Nov. 12, 1940. E. L. DUNN 2,221,395

CONTROL MECHANISM FOR ELEVATORS

Filed June 17, 1938 8 Sheets-Sheet 1

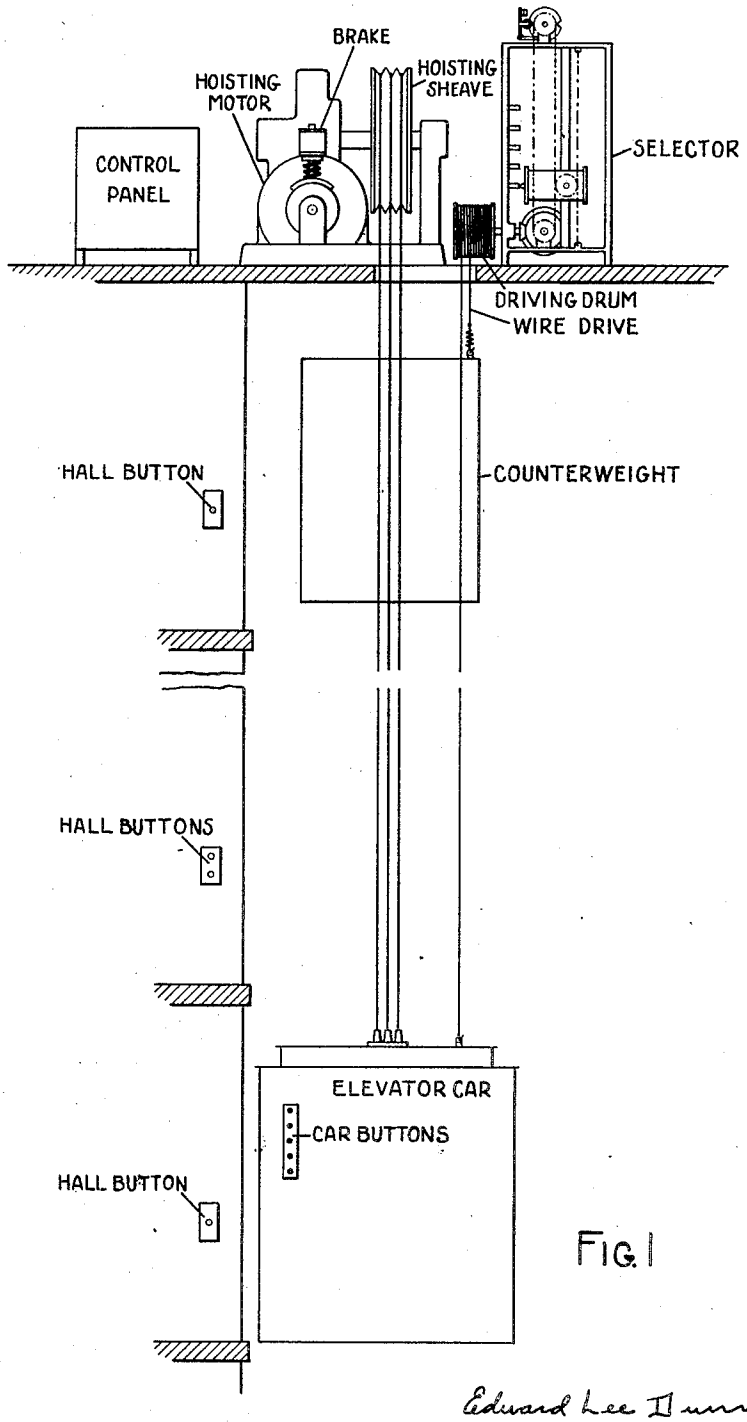


FIG. 1

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Nov. 12, 1940. E. L. DUNN 2,221,395

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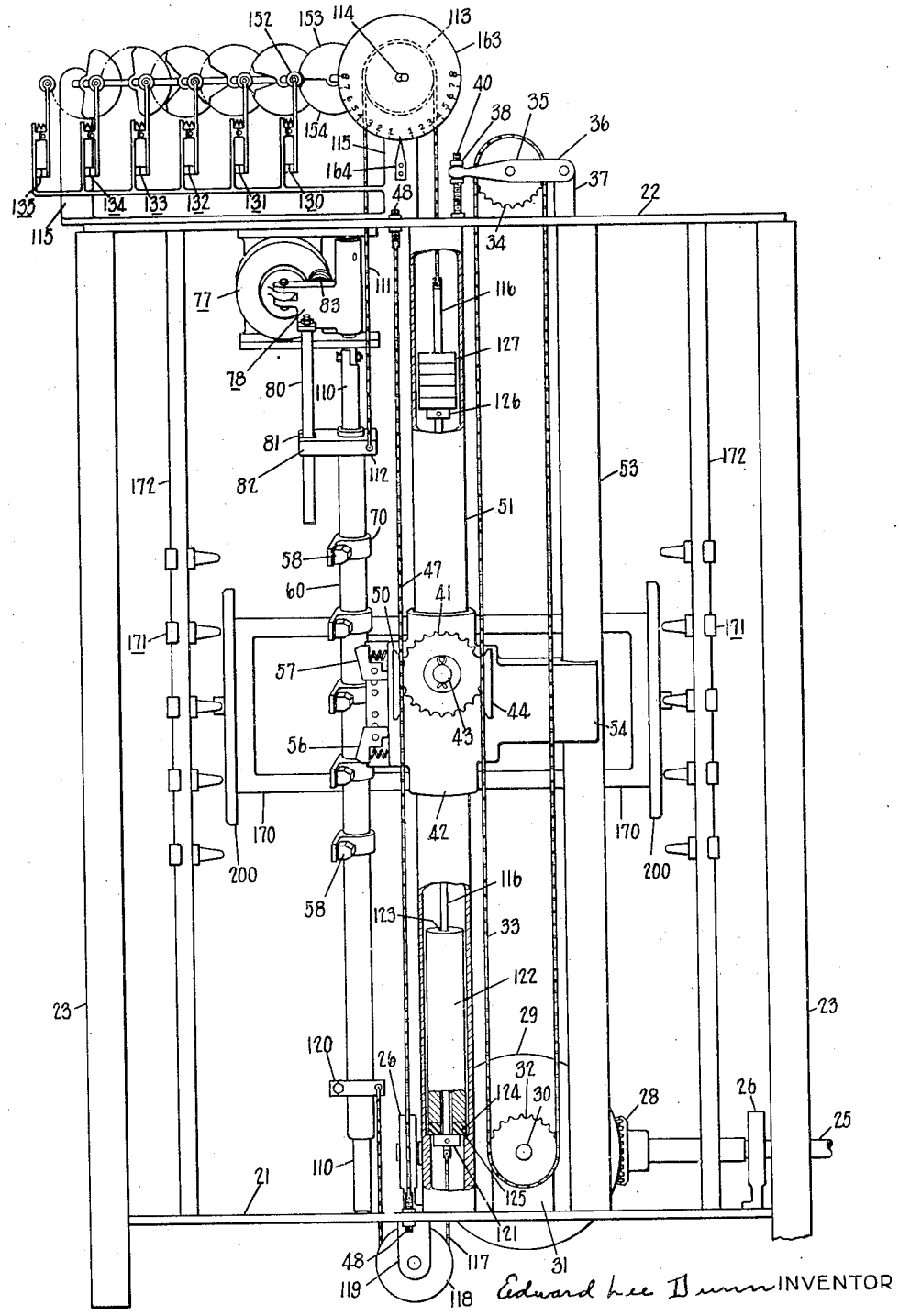


FIG. 2

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Nov. 12, 1940. E. L. DUNN 2,221,395

CONTROL MECHANISM FOR ELEVATORS

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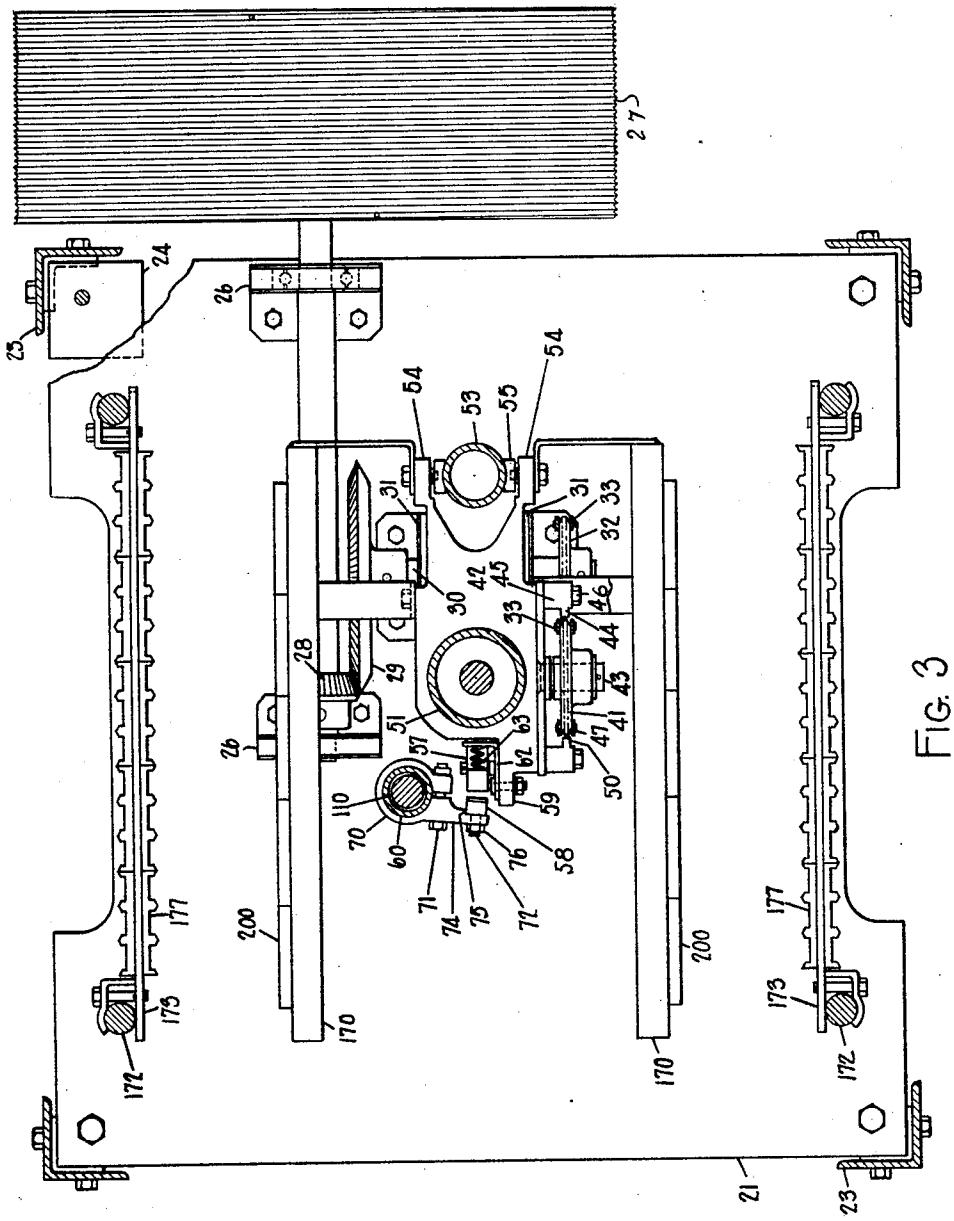


