No. 620,547. Patented Feb. 28, 1899.

E. L. & G. HAIL.

SIGNAL SYSTEM.

(Application filed Aug. 17, 1897.)

(No Model.) 3 Sheets—Sheet 1.

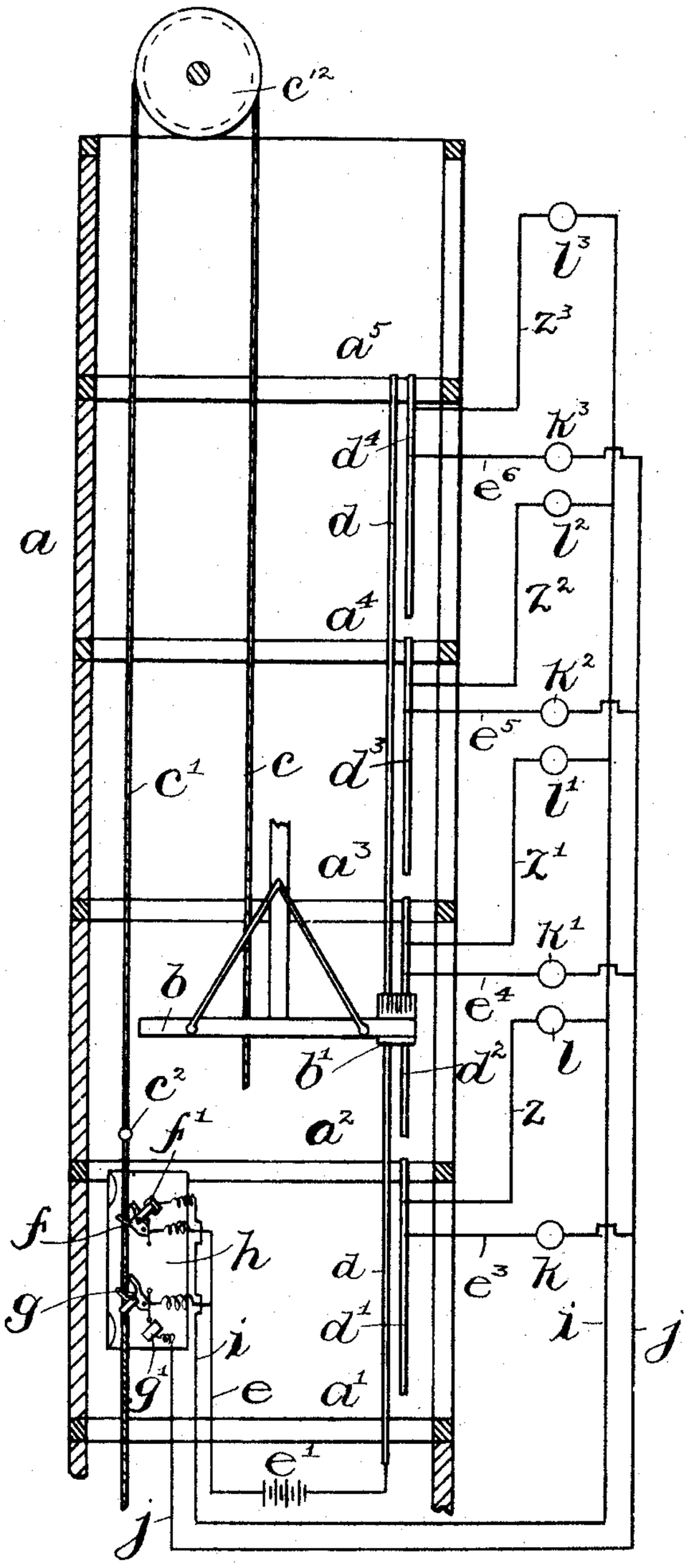

Fig. 1.

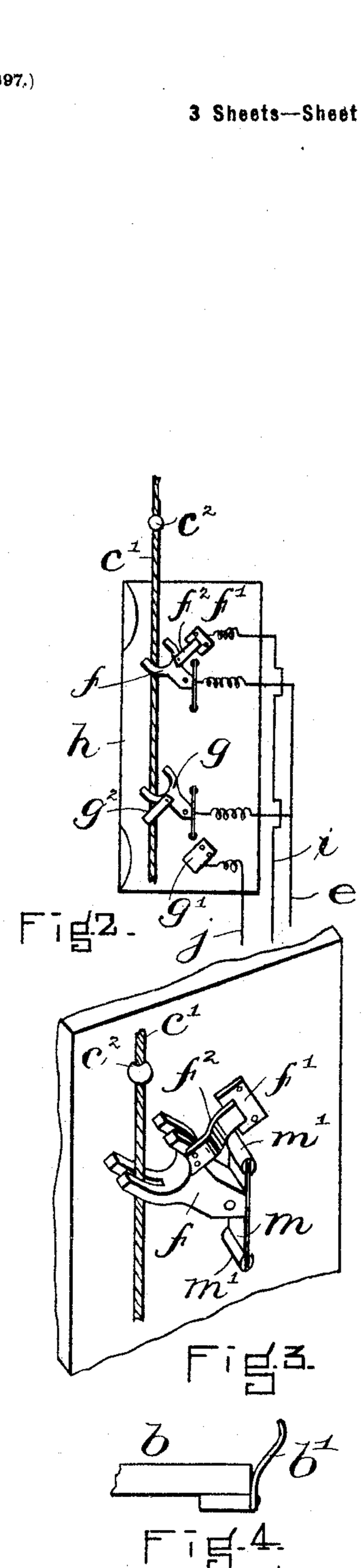

Fig. 2.

