

Nov. 22, 1949

J. DI GIOVANNI

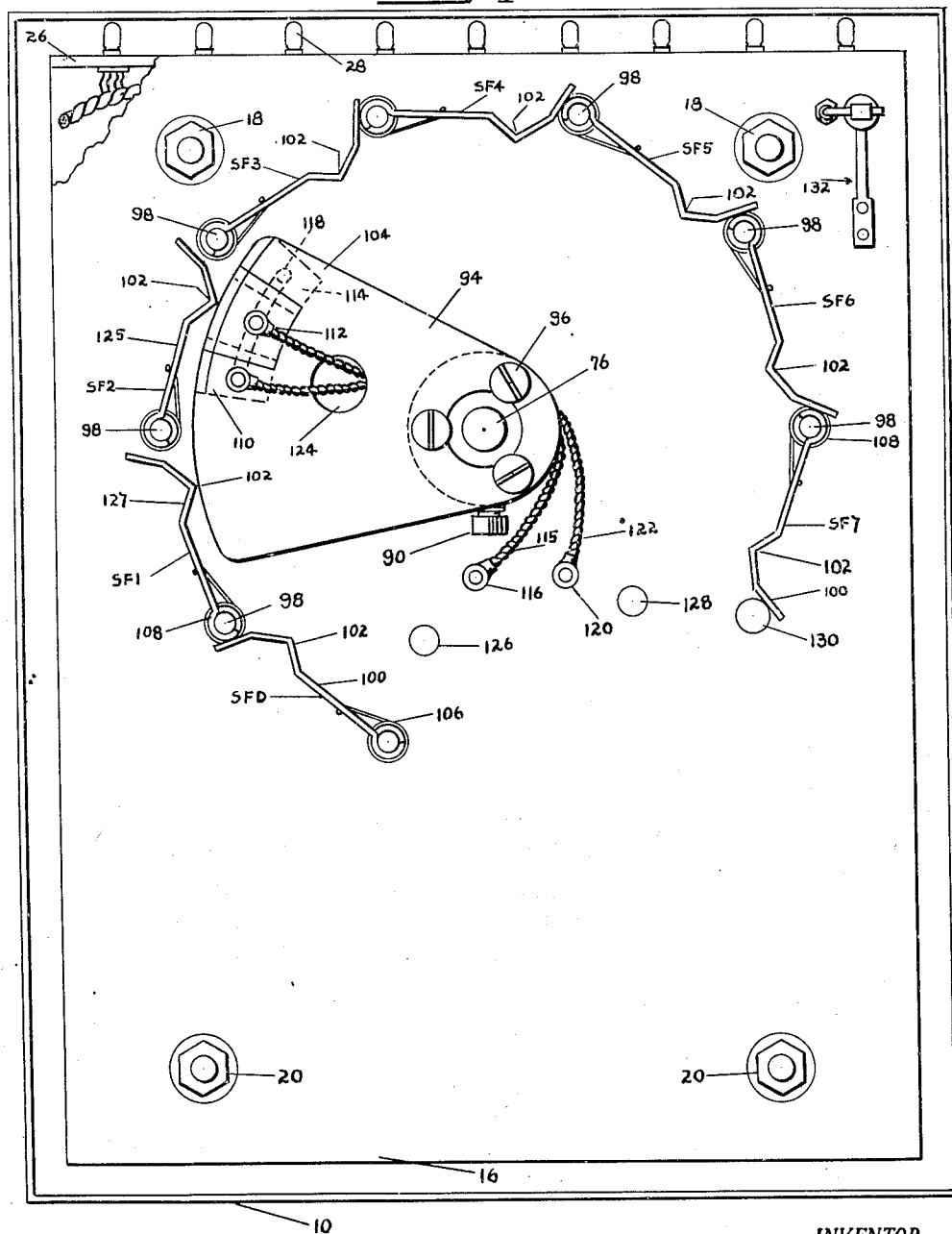
2,489,124

SELECTOR MECHANISM

Original Filed Feb. 2, 1945

3 Sheets-Sheet 1

Fig 1



INVENTOR.
JOSEPH DI GIOVANNI
