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PATENTED JUNE 14, 1904.

E. L. & G. HAIL.

ALARM SIGNAL.

APPLICATION FILED MAY 14, 1902.

NO MODEL.

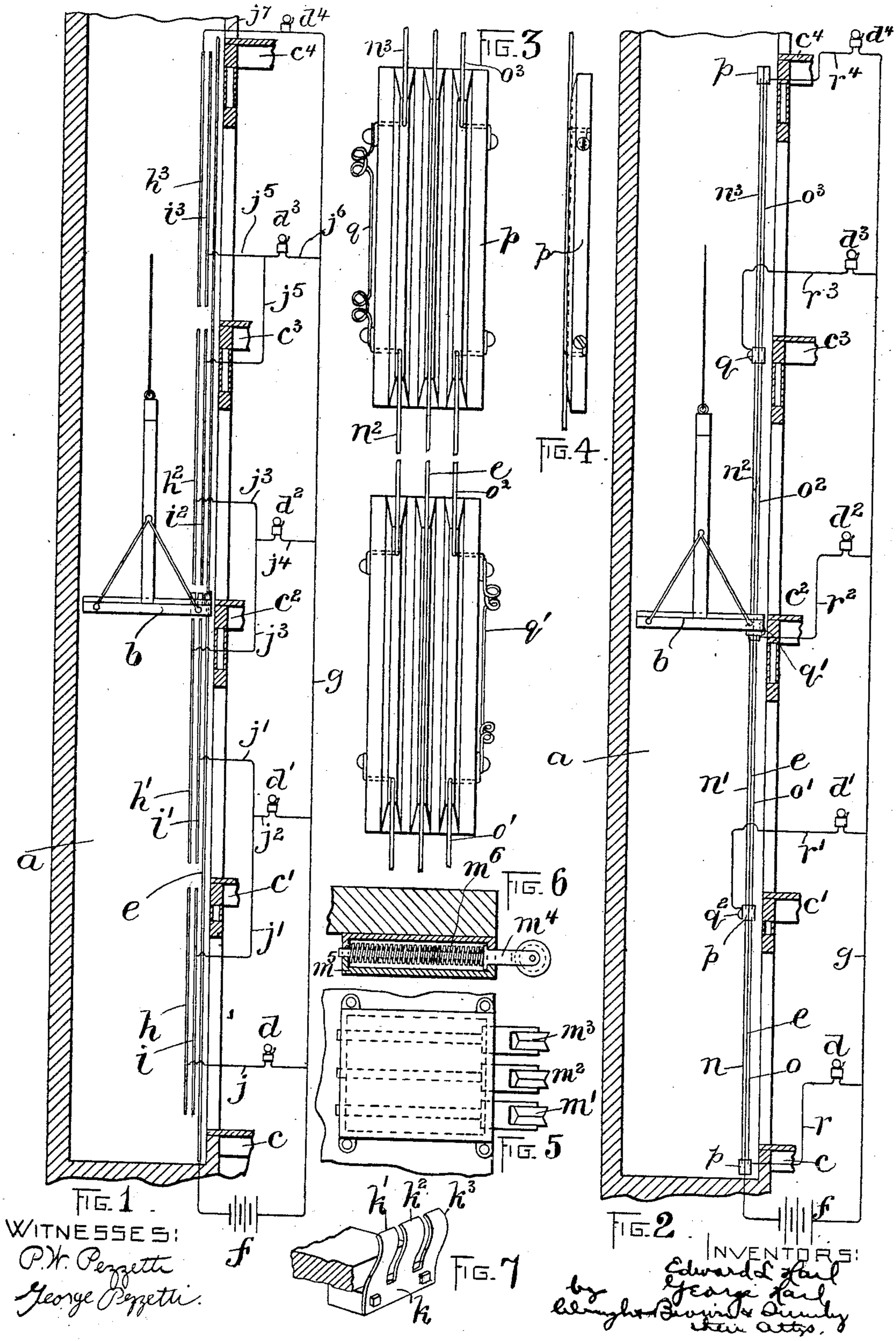

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

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UNITED STATES PATENT OFFICE.

