Oct. 14, 1941. E. U. LASSEN 2,258,775

ELECTRIC CONVEYER SYSTEM

Filed Nov. 18, 1939 4 Sheets-Sheet 1

Fig. 1

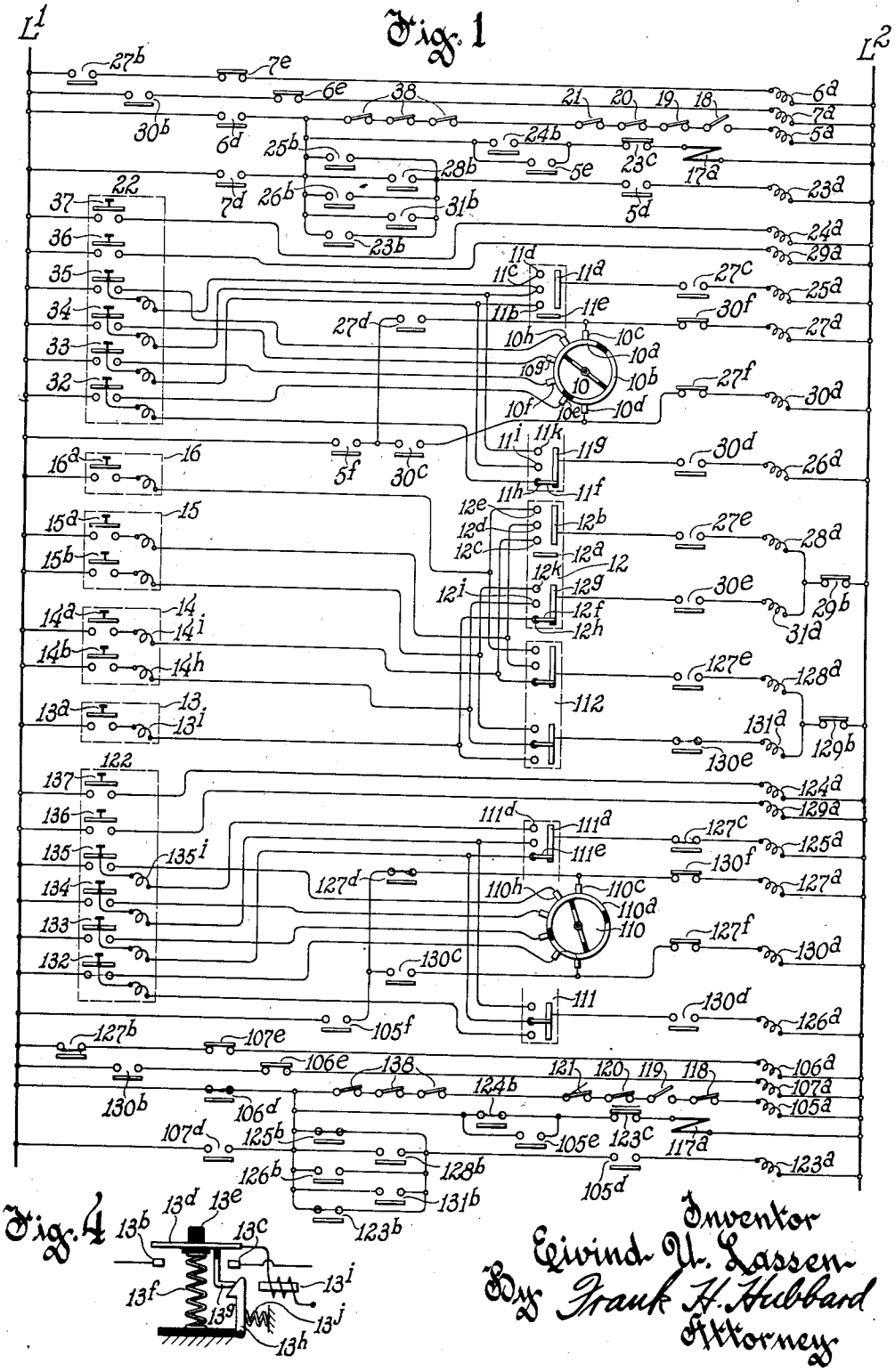


Fig. 4

Inventor
Eivind U. Lassen
By Frank H. Hubbard
Attorney

