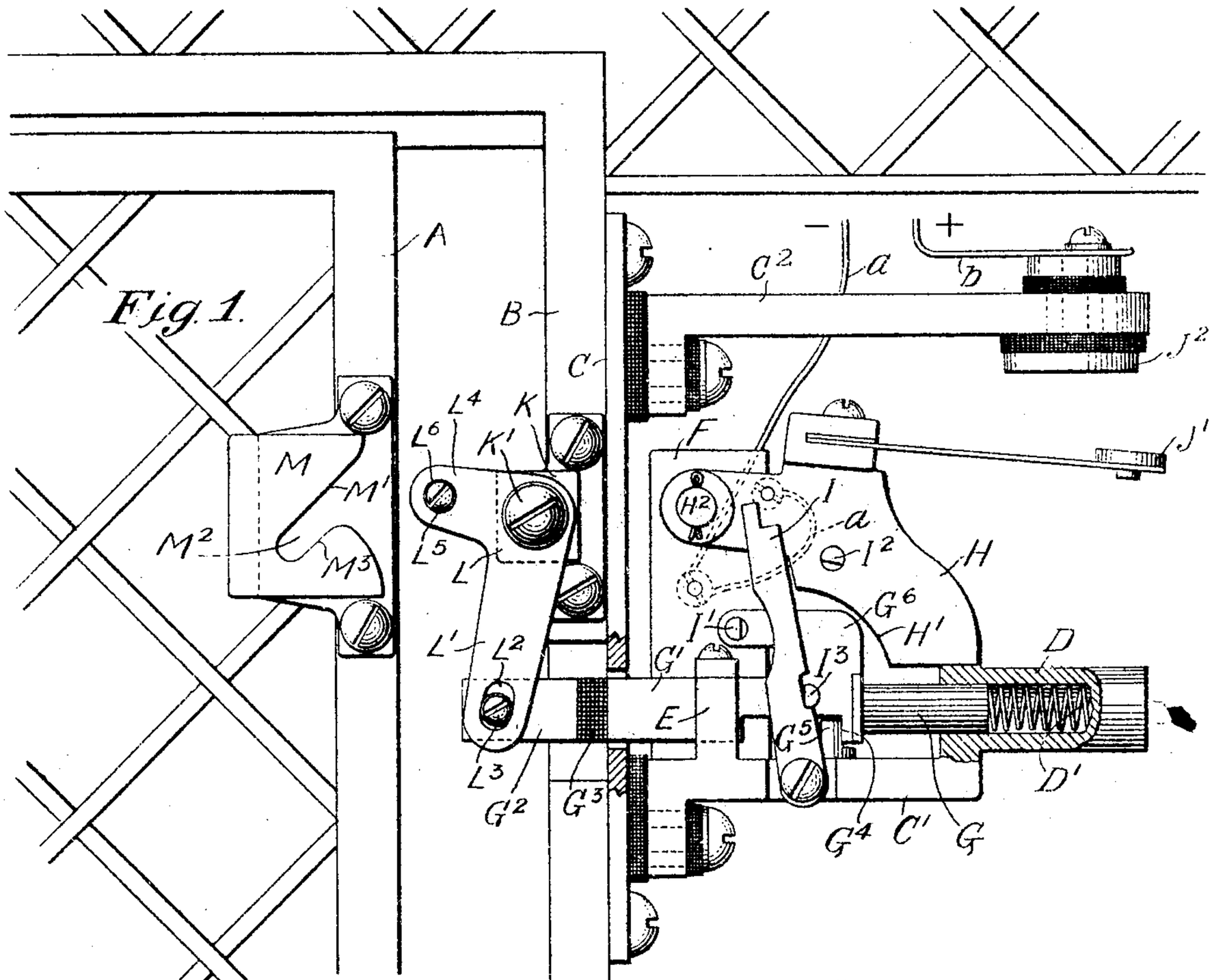