EDWARD L. HAIL AND GEORGE HAIL, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS TO AMERICAN EQUIPMENT COMPANY, OF KITTERY, MAINE, A CORPORATION OF MAINE.

ALARM-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 762,821, dated June 14, 1904.

Application filed May 14, 1902. Serial No. 107,279. (No model.)

To all whom it may concern:

Be it known that we, EDWARD L. HAIL and GEORGE HAIL, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Alarm-Signals, of which the following is a specification.

This invention has relation to danger-signals for elevators, and more particularly to that class of elevators which are employed for the purpose of carrying freight.

The object of the invention is to provide an automatic alarm by means of which the movement of the car will be made known by the sounding of an alarm, so that persons at a landing or looking into the well may be apprised of the approach of the car in time to escape injury.

On the drawings, Figure 1 represents a diagrammatic view of an embodiment of the invention. Fig. 2 represents another embodiment of the invention in diagrammatic view. Fig. 3 represents in front view the elongated contacts which extend along the well and the means for connecting them. Fig. 4 represents a side elevation of one of the supporting-blocks for the elongated contacts. Figs. 5 and 6 illustrate one form of movable contact carried by the car and which engages the elongated contacts. Fig. 7 represents another form of movable contact.

Referring to the accompanying drawings, the elevator-well is indicated at a and the car at b. Said car is adapted to move up and down in the well past the landing-floors c c' c^2 c^3 c^4. It is the purpose of the invention to provide such mechanism that the alarm or alarms will be sounded when the car is between the floors, but will be silent when the car is opposite any one of the landing-floors. Consequently at each landing there is an alarm, said alarms being indicated at d d' d^2 d^3 d^4. Each alarm consists of an electromagnetic bell of any kind or style that is desirable.

In the embodiment of the invention shown in Fig. 1 there is an elongated contact consisting of a wire, strip, or rod e, which is included in a circuit including a source of energy f and a conductor g. In parallelism with the elongated contact e there are two series of parallel elongated contacts, which are indicated, respectively, at h i, h' i', h^2 i^2, and h^3 i^3. The strips of each pair of elongated contacts are insulated from each other and from the strips of each adjacent pair, except as subsequently explained. The elongated contact h is connected by a conductor j with the alarm d and with the conductor g, the elongated contacts i and i' are connected by conductors j' j^2 with the alarm d' and the conductor g, the strips h' and h^2 are connected by conductors j^3 and j^4 with the alarm d^2 and the conductor g, the strips i^2 i^3 by conductors j^5 and j^6 with the alarm d^3 and the conductor g, and the strip h^3 is connected by a conductor j^7 with the alarm d^4 and the conductor g. It will thus be seen that the elongated contacts between each two adjacent floors are in electrical connection with an alarm at the landing opposite the same and also with an alarm at the next landing, starting either from the top or bottom of the well. On the car is secured what we term the "movable" contact, consisting of a spring-metal plate k, having three resilient arms k' k^2 k^3, adapted to make contact with the three lines of stationary contacts. The arm k' is always in contact with the rod or wire e, and the arms k^2 k^3 engage with the parallel wires or rods h i h' i', &c., successively, as the car moves up and down in the elevator-well. The pairs of short contacts are so arranged in the well that the arms k^2 and k^3 are not in contact with any of them when the car is opposite the floor of any one of the landings.

The operation of the device is as follows: Assuming that the car starts from the floor c and moves upward, when the floor of the car is parallel with the floor c the arms k^2 k^3 of the movable contact k will be disengaged from the elongated contact-strips h and i, and the circuit will not be closed through any of the alarms; but as the car moves upward the said arms engage the elongated contacts h and i.

