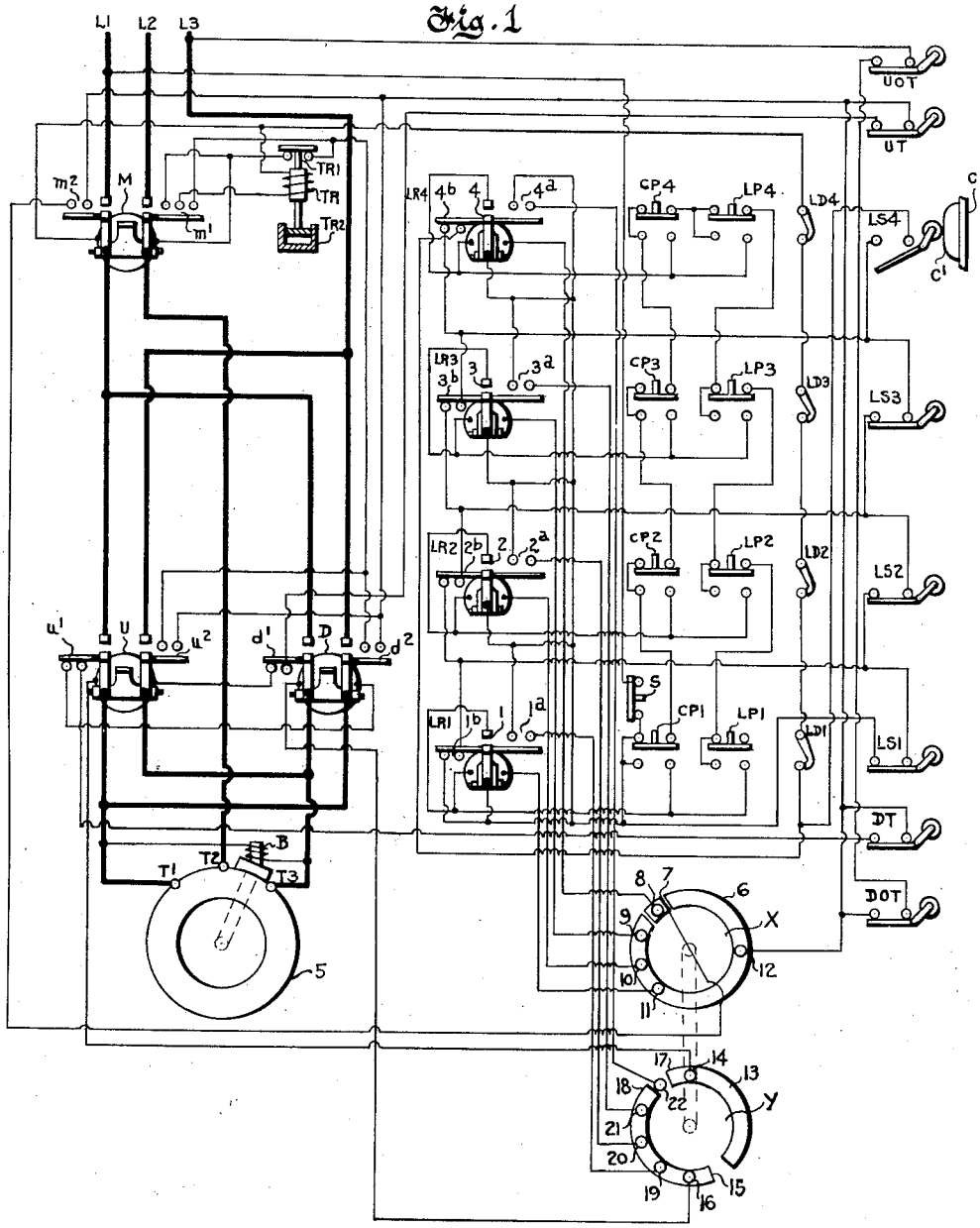
Sept. 30, 1930. E. W. SEEGER 1,777,131

PUSH BUTTON ELEVATOR CONTROL SYSTEM

Filed May 13, 1927 2 Sheets-Sheet 1

Fig. 1



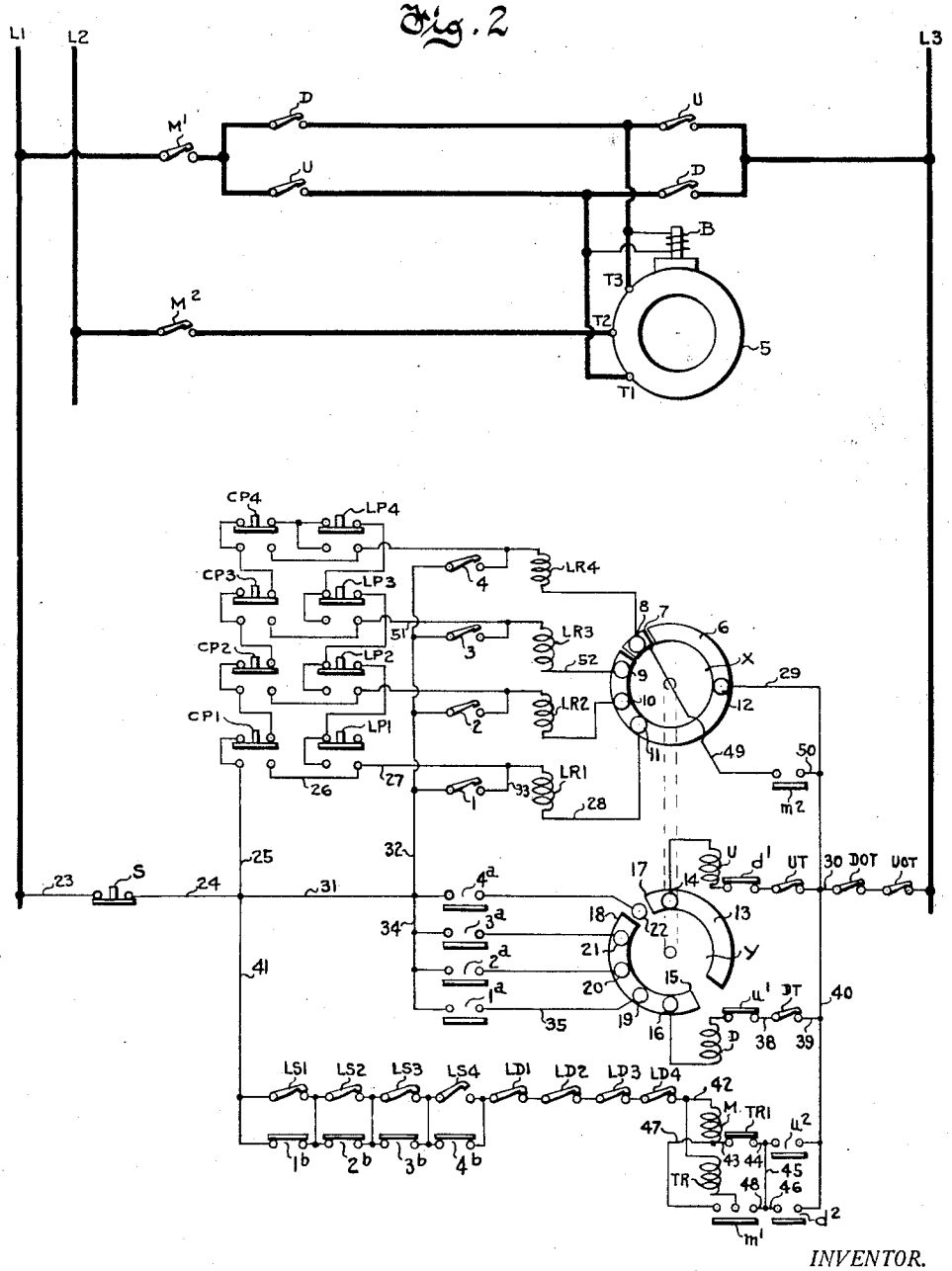
INVENTOR.
Edwin. W. Seeger.
BY Frank H. Hubbard
ATTORNEY

Sept. 30, 1930. E. W. SEEGER 1,777,131

PUSH BUTTON ELEVATOR CONTROL SYSTEM

Filed May 13, 1927 2 Sheets-Sheet 2

Fig. 2



INVENTOR.

BY Edwin W. Seeger.
Frank H. Hubbard

ATTORNEY

Patented Sept. 30, 1930 1,777,131

UNITED STATES PATENT OFFICE

EDWIN W. SEEGER, OF SOUTH MILWAUKEE, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CUTLER-HAMMER, INC., A CORPORATION OF DELAWARE

PUSH-BUTTON ELEVATOR-CONTROL SYSTEM

Application filed May 13, 1927. Serial No. 191,076.

This invention relates to improvements in push button elevator control systems.

An object of the invention is to provide an improved and simplified control system of the above character whereby momentary depression of any one of the push buttons will effect presetting of a control circuit for immediately or eventually calling or directing the elevator car to the desired point.

