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SIGNAL SYSTEM FOR ELEVATORS.

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Patented July 18, 1911.

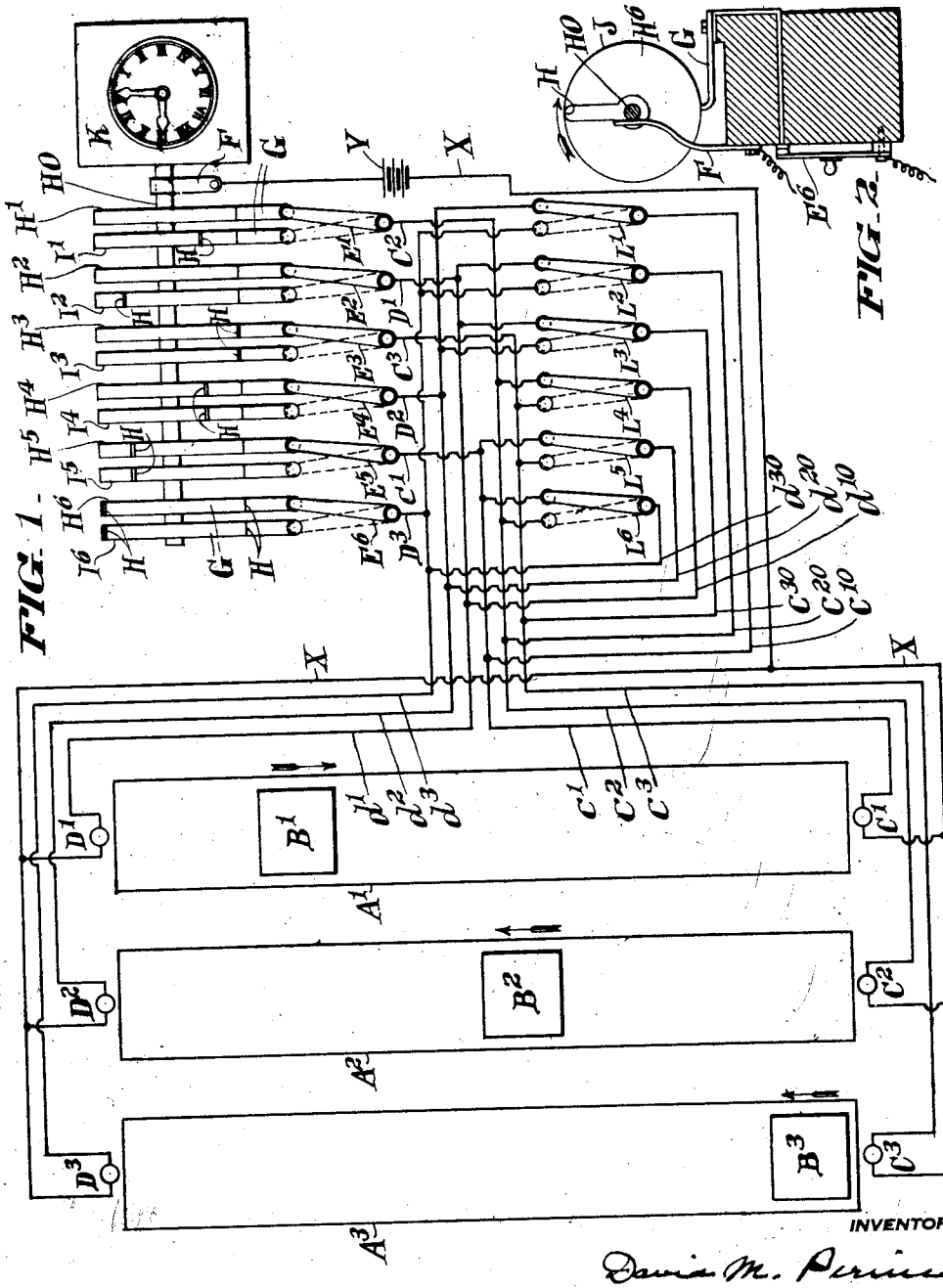

FIG. 1.

FIG. 2.