BY
Wing F. Goddard
ATTORNEY

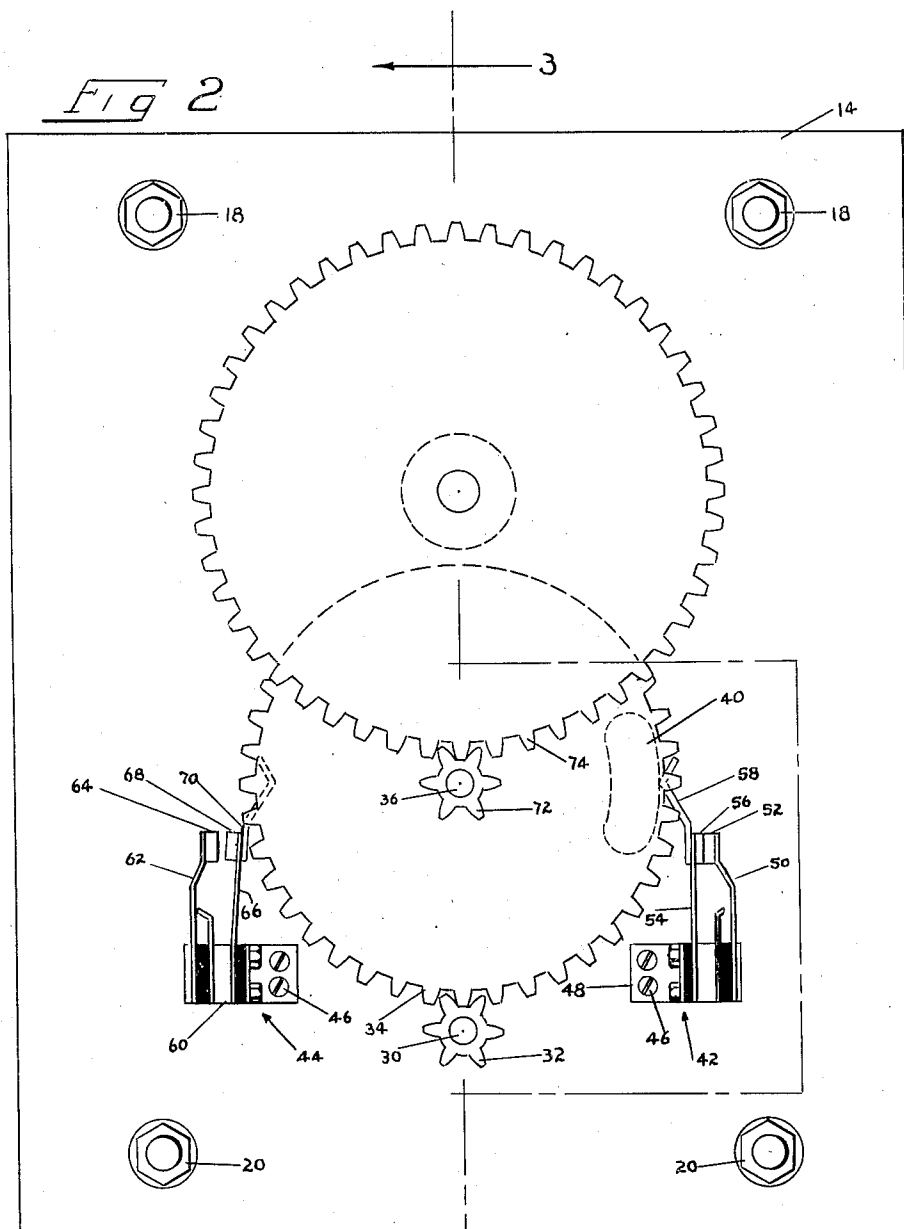
Nov. 22, 1949

J. DI GIOVANNI
SELECTOR MECHANISM

2,489,124

Original Filed Feb. 2, 1945

3 Sheets-Sheet 2



INVENTOR.