Another and more specific object is to provide such a control system wherein any number of control circuits may be preset for completion in a predetermined sequence while providing for most efficient operation of the controlled car.

Another object is to provide such a control system wherein after initial selection of a desired direction of travel of the car the latter cannot be operated in the reverse direction until the most remote preselected point in the first mentioned direction of travel has been reached by the car.

Another object is to provide means for effecting automatic and sequential stopping of the car at any preselected point or points ahead of the same during travel thereof in one direction.

Another object is to provide means whereby in the absence of manual intervention such automatic stopping will be of relatively short duration.

Another object is to provide a control system of the character aforementioned whereby after travel of the car to the most remote preselected point in a given direction the same may thereafter be caused to travel in the opposite direction to a then preselected or previously preselected point, but subject to automatic stopping at intermediate preselected points in the line of travel of the car.

Another object is to provide such a control system wherein operation of the car is at all times dependent upon simultaneous closure of all landing doors.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate one embodiment of the invention which will now be described, it being understood that various changes in the details of construction and operation of the control system may be effected without departing from the scope of the appended claims.

In the drawings, Figure 1 is a schematic and diagrammatic view of a control system embodying the invention, and

Fig. 2 is an across-the-line diagram of the circuits and connections illustrated in Fig. 1.

Referring first to the diagram of Fig. 1 the numeral 5 designates a motor of the polyphase induction type, but it is to be understood that any other suitable type of motor may be employed if desired. As shown, motor 5 is adapted to be supplied with energy from lines L^1, L^2 and L^3 upon closure of a main switch M and one of the double-pole reversing switches U or D, respectively. As hereinafter more fully described switches U and D are respectively provided with normally closed auxiliary contacts u^1 and d^1 which insure against energization and closure of either one of said switches during closure of the other of the same. Energization and closure of main switch M is dependent upon closure of the normally open contacts u^2 or d^2 of either of the switches U or D. Initial energization of the operating winding of switch M is further dependent upon closure of the normally closed contacts TR^1 of a timing relay TR, the operation of which will be more fully explained hereinafter; whereas upon closure of switch M the normally open auxiliary contacts m^1 thereof provide a maintaining circuit independently of said timing relay contacts TR^1. It may be noted here that the winding of relay TR is energized and the contacts TR^1 opened immediately upon closure of auxiliary contacts m^1 of switch M; whereas upon interruption of the maintaining circuit of switch M as hereinafter described the contacts m^1 in reopening effect interruption of the energizing circuit of relay TR, and the contacts TR^1 of the latter tend to close, but subject to a predetermine time delay as provided by the down-dashing dashpot TR^2.

Motor 5 is connected in any suitable or well known manner with the elevator car for driving the latter; said car being designated in general by the fragment C, and being provided

with a cam surface C^1 or the like to co-operate with suitable control switches located in the elevator hatchway.

I have shown my invention as applied to control of an elevator to be operated in a hatchway having four landings, but it is to be understood that the same is likewise applicable in installations involving a greater or lesser number of landings.

The control instrumentalities include electro-responsive relays corresponding to each landing, said relays being respectively designated in the drawing as LR^1, LR^2, LR^3, LR^4. Said relays are respectively provided with normally open main contacts 1, 2, 3 and 4, which are adapted when closed to provide maintaining circuits therefor; normally open auxiliary contacts 1^a, 2^a, 3^a and 4^a; and normally closed auxiliary contacts 1^b, 2^b, 3^b and 4^b. Initial energization of relay LR^1 is dependent upon momentary depression of push button switch LP^1 located at the bottom landing, or momentary depression of the corresponding push button switch CP^1 located within the car. Similarly, initial energization of relays LR^2, LR^3, and LR^4 is dependent upon temporary depression of landing push button switches LP^2, LP^3 or LP^4, respectively, or the corresponding push button switches CP^2, CP^3 or CP^4 located within the car.

I have provided means for rendering de-energization of the relays individually dependent upon arrival of the car at the respective landings corresponding to such relays, through de-energization of main switch M and re-opening of auxiliary contacts m^2 of the latter. Said means may comprise a drum X which is connected in any suitable manner (not shown) to be driven in a direction and to a degree corresponding to the direction and degree of movement of the car. Said drum is provided with a contact segment 6 extending substantially around the periphery thereof and having an electrically independent segment 7 interposed between the ends of the first mentioned segment but spaced therefrom.

