

Sept. 23, 1952

D. C. LARSON
CONTROL MECHANISM

2,611,451

Filed May 20, 1950

6 Sheets-Sheet 1

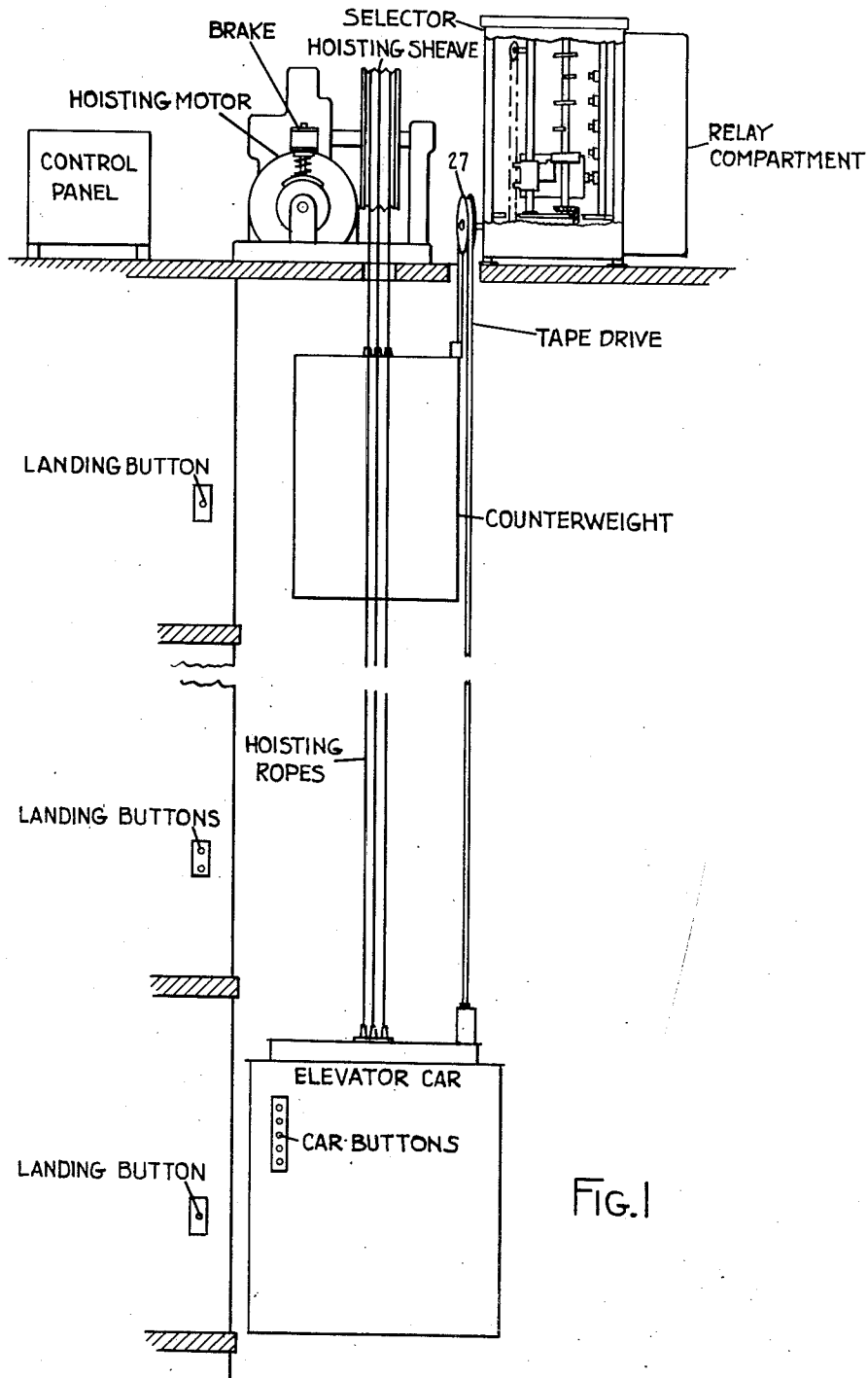


FIG. 1

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6 Sheets-Sheet 3

