A. C. McNABB.

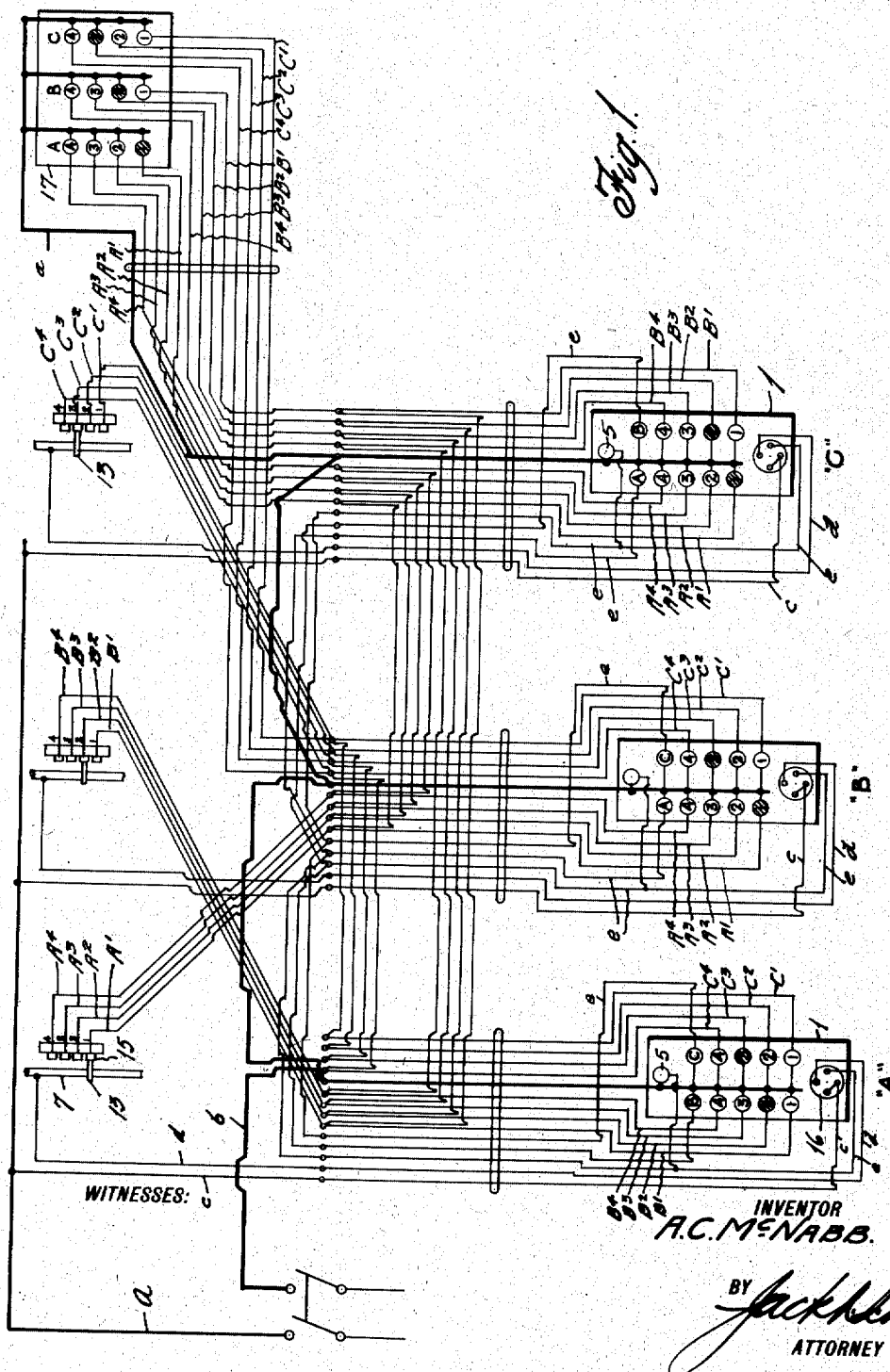
ELEVATOR SIGNAL SYSTEM.

APPLICATION FILED OCT. 23, 1915.

1,256,343.