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To all whom it may concern:

Be it known that I, DAVID M. PERINE, a citizen of the United States of America, residing in Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Signal Systems for Elevators, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My present invention has for its object to provide suitable automatic means in conjunction with a bank of elevators for indicating to each of the different elevator operators the exact instant at which the elevator operated by him should be moved away from a particular point. For instance the system may well be so arranged that each operator is notified at the instants at which he should start his elevator up from the bottom floor and down from the top floor.

In a preferred arrangement for carrying out the invention as hereinafter disclosed, I provide two signal devices for each elevator shaft located one at the top and the other at the bottom of the shaft. It will be obvious, however, that there may be intermediate signal devices and that the signal device or devices for each car may be carried by the car. The signal devices employed may be lamps, bells, or other visual or audible signaling devices. For operating these devices in the regular and predetermined order I employ a timing mechanism with suitable connections between it and the signal devices for controlling the actuation of the latter. In practice, I prefer to employ electrically actuated signal devices and to employ a commutator mechanism operated by or forming a part of the timing mechanism for making and breaking the electric circuit connections for the signal devices and thereby operating the latter in the desired order. In many cases I prefer to employ a commutator mechanism which may be adjusted to permit the elevators to be operated on different schedules at different times as may be desirable at different hours of the day.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the invention, however, and the advantages possessed by it, reference should be had to the accompanying descriptive matter and drawing in which I have described and illustrated in a diagrammatic way apparatus embodying my invention.

Of the drawings, Figure 1 is a diagrammatic representation of an elevator system provided with time controlled signal devices for a group of three elevators. Fig. 2 is a section on the line 2—2 of Fig. 1.

In the drawings, A′, A² and A³ represent the three elevator shafts and B′, B² and B³ represent the elevators respectively working in these shafts.

C′, C² and C³ represent electrically actuated signaling devices which may be bells, lamps, or other audible or visual signaling devices and are located at the bottoms of the shafts A′, A² and A³ respectively. A similar set of signaling devices D′, D² and D³ are arranged at the upper end of the shafts A′, A² and A³ respectively. For operating these various signaling devices at determined time intervals I provide a clock driven timing mechanism and provisions controlled thereby for making and breaking the actuating circuits of the various signals. As shown these provisions include a commutator comprising a series of wheels H′, H², H³, H⁴, H⁵ and H⁶, each having a periphery of nonconducting material except as to one or more contact points H. As shown there is one contact point for each of the wheels H′ to H⁶, the contact points being carried by and electrically connected to the shaft H O on which the wheels H′ to H⁶ are mounted. Each contact point arm is embedded in the corresponding wheel and has its free end exposed at the periphery of the wheel. The shaft H O is driven in a suitable manner by a suitable clock mechanism K. The contacts H carried by the six wheels H′ to H⁶ successively advanced angularly about the axis of the shaft H O with an angular difference of 60° between each adjacent pair of contact points. The shaft H O also carries a set of electric circuit making and breaking wheels I′, I², I³, I⁴, I⁵ and I⁶, generally similar to the wheels H′ to H⁶ inclusive, and alternately disposed with respect thereto. The wheels I′ to I⁶ inclusive, differ from the wheels H′ to H⁶ inclusive only in the placing and number of contact points

at their peripheries, this difference being for the purpose of obtaining a different time interval between the making and breaking of the electrical contacts according to which set of wheels is used for operating the signals. In the particular arrangement disclosed each of the wheels I′ to I⁶ inclusive, is formed with two diametrically opposed contact points H, one of the contacts H of each wheel being alongside of the contact H carried by an adjacent one of the wheels H′ to H⁶. Each of these twelve commutator wheels forms a part of corresponding electric circuit making and breaking devices. As shown each of these circuit making and breaking devices includes a spring contact member G which has its free end normally bearing against the corresponding commutator wheel. A spring contact member F is provided which bears against the shaft H O and through the latter is electrically connected to all of the commutator wheel contacts H. An electrical connection is thus established between the contact member F and each contact finger G whenever the latter engages a contact point H carried by the corresponding commutator wheel, and this connection is broken as soon as the movement of the wheel carries the point H out of engagement with the finger G.