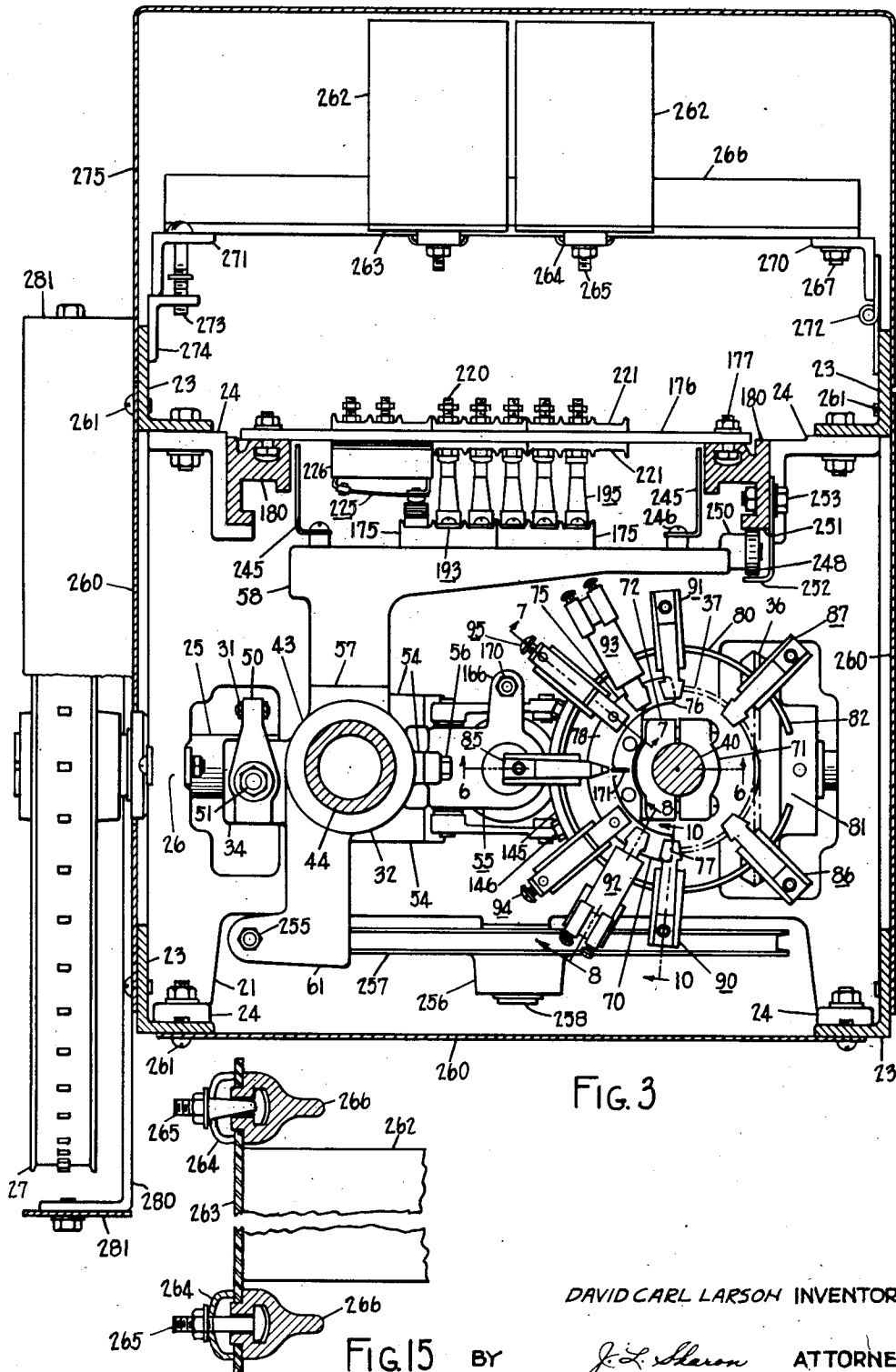


FIG. 3

FIG. 15

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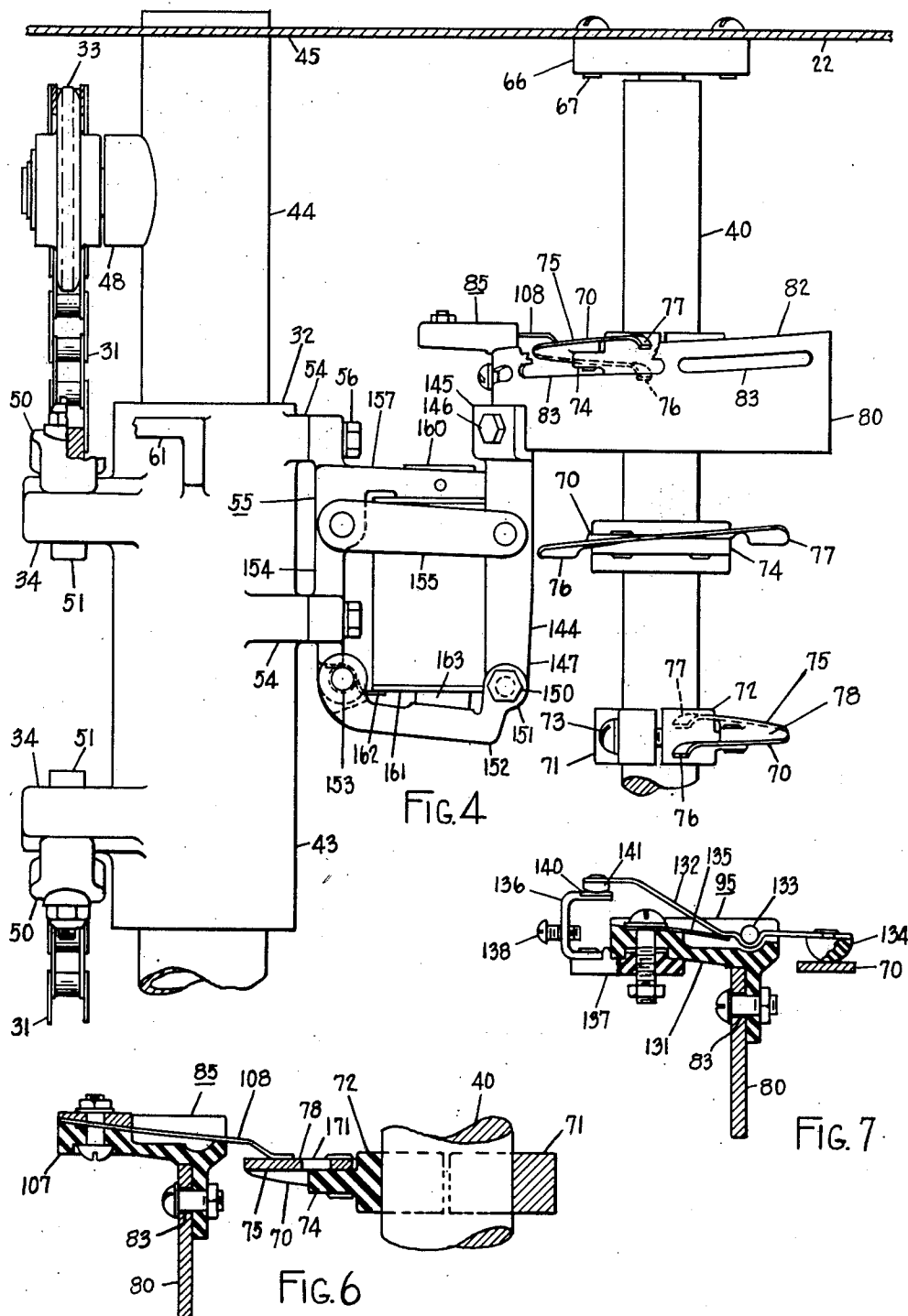
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6 Sheets-Sheet 4



