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ELEVATOR SIGNAL SYSTEM.

APPLICATION FILED JAN. 10, 1917.

1,274,301.

Patented July 30, 1918.

2 SHEETS—SHEET 1.

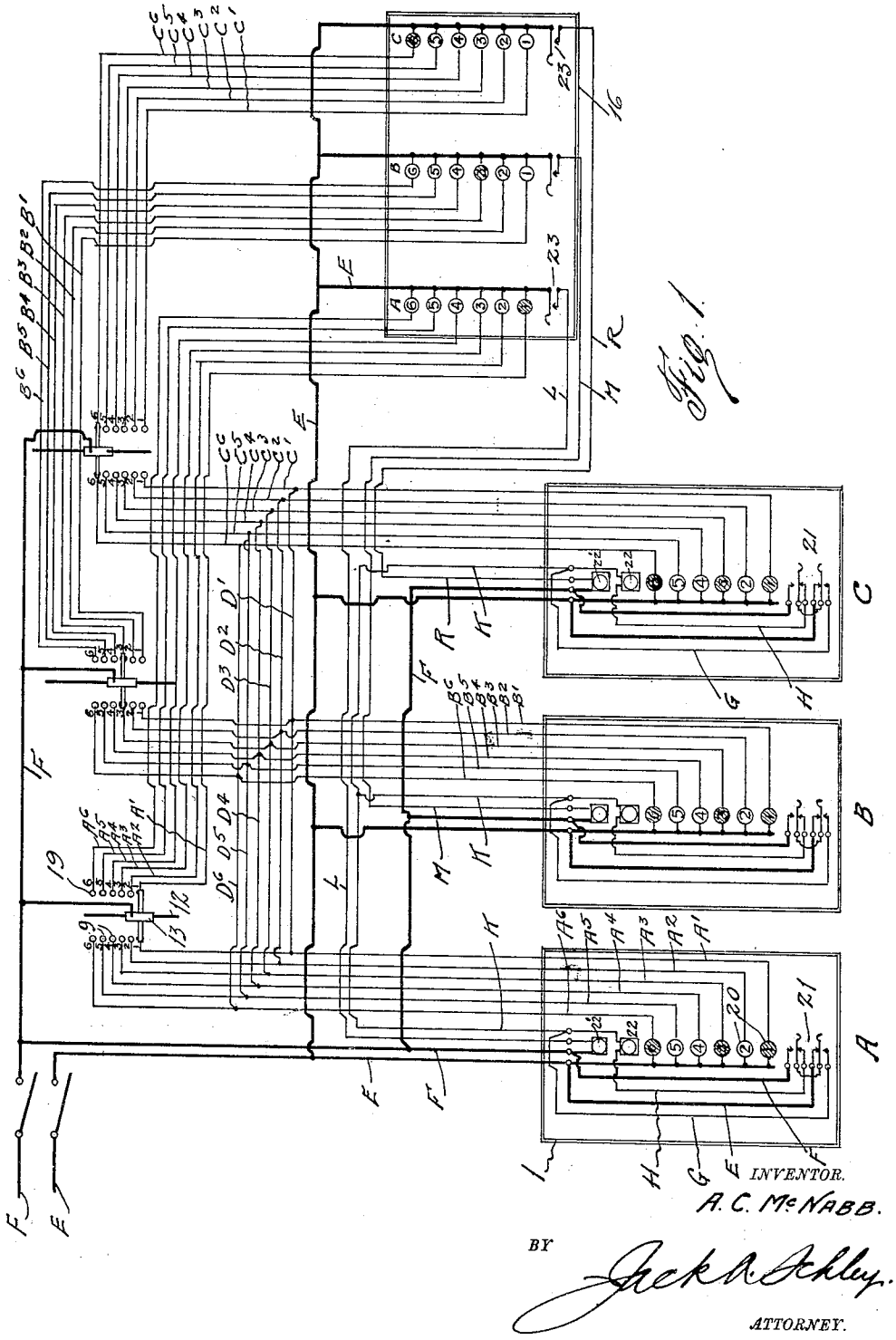


Fig. 1.

