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 AUTOMATIC SIGNALING APPARATUS FOR ELEVATORS.
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1,012,623.

Patented Dec. 26, 1911.

2 SHEETS—SHEET 2.

Fig. 2.

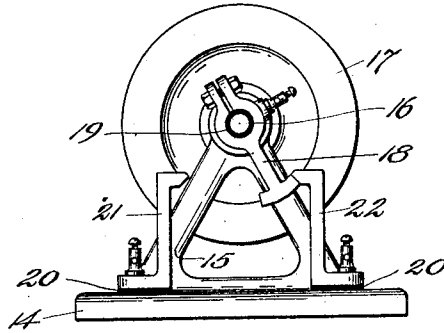


Fig. 3.

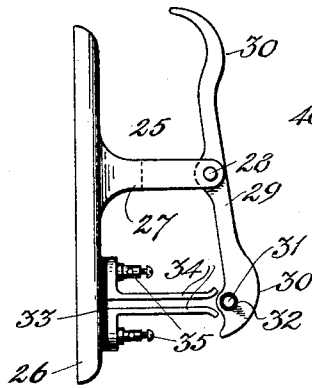


Fig. 4.

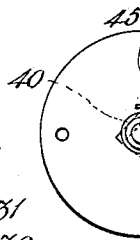


Fig. 5.

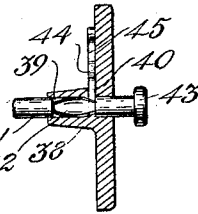
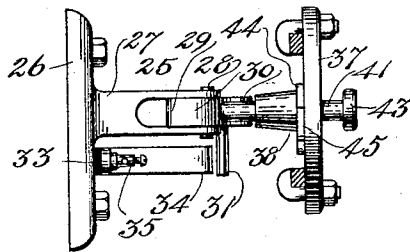


Fig. 6.



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AUTOMATIC SIGNALING APPARATUS FOR ELEVATORS.

1,012,623.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALLEN A. FULLER, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented new and useful Improvements in Automatic Signaling Apparatus for Elevators, of which the following is a specification.

This invention relates to elevator signaling systems and has special reference to a device of this character adapted to control the starting of elevators from the termini of their trips.

The principal object of the invention is to provide a signaling system of novel character which will indicate at the starting termini of a battery of elevators the presence of each individual car within a predetermined distance of the given terminus whenever the car is approaching, said signal being inoperative whenever the car is moving away from said terminus.

With the above and other objects in view, as will be hereinafter apparent, the invention consists in general in a novel system of electric signal circuits controlled by an improved arrangement of switch means actuated both by the directional movement and position of the respective cars.

The invention further consists in certain novel arrangements of details and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and specifically set forth in the claims.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—Figure 1 is a diagrammatic view of a battery of elevators equipped according to this invention. Fig. 2 is an elevation of a switch adapted to be used with this invention to close one or the other of two circuits. Fig. 3 is a side elevation of a circuit closer adapted to be used in connection with this invention. Fig. 4 is a face view of a device carried on each car to actuate the circuit closers. Fig. 5 is a vertical section through the device shown in Fig. 4. Fig. 6 is a plan view showing the relationship of the devices disclosed in Figs. 4 and 5, when in operative position.

In the diagrammatic view shown in Fig. 1, is indicated a battery of five elevators A, B, C, D and E moving in shafts 10. At 11 is a battery which is to be understood as typical of any source of electrical energy and from this battery extend the main line

circuit wires 12 and 13. At the top of each shaft is a two pole switch and this switch is indicated typically in Fig. 2, wherein there is shown a base 14 having standards 15 extending up therefrom and in these standards is journaled the shaft 16 of a hoisting drum 17 or like revolving part. On the shaft 16 is mounted an arm 18 and this arm is engaged frictionally on the shaft but is insulated from said shaft as at 19. To a suitable binding-post on this arm the wire 12 is connected. Mounted on insulation 20 are contacts 21 and 22 to which may be connected branch circuits 23 and 24, respectively. The connections are so made that when the drum is being rotated to hoist the car, the arm 18 will engage the contact 22 while the descent of the car will cause the arm to engage the contact 21.

In each of the branch circuits 23 is a circuit closer 25 and in each of the branch circuits 24 is a circuit closer 25'. These circuit closers are precisely similar in construction and a suitable type of circuit closer for this purpose is illustrated in Figs. 3 and 6, wherein there is shown a base 26 on which is formed a forked member 27. A pin 28 passes through the sides of this fork and on this pin is pivoted a lever 29. This lever 29 is pivoted intermediate its ends and each end of the lever is formed as a cam surface 30. At one end of this lever is a pin 31 insulated from said lever by insulation 32. On the base is an insulating block 33 to which is attached a pair of spring contacts 34 provided with binding posts 35. The wire forming each branch circuit is cut and the cut ends are each attached to a respective post 35. Each of the branch circuits is so arranged that the circuit breaker belonging to that circuit may be positioned at a predetermined distance above or below the termini of the elevator trips. For instance, there has been shown in Fig. 1 an arrangement for a building of nine floors, each indicated by a broken line and designated by the letters FL with an appropriate floor numeral added. In this arrangement the circuit closers 25 are shown as located at the third floor while the circuit closers 25' are shown on the seventh floor, indicated respectively at FL³ and FL⁷. In each of the circuits 23 is also located a signal 36, while in the circuit 24 are signals 36', these signals being here indicated as incandescent lamps, although it is obvious that other forms of

signals might be used. These switches, circuit closers and signals are all to be regarded as merely typical of suitable devices for the purpose.