Oct. 14, 1941. E. U. LASSEN 2,258,775

ELECTRIC CONVEYER SYSTEM

Filed Nov. 18, 1939 4 Sheets-Sheet 2

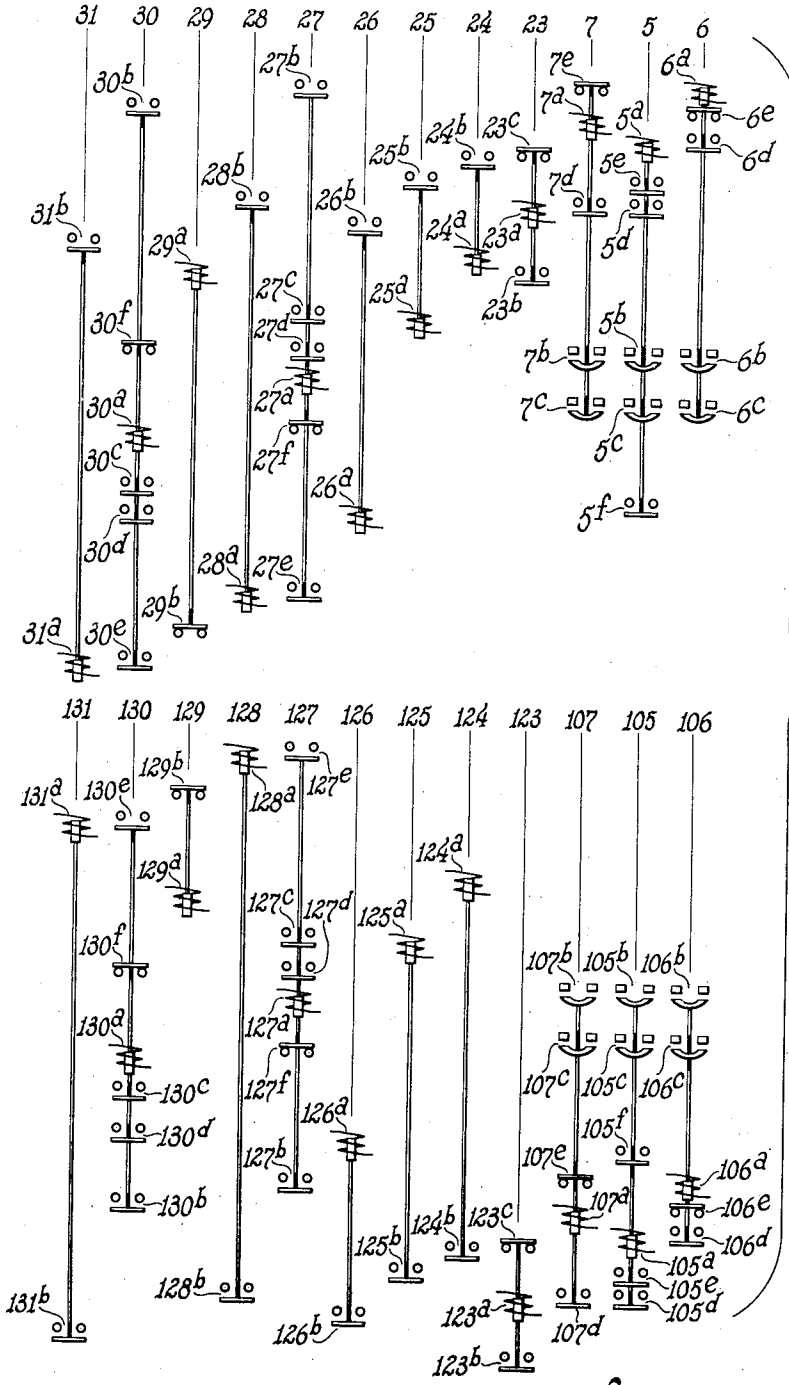


Fig. 2

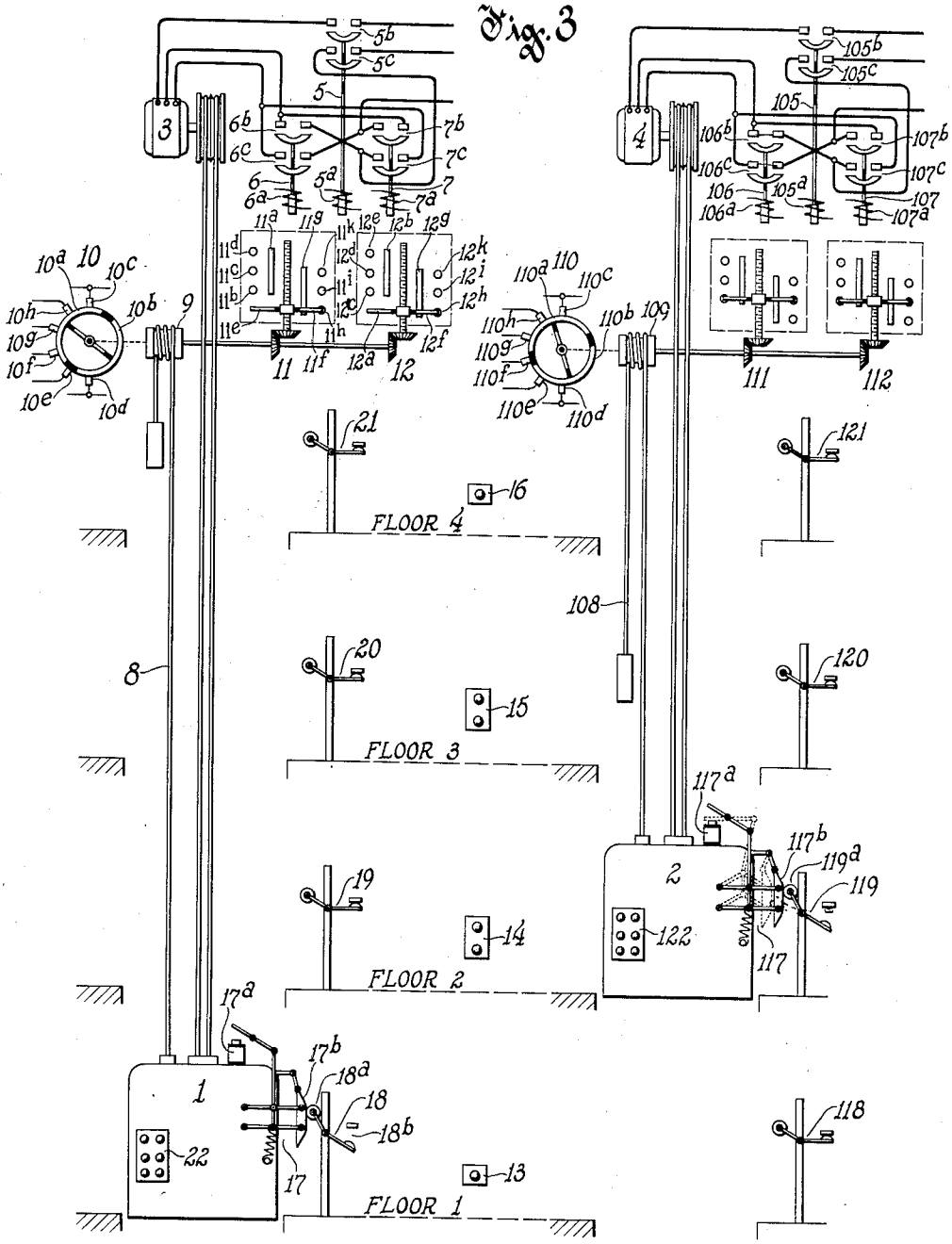
Inventor
Eivind U. Lassen
By Frank H. Hubbard
Attorney

