No. 737,635.

PATENTED SEPT. 1, 1903.

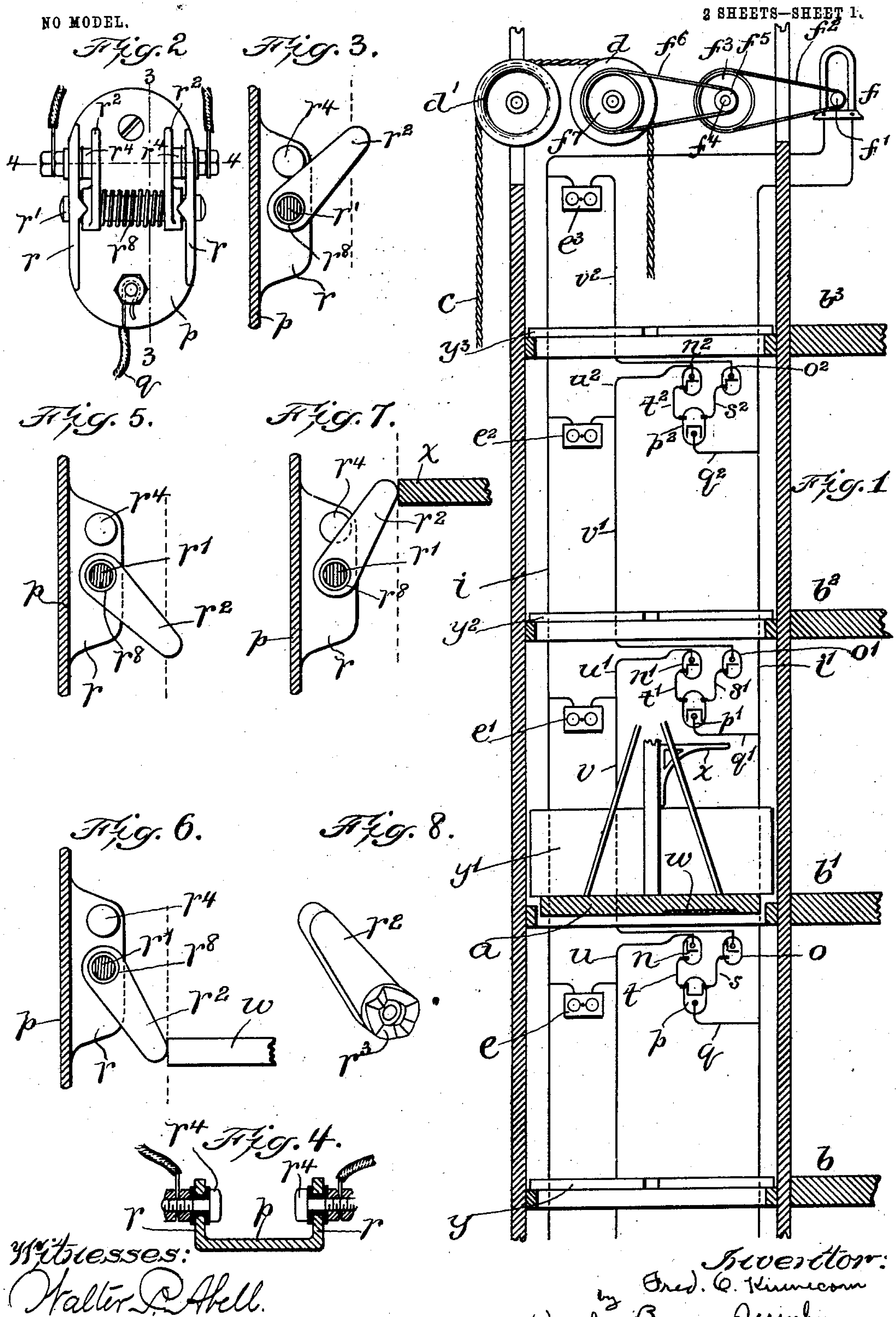
F. O. KINNECOM.

ELECTRIC ALARM FOR ELEVATORS.