The circuits will be immediately closed between the strip h, the contact k, and the elongated contact e, and therefore through the alarm d, and the alarm will continue to sound so long as the arm k^3 is in engagement with the contact h. At the same time, however, the circuit is closed between the contact i and the contact e, and therefore through the alarm d', so that it too will sound at the landing between the floor c' and the floor c^2, and hence any one on the floor c' will be notified that the car is in motion. As soon as the floor of the car is level with the floor c' of the second landing the alarms will cease sounding. Upon the further movement of the car, however, the arm k^2 will engage the contact i', so as to close the circuit through the alarm d' again, and at the same time the circuit will be closed between the contact h', contact e, and the alarm d^2. Thus it will be seen that as the car is moving upward an alarm will be sounded at the landing opposite which the car is moving and also at the landing immediately thereabove and that the alarms will cease sounding as soon as the floor of the elevator comes to a level with the floor of a landing. As the car moves downward the bell will sound at the landing opposite the car and also on the floor immediately below.

In Fig. 2 the elongated contact e is adapted to be engaged by the wheel m^2 of the movable contact at all times. The shorter contact-strips are arranged on either side of the contact e, as indicated at $n\,o$, $n'\,o'$, $n^2\,o^2$, $n^3\,o^3$. The ends of all of the contacts or strips are supported by grooved blocks (indicated at p) formed of insulating material, such as wood, porcelain, or the like. The elongated contact n^3 is connected by the conductor q with the elongated contact n^2; but the conductor q is so located that it will not be engaged by the contact-wheel m'. Similar conductors q' and q^2 respectively connect the elongated contact o^2 with the contact o' and the contact n' with the contact n. The contact o^3 is connected by a conductor r^4 with the alarm d^4 and the contact o by a conductor r with the alarm d. Conductors r', r^2, and r^3 are in branch circuits with the alarms d', d^2, and d^3 and are electrically connected with the conductors q^2, q', and q, respectively. The spaces between the contacts n n' and o o', &c., are so located that when the floor of the car is level with the floor at a landing the movable-contact wheels or members will not close a circuit therethrough from the supply-contact e. When a car is passing between floors c and c', the circuit will be closed through the alarms d and d', and as it moves upward to the next landing the alarm d will be cut out and the circuit closed through alarm d^2. It is thus made plain that when the car is moving either upward or downward the alarm at the landing opposite which the car is moving and the alarm at the next adjacent landing being approached will both be sounded, this entirely irrespective of the controlling apparatus which governs the movement of the car.

Each of the contact wheels or members is journaled in a metallic slide m^4, mounted in a casing m^5, and held yieldingly forward by a spring m^6. The movable contact may have any other form of yielding members to engage the stationary contacts in case it be desirous to change the forms shown.

It will be observed from the specification that the alarm-signal mechanism is operated independently of the car-controlling mechanism and also is operative independently of any action of the doors which are at the landing. In this respect it differs from systems in which the actuation or non-actuation of the alarm depends upon the opening or closing of a door or any movement of the car-controlling mechanism.

Various changes may be made in the mechanism and in the arrangement of circuits without departing from the spirit and scope of the invention.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, we declare that what we claim is—

1. In an elevator plant, the combination with a car, of an alarm-signal system operable independently of the car-controlling apparatus and including an electric circuit, a series of alarms at the landings, and means directly connected to said alarms for closing and breaking said circuit and operable by said car from either direction of travel, the said alarm-signal system causing the sounding of an alarm on each landing being approached by the car in either direction and the silencing of said alarm when the car has passed said landing.

2. In an elevator, the combination with a car, of an alarm-signal system comprising a series of alarms arranged one at each landing, and means operatable independently of the car-controlling apparatus but automatically governed by the movement of said car and including a single source of energy and a device on the car to cause the said alarms to be connected to and disconnected from the said source of energy for sounding the alarms at the successive landings approached by the car and silencing the alarms at the landings passed by the car.

3. In an elevator plant, the combination with a car, of an alarm-signal system operable independently of the car-controlling apparatus and including a series of alarms at the landings, and means for causing the operation and cessation of said alarms and operable by said car from either direction of movement, the said alarm-signal system causing the sounding

of an alarm on each landing being approached by the car from either direction and the silencing of said alarm when the car has passed said landing.

4. In an elevator, the combination with a car, of an alarm-signal system comprising a series of alarms arranged one at each landing, and means operatable independently of the car-controlling apparatus but automatically governed by the movement of the car and including a single source of energy for sounding the alarms at the successive landings approached by said car in either direction and silencing the alarms at the landings passed by said car.