Patented Feb. 12, 1918.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

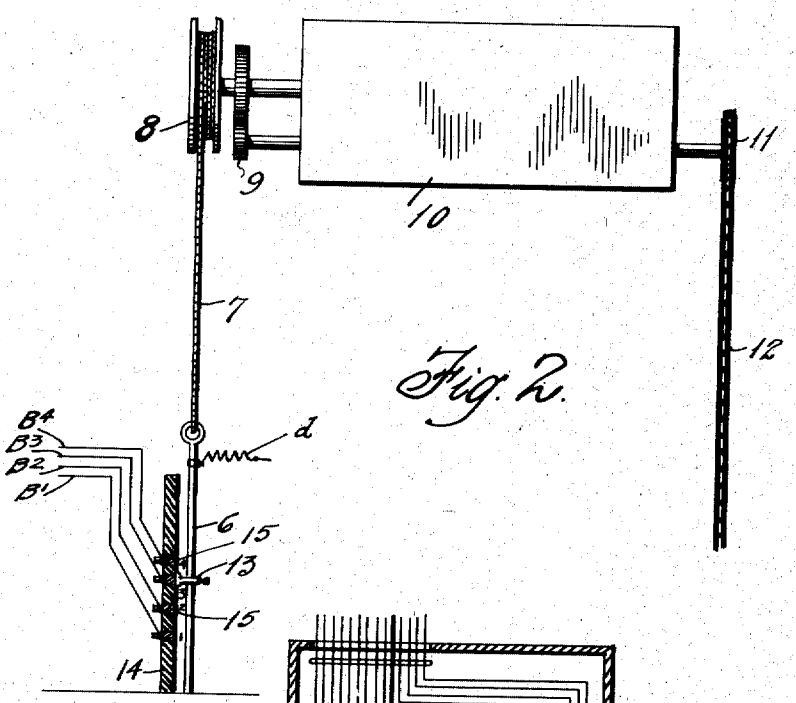


Fig. 2.

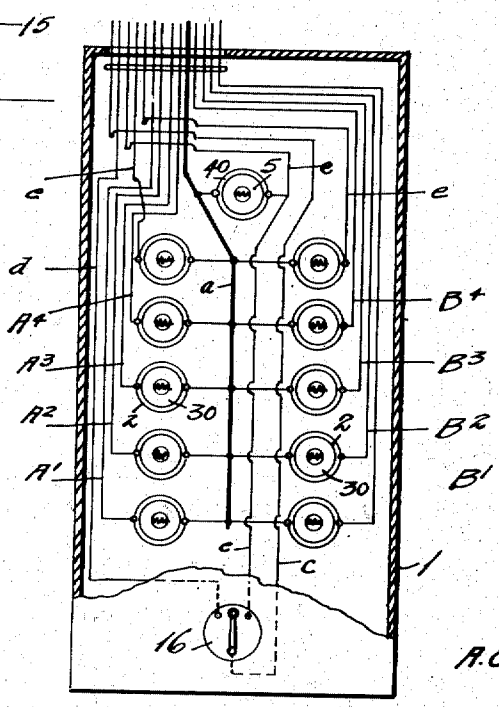


Fig. 3.

INVENTOR

A. C. McNABB.

BY

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UNITED STATES PATENT OFFICE.

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ELEVATOR SIGNAL SYSTEM.

1,256,343. Specification of Letters Patent. Patented Feb. 12, 1918.

Application filed October 23, 1915. Serial No. 57,393.

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 pertains to new and useful improvements in elevator signaling systems.

In buildings having a bank of two or more elevators quite a little difficulty is experienced in running the cars in the proper spaced order and maintaining such spaced order. For instance in a building of ten floors with three cars the first car should be at the top floor when the third car is at the first floor; while the second car should be at the fifth or sixth floor. These relative positions must be retained in order to give first class service and handle the traffic in an efficient manner.

It has been found that a practical way to accomplish this result is to provide means in each car whereby the operator thereof will know at all times the exact floor position of the other cars in the same bank. Such information can be given in a practical way by indicators placed in the cars; outside signals, telephones and starting devices have not proven efficient.

