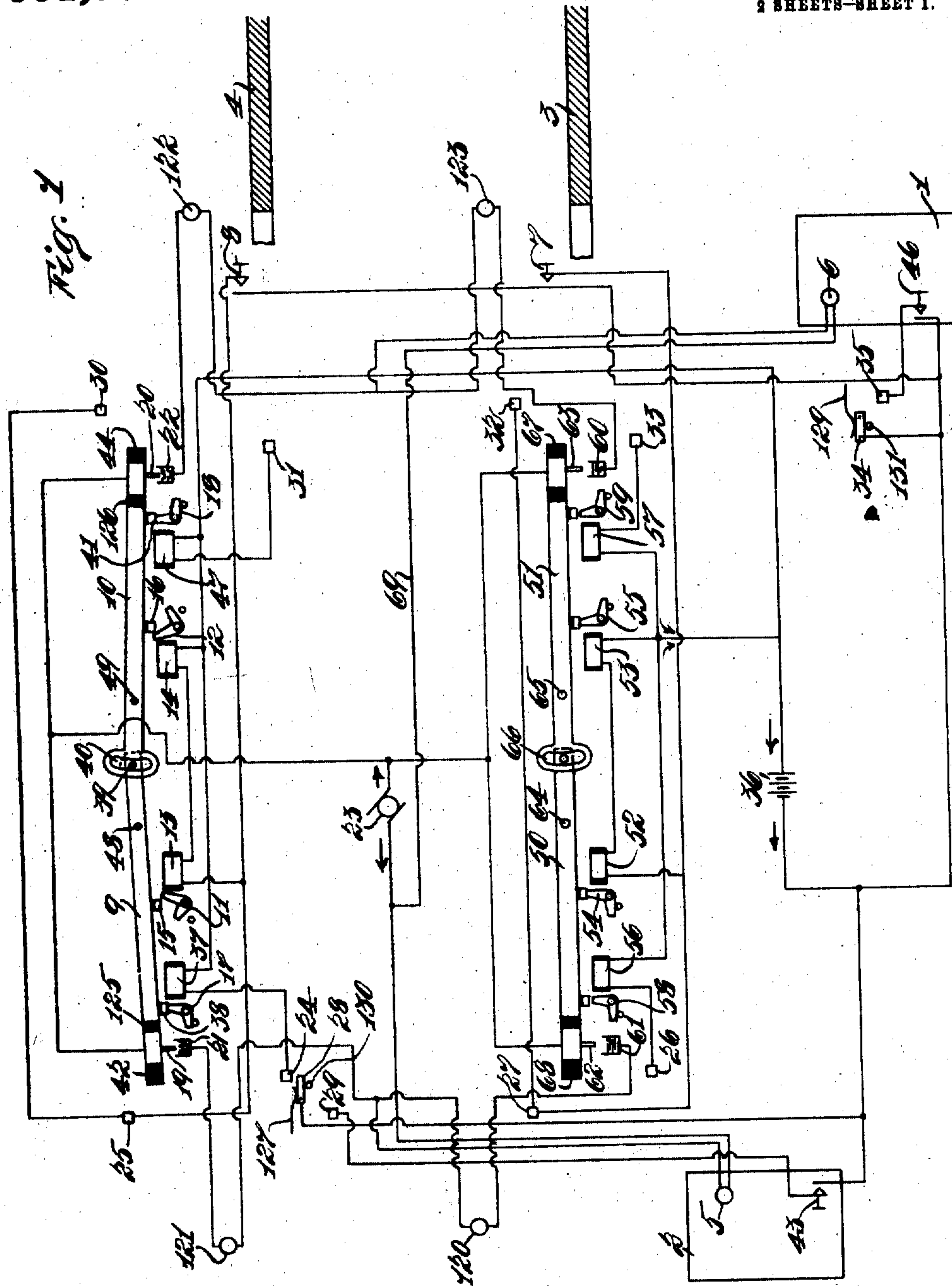


J. M. GRAHAM.
ELEVATOR SIGNALING APPARATUS.
APPLICATION FILED FEB. 25, 1908.

Patented May 9, 1911.