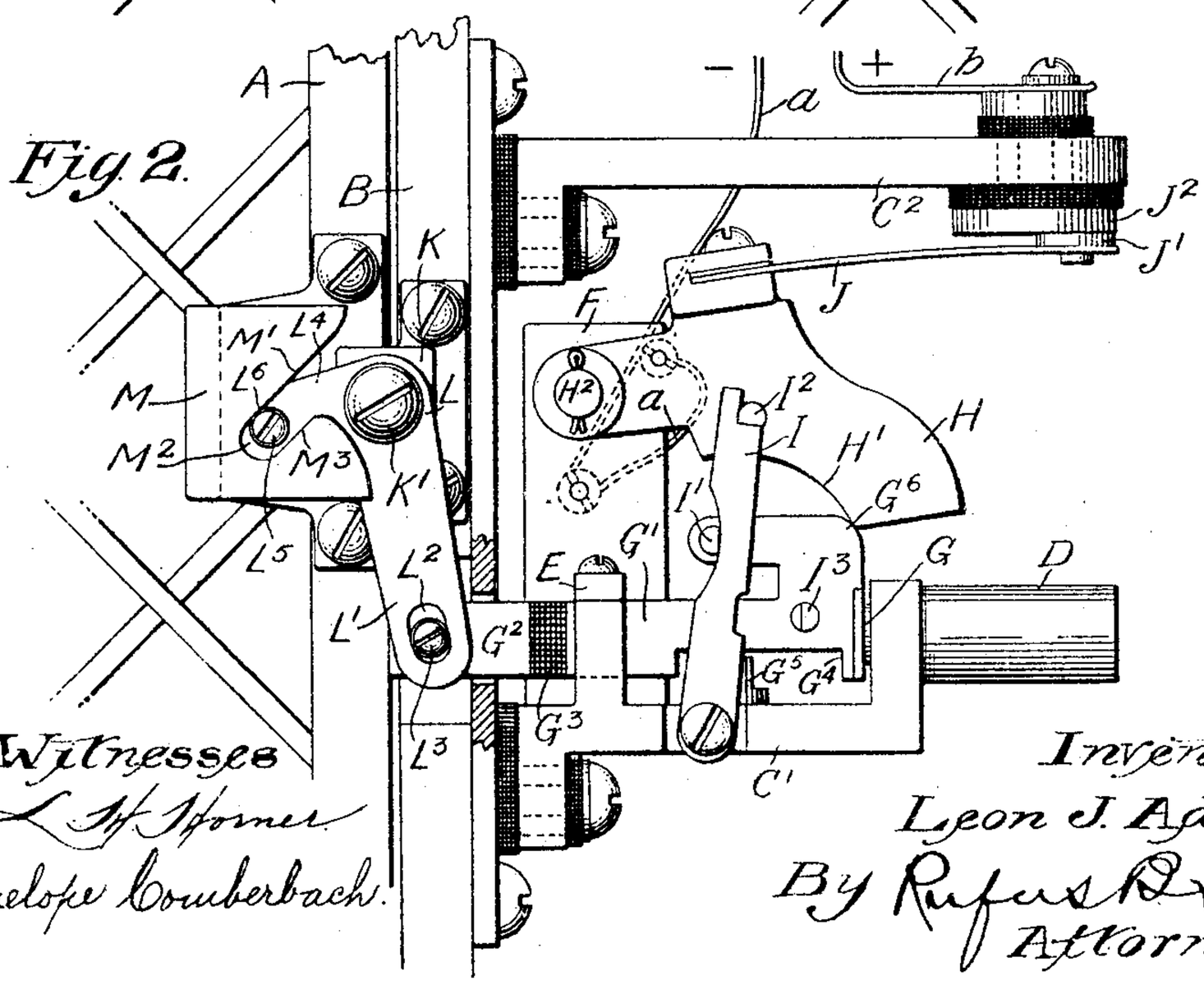