Oct. 14, 1941. E. U. LASSEN 2,258,775

ELECTRIC CONVEYER SYSTEM

Filed Nov. 18, 1939 4 Sheets-Sheet 3

Fig. 3



Inventor
Erwin U. Lassen
By Frank H. Hubbard
Attorney

Oct. 14, 1941. E. U. LASSEN 2,258,775

ELECTRIC CONVEYER SYSTEM

Filed Nov. 18, 1939 4 Sheets-Sheet 4

Fig. 5

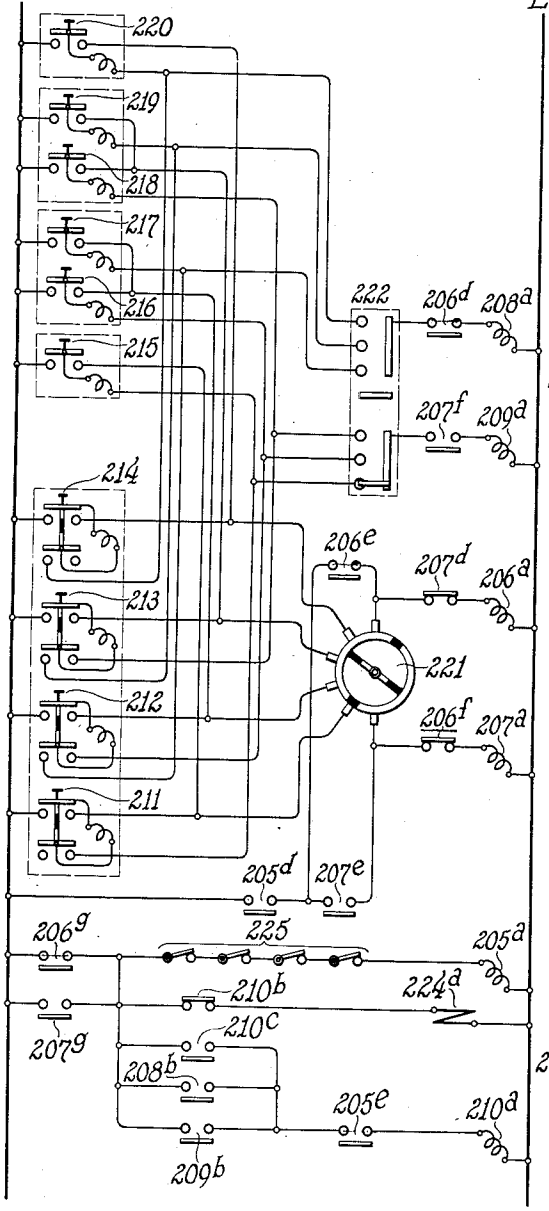
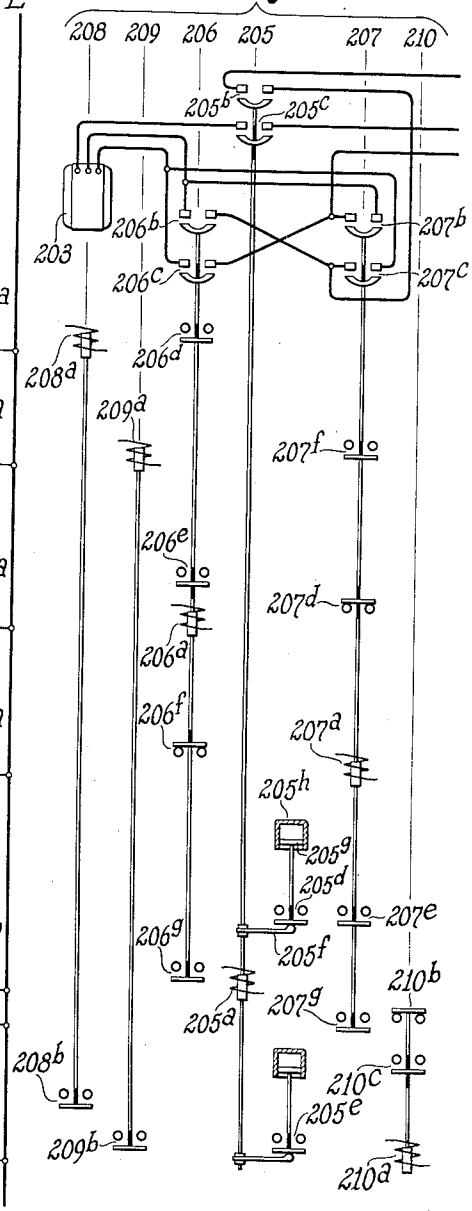