2 SHEETS—SHEET 1.

991,973.



Witnesses:
C. A. Jarvis
Beatrice Munn

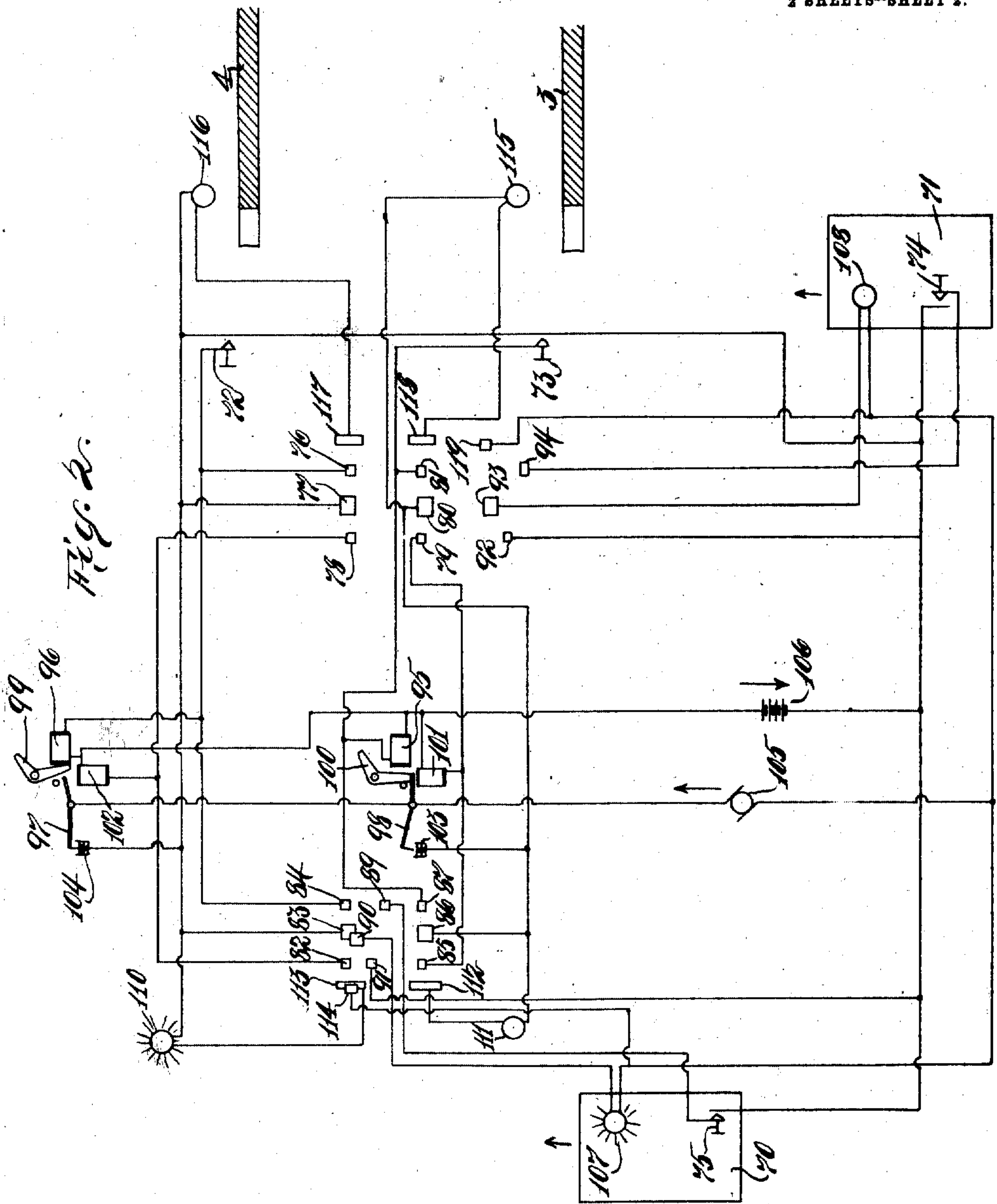
Inventor:
James M. Graham
By Emerson R. Howell
his Attorney

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James M. Graham.
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UNITED STATES PATENT OFFICE.