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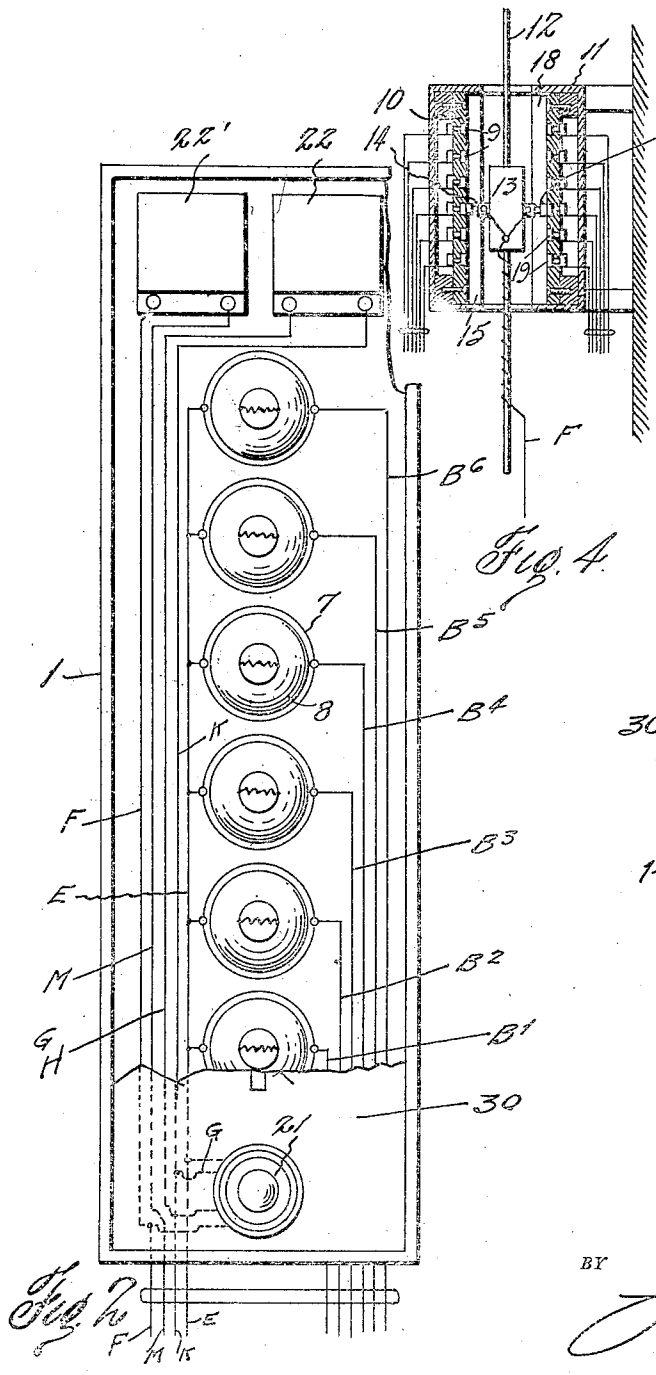


Fig. 4.

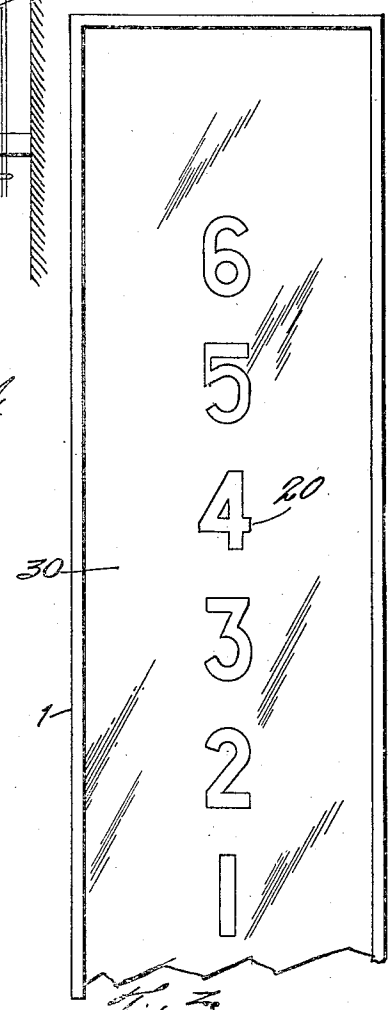


Fig. 3.