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6 Sheets-Sheet 5

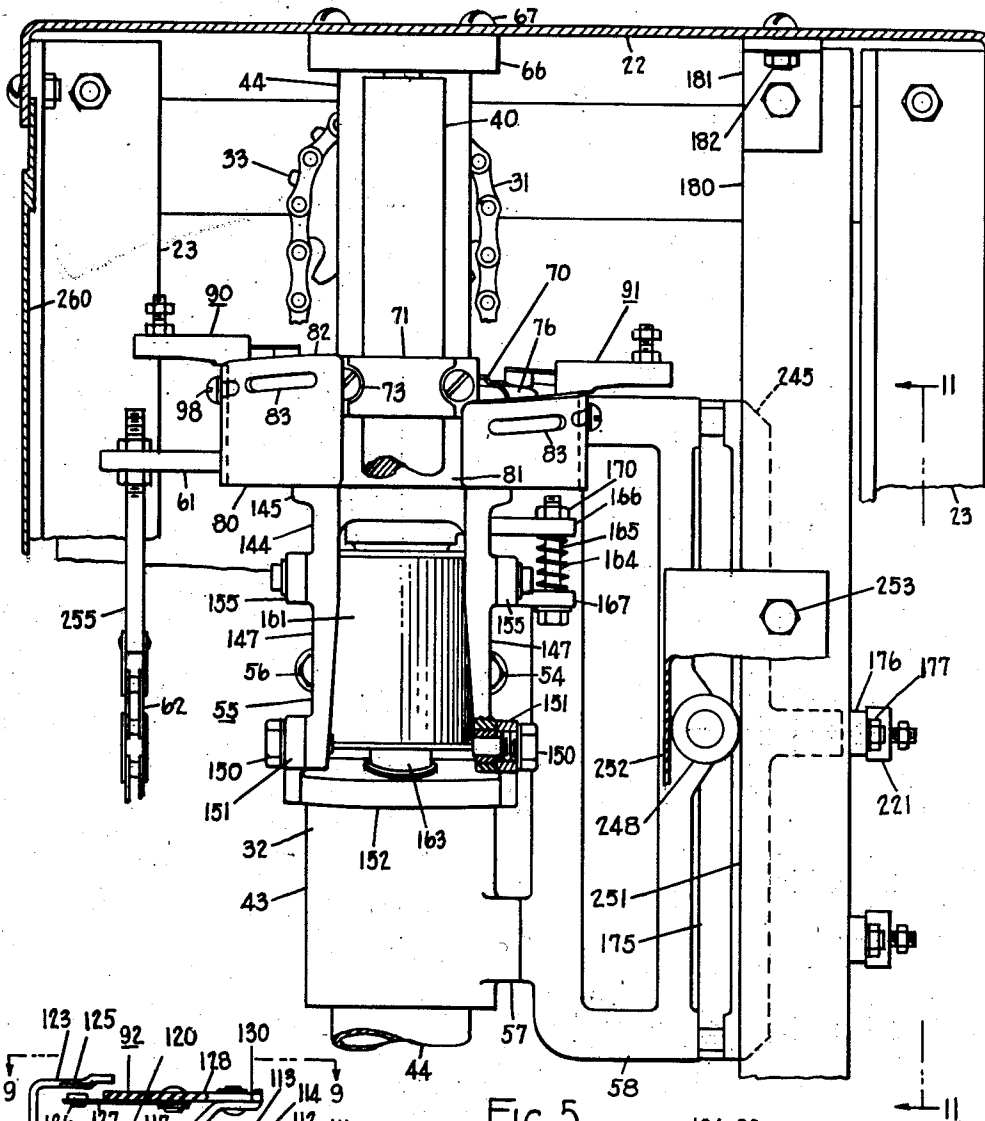


FIG. 5

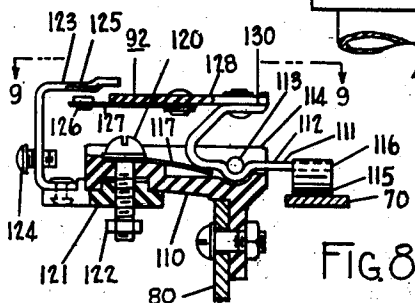


FIG. 8

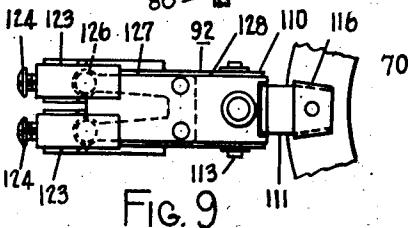


FIG. 9

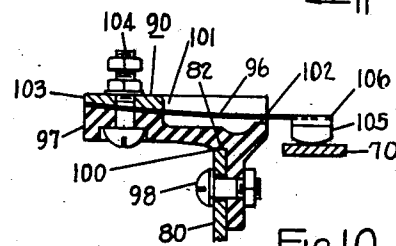


FIG. 10

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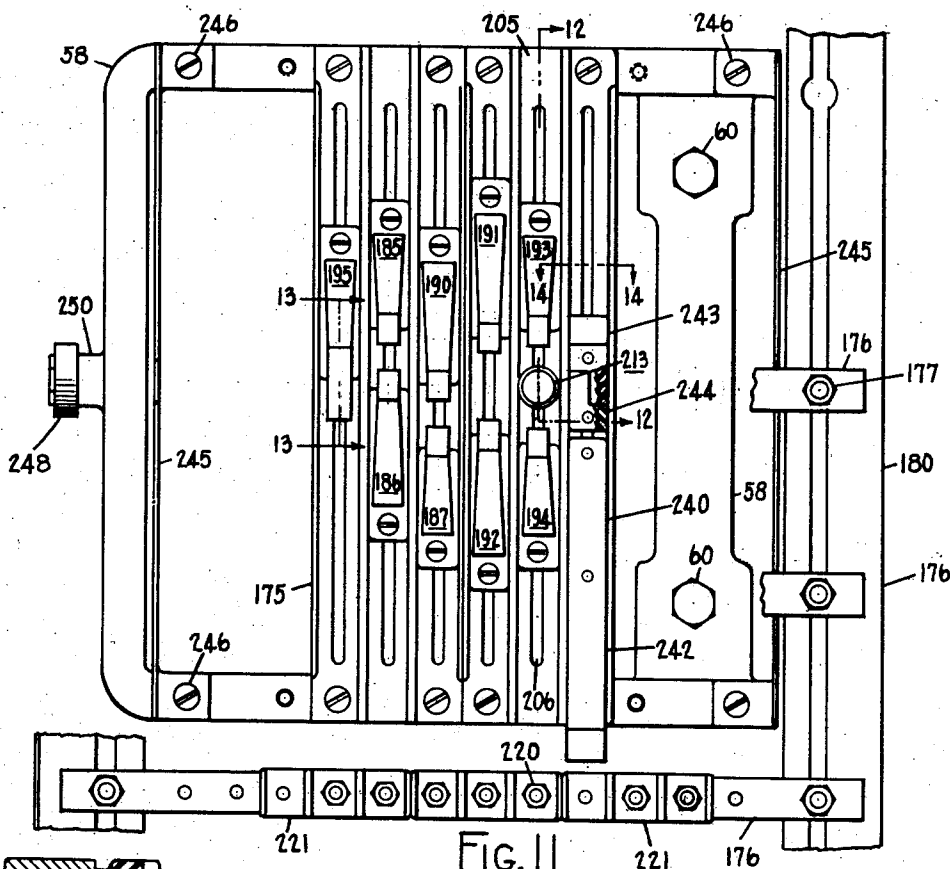