APPLICATION FILED FEB. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
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Horace Brown

Inventor:
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THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

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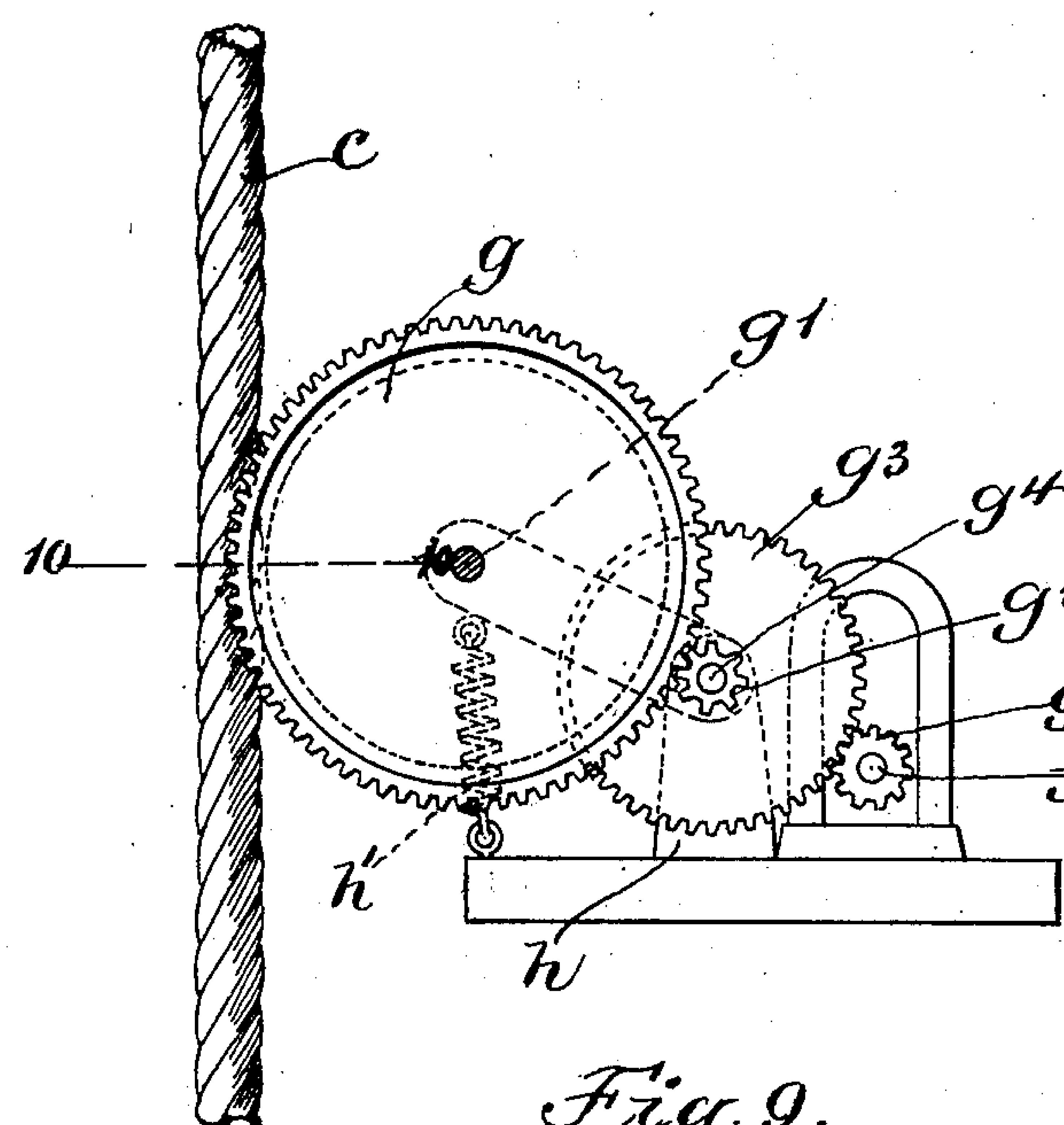

Fig. 9.

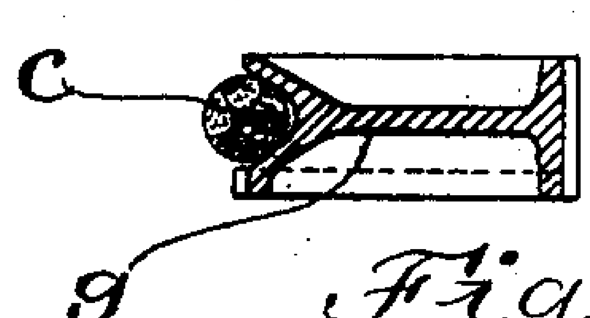

Fig. 10.