Fig. 2.

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ELEVATOR SIGNAL SYSTEM.

1,274,301. Specification of Letters Patent. **Patented July 30, 1918.**

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To all whom it may concern:

Be it known that I, ALVIN C. McNABB, citizen of the United States, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Elevator Signal Systems, of which the following is a specification.

This invention has particular relation to elevator signal systems involving indicators placed in the elevator cars, whereby the floor positions of all the cars as well as the car carrying the indicator are shown. I have filed an application for Letters Patent on a similar system under date of October 23, 1916, Serial Number 57,393.

The main point of difference between the two systems is that the former one does not indicate the floor positions of the car carrying the indicator, on the indicator in said car, but gives only the floor positions of the other cars. In the present system the floor position signal is set up in each car so that the operator knows just where he is by merely glancing at his indicator and at the same glance observes the floor positions of the other cars in his bank.

It is customary to paint the floor numbers in the elevator shaft just under the sill of the floor landing at each floor. These numbers have certain objections. Passengers instead of calling the floor they desire upon entering the car, will watch these numbers and call their floor just prior to the arrival of the car at the desired floor. This frequently results in the operator running the car past the floor and causes him to reverse and thus impede traffic.

When my system is installed the floor numbers are removed and the operator soon learns to watch his indicator and announce the floor before reaching it. The regular passengers are quick to realize that they must call their floors; while the transient passengers failing to find the floor numbers in the shaft immediately call their floor number. Tests show that the service is much improved and the traffic more efficiently handled.

In carrying out the invention an indicator comprising a single row of signals is placed in each car, said signals being preferably arranged in a vertical row. Each signal is individual and has separate circuit connection with a separate contact. Thus when a car moves and closes the circuit through one of the contacts, only the signal connected with said contact is illuminated or energized; however the same signal in each row is operated. By this arrangement three different signals in the same row may be operated at the same time and each retain its individuality.

As an illustration in a ten story building with three elevators, an indicator would be placed in each car. Each indicator would display a vertical row of numerals ranging upward from 1 to 10. Under each number a lamp is mounted with a separate circuit connection. In each shaft a series of ten contacts, one for each floor, is arranged. A circuit closing device is correlated with and operated by each car to close a circuit upon engaging a contact. Each contact has circuit connection with the same relative lamps in each indicator. If car No. 1 is at the first floor the circuit to the lamps under the number 1 in each indicator will be closed and the number illuminated. Car No. 2 being at the fifth floor will cause the illumination of 5 on each indicator; while car No. 3 at the tenth floor will cause the illumination of 10 on each indicator. As the cars move the numbers will be successively illuminated and the positions of all three constantly shown.

This system also contemplates a monitoring cabinet which however necessitates an extra series of contacts in each shaft as a row of signals for each car is required and only one signal in a row must be operated at a time.

An auxiliary signal system is included and comprises means whereby each operator may signal to the other operators when his car is loaded and whereby the supervisor at the monitoring cabinet may individually signal the operators in their cars.

It is pointed out that the application of the invention is not limited to an indicator having a single row of signals and also it is to be understood that the indicator may be used with a single elevator car.

The invention will be more readily under-

stood from the following specification and by reference to the accompanying drawings, in which an example of the invention is shown and wherein:

Figure 1 is a circuit diagram of the system,

Fig. 2 is an elevation of one of the indicators with the major portion of the front wall removed,

Fig. 3 is a partial face view of one of the indicators, and

Fig. 4 is a sectional detail of the circuit closing device and the contacts.