JOSEPH DI GIOVANNI

BY

Oring F. Goodfriend
ATTORNEY

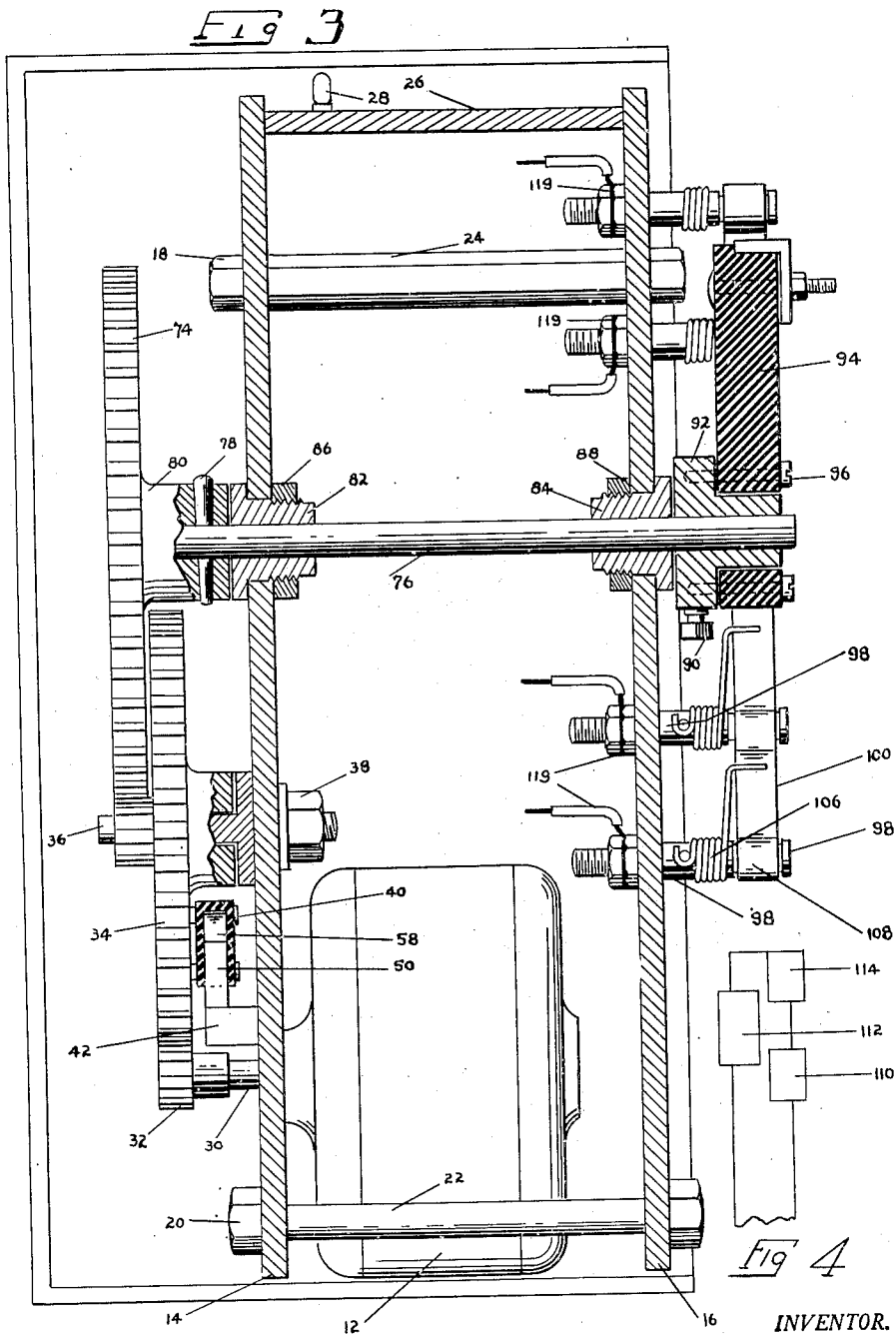
Nov. 22, 1949

J. DI GIOVANNI
SELECTOR MECHANISM

2,489,124

Original Filed Feb. 2, 1945

3 Sheets-Sheet 3



INVENTOR.
JOSEPH DI GIOVANNI
BY
Irving F. Goodfriend
ATTORNEY

UNITED STATES PATENT OFFICE

2,489,124

SELECTOR MECHANISM

Joseph Di Giovanni, Fairview, N. J., assignor to
United Elevator Service, Inc., New York, N. Y.