Some work has been done along this line, but it is pointed out that the indicator must be of an instantaneous nature, giving a prominent individual signal for each other car as the operator has no time for following the course of revolving or rotating signals of a swinging pointer. The signal must stand out bold and be discernible at a glance. The operator must know not only the position of the car ahead or above but also the position of the car following.

It has been found by actual tests that signals arranged in vertical rows give the best results as the operation of the signals more closely simulates the movements of the cars, particularly when cars pass each other. The signals should be of a positive and individual nature and each operated by a separate circuit and contact free from resistance or other current consuming agents.

Lamps or targets, one for each floor and arranged in vertical rows give an individual signal of a positive nature and have been found very efficient. Each lamp or target is connected with its contact by a separate circuit and may be separately energized.

Frequently a car having descended only a few floors becomes so loaded that it cannot take on more passengers. My invention contemplates in connection with the individual floor signals, means whereby an operator may notify the operators in the other cars that his car is loaded and also designate his particular car by a character signal located in the other cars. This permits the operator with the loaded car to complete the trip without making additional stops and at the same time enables the other cars following to take on the passengers from the floors passed by the loaded car. To facilitate the through trip of the loaded car its floor indicating circuits to the other cars may be broken and a signal set up in the loaded car which can only be removed by restoring the floor indicating connections or circuits.

It is further planned to have a monitoring cabinet located on an inspector's or starter's desk and arranged to show simultaneously at all times the relative floor positions and conditions of all the cars.

In carrying out the invention I provide in each car a cabinet having one or more vertical rows of signals arranged so that a separate and distinct signal is set up for each floor, successively from one end of the row to the other; there being a separate contact for each signal in the row. I prefer to arrange the contacts at one end of the elevator shaft or all at one place so they will be close together, whereby the signals will be given at rapid intervals and substantially in a continuous manner.

Each indicator is also provided with a "loaded" signal for each of the other cars and an operator's signal for the car in which the said indicator is located; together with proper switches and accessories.

Other objects will be apparent from a perusal of the following specification and the invention will be more fully understood by reference to the accompanying drawings in which an example of the invention is illustrated and wherein:

Figure 1 is a circuit diagram of the system,

Fig. 2 is a view showing one of the con-

tact strips in section and its associate parts in elevation, and

Fig. 3 is a detail of one of the indicator cabinets.

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

In carrying out the invention an indicator cabinet 1 is provided in each car and comprises a plurality of vertical rows of sockets 2, one row being provided for each other car and the rows being sufficiently spaced to isolate them from each other. In the sockets lamps 30 are disposed. Also in each cabinet 1 a socket 40 is provided at the top and receives a lamp 5. The cabinet is constructed with a glass or cover having the characters shown in Fig. 1 which will be illuminated when the circuits to the lamps thereunder are closed. Just here I wish to state 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 given for each floor as the floor is passed and the preceding signal being extinguished before the succeeding signal is set up, is most desirable. By this method the operator may see at a glance at just what floors the other cars are and is not required to locate, proportion or follow any continuously moving apparatus.

By observing Fig. 1 it will be seen that each row of indicator signals is headed by a letter (A, B and C) designating one of the other cars; while in the same row appear the numbers of the floors in their proper order. The cabinet 1 in the car B has its rows designated A and C and it is the purpose to indicate the courses of the other cars A and C. It is obvious that circuits closed by the cars A and C will operate the signals in car B.

It will be noted that each row has an individual signal for each floor and at the head of each row there is a character signal indicating the particular car operating the other signals in said row. The lamp at this character signal is normally not lighted and is not connected with the floor contacts.

I propose to locate my circuit closing contacts at the top or bottom of the elevator shaft and in the pent house when the same is present. I had contemplated placing a contact at each floor in the shaft, but found this impractical and expensive to install and maintain as well as inefficient. In the great majority of elevator banks there is found a well known floor indicator which includes at the top of each shaft a vertical moving rod 6, moving up and down with the car. This rod even in buildings of many stories has its movement confined to a path not exceeding two feet and is operated by a chain 7 winding on a drum 8 rotating very slowly. The drum is driven by a speed reduction gearing, a portion of which is indicated at 9 and which is inclosed in the housing 10. This gearing is driven by a chain 12 and sprocket 11 which are operated by the car. The parts just described are well known in this art and form no part of the invention. I fasten a sliding contact 13 on the rod and connect this with one side *a* of the main circuit. An upright contact strip 14 of insulating material is erected opposite each rod and provided with a plurality of superposed spaced contacts 15, one for each floor. The sliding contact 13 is of such construction as to slide freely over the contacts 15, but to engage only one at a time. Each contact 15 has individual circuit connection with one of the lamps in the cabinets 1 of the cars in the other shafts. It is obvious that these circuits could be closed by other means, and apparatus at the top or bottom of the shaft suitable for the purpose can always be found, the foregoing merely being an illustration.