Fig. 2.



Witnesses
L. H. Homer
Penelope Comberbach.

Inventor
Leon J. Adams
By Rufus B. Fowler
Attorney

UNITED STATES PATENT OFFICE.

LEON J. ADAMS, OF PROVIDENCE, RHODE ISLAND.

AUTOMATIC SAFETY CUT-OFF FOR ELEVATORS.

No. 798,124. Specification of Letters Patent. Patented Aug. 29, 1905.

Application filed May 20, 1903. Serial No. 157,893.

To all whom it may concern:

Be it known that I, LEON J. ADAMS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Automatic Safety Cut-Offs for Elevators, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 is a side elevation, partly shown in section, of a safety cut-off for elevators embodying my invention and showing the position of the operating parts when the electrical circuit is broken. Fig. 2 is a side elevation of the same device, showing the position of the parts when the circuit is closed.

Similar letters of reference refer to similar parts in both views.

The object of my invention is to provide a safety device adapted to be used with elevators in which the elevator-operating mechanism comprises an electric circuit, the completion of which is necessary for the operation of the elevator-car, and the device embodying my invention is adapted to break the electric circuit whenever the elevator-door is opened, and thereby prevent the movement of the car, rendering the elevator inoperative except when the elevator-door is closed.

Referring to the accompanying drawings, A denotes the elevator-door, represented in Fig. 1 as partially open and capable of a sliding movement to bring it into contact with the door-jamb B when closed. Attached to the jamb B is a supporting-plate C, upon which the operating parts of my improved safety cut-off are mounted. Attached to the plate C by insulated connections are the brackets C′ and C^2. The bracket C′ supports a cylindrical casing D and the posts E and F. Sliding in suitable bearings in the casing D and post E is a sliding bolt G, provided with a rectangular section G′, which slides in the post E, and with a brass tip G^2, attached by an insulated joint G^3 with the rectangular section G′. The casing D contains a spiral spring D′, which presses against the end of the sliding bolt G to normally hold its shoulder G^4 against a stop-pin G^5, held in the bracket C′. In this position of the bolt G its tip G^2 projects through a suitable opening in the plate C and door-jamb B in the path of the door A, so that the operation of closing the door will impart a longitudinal movement to the sliding bolt G against the compression of the spiral spring D′, forcing the bolt from the position shown in Fig. 1 to the position shown in Fig. 2. The sliding bolt G is provided with a projecting shoulder G^6, which, as the bolt is pushed in by the closing of the elevator-door, is moved against the curved cam-surface H′ of a lever H, pivoted on a stud H^2, which is held in the post F. The inward movement of the sliding bolt G lifts the lever H from its normal position with its tip resting upon the casing D, as shown in Fig. 1, to the position shown in Fig. 2. In the elevated position of the lever H, as shown in Fig. 2, it is supported by a latch I, which is pivoted at its lower end to the bracket C′ and is swung on its pivotal connection by the stud I′, carried by the sliding bolt to bring the free end of the latch beneath a stud I^2, held in the lever H.

Attached to the lever H is a blade-spring J, carrying at its free end an electric contact-plate J′, which is brought by the upward rocking of the lever H against the contact-plate J^2, which is supported by and insulated from the bracket C^2, but has an electrical connection with the wire *b*, forming part of the electric circuit. The lever H is electrically connected with a wire *a*, also forming part of the electric circuit, so that by the contact of the plates J′ and J^2 the circuit is closed. When the door A is moved away from the door-jamb B in the operation of opening the door, the movement of the sliding bolt G is reversed by the tension of the spiral spring D′, which carries the shoulder G^6 away from the lever H; but the lever H is held in its elevated position by the latch I until the latter is swung from beneath the stud I^2 by means of the stud I^3, carried by the sliding bolt G. The removal of the latch I permits the lever H to fall by gravity and to instantly open the circuit by the removal of the plate J′ from the plate J^2, when the operative parts of the mechanism again assume their normal position, as shown in Fig. 1. The upward movement of the lever H is continued for a short period after the contact of the plate J′ against the plate J^2, thereby causing a slight bending of the blade-spring J, as shown in Fig. 2, by which a pressure is applied to the contact-plates equal to the elastic force of the blade-

spring J, and in addition the curvature of the spring causes a slight sliding movement between the contacting surfaces of the plates J′ and J² and a slight period of dwell is given to the contact-plate J′, due to the lost motion of the stud I³ before it is brought into contact with the latch I on the reversal of the sliding bolt G. The contact of the stud I³ with the latch I near its pivoted end causes a quick movement of the free end of the latch, and the downward movement of the lever H by gravity is then accelerated by the elasticity of the blade-spring J, which is in a state of tension, thereby producing an instantaneous break in the circuit. As the contact-plate J′ during the upward movement of the lever H approaches the contact-plate J² in a line at substantially right angles with their contacting surfaces the contact of the plate J′ with the plate J² is instantaneous and complete throughout its entire surface.