Original application February 2, 1945, Serial No.
575,758. Divided and this application July 24,
1945, Serial No. 606,825

10 Claims. (Cl. 200—92)

1

The present invention relates to a remote controlled selector for use with elevator systems and particularly to those systems in which the elevator car automatically responds to a call that is impressed either in the car itself or in the hallway of the building served by the car.

The present application is a division of application Ser. No. 575,758 filed by me Feb. 2, 1945, for Elevator system which application issued into Pat. No. 2,384,986. This patent illustrates and claims elevator systems in which a remote controlled selector mechanism such as that which is the subject matter of the present invention is utilized. In that patent, I have illustrated an elevator system in which the remote control selector of the present invention is used.

The present invention contemplates the provision of a selector mechanism which is relatively simple in construction and is provided with but a single contact for each floor served although the mechanism serves to perform a plurality of functions, which functions may be the registration and holding of a call for the car at each and every floor, preserving the direction of the movement of the car in response to a registered call, initiating the starting and stopping of the car in either direction, and isolating the call at the floor to which the car and selector have moved in response to a registered call from all other registered calls on either side of car movement so that the thus isolated call may be operatively acted upon by the mechanism of the elevator system.

The present invention further contemplates the provision of a selector mechanism that is not mechanically connected to the elevator car but which is so arranged and constructed that it may operate only once for each floor passed by the car irrespective of the distance travelled by the car between one floor and the next succeeding floor.

The present invention still further contemplates the provision of a relatively inexpensive, compact and comparatively small selector unit which is provided with a single moving part for engagement with one of a plurality of contacts, each of which contacts corresponds to a floor and which contacts on either side of the moving part are arranged in series to collect each call registered above and below the position of the car and determines the direction of travel of the car.

These, other and further objects, advantages and uses of the present invention will be clear from the following description and the drawings which are by way of illustration thereof, and in which drawings—

Fig. 1 is a front elevation of a selector mechanism according to my invention.

Fig. 2 is a rear view thereof.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a schematic plan view of the selector

2

finger actuating cam, showing the relative position of the circuit making contacts.

Referring now to the drawings, the selector mechanism which is used to register and hold a call at a floor served by an elevator car is known in the art as a floor selector. The selector of the present invention is not mechanically connected to the elevator car, which is operated and controlled through it, and is arranged as a unit in the comparatively small housing 10, which occupies a relatively small space and may be placed in any convenient available part of the building.

The selector mechanism is driven by a conventional fractional horsepower, direct current, preferably shunt wound motor 12 which is mounted in any conventional manner on the insulating panel 14, between which and the insulating panel 16 it is housed.

The panels 14 and 16 may be connected together as by means of the bolts 18 and 20, on which are mounted conventional spacers 22 and 24.

At the upper edge of the panels 14 and 16, I secure the upper shelf-like member 26, on which may be arranged the operative elements used in connection with the selector, such as the electronic valves (the floor valves, directional determining valves or similar elements), the functions of which are described in detail in my application Ser. No. 575,758, now Pat. No. 2,384,986 and to which reference is made for description of an elevator system in which the present selector mechanism may be used.

Secured to the motor shaft 30, I provide the gear 32 which meshes with the gear 34, mounted on the idler of the counter shaft 36, which latter shaft is fixedly secured to the panel 14, as by the nut on shaft 38.

Secured to the inside face of the gear 34, as by riveting, I provide the switch closing cam 40, which is used to open and close the circuits that function to electrically lock the armature of the motor 12 and brake its action as is fully and completely described in my said co-pending application Ser. No. 575,758, now Pat. No. 2,384,986.

The cam 40 closes the normally open switches 42 and 44, which are mounted on the panel 14 as by screws 46.