JAMES M. GRAHAM, OF NEW YORK, N. Y., ASSIGNOR TO ELEVATOR SUPPLY & REPAIR COMPANY, A CORPORATION OF ILLINOIS.

ELEVATOR SIGNALING APPARATUS.

991,973.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed February 25, 1908. Serial No. 417,636.

To all whom it may concern:

Be it known that I, JAMES M. GRAHAM, a citizen of the United States, residing at New York city, New York, have invented certain new and useful Improvements in Elevator Signaling Apparatus, of which the following is a clear, full, and exact description.

My invention relates to an elevator signaling apparatus, and my object is to provide a construction by which an operator of any one of a plurality of cars may run by a floor where an intending passenger has operated a device, such as the ordinary push-button, for the purpose of signaling the car to stop, and still leave the parts or circuits in condition to operate the signal of the next following car, so that the next following car will receive the signal to stop at such floor.

I am aware of such patents as the Smalley & Reiners Patent No. 634,220, the Pedersen Patent—Re-issue #12,313, the McLean Patents 748,408 and 748,409, Bowne 850,618, Moore 880,152 and others of the prior art. It is common in the art to provide a construction which comprises a push-button located at a floor and which sets certain mechanism which operates conjointly with a commutator moved correspondingly with the movement of the car to determine the time when the signal can be displayed, said push-button-operated mechanism being restored to normal condition by various means, such, for example, as by the action of the commutator in the said Smalley & Reiners and Pedersen patents and by the elevator shaft gates or doors in said McLean patents.

One of the objects of my invention is to provide means under the control of, and operable by, the operator of a car by which he may reset the push-button-operated mechanism of the other car or cars of the bank of elevators in the same condition that it would be if the floor push-button had been again pushed by the intending passenger, and so leave the mechanism in condition such that the next following car will receive the signal.

I am aware that my invention is capable of embodiment in other forms than I have shown in the drawings, but for the purposes of this application I have illustrated in the drawings two forms of apparatus which accomplish this result.

My invention will be set forth in the claims.

In the drawings, Figure 1 shows diagrammatically the preferred embodiment of my invention, and Fig. 2 represents an alternative construction.

In Fig. 1 I have shown diagrammatically my invention as applied to a construction such as represented in the Bowne Patent 850,618, and from the following description it will be evident to any mechanic skilled in the art how my invention would be actually adapted to such construction, but I consider that the diagrammatic representation in Fig. 1 indicates to a person familiar with the elevator signaling art the operation and features of my invention more clearly than detailed drawings of the mechanism.

1 and 2 represent a plurality of cars which are supposed to be moving "up" and "down" in suitable shafts past the floors 3 and 4, such cars being provided with the usual hoisting mechanism.

5 and 6 are visual signals for each car, which are preferably carried by the cars, and may, if desired, be single electric lights, as is common in the art.

7 is a passenger's-controller such as a push-button located at the third floor, and 8 a similar one at the fourth floor. By the word "passenger's-controller" I do not mean to limit myself to the construction shown, as I consider that other devices, which are operated by the intending passenger when he wishes to take passage in the elevator, would be equivalent constructions.

