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C. SAVAGE

2,840,188

ELEVATOR SYSTEMS

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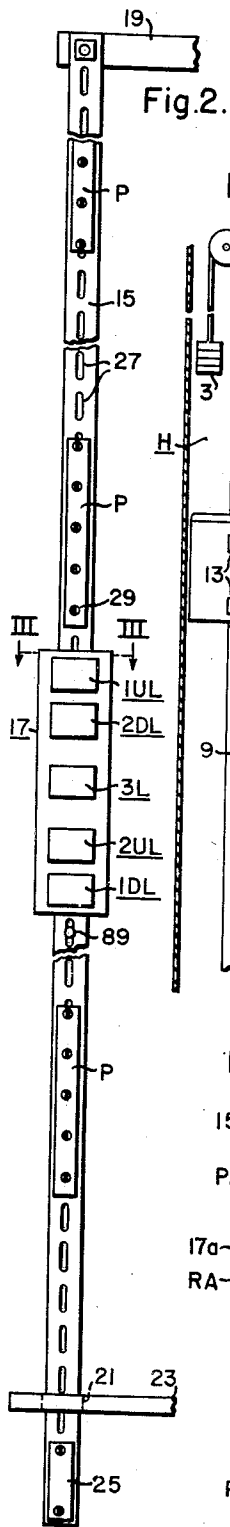


Fig. 1.

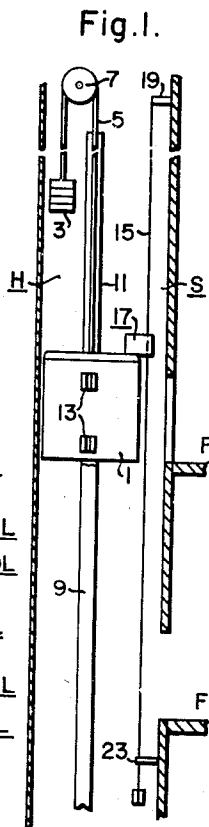


Fig. 3.

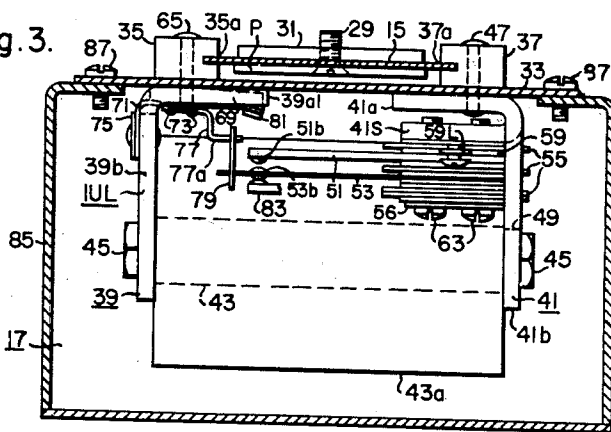


Fig. 4.

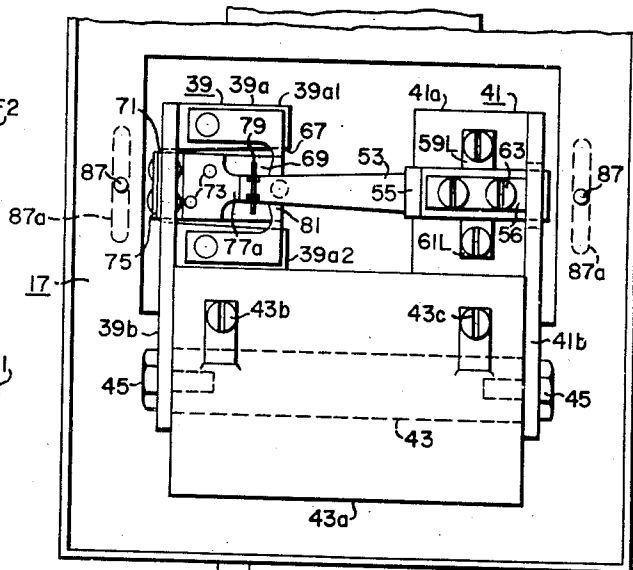


Fig. 7.