Switch 42 is arranged to be connected in a circuit across the armature of the motor 12 which circuit, when made, will short that armature in the manner that is described more completely in my said co-pending application Ser. No. 575,758, now Pat. No. 2,384,986.

Switch 44 is arranged to be connected in an auxiliary circuit which in my said co-pending application Ser. No. 575,758, is the one that controls the auxiliary opening and closing of the said short circuit across the armature of the motor

112.

3

Extending up from the base 48 of the switch 42, I provide the arm 50 carrying the contact point 52 and the resilient arm 54, on which latter is mounted the contact 56 and from which the cam follower 58 is formed. Similarly extending up from the base 50 of the switch 44 I provide the arm 62, on which the contact 64 is mounted and the arm 66, on which latter the contact 68 is mounted and from which the cam follower 70 is formed.

The resilient arms 54 and 66 are tensioned so that the contact 52 is normally out of engagement with the contact 56 so that the switch 42 is normally open and the contact 68 is away from the contact 64 so that the other switch 44 is also normally open.

Rotation of the gear 34 alternately brings the cam 40 into and out of engagement with the follower 58 to close the switch 42 at one position of rotation of the shaft 36 and permit it to be open in every other position of one complete rotation of the shaft 36. Similarly the cam 48 is brought into and out of engagement with the follower 70 to close the switch 44 in but one position of a complete rotation of the shaft 36 and to permit it to be open in all other positions in a rotative cycle of that shaft. It will be seen that the switches 42 and 44 are closed but once in a rotative sequence being at all other times open.

Secured to the gear 34 and rotatable therewith I provide the gear 72, which latter meshes with the floor selector cam driving gear 74, to thereby interconnect the operation of the switches 42 and 44 with the operation of the mechanism floor selector cam 94. Gear 74 is keyed to the shaft 76 as by means of the tapered pin 78, inserted in the gear collar 80 and through the shaft 76. The shaft 76 is mounted for rotation in the bearings 82 and 84 which are held on the panels 14 and 16 by the threaded washers 86 and 88.

Mounted on the other end of the shaft 76 and secured thereto as by the bolt 90, I provide the flanged collar 92 to the flange of which I mount the selector cam 94, which is made from a conventional insulating material, such as a paper base fibre, as by the screws 96.

Pivotaly mounted on the pins 98, I provide the selector contact fingers 100, which are bent to form at the upper parts thereof, the cam followers 102. Rotation of the cam 94 on the shaft 76 brings the nose 104 into engagement with a cam follower 102 to move the corresponding selector finger on its pivot pin 98 away from engagement with the succeeding finger 100. For example, SFD engages the succeeding finger SF1, which latter since the follower thereof is engaged by the nose 104 is raised away from finger SF2. Similarly, since its cam follower is engaged by the nose 104, finger SF2 is raised from engagement with finger SF3, whereas the latter engages the finger SF4, the finger SF4 engages the finger SF5 and so on to the finger SF7. It will of course be understood that the fingers SFD to SF7 are electrically conductive.

It will thus be seen that the finger SF2 is isolated from the fingers SF1 and SF3, adjacent to it, whereas all the fingers, SF1 and SFD, on one side of this isolated finger engage one another to form a continuous electrical line as do all the fingers, SF3 etc., on the other side of the isolated finger.

In order to accomplish this, all the selector fingers are tensioned by a spring means 106, so that each finger, unless pushed away therefrom by the nose 104, is normally held in contact with

4

the base 108 of that selector finger positioned ahead of it around the periphery formed by the plurality of fingers.

The nose 104 is provided with three selector cam contacts 110, 112 and 114, the centre contact 112 being insulated from the contacts 110 and 114, which latter are electrically connected in the rear of the cam by the lead wire 118. Contact 110 is connected by means of the lead wire 115 to the binding post or electrical terminal 116, mounted on the panel 16. The binding post or electrical terminal 116 is to be connected to one side of the line and the base of each finger at the rear side of the panel 16, as by the connections 119, is connected to the other side of the line, as is described and illustrated in my co-pending application Ser. No. 575,758, now Pat. No. 2,384,936. The centre contact 112 is electrically connected to the binding post 120 by the lead wire 122 for convenience the lead wires 115 and 122 being threaded through the enlarged opening 124. The binding post 120 is connected to one side of the line through a control circuit, such as an auxiliary stop magnet relay as is illustrated and described in my said co-pending application Ser. No. 575,758, now Patent No. 2,384,986, so that a circuit may be completed from the other side of the line through an isolated finger, the centre contact and the control circuit.