Fig. 3.

Fig. 4.

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No. 620,547. Patented Feb. 28, 1899.

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SIGNAL SYSTEM.

(Application filed Aug. 17, 1897.)

(No Model.) 3 Sheets—Sheet 2.

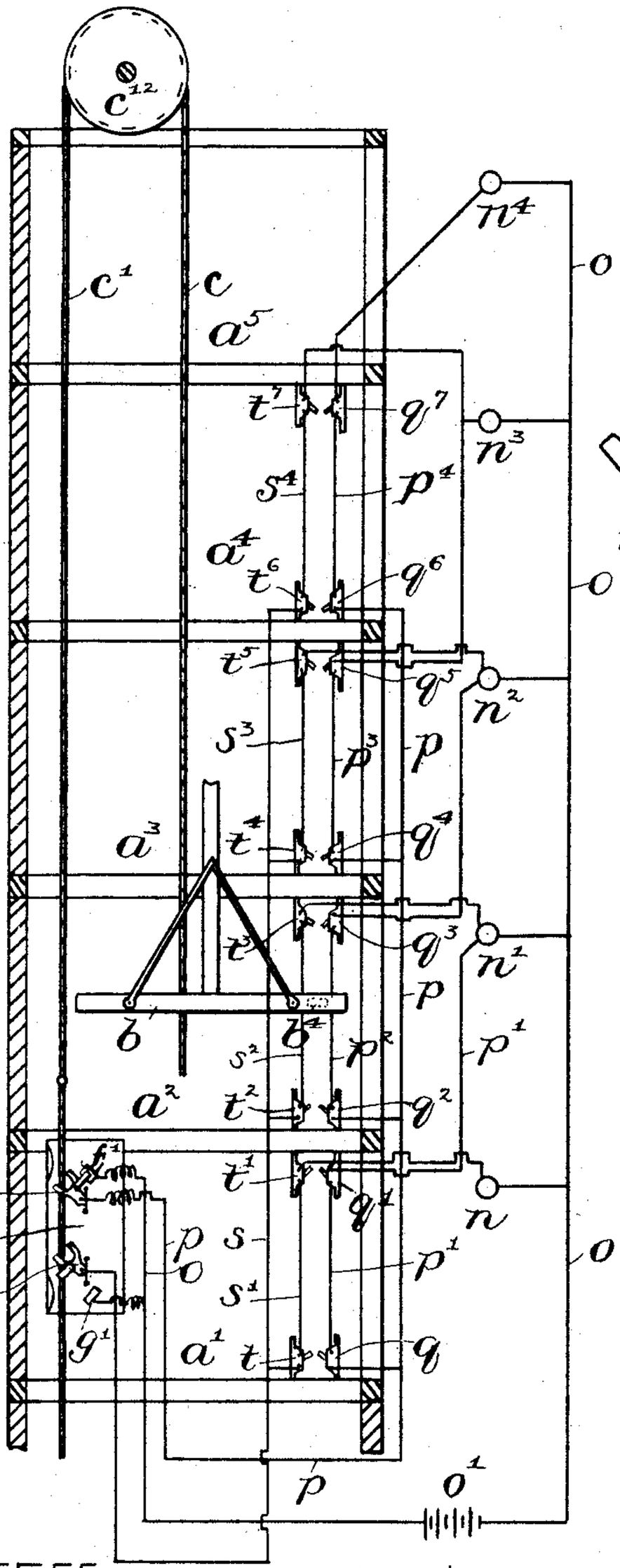

Fig. 5.

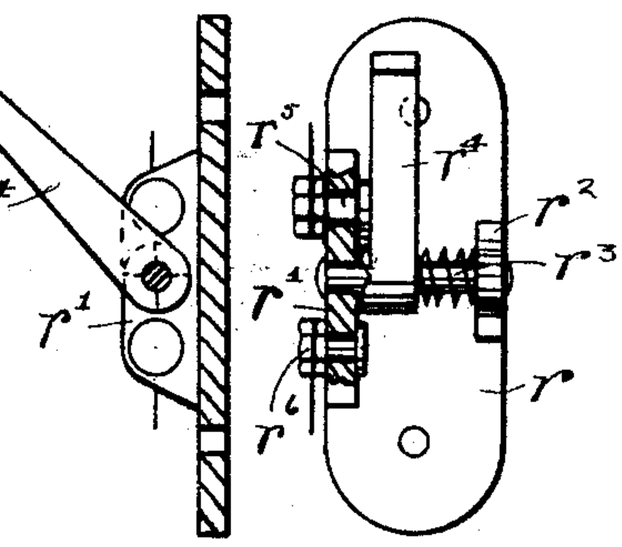

Fig. 6. Fig. 7.