As shown the various elements are in the positions respectively assumed when the car is located or positioned at the fourth landing, and with all of the relays LR^1, LR^2, LR^3 and LR^4 de-energized. Under these conditions segment 7 will be in engagement with a contactor 8 which corresponds to the aforementioned position of the car; said contactor being included in the energizing circuit of the winding of relay LR^4, and such circuit being interrupted through open positioning of auxiliary contacts m^2 of main switch M. On the other hand, contactors 9, 10 and 11, connected in circuit with the windings of relays LR^3, LR^2 and LR^1 respectively, will be engaged by segment 6, whereas the latter is at all times adapted to engage a contactor 12. Contactor 12 is normally connected with line L^3 through normally closed overtravel limit switch DOT located adjacent to the bottom landing and normally closed overtravel limit switch UOT located adjacent to the top landing. Travel of the car in a downward direction is also limited by a normally closed terminal switch DT located in the hatchway adjacent to the bottom landing, and travel of the car in an upward direction is limited by a normally closed terminal switch UT located in the hatchway adjacent to the upper landing. The construction and purpose of limit switches DOT, DT, UOT and UT is well understood in this art and hence further description thereof is deemed unnecessary.

Normally closed limit switches LS^1, LS^2, LS^3 and LS^4 are located in the hatchway adjacent to the first to fourth landings, respectively; said switches having projecting portions located in the path of a cam or projection C^1 on the car C to be engaged thereby. the contacts of the respective limit switches LS^1, LS^2, LS^3 and LS^4 are normally shunted by the auxiliary contacts 1^b, 2^b, 3^b and 4^b of relays LR^1, LR^2, LR^3 and LR^4, respectively.

I have also provided means for automatically preselecting the direction of travel of the car. Said means as shown may comprise a drum Y positively geared to or otherwise connected with drum X for movement in a direction and to a degree corresponding to the direction and degree of movement of the car. Drum Y is provided with a segment 13 to be at all times in engagement with a contactor 14 included in the energizing circuit of switch U, and a segment 15 to be at all times in engagement with a contactor 16 included in the energizing circuit of switch D. Segments 13 and 15 are electrically independent and the ends 17 and 18 thereof are spaced apart sufficiently to permit disengagement thereof from the respective contactors 19, 20, 21 or 22 upon positioning of the car at the first, second, third or fourth landing.

The respective landing door switches LD^1, LD^2, LD^3 and LD^4 are included in circuit in series with the operating winding of main switch M, thus requiring closure of all of the former prior to energization and closure of the latter. A safety switch S may be located in the car for effecting immediate stopping of the car at any point in its travel. A suitable form of electromagnetically releasable brake may be provided, the brake releasing winding B as shown being connected across lines L^1 and L^2 between the reversing switches U, D and terminals T^1, T^3 of the motor.

Operation of the control system will now be described with particular reference to the diagram of Fig. 2. Thus with the car positioned at the fourth landing as aforenoted, and with all of the relays LR^1 to LR^4 de-energized so that the respective auxiliary contacts 1^b to 4^b of the latter are closed, the

contacts of limit switch LS^4 will be open due to the action of cam C^1 on the car (Fig. 1), whereas all of the other limit switches will be in their normally closed positions. Moreover, the brake B will be applied due to open positioning of main switch M and reversing switches U and D.

A party in the car desiring to direct the same to the first landing will momentarily depress the car push button CP^1, which completes an energizing circuit for the winding of relay LR^1. Said circuit may be traced from line L^1 by conductor 23 through the safety switch S located within the car, conductors 24 and 25, through the normally open lower contacts of push button switch CP^1, conductors 26 and 27 through the winding of said relay LR^1, conductor 28 to contactor 11, segment 6 of drum X to contactor 12, conductors 29 and 30, and thence through down overtravel limit switch DOT and up overtravel limit switch UOT to line L^3. Relay LR^1 thereupon closes to provide a maintaining circuit for itself independently of push button switch CP^1, said maintaining circuit extending from line L^1 to conductor 24 as just traced, thence by conductors 31 and 32 through main contacts 1 of said relay, conductor 33 to conductor 27, and thence through said winding to line L^3 as previously traced.

Relay LR^1 in closing effects closure of its normally open auxiliary contacts 1^a, thereby completing an energizing circuit for the winding of switch D, which circuit may be traced from line L^1 to conductor 31, as aforedescribed, thence by conductor 34 through said contacts 1^a, conductor 35 to contactor 19 and segment 15 of drum Y, to contactor 16 through the winding of said switch D, thence through the normally closed auxiliary contacts u^1 of switch U, conductor 38 through the normally closed contacts of limit switch DT, conductors 39 and 40 to conductor 30, and thence to line L^3 as previously traced. Relay LR^1 in closing also effects opening of its normally closed auxiliary contacts 1^b for a purpose hereinafter described.