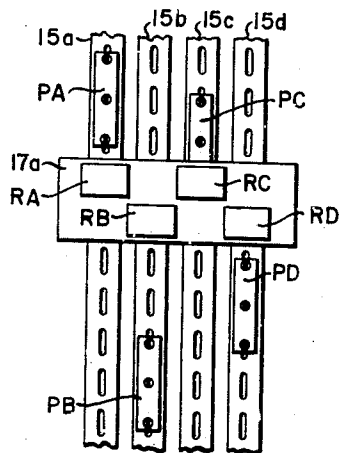


Fig. 6.

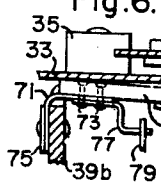
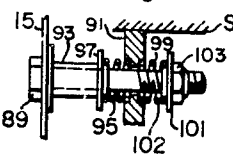


Fig. 5.



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2,840,188

ELEVATOR SYSTEMS

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14 Claims. (Cl. 187—29)

This invention relates to elevator systems and it has particular relation to elevator systems wherein controls are responsive to the position of an elevator car in its hoistway.

In elevator systems it has been the practice to employ translating devices which are responsive to the position of an elevator car in its hoistway for the purpose of controlling the operation of the elevator car. For example, such a translating device may take the form of mechanism for producing a light beam which is interrupted when the elevator car reaches a predetermined position in its hoistway for the purpose of initiating a control operation. As a further example, the translating device may take the form of a mechanical switch which is cam operated as the elevator car reaches a predetermined position in its hoistway. One of the most satisfactory translating devices takes the form of an inductor relay which has an incomplete magnetic circuit when the inductor relay is in effective condition. The relay is moved with an elevator car into juxtaposition with a magnetic plate to complete the magnetic circuit for the inductor relay. This results in an operation of the inductor relay.

In an elevator system an elevator car is guided for movement generally in a vertical direction through the hoistway of a structure such as a building. Because of tolerances provided for manufacturing purposes and to permit operation of the elevator system despite minor building distortions, an elevator car can move slightly in horizontal directions with respect to its hoistway. Translating devices associated with the elevator car must permit such movement of the elevator car, and this may result in constructional and operational disadvantages.

In accordance with the invention, an elevator system is provided with an elongated control element which extends along the hoistway of an elevator car for a distance somewhat greater than the travel of the elevator car. This control element is substantially fixed in a vertical direction with respect to the structure housing the elevator system. However, the control element is movable horizontally for distances corresponding to the distances to which the elevator car may move relative to its housing structure in horizontal directions.

The elevator car is provided with a translating device. During movement of the elevator car in its hoistway, the control element is guided accurately with respect to the translating device. If the translating device is in the form of an inductor relay, the control element may be provided with vertically spaced control devices in the form of inductor plates for controlling the operation of the inductor relay. If a large number of controls are required, a plurality of control elements may be mounted in side-by-side relationship for the purpose of controlling the operation of separate translating devices.

It is, therefore, an object of the invention to provide an elongated control element for an elevator system which is fixed relative to the structure enclosing the elevator system against movement in the direction of its length

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but which is movable in directions transverse to its length.

It is another object of the invention to provide an elevator system employing the control element of the preceding paragraph in combination with a translating device mounted on an elevator car which is movable along the control element with the translating device being responsive to the position of the control element relative thereto.

It is an additional object of the invention to provide an elevator system having multiple elongated control elements mounted in a hoistway in side-by-side relationship in fixed positions vertically but movable relative to the hoistway in horizontal directions together with a separate translating device for each of the control elements mounted on an elevator car for movement therewith.

Other objects of the invention will be apparent from the following description taken in conjunction with the accompanying drawing, in which:

Figure 1 is a view in elevation with parts broken away of an elevator system embodying the invention;

Fig. 2 is a view in elevation with parts broken away of a control element and translating devices suitable for the system of Fig. 1;

Fig. 3 is a view in section taken on the line III—III of Fig. 2 and showing an inductor relay;

Fig. 4 is a view in elevation of the inductor relay shown in Fig. 3;

Fig. 5 is a detailed view in section showing an intermediate support for the control element of Fig. 2;

Fig. 6 is a detailed view in section showing the link construction of the inductor relay of Fig. 3; and

Fig. 7 is a view in elevation with parts broken away showing a plurality of control elements in side-by-side relation and their associated translating devices.

Referring to the drawing, Fig. 1 shows an elevator system wherein an elevator car 1 is mounted in the hoistway H of a building or structure S for the purpose of serving a plurality of floors or landings which are vertically spaced in the building. Two floors F1 and F2 are illustrated in Fig. 1.