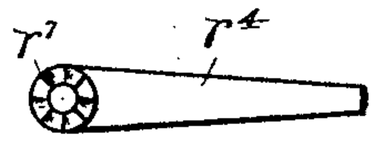

Fig. 8.

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(Application filed Aug. 17, 1897.)

(No Model.) 3 Sheets—Sheet 3.

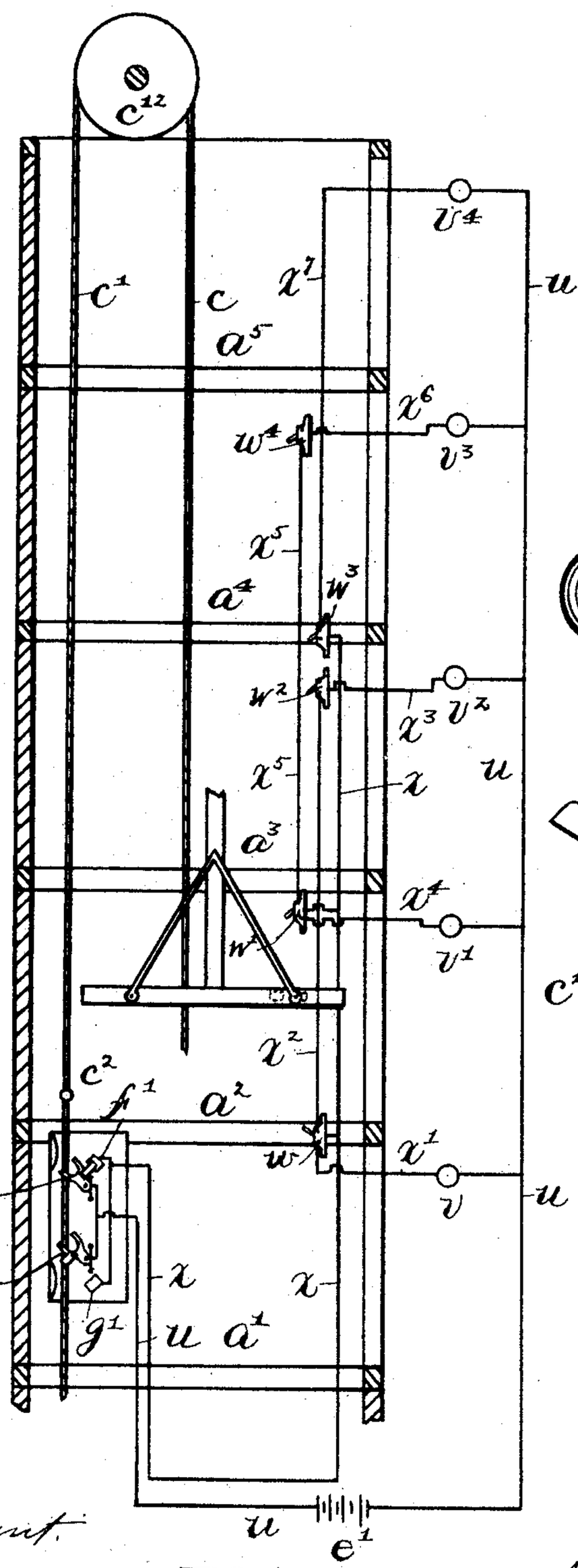

Fig. 9.

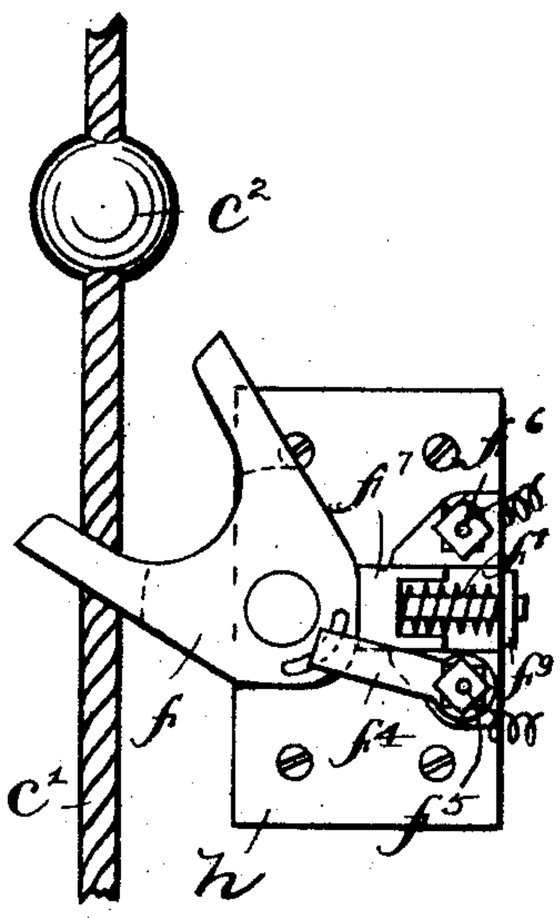

Fig. 10.