The means for displaying the signals preferably comprises mechanism which is adapted to be set in one position by the operation of a floor push-button and also a commutator which determines the time when the signal shall be given after the push-button has been operated, and in the embodiment of my invention illustrated in Fig. 1 of the drawings such mechanism set by the push-button on the fourth floor comprises two pivoted arms 9 and 10, one for each car, together with pivoted detents 11 and 12 and magnets 13 and 14. The normal position of the arms are as shown in the lower half of the figure at 50, 51, that is, with the detents 11 and 12 underneath the projections 15 and 16. When, however, one of said magnets is energized it will rock its detent, as indicated,

and allow the arm to drop slightly and rest upon another pivoted detent 17 or 18, as shown. The detents 11 and 12 are obviously prevented from returning to their normal position as the projections 15 and 16 stand in front of them. If the detents 17 and 18 are withdrawn, the arms will drop sufficiently to cause the fingers 19 and 20 to enter the mercury pots 21 and 22 and close the circuits through the signals from the dynamo or other source of E. M. F. 23. In order to operate these detents 17 and 18, a commutator is provided for commuting or successively closing or opening a series of electric circuits, one part of which is moved correspondingly with the car and the other part or portions of which are relatively stationary. In the present embodiment the commutator renders the signals inoperative except when the car is approaching and is adjacent the floor on which a passenger's controller has been operated and comprises suitable fixed contacts, and brushes moved correspondingly with the movement of the elevator, as is common, but preferably much slower. I have not shown the connection between the moving brushes and the hoisting mechanism of the car, because it would complicate the drawings and it is evident to any mechanic skilled in the art. In the present embodiment the fixed contacts of the commutator for car 2 are indicated by 24 and 26, and the moving brush as 28. The commutator for car 1 consists of the fixed contacts 31 and 33, and the moving brush 34. I have also provided in the present instance fixed contacts 25, 27, 30 and 32, and moving brushes 29 and 35, which I have for convenience embodied as parts of the commutator, although this is not necessary in all cases. It will be observed that when brush 28 strikes contact 24, a circuit will be closed from the battery 36 through the magnet 37, which will energize the magnet and draw the detent 17 out from under the projection 38 and allow the arm 9 to drop the finger 19 into the mercury pot 21, which will close the circuit through the lamp 5, thus indicating to the operator of the car that he is expected to stop at the fourth floor. The pin and slot connection indicated at 39 and 40 between the arms 9 and 10 allows either arm to drop into its mercury pot independently of the other one.

The restoring mechanism for restoring the arm to normal condition may, if desired, be a projection 42 on the end of the arm which will be engaged by a moving portion of the commutator, such as brush 28, which will lift the arm until both detents 11 and 17 drop back because of their overweighted ends to the normal position under the projections 15 and 38, thus restoring the parts to normal condition. The pin 39 on arm 9 will strike the bottom of the slot 40 and

similarly raise the arm 10, thus also restoring it to normal condition, although this is not necessary in some cases.

The operation of the commutator of car 1 is substantially the same as just described with reference to the arm 10 and the signal 6 in the car. The arm 10 will be similarly restored by brush 34 and as the top of slot 40 will strike pin 39, it will, preferably, also restore arm 9.

In order to allow the operator of car 2 to run past the floor if he desires, and still leave the push-button-operated mechanism which corresponds to the other car, in position such that the signal of the other car will be displayed when its commutator touches the proper contact, I have provided transfer means which is in part carried by the car and operable by the operator thereof and which is adapted to cause the push-button-operated arm 10 of the other following car 1 to be left in the set position after car 2 has restored arm 9 to normal position. This is preferably accomplished by re-setting arm 10 to the position shown. This transfer means, in the present embodiment of my invention, comprises a transfer button or switch 43 in car 2, a moving brush 29 of the commutator, and the fixed commutator contact 25. The brush 29 strikes the contact 25 just after brush 28 has raised arm 9 and passed out of engagement with the same. If, therefore, the operator of the car closes switch 43, he will close a circuit from battery 36, through such switch, brush 29 and contact 25, and from there through "setting" magnets 13 and 14 in series, and back to the battery, thus drawing detents 11 and 12 to the position shown and resetting arm 10 (and preferably arm 9 also) in the "set" position, which is the same as would result if the push-button 8 were again pushed. This will obviously leave the parts in condition such that when the commutator brush 34 of car 1 strikes contact 31, the car 1 will receive the signal to stop at the floor. The brush 34 will then, as the car passes on, strike the end 44 of arm 10, and the transferred signal will be restored to normal condition, or, if desired, the operator of car 1 may press his transfer button 46 when brush 35 strikes contact 30 and pass on, resetting arm 9 in the position shown.