FIG. 11

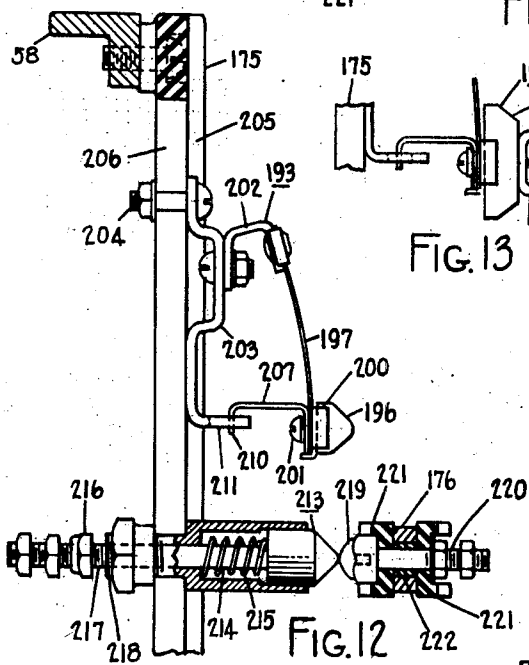


FIG. 12

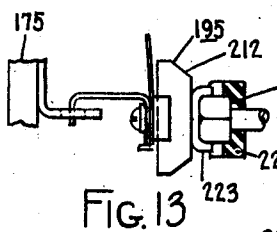


FIG. 13

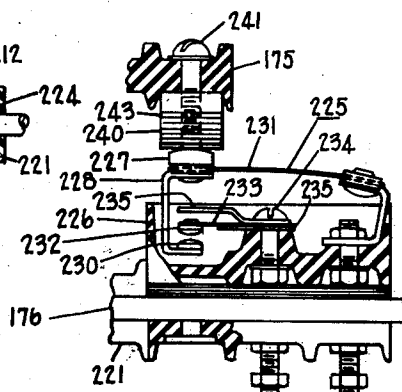


FIG. 14

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UNITED STATES PATENT OFFICE

2,611,451

CONTROL MECHANISM

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Application May 20, 1950, Serial No. 163,233

8 Claims. (Cl. 187—29)

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The invention is directed to control mechanism for elevator cars.

In many elevator control systems, it is common practice to employ control mechanism actuated by movement of the car. Such mechanism may be utilized for controlling slowing down of the car, levelling the car with the floors, controlling the door operating mechanism and other purposes. There are certain advantages in having this mechanism out of the hoistway and it is usually positioned in the penthouse along with other control apparatus. Such mechanisms are usually referred to as selectors and floor controllers, or as levelling mechanism when the principal function is to control the bringing of the car to the exact floor level. There is especial advantage in having the levelling mechanism out of the hoistway and the invention is particularly directed to such levelling mechanism either alone or in combination with other selector mechanism, especially that for controlling the door operating mechanism.

The object of the invention is to provide control mechanism of the above character which is reliable in operation, simple to construct and maintain and which assures positive control of the circuits subject thereto.

In carrying out the invention according to the arrangement which will be described, a plurality of electrically conductive helical contacting segments, one for each floor served by the elevator car, are mounted on a shaft to be rotated thereby at a speed proportional to that of the elevator car. These segments are spaced on the shaft in accordance with the distances between the floors for which they are provided. A plurality of contacting devices are arranged on a follower in the form of a crosshead movable along a path parallel to the axis of rotation of the shaft in accordance with movement of the car. These contacting devices are principally in the form of contact fingers and switches and are biased into position to slidably engage the face of each contacting segment when the car is within a certain distance of the floor for which the segment is provided. An electromagnet is carried by the crosshead for retracting the contacting devices into position to clear the segments when stops are not being made at the floors for which the segments are provided.

Features and advantages of the invention will be gained from the above statements and from the following description and appended claims.

In the drawings:

Figure 1 is a simplified schematic representa-

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tion of an elevator installation embodying a selector in accordance with the invention;

Figure 2 is a schematic representation of the selector;

Figure 3 is a view in horizontal section taken above the selector crosshead;

Figure 4 is a detail in front elevation of a portion of the selector, illustrating particularly the levelling mechanism;

Figure 5 is a detail in side elevation, also directed particularly to the levelling mechanism;

Figure 6 is a detail taken along the line 6—6 of Figure 3, illustrating the construction and mounting of the pointer utilized in setting the levelling cams, and also illustrating the construction of the levelling cams and its relation to the pointer;

Figure 7 is a detail taken along the line 7—7 of Figure 3, illustrating the construction of a door zone switch;

Figure 8 is a detail taken along the line 8—8 of Figure 3, illustrating the construction of a combined interlock switch and contact finger;

Figure 9 is a view of the same taken along the line 9—9 of Figure 8;

Figure 10 is a view taken along the line 10—10 of Figure 3, illustrating the construction of a contact finger;

Figure 11 is a detail in rear elevation, illustrating the crosshead panel assembly and the arrangement of the floor bars;

Figure 12 is a view of brushes on the crosshead panel assembly and a stationary contact on a floor bar, taken along the line 12—12 of Figure 11;

Figure 13 is a similar view of another brush and stationary contact, taken along the line 13—13 of Figure 11;

Figure 14 is a detail of a travelling cam and a switch operated thereby, taken along the line 14—14 of Figure 11; and

Figure 15 is a detail in cross section showing the mounting of a floor relay.

For a general understanding of a type elevator installation to which the invention is applicable, reference may be had to Figure 1. An elevator installation has been schematically illustrated in which the car may be controlled by the passengers and intending passengers themselves, such for example as is known as a collective control installation. Various parts of the system are indicated by legend. The elevator car is raised and lowered by means of a hoisting motor. This motor drives a traction sheave over which pass the hoisting ropes for the car and counterweight.

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The hoisting motor is controlled by various electromagnetic switches mounted on a control panel, and electromechanical brake is provided and is applied to effect the final stopping operation and hold the car when at rest.

A five-floor installation has been indicated. An up push button and a down push button are arranged at each intermediate floor and a single push button is arranged at each terminal floor. These buttons are known as landing buttons. The elevator car is provided with an independent set of push buttons, one button being provided for each floor. These buttons are known as car buttons. The landing buttons and car buttons act through floor relays which, in conjunction with the selector and other control apparatus, cause the car to proceed to and stop at the floors for which buttons have been pressed.

The selector is driven from the elevator car. The selector drive shaft is provided with a drive wheel which is driven by a tape provided with teeth for meshing with teeth on the driving wheel. The toothed tape is attached at one end at the top of the elevator car from which point it extends upwardly to and over the driving wheel and thence downwardly to the counterweight to which the other end of the tape is connected. The selector is preferably enclosed. The floor relays are arranged in a closed compartment mounted on the selector. Other control switches utilized in the control system are mounted on the control panel.