FIG. 3

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Nov. 12, 1940. E. L. DUNN 2,221,395

CONTROL MECHANISM FOR ELEVATORS

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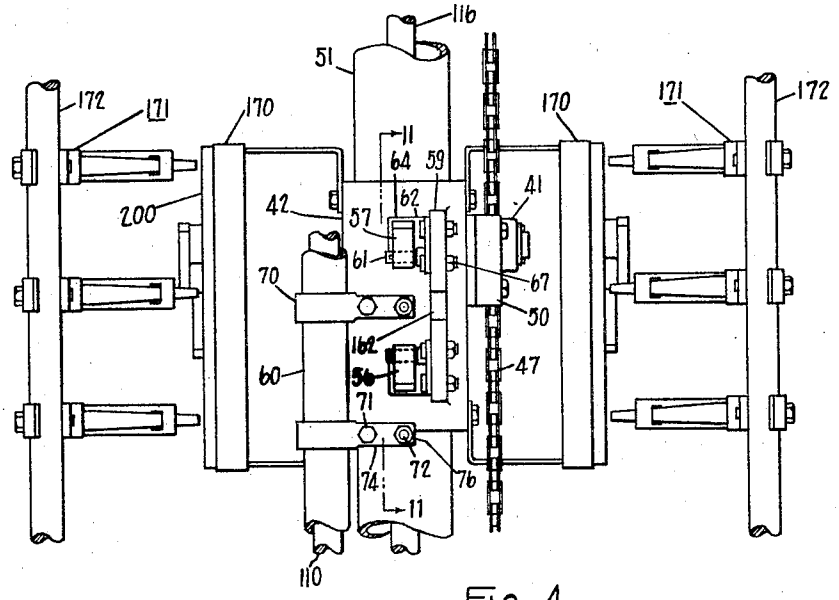


FIG. 4

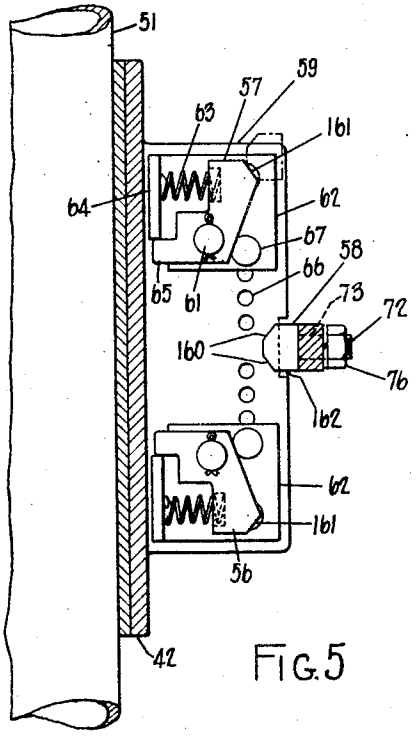


FIG. 5

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Nov. 12, 1940. E. L. DUNN 2,221,395

CONTROL MECHANISM FOR ELEVATORS

Filed June 17, 1938 8 Sheets-Sheet 5

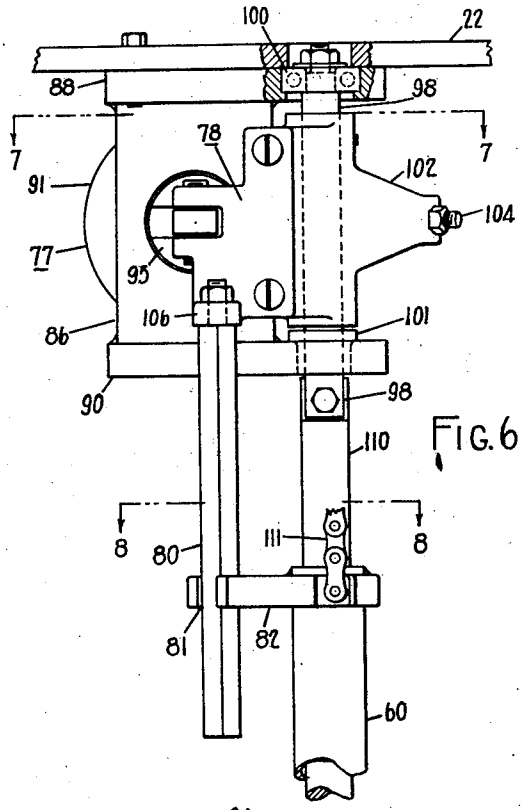


FIG. 6

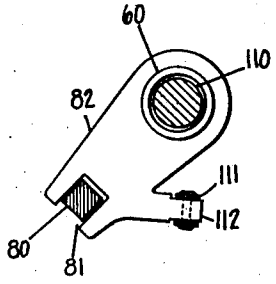


FIG. 8

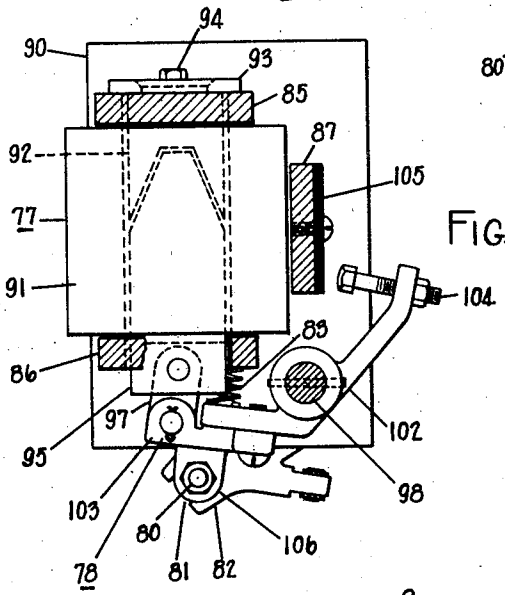


FIG. 7

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Nov. 12, 1940. E. L. DUNN 2,221,395

CONTROL MECHANISM FOR ELEVATORS

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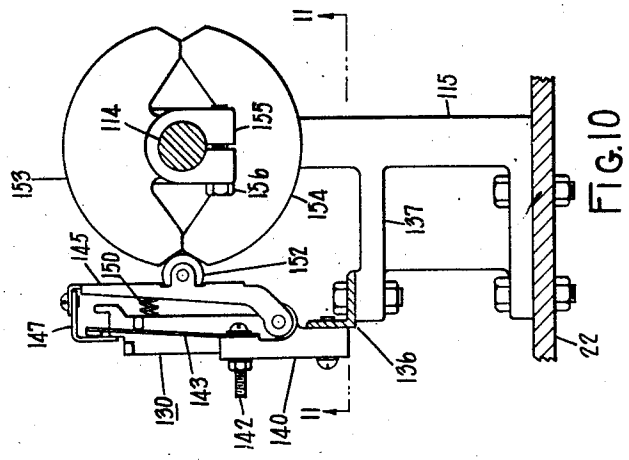