It will be seen that the contacts at the top of a certain shaft are connected with the signals in the cars in other shafts. For instance the contacts 15 at the top of the shaft of car B are connected with the indicator lamps 30 in the cars A and C and so on. Four contacts for each shaft are shown and they each have connection with the floor lamps in the cabinets 1 of the cars in the other shafts indicating the first, second, third and fourth floors respectively. The other side *b* of the main circuit has common connection with all lamps.

In Fig. 1, I have lettered the wires leading from the contacts 15 of each shaft as follows;—from shaft A, the wires are A^1, A^2, A^3 and A^4; while B^1, B^2, B^3 and B^4 run from shaft B, and C^1, C^2, C^3 and C^4 run from shaft C. These wires lead through cables to the proper lamps 30 in the various cabinets 1. It will be seen that the contact 13 of the car B is engaged with the contact 15 for the second floor which is attached to the wire B^2 running to cabinets in cars A and C and to the lamps 30 under the character "2" in row "B" of each cabinet.

On each cabinet is located a two-way switch 16 having connection by a wire *c* with side *a* of the main circuit and which has two poles, one connected by a wire *d* with the respective contact 13 and the other

being connected by a wire *e* with parts later described. The circuits being closed through switches in each car and by way of the wires *c* and *d*, the lamps under the character "2" in the rows "B" of the cabinets 1 in cars A and C, will burn. If car B moves up or down the circuit over wire B^2 will be broken and the circuit leading from the next contact will be closed and the corresponding lamps lighted and so on. The same is true of the other cars.

Car A is indicated as being at the first floor, its contact 13 being engaged with contact 15 of the first floor which is connected by wires A^1 with the signal "1" in row "A" of cars B and C. Car C is at the third floor as indicated. In Fig. 1 the illuminated signals are shaded indicating the lamps which are burning. It is obvious that each movement of the cars is indicated by the extinguishing of one lamp and the lighting of the next lamp.

This system is much more effective where a monitoring cabinet is used. The cabinet 17 may be constructed similar to the cabinets 1 except that a row of lamps and characters for each car are employed and no car indicating lamps are needed. The lamps in this cabinet are connected as indicated and the signal for the location of each car is given. An attendant can see at a glance the relative positions of the cars and learn which operator is responsible for inefficient service due to the improper spacing of his car.

The lamp 5 in each cabinet 1 is not lighted under normal conditions, but should a car become loaded while going up or down the operator may by operating the switch 16 light the lamp 5 in his own car, also light the lamps at his row character ("A", "B" or "C") in the cabinets of the other cars, said lamps not burning under normal conditions; he may also break the circuit connections from the contacts 15 of his shaft. In this way he will notify the other operators that he is going to the other end of the shaft without taking on additional passengers and permitting them to care for the traffic from which he has temporarily withdrawn. This signal is given by swinging the switch 16 to the pole attached to wire *e*. Wire *e* of each cabinet runs to the lamps at the row characters "A", "B" and "C". For instance wire *e* from the cabinet in car C runs to the lamps at "C" in the cabinets of cars A and B. When the switch is thrown to give this signal the floor signals in the car are not operated as their circuits are broken and this is also carried out in the monitoring cabinet 17. Each lamp 5 has connection with the wire *e* of its own cabinet and is thus lighted when the switch is thrown.

If car C should become loaded at the third floor on a down trip the operator merely throws his switch 16 so that the circuit over wire *d* is broken and the circuit over wire *e* is closed, whereby the lamps at the floor characters in cars A and B cease to burn, as well as those in the same row in the cabinet 17; the lamps at "C" in said cars being lighted, thus giving the loaded signal. The lamp 5 in car C is also lighted and burns until the switch is thrown back and normal conditions restored. The operator must do this, thus checking himself.