The elevator car 1 is connected to a counterweight 3 by means of one or more flexible cables or ropes 5 which pass over a sheave 7. It will be understood that the sheave may be rotated in any conventional manner for the purpose of moving the elevator car in its hoistway and stopping the elevator car at selected floors. For present purposes, it will be assumed that the elevator car 1 is operated by a system similar to that shown in the Santini et al. Patent 2,674,348, issued April 6, 1954.

The elevator car 1 is guided for vertical movement by means of a pair of conventional guide rails 9 and 11 mounted on opposite sides of the car which cooperate with suitable guide shoes 13 mounted on opposite sides of the car provided with the elevator car. Such guide mechanism is well known in the art.

For the purpose of controlling the movement of the elevator car an elongated control element 15 is secured to the structure S. This control element is continuous from a point below the lower end of the path of the travel of the elevator car 1 to a point above the upper end of the path of travel of the car. It is substantially inextensible but capable of horizontal movement relative to the structure at points spaced from its ends.

The control element 15 is guided with respect to a control unit 17 which is mounted on the elevator car. The relationship of the parts will be understood by consideration of Fig. 2.

Conveniently, the upper end of the control element 15 may be secured rigidly to a bracket 19 which, in turn, is secured to the building or structure S or to the guide

rail 9 or 11. The control element 15 may be constructed of any suitable flexible but inextensible non-magnetic metallic or non-metallic material. Suitable materials include aluminum and bronze. In a preferred form of the invention the control element 15 is in the form of a thin ribbon or tape having its upper end secured to the bracket 19.

The lower end of the control element 15 conveniently may pass through a vertical slit 21 in a bracket 23 which is secured to the building or structure S or to the guide rail 9 or 11. The lower end of the control element may be biased in any suitable manner for the purpose of maintaining the control element in taut condition. For present purposes, it will be assumed that weights 25 are attached to the lower end of the control element for the purpose of maintaining the control element taut.

The control unit 17 conveniently may include five vertically spaced inductor relays 1UL, 2DL, 3L, 2UL and 1DL. These relays may be similar to the relays identified by the same reference characters in the aforesaid Santini patent and may be employed in the manner set forth in the patent for controlling the operation of the elevator car.

The operation of the control unit 17 is determined in part by suitable control devices P which are spaced vertically along the control element 15. If the control unit employs inductor relays similar to those described in my Patent 2,666,111, which was issued January 12, 1954, the control devices may take the form of magnetic channels similar to those disclosed in my patent. However, it will be assumed that the inductor relays are of a construction to be described below and that the control devices P are flat plates constructed of a magnetically soft material such as soft iron or steel.

Preferably, each of the inductor plates P is adjustable with respect to the non-magnetic ribbon employed for the control element 15. To this end, the non-magnetic ribbon may have a plurality of vertically spaced elongated slots 27 formed therein. Each pair of adjacent slots is separated vertically by a space which is smaller than the length of the slot. Each inductor plate is secured to the ribbon by means of machine screws 29 which pass through openings in the inductor plate and in the ribbon for threaded reception in clamping bars 31. Consequently, each of the screws clamps the ribbon between an inductor plate and one of the bars 31.

The inductor relays are secured to one face of a base plate 33 constructed of a non-magnetic material such as brass or aluminum. Two spaced guide members 35 and 37 are secured to the opposite face of this face plate 33. These guide members may have slots 35a and 37a, respectively, for slidably receiving the edges of the control element 15. The guide members may be constructed of a non-magnetic material which permits sliding movement of the control element such as bronze.

The inductor relay 1UL herein illustrated includes two polar assemblies 39 and 41 which are constructed of a soft magnetic material such as magnetically soft iron or steel. These polar assemblies are secured to the opposite ends of a magnetic core 43 in any suitable manner as by machine screws 45.

The polar assembly 41 is in the form of an angle having two arms 41a and 41b which are at right angles to each other. The arm 41a engages the base plate 33 and may be secured thereto by means of a rivet 47 which passes through the arm, the base plate and the guide member 37.

It will be noted that a window 49 is provided in the arm 41b. Conveniently, this window may be formed by slitting the material of the arm along three sides of the window and bending the material so outlined parallel to the arm 41a to provide a support 41s for a contact assembly.