FIG. 10

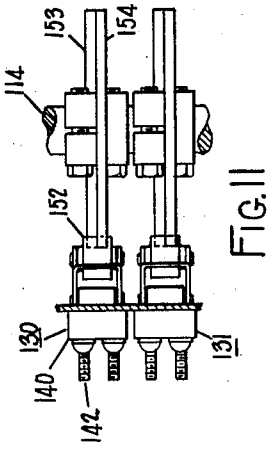


FIG. 11

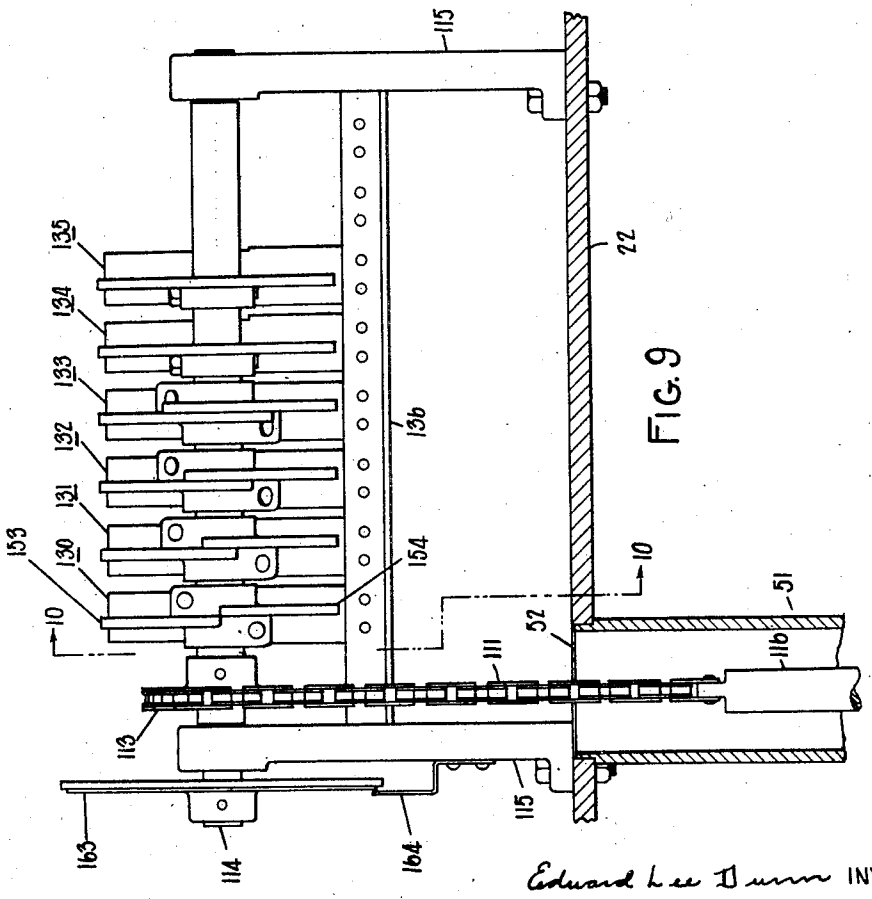


FIG. 9

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FIG. 13

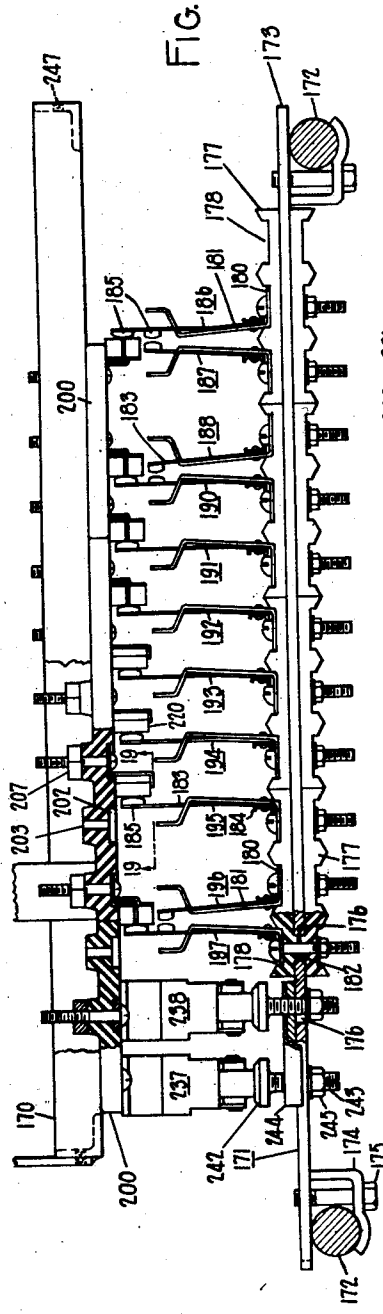
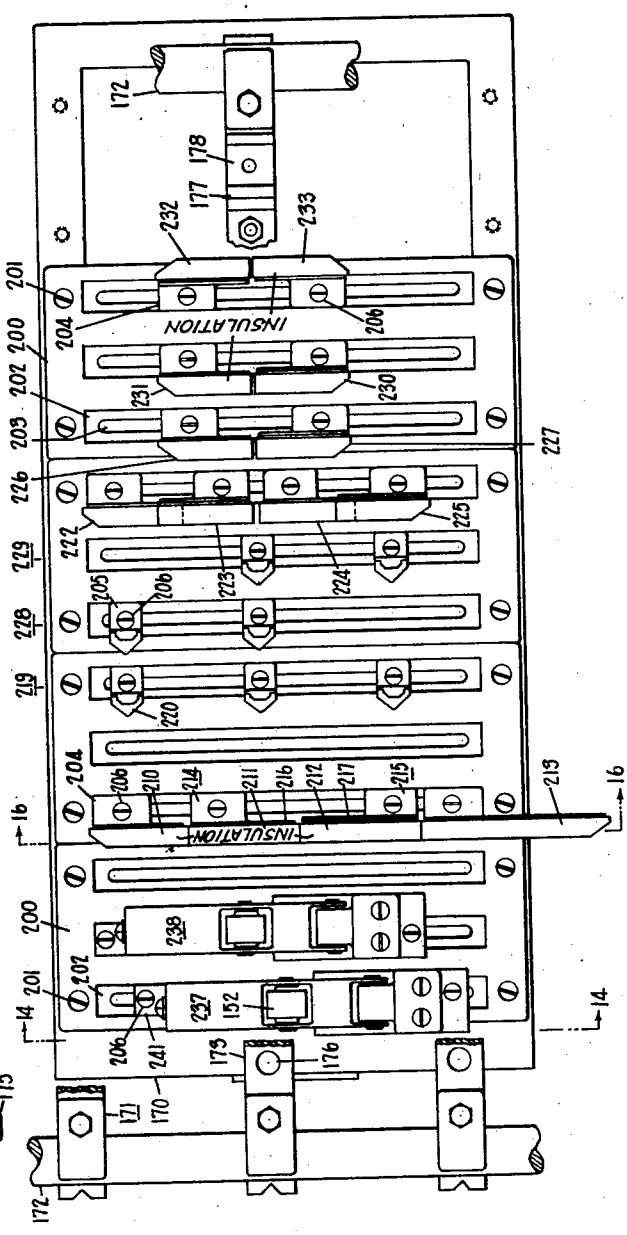


FIG. 12



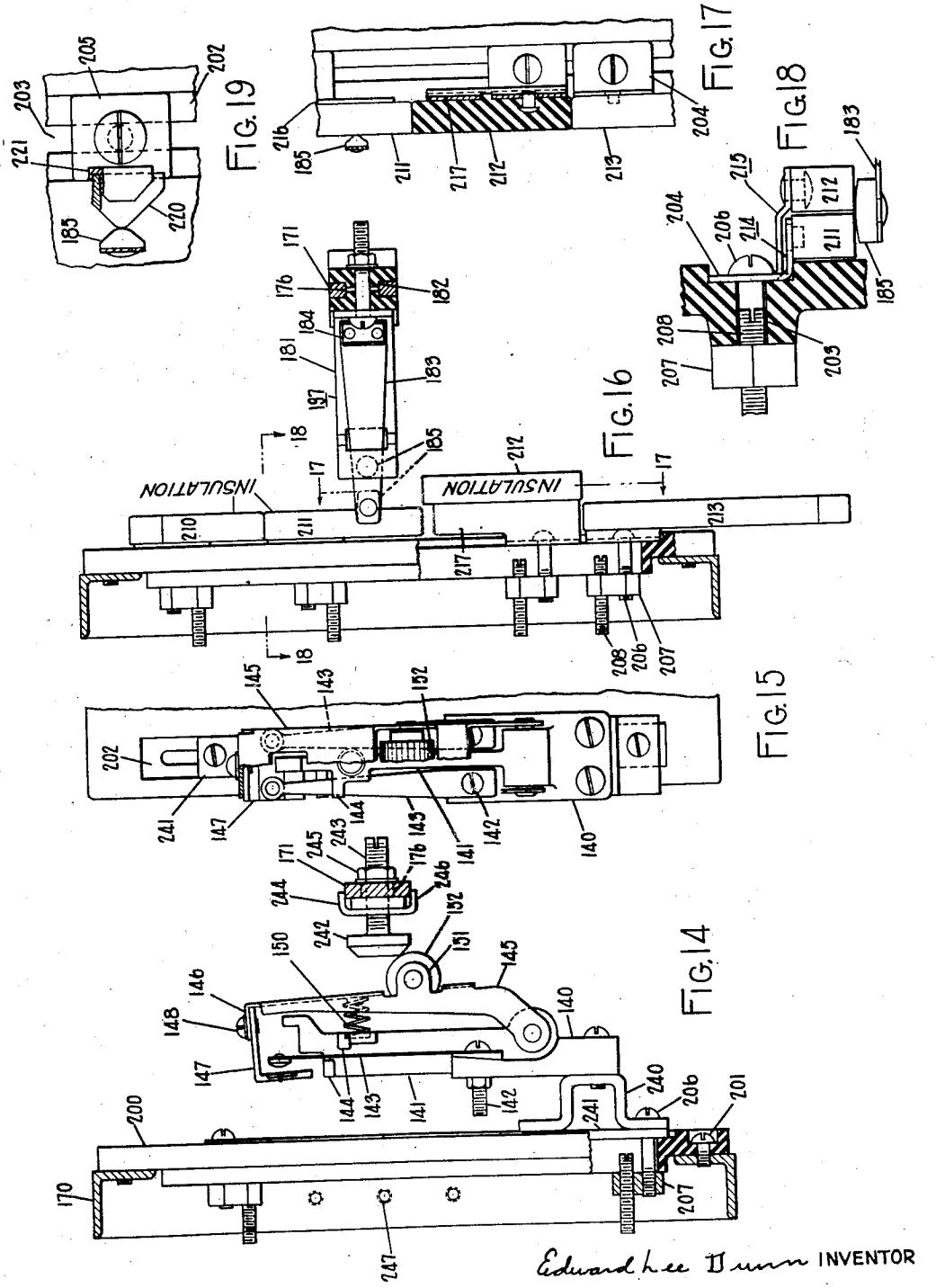
Edward Lee Dunn INVENTOR

BY Walter B. Bradley ATTORNEY

Nov. 12, 1940. E. L. DUNN 2,221,395

CONTROL MECHANISM FOR ELEVATORS

Filed June 17, 1938 8 Sheets-Sheet 8



Edward Lee Dunn INVENTOR

BY Hatley & Bradley ATTORNEY

Patented Nov. 12, 1940 2,221,395

UNITED STATES PATENT OFFICE

2,221,395

CONTROL MECHANISM FOR ELEVATORS

Edward Lee Dunn, Livingston, N. J., assignor to Otis Elevator Company, New York, N. Y., a corporation of New Jersey

Application June 17, 1938, Serial No. 214,271

12 Claims. (Cl. 187—29)

The invention relates to control mechanism for elevators and especially to control mechanism actuated in accordance with movement of the elevator car.