Switch D in closing effects closure of its normally open auxiliary contacts d^2, thereby completing an energizing circuit for the winding of main switch M. Said circuit may be traced from line L^1 to conductor 24, by conductor 41 through the normally closed contacts of limit switch LS^1 (contacts 1^b having been opened in the manner aforedescribed), thence through the normally closed contacts of limit switches LS^2 and LS^3, and in shunt with the latter through the normally closed auxiliary contacts 2^b and 3^b of relays LR^2 and LR^3, thence through the normally closed auxiliary contacts 4^b of relay LR^4 (the contacts of limit switch LS^4 being opened through the action of cam C^1 when the car is positioned at the fourth landing), thence through landing door switches LD^1 to LD^4 in series, conductor 42 through the winding of switch M, conductor 43 through the normally closed contacts TR^1 of timing relay TR, conductors 44, 45 and 46 through said auxiliary contacts d^2, and thence by conductor 40 to line L^3 as previously traced. Switches D and M being thus closed, an energizing circuit for motor 5 is provided to effect movement of the car in a downward direction, such power circuit being obvious. It will be noted that immediately upon completion of a circuit for motor 5 the winding of brake B is energized, thus effecting release of the latter. Closure of main switch M effects closure of its normally open auxiliary contacts m^1, thus maintaining an energizing circuit for the winding of the former independently of the contacts TR^1 of relay TR,—the shunt around said last mentioned contacts extending from one end of said winding by conductor 47 through said contacts m^1, and by conductor 48 to conductor 46 (or to conductor 45 under conditions of preselected upward travel of the car as hereinafter set forth. Moreover, upon closure of said auxiliary contacts m^1 an energizing circuit is provided for the winding of relay TR, said circuit providing for connection of windings TR and M in parallel, as will be obvious. Upon completion of the energizing circuit of winding TR contacts TR^1 will be immediately opened, whereas upon de-energization of said winding in the manner hereinafter described said contacts will be permitted to reclose, but subject to a predetermined delay through the action of dashpot TR^2.

Closure of switch D in the manner aforedescribed effects opening of the normally closed auxiliary contacts d^1 of the latter to insure against simultaneous completion of an energizing circuit for the winding of switch U, whereas switch D when energized and closed, through closure of the normally open auxiliary contacts 1^a of relay LR^1 in the manner aforedescribed, will remain closed until the car reaches the bottom or first landing. Thus assuming downward movement of the car under the conditions aforedescribed, the energizing circuit for main switch M will be maintained until the car arrives at the first landing, whereupon the cam C^1 or other projecting portion of the car will effect opening of the contacts of limit switch LS^1 located adjacent to said landing, thereby interrupting the energizing circuit of main switch M which opens to disconnect the motor from the line and to permit automatic application of the brake. At the same time drum Y will have been moved in a counterclockwise direction to a position wherein segment 15 is disengaged from contactor 19, thereby interrupting the energizing circuit of switch D to permit re-

closure of the normally closed auxiliary contacts d^1 of the latter.

Drum X will also have been moved in a counterclockwise direction to a position wherein segment 6 has moved out of engagement with contactor 11 and segment 7 has moved into engagement with the latter. The alternative maintaining circuit for relay LR^1, which then extends from contactor 11 to segment 7, by conductor 49 through the normally open auxiliary contacts m^2 of switch M and conductor 50 to conductors 29 and 30, will be interrupted upon opening of said auxiliary contacts m^2, thus effecting reopening of relay LR^1 and reclosure of the auxiliary contacts 1^b of the latter.

The manner of completing the energizing circuit for relay LR^1 by momentarily depressing the push botton LP^1 will be apparent from the foregoing description, it being noted that the initial circuit would then extend from conductor 25 through the upper contacts of push button switches CP^1 to CP^4 and LP^4 to LP^2 in series, and thence through the lower contacts of push button switch LP^1 to conductor 27.

If, after presetting the control system in the manner aforedescribed to effect travel of the car from the fourth to the first landing, it is desired to stop the car at one or more of the intermediate landings, such stopping my be effected by momentarily depressing one or the other of the push buttons CP^3 or CP^2 or both within the car, or one or the other or both of the landing push buttons LP^3 and LP^2. Said push buttons will not be effective for reversing the direction of travel of the car until the most remote preselected landing in the downward direction of travel has been reached (which would be the first landing under the conditions assumed); whereas if the respective intermedite landings have not been passed by the downwardly traveling car prior to depression of said push buttons, the control will be automatically preset to effect stopping of the car.