This contact assembly includes a fixed electro-conduc-

tive contact member 51 having a contact button 51b at one end. In addition, an electroconductive leaf spring 53 is provided which has a contact button 53b adjacent one end thereof. The contact member 51 and the leaf spring 53 are insulated from each other but are secured to the support 41s in any suitable manner. For present purposes it will be assumed that insulating spacers 55 are provided between the support 41s, the contact member 51, the leaf spring 53 and the clamp plate 56. To provide a terminal for the contact member 51, an electroconductive plate 59 in engagement with the contact member, has a lug 59L projecting therefrom. This lug has a terminal screw in threaded engagement therewith for the purpose of receiving an electrical connection. In a similar manner a lug 61L provides an electrical connection for the leaf spring 53. The various plates are secured to the support 41s by means of screws 63 which may be constructed of insulating material or which may pass through insulating sleeves for the purpose of insulating the screws from the various plates and contact members. Such contact construction is well understood in the art.

The polar assembly 39 is formed of an angle having two arms 39a and 39b which are at right angles to each other. The arm 39a is secured to the base plate 33 and the guide member 35 by means of rivets 65.

By inspection of Fig. 4 it will be noted that the arm 39a has a slot 67 of trapezoidal configuration formed therein between parts 39a1 and 39a2. A rectangular armature 69 is disposed in this slot. The armature is constructed of a soft magnetic material such as magnetically soft iron or steel and is hingedly associated with the arm 39b in any suitable manner. In a preferred embodiment of the invention, the hinge takes the form of a thin magnetic or non-magnetic spring ribbon 71 which is bent to bring one arm adjacent the armature 69 to which it is secured by rivets 73. The remaining arm of the spring is clamped between a clamp bar 75 and the arm 39b by means of suitable rivets. The spring conveniently can be constructed of bronze.

The armature 69 is coupled to the leaf spring 53 through an arm 77 which is secured to the armature. The arm has a lip 77a which extends substantially parallel to the leaf spring 53. An insulating link 79 couples the lip 77a to the leaf spring 53. The link may have a key-hole and key connection to the lip 77a and the end of the leaf spring 53 in the manner discussed in my aforesaid patent.

It is assumed that the contacts provided by the contact member 51 and the leaf spring 53 are of the make type. Consequently, the spring 53 is self-biased away from the contact member 51 and through the link 79 maintains the armature 69 against a non-magnetic stop 81. This non-magnetic stop may be formed from a sheet of brass which has its ends riveted to the arm 39a of the polar assembly.

If break contacts are desired, a fixed contact member 83 could be disposed adjacent the opposite face of the button 53b. Thus, the self-bias of the leaf spring 53 would bias the contact button 53b into engagement with the contact member 83. It will be understood that the contact member 83 would be secured to the support 41s but would be insulated from the remaining elements in the same manner by which the contact member 51 and the leaf spring 53 are mounted.

In order to consider the operation of the inductor relay shown in Fig. 3, let it be assumed that the magnetic core 43 is constructed of a permanent magnet material which develops a magnetomotive force between the polar assemblies 39 and 41. If the inductor plate P is not located adjacent the inductor relay 1UL, a substantial non-magnetic gap is present between the polar assemblies. Because of the substantial magnetic reluctance introduced by this gap, little magnetic flux flows and a negligible magnetic force is exerted on the armature 69.

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If the inductor plate P now is brought adjacent the inductor relay 1UL, a magnetic circuit for the relay is substantially completed and substantial magnetic flux now flows through this magnetic circuit. The solenoid force exerted on the armature 69 now forces the armature in a counterclockwise direction about its hinge as viewed in Fig. 3 to raise the link 79 and force the contact button 53b into engagement with the contact button 51b. When the inductor plate P is removed from the vicinity of the inductor relay 1UL, the restoration of the large non-magnetic gap permits the spring of the leaf spring 53 to return the parts to the positions illustrated in Fig. 3.

The provision of a magnetic core 43 constructed of permanent magnet material would result in an operation of the inductor relay for each movement of an inductor plate past the relay. In a preferred embodiment of the invention a further control is introduced by constructing the magnetic core of a soft magnetic material such as magnetically soft iron or steel and surrounding the core by a solenoid coil 43a. This coil has terminals 43b and 43c to which it may be energized from a suitable source of direct current for the purpose of establishing a magnetomotive force across the polar assemblies. Consequently, the inductor relay is in effective condition only when the coil 43a is energized.