It will thus be seen that a circuit will be made from one side of the line through a switch means, which in an elevator system comprises a push button and a holding means such as a vacuum tube or relay, the isolated selector finger SF2, the control means, which in an elevator system is a stop magnet relay, to the other side of the line, which circuit is isolated from any other circuit that may be made by the remaining selector fingers on each side of the isolated finger.

It should be noted that the first cam contact is positioned on the nose 104 so that the follower 102 is first engaged before the next succeeding selector finger 125 is raised from the base 108 of the finger which follows, the cam rotating in a clockwise direction, in order that, any circuit that may be made through the fingers below the first cam will be preserved when a finger is isolated.

The cam contact 110 is positioned on the nose 104 so that when the cam rotates in a counter-clockwise direction contact 110 will engage the finger 127 before the finger 100 is raised from the base 108. Finger 100 is raised prior to engagement of contact 112 by the finger 127.

As pointed out in my co-pending application Ser. No. 575,758, now Pat. No. 2,384,986, where the selector mechanism is used in an elevator system, the base 98 of the down terminal finger SFD is connected to a down directional circuit and the contact 130 against which the finger SF7 is normally held, corresponding to the upper floor) is connected to an up directional circuit. It will be apparent that even though an intermediate finger, SF2, is isolated, circuits through the fingers on either side thereof and the down directional and the up directional circuits will nevertheless be preserved even though there is but one finger to be contacted for each floor or unit served.

In operation, the cam 94 reciprocates or oscillates between the first selector finger SFD which is the lower terminal selector finger (the purpose of which will become apparent) and the last selector finger SF7, which is the upper

terminal selector finger (in an elevator system, corresponding to the upper or top floor of the building, the selector here illustrated for use in a seven story building), the stops 126 and 128 serving to limit uncontrolled movement of the cam in the counterclockwise and clockwise directions.

It should be noted that the last selector finger SF7 normally bears against the contact 130 (which contact corresponds to the terminal of the circuit made through the fingers above the cam 94 and which may correspond to SFU referred to in the wiring diagram illustrated in my co-pending application Ser. No. 575,758, now Pat. No. 2,384,986 of which the present application is a division), and to which no selector finger is attached since this contact is in advance of the finger corresponding to the last position or floor of the unit or building, which in the elevator illustration given is the top floor. The function of this contact 130, as well as that of the terminal finger SFD, is to permit the isolation of the finger corresponding to the terminal floor (SF1 and SF7) and respectively the opening of auxiliary circuits, such as a down directional and an up directional elevator circuit.

It will of course be understood that various elements, such as relays, that are required for the operation of a system that utilizes the present selector mechanism may be mounted in convenient portions of the housing 10, as for example the relay 132, at the upper corner of the platform 16, which relay may be an auxiliary stop magnet relay, such as that referred to in the wiring diagram of my co-pending application Ser. No. 575,758, now Pat. No. 2,384,986 as ASM.

As pointed out above, switch 42 is connected in a circuit across the armature of the motor 12, which circuit when closed electrically locks the motor, which can occur in only one position of rotation of the gear 34 and its corresponding cam 40. Thus in the position illustrated in the drawings, this circuit is closed and the motor 12 cannot rotate unless the short circuit across the armature is opened by other means.

As pointed out, in my said co-pending application Ser. No. 575,758, now Pat. No. 2,384,986, an auxiliary circuit and means is provided which will open the short circuit across the armature upon closing the circuit for the motor 12, thus permitting it to operate and so permit the cam 40 to be brought away from the follower 58, whereby the switch 42 is opened to keep the short circuit open until the switch 42 is again closed irrespective of the condition of the said auxiliary circuit and means.