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UNITED STATES PATENT OFFICE.

EDWARD L. HAIL AND GEORGE HAIL, OF PROVIDENCE, RHODE ISLAND.

SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 620,547, dated February 28, 1899.

Application filed August 17, 1897. Serial No. 648,577. (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 Signal Systems, of which the following is a specification.

This invention has relation to systems or devices for use in elevator plants by means of which the movements of the car may be indicated to the senses and the liability of accident to those employed near or upon the elevator be decreased; and it relates more particularly to the systems or devices for indicating the movements of the car audibly by bells, buzzes, gongs, or the like. Systems for indicating the movements of the car in this manner are generally required for those elevators which are employed for carrying freight and the entrances to the shaft or well of which are more or less unguarded, and they generally include an electric circuit which is closed when the car is moving and broken when the car stops and which includes a series of alarms or bells located at the different landings and sounded only while the car is in motion; but where the alarms are continuously sounded when the car is moving irrespective of its position in the shaft or well the operators or those employed near the elevator are apt to and frequently do become careless and expose themselves to unnecessary danger in endeavoring to ascertain at which landing the car may be or whether it is approaching, and, moreover, such continuous ringing of the bells occasions a waste of electricity and requires a constant renewal of the batteries and becomes more or less of a nuisance.

Therefore the object of this invention is to decrease the liability of accident to a greater degree by causing the sounding of an alarm on a landing only when the car approaching it from above or below is adjacent thereto, so that at all other times during the movements of the car the alarm will be silent, and by this means the workmen or those employed near the elevator will be notified in time to prevent them from placing themselves in a position where they are liable to accident by being informed when the car is approaching the floor or landing where they are. These systems are advantageously employed where there are automatic horizontal hatchway-doors which open and close suddenly.

To this end the invention consists of a signal system for elevators possessing certain features of novelty, all as illustrated upon the drawings and now to be described in detail and then pointed out in the claims hereto annexed.

Reference is to be had to the accompanying drawings, and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 represents a diagrammatic view illustrating an elevator well or shaft with the car therein, together with the electric circuits and the devices actuated thereby for sounding an alarm. Fig. 2 represents a switchboard the switches of which are operated by the shifting of a controlling-line. Fig. 3 represents in perspective one of the switches. Fig. 4 represents the brushes carried by the car for making contact with the strips extending up the elevator-well. Fig. 5 represents a diagrammatic view showing a different system of electric circuits. Figs. 6, 7, and 8 represent in detail the switches which are arranged in the elevator-well and which are operated as the car passes them. Fig. 9 represents another diagrammatic view and illustrates another arrangement of the electric circuits. Fig. 10 represents a form of switch which may be employed upon the switchboard.

Referring to the drawings, *a* indicates conventionally an elevator shaft or well in which the car *b* travels, the landings being indicated by a', a^2, a^3, a^4, and a^5. The car *b* is raised and lowered by any approved hoisting mechanism, which is under the control of a motor-controlling device, consisting of the line $c\,c'$, which passes over the shaft c^{12} at the top of the shaft or well and extends down to a valve-wheel or other form of controller connected to the hoisting mechanism. The controlling device may be of any desired kind and may include a hand-lever, if necessary.

Extending vertically from the floor of the lower landing a' to the upper landing a^5 in the elevator well or shaft is a continuous metallic contact-strip *d*, and arranged beside the same and parallel thereto is another strip di-

vided into insulated sections d' d^2 d^3 d^4. These strips are insulated from each other and are arranged to be connected electrically by a metallic brush or contact b', carried by the car.

The strip d is connected by a wire e, through a battery or other suitable source of energy e', with movable switches f g, pivoted upon a switchboard h, arranged in the well, as shown in Fig. 1, and the contact-strips d' d^2, &c., are connected to the stationary contacts f' g' by circuits i and j, respectively.

At the lower landing a' a bell k is placed in the branch circuit e^3, extending from the strip d' to the stationary contact g' on the switchboard, and similar bells k' k^2 k^3 are placed in the branch circuits e^4 e^5 e^6, connecting the strips d^2 d^3 d^4, respectively, with the return-wire j. At the landing a^2 a bell or gong l is in a branch circuit z, extending from the contact d' to the wire i, there being similar bells or gongs l' l^2 l^3 in other branch circuits z' z^2 z^3 from the strips d^2, d^3, and d^4 to the wire i, as shown, so that with the exception of the upper and the lower landing there are two bells at each landing, arranged in different circuits, one circuit including the contact f' and the other the contact g' on the switchboard h.