More specifically, assuming that the car has started to travel downwardly from the fourth to the first landing, and that a party at the third landing also desires to ride to a lower landing. If such party momentarily depresses the push button LP^3 an energizing circuit for relay LR^3 will be completed, said circuit extending from line L^1 through the upper contacts of push buttons CP^1 to CP^4 and LP^4 in series and through the lower contacts of push button switch LP^3, by conductor 51 through the winding of relay LR^3, conductor 52 to contactor 9 of drum X, and thence through segment 6 and contactor 12 to line L^3 as previously traced. Upon closure of relay LR^3 the normally closed auxiliary contacts 3^b thereof are opened, so that the car in traveling downwardly will effect opening of the contacts of the limit switch LS^3 through engagement of the cam C^1 with the latter, thus interrupting the energizing circuit of the winding of switch M to disconnect the motor from the line and permit automatic application of the brake.

In this manner the car is stopped and the party at the third landing may open the landing door and enter the car, and upon reclosure of such door the control circuits will be automatically completed to effect continued movement of the car in a downward direction. If the landing push button LP^2 or the car push button CP^2 corresponding thereto has been previously depressed to effect energization of relay LR^2 the normally closed auxiliary contacts 2^b of the latter will have been opened to render the energizing circuit of main switch M subject to control by the contacts of limit switch LS^2 located adjacent to the second landing. The car in passing downwardly to the second landing will effect opening of the contacts of said switch LS^2, and the stopping and starting operations last described will be repeated.

Thus by presetting the various landing relays for control of the operation of the car the latter may be stopped at any landing between its instant location and the original destination thereof. However, it will be understood that if the car has traveled beyond any one or more of the landings in a given direction prior to energization of the landing relays corresponding thereto, such relays will not become effective until the most remote preselected landing in such direction of travel has been reached by the car; whereas such relay or relays will nevertheless be closed and will remain closed to effect automatic return movement of the car after completion of the predetermined travel thereof in one direction.

For example, if the car in traveling from the fourth to the first landing has already passed the third landing when the landing push button LP^3 is depressed, an energizing circuit for said relay will be completed and maintained in the manner aforedescribed, and the normally closed auxiliary contacts 3^b thereof will be opened and the normally open auxiliary contacts 3^a thereof will be closed. Obviously, however, the contacts of limit switch LS^3 will not be opened until the car again reaches the third landing through travel thereof in the reverse direction. Moreover, if the car has passed downwardly beyond the third landing the segment 13 of drum Y will be in engagement with contactor 21, so that closure of auxiliary contacts 3^a of relay LR^3 would tend to complete an energizing circuit for the winding of reversing switch U. Due to energization and closure of switch D, the normally closed auxiliary contacts d^1 thereof will be opened, thus insuring against completion of the energizing circuit of said switch U. When the lowest preselected landing in the downward direction

of travel of the car has been reached, however, the segment 15 of drum Y will have moved out of engagement with the corresponding contactor 21, 20 or 19 thereby interrupting the energizing circuit for the winding of switch D, which opens to permit reclosure of its auxiliary contacts d^1. The energizing circuit for the winding of switch U which was preset as aforedescribed will then be completed, and upon reclosure of main switch M a motor circuit will be completed to effect upward travel of the car.

As aforestated the initial energizing circuit for the winding of main switch M is interrupted immediately upon energization of the winding of timing relay TR, through opening of the contacts TR^1 of the latter, a maintaining circuit for the winding of switch M, however, having been completed through closure of its auxiliary contacts m^1. Moreover, upon de-energization of switch M and consequently of relay TR, the contacts TR^1 of the latter are held open through the action of dashpot TR^2 for a predetermined period (which in practice is several seconds) to permit opening of the proper landing door,—which then requires reclosure prior to continued automatic control of operation of the car. If for any reason the landing door is not opened the car will be stopped for only the aforementioned short period and upon reclosure of contacts TR^1 of relay TR the energizing circuit of the winding of main switch M will be immediately completed if either of the reversing switches U or D and their respective auxiliary contacts u^2 or d^2 are closed.

By the provision of the separate segment 7 on drum X, I insure interruption of the maintaining circuits of the relays LR^1, LR^2, LR^3 or LR^4, as the case may be, when the car in traveling reaches the respective landing, with resultant de-energization of main switch M and opening of its auxiliary contacts m^2. When the car is located at any landing the car or landing push buttons corresponding to such landing are ineffective for completing the energizing circuit of the corresponding landing relay, until the energizing circuit of main switch M has been completed through the action of another of such landing relays, with resulting closure of auxiliary contacts m^3.