5. In an elevator, the combination of a car, a series of alarms arranged one at each landing, and means operated independently of the controlling apparatus which governs the movement of the car, including a single circuit with a separate branch for each alarm and with each alarm except those at the top and bottom landings located in two branches and means for closing and opening the branch circuits respectively, whereby said alarms are caused to sound on the landing ahead of the travel of the car in either direction and on the landing the car is passing, and the remaining alarms are caused to be silent.

6. In an elevator, the combination with a car, of an automatic alarm-signal system operatable independently of the car-controlling apparatus and comprising a single alarm at each landing, a contact movable with the car, a source of electrical supply, an elongated stationary contact formed in separated sections extending longitudinally of the travel of the car, in position to be engaged by the contact on the car, the parts of said system being included in a single complete electric circuit with each alarm in a branch circuit and being so constructed and arranged that in consequence thereof an alarm will sound during the continuance of an engagement of the movable and the stationary contacts.

7. In an elevator, the combination with a car, of an alarm-signal system operatable independently of the car-controlling apparatus and comprising a source of electrical supply, a series of alarms arranged one at each landing, a plurality of elongated contacts in the well, and a contact on the car adapted to successively engage said elongated contacts to close a circuit therethrough and effect the sounding of said alarms in succession as the car moves up and down the elevator-well, said alarms, said source of supply, said elongated contacts and said contact on the car being included in one complete electric circuit with the alarms in branch circuits in multiple with each other, and with an elongated contact in each branch circuit, said circuit being closed to cause the sounding of an alarm by the engagement of the car-contact with the stationary contact whether the car be moving in one direction or the other.

8. The combination of an elevator-car, a series of alarms at the landings, and means for sounding the alarm at the landings successively as the car moves up or down, said means including a series of contacts in the well, each electrically connected with an alarm, a second elongated contact parallel to the series of contacts, a source of electrical supply, a single circuit connection between said source of supply and said series of contacts and said elongated contact, and a contact on the car adapted to engage and close a circuit between said elongated contact and said series of contacts in succession, said elements being in one complete electric circuit which is closed by the engagement of the movable contact with two parallel contacts independently of the car-controlling apparatus and operative whether the car be moving upward or downward.

9. The combination of an elevator-car, a series of alarms at the landings, and means for sounding the alarm at the landings successively as the car moves up or down, said means including two series of contacts in the well, the contacts of one series being parallel to those of the other series, and the corresponding contacts of both series being respectively electrically connected with the alarms at two adjacent landings, a source of electrical supply connected to the alarms, and a contact movable with the car, connected to the source of supply, and adapted to engage the contacts of both of said series as the car travels up or down the well.

10. The combination of an elevator-car, a series of alarms at the landings, and means for sounding the alarm at the landings successively as the car moves up or down, said means including two series of contacts in the well, the contacts of one series being parallel to those of the other series, and the corresponding contacts of both series being respectively electrically connected with the alarms at two adjacent landings, a source of electrical supply connected to the alarms, and a contact movable with the car, connected to the source of supply, and adapted to engage the contacts of both of said series as the car travels up and down the well, the contacts of each series being disposed whereby they are not engaged by said movable contact when the floor of the car is substantially level with the floor at a landing.

11. The combination with an elevator-car and a plurality of landings, of a series of electric alarms at the landings, an electric signaling-circuit containing said alarms and consisting of a single main circuit with a branch circuit at each landing, each branch circuit having one of said alarms therein and each alarm, except those at the top and bottom landings

being arranged in two of said branch circuits, and automatic means for breaking said signaling-circuit when the car is opposite any one of said landings and for closing said signaling-circuit as the car travels between the said landings in either direction to cause the alarm to sound at the landing being approached by the car.

In testimony whereof we have affixed our signatures in presence of two witnesses.

EDWARD L. HAIL.
GEORGE HAIL.

Witnesses:
HENRY A. GREENE,
AUGUSTA ALLEN.