The return portion c' of the controlling-line c is provided with a clip or enlargement c^2, which is adapted to engage the pivoted switches f and g in such way that when the said return portion c' is raised the switches are (one or both) thrust upward, as shown in Fig. 1, and when it is lowered one or both are thrust downward. These switches, however, are so arranged that when they project toward each other their respective circuits are broken, when they both extend upward the circuit including the wires i and e is closed, and when both the switches are forced downward the circuit through the wires e and j is closed and the other is broken. They are placed a distance apart equal to the idle play of the valve, so that when the car is motionless and the valve and controlling-line are in a neutral position the clip or stop c^2 will be between the two switch-levers and may be moved the extent of the idle play of the valve without starting the car or actuating them. When the stop or clip c^2 is thus between the two switches the levers are both turned inward or toward each other, so as to break their respective circuits, and hence when the controlling-line is actuated or moved to start the car it must swing one of the switch-levers on its pivot to make contact with its contact-plate f' or g', as the case may be, depending upon whether the car is started upward or downward in the well.

Assuming that the car is at the second landing and that the controlling-line be shifted to start it upward, the shifting of the controlling-line causes the clip or stop c^2 to swing the pivoted switch f into contact with the stationary contact-plate f' to close the circuit including the wire i. The brush b' electrically connects the strip d and the strip d^2 and a circuit is closed through the wire i, bell or alarm l', strip d^2, contact-strip d, wire e, battery e', switch f, and contact f', whereupon the bell or alarm l' will continue to sound until the brush b' leaves the contact-strip d^2 and engages the contact d^3, and then a new circuit will be formed through the said contact d^3 and the bell or alarm l^2. Thus it will be seen that so long as the car continues to travel upward an alarm will be sounded at the landing immediately above the one to which the car is opposite or which it is then passing, the alarms being all successively sounded until the car reaches the upper end of the well or hatchway and is brought to a stop. The bringing of the car to a state of rest by shifting the controlling-line causes the throwing of the switch f into an inoperative position, so as to break its circuit, and hence the alarm l^3 ceases to sound. When the controlling-line is again shifted to start the car downward, the clip or stop c^2 engages the switch g and throws it against the contact-plate g', so as to close the circuit between the wire e and the wire j. The brush b' being at that time against the contact-strip d and the section d^4, the circuit will be closed through the wire j and the alarm k^3 at the landing a^4 which is below the landing a^5 at which the car is at that time. As the car continues to descend the alarms k^2, k', and k are successively sounded as the car approaches the landing at which they are placed. While the car is thus descending the stop or clip c^2 is below the switch g, so that when the car is brought to a state of rest the return portion of the controlling-line is raised and the said clip engages the lever of the said switch and throws it out of its operative position.

In Figs. 2 and 3 we have illustrated the switchboard and the switches thereon. On the board h are mounted the switch-levers f g, as before stated, each of which is adapted to make contact with a contact-plate f' or g' by means of a small spring-strip f^2 or g^2, secured upon them, the spring-strips being on opposite sides of their respective levers. Each lever is two-armed and is likewise bifurcated to receive the return portion c' of the controlling-line, as shown more particularly in Fig. 3. The end of each lever bears against a flat spring m, mounted in insulated studs or posts m', the said end being V-shaped or wedge-shaped, so that the lever is held in either of two positions, though free to be swung from one side to the other.

If desired, we may employ the form of switch shown in Fig. 10, in which case the spring-strip f^4 is secured upon an insulated binding-screw f^5 and bears against the raised contact-strip on the lever. The strip may be removed from the screw f^5 and placed upon the insulating-screw f^6, so as to reverse the action of the switch. The block f^7, sliding in guides, is pressed against the end of the switch-lever by a coiled spring f^8, abutting against a lug f^9. In Fig. 5 we have shown

how we may dispense with the contact-strips extending up the elevator well or shaft, in which case we employ a series of switch-levers all secured upon the wall of the well, and instead of a double set of bells or alarms we employ only a single one for each landing. These alarms are indicated by n, n', n^2, n^3, and n^4, and they are all in circuit with a line or wire o, passing through a battery or other suitable source of energy o' to the contact-plates f' g' on the switchboard. Two independent circuits are employed, which include the wire o and the alarms, one including switches for closing the circuit through the alarm when the car is traveling upward and another for closing the circuit through the alarms when the car is traveling downward, said circuits being opened or closed by the stop or clip c^2 on the controlling-line. For closing the alarm when the car is traveling upward a wire p is connected with the switch f on the switchboard h and extends to the floor next below the upper landing, thence through switches and branch wire to alarm n^4 and return-wire c at the top landing. It is provided with branches p', p^2, p^3, and p^4, which are respectively connected with the return-wire o through the alarms n', n^2, n^3, and n^4.

q q' indicate wall-switches placed upon the floor and ceiling of the first landing in the branch p' of the wire p. Each switch (see Figs. 6, 7, and 8) comprises a base-plate r, having lugs r' r^2 to receive a pivot r^3, on which the switch-lever r^4 is mounted, so as to be swung between the contacts r^5 r^6. These contacts may be both insulated and the said switch-lever insulated from them, so as to close the circuit through either of them.