It is obvious that this system permits each operator to properly space his car and if a car gets out of position the operator can see the relative positions of the other cars at a glance and bring his car into harmony with the others. The signals for each car being readily comprehended add much to the efficiency of the operation. If a floor is passed and the car is "backed up" no additional operation is required so far as this system is concerned. When a car is stationary at a certain floor, a standing signal of much prominence is given in the other cars.

What I claim, is:

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

2. 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 the other cars, electrical circuit connections between the indicators, a monitoring indicator located at a fixed point and having signals corresponding to those of the indicators in the cars, and electrical circuit connections between the signal devices of the car indicators and the corresponding signals of the monitoring indicator whereby the relative positions of all the cars are indicated by the operation of the signals of the monitoring indicator.

3. The combination with a bank of elevator cars, of a plurality of floor indicators, each of which has provision for indicating floors traversed and is located in a different car, said indicators being electrically connected one with the other, and a monitoring

indicator located at a fixed point and having means electrically connected with indicators of the cars for indicating the respective floor positions of all the cars whose indicators are connected therewith.

4. The combination with a bank of elevator cars; of an indicator located in each car and including individual rows of signals, a row of signals corresponding to the number of floors being provided for each car except that in which the indicator is located; and means operated by each car for successively operating the signals in individual order in the other cars.

5. The combination with a bank of elevator cars, of a plurality of indicators each located in a different car, each indicator having means for indicating the relative positions of the other cars, electrical circuit connections between the indicators, and means carried in each car and electrically connected whereby a loaded signal may be given in each of the other cars.

6. The combination with a bank of elevator cars, of a plurality of indicators each located in a different car, each indicator having means for indicating the relative positions of the other cars, electrical circuit connections between the indicators, means carried in each car and electrically connected whereby a loaded signal may be given in each of the other cars, and a monitoring indicator electrically connected with the indicators in the cars and having provision for indicating the positions of all the cars in the bank.

7. The combination with a bank of elevator cars, of a plurality of indicators each located in a different car, each indicator having means for indicating the relative positions of the other cars, electrical circuit connections between the indicators, and means carried in each car and electrically connected whereby a loaded signal may be given in each of the other cars and the indicating means of the loaded car made inoperative.

8. The combination with a bank of elevator cars, of a plurality of indicators each located in a different car, each indicator having means for indicating the relative positions of the other cars, electrical circuit connections between the indicators, means carried in each car and electrically connected whereby a loaded signal may be given in each of the other cars, and a monitoring signal in each car electrically connected so as to be operated only in the car giving the loaded signal.

9. In an elevator car indicator, a row of signals disposed in superposed order in the car and arranged to indicate floors of a building as the car reaches and passes the same, a car designating signal correlated with the row of floor signals, and a switch located at a place other than the car carrying the indicator and connected with the same so that said floor signals may be cut out and said car designating signal operated.

10. The combination of two indicators each located in a separate elevator car, each indicator having a plurality of signals for indicating the floor positions of the other car and also a designating signal for the other car inactive while said floor signals are active, and a switch located at each indicator and connected with the indicator of the other car so that when closed it will disconnect the floor signals at said last named car indicator and operate the car designating signal at the same indicator.

11. The combination of two indicators each located in a separate elevator car, each indicator having a plurality of signals for indicating the floor positions of the other car and also a designating signal for the other car inactive while said floor signals are active, a switch located at each indicator and electrically connected with the indicator of the other car so that when closed it will disconnect the floor signals at said last named car indicator and operate the car designating signal at the same indicator, said indicators each having an operator's signal connected with said switch to operate at the same indicator at which the switch is closed.

12. 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 signal devices for each of the other cars, electrical circuit connections between the indicators whereby individual floor signal devices at each indicator for each car are simultaneously operated by the other cars, the operated floor signal device for a car being differentiated from the other signal devices for the same car, each signal device being controlled by a separate circuit.

In testimony whereof I affix my signature.

ALVIN C. McNABB.