In illustrating the invention I have designated by the letters A, B and C, cars in a bank of three elevators operating in a building with six floors, but it is to be understood that the system may be used with various numbers of cars and different numbers of floors. As indicated in Fig. 1 car A is at the first floor, car B at the third floor, and car C at the sixth floor. A movement of any car is immediately indicated in each of the three cars, and each operated is always aware of the exact positions of the other cars.

In carrying out the invention an indicator cabinet I is provided in each car and each indicator comprises a single vertical row of signal-numbers 20. The signals in the present instance take the form of numerals of a translucent nature arranged on a plate or cover 30. Within the cabinet a plurality of lamp sockets 7 are mounted, one under each number. Lamps 8 are screwed into the sockets. The lamps are thus concealed and when one is lighted the numeral over the same is illuminated and the signal thus displayed. It is to be noted that it is not necessary to employ lamps as other forms of indicators employing signals in a row might be used; but I wish to point out that an individual signal is given for each floor as the floor is approached and passed and the preceding signal is extinguished before the succeeding signal is set up. By this method the operator may see at a glance just what his own position is, as well as the positions of the other cars.

By observing Fig. 1 it will be seen that in each indicator each lamp socket is connected in a separate circuit. At a suitable point in the shaft I arrange a plurality of contacts 9, one for each floor, which in the present instance would be six. A circuit wire leads from each contact to one of the lamp sockets and I have designated these wires as follows: A^1, A^2, A^3, A^4, A^5 and A^6; B^1, B^2, B^3, B^4, B^5 and B^6; and C^1, C^2, C^3 C^4, C^5 and C^6. The contacts and signals are arranged in the same vertical order. All the wires designated by the same exponent numeral are connected in common by jumper or cross-connecting wires which I have designated by the characters D^1, D^2, D^3, D^4, D^5 and D^6. Thus the wires A^1, B^1 and C^1 are connected in common by the wire D^1 and if the circuit is closed through the first or lower most contact 9 of any shaft, the circuits through the lamp sockets 7 under the numeral 1 in each indicator will be closed and said number illuminated at each indicator. This indicates that one of the cars is at the first floor. If the circuit is closed through one of the third contacts which is the contact for the third floor the circuits will be closed over the wires A^3, B^3 and C^3 and D^3, thus illuminating the number 3 on each indicator which signifies that one of the other cars is at the third floor; while if the circuits are closed through one of the upper or last contacts over the wires A^6, B^6, C^6 and D^6, the number 6 at each indicator will be illuminated which will show that the other car is at the sixth floor.

As shown in Fig. 4 the contacts 9 may be mounted in an insulating strip 10 which is supported in a housing 11. This housing may be mounted in the shaft at the most suitable place with a view toward economy in the length of wire or cable used. The housing is placed so that the cable 12 of the usual floor indicating device which includes one or more revolving hands, passes through the center of the same. A clamp 13 is fastened on the cable and carries a spring pressed contact brush 14 traveling between guides 15 and bearing on the contacts 9. The contacts 9 are spaced according to the distance between floor landings and as the cable 12 has a very limited movement, the spacing will not be great and the contacts will in all instances be comparatively close together. These contacts cause each lamp to be illuminated at a particular time and the operator thus becomes familiar with the exact distance from the floor landing at which the lamp is first lighted. Practice has shown that guided by the lighting of the signal lamp an operator is able to stop substantially flush with the floor landing without looking at the landing and with no other guide than the lamp. He accomplishes this cutting off or diminishing the power at the proper point to stop the car at the landing.

As the brush 14 is carried up and down the contacts 9 the circuits are successively closed and the signal-numbers successively illuminated. The operator learns to follow his own signal, irrespective of the fact that other signal-numbers in the same row are operating at the same time. When two cars pass each other or stop at the same floor they will both operate the same signal, but as one car moves upward the higher signal number is operated, while the next lower signal-number is operated by the other car

as it moves downward. The passing of cars is in this way vividly indicated and the successive illumination of the numbers both up and down simulates the movements of the cars.

It is pointed out that this signaling system is not intended for the passengers, although it has a tendency to make the passengers call their floors, especially where the floor-numbers at the landings in the shaft are removed. The operator follows his own signal very closely and experience has shown that he is not confused by the other signals in the cabinet.