As further pointed out above, switch 44 is connected in another auxiliary circuit which controls the first auxiliary circuit so that when the switch 44 is closed the first auxiliary circuit is opened to close the short circuit across the armature of the motor 12 except for the still open switch 42. Thus, the closing of switch 44 by the rotation of the gear 34 and its corresponding cam 40 places the armature short circuit in condition to be effective immediately that switch 42 is thereafter closed by the continued rotation of gear 34 and cam 40, which locking action will continue so long as the circuit across the motor 12 remains closed.

This function, as applied to an elevator system, is described and illustrated in detail in my said co-pending application Ser. No. 575,758, now Pat. No. 2,384,986, to which reference is hereby made

as it is unnecessary to repeat it and the drawings contained therein.

The driving motor 12, the gear 34 and the cam 94 are interconnected so that for each rotation of the cam 40 from engagement with the follower 58 and return corresponds to the movement of the cam 94 from one finger 100 (SFD, SF1 etc.) to the adjacent succeeding finger. It will thus be seen that the cam 40 will make but one rotation for each movement of the cam 94 between two adjacent fingers.

To repeat, in the position illustrated, a circuit is completed through the finger SF2, the center cam 112, the wire 122 and the post 120 from one line to the other line through a control circuit, which in my co-pending application Ser. No. 575,758, now Pat. No. 2,384,986, initiates the stopping of an elevator car to cancel the circuit thereby formed. Simultaneously circuits through the fingers on either side of the cam 94 and one of the connections at 98 or 130 are preserved by reason of the isolation of the fingers, SF1 and SF3 by the cam 94 from the finger SF2.

A circuit through finger SF6, the fingers following it and the post 130 may be made through a connecting circuit, such as that described in my said co-pending application and the patent granted thereon, that is arranged to cause the cam 94 to be driven into contact with SF6. In the sequence of operation (the cam 94 moving in a clockwise direction), contact 114 engages the follower 102 of SF6 but the cam 94 does not raise SF6 from its base pivot 108. A circuit therefore is still made through contact 114, lead wire 113, wire 115 and the post 116, which circuit may be a by-passing circuit. As the cam moves further, it raises finger SF6 and isolates it from SF7, contact then being made through the follower of SF6 and the center contact 112, which permits completion of a circuit through the post 120.

Since all other fingers are now isolated from SF6 by the cam, a circuit may continue to be made through the fingers on either side of SF6 and the corresponding posts 98 and 130. Of course, the cam is so arranged that contact is made with 112 before contact is broken with 114 so that the circuit through the finger SF6 is preserved for action through the control connected to 120.

Should a circuit be made through SF1 and post 98 by reason of which the cam 94 will be moved in a counterclockwise direction for its engagement with follower 102 of finger SF1, contact 110 is arranged to engage the follower of SF1, which latter has already been raised (as stated) from SF2. Thus, the circuit through SF1 will be preserved through the by-passing circuit formed by wire 115 and post 116. Further movement of the cam 94 in the counterclockwise direction will bring the follower of SF1 into contact with 112, which latter is so arranged with respect to 110 that contact is made with it before contact is broken with 110.

The cam 94 is so arranged that as contact is made by 110 with finger SF1, finger SF2 engages the next succeeding SF3.

It will now be recognized that I have provided a selector mechanism, primarily for use in an elevator system, which has but a single contact for each floor to be served and a single movable element to selectively engage a contact but which mechanism performs a plurality of separate functions, such as the registration and holding of a call for the car at each and every floor, pre-

serving the direction of the movement of the car in response to a registered call, initiating the starting and stopping of the car in either direction and isolating the call at the floor to which the car and selector have moved in response to a registered call from all other registered calls on either side of the car movement so that the thus isolated call may be operatively acted upon.

I claim:

1. A selector mechanism comprising a motor, a pair of spaced normally open switches for arrangement in a circuit to control shorting of the armature of said motor, first cam means for movement by the motor between the switches to alternately close in sequence the said switches, electrically conductive selector fingers mounted on pivots, tension means for normally holding each finger against the next finger, a second cam means movable from the first of said fingers to the last of said fingers and return upon corresponding operation of the motor and said first cam means said motor moving said first cam means from said first mentioned switch and return thereto upon moving said second mentioned cam means from one selector finger to the selector finger adjacent thereto.