Pivoted switches E′, E², E³, E⁴, E⁵ and E⁶ are electrically connected each to a corresponding one of the six signal devices C′, C², C³, D′, D² and D³ by the conductors c', c^2, c^3, d', d^2 and d^3 respectively. These switches each have two operative positions, one being the full line and the other the dotted line position shown, and in addition each of these switches may be moved into an open position. When in the position shown in full lines in the drawing, the switch blades E′ to E⁶ inclusive, are in contact with the conductors G pertaining to the group of commutator wheels H′ to H⁶ inclusive and when shifted into the dotted line position the switch blades E′ to E⁶ make contact with the conductors G which pertain to the group of commutator wheels I′ to I⁶ inclusive. Branch conductors c^{10}, c^{20}, c^{30}, d^{10}, d^{20} and d^{30} connected at one end to a corresponding one of the conductors c', c^2, c^3, d', d^2 and d^3 are connected at their opposite ends to pivoted switch blades L′, L², L³, L⁴, L⁵, and L⁶ respectively. The switch blades L′ to L⁶ inclusive are movable to engage one or the other, or neither of a pair of contacts connected to a corresponding pair of conductors, c', c^2, c^3, d', d^2 and d^3, the arrangement being such as to permit of the simultaneous operation of the signal device at the bottom of one elevator shaft and the signal device at the top of one or the other of the other two shafts, as desired. X, designates the return connections between the various signal devices and the contact F and includes a suitable source of current as the battery Y.

It will be apparent that the various switches and circuit connections provided permit of numerous variations in the manner and order of operating the various signal devices independently of any change in the time controlling mechanism, and that one or more of the various signals may be cut out of operation whenever desirable by opening the appropriate switches.

In operation when the switch blades E′ to E⁶, inclusive, are in full line position shown and the switches L′ to L⁶ are all open, as the commutator wheels are revolved by the clock mechanism K, the signals C′, C², C³, D′, D² and D³ will be operated successively with the desired intervals between successive actuations. For instance, if the time interval between the successive operations of each signal device is two minutes, the various signal devices may be actuated successively at intervals of twenty seconds, and in the following order: C², D′, C³, D², C′, D³, C² and so on. The time interval between each successive signal actuation may be changed while preserving the same relative order of operation of the various signaling devices, by switching the switch blades E′ to E⁶ so that their upper ends engage the conductors G, pertaining to the wheels I′ to I⁶ inclusive, respectively. Then if the time interval between successive operations of each of the devices is one minute, say, the interval between the successive actuations of the various signal devices will be ten seconds. The arrangement with the switches E′ to E⁶ are all either in the full line or dotted line positions and the switches L′ to L⁶ all open, may be regarded as the normal arrangement.

By appropriate adjustment of the switches in the two groups E′ to E⁶ and L′ to L⁶, pertaining to the signal devices at the top and bottom of any one elevator shaft these signal devices may be operated simultaneously with the signal devices at the bottom and top respectively of another elevator shaft without any change in the normal circuit connections for the last mentioned signal devices. For instance the signal devices at the top and bottom of the elevator shaft A³ may be operated simultaneously with the operation of the signal devices at the bottom and top respectively of the shaft A³ by opening the switches E′ and E⁴ and throwing the switches L³ and L⁴ into their dotted line positions. Then if the commutator shaft makes one complete rotation in two minutes and the switches E³ and E⁶ are in the full line positions the intervals between the simultaneous operation of the signals C³ and D² and the following simultaneous operations of the signals C² and D³ will be one minute, and if the switches E³

and E^6 are in the dotted line positions the intervals between successive signal actuations will be thirty seconds. By shifting the switches L^3 and L^6 into the full line positions and opening the switches E^2 and E^5 the signal device C′ and D′ will be operated simultaneously with the signal devices D^3 and C^3, respectively.

When the signal devices for two elevator shafts are coupled together for simultaneous operation in pairs in the manner indicated in the preceding paragraph, the signal devices for the third elevator shaft may be operated on one or the other of its two normal schedules or may be cut out of operation, as desired. For instance, when the signal devices for the elevator shafts A^3 and A^2 are operated through the circuits, including the switches E^3 and E^6 the signal devices for the elevator shaft A′ may be operated on one or the other of its two regular schedules or be cut out of operation by throwing the switches E^2 and E^5 into their full line positions, or into their dotted line positions or into their open positions.

