H. G. HILLMAN.

ELEVATOR SAFETY SYSTEM.

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1,244,211.

Patented Oct. 23, 1917.

Fig. 1.

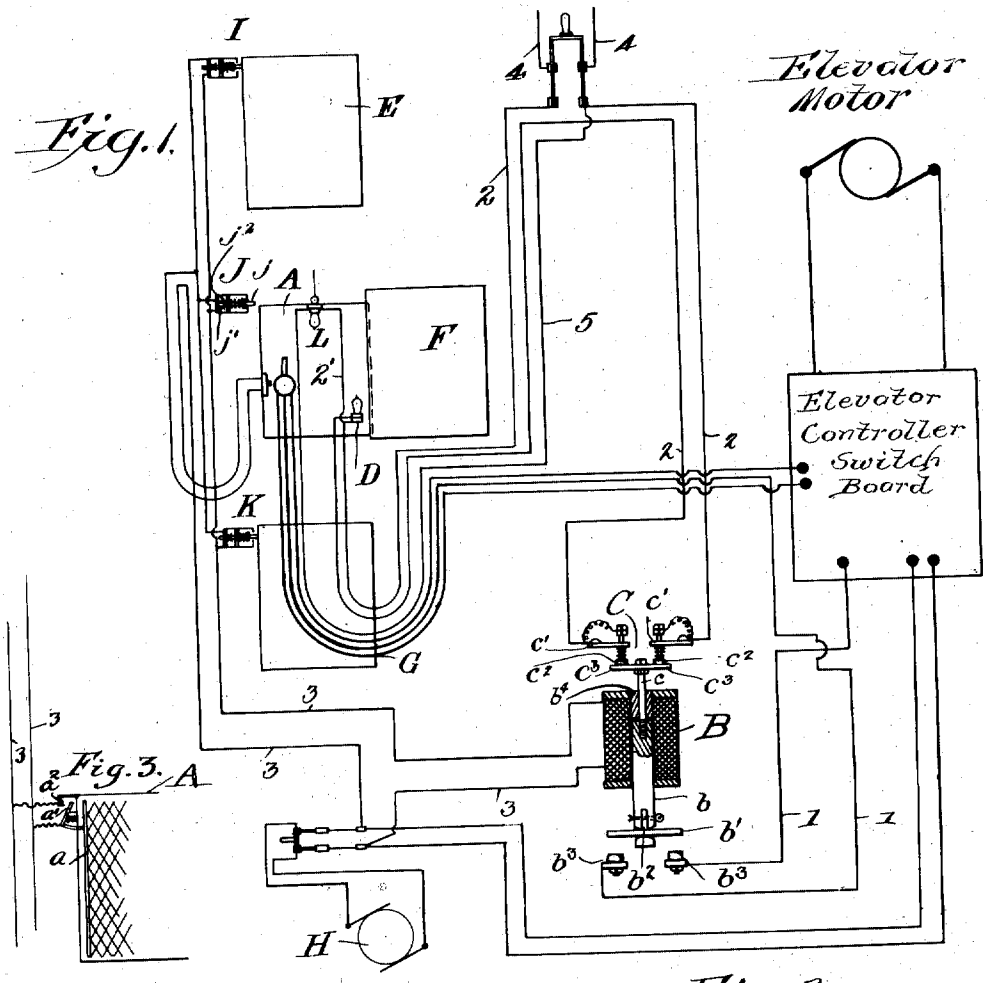
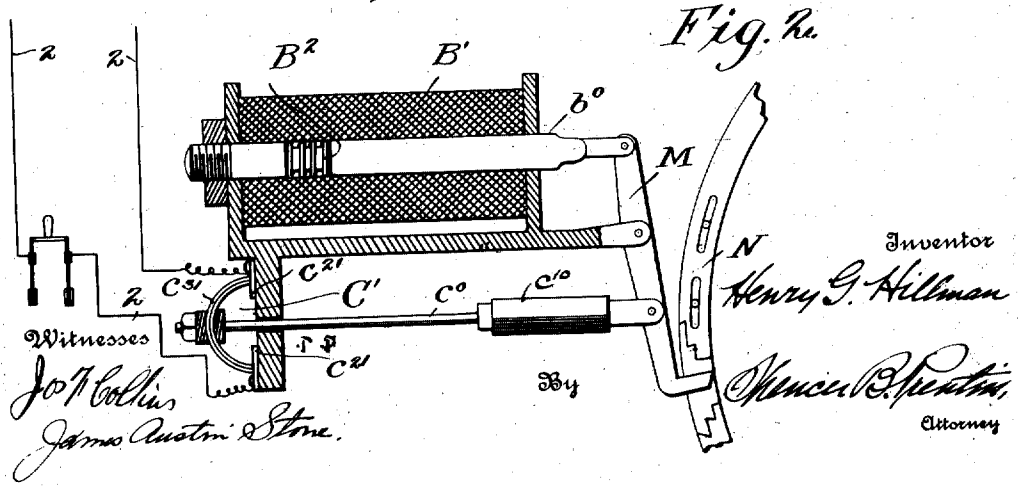