There are many forms of elevator systems. In many of these, mechanism actuated in accordance with movement of the elevator car is utilized to control the operation of the car. Such mechanism is also used in elevator systems for other purposes, such as in signalling, scheduling and door operation. There are certain advantages in grouping these various operating parts together in a single mechanism driven from the elevator car. The invention is directed to mechanism of this character. Such mechanism is known by various terms in the art, dependent principally upon the purpose served. For convenience, the mechanism will be hereinafter referred to as a selector.

One object of the invention is the provision of a selector in which operating parts may be readily added, subtracted or varied so as to give combinations of apparatus suitable for the requirements of different installations.

Another object of the invention is the provision on a selector of mechanism for controlling the retardation and stopping of the car which is accurate in operation, of simple construction and which is readily accessible for purposes of connecting and adjusting.

Another object of the invention is the provision for the elements of the selector actuated in accordance with car movement of driving mechanism which is reliable in operation, of simple construction and economical to manufacture.

Features and advantages of the invention will be apparent from the following description and appended claims.

In the drawings:

Figure 1 is a simplified schematic representation 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 side elevation of a portion of the selector mechanism illustrating particularly the pawls and stopping lugs;

Figure 5 is an enlarged detail of the pawls and stopping lugs;

Figure 6 is a detail of the mechanism for retracting the stopping lugs;

Figure 7 is a detail taken along the line 7—7 of Figure 6;

Figure 8 is a detail taken along the line 8—8 of Figure 6;

Figure 9 is a detail in side elevation illustrating the mechanism for controlling the retardation and stopping of the elevator car;

Figure 10 is a detail taken along the line 10—10 of Figure 9;

Figure 11 is a detail taken along the line 11—11 of Figure 10;

Figure 12 is a detail in side elevation illustrating the crosshead panel assembly with various contacting elements arranged thereon;

Figure 13 is a detail in plan view of the crosshead panel assembly and the contacting elements on a floor bar for cooperating with the contacting elements on the crosshead;

Figure 14 is a side view of switching mechanism mounted on a crosshead panel and its operating cam on a floor bar, this view being taken along the line 14—14 of Figure 12;

Figure 15 is a front view of the same;

Figure 16 is a side view of a sectional cam on the crosshead panel and switching mechanism on a floor bar for cooperating therewith, this view being taken along the line 16—16 of Figure 12;

Figure 17 is a view taken along the line 17—17 of Figure 16;

Figure 18 is a view taken along the line 18—18 of Figure 16; and

Figure 19 is a fragmental detail of a contact mounted on a crosshead panel and the contact spring on a floor bar for cooperating therewith.

For a general understanding of a typical 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 for example as disclosed in the patent to Lewis, Waters and Krauer, No. 2,101,146, granted December 7, 1937. 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. The hoisting motor is controlled by various electromagnetic switches mounted on a control panel. An 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. Up and down push buttons are arranged at the intermediate floors and a single push button is

arranged at each terminal floor. These buttons are known as hall buttons. The elevator car is provided with an independent set of push buttons, one button being provided for each floor. These push buttons are known as car buttons. The hall 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 driving drum. This drum is driven by means of piano wire. This wire is arranged in two sections. One section of the wire is attached at one end to the top of the elevator car. From the car it extends upwardly to the drum on one side thereof and is wound around the drum in a certain direction in the helical groove provided on the drum. The other end of this section of the wire is secured at the point on the end of the drum where the groove ends. The other section of wire is secured at one end to the top of the counterweight through the intermediary of a spring. From the counterweight it extends upwardly to the drum on the other side and is wound around the drum in the opposite direction in the helical groove to occupy the remaining space. The other end of this section of the wire is secured to the drum at the point where the groove ends. Thus one section of the wire winds up as the other section unwinds in the driving operation, the section which winds up taking up the space vacated by the unwinding section. A silent drive is thus provided which is unaffected by sliding or stretching ropes and the moving parts of the selector are driven in exact synchronism with the elevator car.

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 19 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 top plate 22 joined together by four corner posts 23 in the form of angle irons. The angle irons are secured to the plates through feet 24, the angle irons being fastened to the feet which in turn are secured to the plates. The selector drive shaft 25 is supported in bearings 26 secured to the base plate. The driving drum 27 for the selector is secured to the outer end of the shaft. This shaft operates through bevel gears 28 and 29 to drive an operating shaft 30 in bearings 31.

The operating shaft has a sprocket 32 secured to the end thereof for driving an endless sprocket chain 33. This chain extends upwardly over and around an idler sprocket 34 mounted on a tensioning device 35 secured to top plate 22. The tensioning device comprises a lever 36 which carries a stub shaft upon which idler sprocket 34 is mounted. This lever is pivotally supported by bracket 37 secured to the top plate and at its outer end is arranged between two adjusting nuts 38 arranged on a screw 40 secured to the top plate.

Sprocket chain 33 acts through a sprocket wheel 41 to drive the selector crosshead 42. The sprocket 41 is mounted on the stub shaft 43 secured to the crosshead in position for the sprocket wheel to mesh with the left hand run of the chain as viewed in Figure 2. A shoe 44 is carried by the crosshead opposite the sprocket wheel in position to maintain the chain in mesh with the sprocket wheel at all times. This shoe is formed on a block 45 which is secured to the crosshead by screws 46. The sprocket wheel meshes on its other side with a stationary chain 47 secured at its ends by tensioning bolts 48 to the top and bottom plates. A similar shoe 50 is carried by the crosshead to maintain the stationary chain in mesh with the sprocket wheel at all times. With this arrangement, a 2:1 ratio drive chain movement to crosshead movement is obtained. In other words, for every two inches of chain movement, an inch of crosshead movement is obtained.

The crosshead in its up and down movement slides on a tubular member 51. This tubular member is secured in apertures 52 formed in the top and bottom plates, the arrangement for the upper plate being illustrated in Figure 9. The crosshead is provided with a cylindrical aperture through which the tube extends, the crosshead being slid onto the tube before the top plate is put in place in the assembly operation.

Another tubular member 53 is similarly secured to the top and bottom plates and serves as a further guide for the crosshead. One end of the crosshead is bifurcated to provide guide arms 54 spanning member 53. A guide shoe 55 is supported by each guide arm in position to engage member 53 and thus maintain the proper angular position of the crosshead on tubular member 51.

The cross head carries a pair of oppositely disposed pawls 56 and 57 for cooperating with stopping lugs 58 mounted on an elongated tubular sleeve 60. The arrangement of these pawls is shown in Figures 4 and 5. Each pawl is pivotally mounted on a pin 61 secured to a bracket 62 carried by an elongated lug 59 of the crosshead. The pawl is biased by spring 63 into position for cooperation with the stopping lugs, this spring being arranged between the end of the pawl and an arm 64 formed on the bracket. A lug 65 formed on the pawl cooperates with the arm 64 to limit the outward movement of the pawl. The brackets are secured to the crosshead by bolts 67, the heads of the bolts being welded to the bracket. These bolts extend into apertures 66 in elongated lug 59, a plurality of the apertures being provided in vertical alignment. This arrangement permits adjusting the positions of the pawls, which is desirable in certain installations to take care of short floor height conditions.

The stopping lugs 58 are carried by collars 70 adjustably mounted on sleeve 60. A stopping lug is provided for each floor, the collars being in spaced relation on sleeve 60 in accordance with the distance between the floors for which the lugs are provided. The collars are split to permit adjustment and clamping thereof to the sleeve, the collars being clamped in adjusted position by bolts 71. Each stopping lug is provided with a threaded stem 72 which extends through an aperture 73 in supporting arm 74 formed on the collar. A shoulder 75 is formed on this arm against which the lug fits to prevent rotative

movement thereof. The lug is clamped in its proper position by means of a nut 76 on the threaded end of the stem. The upper pawl cooperates with the stopping lugs during upward movement of the crosshead and the lower pawl cooperates with the stopping lugs during downward movement of the crosshead.

The stopping lugs are retracted, during the movement of the crosshead, to a position where the pawls clear the lugs. The lugs are maintained retracted until the car arrives at a certain distance from a landing at which a stop is to be made. When this condition is reached, the lugs are released and move into position for cooperation with the pawls. This operation is controlled by an electromagnet 77 mounted on the bottom of top plate 22. This magnet operates a lever 78 which has a rod 80 secured thereto and extending downwardly therefrom into a slot 81 formed in an arm 82 secured to sleeve 60. Energization of the electromagnet causes clockwise movement of lever 78 as viewed in Figure 2, causing, through the action of rod 80 and arm 82, the clockwise movement of sleeve 60. This moves all the stopping lugs to retracted position, where the pawls clear during travel of the crosshead. Upon deenergization of the electromagnet, a spring 83 acts to swing the lever 78 counterclockwise. This in turn, through rod 80 and arm 82, causes counterclockwise movement of sleeve 60 to move the stopping lugs into position for cooperation with the pawls.