Fig. 6



Inventor
Ewind U. Lassen
By Frank H. Hubbard
Attorney

Patented Oct. 14, 1941

2,258,775

UNITED STATES PATENT OFFICE

2,258,775

ELECTRIC CONVEYOR SYSTEM

Eivind U. Lassen, Whitefish Bay, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis., a corporation of Delaware

Application November 18, 1939, Serial No. 305,101

10 Claims. (Cl. 187—29)

The present invention relates to electric conveyor systems and especially to elevator systems of the push button type in which one or more conveyors or elevators may be controlled from push button stations at the various landings and/or push buttons in the car in such a manner that the car stops in succession at the various landings for which push buttons have been operated in the natural order of such landings and so that the car completes its travel in a given direction before it reverses to respond to push buttons which have been operated to require the car to travel in the opposite direction.

An object of the invention is to provide an elevator control system requiring a minimum of apparatus to accomplish the aforediscussed results.

Another object is to provide a system which employs a control panel, the construction of which is independent of the number of elevators in an installation or the number of floors served.

Another object is to provide a system which can readily be adapted to any desired number of elevators to either operate independently or jointly to serve a plurality of floors.

The accompanying drawings are illustrative of several embodiments of the invention.

In the drawings,

Figure 1 is a circuit diagram of the control circuits of a system comprising two elevators which operate jointly.

Fig. 2 is a schematic diagram of the electromagnetic switches and relays employed to form the control panels for the motors which form a part of the control system of Fig. 1.

Fig. 3 is a general representation of the two elevator cars including their driving motors and their relation to several of the elements of the control system.

Fig. 4 is a schematic drawing of the push buttons employed in the system, while

Figs. 5 and 6 are diagrams of a modification of the system of Fig. 1 and designed for a single elevator installation.

Referring to the drawings Figs. 1 to 4, the same illustrate two elevator cars 1 and 2, which are operated by reversible three phase alternating current motors 3 and 4, respectively. The motor 3 is supplied with energy through a main switch 5 and a pair of reversing switches 6 and 7, the main switch 5 having a magnetizing winding 5^a, normally open main contacts 5^b and 5^c, and normally open auxiliary contacts 5^d, 5^e and 5^f. The switch 6 is provided with a magnetizing winding 6^a, normally open main contacts 6^b and 6^c, normally open auxiliary contacts 6^d, and normally closed auxiliary contacts 6^e. The switch 7 is provided with a magnetizing winding 7^a, normally open main contacts 7^b and 7^c, normally open auxiliary contacts 7^d, and normally closed auxiliary contacts 7^e. The car by means of a counter-weighted rope 8 running over a sheave 9 drives a number of selector switches so that their operation is a function of the position of the car. A rotating drum selector switch 10 is provided with two substantially semi-circular contact segments 10^a and 10^b, respectively, and is arranged so that it makes substantially one-half revolution for the full travel of the car in the hatchway. The segments 10^a and 10^b are provided with contact brushes 10^c and 10^d, respectively, which are continuously in engagement with the respective segments to conduct current thereto. A series of contact brushes 10^e to 10^h, inclusive, corresponding to the number of floors is arranged about the circumference of the segments to make contact with one or the other depending upon the position of the car in the hatchway. There are further provided two travelling nut selector switches 11 and 12 which are geared to the drum 9 to move therewith. The switch 11 is provided with a segment 11^a and a series of floor contacts 11^b, 11^c and 11^d, which are selectively connected to the segment 11^a by a bridging contact 11^e attached to the travelling nut. A second bridging contact 11^f is adapted to bridge across a segment 11^g and contacts 11^h, 11^i and 11^k. The selector switch 12 has a bridging contact 12^a with a cooperating segment 12^b and contacts 12^c, 12^d and 12^e, and a bridging contact 12^f with a cooperating segment 12^g and contacts 12^h, 12^i and 12^k.

Mounted on the various floors are push button stations 13 to 16, inclusive, as will be explained more fully hereinafter. There is also provided a retiring cam limit switch operating mechanism 17 on the car comprising an operating magnet having an energizing coil 17^a which when de-energized actuates a cam 17^b so that when the car moves through the hatchway it abuts the lever 18^a of a limit switch 18 mounted near the first floor in the hatchway to open a normally closed contact 18^b of the latter. Similar limit switches 19 to 21, inclusive, are mounted at the other floors. A push button station 22 is mounted inside of the car.

The floor push button stations 14 and 15 each comprise an "up" button switch 14^a, 15^a and a "down" button switch 14^b, 15^b, respectively, while

the station 13 has only an "up" switch 13a, and station 16 only a "down" switch 16a.

All of the push button switches are alike in construction and are shown more in detail in Fig. 4. The switch comprises a pair of stationary contacts 13b and 13c which are adapted to be bridged by a bridged contact 13d which is attached to the push button 13e. The bridging contact 13d is normally held out of engagement with the stationary contacts by a biasing spring 13f and is provided with an abutment 13g which is adapted to engage a latch 13h to hold the bridging contact in the engaged position when the button has been depressed. To again release the latch and open the contacts the switch is provided with a tripping magnet 13i which when energized retracts the latch 13h against the bias of a spring 13j to thus open the push button contacts. One terminal of the magnet winding is connected to the bridging contact which thus deenergizes the magnet when the bridging contact is released.