Fig. 2.



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ELEVATOR SAFETY SYSTEM.

1,244,211. Specification of Letters Patent. Patented Oct. 23, 1917.

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To all whom it may concern:

Be it known that I, HENRY G. HILLMAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Elevator Safety Systems, of which the following is a specification.

My invention relates to safety systems for elevators in which there is an inter-relation between the door or doors controlling entrance to or egress from the elevator car, and the elevator control or operating mechanism, and the invention has for its principal object the provision of means whereby the car operator may at all times be informed as to the condition and operation of the safety devices.

A further object is to provide means whereby the car operator may know at once when the safety condition does not exist.

A further object is to combine with the safety apparatus and a suitable source of current, and located in the car, a lamp which will be lighted when the unsafe condition exists and will be dark when the safety condition exists, or vice versa. The unsafe condition may be considered an open or unlocked car or floor door, and the safety condition may be considered the closed or locked doors by which egress from or admission to the elevator car is controlled.

The invention consists in the novel combination and arrangement of apparatus and circuits hereinafter described, and shown in the accompanying drawings, in which drawings—

Figure 1 is a diagrammatic representation of an electrically controlled or operated elevator equipped with a safety system to which my invention is applied;

Fig. 2 shows the locking device of a hydraulic elevator equipped with my invention.

Fig. 3 shows a detail of the car shown in Fig. 1, and including a switch on the car operated by the collapsible gate for controlling the safety circuit in the same manner as the switches operated by the floor doors.

Referring to the drawings, A is an elevator car controlled or operated through circuit 1, 1, by any suitable or well-known apparatus, such as hand switch O.

Circuit 1, 1, is controlled by an electromagnetic device B with which is combined means for controlling the circuit of the flash light or lamp, to be presently described, located in the elevator car. Electromagnet B has a movable core b to which is secured bridging contact b^1 which is preferably a copper disk and mounted so as to have a slight rocking play. To effect this, the lower end of core b is slightly rounded, and the disk secured by pin b^2 having the inner surface of its head also rounded, as shown.

Bridging contact b^1 is adapted to engage and make electrical connection between carbon contacts b^3 which form the terminals of control or power circuit 1, 1.

At its upper end electromagnet B is provided with a fixed core b^4 having a central bore through which extends rod c of switch C. Switch C constitutes a circuit closer for the flash light D in the elevator car from which conductors 2, 2 extend to plates c^1, c^1. Mounted upon each of plates c^1 is a spring-pressed carbon contact c^2 which contacts constitute the circuit terminals and cooperate with copper disk bridging contact c^3 mounted upon rod c in any suitable manner.

E, F and G are elevator floor doors, F being shown open and the others closed.

Electromagnet B is adapted to be energized from source of current H through circuit 3, 3, which circuit is closed through one or more of switches I, J, K when the respective floor doors or any of them are open or unlocked.