While I have particularly described the control system under conditions of travel of the car in a downward direction, it will be understood that control of the car for effecting or during travel thereof in an upward direction is in all respects similar to that described, and hence further description thereof is deemed unnecessary.

While I have shown an arrangement of push button switches to provide for preferential control by the switches located within the car, it will be obvious to those skilled in the art that if desired the normally closed upcontacts of the several push button switches may be short-circuited, thus permitting simultaneous energization of the various landing relays.

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

1. In a push button elevator control system, in combination, push button switches at the respective landings and corresponding push button switches within the car, an electro-responsive relay for each landing, means for rendering initial energization of the respective relays subject to control by the push button switches corresponding thereto, means for maintaining the energizing circuits of said relays irrespective of the instantaneous position or direction of travel of the car pending arrival of the car at the respective landings, and means dependent upon the sequence of energization of said relays and the relative position of the car for rendering the respective relays either immediately or ultimately effective for controlling the direction of travel and destination of the car.

2. In a push button elevator control system, in combination, push button switches at the respective landings and corresponding push button switches within the car, electro-responsive relays respectively adapted when energized to preselect a control circuit for effecting travel of the car in either direction to one of said landings, means for rendering initial energization of the respective relays subject to control by the push button switches corresponding thereto, means for maintaining energization of said relays independently of said push button switches, means dependent upon the sequence of energization of said relays and the position of the car for determining the initial direction of travel, said means comprising normally closed contacts on each of said relays and normally closed limit switches respectively connected in parallel with said contacts, said limit switches being located in the path of the car and adjacent to the respective landings and destination of the latter, and means adapted during travel of the car in said direction to permit preselection of control circuits for effecting automatic stopping of the car prior to its arrival at said destination or 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.

3. In a push button elevator control system, in combination, push button switches at the respective landings and corresponding push button switches within the car, electro-responsive relays respectively adapted when energized to preselect a control circuit for effecting travel of the car in either direction to one of said landings, means for rendering

initial energization of the respective relays subject to control by the push button switches corresponding thereto, means for maintaining energization of said relays independently of said push button switches, means dependent upon the sequence of energization of said relays and the position of the car for determining the initial direction of travel and destination of the latter, and means adapted during travel of the car in said direction to permit preselection of control circuits for effecting automatic stopping of the car prior to its arrival at said destination or 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, said means including a plurality of rotary selector contact devices to be driven in a direction and to a degree corresponding with the direction and degree of movement of the car.

4. In a push button elevator control system, in combination, push button switches at the respective landings and corresponding push button switches within the car, electro-responsive relays respectively adapted when energized to preselect a control circuit for effecting travel of the car in either direction to one of said landings, means for rendering initial energization of the respective relays subject to control by the push button switches corresponding thereto, means for maintaining energization of said relays independently of said push button switches, means dependent upon the sequence of energization of said relays and the position of the car for determining the initial direction of travel and destination of the latter, means adapted during travel of the car in said direction to permit preselection of control circuits for effecting automatic stopping of the car prior to its arrival at said destination or 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, said means including a pair of rotary selector contact devices to be driven in a direction and to a degree corresponding with the movement of the car, and a plurality of limit switches located in the path of the car and cooperating with said relays for effecting automatic stopping of the car at said preselected landings.

5. In a control system for electrically operated elevators, in combination, a reversible driving motor for the elevator car, push button switches located at the respective landings and corresponding push button switches within the car, a plurality of electro-responsive relays each adapted when energized to preselect a control circuit for the motor for effecting travel of the car in either direction to one of said landings, initial energization of the respective relays being subject to control by the push button switches corresponding thereto, means for maintaining the respective relays energized independently of said push button switches pending arrival of the car at the landings corresponding thereto, an electro-responsive main switch for the circuit of said motor and a pair of electro-responsive reversing switches for selectively controlling the direction of operation thereof, means dependent upon the sequence of energization of said relays and the initial position of the car for determining the initial direction of travel and destination of the car, and means including said relays for effecting stopping of the car at any landing in its path during travel thereof in said initial direction and for insuring against reversal of the direction of travel thereof prior to arrival thereof at the most remote preselected point in said direction of travel, said means also including means for subjecting said reversing switches to control by said relays jointly and for effecting stopping of said motor independently of said reversing switches.