Reference may now be had to Figure 2, which illustrates schematically a selector of preferred construction. This figure is for the purpose of giving a comprehensive understanding of the machine and its operation. It is not intended to show the details of construction, such details being illustrated in Figures 3 to 15 inclusive. In the drawings showing details of construction, certain parts, not involved in the operation of the portion of mechanism illustrated in a particular figure of drawings, are not shown in that figure in order that the construction and operation of such portion of the mechanism may be readily understood.

Referring also to Figure 3, the selector comprises a frame formed by a base plate 21 and cover 22 joined together by four corner posts 23 in the form of angles. The corner posts are secured to lugs 24 formed on the base plate and to the cover as by bolts, the cover being of inverted pan formation which fits down over the top of the corner posts. The selector drive shaft 25 is supported in bearings 26 on the base plate. The drive wheel 27 for the selector is secured to the outer end of the shaft. This shaft operates through reduction gearing 28 to drive a sprocket 30 which in turn acts through a sprocket chain 31 to drive the selector crosshead 32. This chain passes over an idler sprocket 33 mounted near the top of the selector and has its ends secured to lugs 34 on the crosshead. The drive shaft also operates through bevel gears 36 and 37 to drive an operating shaft 40. The corner posts 23 extend down below the base plate to provide space for the reduction gearing 28 and bevel gear 36. Feet 42 are formed on the bottoms of the corner posts.

The crosshead comprises a sleeve 43 which slides on a vertical tubular member 44. This tubular member extends through an aperture 45 in cover 22 and into a recess 46 in a boss formed on the base plate, where it is secured by a set screw 47. The idler sprocket 33 is mounted

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on a stud 48 welded to member 44 (Figure 4), being provided with a ball bearing which fits on the stud. A plurality of lugs are formed on the sleeve. The lugs 34, as above set forth, are for securing the ends of chain 31. The connection in each case is made to a tightening lever 50 which is adjustably secured to the lug by a bolt 51. The three lugs 54 (see also Figure 4) are for mounting the levelling magnet 55, the magnet frame being secured to the lugs as by screws 56. The lugs 57 (see also Figures 5 and 11) are for mounting the crosshead panel frame 58, the frame being secured thereto as by screws 60. The lug 61 is for attaching the position indicator drive chain 62.

The operating shaft 40 is provided at its lower end with a bearing mounted in a seat formed in the boss 64 on base plate 21. At its upper end, shaft 40 is provided with a bearing positioned in a housing 66 secured to the cover as by screws 67 (see Figure 5). Referring also to Figure 4, a plurality of cams 70 are mounted on shaft 40 to be rotated thereby. There is one cam for each floor and they are mounted on the shaft in spaced relationship. The spacing of the cams is such that the distance between adjacent cams is in accordance with the distance between the floor landings for which these cams are provided, considered from the standpoint of the travel of the crosshead. These cams are of the same construction. Each comprises a pair of clamps 71 and 72, clamp 72 being of insulating material. These clamps are secured in adjusted position to shaft 40 by screws 73. Each insulating clamp 72 has a rib 74 formed thereon to which a semi-circular contacting plate 75 of conducting material is secured as by riveting. Each contacting plate is helical and has a pitch equal to the travel of the crosshead per revolution of the shaft. Also the leading ends 76 and 77 of each contacting plate is turned downward slightly.

The faces 78 of the contacting plates 75 are for slidably engaging a plurality of contact fingers and switches when the car stops at the respective floors for which the plates are provided. These contact fingers and switches are mounted on a collar 80 moved longitudinally of shaft 40 by the crosshead. The connection of the collar to the crosshead is such that the collar is substantially concentric with the shaft 40. The collar is of a radius greater than that of the contacting plates to enable it to move past these plates. An opening 81 is provided in the collar to admit shaft 40 during assembly. The collar is helical at its upper edge 82 to correspond with the helical contacting plates 75. Also helical slots 83 are formed near the upper edge and parallel thereto. This helical arrangement of edge and slots is for properly positioning the contact fingers and switches.

The contact fingers and switches are arranged in pairs, one on each side of a centrally disposed pointer 85. Contact fingers 86 and 87 are for up and down fast levelling speed operation and contact fingers 88 and 89 are for up and down slow levelling speed operation. 92 and 93 are combination up and down interlock switches and feed contact fingers. 94 and 95 are door zone switches.

Contact fingers 86, 87, 90 and 91 are of the same construction and are mounted in the same way on the collar 80, a detail in cross section of one of them being shown in Figure 10. Each contact finger comprises a contact spring 96 mounted on a base 97 of insulating material. The base is

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formed with a depending lug for mounting the contact finger on the collar 80, as by a bolt 98 extending through the lug and one of the slots 83 in the collar. The base is formed with shoulder 100 of helical contour for seating on the helical upper edge 82 of the collar. The base is also provided with a slot 101 which forms a seat for the contact finger. This seat extends at such an angle as to force the spring 96 against a stop 102 formed on the base. A tapered washer 103 is provided over the top of the spring and a bolt 104 secures the spring and washer to the base. This bolt also serves as a terminal stud for the contact finger. The outer end of the contact finger has a contact 105, preferably of carbon which is copper covered on top to enable it to be soldered to the contact spring. The contact spring is bent over the contact on the sides as indicated at 106.

The pointer 85 is mounted in a similar manner. As shown in Figure 6, the base 107 is of the same construction as base 97 and is secured in the same way to collar 80. The pointer is in the form of a spring 108 and is secured to the base in the same way as contact spring 96. The outer end of the pointer is bent downwardly and is tapered to form an index.

The combination interlock switches and feed contact fingers 92 and 93 are of the same construction and details of one of them are shown in Figures 8 and 9. The mounting base 110 is of the same construction as base 97 and is secured in the same way to collar 80. The feed contact finger 111 is in the form of an arm 112 fulcrumed on a pin 113 extending between the sides 114 of the base. The outer end of the arm has a contact 115, preferably of carbon which is copper covered on top to enable it to be soldered to the contact finger. A retaining clip 116 is provided on top of the contact finger. The contact finger is biased for clockwise movement about its fulcrum as viewed in Figure 8 by a spring 117 secured as by screw 120 to the base. Screw 120 screws into a mounting plate 121 of insulating material to hold the spring in place. A nut 122 is provided on the screw for effecting electrical connection to the contact finger. The mounting plate 121 has riveted thereto a pair of U-shaped contact supports 123. Each support is provided with a connecting screw 124. Also each support has a silver contact insert 125 in position to be engaged by a movable contact 126. Contacts 126 are also silver contacts and are secured to the forked ends of a bridging contact spring 127. This spring is mounted on an insulating support 128, in turn secured to the other end 130 of arm 112 which is bent back over itself as indicated.