The mechanism for operating the signals when the car is approaching floor 3 is substantially the same as above described, comprising arms 50, 51, the magnets 52, 53 which are operated by the push-button 7 or transfer button 46 to withdraw the detents 54, 55, the magnets 56 and 57 for withdrawing the detents 58, 59, and the mercury pots and fingers 60, 61 and 62, 63.

It will be obvious that the signals are displayed by the conjoint operation or action of the push-button-operated mechanism and

the respective commutators, in the sense that the push-button must be operated and the moving brush of the commutator must touch its corresponding contact before the signal will be given. In the embodiment of my invention shown in the drawings the operation of either one without the other will not display the signal.

In Fig. 2 I have, for the purposes of illustration merely, shown a modification of my invention which is adapted to be used with, for example, the construction shown in the Smalley & Reiners patent heretofore mentioned. In this construction 70 and 71 are the two cars, 72 and 73 the floor push-buttons, 74 and 75 the transfer buttons, and 76 to 87 the fixed, and 89 to 94 the moving, parts of the commutators. 95 and 96 are magnets for setting or resetting the pivoted arms 97, 98 through withdrawal of the weighted detents 99 and 100, and 101 and 102 are the restoring magnets, and 103 and 104 the mercury pots. 107 and 108 are the signal lamps. In this modification the push-button 72 has been pushed to energize magnet 96 and rock detent 99 to release the mercury pot arm 97 which has dropped into the mercury pot 104, and the moving brush 90 of the commutator has touched fixed contact 83, therefore closing the circuit through the car light 107 which is indicated as lighted. When the moving brush 91 strikes contact 82 it will energize magnet 102 and draw the pivoted arm 97 back to the position of the similar arm 98, detent 99 dropping back to the position of detent 100, thus restoring the circuits to normal condition. If the operator of car 70 wishes to reset arm 97 in the position shown, he presses the transfer button 75 as the moving brush 89 strikes contact 84, which will again close the circuit through magnet 96 and attract the detent 99, thus allowing arm 97 to be reset in the position shown, so that when car 71 comes along it will receive its signal when the moving brush 93 strikes fixed contact 77.

After a floor push-button has been pushed and a car operator has pressed his transfer button, the signal will stand for the next succeeding car in the sense that the parts are left in such a position that the next following car will receive its signal at the proper time.

Of course it will be understood that in both figures the fixed and moving portions of the commutators are so disposed that the signal would be given somewhat before the car reaches the floor at which it is to stop, such, for example, as two floors in advance of the car. In Fig. 1 car 2 is moving upwardly and at about the second floor as the moving brush 28 is about to engage the fixed car light contact 24. In Fig. 2 car 70 is at about the third floor. The moving brushes 28 and 34 of the commutator in Fig.

1 are pivoted so that when moving in the opposite direction they will rock on their pivots when they strike the insulated ends of the arms and pass by the same. I have not considered it necessary to show the apparatus for use when the car is moving downwardly, as this will be evident to any mechanic skilled in the art and familiar with the patents heretofore mentioned. I have also shown visual signals for each car in the form of electric lamps stationarily located at the floors, one for each car at each floor, for signaling to the intending passenger. Such floor lamps for car 2 are shown at 120 and 121 in Fig. 1, and for car 1 at 122 and 123. In Fig. 2 the similar lamps are indicated at 110, 111, 115 and 116. In this latter figure are shown other stationary contacts 112, 113, 117 and 118, and moving floor lamp brushes 114 and 119.

41 is a block on lever 10 which rests on top of the armature 18. 47 is the magnet which moves said armature.

48 and 49 are fixed pivots on which the arms 9 and 10 rock. 64 and 65 are the similar fixed pivots for the levers 50 and 51.