The controller for elevator car 1 further comprises the following: Relay 23 has an energizing coil 23a, normally open contacts 23b, and normally closed contacts 23c. Relay 24 has an energizing coil 24a, and normally open contacts 24b. Relay 25 has an energizing coil 25a, and normally open contacts 25b. Relay 26 has an energizing coil 26a, and normally open contacts 26b. Relay 27 has an energizing coil 27a, normally open contacts 27b, 27c, 27d and 27e, and normally closed contacts 27f. Relay 28 has an energizing coil 28a, and normally open contacts 28b. Relay 29 has an energizing coil 29a, and normally closed contacts 29b. Relay 30 has an energizing coil 30a, normally open contacts 30b, 30c, 30d and 30e, and normally closed contacts 30f. Relay 31 has an energizing coil 31a, and normally open contacts 31b.

The car push button station 22 is provided with floor push buttons 32 to 35, inclusive, which are in construction and operation similar to that illustrated in Fig. 4. In addition, the station 22 includes a momentary normally open contact starting push button 36, and a momentary normally open contact by-pass push button 37. The system may also include a number of the conventional safety devices, such as door switches, etc., which are connected in the usual manner to stop the car and which are generally designated in the drawing by the numeral 38.

The second elevator is provided with control instrumentalities identical to those just described for car 1, as indicated in the drawing. Where required in the description of operation of the system, the elements of the second elevator have been designated by adding 100 to the numbers of the corresponding numerals of the elements for car 1, hence the controller for car 2 needs no further explanation, as it is selfevident from the foregoing description and the drawing.

The operation of the system is as follows: With the apparatus connected as shown, and power on busses L^1, L^2, car 1 is at rest on the first floor, and car 2 is on the second floor. If now the operator of car 2 desires to start the car, he may start it in either the "up" or "down" direction. If he wishes to start it in the "up" direction he presses floor button 135, for instance, thereby establishing a circuit from L^1 over contacts 135, brush 119h, segment 110a, brush 110c, normally closed contact 130f, coil 127a to L^2. Relay 127 opens contacts 127f and closes contacts 127b, 127c, 127d and 127e. A circuit is thereby established from L^1 over contacts 127b, 107e, coil 106a to L^2. This closes the up direction reversing switch main contacts 106b, 106c, but the motor cannot start, as the motor main switch 105 is de-energized. If now the operator pushes the button 137, a circuit is established from L^1, over contacts 137, through coil 124a to L^2. Relay 124 closes contacts 124b and thus a circuit is established from L^1, over contacts 106d, contacts 124b, 123c, coil 117a to L^2. Upon energization of coil 117a, the retiring cam mechanism tends to complete a circuit, subject to prior closure of the various safety switches, such as door switches, indicated in the diagram as safety contacts 138, said circuit extending from L^1 over contacts 106d, 138, 118 to 121, inclusive, coil 105a to L^2. The energization of coil 105a closes the main switch contacts for the motor and the latter lifts the elevator.

If now the car reaches the fourth floor, the limit switch 111 energizes the coil 135i of the push button 135 through a circuit from L^1, over contacts 135, coil 135i, contacts 111d, 111e, 111a, 127c, coil 125a to L^2. Coil 135i thereupon causes opening of said push button.

Completion of the circuit through coil 125a effects closure of contacts 125b and thus simultaneously energizes momentarily relay coil 123a, through contacts 105d. Relay 123 makes its own maintaining circuit through contacts 123b and opens contact 123c which de-energizes coil 117a of the retiring cam, thus opening limit switch contact 121 (Figs. 1 and 3) and de-energizing coil 105a which opens the supply to the motor and stops the elevator. It will be noted that when the car reaches the fourth floor the circuit is also opened in selector switch 110 between brush 110h and segment 110a, but energization of relay coil 127a is continued through contacts 105f, 127d and 130f until the main switch 105 is de-energized, thus preventing interference of another call button with the operation of the car. It will further be noted that relay 127 remains energized as long as any buttons in the "up" direction maintain a contact for said relay through limit switch 110, and as long as relay 127 is energized relay 130 cannot respond to permit travel of the car in the down direction. Thus by pressing either button 132 or 135 the operator may determine the direction of travel of the car which is then maintained until all landing buttons pressed for that direction have been answered.

When the car has reached the highest floor for which an "up" push button had previously been depressed, and a "down" push button was previously closed, for instance, the button 14b, the operator starts the car in the down direction by closing button 132 thus energizing the coil 130a of relay 130, thereby establishing direction of travel, and then pushing the button 137, whereupon the coil 124a of relay 124 is energized, thus energizing motor switches 105 and 107 in a manner similar to that aforediscussed, and the motor is started in the down direction. As the elevator approaches the second landing a circuit is established from L^1 over button 14b, coil 14h, limit switch 112, contacts 130e, coil 131a, contacts 129b to L^2. This energizes relay 131, thus completing a circuit from L^1 over contacts 107d, 131b, 105d, coil 123a to L^2. In responding, relay 123 opens contact 123c which de-energizes coil 117a of the retiring cam, whereupon the cam opens limit switch contacts 119, thereby de-energizing the main switch 105 and bringing the motor to a stop. This permits opening of the doors, which

opens safety contacts 138, and the car cannot be restarted until all said safety contacts are closed again.