It will be apparent that if the circuit connections for the signal devices at the top and bottom of two elevator shafts be interrupted, as by opening the proper switches, E′ to E^6 inclusive, the signal devices at the top and bottom of the shaft left in service may be operated in alternation, with time intervals between successive actuations either two minutes or one minute dependent on the position of the switch blades E′ to E^6. It will also be apparent that by increasing the number of sets of commutator wheels H′ to H^6 and I′ to I^6, the various signal devices may be operated on still another schedule. The commutator wheels H′ to H^6 and I′ to I^6, while forming a part of a single mechanical element, may be regarded as forming in effect two separate commutators revolving with the same speed relative to the clock mechanism. The effect produced by shifting from one of these commutators to the other may obviously be obtained by the use of two mechanically separate commutators alternately brought into operation, or with a single commutator, by changing the rotation of the commutator with respect to the timing mechanism as by means of speed changing gears.

While ordinarily and as shown, each of the commutator wheels in the same set H′ to H^6, have one electrical contact point each, and are mounted on the shaft H O, so that each contact point on each wheel is set in an advanced position over the wheel next to it of 1/16 of a revolution and commutator wheels I′ to I^6 have two electrical contact points diametrically opposed, arranged on the shaft in similar manner, it will be understood that this is not necessary and would not be the case if it were desired to have time intervals between the actuations of the signal devices at the top and bottom of one elevator shaft different from the time interval between the actuations of signals at the top and bottom of one or more other elevator shafts.

While I have shown the invention as applied to a bank of three elevators, it will be understood that the invention is generally applicable for operating banks of elevators containing a greater number of individual elevators.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is,

1. In an elevator system, the combination of a group of elevators, an individual signal device for each of said elevators, a timing mechanism and operating connections controlled by said timing mechanism for the various signal devices whereby the latter are operated in accordance with a predetermined schedule.

2. In an elevator system, the combination of a group of elevators, an individual signal device for each of said elevators, a timing mechanism, operating connections for the various signal devices controlled by said timing mechanism whereby the signal devices are operated in accordance with a predetermined schedule and provisions for adjusting said connections to change the schedule of operation.

3. In an elevator system, the combination with a group of elevators, an individual signaling device for each of said elevators, a timing mechanism, operating connections for the various signal devices controlled by said timing mechanism whereby the signal devices are operated in accordance with a predetermined schedule and provisions for cutting out certain of the signal devices.

4. In an elevator system, the combination with a group of elevators, an individual signaling device for each of said elevators, a timing mechanism, operating connections for the various signal devices controlled by said timing mechanism whereby the signal devices are operated in accordance with a predetermined schedule, provisions for adjusting said connections to cut certain of the signal devices out of operation and change the schedule of operation of the remaining devices.

5. In an elevator system, the combination of a group of elevator shafts with elevators working therein, a pair of signal devices for each elevator shaft arranged one at the top and one at the bottom of the shaft, a timing device operating connections for the signal devices controlled by said timing device whereby the signal devices at the bottoms of the shafts are operated in regular progressions and the signal devices at the tops of the shafts are also operated in

regular progression and the operations of the two signal devices for each elevator shaft occur alternately and at regular intervals.

6. In an elevator system, the combination of a group of elevators, an individual electrically actuated signal device for each of said elevators and a program clock controlling the operation of said signal devices and effecting their actuation according to a predetermined schedule.

7. In an elevator system, the combination of a group of elevators, an individual electrically actuated signal device for each of said elevators, a timing mechanism, a rotating commutator driven thereby and electrical circuit connections controlled by said commutator to thereby effect the actuation of said signal devices in accordance with a predetermined schedule.

8. In an elevator system, the combination of a group of elevators, an individual electrically actuated signal device for each of said elevators, a timing mechanism and shiftable electrical circuit controlling provisions including a pair of rotating commutators, each adapted to be rotated by said timing device, for effecting the operation of said signal devices according to one or the other of two schedules dependent upon which of the two commutators is operatively employed.

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