The door zone switches 94 and 95 are of the same construction and the details of one of them are shown in Figure 7. The mounting base 131 is of the same construction as base 97 and is secured to collar 80 in the same way. An arm 132 is fulcrumed on pin 133 extending between the sides of the base. The outer end of the arm has an insulating button 134 riveted thereto. The arm is biased for clockwise movement by a spring 135 mounted the same as spring 117. A U-shaped contact support 136 is mounted on insulating plate 137 and has a terminal screw 138. Support 136 has a contact insert 140 in position to be engaged by a contact 141 on the other end of arm 132.

The collar 80 is supported by a bracket 144 operated by levelling magnet 55 on the crosshead. The bracket is formed with a curved yoke 145 to which the collar is secured as by screws

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146. A pair of arms 147 depend from the yoke and are supported at their lower ends on pivot screws 150 secured in lugs 151 on opposite sides of levelling magnet armature 152 (see Figure 5). The armature 152 is pivoted at its other end on a pin 153 supported in the lower end of the levelling magnet frame 154. Links 155 extend between frame 154 and bracket 144 above armature 152 to form a parallelogram and thus maintain the desired position of collar 80 with respect to shaft 40 upon energization and deenergization of the levelling magnet 55. The levelling magnet frame 154 has an extension 157 at the top which supports the fixed magnet core 160. The electromagnet 161 is mounted on the core 160 and is supported at the bottom by a clip 162 arranged on pin 153. The armature 152 carries the movable core 163 for the magnet. A spring 164 is arranged on a bolt 165 between a lug 166 formed on extension 157 and a lug 167 formed on one of the links 155. This spring acts to assist gravity in biasing the armature to unattracted position. The nut 170 on the bolt serves both to adjust the compression of the spring and to limit the downward movement of the armature. The magnet frame as previously pointed out is secured to lugs 54 on the crosshead sleeve as by screws 56.

A radial slot 171 is provided in each contacting plate 75 intermediate the ends thereof. This is utilized in conjunction with pointer 85 to position the cam on shaft 40. In setting the cams and the contact fingers and switches with which they cooperate, it is preferred to drop all the cams to the bottom of the shaft 40 and run the car up to a position level with the top floor. With the electromagnet 151 deenergized, the cam for the top floor is set so that its slot 171 is opposite the index of pointer 85 and so that the contacting plate just contacts the lower side of the pointer index. With the cam properly positioned, the contact fingers and switches are then set in their proper positions. First the positions of contact fingers 90 and 91 are adjusted. Each contact finger is set so that its contact 105 is engaged by the face of the contacting plate of the cam on say $\frac{3}{8}$ " car movement in the direction to move the contacting plate into engagement with the contact finger. The car is then set at the desired point of start of the fast speed levelling zone, say below the floor, and the combination up interlock switch and feed contact 92 is set so that its contact 115 is just touching leading end 76 of the contacting plate. The car is then moved up to the desired lower limit of the door zone and up door zone switch 94 is set so that contacts 140, 141 are just engaged. The car is then moved up to the desired point of start of the slow speed levelling zone and up contact finger 86 is set to just disengage the end 77 of the contacting plate. The combination down interlock switch and feed contact 93, the down door zone switch 95 and down contact finger 87 are set in a similar way with the car above the floor. The cams for the other floors are set in the same way.

Referring now especially to Figures 3 and 11, the crosshead panel frame 58 carries a plurality of panel sections 175 of insulating material on which are mounted a plurality of circuit controlling members for contacting cooperating circuit controlling members mounted on floor bars 176. These floor bars are secured as by bolts 177 to extrusions 180 extending vertically between the base plate 21 and cover 22. The extrusions are secured as by screws to lugs 24 at

the bottom (see Figure 2) and to angles 181 at the top, in turn secured as by bolts 182 to cover 22 (see Figure 5). There is one floor bar for each floor served and these bars are spaced in accordance with the distance between the respective floors for which they are provided.

A number of the circuit controlling members carried by the crosshead are usually referred to as brushes. In the construction illustrated these include up landing call pick-up and reset brush 185, down landing call pick-up and reset brush 187, car call pick-up brush 193 for up car travel, car call pick-up brush 194 for down car travel, up auxiliary stopping brush 191 for initiating the actual slow down of the car in its upward travel after a call has been picked up, down auxiliary stopping brush 192 for initiating actual slow down of the car in its downward travel after a call has been picked up, up landing call auxiliary reset brush 186, down landing call auxiliary reset brush 190 and position indicator brush 195.

Brushes 185, 186, 187, 190, 191, 192, 193 and 194 are all of the same construction, the details of one of them, namely brush 193, being illustrated in Figure 12. The brush comprises a carbon contact 196 which makes the actual engagement with the stationary contacts. The carbon contact is secured to one end of a leaf spring 197 as by a clip 200 and screw 201. The spring is secured at its other end to an arm 202 which is mounted on a bracket 203 and secured in place as by a bolt 204. The bracket is positioned in groove 205 formed in the panel section 175 with the bolt extending through a slot 206 in the groove. A U-shaped member 207 is secured to the contact spring in back of contact 196 and has its other end 210 extending into a slot 211 formed in the bracket. This minimizes the possibility of the brush being bent out of shape and limits its outward movement. Brush 195 is of the same construction except that its contact 212 is longer than contact 196.

Intermediate car call pick-up and reset brushes 193 and 194 is a plunger type car call auxiliary reset brush 213. The plunger 214 is biased by a spring 215 into position to engage the stationary contact on the floor bar. The outward movement of the plunger is limited by a nut 216 on the shank 217 engaging the mounting sleeve 218 for the plunger. Brush 213 engages the same stationary contacts as brushes 193 and 194.

The stationary contacts engaged by brushes 185, 186, 187, 190, 191, 192, 193 and 194 are of the same construction, one of them being shown in Figure 12. This stationary contact has a rounded silver contact tip 219 having a pressed fit in the head of the mounting bolt 220. Insulating blocks 221 and sleeves 222 insulate bolt 219 from the floor bar 176. The stationary contacts engaged by brush 195 are of the same construction, one of them being shown in Figure 13. It comprises a silver contact cap 223 soldered to the head of mounting bolt 224.