It will be noted that when once started in a given direction by the operator, the car will continue to proceed in that direction to stop on any floor for which buttons have been pressed, but it will not stop on such floors on which buttons for travel in the opposite direction have been depressed, such buttons remaining closed until finally the car moves in the desired direction, when it will stop at the respective floor.

Push button 136 when depressed by the operator energizes relay coil 129^a, said relay when energized opening contacts 129^b, so that the car in passing any floor for which a floor button has been depressed will not respond thereto, as the energization of the relays 128 and 131 is prevented. Thus the operator can by-pass any floor if he so desires.

The operation of car 1 is similar to that of car 2 which has just been described. The system further provides that whichever car first reaches a floor on which a call button has been depressed for the proper direction, will stop in response thereto. For instance, if car 2 on its up travel approaches floor 3, at which button 15^a has been pressed, and reaches said floor before car 1 reaches it, travelling in the same direction, relay coil 128^a is energized to initiate stopping of the car, while at the same time the push button 15^a is released, thus making ineffective the setup for energization of relay 28^a through limit switch 12, which would otherwise cause stoppage of car 1. It is thus apparent that by the latched-in push buttons the selective stoppage of the first car reaching the floor from which a call originates is provided for in a simple and efficient manner.

It is obvious that the system may be extended for any number of cars and any number of floors, and it will also be apparent that the system may be used with a one-car installation by omitting selector switches 12 and 112 and relays 28, 31, 128, 131, and connecting the floor button stations 13 to 16, inclusive, to the proper elements of the remaining selector switches.

The system may, of course, be used in combination with the usual automatically operating doors and various signal devices. It may equally be adapted to various types of power supply and motors and their control.

The system illustrated in Figs. 5 and 6 is a modification of the previously described system and is shown as applied to the control of a single elevator. In this system, whenever a push button, either on a floor or in the car, is pressed to call the car to a different floor from the one on which it is at the time, the car upon closure of the doors will proceed to the next floors for which buttons have been pressed and stop successively at all such floors in the natural order of such floors.

The system comprises a car (not shown) including floor limit switches, the latter being similar to switches 18 to 21 in Fig. 3, and designated together with door switches and other safety switches by the numeral 225, a retiring cam mechanism (not shown) which may be similar to the retiring cam 17, and other conventional accessories of an elevator as will be explained hereinafter. The car is operated by a reversing 3-phase motor 203 which is controlled by a double pole electromagnetic main switch 205 and a pair of double pole electromagnetic reversing switches 206 and 207. The main switch 205 is provided with an energizing coil 205^a, normally open main contacts 205^b and 205^c, and normally open temporarily closed auxiliary contacts 205^d and 205^e. The bridging contact of contacts 205^d is connected to a piston 205^g of a dash pot 205^h, which in turn is mounted on a fixed support. The bridging contact is lifted into engagement with the stationary contacts by an abutment 205^f on the operating rod of switch 205 so that the contacts 205^d are closed when coil 205^a is energized. Upon de-energization, the bridging contact is held in engagement to maintain its circuit temporarily closed until sufficient air has leaked out of the dash pot to permit descent of the piston by gravity and opening of the auxiliary contacts 205^d. The construction and operation of contacts 205^e is the same as that just described, except that the time delay in opening of contacts 205^e is slightly greater than that of contacts 205^d. The reversing switch 206 is provided with an energizing winding 206^a, normally open main contacts 206^b and 206^c, and normally open auxiliary contacts 206^d, 206^e, 206^g, and normally closed auxiliary contacts 206^f. Switch 207 is provided with an energizing winding 207^a, normally open main contacts 207^b and 207^c, and normally open auxiliary contacts 207^e, 207^f and 207^g, and normally closed auxiliary contacts 207^d. There is further provided a relay 208, having an energizing winding 208^a and normally open contacts 208^b, a relay 209 having an energizing winding 209^a, and normally open contacts 209^b, and a relay 210 having an energizing winding 210^a and normally closed contacts 210^b, and normally open contacts 210c.

The system also includes double pole latched-in push button switches 211, 212, 213 and 214, one for each floor, respectively, in the car. These push buttons are similar to those shown in Fig. 4, except that they are equipped with an additional set of normally open contacts, as shown in the diagram. Furthermore, each intermediate landing or floor is equipped with an "up" and a "down" push button switch, while each of the terminal landings is equipped with a single push button switch. These switches are designated in the diagram by the numerals 215 to 220, inclusive. A rotating drum selector switch 221 is similar to switch 10 of Fig. 1, and is connected to the car in the manner shown in Fig. 3. A travelling nut selector switch 222 is similar in construction and operation to the two halves of the selector switch 11 of Figs. 1 and 3. A retiring cam mechanism 224 which may be similar to mechanism 17 shown in Fig. 3 is represented in Fig. 5 by an energizing coil 224^a, the floor contacts which are operated thereby and the safety contacts together with the floor limit switches being designated by the numeral 225, as mentioned heretofore.