Current for circuit 2, 2, may be derived from any suitable source, as from the lighting circuit 4, 4, the car light L receiving current through one of conductors 2, conductor 2′ and conductor 5.

The operation of the system is as follows: When the doors are all closed or locked, circuit 3 of electromagnet B is open and core b down so that bridging contact b^1 rests on terminals b^3 of control or power circuit 1. When a door, for instance F, is open, the apparatus will be as shown in Fig. 1. Circuit 3 is closed at door switch J, thereby energizing electromagnet B which pulls up its core and performs its double function, as follows. Elevator control or power circuit 1 is opened. Flash light circuit 2 is closed at contacts c^2 by bridging contact c^3, thereby lighting lamp D on the car. When the door is again closed the parts resume their

original positions and lamp D goes out. It will thus be seen that the indication will show when any door or gate is open or unlocked, and this independent of the control of the application of power to the car by the normal operating means O. In other words, the signal will be given at any time when the danger condition occurs, in any position of the car and irrespective of the position of the normal car operating means or controller.

Switches I, J and K may be of any preferred construction. As shown, each comprises a spring-pressed element j which in its forward position completes the electrical circuit through springs j', and in its rearward position interrupts said circuit by an insulated section j^2.

The invention is also applicable to other types of elevators than electric. For instance, I have shown in Fig. 2 its application to the valve wheel N, such as shown in Patent No. 981,442, granted January 10, 1911, to Robert P. Lumley and Henry G. Hillman. In this embodiment of the invention M is the locking arm for the valve wheel, B^1 the electromagnet, b^0 the movable core, c^0 the rod insulated by c^{10} to operate the leaf spring bridging contact c^{31}, and c^{21} the terminals of circuit 2. B^2 is a spring to hold core b^0 in its forward position to release the valve wheel except when electromagnet B′ is energized. The operation of this arrangement is otherwise the same as that described in connection with Fig. 1.

It it obvious that many changes in construction and arrangement of parts may be made without departing from the invention as set forth in the appended claims. For instance, circuit 3 may be normally closed instead of open, when the action of the electromagnet will be reversed. In the term "door," I include the collapsible gate or door upon the car, to which the invention may be applied, as well as the floor door. Referring to Fig. 3, in this connection, a collapsible gate a on the car is shown in its closed or extended position. It will be observed that the gate has engaged the end of the curved lower portion of the contact lever a' throwing the same out of engagement with contact a^2 and thus opening circuit 3. The switch and flash light may be operated so that the light will show when the collapsible gate on the elevator car is open, and the light shut off when the collapsible gate is closed or partly closed. Also, wherever I speak of the door being open, I refer as well to its being unlocked, the two conditions being the same for the purpose of my invention.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States is:—

1. An elevator safety system comprising, in combination with an elevator car and a door, a normal operating means for said car, a device distinct from said normal operating means and operated independently thereof for determining the application of power to said car, an electromagnet arranged to control said device, a safety circuit including said electromagnet and a switch operated by said door, an indicating device in the car, and a circuit extending from said indicating device and operated by said electromagnet, whereby the operator is notified at any time said door is in a dangerous position.

2. An elevator safety system comprising, in combination with an elevator car and a door, a normal control circuit and switch for controlling the application of power to said car, contacts in said control circuit independent of said switch, an electro-magnet arranged to operate said contacts, a safety circuit including said electro-magnet and a switch operated by said door, an indicating device in said car, and a circuit including said indicating device and a switch operated by said electro-magnet.

3. An elevator safety system comprising, in combination with an elevator car and a door, a normal control circuit and switch for controlling the application of power to said car, an independent switch in said normal control circuit, an electro-magnet for operating said switch, a safety circuit including said electro-magnet and a switch operated by said door, an indicating device in the car, and a circuit including said indicating device and a switch operated by said electro-magnet.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY G. HILLMAN.

Witnesses:
JOHN T. CLARKE,
WM. C. PETRY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."