I am aware that safety cut-off devices for elevators comprising a sliding bolt which is actuated by the movement of the elevator-door is not new; but the several features of construction and operation of my improved device by which the circuit is maintained for a period independently of the movement of the door and in which the contact-plates make an instantaneous face-to-face contact with the yielding pressure applied thereto and with a slight sliding movement of the contacting surfaces I believe to be broadly new.

In the operation of the mechanism, as above described, the reversal of the sliding bolt G and the separation of the contact-surfaces are effected by means of the spiral spring D′. As a precaution against the breaking of the spring, I attach to the door-jamb B a bracket K, carrying a stud K′, upon which I pivot a bell-crank lever L, having one of its arms L′ provided with a slot L², which incloses a stud L³ on the sliding bolt G. The other arm L⁴ carries a stud L⁵, on which a roll L⁶ is arranged to be struck by the oblique edge M′ of a plate M, which is attached to the door A, so that the roll L⁶ will pass into the oblique slot M² as the door A is closed, and as the door is opened the oblique edge M³, acting against the roll L⁶, will serve to rock the bell-crank L and reverse the motion of the sliding bolt G independently of the spring D′.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a safety cut-off for elevators, the combination with a sliding spring-actuated bolt projecting into the path of the elevator-door, of a rigid pivoted lever, a movable contact-plate carried by said lever, a fixed contact-plate in the path of said movable plate, means carried by said bolt for rocking said lever, thereby making a contact between said contact-plate and said movable plate, and means whereby said contact is broken by the action of gravity.

2. In an elevator safety cut-off, the combination with a sliding bolt projecting into the path of the elevator-door, of a spring for reversing the movement of said bolt, a shoulder on said bolt arranged to contact with a pivoted lever, a pivoted lever, an electrical contact-plate carried by said lever, a fixed contact-plate, a pivoted latch arranged to hold said lever with said plates in contact, and means carried by said sliding bolt for actuating said latch, substantially as described.

3. The combination with a pair of contact-plates forming electrical terminals, of means for bringing said terminals into contact comprising a sliding bolt a stud carried by said bolt a pivoted lever carrying one of said terminals, and arranged to be actuated by said sliding bolt, a latch by which said lever is held in position, and means carried by said bolt for actuating said latch, substantially as described.

4. In a safety cut-off for elevators, the combination of a sliding bolt arranged to be moved in one direction by the closing of the elevator-door, a spring by which the movement of the bolt is reversed, a pivoted lever arranged to be lifted by said bolt, a latch for supporting said lever in an elevated position, means carried by said bolt for actuating said latch, a fixed contact-plate, a blade-spring carried by said pivoted lever, a movable contact-plate carried by said blade-spring, and a shoulder on said bolt arranged to move said pivoted lever and impart a tension to said blade-spring as the contact-plates are brought together, substantially as described.

5. In a safety cut-off for elevators, the combination with a fixed electric terminal, of a pivoted member, a terminal carried by said pivoted member, means operated by the elevator-door for actuating said pivoted member to bring the terminals into contact, a latch for holding said terminals in contact, and means for releasing said latch, substantially as described.

6. In a safety cut-off for elevators, the combination of a fixed terminal, a pivoted lever, a movable terminal carried by said lever, a sliding bolt adapted to move said lever against gravity, a latch for supporting said lever in its elevated position, a stud carried by said bolt for moving said latch into engagement with said lever, and a stud carried by said bolt for disengaging said latch on the reverse movement of said lever, substantially as described.

7. In a cut-off for elevators comprising a pair of electric terminals and a sliding bolt, of a bell-crank lever pivoted upon a fixed stud, with one of its arms operatively connected with said sliding bolt and having its other arm extending into the doorway of an elevator, and an actuating-plate carried by the elevator-

door by which said bell-crank lever is reversed, substantially as described.

8. The combination with a pair of electric terminals of actuating mechanism for bringing said terminals into contact and separating the same, and comprising a sliding bolt, a bell-crank lever operatively connected with said bolt, and a plate carried by the elevator-door, by which said bell-crank is rocked as the door is moved, substantially as described.

Dated this 9th day of May, 1903.

LEON J. ADAMS.

Witnesses:
RUFUS B. FOWLER,
PENELOPE COMBERBACH.