2. The selector mechanism of claim 1, the second mentioned cam means positioned relatively to the selector fingers to raise a pair of adjacent fingers about the corresponding pivots against the tension means whereby said fingers are disengaged from the next succeeding adjacent finger to isolate one of said pair of adjacent fingers from the remaining fingers upon the return of the first mentioned cam means to the first mentioned switch.

3. A selector mechanism comprising a motor, cam means formed from an insulating material, a series of electrically conductive fingers, each fixed at one end for movement thereabout and the other end of the finger normally held against the fixed end of the next succeeding adjacent finger, said cam means oscillated by the motor between the first and last of said series of fingers to raise a pair of adjacent fingers about the fixed ends away from the fixed end of the next succeeding finger upon engagement of said pair of fingers by the cam whereby one of said pair of fingers is electrically isolated from the remaining fingers and said remaining fingers forming an electrical line on each side of the isolated finger, said cam having a contact on the edge thereof adjacent the said series of fingers for engagement with the said isolated finger to form an electrical circuit therewith and means at the first finger and at the last finger for electrically connecting each series of fingers on each side of said isolated finger to an electrical line.

4. The selector mechanism of claim 3 and including contact on each side of said first mentioned contact and insulated therefrom, said last two contacts being electrically connected and positioned relatively to the first mentioned contact whereby said first mentioned contact is engaged by the finger before one of said second mentioned contacts is disengaged by the finger.

5. A selector mechanism comprising a rotatable shaft, means for rotating the shaft, a plurality of electrical conductive members spaced about the shaft and having one end pivoted in the mechanism and the other end normally held in engagement with the pivoted end of the succeeding adjacent member and cam means formed from an insulating material se-

cured to said shaft, one portion of said cam for engaging a member to disengage it from a member on one side of said engaged member and for engaging a member on the other side of said first engaged member to disengage the second engaged member from the first engaged member, said cam having means for forming an electrical circuit with said first engaged member.

6. A selector mechanism unit for an automatically controlled system and comprising a housing, operating means in the housing, a plurality of electrically conductive elements, each fixed at one end and each having a free end normally held against the fixed end of the next adjacent element and cam means movable by said operating means between the first and the last of said elements for raising a pair of adjacent elements about the fixed end thereof, said cam means for forming an electrical circuit with one of the said pair of elements and electrically insulated from the other of said pair of elements.

7. The selector mechanism of claim 6, said cam means having three electrical contacts, the intermediate contact being insulated from the other two contacts.

8. The selector mechanism of claim 6, said cam means having three electrical contacts, the intermediate one of which is insulated from the other two contacts and said other two contacts being electrically connected, an electrical terminal connected to the intermediate contact, a second electrical terminal connected to the electrical connection between said other two contacts, a third electrical terminal connected to the first of said elements and a fourth electrical terminal connected to the last of said elements.

9. In a selector mechanism for an automatically controlled system, a plurality of electrically conductive elements, each element having a free end that is normally in electrical contact with the element adjacent thereto and means movable between the first and last of said elements for engaging a pair of adjacent elements and moving each from normal contact with the element adjacent to electrically disconnect each of said pair of elements with the element positioned next to it, said means being electrically conductive on that portion thereof engaging one of the said pair of elements and being electrically non-conductive on that portion thereof engaging the other of said pair of elements, said conductive and non-conductive portions being relatively positioned to make contact with a third element prior to raising said third element from electrical contact with that element that is positioned next to it.

10. The selector mechanism of claim 9 and including a motor, a normally open switch, a cam adapted to close said switch at one position of cam movement and mechanism interconnecting the motor, cam and movable means whereby said switch is closed upon engagement of a pair of said elements.

JOSEPH DI GIOVANNI.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
800,418	Varley	Sept. 26, 1905
1,517,042	Anderson	Nov. 25, 1924
2,094,337	Williams et al.	Sept. 23, 1937