Also mounted on each floor bar is a direction switch 225 which is a combination brush and switch and is utilized in the construction shown in the direction determining circuit for the car. The brush is of substantially the same construction as brush 193 except that it is mounted on an insulating base 226 and has more of a flat contact 227. The U-shaped member 228 carries a contact tip 230 biased by the spring 231 to engage a contact tip 232 on the end of a spring 233 secured to base 226 as by a bolt 234. Members 235 also secured by bolt 234 limit the movement

of spring 233. The contact 227 is adapted to be engaged by a direction cam 240 mounted in a groove in a panel section 175 and secured thereto as by screws 241. This cam comprises an up section and a down section. The down section is an elongated section 242 of conducting material. The up section is made up of a pair of L-shaped members 243 and 244 of insulating material arranged in lapping relation. The leading edge of member 243 and the leading edge of section 242 are both tapered. The conducting section 242 is of a length to span the switches 225 for the farthest apart adjacent floors. The switches 224 are controlled by the registered calls for the floors for which they are provided and are connected in series relation from the bottom switch to the top one, with the top one connected to the coil of the up direction relay, as for example as shown in Figure 15 of the patent to Dunn, No. 2,032,475, granted March 3, 1936. The conducting section 242 of the cam is connected to the coil of the down direction relay.

Gauges 245 are secured to each end of the panel frame 58 as by screws 246. The ends of these gauges are the same height as the floor bars 176 and are for setting the floor bars in proper positions with the car stopped at the respective floors. Also a guide roller 248 is pivotally mounted on a lug 250 formed on one end of the frame. This roller runs in a guide channel formed by one edge 251 of the adjacent extrusion 180 and the opposite leg 252 of an angle secured to the extrusion as by screws 253.

For one control system for which this particular selector is especially adapted, the auxiliary stopping brushes 191 and 192 are set so that during up car travel up brush 191 disengages its stationary contact for each floor slow down distance from the floor and during down car travel down brush 192 disengages the stationary contact for each floor slow down distance from the floor. The call pick-up and reset brushes for each direction of car travel are set to engage their respective stationary contacts for each floor ahead of the engagement of the auxiliary stopping brush for that direction with its contact for that floor, but to remain in engagement with their stationary contacts until after the engagement of the auxiliary stopping brush and contact takes place. The auxiliary reset brushes and position indicator brush are set to be in engagement with their stationary contacts with the car stopped at the floor for which the contacts are provided. L-shaped direction cam member 243 is set to separate contacts 230 and 232 for a floor slightly ahead of the disengagement of brush 191 from its stationary contact for that floor during up car travel. Conducting section 242 is set to disengage contact 227 for a floor slightly ahead of the disengagement of brush 192 from its stationary contact for that floor during down car travel.

Referring to Figures 3 and 5, the position indicator drive chain 62 is secured to lug 61 on the cross-head sleeve by an eye bolt 255. The other end of the chain (not shown) is secured to a drive wheel 256, passing around the rim 257 of the wheel. The drive wheel is rotatably mounted on a shaft 258 secured to the base plate 21. The drive wheel acts to drive mechanical position indicators at the various landings by mechanism not shown but well understood in the art. The electrical position indicator controlled by brush 195 is located in the elevator car.

Referring particularly to Figure 3, the selector

is enclosed on three sides by plates 260 secured to the corner posts 23 by screws 261. On the side opposite the floor bars is the floor relay compartment. The floor relays 262, indicated by rectangles are mounted on bases 263 secured as by clips 264 and bolts 265 to cross bars 266 in the form of extrusions into which the bolt heads extend (see Figure 15). The cross bars are secured by bolts 267 to upright angles 270 and 271 which form the side members of a frame. Angle 270 is mounted on hinges 272 welded to the angle and to the adjacent corner post 23. On the other side, angle 271 is locked by screws 273, to angles 274 welded to the adjacent corner post. To gain access to the floor bars, screws 273 are removed and the relay assembly is swung outwardly about the hinges. A cover 275 is provided for the floor relay assembly. This cover fits over the corner posts 23 and is held in place by bayonet joints (not shown). This completes the enclosure for the selector. A guard is provided for drive wheel 27. This guard is in the form of a bracket 280 secured to base plate 21 and a semi-circular cover plate 281 mounted on the bracket.

In operation, upon starting the car, electromagnet 161 is energized to lift the collar 80 into position where the contact fingers and switches clear the levelling cams during running of the car past the floors. As the car approaches a floor, say in the up direction, for which say a car call is registered, the car call pick-up and reset brush 193 for up direction of car travel engages its stationary contact for that floor, picking up the call and effecting its automatic cancellation. It also renders the up auxiliary stopping brush 191 effective so that as this brush leaves its stationary contact for the floor, slow down is initiated.

As slow down is initiated, electromagnet 161 is deenergized allowing collar 80 to drop the contact fingers and switches carried by the collar into position to be engaged by the contacting plate 75 of the levelling cam for the floor at which the stop is being made. The car is slowed down as it continues toward the floor. As this continued movement takes place the leading edge 76 of contacting plate 75 runs onto the contacts of contact fingers 86 and 90 and as the car reaches a certain distance from the floor contact 115 of combined up interlock switch and contact finger 92 is engaged by the edge 76 of the contacting plate. Immediately thereafter, the contacting plate affects the separation of contacts 125 and 126. The engagement of the contacting plate with contact 115 establishes another operating circuit for the car while the separation of contacts 125 and 126 opens the main operating circuit. Also the car is caused to operate at fast levelling speed. Upon the arrival of the car in the door zone, up door zone switch 94 is operated to engage contacts 140 and 141. This renders the door operating mechanism effective to cause the opening of the door or doors as the stop is made. As the car arrives in the slow speed levelling zone, the edge 77 of the contacting plate runs off up fast speed levelling contact finger 86, causing the car to run at a slow levelling speed. Just before the car reaches floor level, edge 77 of the contacting plate runs off up slow levelling speed contact finger 90, causing the car to be brought to a stop. The mechanism operates in a similar manner during down car travel and this operation will not be described.

When the car reaches its highest call in its upward travel, the leading insulating member 243 of the direction cam separates contacts 230

and 232 of switch 225 for that floor to break the up direction circuit. This enables a stop to be made during up car travel in response to a down landing call, provided no call is registered for a floor above. During down car travel, when contacts 230 and 232 are separated by the direction cam, the direction circuit is maintained through the conducting section 242 of the cam and contact 227 until the car reaches its lowest call, whereupon as conducting section 242 runs off contact 227, the down direction circuit is broken.