66 is a slot in lever 51 similar to the slot 40 in lever 10.

125 and 126 are insulating portions of the levers 9 and 10 which serve to insulate the pins 19 and 20 from the rest of the arms.

67 and 68 are insulated portions at the ends of the arms 50 and 51.

130 is a stop pin, movable with brush 28, to normally hold the moving brush 28 from moving beyond its position shown under impulse of spring 127. 131 is a similar stop for the brush 34.

105 and 106 are suitable sources of electromotive force, such as a dynamo and a battery, respectively.

I am aware that my invention may be embodied in various other forms without departing from the spirit of the same as set forth in the claims. I therefore do not limit myself to the construction shown in the drawings.

What I claim is:

1. In an electric signaling apparatus for elevators, the combination of visual signals for the several elevator cars, individual commutators for controlling the passage of current through said visual signals, a restoring mechanism whereby said visual signals are brought to inactive condition, resetting mechanism for thereafter resetting the parts in position such that the commutators may cause the signals to be displayed, electric circuits leading from said resetting mechanism to the elevator cars, and a circuit-controlling mechanism within each car whereby the said resetting mechanism can be controlled to permit the signal to stand for the next succeeding car.

2. In an electric signaling apparatus for

elevators, the combination of visual signals for a plurality of elevators, individual commutators for controlling the passage of current through said signals, said commutators comprising means for restoring said signals to inactive condition, resetting mechanism for thereafter resetting the parts in position such that the commutators may cause the signals to be displayed, and a circuit-controlling mechanism such as a transfer button within each car, said transfer buttons being connected with the resetting mechanism of said commutators in such a manner that by the actuation of said buttons the operation of the resetting mechanism can be controlled to transfer the signal.

3. In an electric signaling apparatus for elevators in combination, a pair of cars, an electrically-operated signal for each car, means for operating said signals comprising a passenger's controller located at a floor and mechanism set by the operation of said passenger's-controller, signal transfer means in part carried by each car and operable by the operator of the car for setting said passenger's-controller-operated mechanism in position such that the signal of the other car will be operated, and means for restoring said mechanism to normal condition whereby the transferred signal is restored to normal condition, said transfer means comprising mechanism rendering said transfer means incapable of controlling said passenger's-controller-operated mechanism except when the car from which the transfer means has been operated is adjacent the floor on which said passenger's controller is located.

4. In an electric signaling apparatus for elevators in combination, a pair of cars, a visual signal carried by each car, means for displaying said signals comprising a passenger's-controller located at a floor, a commutator for and operated by each car and mechanism set by the operation of said passenger's-controller, said commutator and mechanism acting conjointly to determine the time when a signal shall be given, signal transfer means in part carried by each car and operable by the operator of the car for setting said passenger's-controller-operated mechanism in position such that the signal of the other car will be displayed, and means for restoring said mechanism to normal condition whereby the transferred signal is restored to normal condition.

5. In an electric signaling apparatus for elevators, the combination of a pair of cars, a visual signal for each car, means for displaying said signals comprising a passenger's controller located at a floor and mechanism for each car set by the operation of said passenger's-controller, signal transfer means in part carried by each car and operable by the operator of each car for setting said passenger's-controller-operated mechanism

which corresponds to the other car in position such that the signal of the other car will be displayed, and means for restoring said mechanism to normal condition whereby the transferred signal is restored to normal condition, said transfer means comprising mechanism rendering said transfer means incapable of controlling said passenger's-controller-operated mechanism except when the car from which the transfer means has been operated is adjacent the floor on which said passenger's-controller is located.

6. In an electric signaling apparatus for elevators, the combination of a pair of cars, an electrically-operated signal for each car, means for determining the time when said signals may be operated and comprising a passenger's-controller located at a floor and a commutator for each car operated correspondingly with the movement of such car and mechanism set by the passenger's-controller, restoring means operated by each car for restoring to normal condition the mechanism so set by said passenger's-controller, and signal transfer means in part carried by each car and operable by the operator of the car for resetting the said passenger's-controller-operated mechanism.