The hub of the switch-lever r^4 is provided with grooves or teeth r^7 to fit into corresponding grooves or teeth in the lug r', the grooves being at right angles to each other, so that said switch-lever may be given a quarter-turn and remain in proper position to be engaged by the shifter on the car, being held there by the spring r^3. The lever will be pressed down as the car passes by the engagement of the shifter therewith beyond the normal engagement of the teeth in the grooves in the lug r', and after the car has passed the spring will press the lever against the lug to cause it to be wedged around far enough to be engaged by the shifter when the car returns.

The switches q q' are oppositely arranged—that is to say, the switch-lever at q when thrust upward closes the circuit, while the lever q' must be thrust downward to close the circuit, and consequently breaks the circuit when it is raised. The car is provided with a projection b^4 to engage the said switch-levers and throw them upward or downward, as the case may be, according to whether the car is being raised or lowered.

Assuming that the car b is at the lowest landing and is stationary, the controlling-line is actuated to start it upward and throw the switch f against the contact-plate f'. As soon as the car commences to rise the projection b^4 strikes the lever on the switch q and turns it to close a circuit through wire p, branch p', alarm n' (which is at the landing next above,) and the return-wire o. At this time the lever at the switch q' extends downward, so that when the car has traveled upward far enough for the projection b^4 to strike it it is thrust upward and the circuit, including the arm n', is again broken, so that the latter ceases to sound. Similar switches q^2 q^3 q^4 q^5 q^6 q^7 are arranged at the landings a^2, a^3, and a^4, respectively, so that as the car continues to travel upward an alarm is sounded at the landing in advance of the car, which alarm ceases to sound as soon as the car comes opposite and is passing the said landing.

To sound the alarm when the car is traveling downward, a wire s is connected to the switch-lever g and extends to the floor next below the upper landing, thence through switch branch wire to alarm n^3 and return-wire o. It is provided with branches s' s^2 s^3 s^4, connected, respectively, with the alarms n, n', n^2, and n^3. In each branch is placed a pair of wall-switches for opening and closing the circuit therethrough, being indicated by t, t', t^2, t^3, t^4, t^5, t^6, and t^7. The levers of the several switches are placed in position to be engaged by the projection b^4 on the car as it travels downward. When the car is at the upper end of the well or shaft, and the controlling-line has been shifted to start it downward, and has thereby broken the circuit including the wire p and has closed the circuit including the switch g, contact g', and wire s in descending, the projection b^4 strikes the lever of the switch t^7 and closes a circuit through the alarm n^3 at the landing a^4, which circuit is broken as soon as the projection a^4 strikes the lever of the switch t^6. The car in continuing to descend strikes the levers of the several switches and closes and opens the circuits through the alarms n^2, n', and n successively, always sounding the alarm at the landing below that which the car is then passing.

In Fig. 9 we have shown another embodiment of the invention, in which the alarms are caused to sound not only on the floor or landing being approached, but on the landing that is being passed as well. In this system the switches f and g are in circuit with a wire u, passing through a battery e' to an alarm v^4 at the upper landing, and wire x, passing from the contact-plates f' and g' upward to the floor below the top landing, thence through a switch, as w^3, and branch wire to the said alarm v^4. A switch w is arranged adjacent the floor or landing a^2 and is placed in a branch x', passing through the alarm v and connecting the wire x with the return-wire u. Another branch circuit x^2 extends from the switch w to a binding-post on a switch w^2 just below the landing a^4, from which switch a branch x^3

extends through the alarm v^2 to the return-wire u. The binding-posts r^5 r^6 of the switch w (see Figs. 6, 7, and 8) are both provided with contact-surfaces and are insulated from the base, and the wire x is connected to the base of the switch, and therefore electrically connected with the lever, so that by throwing the lever upward the circuit is closed through the branch x^2, and by throwing it downward it is closed through the branch x'. Just below the floor of the landing a^3 is placed a switch w', having its lever electrically connected to the wire x and having one of its insulated contacts connected to the wire u by a branch x^4, containing the alarm v', and having its other contact connected by the branch x^5 with the lower contact of a switch w^4, placed below the landing a^5 and connected by a branch x^6 with the return-wire u, which branch is provided with the alarm v^3. At the landings a^4 is placed the switch w^3, having its lever in contact with the wire x and connected by branch wire x^7 and alarm v^4 with the wire u.