The selector has many advantages. It occupies a minimum of space and is economical to construct and maintain. A large number of parts are interchangeable and the mechanism is readily adaptable to various control circuit arrangements. The two section cam simplifies the control of the direction circuits. The levelling mechanism is simple and easy to set. It is positive in operation, thereby eliminating interlocks between up and down switches and insuring the breaking of the circuits. Thus unwanted levelling of the car away from the floor is obviated. The positions of the door zone switches are readily adjustable, thereby enabling the extent of the door zone to be adjusted. The number of contact fingers and switches may be varied, i. e., more can be added, or some omitted such as the fast speed levelling contact fingers. The short stroke levelling magnet is quiet and reliable.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Control mechanism for an elevator car comprising; a contacting segment rotatable at a speed proportional to the speed of the car; a follower movable in a direction parallel to the axis of rotation of said segment in accordance with the movement of the car; and a plurality of contacting devices carried by said follower for slidably engaging said contacting segment.

2. Control mechanism for an elevator car comprising; an electrically conductive helical contacting segment rotatable at a speed proportional to the speed of the car; a follower movable in a direction parallel to the axis of rotation of said segment in accordance with the movement of the car; and a plurality of contacting devices carried by said follower and biased into position to slidably engage the face of said contacting segment.

3. Selector mechanism for an elevator car comprising; a plurality of electrically conductive helical contacting segments, one for each floor served by the car, said segments being rotatable about a common axis at a speed proportional to the speed of the car; a crosshead movable in a direction parallel to the axis of rotation of said segments at a speed proportional to that of the car; a plurality of contact fingers carried by said crosshead and biased into position to be slidably engaged by said contacting segments; and means for moving said contact fingers into position to clear said contacting segments.

4. Selector mechanism for an elevator car comprising; a crosshead actuated linearly in accordance with movement of the elevator car; a shaft rotated in accordance with the speed of the elevator car about an axis parallel to the line of movement of said crosshead; a plurality of heli-

cal contacting segments of electrically conductive material, one for each floor served by the car, arranged on said shaft to be rotated thereby and positioned in spaced relationship thereon in accordance with the distances between the floors for which they are provided; a plurality of contact fingers carried by said crosshead to be slidably engaged by each contacting segment as a stop is being made at the floor for which such segment is provided; and means for moving said contact fingers into position to clear said contacting segments during running of the car.

5. Selector levelling mechanism for an elevator car comprising; a crosshead actuated linearly in accordance with movement of the elevator car; a shaft extending parallel to the line of movement of said crosshead and rotated in accordance with the speed of the elevator car; a plurality of helical contacting segments of electrically conductive material, one for each floor served by the car, arranged on said shaft to be rotated thereby and positioned in spaced relationship thereon in accordance with the distances between the floors for which they are provided, each segment having a pitch equal to the travel of the crosshead per revolution of said shaft; a plurality of contact fingers common to said floors carried by said crosshead to be slidably engaged by the face of each contacting segment as the car is being stopped at the floor for which such segment is provided; and electromagnetic means carried by said crosshead for moving said contact fingers into position to clear said contacting segments during running of the car.

6. Selector levelling mechanism for an elevator car comprising; a crosshead actuated linearly in accordance with movement of the elevator car; a shaft extending parallel to the line of movement of said crosshead and rotated in accordance with the speed of the elevator car; a plurality of helical contacting segments of electrically conductive material, one for each floor served by the car, arranged on said shaft to be rotated thereby and positioned in spaced relationship thereon in accordance with the distances between the floors for which they are provided, each segment having a pitch equal to the travel of the crosshead per revolution of said shaft; a plurality of contact fingers common to said floors for cooperation with said contacting segments, said fingers being arranged in two groups, one on each side of the center of each contacting segment with the car stopped at the floor for which the contacting segment is provided, to be slidably engaged by the faces of said contacting segments; an electromagnet carried by said crosshead; and a support for mounting said contact fingers on said crosshead for cooperation with said contacting segments, said support being operable by said electromagnet upon energization thereof to move said contact fingers into position to clear said contacting segments during running of the car.

7. Selector levelling mechanism for an elevator car comprising; a crosshead actuated linearly in accordance with movement of the elevator car; a shaft extending parallel to the line of movement of said crosshead and rotated in accordance with the speed of the elevator car; a plurality of cams, one for each floor served by the car, arranged on said shaft to be rotated thereby and positioned in spaced relationship thereon in accordance with the distances between the floors

for which they are provided, each cam having a helical contacting segment of conducting material of a pitch equal to the travel of the crosshead per revolution of said shaft; a plurality of circuit controlling devices common to said floors for cooperation with the faces of said contacting segments, said devices being arranged in two groups one on each side of the center of each contacting segment with the car stopped at the floor for which the contacting segment is provided, each circuit controlling device having a contacting member adapted to be slidably engaged by the faces of said contacting segments; an electromagnet carried by said crosshead; and a support for mounting said circuit controlling devices on said crosshead for cooperation with said contacting segments, said support being operable by said electromagnet upon energization thereof to move said circuit controlling devices into position to clear said contacting segments during running of the car.

8. Selector levelling mechanism for an elevator car comprising; a crosshead actuated linearly in accordance with movement of the elevator car; a shaft extending parallel to the line of movement of said crosshead and rotated in accordance with the speed of the elevator car; a plurality of cams, one for each floor served by the car, arranged on said shaft to be rotated thereby and positioned in spaced relationship thereon in accordance with the distances between the floors for which they are provided, each cam having a helical contacting segment of conducting material of a pitch equal to the travel of the crosshead per revolution of said shaft; a plurality of circuit controlling devices common to said floors for cooperation with said contacting segments, said devices being arranged in an up group and a down group with corresponding devices of each group spaced substantially equidistant on each side of the center of each contacting segment with the car stopped at the floor for which the contacting segment is provided, each circuit controlling device having a contacting member adapted to be slidably engaged by the faces of said contacting segments, and certain of said circuit controlling devices having switch contacts operated by the engagement of said contacting member of that device by a contacting segment; an electromagnet carried by said crosshead; and a support for said circuit controlling devices for mounting them in helical relation corresponding to the pitch of said contacting segments, said support being carried by said crosshead and operable by said electromagnet upon energization thereof to move said circuit controlling devices into position to clear said contacting segments during running of the car and being operable upon de-energization of said electromagnet to move said circuit controlling devices into position for cooperation with said contacting segment for the next floor to be reached by the car.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,632,226	Grosvenor	June 14, 1927