Details of the mechanism for retracting the stopping lugs are shown in Figures 6, 7 and 8. The electromagnet 77 comprises a frame formed of two end plates 85 and 86 and a side plate 87 joined as by welding to a top plate 88 and bottom plate 90, the top plate 88 being secured to the top plate 22 of the floor controller frame as by screws. The magnet coil 91 is arranged between the end plates 85 and 86 and is maintained in proper position by a stationary core 92. This core extends through an aperture in end plate 85 and is secured at its end to a plate 93, in turn secured to end plate 85 as by screws 94.

The stationary core is recessed to receive the conical end of the movable core 95 of the magnet. Core 95 extends through an aperture in end plate 86 and is connected by link 97 to lever 78. This lever is secured to a pivot shaft 98, supported by bearings 100 and 101 in the top and bottom plates of the magnet frame. This lever is made up of two parts, one part, 102, being arranged on the pivot shaft and the other, 103, being secured thereto and connected to link 97. The spring 83 is arranged between one arm of member 102 and end plate 86. This spring acts to bias the lever for counterclockwise rotative movement as viewed in Figure 7. The other arm of member 102 is provided with an adjustable screw 104 for cooperating with thin metal plates 105 secured to side plate 87 to limit the counterclockwise rotative movement of the lever, thereby bringing the stopping lugs to a stop in proper position for cooperation with the pawls.

The rod 80 is secured to lever member 103, being provided at its upper end with a threaded stem which extends through a lug 106 on member 103 and being secured to the lug by a nut on the threaded end of the stem. The rod is of square cross-section and the slot 81 in the arm 82, into which the rod extends, is formed with parallel sides to be engaged by the rod. The arm 82 is secured to the sleeve 60 as by welding.

With this arrangement, upon energization of the electromagnet its movable core is pulled inwardly to the position illustrated in Figure 7, causing clockwise rotative movement of the lever 78 and thus, through rod 80 and arm 82, clockwise movement of sleeve 60. This retracts the stopping lugs into position where they are clear of the pawls during movement of the crosshead. Upon deenergization of the electromagnet, spring 83 moves lever 78 counterclockwise into position where the lugs extend into the path of movement of the pawls. If the crosshead is moving upwardly, the up pawl engages the stopping lug next above as continued upward movement of the crosshead takes place, whereas, if the crosshead is moving downwardly, the down pawl engages the stopping lug next below as continued downward movement of the crosshead takes place. When a lug is engaged by a pawl, the continued movement of the crosshead causes corresponding movement of sleeve 60, that is, continued upward movement of the crosshead causes upward movement of the sleeve, while continued downward movement of the crosshead causes downward movement of the sleeve. The sleeve is arranged on a guide rod 110 which, for convenience, is secured at its upper end to pivot shaft 98. As this results in rotative movement of the rod, it is mounted at its lower end in a bearing provided in base plate 21. With such arrangement, the bearing 100 for the upper end of pivot shaft 98 is arranged as a thrust bearing to take care of any upward thrust which may result from upward movement of sleeve 60 on guide rod 110.

Movement of sleeve 60 by the pawls is utilized to operate a plurality of switches arranged on the top of the selector. A sprocket chain 111 is secured to a lug 112 formed on arm 82. This chain extends upwardly therefrom around a sprocket wheel 113 arranged on a shaft 114 supported in bearing stands 115 on top plate 22. From this sprocket wheel the chain extends downwardly into tubular member 51, where it is secured to the top of a counterweight rod 116. The lower end of the counterweight rod has secured thereto an additional chain 117 which extends downward therefrom around an idler pulley 118 pivotally supported in a bracket 119 secured to the base plate 21. From this pulley the chain extends upwardly to a bracket 120 to which the upper end of the chain is secured. This bracket is adjustably secured to the sleeve 60 to enable any slack in chains 111 and 117 to be taken up.

A collar 121 is secured to the lower end of counterweight rod 116 for supporting counterweight 122 arranged within tubular member 51. This counterweight is provided with an aperture 123 through which the counterweight rod 116 extends and is supported on collar 121 through the intermediary of a resilient washer 124. The weight of the counterweight is such as to overbalance the weight of sleeve 60, the counterweight being supported by tubular member 51 on a shoulder 125 which may be formed by providing an auxiliary tube inside tubular member 51 at the bottom. Near the top of counterweight rod 116 is secured another collar 126 for supporting balance weights 127. The weight of each balance weight is equal to the weight of a stopping collar and lug on sleeve 60, there being one balance weight provided for each stopping lug.

With this arrangement, upon downward movement of sleeve 60 by downward movement of the crosshead, counterweight 122 and balance weights

127 are lifted by the counterweight rod so that, upon rotative movement of the sleeve by electromagnet 77 to withdraw the stopping lug from cooperative engagement with the down pawl, counterweight 122 returns the sleeve to neutral position, being brought to a stop by the engagement of the resilient washer 124 with shoulder 125. Upon upward movement of sleeve 60 by the crosshead, downward movement of counterweight 122 is prevented by shoulder 125, the counterweight rod 116 sliding downwardly through aperture 123 in the counterweight. Thus only the rod and balance weights 127 are moved by the chains during upward movement of sleeve 60 so that, upon retraction of the stopping lug from engagement with the up pawl, the sleeve 60 is returned by gravity to neutral position and brought to a stop by the engagement of collar 121 with resilient washer 124.

Sprocket chain 111, in being driven by the above described movement of sleeve 60, causes rotative movement of sprocket wheel 113. The sprocket wheel, in turn, acts through shaft 114 to effect corresponding rotative movement of a plurality of cams to operate switches 130, 131, 132, 133, 134 and 135. Details of this portion of the mechanism are shown in Figures 9, 10 and 11. The bearing stands 115 for shaft 114 are secured to the top plate 22 as by screws. An angle member 136 extends between these stands, being secured as by bolts to brackets 137 formed on the stands. Switches 130, 131, 132, 133, 134 and 135 are secured as by screws to this angle member in spaced relation, space being provided for adding switches, if desired. These switches are principally for controlling retardation and stopping of the car. Each of these switches is of the same construction so that only one of them will be described. Details of construction are shown in Figures 10 and 11 and also in Figures 14 and 15 where the switch is shown for use in connection with another portion of the mechanism.

Each switch comprises a frame 140 of molded insulating material secured to angle member 136. The frame has a dividing member 141 extending upwardly from the base portion. A pair of leaf springs 143 is secured as by terminal screws 142 to bosses formed on the frame, one on each side of dividing member 141. Each spring has a silver contact tip at its upper end. Protecting stops 144 are formed on each side of member 141 between which the contact springs extend. The movable contact comprises a lever 145 pivotally mounted on a pin supported in a boss formed on the contact frame and having its upper end 146 bent toward the contact springs. A contact bridging member in the form of an angle 147 having a silver contact insert is secured to the bent end as by a screw 148. The contact lever is biased by spring 150 into position where the member 147 bridges the contact tips of the contact springs. The contact lever is channel shaped and lugs 151 are formed on the sides of the channel between the ends of the lever to form a support for the pivot pin for operating roller 152. This roller is positioned in the path of movement of cams 153 and 154 to move the lever about its pivot against the force of spring 155 into position to disengage the stationary contact springs.

The operating cams for switches 130, 131, 132 and 133 are arranged in pairs, the cams of each pair being arranged side by side on shaft 114. Each cam is arc shaped, the camming surface being the arc of a circle with the center coinciding with the operating shaft. The cam is provided with a split hub 156, a screw 156 extending across a portion of the hub to clamp the cam to the shaft. The cams are positioned on the shaft so that the cams straddle the operating roller 152 for the switch which they operate.

In certain installations it is preferred to provide separate up and down switches for the direction circuits. Such arrangement has been illustrated in which switches 134 and 135 are direction circuit switches for controlling the stopping of the car, one for up travel and the other for down. Each of these switches has only one operating cam. The leading edges of the cams for switches 130, 131, 132 and 133 are substantially equally spaced from the rollers which they operate, so that a similar amount of rotative movement is required in one direction as in the other to open each switch. Similarly, the cams for operating switches 134 and 135 are substantially equally spaced from the operating rollers of their switches. The cams are set so that their leading edges are increasingly farther from the rollers which their switches operate in the order of switches 130, 131, 132, 133 and 134 or 135. In other words, upon rotative movement of the operating shaft in either direction, the switches are opened in the order of switches 130, 131, 132, 133 and 134 or 135. The relative positions of the cams and the various switches with respect to the rollers with the shaft 14 in neutral position, that is, with the stopping lugs retracted, are indicated in Figure 2.

Assume that the elevator car is travelling in the up direction, causing the selector crosshead to be moved upwardly. Assume further that a call has been registered for the fourth floor. This call is picked up as the car arrives at a certain distance from the fourth floor, causing the de-energization of magnet 77 to extend the stopping lugs in the path of movement of the pawls. As continued movement of the crosshead takes place, the up pawl engages the fourth floor stopping lug, causing upward movement of sleeve 60. This causes clockwise rotative movement of shaft 114 as viewed in Figure 2, causing the opening of switches 130, 131, 132, 133 and 135 in sequence as the car reaches certain points in its approach to the fourth floor landing. The opening of these switches causes the car to slow down and stop at the fourth floor, the car being stopped as a result of the opening of switch 135 just before the car reaches an exact level with the landing.

Upon restarting the car, magnet 77 is energized to retract the stopping lugs. This releases the sleeve 60 which is returned to neutral position, causing the reclosing of the operated switches. During downward movement of the car and crosshead, upon the picking up of a call, the lugs are extended into position as before for cooperation with the pawls and the down pawl engages the lug for the floor for which the call is picked up. This causes downward movement of the sleeve and counterclockwise rotative movement of shaft 114, causing the opening of switches 130, 131, 132, 133 and 134 in sequence as the car reaches certain points in its approach to the landing. The opening of these switches causes the car to be slowed down and brought to a stop at the floor level, the stopping operation being effected as a result of the opening of switch 134.