6. In a control system for electrically operated elevators, in combination, a reversible driving motor for the car, an electro-responsive main switch and a pair of electro-responsive reversing switches associated therewith for selectively controlling the direction of operation of said motor, means for controlling response of said main switch and said reversing switches, said means comprising an electroresponsive relay corresponding to each landing and a plurality of selector elements driven in synchronism with the car, said selector elements being adapted to cooperate with said relays to preselect the initial direction of travel of the car, means also cooperating with said relays for preselecting the initial destination of the car, said last mentioned means comprising normally closed limit switches located in the path of the car adjacent to the respective landings and said relays having normally closed contacts connected in parallel therewith, and a plurality of push button switches within the car and at the respective landings for initially effecting response of said relays respectively.

7. In a control system for electrically operated elevators, in combination, a reversible driving motor for the car, an electro-responsive main switch and a pair of electro-responsive reversing switches associated therewith for selectively controlling the direction of operation of said motor, means for controlling response of said main switch and said reversing switches, said means comprising an electro-responsive relay corresponding to each landing and a plurality of selector elements driven in synchronism with

the car, said selector elements being adapted to cooperate with said relays to preselect the initial direction of travel of the car, means also cooperating with said relays for preselecting the initial destination of the car, said last mentioned means comprising normally closed limit switches located in the path of the car adjacent to the respective landings and said relays having normally closed contacts connected in parallel therewith, a plurality of push button switches within the car and at the respective landings for initially effecting energization of said relays respectively, energization of said relays being thereafter maintained independently of said push button switches pending arrival of the car at the landings corresponding thereto.

8. In a push button elevator control system, in combination, an elevator car, an electric motor for driving the same, an electroresponsive main switch and electroresponsive reversing switches operable selectively to control the direction of operation of said motor, means for effecting energization of either of said reversing switches to preselect the initial direction of operation of said motor, said means comprising an electroresponsive relay each landing and push button control means therefor, means adapted upon energization of either of said reversing switches to complete an energizing circuit for said main switch, and means for maintaining said last mentioned energizing circuit pending arrival of the car at a predetermined landing, said means comprising limit switches located in the path of the car adjacent to the respective landings, said limit switches having normally closed contacts connected in series with each other in said energizing circuit, and said relays having normally closed auxiliary contacts also connected in said energizing circuit in series with each other and in parallel with the contacts of the respective limit switches.

9. In a push button elevator control system, in combination, an elevator car, an electric motor for driving the same, control means for the motor, said means comprising an electroresponsive relay for each landing and control means therefor comprising push button switches at the respective landings and corresponding push button switches within the car, a plurality of rotary selector elements driven in synchronism with the car and cooperating with said relays to preselect the initial destination of said car, means comprising a normally closed limit switch located in the path of the car adjacent to each landing and tending when opened to effect stopping of the car, and said relays each having normally closed auxiliary contacts connected in shunt with the respective limit switches, whereby upon energization of any of said relays the corresponding limit switches are rendered effective for stopping the car.

10. In a push button elevator control system, in combination, an elevator car, an electric motor for driving the same, an electroresponsive main switch and electroresponsive reversing switches operable selectively to control the direction of operation of said motor, means for effecting operation of said electroresponsive switches, said means comprising an electroresponsive relay for each landing and corresponding push buttons within the car and at the respective landings for effecting energization of said relays selectively, means responsive to operation of one of said push buttons and dependent upon the relative position of the car to predetermine the initial destination of said car, said means comprising rotary selector mechanism operable in synchronism with the car and cooperable with the respective relays to initially effect energization of one of said reversing switches, means adapted upon closure of said reversing switch to complete an energizing circuit for said main switch, means for maintaining said energizing circuit pending arrival of the car at a predetermined landing, said means comprising a normally closed limit switch at each landing and normally closed auxiliary contacts on the relays corresponding thereto, the respective limit switches and auxiliary contacts being connected in parallel with each other and in series with the main switch winding, whereby interruption of the aforementioned energizing circuit of the latter is rendered dependent upon simultaneous open positioning of the limit switch and the auxiliary contacts corresponding to said predetermined landing.

In witness whereof, I have hereunto subscribed my name.

EDWIN W. SEEGER.

CERTIFICATE OF CORRECTION.

Patent No. 1,777,131. Granted September 30, 1930, to

EDWIN W. SEEGER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, line 32, for the word "my" read may, and line 42, for the misspelled word "intermedite" read intermediate; page 5, claim 2, lines 106 to 112 inclusive, strike out the words "said means comprising normally closed contacts on each of said relays and normally closed limit switches respectively connected in parallel with said contacts, said limit switches being located in the path of the car and adjacent to the respective landings" and insert same to follow the word "travel"; line 122, of same claim; page 7, line 28, claim 8, after "relay" insert the word "for"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of January, A. D. 1931.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)