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UNITED STATES PATENT OFFICE.

FRED O. KINNECOM, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO EDWARD L. HAIL AND GEORGE HAIL, OF PROVIDENCE, RHODE ISLAND.

ELECTRIC ALARM FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 737,635, dated September 1, 1903.

Application filed February 24, 1903. Serial No. 144,619. (No model.)

To all whom it may concern:

Be it known that I, FRED O. KINNECOM, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Electric Alarms for Elevators, of which the following is a specification.

This invention has relation to electric alarms for freight-elevators.

Heretofore reliance has been placed upon either the ordinary lighting-circuit or upon a battery-circuit for supplying current to the alarms, but with unsatisfactory results. The employment of a lighting-circuit is more or less dangerous, owing to its high voltage, and expensive, and, on the other hand, where a battery-circuit is employed the attention required to keep the batteries in proper working order causes annoyance and inconvenience.

According to the present invention a magneto-electric generator is employed which is operated only when the car is in motion and which supplies the current for magneto-electric alarms, such as polarized bells, only as it is needed.

On the illustration a system is shown as applied to elevator-wells fitted with floor-doors at each landing which open automatically as the car approaches that landing from either direction. When a car approaches a landing from above, it is in most cases in sight to those on the floor below as soon as the hatchway opens; but there is no warning to persons on the landing or working upon the hatchway-door when a car is approaching from below, and therefore many persons have been seriously or fatally injured when standing on or passing over such hatchway-doors. By the employment of a warning-signal on each landing to be sounded as the car approaches the same from either direction and before the hatchway-doors are opened it is possible to prevent many accidents of the character referred to.

According to the illustrated embodiment of the invention a plurality of actuators or contact-pieces may be employed for operating the various switches, so as to prevent prolonged sounding of the warning-signals and to permit a judicious location of the signals, so that the warnings will be given an appreciable space of time before the hatchway-doors commence to open.

On the accompanying drawings, Figure 1 represents diagrammatically an elevator-well and the alarm-circuit. Fig. 2 represents a front elevation of one of the double switches. Fig. 3 represents a section on the line 3 3 of Fig. 2. Fig. 4 represents a section on the line 4 4 of Fig. 2. Fig. 5 represents a section on the line 3 3 with the levers thrown downward. Fig. 6 represents a similar section and illustrates the lever yielding to permit the passage of a projection on the car. Fig. 7 represents the switch-lever in its upward position and yielding to permit the passage of a projection on the car in an upward direction. Fig. 8 represents one of the switch-levers in detail and shows the cam-teeth on its hub. Fig. 9 represents another arrangement of mechanism for actuating the generator. Fig. 10 represents a section on the line 10 10 of Fig. 9.

On the drawings the elevator-car is indicated conventionally at a. It travels up and down the elevator-well from and past the various landings indicated at $b\ b'\ b^2\ b^3$. The hatchway-doors are indicated at $y\ y'\ y^2\ y^3$, and they are opened and closed automatically as the car passes the landings. The supporting-cable of the car is indicated at c, and it passes around the sheaves $d\ d'$ at the top of the well. $e\ e'\ e^2\ e^3$ indicate magneto-electric alarms, such as polarized bells, placed one at each landing, as shown. Each alarm is in a branch circuit and receives its electric current from a magneto-electric generator, (indicated at f.) The armature f' of said generator is actuated from any movable element forming a part of the elevator-plant. As shown, it may be actuated by an endless belt f^2 from a pulley f^3, located at the top of the well. The pulley f^3 is on a shaft f^4, carrying a small pulley f^5, to which rotation is transmitted by a belt f^6 from a pulley f^7, fast with the pulley d. The rotation of the pulley d due to the travel of the car upward or downward effects the rapid rotation of the armature f' of the generator f for generating the current to effect the sounding of the various alarms as permitted by the switches.

It is understood that in lieu of the belt-and-pulley power-transmitting mechanism other devices may be employed, such as illustrated in Fig. 9. In this case a grooved pulley g bears against the hoisting-cable c and is rotated by the longitudinal movement of said cable. The said pulley is mounted in the end of the radius-arm g', which is pivoted upon the bracket h and is held toward the cable by a spring h'. The armature f' of the magneto-electric generator is provided with a small pinion g^2, intermeshing with and driven by a gear g^3, the shaft g^4 of which is mounted in the bracket h and serves as a pivot-stud for the arm g'. The gear g^3 has secured to it a pinion g^5, which intermeshes with teeth formed on the pulley g. With this construction it is apparent that the movement of the cable will rotate the pulley g and transmit power to the armature-shaft f'.