When the car is brought to a stop, the crosshead being driven by the car also comes to a stop with the sleeve 60 moved to its operated position. If for any reason should the car and crosshead not come to a stop as a result of the opening of these switches, the pawl automatically disengages the stopping lug as sleeve 60 reaches its limit of travel to avoid any breakage of selector parts. This is effected by bevelling the corners of the stopping lugs and pawls as indicated at 160 and 161 in Figure 5. The angle of bevel is such that there is sufficient friction to effect movement of sleeve 60 but upon sleeve 60 being stopped the pawl slides past the lug, spring 63 yielding to permit this movement.

In setting the stopping lugs 58 on sleeve 60, the car is brought to an exact level with the floor for which a stopping lug is provided and, with the magnet 77 deenergized so that the sleeve 60 is in neutral position, the stopping lug is set so that its horizontal center is aligned with the horizontal center of elongated lug 59. Accurate setting is effected by means of a gauge which fits into slot 162 in lug 59, this gauge being provided with a slotted end to receive the end of the supporting arm 74 on the collar for the lug. In this way the stopping lug is located in correct position horizontally and it is also in the correct position radially for cooperation with the pawls 56 and 57.

Selectors of the construction shown in these drawings may be geared at different ratios. A ratio of 48 to 1, that is, forty-eight feet of car travel to one foot of crosshead movement, has been found satisfactory in average installations. The selector parts are illustrated for this ratio. The apertures in elongated lug 59 are illustrated as spaced a distance corresponding to one foot of car travel, that is, one-quarter of an inch apart. For installations without any short floor heights, the mounting brackets for the pawls are secured to the farthermost apertures 66 in elongated lug 59. This places the pawls in position to engage the stopping lug eight feet in advance of the floor for which the lug is provided.

A disc 163 marked off to provide a scale is secured to shaft 114 at one end thereof outside the bearing stand. This disc, in conjunction with pointer 164, is for setting the cams to operate the selector switches at the proper points. This scale is arranged symmetrically about a neutral point, that is, the point on the disc opposite the pointer 164 when sleeve 60 is in neutral position. Numerals may be applied to these marks as indicated. Each numbered mark on the scale represents one foot. Eight numbered marks have been provided on each side of the neutral point to correspond with the eight foot advance of the pawls.

As soon as the sleeve 60 is moved by a pawl, the shaft 114 is moved correspondingly, as previously described. When the car has arrived at a point seven feet from the floor, the mark on the scale numbered "1" in the direction corresponding to the direction of car movement becomes opposite the pointer. Similarly, as the car arrives at each successive point one foot closer to the floor, the next numbered mark on the scale becomes opposite the pointer, until the car arrives at the floor level, when the mark numbered "8" becomes opposite the pointer. If the speed is such that an eight foot slow down is provided, the cams for operating switch 130 are set to open the switch as soon as rotative movement of shaft 114 takes place in either direction. If the speed is such that a less slow down distance is provided, these cams are set to such angular position on shaft 114 as to delay the opening of switch 130 until the slow down initiating point is reached. The cams for the other switches are set to open these switches at decreasing distances from the floor, the actual angular positions of these cams being dependent upon the total slow down distance and the characteristics of the particular installation. In any event, the cams for operating switches 134 and 135 are set to operate these switches just before the car arrives at exact floor level. The setting of the various cams is effected by moving shaft 114 by hand in each direction until the pointer is opposite a point which is a distance from the point marked "8" corresponding to the distance of the car from the floor at which it is desired to have a particular switch open. The cam for that direction is then clamped onto shaft 114 in position to just crack open the switch.

In installations where a condition exists that the distance between a pair of adjacent floors is such that, with the stopping lugs set to correspond with this floor distance, the eight foot advance of the pawls would prevent the proper cooperation of the lugs for these floors with the pawls, the pawls are moved back toward center a sufficient distance to insure the proper cooperative relationship. This means a corresponding decrease in total slow down distance, so that the cams on shaft 114 are set to compensate for this decrease. For example, if the pawls are set back to a six foot advance point, the cams for operating switches 134 and 135 are set to open these switches just before the mark "6" comes opposite the pointer, with the positions of the other cams set according to the slow down distance and characteristics of the particular installation.

At each of its ends the crosshead carries a frame 170 upon which are mounted a plurality of circuit controlling elements for cooperating with stationary circuit controlling elements mounted on floor bars 171, one for each floor served by the car. These floor bars are spaced in accordance with the distance between the floors for which they are provided, and are mounted on round bars 172 secured to the bottom and top plates 21 and 22 of the floor controller. Details of this portion of the mechanism are shown in Figures 12, 13, 14, 15, 16, 17, 18 and 19.

Referring to these figures, each floor bar comprises an elongated flat bar 173 spanning mounting bars 172 and secured thereto by means of angle clamps 174 and screws 175, as shown in Figure 13. The bar is provided with a plurality of equally spaced apertures 176 for mounting the various circuit controlling elements. In the arrangement shown in Figure 13, the floor bar has mounted thereon a plurality of spring contacts and two operating cams. The spring contacts are mounted on the bar through the intermediary of insulating bases both on the front and back of the bar. These bases are arranged in duplicate sections 177, each section being formed with three slots 178 to receive the feet 180 of the guards 181 for the contact springs. The slots are spaced in accordance with the distance between the apertures in bar 173 and in back of each slot is formed a circular porjection 182 which extends partially into the aperture for locating the insulated section on the bar. The guard 181 for the spring contact is secured to the bar by a screw which extends through an aperture formed centrally of the slot 178 for the base of the guard.

These screws also serve to clamp the front and rear insulated mounting sections together and as connecting screws for the leads to the spring contacts.

Contact springs 183 are secured to the spring guards by rivets which extend through clips 184 which cooperate with the flattened side of the head of the mounting screw to prevent the screw from turning. At the end of the contact spring is provided one or more silver contact tips 185. In the arrangement shown in Figure 13, eleven spring contacts are provided. The spring contact 186 on the extreme right has two contact tips, the outer one of which is for engaging with a contacting cam carried by the crosshead frame and the inner one of which is for engaging with the contact tip of an oppositely arranged spring contact 187 when the outer contact tip is not engaged by the crosshead cams. A similar arrangement is provided for the spring contacts 188 and 190 third and fourth from the right. The next five spring contacts 191, 192, 193, 194 and 195 to the left have single contact tips at their ends, the first two for cooperating with cams carried by the crosshead frame and the next three for cooperation with contacts carried by the crosshead frame. The last two spring contacts 196 and 197 are arranged in the same manner as spring contacts 188 and 190.

The crosshead frame 170 which carries the various elements for cooperating with the spring contacts above described is provided with a mounting panel of insulating material arranged in duplicate sections 200. The frame is made up of angle members secured together in right angle relationship. The panel sections 200 are secured in abutting relation to the sides of the cross angles as by screws 201. Each panel section is formed with a plurality of elongated slots 202 and with apertures 203 extending through the panel along the longitudinal center lines of the slots. The slots are located so as to be equally spaced throughout the width of the mounting panel, with the distance between their longitudinal center lines equal to the distance between the centers of the apertures 176 in bar 173.

The various cams and contacts for cooperating with the spring contacts on the floor bars are secured to brackets adjustably mounted in slots 202. The feet 204 and 205 of the brackets are of a width to fit within the slots 202 to properly locate the contacting elements and at the same time permit these elements to be slid longitudinally of the slots for purposes of adjustment. The brackets are secured to the panels by screws 206, which extend through apertures 203 into a nut 207 in back of the panel. As illustrated in Figures 16 and 18, this nut is provided with an off-center threaded aperture to receive the screw and with an additional off-center threaded aperture to receive an additional screw 208. The front end of screw 208 extends into aperture 203 to prevent the nut from turning and the outer end of the screw serves to receive binding posts for effecting the connection of the contacting element in the system.

The contacting cam for engaging the outer contact tip of spring contact 197 is illustrated as arranged in four sections 210, 211, 212 and 213. The upper three sections are of insulating material while the bottom section is of conducting material. Details of this portion of the mechanism are shown in Figures 16, 17 and 18. The brackets 214 and 215 for the intermediate ones of these cam sections have their mounting arms 216 and 217 extending toward each other from their bases. The arm of bracket 215 for cam section 212 extends outwardly as shown in Figure 18 sufficiently to mount cam section 212 outside of cam section 211, the arm being bulged to receive the extended portion of the arm 214 of cam 211 in telescopic relationship. This permits the two cam sections to be adjusted in overlapping positions. The outer two cam sections are maintained in abutting relationship with their adjacent inner sections.

When the outer contact tip of spring contact 197 is engaged by the cam, the inner contact tip is separated from the contact tip of spring contact 196. This portion of mechanism is arranged in the direction control circuits but may be used for other purposes. When used for direction control in collective control systems, for example, there is provided a pair of spring contacts 196 and 197 per floor bar and the lowermost cam section 213 is of a length to span the spring contacts 197 for those adjacent floors which are the farthest floor distance apart. also, the insulated sections are set so that the upper insulated section 210 engages the outer contact tip of spring contact 197 during upward movement of the crosshead slightly more than slow down distance in advance of the floor for which the spring contact is provided and insulated section 212 engages the outer contact tip of spring contact 197 during downward movement of the crosshead slightly more than slow down distance in advance of the floor for which the spring contact is provided. This is for the purpose of causing the car to pick up a down call when traveling up, provided no calls are registered for floors above, and to pick up an up call when travelling down, provided no calls are registered for floors below.