The system is connected and operates as follows: Let it be assumed that the car has come to a stop on the second floor and has discharged its passengers. If no push buttons are closed, the car will stay at the floor with all switches 225 closed, except the floor switch of floor 2. If, however, the push button 213 is depressed, to call the car to the third floor, a circuit is established over limit switch 221, contact 207^d, and coil 206^a, whereupon reversing switch 206 is energized to close its main contacts and also contacts 206^d, 206^e and 206^g. This completes a circuit over contact 206^g, contact 210^b and coil

224[a] to L[2] so that the cam is retired to effect completion of a circuit, provided that all of the safety switches 225 are closed. Thus a circuit is completed through switches 225 and coil 205[a] to energize the main switch 205, which closes its contacts to complete the motor circuit, and the motor causes the elevator to travel upward. Switch 205 also completes a maintaining circuit for the coil 206[a] over contacts 205[d], 206[e] and normally closed contacts 207[d]. As the car approaches the third floor, the floor selector 221 opens the circuit feeding coil 206[a], but said circuit is maintained through contacts 205[d], 206[e] and 207[d]. At the same time selector 222 closes a momentary circuit for coil 208[a], and relay 208 closes contacts 208[b] and thus energizes the circuit for coil 210[a]. Relay 210 closes contacts 210[c] and maintains itself and opens contacts 210[b], which de-energizes coil 224[a] so that the retiring cam causes opening of the limit switch (225) at the third floor. This de-energizes the coil 205[a] and the switch 205 disconnects the motor from the line. After a time sufficiently long for a passenger to enter the car and register his call, if desired, the contact 205[d] reopens to de-energize the coil 206[a] of switch 206. When the contact 205[d] opens, and if no more calls have been registered in the established direction of travel, the switch 206 is de-energized. Shortly thereafter contacts 205[e] also open, thus de-energizing relay 210 and preventing its reclosure until the next stop is reached.

If relay 206 is still energized due to the continued closure of push buttons signalling for the car to travel in the previously established direction of travel, de-energization of relay 210 closes contacts 210[b], thus re-establishing an energizing circuit for the retiring cam winding 224[a], which permits closure of the respective floor limit switch 225, thus energizing the main switch 205 to effect operation of the motor as previously explained.

The operation upon closure of any other push button switch is apparent from the foregoing description, as it will also be apparent that having started in a given direction the elevator will stop at all floors in succession for which push buttons have been or are operated for effecting travel in that direction in the manner aforedescribed, and that it will reverse to stop in response to push buttons for the other direction after it has completed its original direction of travel to the last station which has previously called. Operation of a push button in the car will stop the car at the respective floor upon its reaching said floor for the first time.

It will be apparent that the system aforedescribed affords a control wherein calls which are registered remain registered until the elevator stops in response thereto, even if the electric power supply should temporarily fail or if the calls where initiated during such power failure.

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

1. A conveying system, comprising a car, car actuating means, a plurality of landing push button switches, at least one on each landing to be served by said car, a plurality of car push button switches in the car, at least one for each landing, said push button switches being operable to start said car actuating means to move said car to the corresponding landing and being provided with electromagnetically releasable mechanical latching means to retain them in their operated position, and means controlled by said car actuating means to cause the latter to respond in a predetermined order to the control by said push button switches, irrespective of the order of actuation of the latter, said last named means including means to energize said latching means to cause return of the respective switches to their inoperative position in said order and thereby stop said car actuating means when said car reaches the respective landing.

2. An elevator system comprising, an elevator car, a reversible motor, a winch connected to said motor and said car to move the latter between a plurality of landings, a plurality of landing push button switches, at least one at each landing, a plurality of car push button switches in the car, at least one for each landing, said push button switches being operable to energize said motor for moving said car to the corresponding landing and being provided with electromagnetically releasable mechanical latching means to retain them in their operated position, means controlled by said winch to effect energization of said latching means to release said push button switches and interrupt energization of said motor when said car approaches the corresponding landing, and other means controlled by said winch and cooperating with said push button switches to selectively control the energization of said motor so as to operate it in the same direction to effect its stoppage at the respective landings in a predetermined order, independent of the order of actuation of said switches.

3. An elevator system comprising, an elevator car, a reversible motor, a winch connected to said motor and said car to move the latter between a plurality of landings, electromagnetic control means for said motor, a plurality of landing push button switches, at least one at each landing, a plurality of car push button switches in the car, at least one for each landing, said push button switches being operable to energize said electromagnetic control means to selectively start said motor in opposite directions and being provided with electromagnetically releasable mechanical latching means to retain them in their operated position, a floor selector coupled to said winch and arranged to energize said latching means to release said push button switches and thereby effect de-energization of said motor when said car approaches the corresponding landing, and commutating means coupled to said winch and connected in circuit with said push button switches to selectively control said electromagnetic control means to cause said motor to move the car in the direction to effect its stoppage at the respective landings in a predetermined order, which is independent of the order of actuation of said switches.

4. An elevator system, comprising, an elevator car, a reversible motor, a winch connected to said motor and said car to move the latter between a plurality of landings, a plurality of landing push button switches, at least one at each landing, a plurality of car push button switches in the car, at least one for each landing, said push button switches being operable to energize said motor for moving said car to the corresponding landing and being provided with electromagnetic latching means to retain them in their operated position, means controlled by said winch to effect energization of said latching means to release said push button switches and interrupt energization of said motor when said car approaches the corresponding landing, other means controlled by said winch and cooperating

with said push button switches to selectively control the energization of said motor so as to operate it in the direction to effect its stoppage at the respective landings in a predetermined order, independent of the order of actuation of said switches, and a push button switch in the car adapted to prevent response of any one of said releasing means at will.