7. In an electric signaling apparatus for elevators, the combination of a pair of cars and floors, a visual signal carried by each car, means for determining the time when said signals may be displayed and comprising a passenger's-controller located at each floor, a commutator for each car operated correspondingly with the movement of such car and mechanism corresponding to each floor set by said passenger's-controller, restoring means operated by each car for restoring to normal condition the mechanism so set by said passenger's-controllers, and signal transfer means in part carried by each car and operable by the operator of the car for resetting either of the said passenger's-controller-operated mechanisms.

8. In an electric signaling apparatus for elevators, the combination of a pair of cars and floors, a visual signal carried by each car, means for determining the time when said signals may be displayed and comprising a passenger's-controller located at each floor, a commutator for each car operated correspondingly with the movement of such car and mechanism corresponding to each floor set by said passenger's-controller, said mechanism so set being common to both cars, restoring means operated by each car for restoring to normal condition the mechanism so set by said passenger's-controllers, and signal transfer means in part carried by each car and operable by the operator of the car for resetting either of the said passenger's-controller-operated mechanisms.

9. In an electric signaling apparatus for

elevators, the combination of a pair of cars, a visual signal for each car, means for determining the time when said signals may be displayed and comprising a passenger's-controller located at a floor and a commu-
 5 tator for each car operated correspondingly with the movement of such car and mechanism for each car set by the passenger's-controller, restoring means operated by each
 10 car for restoring to normal condition the mechanisms so set by said passenger's-controller, and signal transfer means in part carried by each car and operable by the operator of the car for resetting the said
 15 passenger's-controller-operated mechanism which corresponds to the other car.

10. In an electric signaling apparatus for elevators, the combination of a pair of cars, an electrically-operated signal for each car,
 20 means for operating said signals comprising, and operating by the joint action of, a commutator for and operated by each car correspondingly to the movement thereof and mechanism to be set, signal transfer
 25 means in part carried by each car and operable by the operator of the car for setting the said mechanism in position such that the signal of said other car will be operated, and restoring means for restoring said
 30 mechanism to normal condition.

11. In an electric signaling apparatus for elevators, the combination of a pair of cars, a visual signal carried by each car, means for displaying said signals comprising, and
 35 operating by the joint action of, a commutator for and operated by each car correspondingly to the movement thereof and mechanism to be set, signal transfer means in part carried by each car and operable
 40 by the operator of the car for setting the said mechanism in position such that the signal of said other car will be displayed, and restoring means for restoring said mechanism to normal condition.

12. In an electric signaling apparatus for elevators, the combination of a pair of cars, an electrically-operated signal for each car, means for operating said signals comprising, and operated by the joint action of, a
 50 commutator for and operated by each car correspondingly to the movement thereof and mechanism for each car adapted to be set; signal transfer means in part carried by each car and operable by the operator of
 55 the car for setting the said mechanism which corresponds to the other car in position such that the signal of said other car will be operated, and restoring means for restoring said mechanism to normal condition.

13. In an electric signaling apparatus for elevators, the combination of a pair of cars, a visual signal for each car, means for determining the time when a signal can be
 60 displayed and comprising a passenger's-controller located at a floor and mechanism

for each car adapted to be set by said passenger's-controller, restoring means operated by one car and adapted to restore at
 least its own passenger's-controller-operated mechanism to normal condition, and
 70 signal transfer means in part carried by said car and operable by the operator of said car and adapted to cause the passenger's-controller-operated mechanism of the
 75 other following car to be left in the set position after the restoring means of the first car has operated, said transfer means comprising mechanism rendering said transfer means incapable of controlling said passenger's-controller-operated mechanism except
 80 when the car from which the transfer means has been operated is adjacent the floor on which said passenger's-controller is located.