The contacts carried by the crosshead for cooperating with spring contacts 193, 194 and 195 are designated 220. Each of these contacts is of the same construction and is preferably of impregnated carbon, secured as by soldering to the arm 221 of its mounting bracket. The contact is tapered to provide a short duration of contact with the contact tip of the spring contact. These contacts and the spring contacts may be used for various purposes, such as picking up calls and resetting floor relays. When employed to pick up calls, they are set to engage spring contacts when the car is at a certain distance from the floor for which the spring contact is provided. The reset of the operated floor relay may be effected at the same time. In certain instances, as where slow down is initiated at the time the call is picked up, this may be slow down distance in advance of the floor. It is preferred, however, to cause the slow down to be effected by the cooperation of the pawls with the stopping lugs. With such arrangement, each call pick up contact 220 is set to engage its spring contact to pick up the call at a distance in advance of the floor such that the stopping lug for that floor will be released at the proper time to be engaged by the pawl for the direction in which the car is travelling.

Contacts in addition to the call pick up contacts may be provided for cooperating with the spring contacts, these additional contacts being set to be in engagement with the tips of the spring contacts for a floor when the car is level with the floor. This arrangement may be used for resetting floor relays operated after the call for that floor has been picked up. These addi-

tional contacts may be used for other purposes, such as, for example, in the circuits for causing automatic door opening operation in response to the pushing of a hall button at the floor at which the car is positioned.

When contacts 220 are used for call pick up and floor relay reset and also for resetting floor relays operated after the slow down has been initiated, in an installation having one push button per floor in the elevator car and up and down hall buttons at intermediate floors, one column of three contacts is provided for the car button circuits, as shown in the column 219 of contacts for cooperating with spring contacts 195, another column of two contacts is provided for the up hall buttons, as shown in column 228 of contacts for cooperating with spring contacts 194, and a third column of two contacts is provided for the down hall button circuits, as shown in column 229 of contacts for cooperating with spring contacts 193.

The contacting cam for cooperating with spring contact 192 is arranged in four sections 222, 223, 224, 225. The two upper sections 222 and 223 are arranged for telescopic adjustment; similarly, the two lower sections 224 and 225 are arranged for telescopic adjustment, such mounting having been described in connection with cam sections 211 and 212. All of these cam sections are of conducting material. This arrangement also may be used for various purposes, including certain operations in the control of elevator cars in which the starting of the cars is under the control of a car attendant and the stopping is controlled in response to push buttons for the various floors. In such control arrangement, one spring contact 192 is provided on each floor bar for the floors served by the car.

The cam for operating spring contact 191 is arranged in two sections, designated 226 and 227. As in the case of the cam sections 211 and 212, sections 226 and 227 are arranged in telescopic relationship for adjustment purposes. Both sections of the cam are conducting. Such arrangement may be used for various purposes in elevator systems, such as the control of hall lanterns and car position indicators. When used for the control of the position indicators, one spring contact 191 is provided per floor for the floors served by the car. When used for control of hall lanterns, two columns of spring contacts of one contact per floor served by the car, with a separate contacting cam for each column, are provided, one column for up hall lanterns and the other for down hall lanterns, or there may be one contact per floor bar for floors below the uppermost floor served by the car for the up hall lanterns in the one column and one spring contact per floor bar for floors served by the car above the lowermost floor served by the car in the other column.

The contacting cam for engaging the outer contact tip of spring contact 190 is arranged in two sections 230 and 231. The lower section 230 is of conducting material and the upper section 231 of insulating material. These cam sections are mounted for telescopic adjustment. The contacting cam for engaging the outer contact tip of spring contact 186 is of a similar construction, being arranged in two sections, the upper one 232 of which is the conducting section and the lower one 233 the insulated section. These contacting cams and spring contacts 186, 187, 188 and 190 also may be used for various purposes in elevator circuits. For example, when used for scheduling, spring contacts 188 and 190 are arranged on the floor bar for the upper scheduling floor and spring contacts 186 and 187 are arranged on the floor bar for the lower scheduling floor. The conducting sections of the cams are positioned so that they are in engagement with the contact tips of their respective cooperating spring contacts when the car is at the scheduling floor for which the spring contact is provided. With such arrangement, when the lower cam section 230 engages the outer tip of spring contact 190 as the car approaches the lower scheduling floor, the inner contact tip is disengaged from the tip of spring contact 188. The spring contacts remain in this condition with the car stopped at the scheduling floor. However, should the car run to a floor below the scheduling floor, upon its return thereto the upper insulated section 231 causes the separation of spring contacts 190 and 188 before contact is made between the outer contact tip of spring contact 190 and conducting section 230, thus giving the desired control of the circuits under such conditions. The operation is similar for the cam sections 232 and 233 and spring contacts 187 and 186 in that, in returning to the upper scheduling floor from the floor above, the lower insulated section 233 separates spring contacts 187 and 186 before the outer contact tip of spring contact 186 contacts the conducting section 232 of the cam.

The arrangement of the spring contacts so that the springs extend inwardly from the floor bars perpendicular to the plane of the crosshead panel sections, with the flats of the springs vertical, takes up a minimum of space, permitting the floor bars to be placed close together. With this arrangement the contact springs are deflected horizontally by the vertical movement of the crosshead. Also, the spring contacts and their cooperating contacting elements on the crosshead insure positive circuit connections as there are no joints or lost motion connections involved.

The left hand panel as viewed in Figure 12 carries two switches 237 and 238 of the same construction as the switches on top of the selector, previously described. These switches are shown in Figures 14 and 15. The frame 140 of each switch is secured to an extension bracket 240 in turn welded to an elongated strap 241. This strap extends into the slot 202 in the panel and is secured to the panel as by screws 206 extending through aperture 203 into nut 207 in back of the panel, as previously described.

Each switch is provided with an operating cam 242, one for each floor. Each cam has a threaded shank 243. This shank extends through the floor bar aperture 176 opposite the switch. The shank is clamped to the floor bar by means of an adapter 244 on the cam side of the bar and a nut 245 on the other side. The adapter is provided with prongs 246 fitting over the floor bar. This enables the cam to be adjusted by loosening the nut 245 and turning the shank with a screw driver and to be clamped in adjusted position by taking up on the nut.

This arrangement may be used for various purposes in elevator circuits. For example, the switches may be used to control the automatic opening of the hatchway doors and car gate. By connecting the contacts of these switches in parallel relationship, they may be utilized to provide a door zone limit, that is, a zone in which the car must be in making a stop in order for the door opening operation to be initiated. With the switch contacts connected in parallel relationship, the circuit controlled thereby is not broken

by them unless both of them are open. By setting these switches so that the midpoints of their rollers are on the centers of the operating cams with the car stopped at a floor, a maximum door zone limit is obtained. This distance may be decreased by spreading the switches apart as indicated in Figure 12. A similar arrangement may be had by providing switches with making contacts and connecting these contacts in series relationship. These switches may be used for other purposes, as to control the stopping of the car in certain installations where the pawls and stopping lugs are omitted.

The frame 170 is provided with threaded apertures 247 on each end thereof which are utilized to mount gauges for setting the floor bars. With the gauges in place, the car is brought to an exact floor level and the floor bar for that floor is then moved to and clamped in position opposite the gauges.

The contacting elements which are provided on the floor bars and on the panels of the crosshead frames are determined by the particular installations. In certain relatively simple installations, a few contacting elements are provided on each floor bar and on the crosshead panels. In such event, insulated mounting bases are provided only for the contacting elements used on the floor bars. Similarly, crosshead panels are provided only for the contacting elements provided on the crosshead panel. In some installations, on the other hand, a large number of contacting elements are used both on the crosshead and, if the number of them is sufficient, floor bars are provided on both sides of the selector for mounting the stationary elements, and panels are provided on both crosshead frames for the moving elements. The positions of the contacting elements may vary depending upon the particular installation. The use of insulated bases and panels in sections enables these different combinations to be effected without any change in design of apparatus. In a system such as disclosed in the patent to Lewis, Waters and Krauer, No. 2,101,146, granted December 7, 1937, previously referred to, the contacting cam, made up of sections 210, 211, 212 and 213, and the columns 219, 228 and 229 of contacts are provided on the crosshead and spring contacts 197, 196, 195, 194 and 193 are provided on the floor bars. In other types of systems, other combinations are used. It is to be understood that the mechanism with suitable combinations of apparatus is applicable not only to systems in which push buttons control the operation of the car but also to those in which push buttons are not provided or those in which push buttons are utilized to control the operation of signalling mechanism.

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 serving a plurality of landings comprising; switching mechanism; rotatable means; a plurality of lugs, one for each of said landings, mounted on said rotatable means in spaced relation in accordance with the distance between the landings for which the lugs are provided; movable means actuated in accordance with car movement; a member carried by said movable means for cooperation with said lugs; electromagnetically controlled means for effecting rotative movement of said rotatable means to move said lugs into and out of the path of movement of said member, said member upon extension of said lugs into its path of movement acting to engage the next lug; and means operable by the coaction of said member with said lug as movement of said movable means continues for actuating said switching mechanism.

2. Control mechanism for an elevator car serving a plurality of landings comprising; a movable member; a plurality of lugs, one for each of said landings; means for securing said lugs on said movable member in spaced relation in accordance with the distance between the landings for which they are provided; a pair of oppositely disposed pawls for engaging said lugs; means for moving said pawls in accordance with car movement; means for operating said movable member to move said lugs into and out of the path of movement of said pawls, one or the other of said pawls, depending upon the direction in which they are moving, acting upon extension of said lugs into the path of movement of said pawls to engage the next lug in the direction therefrom in which the pawls are moving and thereby to move said movable member in said direction as movement of said pawl continues; switching mechanism; and means operable by movement of said movable member by a pawl for actuating said switching mechanism.