In order that control may be had over the operators a monitoring cabinet is connected in the system. This cabinet may be constructed similar to the cabinets 1, except that it has a separate row of signal-numbers for each car. In Fig. 1 I have indicated such a cabinet at 16 and have marked the rows A, B and C respectively as some means for identifying the cars would have to be used. A duplicate set of contacts 19 are provided in each housing and the A, B and C series of wires are led from said contacts to the signals whereby the A car closes the circuits controlling the signals only in the A row of the monitoring cabinet, while the other cars operate the B and C signals respectively. This cabinet may be located at any desirable point. The clamp 13 carries a second brush 17 which travels between guides 18 over the contacts 19. The monitoring cabinet shows the operation of the cars and if an operator "loafs" it is shown by the cabinet.

For giving loaded signals from one car to another I provide an auxiliary signaling system which includes a switch 21 on each indicator as well as signal devices 22 and 22′; while the monitoring cabinet has three switches 23, one for each car. The devices 22 and 22′ are mounted under the cabinet faces and are thus concealed. Referring to Fig. 1 it will be seen that the circuits through all the lamp sockets are completed by connection with a common wire E which forms one side of a main circuit, while the other side of the main circuit is formed over a wire F. The wires E and F have several branches, but separate designation is not deemed necessary. The switches 21 and 23 are connected with the wire E, the switches 21 also with the wire F; while the signal devices 22 are connected with the wire E through the switches 21 and the devices 22′ are connected with the wire F.

In each car the switch 21 is connected with the signal device 22 thereof, by means of a wire H. The switch is normally in contact with the pole at which the wire H terminates and also with a pole connected with the common circuit wire E, said poles being tied together. The switch also has two other poles one of which is connected with the common circuit wire F and the other by means of a wire G with the signal device 22. The first two poles form the normally closed side of the switch, while the last two poles constitute the normally open side. From the signal device 22 in each car a wire K leads, said devices thus being connected with each other in common, said wires K also being connected with the wires G. If the switch in car A is operated its normally closed side is opened and its normally open side is closed, thus breaking contact with the poles of wires H and E in said car A and breaking the connection with the signal device 22 of car A, but the switches in cars B and C are still open and in circuit connection with their respective signal devices 22. The switch in car A will be thus moved into contact with the poles of the wires F and G and the latter connecting with the wire K will close the circuit from wire F of car A, through wires K to devices 22 of cars B and C and from each device therein over their wires H, through their switches and by means of the tied poles to the circuit wires E; whereby the signal devices 22 in cars B and C are energized, while the same device 22 in car A is dormant. The operation of the switch in any car energizes the signal devices 22 in each of the other cars.

Each switch 23 of the monitoring cabinet has a separate wire L, M and R respectively leading to one of the poles of one of the signal devices 22′, the wire L leading to car A, wire M to car B and wire R to car C. Each device 22′ may thus be separately energized. It will be seen that if the operator of car B holds his car at the top of the shaft too long, the supervisor at the monitoring cabinet merely has to operate the switch for this car and thus signal the operator. If a car becomes loaded and the operator is not going to make any more stops to take on passengers, he may signal this fact to the other operators who can thus take care of the traffic. Codes of signals may be used.

The floor at which each is located may be referred to as the "current" floor.

What I claim is:

1. In an elevator signaling system, the combination with two or more elevator cars, of a plurality of indicators each located in a different car, each indicator having a plurality of individual floor-number signal devices, corresponding signal devices in all the cars having a common circuit connection, separate circuit connections extending from each signal device, a set of contacts for each car, corresponding contacts having a common connection with one of the separate circuits, whereby the closing of the circuit through any one of a series of commonly

connected contacts operates corresponding signal devices in all the cars thus duplicating the signal in each car.

2. The combination with two or more elevator cars, of a plurality of indicators each located in a different car, each indicator having a plurality of individual floor-number signal devices, electrical circuit connections between the indicators whereby individual floor-number signal devices at each indicator for each car are operated simultaneously and duplicated at each indicator, the operated floor-number signal devices being differentiated from the dormant signal devices in each car, each signal device in a car being controlled by a separate circuit.