5 On each car is mounted a device for actuating the respective circuit closers pertaining to that car, it being understood that circuit closers for each pair of circuits 23 and 24 are mounted in suitable position in the shaft of each respective car. Each of
10 these devices comprises a plate 37 having a central boss 38. An opening 39 is formed through the plate and boss and a slot 40 extends through the boss. Slidably mounted in the opening 39 is a pin 41 provided with
15 a spindle shaped portion 42 arranged to form notches at each end. This pin is further provided with a knob or grip 43. Pivoted at one end to the plate is an arm
20 44 arranged to lie in the slot 40 and engage one or the other of said notches, the shoulders at the ends of the notches forming stop means to prevent too great movement of the pin by engaging said arm. In order to hold
25 this arm in proper engagement, a spring 45 is secured to the plate and bears against said arm. This portion of the arrangement is so positioned and proportioned with reference to the circuit closers that when the
30 pin is projected outwardly from the car it will contact with one or the other of the cam surfaces 30, while when the pin is retracted or pulled inwardly by the operator, it will pass the circuit closers without touching lever 29. The purpose of this arrangement
35 is to permit any one of the elevators to be cut out of operative connection with the signaling mechanism at will.

In order to render the operation of the
40 device clear, the several cars have been shown in different positions. The car A is in the position in which it will be at the end of its downward trip, car B has started up and has been reversed before reaching
45 its circuit closer 25, as indicated by the arrow, cars C and D are in the positions shown and moving in the direction of the arrows on the cars, and car E is at the end of its upward path. As here indicated,
50 there is a single car at the top floor and the light for this car is lighted as indicated at 36' in the circuit for said car by lines radiating from the lamp. It will be noted that in its upward path the car E has closed its
55 circuit closer 25' and that its arm 18 has moved to contact with the member 22 so that the circuit through its signal is complete. The car D has just started down from the top and this has caused the arm
60 18 pertaining to said car to swing over to the contact 21 of that car. By this means the circuit, through the signal 36', of car D is immediately broken so that said signal is rendered inoperative. The car C has left
65 the bottom floor and reversed its switch arm

18 so that the arm engages the contact 22. Furthermore, this car has passed its circuit closer 25 and the pin 41 of said car has contacted with the lever 29 and rocked said lever to further break the circuit 23 of said
70 car. When this car passes the seventh floor its pin will contact with the lever 29 of its circuit closer 25 and complete the closing of its circuit 24, thereby actuating its upper signal and notifying the operator of car E
75 of its presence. The car B has started upward from the bottom and opened its circuit 23 by moving its switch arm 18 away from its contact 21, but as the car has not passed the third floor, the circuit closer 25
80 for said car has not been opened. The operator has reversed his car and this has resulted in the circuit 23 of that car being closed and its signal actuated as shown by the radial lines extending therefrom. This
85 serves to notify the starter and the operator of car A that car B is again moving downward.

It will be seen from the foregoing that the presence of a car within a predetermined
90 number of floors of one of the termini is always indicated, but that a car moving in the direction away from a terminus never actuates its signal at that terminus.

It will be understood that the switch arm
95 18 will not respond sufficiently to the small adjustments, necessary to bring the car to rest on a level with a floor, to swing across and again close the circuit which is opened on leaving its terminus. In other words,
100 car B will not flash its signal 36, as shown, unless its reverse movement is substantial, i. e., more than about five feet. The two sets of signals 36 and 36' are grouped and arranged so as to be visible to the operators
105 of all the cars.

In practice, when an operator has his car at a terminus, he awaits the flash of the signal lamp of any other of the cars, and when that signal comes, he starts immediately toward the other terminus, thereby
110 cutting out his signal at the terminus left. Each elevator controls its respective signals only, and each car in its movements may be controlled by any other of the cars in
115 service, or, in other words, by the car which happens to approach a terminus next after it, and thereby I avoid any confusion which would arise were the elevators required to move only in a predetermined order. In
120 fact, my signaling apparatus gives exactly the same results automatically as are obtained by starters, as the car first at a terminus is signaled to start as soon as any
125 other car approaches that terminus, and obviously the switches can be so spaced as to cause the cars to flash their signals from any desired floor nearer to or farther from a terminus than three floors.

Having thus described my invention, what 130

I claim as new and desire to secure by Letters Patent, is:—

1. Mechanism for automatically signaling the several elevators of a battery of elevators for controlling the starting of same, comprising, in combination, a common signaling means for the whole battery of elevators located at a terminus thereof and comprising a number of distinctive signals, one controlled by each elevator and each so disposed as to signal all elevators at said terminus, means controlled by the position and directional movement of an elevator to operate its distinctive signal and signal its position relative to said terminus to all other elevators at said terminus, substantially as described.