3. Control mechanism for an elevator car serving a plurality of landings comprising; a movable member actuated in accordance with movement of the elevator car; an elongated member adapted for movement along a path parallel to that of said movable member; a plurality of lugs, one for each of said landings; means for securing said lugs on said elongated member in spaced relation in accordance with the distance between the landings for which they are provided; a pair of oppositely disposed pawls, one for each direction of movement of said movable member, mounted on said movable member for engaging said lugs; means for operating said elongated member to move said lugs into and out of the path of movement of said pawls, said pawl for the direction in which said movable member is being actuated acting upon extension of said lugs into the path of movement of said pawls to engage the next lug in said direction therefrom and thereby to move said elongated member from a neutral position in said direction as movement of said movable member continues; means operable upon retraction of said lugs after movement of said elongated member by a pawl to return said elongated member to its neutral position; switching mechanism; and means operable by movement of said elongated member by a pawl for actuating said switching mechanism.

4. A selector for an elevator car serving a plurality of landings comprising; an elongated guide; a member slidably mounted on said guide; a plurality of lugs, one for each of said landings; means for securing said lugs on said member in spaced relation in accordance with the distance between the landings for which they are provided; a crosshead actuated in accordance with movement of the elevator car; a pair of oppositely disposed pawls, one for each direction of movement of said crosshead, mounted on said crosshead for engaging said lugs, said member being biased to extend said lugs into the path of movement of said pawls; electromagnetic means for operating said member to re-

tract said lugs into position to be clear of said pawls during movement of said crosshead, said pawl for the direction in which said crosshead is being actuated acting upon extension of said lugs to engage the next lug in said direction therefrom and thereby to move said member from a neutral position longitudinally on said guide in said direction as movement of said crosshead continues; means operable upon retraction of said lugs after movement of said member on said guide by a pawl to return said member to its neutral position; switching mechanism; and means operable by movement of said member on said guide for actuating said switching mechanism.

5. A selector for an elevator car serving a plurality of landings comprising; an elongated guide; a pair of wheels, one at each end of said guide; a sleeve slidably mounted on said guide; means forming a closed loop comprising said sleeve and flexible means connected to opposite ends of said sleeve and extending oppositely therefrom to and around said wheels; a plurality of lugs, one for each of said landings; means for securing said lugs on said sleeve in spaced relation in accordance with the distance between the landings for which they are provided; a crosshead actuated in accordance with movement of the elevator car; a pair of oppositely disposed pawls mounted on said crosshead for engaging said lugs, said sleeve being biased to an angular position to extend said lugs into the path of movement of said pawls; an electromagnet; means operable by said electromagnet for turning said sleeve in a direction to retract said lugs into position to be clear of said pawls during movement of said crosshead, said pawl for the direction in which said crosshead is being actuated acting upon extension of said lugs to engage the next lug in said direction therefrom and thereby to move said sleeve from a neutral position longitudinally on said guide in said direction as movement of said crosshead continues; means operable upon retraction of said lugs after movement of said sleeve on said guide by a pawl to return said sleeve to its neutral position; and switching mechanism operable by rotative movement of one of said wheels by said flexible means upon longitudinal movement of said sleeve on said guide.

6. A selector for an elevator car serving a plurality of landings comprising; an elongated vertical guide; a pair of wheels, one at each end of said guide; a tubular member slidably mounted on said guide; means forming a closed loop comprising said tubular member and flexible means connected to opposite ends of said tubular member and extending oppositely therefrom to and around said wheels; a plurality of lugs, one for each of said landings; means for securing said lugs on said tubular member in spaced relation in accordance with the distance between the landings for which they are provided; a vertically movable crosshead; means for actuating said crosshead in accordance with movement of the elevator car; a pair of oppositely disposed pawls mounted on said crosshead for engaging said lugs, said tubular member being biased to an angular position to extend said lugs into the path of movement of said pawls; an electromagnet; means operable by said electromagnet for turning said tubular member in a direction to retract said lugs into position to be clear of said pawls during movement of said crosshead, said pawl for the direction in which said crosshead is being actuated acting upon extension of said lugs to engage the next lug in said direction therefrom and thereby to move said tubular member from a neutral position longitudinally on said guide in said direction as movement of said crosshead continues; means for overbalancing said tubular member; means for supporting said overbalancing means in position to support said tubular member in neutral position, said overbalancing means acting upon retraction of said lugs after movement of said tubular member on said guide in one direction to return said tubular member to its neutral position and said tubular member acting upon retraction of said lugs after movement thereof on said guide in the opposite direction to return to its neutral position under the influence of gravity; and switching mechanism operable by rotative movement of one of said wheels by said flexible means upon longitudinal movement of said tubular member on said guide.

7. A selector for an elevator car serving a plurality of landings comprising; an elongated vertical guide; a sprocket wheel at one end of said guide; an idler wheel at the other end of said guide; a sleeve slidably mounted on said guide; a sprocket chain connected at one end to the end of said sleeve toward said sprocket wheel and extending therefrom to and around said sprocket wheel; a second chain connected at one end to the other end of said sleeve and extending oppositely therefrom to and around said idler wheel; a rod connecting the other ends of said chains together to form a closed loop; a plurality of arms, one for each of said landings, secured on said sleeve and spaced thereon in accordance with the distance between the respective landings; a stopping lug on the end of each arm; a vertically movable crosshead; means for actuating said crosshead in accordance with movement of the elevator car; a pair of oppositely disposed pawls mounted on said crosshead for engaging said lugs; an electromagnet; means operable by said electromagnet for turning said sleeve in a direction to retract said lugs into position to be clear of said pawls during movement of said crosshead; means biasing said sleeve for turning in a direction to extend said lugs into the path of movement of said pawls, said pawl for the direction in which said crosshead is being actuated acting upon extension of said lugs to engage the next lug in said direction therefrom and thereby to move said sleeve longitudinally on said guide from a neutral position in said direction as movement of said crosshead continues; a weighted member slidably arranged on said rod for overbalancing said sleeve; means supporting said weighted member in position to support said sleeve in neutral position; means secured to said rod for lifting said weighted member upon movement of said sleeve longitudinally on its guide in one direction, said weighted member acting upon retraction of said lugs to return said sleeve to its neutral position and said supporting means by supporting said weighted member upon longitudinal movement of said sleeve on its guide in the opposite direction from neutral, discontinuing said overbalance, said sleeve acting under such conditions upon retraction of said lugs to return to its neutral position under the influence of gravity; and switching mechanism operable by rotative movement of said sprocket wheel by said sprocket chain upon longitudinal movement of said sleeve on said guide.

8. Control mechanism for an elevator car serv-

ing a plurality of landings; switching mechanism; an elongated guide; movable means slidably mounted on said guide; a pair of wheels, one at each end of said guide; flexible means connected to the ends of said movable means and extending around said wheels to form a closed loop; means operated in accordance with car movement for moving said movable means longitudinally on said guide from a neutral position; a weighted member slidably arranged on said flexible means for overbalancing said movable means; means supporting said weighted member for supporting said movable means in neutral position; and means secured to said flexible means for lifting said weighted member upon movement of said movable means in one direction, said weighted member acting under such conditions to return said movable means to its neutral position, and said supporting means supporting said weighted member upon movement of said movable means in the opposite direction to discontinue said overbalance, said movable means acting under such conditions to return to its neutral position under the influence of gravity.

9. Selector mechanism for an elevator car serving a plurality of landings comprising; a frame; a movable member; means for guiding the movement of said member in said frame; a sprocket wheel rotatably mounted on said member; a stationary sprocket chain secured to said frame parallel with the path of movement of said member and meshing with said sprocket wheel; and means for rotating said sprocket wheel in accordance with movement of the elevator car, whereby said member is moved in accordance with movement of the car but at one-half the peripheral speed of said sprocket wheel.

10. Selector mechanism for an elevator car serving a plurality of landings comprising; an endless sprocket chain; a frame; a pair of wheels mounted on said frame around which said chain passes; means acting through one of said wheels to drive said sprocket chain in accordance with movement of the elevator car; a stationary sprocket chain secured to said frame parallel with one run of said endless chain; a movable member; and a sprocket wheel rotatably mounted on said member and meshing on one side with said stationary chain and on the other with said one run of said endless chain, whereby upon rotative movement of said sprocket wheel by said endless chain said member is moved in accordance with movement of the car but at one-half the speed of said endless chain.

11. Selector mechanism for an elevator car serving a plurality of landings comprising; an elongated frame; a pair of wheels, one at each end of said frame; an endless sprocket chain passing around said wheels; means acting through one of said wheels to drive said sprocket chain in accordance with movement of the elevator car; a crosshead; means for guiding said crosshead for movement toward either end of said frame; a sprocket wheel rotatably mounted on said crosshead and meshing with one run of said chain; and a stationary sprocket chain meshing with said sprocket wheel on the side opposite to said endless chain, whereby upon rotative movement of said sprocket wheel by said endless chain said crosshead is moved in accordance with movement of the car but at one-half the speed of said endless chain.

12. Selector mechanism for an elevator car serving a plurality of landings comprising; a frame having two end plates; a sprocket wheel mounted on one of said end plates; an idler wheel mounted on the other end plate; an endless sprocket chain passing around said wheels; means acting through said sprocket wheel to drive said sprocket chain in accordance with movement of the elevator car; a crosshead; means for guiding said crosshead for movement toward either end plate; an additional sprocket wheel rotatably mounted on said crosshead and meshing with one run of said chain; and a stationary sprocket chain meshing with said additional sprocket wheel on the side opposite to said endless chain, rotative movement of said additional sprocket wheel by said endless chain causing said additional sprocket wheel to travel on said stationary chain and thus cause movement of said crosshead in accordance with movement of the car but at one-half the speed of said endless chain.

EDWARD LEE DUNN.