The conductors of the main circuit, which includes the magneto-electric generator f, comprise the conductors $i\,i'$. The alarms $e\,e'$, *et seq.*, are arranged in branch circuits or in multiple with each other. Provision is made for closing the branch circuits successively as the car moves up and down and for insuring that the said circuits are broken when the floor of the car is on a level with a landing. Preferably the alarms are sounded not only at the landing opposite which the car may be, but also the landing which is being approached by the said car, whether said car be moving upward or downward.

In the illustrated form of the invention there are a plurality of switch mechanisms at each landing, said mechanisms controlling the circuits for two alarms, so that each alarm may be closed by each one of two branch circuits. Any suitable form of switch mechanism may be employed, although for obvious reasons it is desirable to utilize a form of switch such as illustrated upon the drawings. The three switches at each landing comprise two single switches $n\,o$ and a double switch p.

In Fig. 2 a double switch is illustrated. It consists of an ordinary base having lugs $r\,r$, in which is secured shaft r' for the switch-arms $r^2\,r^2$, which are held apart by a spring r^8. Each switch-arm has on its hub teeth r^3, adapted to be yieldingly engaged by the spring r^8, with complemental teeth on the lugs r, so as to yieldingly hold said switch-arms in either of the two different positions shown in Figs. 3 and 5 and also to return said arms to said positions if they be moved to the positions shown in Figs. 6 and 7. Said switch-arms are adapted to engage contacts r^4, which are set in and insulated from the lugs r. When the switch-levers r^2 are moved to a downward position, as shown in Fig. 5, the circuit between them and the contacts is broken.

The alarms $e\,e'\,e^2$ are each connected with two groups of switch mechanisms, as previously stated, although but one switch mechanism is shown as connected with the alarm e for lack of space. The alarm e^3 at the top landing is connected with but one group of switch mechanisms for reasons which will appear, since the car does not travel above said landing. From the supply-conductor i' there leads to each of the switches $p\,p'\,p^2$ a conductor, (designated in the several instances as $q\,q'\,q^2$, respectively.) These wires are electrically connected with the bases of the double switches.

The single switches at each landing have insulated contacts similar to those at r^4, which are respectively connected by conductors $s\,t$ (and the higher power of those characters) with the insulated contacts r^4 of the double switches. Each single switch is substantially similar to the half of a double switch when the latter is divided along its median line, except that the insulated contacts are located below the supporting-shaft r' instead of above it, as shown in Fig. 2, so that in each of the single switches the circuit is closed when the switch-lever is downwardly inclined, being in this respect different from the double switches, in which the circuits are closed when the switch-levers are upwardly inclined. The base of the single switch n is electrically connected with the alarm e by a conductor u, the switch n' with the alarm e' by the conductor u', and the single switch n^2 is connected with the alarm e^2 by the conductor u^2. The switch o is connected with the alarm e' by the conductor v, the switch o' with the alarm e^2 by the conductor v', and the switch o^2 with the alarm e^3 by the conductor v^2. From this description it will be apparent that a circuit may be closed through the alarm e^2—for instance, either by the switch o' or by the switch n^2, providing the double switches have their levers in proper positions to close the circuits. The various switch-levers are adapted to be actuated by one or more actuators on the car, said actuators being indicated, respectively, as $w\,x$ and consisting of projections which are adapted to engage the said levers and move them upward or downward. The actuator x is employed for throwing the switch-levers upwardly as the car travels in that direction, whereas the actuator w is relied upon to move said switch-levers downward when the car travels from an upper to a lower landing. In both cases the following actuator or the second actuator to pass the switches does not permanently alter the position in which the levers were left by the first actuator to engage them. The two single switches of each group are located relatively near the ceiling, so that their levers may be engaged by the actuator w soon after the car is started on its downward trip, so as to be thrown downward and close the circuits through the signal on the landing below as well as on the landing which the car is leaving.