The levers in the switches w and w' act both ways, as above described, while the levers of the other switches operate but in one direction, all the levers being actuated by projections on the car, as hereinbefore set forth. Assuming that the car is at a standstill at the lowest landing a' and the clip or stop c^2 is between the switches f and g, which are both in their inoperative positions, the shifting of the valve-controlling line closes the circuit through the switch f, wire x, switch w, branch x', alarm v, and return-wire u, causing the alarm v to sound, being also closed through wire x, switch w', branch x^4, alarm v', and return-wire u, so that as the car moves from the first to the second landing an alarm is sounded not only on the first landing, but also on the one immediately above it, said switches being already closed as the switch-levers were thrown down as the car passed downward previously. As the car continues to travel, however, it engages the lever of the switch w and throws it upward, breaking the circuit through the branch x' and closing it through the branch x^2, switch w^2, branch x^3, and alarm v^2. Thus the alarm on the second floor continues to sound, and the alarm on the third floor is also caused to sound. Then as the car continues to rise the lever of the switch w' is thrown upward, breaking the circuit through the branch x^4 and closing a circuit through the branch x^5, switch w^4, and branch x^6. The alarm v^2 continues to sound until the car rises far enough to throw upward the lever of the switch w^2, immediately after which it raises the lever of the switch w^3 and closes the circuit through the branch x^7 and the alarm v^4. Upon the stopping of the car the main switch f is thrown out of contact with the plate f' and the circuit is broken. When the car begins its downward travel, the first movement of the motor-controlling line operates the switch g and closes the circuit through the wires u x and the alarm v^4 immediately begins to sound. Then as the car continues to descend it first throws the lever of switch w^4 downward and closes the circuit through alarm v^3 (since the lever of switch w' was moved upward when the car was ascending) and afterward breaks the circuit through alarm v^4 by throwing downward the lever of switch w^3. Immediately thereupon the circuit through the alarm v^2 is closed, and the latter continues to sound until the circuit is broken by the car engaging the lever of switch w and closing the circuit through the alarm v, the alarm v^3 sounding meanwhile until the lever of switch w' is operated to close the circuit through alarm v'. The alarms v and v' do not cease sounding until the switch-lever g is operated to break the main circuit by the stopping of the car. Thus it will be seen that as the car travels upward or downward the alarm is sounded not only at the landing opposite which the car is then traveling, but also at the landing immediately above or below the same, according to the direction of travel of the car.

If desired, we may arrange the circuits to ring the alarms two landings above or below the elevator-car as the latter travels upward or downward.

Thus from the foregoing description it will be seen that we have provided one or more circuits which are broken when the car is at rest and are closed when the car is in motion, the mechanism for operating the switches being controlled directly by the attendant and operated synchronously with the operation of the valve to start or stop the car. The car carries means for intermittingly closing and breaking one or more circuits to sound the alarm at the landing being approached by the car, though the alarm may be sounded at the landing opposite which the car is traveling, if desired.

It will be understood that we do not limit ourselves to any of the details which we have illustrated and described, since they may be varied to suit particular requirements. Other forms of switch may be employed and other devices for closing and breaking the different circuits through the alarms. If the system illustrated in Fig. 1 be used, the series of bells k k', &c., may be different in tone from the series l l', &c., so as to denote whether the car is traveling upward or downward. In all cases a circuit through one of the branches containing an alarm is closed as the car approaches a landing and is broken when the car reaches the landing either by the brush b' leaving the contact-strip or else by turning a switch, as in Figs. 5 and 9.

Having thus explained the nature of the invention and described a way of constructing and using the same, though 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 combination, a series of alarms at the landings, an elevator-car and means for sounding the alarm at a landing being ap-

proached by a car, said means being constructed and arranged to stop the sounding of the alarm when the car is at rest at any point in the hatchway.

2. In combination, a series of alarms at the landings, an elevator-car, and means on the car for sounding the alarm at the landing being approached by the car, said means being inoperative when the car is at rest at any point in the hatchway.

3. In combination, a series of alarms arranged one at each landing, an elevator-car, and means, inoperative when the car is at rest at any point in the hatchway for sounding the alarm at the landing being approached by the car.

4. In combination, a series of alarms at the landings, an elevator-car, and means rendered inoperative on stopping the car at any point in the hatchway, for causing the alarms to be sounded successively at the landings as they are respectively approached by the car, whether the car be ascending or descending.

5. In combination, a series of alarms at the landings, an elevator-car, means for causing a predetermined number of alarms less than the whole, and including the one approached by the car, to sound while the car is passing a predetermined point, said means being rendered inoperative by the stoppage of the car at any point in the hatchway.

6. A signal system for indicating the movements of an elevator-car comprising an alarm, an electric circuit including said alarm, means rendered inoperative by the stoppage of the car at any point in the hatchway, for closing the circuit to sound the alarm when the car is approaching a predetermined point and for breaking the circuit when the car has reached or passed said point.

7. A signal system for indicating the movements of an elevator-car, comprising an alarm, an electric circuit including said alarm, automatic means rendered inoperative by the stoppage of the car at any point in the hatchway, for closing said circuit when the car is opposite a predetermined point and for breaking the circuit when the car is opposite another predetermined point.

8. A signal system for indicating the movements of an elevator-car comprising an alarm, an electric circuit including said alarm, automatic means for closing said circuit when the car is opposite a predetermined point and for breaking the circuit when the car is opposite another predetermined point, a switch in said circuit, and means for operating said switch to open or close the circuit, said means operating said switch to open the circuit when the car is at rest.

9. A signal system for indicating the movements of an elevator-car comprising an alarm, an electric circuit including said alarm, automatic means for closing said circuit when the car is opposite a predetermined point and for breaking the circuit when the car is opposite another predetermined point, a switch in said circuit, and means actuated by the motor-controlling devices for operating said switch to close the circuit when the car is moving and to open the same when the car is at rest.