14. In an electric signaling apparatus for
 85 elevators, the combination of a pair of cars, a visual signal for each car, means for determining the time when a signal can be displayed and comprising a commutator operated by each car and a passenger's-controller
 90 located at a floor and mechanism for each car adapted to be set by said passenger's-controller, restoring means operated by one car and adapted to restore at least its own passenger's-controller-operated mechanism
 95 to normal condition, and signal transfer means in part carried by said car and operable by the operator of said car and adapted to cause the passenger's-controller-operated mechanism of the other following car to be
 100 left in the set position after the restoring means of the first car has operated, and restoring means for restoring to normal condition the passenger's-controller-set mechanism of said following car.

15. In an elevator signaling apparatus in combination, a car, a signal for the same, means for operating said signal comprising
 110 a passenger's-controller located at a floor and mechanism set when said controller is operated, a second car and a signal for the same, signal transfer means in part carried by said second car and controlled by the movement of said car and under control of
 115 the operator thereof and adapted, when operated, to cause the passenger's-controller-operated mechanism which controls the signal of the first car to be set in its operative position, and restoring means operated by
 120 said first mentioned car for thereafter restoring said passenger's-controller-operated mechanism to normal condition.

16. In an elevator signaling apparatus in combination, a car, a signal for the same, means for operating said signal comprising
 125 a passenger's-controller located at a floor and mechanism set when said controller is operated, a second car and a signal for the same, signal transfer means in part carried
 130 by said second car and under control of the

operator thereof and adapted, when operated, to cause the passenger's-controller-operated mechanism which controls the signal of the first car to be set in its operative position, and restoring means operated by said first mentioned car for thereafter restoring said passenger's-controller-operated mechanism to normal condition, said transfer means also comprising mechanism which is operated by said second car and which renders said transfer means inoperative except when said second car is adjacent the floor on which said passenger's-controller is located.

17. In an elevator signaling apparatus in combination, a car, a signal for the same, means for operating said signal and comprising a passenger's-controller located at a floor, a magnet controlled thereby, and mechanism controlled by said magnet and set when said magnet is energized, a second car and a signal for the same, signal transfer means in part carried by said second car and under control of the operator thereof and adapted, when operated, to energize said magnet and thereby cause the passenger's-controller-operated mechanism which controls the signal of the first car to be set in its operative position, and restoring means operated by said first mentioned car for thereafter restoring said passenger's-controller-operated mechanism to normal condition, said transfer means comprising mechanism rendering said transfer means incapable of controlling said passenger's-controller-operated mechanism except when the car from which the transfer means has been operated is adjacent the floor on which said passenger's-controller is located.

18. In an elevator signaling apparatus in combination, a car, electrically-operated means for signaling the operator carried thereby, means for displaying a signal comprising a passenger's-controller located at

each of a plurality of floors and mechanism corresponding to each floor set, when its corresponding passenger's-controller is operated, a second car and signaling means for the same, signal transfer means in part carried by said second car and under control of the operator thereof and adapted, when operated, to cause any one of said passenger's-controller-operated mechanisms to be set in operative position, said transfer means also comprising mechanism operated by said second car and adapted to automatically render said transfer means operative upon said passenger's-controller-operated mechanisms in succession, and restoring means operated by said first car for restoring to normal condition the mechanism so set by said transfer means.

19. In a signaling apparatus for elevators in combination, a pair of cars and a plurality of floors passed by said cars, electrically-operated signal means carried by each car and adapted to signal the operator to stop at the floors, means for operating said signals comprising a passenger's-controller at each floor and mechanism corresponding to each floor set by operation of its corresponding passenger's-controller, signal-transfer mechanism comprising a switch in each car operable by the operator of the car for setting any and all of said passenger's-controller-operated mechanisms corresponding to the other car in position such that the signal means of the other car will be operated, and means for restoring said mechanisms to normal condition.

Signed at New York, N. Y. this 21st day of February 1908.

JAMES M. GRAHAM.

Witnesses:

EMERSON R. NEWELL,
BEATRICE MIRVIS.