5. An elevator system comprising, an elevator car, a hoisting machine for said car, including a reversible motor and adapted to move said car between a plurality of landings, an electromagnetic reversing switch for energizing said motor, a plurality of landing push button switches, at least one at each landing, a plurality of car push button switches in the car, at least one for each landing, said push button switches being operable to commutate an energizing circuit for said reversing switch to energize said motor for movement of said car to the corresponding landing and being provided with individual electromagnetic latching means to selectively retain them in their operated position and upon energization to release them therefrom, a commutator controlled by said car and adapted to energize said latching means and select said push button switches in a predetermined order independent of the order of their operation, a second commutator controlled by said car and connected in circuit with the energizing circuit of said reversing switch and arranged to de-energize the latter in said given order at the landings corresponding to the landing of the respective push button switches, and switch means to complete said energizing circuit of said reversing switch to start said car.

6. An elevator system comprising, an elevator car, a reversible motor, a winch connected to said motor and said car to move the latter between a plurality of landings, a plurality of landing push button switches, at least one at each landing, a plurality of car push button switches in the car, at least one for each landing, said push button switches being operable to permit energization of said motor for movement of said car to the corresponding landing and being provided with electromagnetic latching means to selectively retain them in their operated position and to release them therefrom, commutating means controlled by said winch and cooperating with said latching means to effect release of said switches in a predetermined order independent of the order of operation of said switches, other commutating means controlled by said winch and in circuit with said push buttons and adapted to effect energization of said motor and de-energization thereof at corresponding landings in said order, and a push button switch in said car adapted when operated to complete the circuit for effecting energization of said motor to start the latter, and means to by-pass said last named switch after response of said motor energizing means.

7. An elevator system comprising, a plurality of cars, car actuating means for each car, a plurality of floor push button switches, at least one on each floor to be served by said cars, a plurality of car push button switches, at least one for each floor, in each car, said push button switches being provided with electromagnetically releasable mechanical latching means to retain them in their operated position, means in each car adapted to start said car in response to the operation of any of said floor push button switches and in response to the operation of any of said car push button switches in the respective car, which have been operated, means controlled by the actuating means of each car to cause the latter to respond in a predetermined order irrespective of the order of actuations of said push button switches to the control by the latter, and other means controlled by the actuating means of each car to energize said latching means of all of said floor push button switches and of the push button switches of said car to cause their return to their inoperative position in said predetermined order to thereby stop the actuating means of said car when said car approaches the respective floors.

8. An elevator system, comprising, a plurality of elevators, each comprising a car, car actuating means, a plurality of car buttons corresponding to the number of floors, said car buttons being operable to start said car actuating means to move said car to the corresponding floor and being provided with electromagnetically releasable mechanical latching means to retain them in their operated position, and means controlled by said car actuating means to cause the latter to respond in a predetermined order irrespective of the order of actuation of said car buttons to the control by the latter, said last named means including means to energize said latching means to cause return of the respective car buttons to their inoperative position in said predetermined order and thereby stop said car actuating means when said car approaches the respective floors, a plurality of floor call buttons, at least one on each floor to be served by said cars, and operable to start any of said plurality of car actuating means to move any one of said cars to the corresponding floor and being provided with electromagnetically releasable mechanical latching means to retain them in their operated position, and means controlled by each of said car actuating means to cause the latter to respond in said predetermined order to the control by said floor call buttons and to cause return of the respective car buttons to their inoperative position in said order and thereby stop the respective car actuating means when the corresponding car approaches the respective floors.

9. An elevator control system, comprising a car, car actuating means, a plurality of landing push button switches, at least one on each landing to be served by said car, a plurality of car push button switches in the car, at least one for each landing, said push button switches being operable to start said car actuating means to move said car to the corresponding landing and being provided with electromagnetically releasable mechanical latching means to retain them in their operated positions, and stopping means including means to energize said latching means to cause return of the respective switches to their inoperative positions and thereby stop said car actuating means when said car reaches the respective landing, said stopping means being controlled by said car actuating means and depending upon the sequence of operation of said push button switches and the position of the car for determining the initial direction of travel of said car, said stopping means being adapted during travel of the car in said direction to permit preselection by said push button switches to effect stoppage of said car prior to its arrival at its initially selected destination, and to effect travel of the car to a point or points beyond said destination, while insuring against reversal of the direction of travel of the car prior to arrival

thereof at the most remote preselected point in said direction of travel.

10. An elevator control system comprising, an elevator car, a reversible motor, a winch connected to said motor and said car to move the latter between a plurality of landings, a plurality of landing push button switches, at least one at each landing, a plurality of car push button switches in the car, at least one for each landing, said push button switches being operable to energize said motor for moving said car to the corresponding landing and being provided with electromagnetically releasable mechanical latching means to retain them in their operated positions, and stopping means including means to energize said latching means to cause return of the respective switches to their inoperative positions and thereby interrupt energization of said motor when said car approaches the corresponding landing, said stopping means being controlled by said winch and depending upon the sequence of energization of said push button switches and the position of said car for determining the initial direction of travel of said car, said stopping means being adapted during travel of the car in said direction to permit preselection by said push button switches to effect stoppage of the car prior to its arrival at its initially selected destination, and to effect travel of the car to a point or points beyond said destination, while insuring against reversal of the direction of travel of the car prior to arrival thereof at the most remote preselected point in said direction of travel.

EIVIND U. LASSEN.