In Fig. 1 the car may be assumed to be stationary. At this time the alarms are all silent, since the circuits are all broken. Assuming that the car moves upward, the following results will occur. The actuator x will engage the levers of the double switch p' and throw them into engagement with their respective contacts. The single switches n' o' at this time have their levers in engagement with their contacts, so that as soon as the circuit through the double switch is closed the current is enabled to pass from the supply-wire i' to the alarm e' and the alarm e^2. The further movement of the car, however, brings the actuator into engagement with the levers of the single switches n' o', so as to move said switch-levers upwardly and break the circuits through said switches. As the car continues its travel upward the actuator x is finally brought into engagement with the levers of the double switch p^2 to move them into engagement with their contacts, and consequently the circuit is again closed through the alarm e^2 and is also closed through the alarm e^3. The circuits, however, are broken as soon as the actuator x engages the levers of the single switches n^2 o^2. As the car moves downwardly from the top landing the actuator w thrusts downwardly the levers of the single switches n^2 o^2 and closes the circuits through the alarms e^2 e^3. These circuits are broken as soon as the actuator w engages the levers of the double switch p^2. This action takes place at each group of switches as the car moves downwardly, and it will be seen that at all times except when an alarm is being sounded at least one switch or pair of switches in each group of switches has its levers in position to close the circuit therethrough, while the other switch or switches of the same group have their levers in position to break the circuit. The lower switch of each group is located at such a distance from the upper switches of each group that the warning-signals will sound during the interval of time covered by the passage of the car from the upper switches to the point where the hatchway-doors below the car commence to open. The actuator x on the car-frame is located at such a height that it will engage the levers of the lower or double switch of each group soon after the car has started on its upward trip. Therefore on either up or down trips of the car the warning-signal sounds on the landing ahead of the car from the time it leaves its landing until the hatchway-doors ahead of the car commence to open, and incidentally the signal also sounds on the landing that the car is at that time leaving or passing.

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, I declare that what I claim is—

1. An electric alarm system for elevators comprising a movable element forming a part of the elevator plant and moving only when the car is moving, a magneto-electric alarm, a magneto-electric generator adapted to be actuated by said element, and an electric circuit including said generator and said alarm.

2. An electric alarm system for elevators comprising a magneto-electric alarm, a magneto-electric generator electrically connected therewith, and means for actuating said generator only when the elevator-car is in motion.

3. An electric alarm system for elevators comprising a magneto-alarm, a magneto-generator, a circuit including said alarm and said generator, means forming a part of the elevator plant for actuating said generator, and a car-actuated automatic switch in said circuit.

4. An electric alarm system for elevators comprising an elevator-car, a magneto-generator, means for actuating said generator, a magneto-alarm in circuit with the generator, and means adapted to be automatically actuated by an elevator-car for opening and closing the said circuit.

5. An electric alarm system for elevators comprising in combination with the car and the hoisting mechanism, a magneto-generator actuated by the hoisting mechanism, and a polarized electric bell in circuit with said generator.

6. An electric alarm system for elevators comprising in combination with a rotatory shaft forming a part of the elevator hoisting mechanism and a car, a magneto-electric generator, means for transmitting power from said shaft to the armature of said generator, an alarm, an electric switch in circuit with said generator and said alarm, and means on the car for actuating said switch.

7. An electric alarm system for elevators comprising a magneto-electric generator, a series of magneto-alarms, arranged in the elevator-well, and connected in multiple with the generator, and means for automatically closing the circuit through said alarms successively.

8. The combination with a car, and a movable element forming a part of the elevator plant, of a series of polarized bells arranged in the elevator-well, a magneto-electric generator actuated by said element, and with which said bells are connected in multiple, and means for alternately closing and breaking the circuit through said bells in succession as the car moves up or down the well.

9. The combination with a car, and a movable element forming a part of the elevator plant, a polarized bell, a magneto-electric generator actuated by said element, a pair of switches in series with said bell and in multiple with each other, and means for operating said switches successively to close a circuit through said bell.

10. The combination with a car, and a movable element forming a part of the elevator plant, of a magneto-electric generator actuated by said element, a series of polarized

bells arranged in the elevator-well, one at each landing, and means for closing a circuit through the alarm located at the landing in advance of that being passed by the car whether the car be moved upward or downward.

11. An alarm system for elevators comprising an electric alarm, a source of electrical supply, a pair of separated switches in series with said alarm and said source of supply, an elevator-car, and a pair of separated actuators on the car adapted to successively engage said switches in succession, substantially as described.

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

FRED O. KINNECOM.

Witnesses:

HENRY A. GREENE,

MABEL F. HAYDEN.