2. In a mechanism for automatically signaling the elevator cars of a battery of elevators for controlling the starting of same, the combination with a series of elevator cars and their shafts, of a main line circuit, a pair of branch circuits for each car, a switch for each car controlled by the directional movement of said car and arranged to connect either of the respective branch line circuits to said main line, a signal in each branch line circuit, said signals being located at a common terminus of the elevators and being arranged to form a common signaling means at said terminus for the whole series of elevators, and switch means in each branch line circuit controlled by the positions of the respective cars to cut its respective part of the common signaling means into and out of service, substantially as described.

3. In mechanism for directing the starting of the several elevators of a battery of elevators, the combination with the battery of elevators, and their respective shafts, of a main line circuit, a pair of branch circuits for each of said cars, a series of switch means connected to the main line and each controlled by the directional movement of a respective car to connect either of the pair of circuits for that car to the main line, signals in each of the branch circuits adjacent to the tops and bottoms of the shafts, switch means in each of the branch circuits spaced from the tops and bottoms of the respective shafts, and a switch operating device on each car arranged to operate the switches of the branch circuits pertaining to the respective car as said car passes predetermined points, said signals at a common terminus of the elevators being arranged to form a common signaling means for the whole series of elevators, and means to move said operating device on a car to miss the switches normally controlled thereby to disassociate said car from operative connection with the common signaling means, substantially as described.

4. In mechanism for directing the start-

ing of the several elevators of a battery of elevators, the combination with the battery of elevators, and their respective shafts, of a main line circuit, a pair of branch circuits for each car, a series of switch means connected to the main line circuit, each controlled by the directional movement of a respective car and each arranged to connect one of said branch circuits to the main line circuit, a signal in a respective one of each pair of branch circuits adjacent to the top of the shafts, a second signal in the second of each pair of branch circuits and adjacent to the bottom of the shafts, a switch means in the first of each pair of branch circuits and mounted in the respective shaft in spaced relation to the top of said shaft, a second switch means in the second of each pair of branch circuits and mounted in the respective shaft below the first switch means and in spaced relation to the bottom of the respective shaft, and switch actuating means carried by each car to operate the switches in the shaft of said car as the car passes said switches, said switch actuating means being manually movable from within the car itself to adjust it into or out of operative relation with said switch means and all the signals at a common terminus being grouped together and disposed so as to signal all cars at said terminus substantially as and for the purposes described.

5. In mechanism for directing the starting of the several elevators of a battery of elevators, the combination with each elevator car and its shaft, of a top floor signal, a bottom floor signal, an electric circuit controlling the top floor signal, a second electric circuit controlling the bottom floor signal, switch means controlled by the movement of the car to open the first circuit and partially close the second circuit as the car moves down, other switch means controlled by the movement of said car to close the bottom circuit completely when the car passes within a predetermined distance of the bottom of the shaft and until it starts up, the first mentioned switch means being arranged to open the second circuit and partially close the first circuit as the car moves up, and a third switch means to close the top circuit completely when the car passes within a predetermined distance of the top of the shaft and until it starts down said signals for the several elevators at the top or bottom being so arranged that each signal, when operated, will signal to all cars at said floor and designate the approach or presence of its respective car toward or at said floor, substantially as described.

6. In a signaling apparatus for directing the starting of a battery of elevators, a plurality of elevators, a signal disposed at the corresponding terminus of each elevator, means controlled by the position and direc-

tional movement of each elevator to operate its respective signal when said elevator reaches a predetermined point in approaching said terminus, and means to cut each signal out of service as its respective elevator leaves said terminus, each of said signals being so arranged relatively to the several elevators as to signal to the operators in any of said elevators at said terminus, substantially as described.

7. In a signaling apparatus for directing the starting of a battery of elevators, a plurality of elevators, a signal light for each elevator disposed in a group at a common terminus of said elevators, all said lights being so placed as to be visible to the operators in any of said elevators at said terminus, means operated by each of said elevators to light its respective light at a predetermined distance from said terminus as it approaches the latter, and means controlled by the directional movement of each elevator to cut out its respective signal light as the elevator leaves said terminus.

8. In a signaling apparatus for directing

the starting of a battery of elevators, a plurality of elevators and their shafts, a signal light for each elevator disposed at each terminus of its respective shaft; all said lights at a given terminus being arranged in a group and disposed away from the elevator shafts so as to be visible to the operators in any of the elevators at said terminus, means controlled by the directional movement and position of each elevator to light its respective signal light as said elevator reaches a predetermined point in approaching the terminus at which said light is placed; said means keeping said light lighted until the car leaves said terminus, and means controlled by the reversal in the directional movement of said car to cut out its respective light.

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

ALLEN A. FULLER.

Witnesses:

NOMIE WELSH,
ANNIE L. PEACE.