10. A signal system for indicating the movements of an elevator-car comprising an alarm at each landing, one or more electric circuits including said alarms, and means operated by the car for closing the circuits to sound the alarm on the next adjacent landing being approached by the car, and breaking the said circuit when the car has reached or passed said landing, said means being rendered inoperative by the stoppage of the car at any point in the hatchway.

11. A signal system for indicating the movements of an elevator-car comprising a series of alarms on the landings, a main circuit having insulated branches, means for closing each branch successively as the car moves, and means for opening the main circuit on the stoppage of the car at any position in the hatchway.

12. A signal system for indicating the movements of an elevator-car comprising a series of alarms, a main circuit having insulated branches, each branch including an alarm, means for closing each branch successively as the car moves, and a circuit-breaker for the main circuit in combination with elevator-controlling means adapted to operate said circuit-breaker for breaking said main circuit upon the stoppage of the car.

13. A signal system for indicating the movements of an elevator-car comprising a series of alarms, two independent main circuits each having branches including said alarms, means for successively closing and breaking the said branch circuits as the car travels upward or downward, and automatically-operated means for alternately closing or breaking said main circuits, said means being arranged to automatically break the circuits upon the stoppage of the car at any point in the hatchway.

14. A signal system for indicating the movements of an elevator-car comprising a series of alarms, two independent main circuits each having insulated branches including said alarms, means for closing one of the main circuits when the car is traveling upward, and means for closing the other circuit when the car is traveling downward, said circuits being broken by the stoppage of the car.

15. A signal system for indicating the movements of an elevator-car comprising a series of alarms, two independent main circuits each having insulated branches including said alarms, means for closing one of said main circuits when the car is traveling upward, and means for closing the other circuit when the car is traveling downward, both of said means being actuated by the motor-controlling devices to break the circuits while the car is at rest, and to close said circuits while the car is traveling.

16. A signal system, for indicating the movements of an elevator-car comprising a series

of alarms, two independent normally open main circuits each having insulated branches including said alarms, means for closing one of said circuits when the car is traveling upward, means for closing the other of said main circuits as the car is traveling downward, mechanism operable in connection with said means for opening or breaking said circuits upon the stoppage of the car, and means carried by the car for closing the branches of said first-mentioned circuit successively as the car travels upward, and for closing the branches of said other circuit successively as the car travels downward.

17. A signal system for indicating the movements of an elevator-car, comprising an alarm, an electric circuit including said alarm, and manually-controlled means on the elevator-car for breaking and closing the circuit through the alarm, whereby the alarm is sounded while the car is in motion and is silent while the car is at rest.

18. A signal system for indicating the movements of an elevator, comprising a series of alarms arranged at the different landings, an electric circuit having branches including said alarms, means on the car for successively closing and breaking the branch circuits, and means for breaking the main circuit upon the stoppage of the car.

19. A signal system for indicating the movements of an elevator, comprising a series of alarms, a main circuit having insulated branch circuits including said alarms, devices for breaking said main circuit upon the stoppage of the car, a switch for each branch circuit, and means for operating said switches successively to close and break said branch circuits.

20. A signal system for indicating the movements of an elevator, comprising a series of alarms, a main circuit having insulated branch circuits including said alarms, a switch for each branch circuit, means on the car for operating said switches successively to close and break said branch circuits, devices for controlling the movements of the elevator-car, and means controlled by said devices for breaking the main circuit upon the stoppage of the car.

21. A signal system for indicating the movements of an elevator comprising a series of alarms, a circuit including said alarms, a switch in said circuit and a controlling-line engaging and throwing the switch into and out of operative position, said parts being arranged whereby the circuit is broken upon the stoppage of the car.

22. A signal system for indicating the movements of an elevator, comprising a series of alarms, two independent main circuits each having branches including said alarms, switches in said main circuits arranged in the elevator-well, means for closing the said circuits alternately, and means for operating said switches to break the circuits upon the stoppage of the car.

23. A signal system for indicating the movements of an elevator, comprising a series of alarms, two independent main circuits each having branches including said alarms, a series of switches arranged in the elevator-well, two for each branch, one for closing the circuit and the other for breaking it, and means carried by the car for operating said switches successively.

24. In combination with an elevator-controller, a switch composing a base-plate, a two-armed lever pivoted thereon and adapted to be engaged by the controller, one or more contacts on which said lever may impinge, and a spring for engaging the end of said lever for holding it in each of two positions.

25. A switch, comprising a base, a lever pivoted thereto, and adapted to engage one or more contacts on said base, and provisions for permitting or causing said lever to move yieldingly in either direction past said contacts, and automatically return to the contact last passed by it.

26. In combination, an elevator-car, an alarm, an electric circuit including said alarm and a contact, and a switch in said circuit operated by the car and adapted to remain in either of two positions, said switch having a lever adapted to be moved in either direction past said contact to permit of the passage of the car, and to return to position to be engaged by said car on its return.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 5th day of August, A. D. 1897.

EDWARD L. HAIL.
GEORGE HAIL.

Witnesses:
GILMAN E. JOPP,
CHARLES A. HARKNESS.