3. The combination with an elevator car, of a floor-number indicator mounted in the car, a row of individual floor signals on the indicator, one for each floor and disposed in an order corresponding to that of the floors, a contact for each floor and each contact having separate circuit connection with an individual correlated floor signal of the indicator, a contact brush operated by the car and moving over the contacts, whereby the separate circuits are successively closed and the floor signals successively operated as the car travels up and down the elevator shaft, said signals being differentiated one from the other.

4. The combination with two or more elevator cars, of an indicator located in each car constructed to indicate the floor positions of all the cars, a movable contact member operated by each car, a plurality of individual floor signals disposed on each indicator, each signal having common circuit connection with said movable contact member, and a plurality of contacts successively engaged by said movable contact member and each contact having separate circuit connection with an individual floor signal at each indicator, whereby the floor signal on each indicator is operated by closing a separate circuit connected therewith only, the other signals not energized remaining dormant whereby said operated signal is differentiated.

5. The combination with two or more elevator cars, of an indicator located in each car, each indicator having a single row of floor-number signal devices, a plurality of contacts for each car, there being one contact for each signal device and each contact being electrically connected by an individual circuit with a single signal device at each indicator so that the operation of one signal device causes the operation of the corresponding device on the other indicators and whereby two or more signal devices in the same row may be simultaneously operated without conflict.

6. The combination with two or more elevator cars, of an indicator located in each car, each indicator having a single set of floor signals, there being a single signal for each floor, and electrical circuit means operated by the cars and connected with the indicators for simultaneously operating in the same set two or more floor signals at each indicator whereby the floor positions of all the cars are shown in all the cars by a single set of signals in each car.

7. In an elevator signaling system, the combination of an indicator located in an elevator car and having a plurality of floor signals successively operated as the car moves up and down the elevator shaft, whereby the floor positions of the car are indicated, an auxiliary signal device in the car, a monitoring cabinet located outside the elevator shaft and having signals in duplicate of those of the indicator simultaneously operated therewith, and an auxiliary circuit connection from the location of the monitoring cabinet including a switch and in which the auxiliary signal is included, whereby the auxiliary signal may be operated in harmony with the monitoring cabinet.

8. In an elevator monitoring system, the combination with a plurality of indicators, each of which is located in a different car, each indicator having signal devices for indicating the relative positions of all the cars, electrical circuit connections between the indicators whereby the signal operations in each car are duplicated in each of the other cars, a monitoring indicator located at a fixed point outside of the elevator shaft and having signals corresponding to those of the indicators in the cars, and electrical circuit connections between the signal devices of the monitoring cabinet and each car whereby each car individually operates correlated signal devices on said cabinet.

9. In an elevator signaling system, the combination with two or more elevator cars, of a plurality of indicators, one located in each elevator car, floor signals on the indicators, contacts having separate circuit connection with the signals, and an auxiliary signal carried by each car and having circuit connection with the other cars whereby it may be operated from each of the other cars.

10. In an elevator signaling system, the combination with two or more elevator cars, of a plurality of indicators, one located in each elevator car, floor signals on the indicators, contacts having separate circuit connection with the signals, and an auxiliary signal carried by each car and having circuit connection with other cars including a switch in each car whereby said signal may be operated from each of the other cars, a monitoring cabinet having floor signals correlated with the signals of the indicators,

and electrical circuit connections extending from the location of the monitoring cabinet to the auxiliary signals of the cars for independently operating said signals.

11. In an elevator signaling system, a plurality of floor indicators one carried by each elevator car, a plurality of contacts electrically connected with the indicators, a second set of contacts, a monitoring cabinet having signals correlated with the indicators, separate circuit connections from the second set of contacts to the monitoring cabinet, and a circuit closing device for each car operated thereby, said device engaging both sets of contacts.

In testimony whereof I affix my signature.

ALVIN C. McNABB.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."