Each of the inductor relays or the entire group of relays illustrated in Fig. 2 may be provided with a protective enclosure. To this end, a box 85 preferably constructed of a non-magnetic material such as aluminum or brass is secured to the base plate 33 by means of machine screws 87. If desired, the enclosure may be hermetically sealed in any manner known to the prior art such as by the use of suitable gaskets. The enclosure 85 may be suitably secured to the elevator car for the purpose of positioning the base plate with respect to the elevator car.

Considering further the operation of the apparatus illustrated in Fig. 2, let it be assumed that the elevator car carrying the control unit 17 is approaching a floor at which it is to stop. As the elevator car nears the floor, the coil 43a and similar coils for the remaining inductor relays are energized. As a result of further movement of the elevator car toward the desired floor, the control unit 17 reaches the inductor plate P which is associated with the floor, and the inductor plate successively operates the inductor relays 1UL, 3L, 2UL and 1UL to slow down and stop the elevator car at the desired floor by the same sequence discussed for the inductor relays bearing the same reference characters in the aforesaid Santini et al. patent.

If the elevator car is moving downwardly and desires to stop at a floor, the coils of the inductor relays are energized as the elevator car nears the desired floor. Continued downward movement of the elevator car brings the control unit 17 adjacent the inductor plate P associated with such floor. This inductor plate successively operates the relays 1DL, 3L, 2DL and 1DL to slow down and stop the elevator car at the desired floor by a sequence which will be understood from the aforesaid Santini patent.

Adjustment of the base plate 33 with respect to the enclosure 85 may be effected by providing slots 87a in the base plate through which the machine screws 87 pass. This permits the relay's height above the car floor to be varied, and therefore the distance the car is from a landing when the relay operates.

For high rise or tall buildings additional support for the control element 15 may be desired. To this end, a screw 89 may pass through one of the slots 27 and through a large opening in a bracket 91 (Fig. 5) which is suitably secured to the building structure S or to the guide rail 9 or 11. The screw 89 passes through a spacing sleeve 93 which is partly received within a coil or helical spring 95. The spring seats against a collar 97 which is secured to the sleeve 93. The bracket 91 is

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bored to provide a seat for the remaining end of the spring 95. A second coil or helical spring 99 is similarly seated in the bracket 91 and has its remaining end in engagement with a washer 101 which has a collar 102 extending slightly into the spring 99. A nut 103, which conveniently may be of a locking type, secures the parts in the position illustrated wherein the springs are somewhat compressed. By inspection of Fig. 5, it will be noted that although the machine screw 89 supports a substantial part of the weight of the control element 15 therebelow, a substantial motion of the control element is permitted by the machine screw 89 in horizontal directions.

If a large number of control points are desired, several control elements 15a, 15b, 15c and 15d similar in construction to the control element 15 may be mounted in side-by-side relationship in an elevator hoistway. These control elements are guided past a control unit 17a which is mounted on the elevator car to be controlled. The control unit 17a includes a separate inductor relay RA, RB, RC and RD for each of the four control elements. Typical inductor plates PA, PB, PC and PD are illustrated for the control elements.

Although the invention has been described with reference to certain specific embodiments thereof, numerous modifications falling within the spirit and scope of the invention are possible.

I claim as my invention:

1. In an elevator system, a structure having a plurality of floors spaced in a first direction and an elevator hoistway extending in said direction, an elevator car, means mounting the elevator car for movement in said first direction and in a second direction opposite to the first direction relative to the structure through the hoistway to serve the floors, and control mechanism for said elevator car, said control mechanism comprising a flexible control element extending along said hoistway in said directions, means mounting the control element to be substantially fixed relative to the structure in said directions but to permit appreciable movement transverse to said directions, said control element having a plurality of control devices spaced in said directions along said control element, guide means positioning a portion of the control element adjacent the elevator car against movement relative to the elevator car transverse to said directions while permitting movement of the control element relative to the elevator car in said directions, and translating means mounted on the elevator car, said translating means being responsive to the positions of said control devices.

2. In an elevator system, a structure having a plurality of floors spaced in a first direction and an elevator hoistway extending in said direction, an elevator car, means mounting the elevator car for movement in said first direction and in a second direction opposite to the first direction relative to the structure through the hoistway to serve the floors, and control mechanism for said elevator car, said control mechanism comprising a flexible control element extending along said hoistway in said directions, means mounting the control element to be substantially fixed relative to the structure in said directions but to permit appreciable movement transverse to said directions, said control element having a plurality of control devices spaced in said directions along said control element, guide means positioning a portion of the control element adjacent the elevator car against movement relative to the elevator car transverse to said directions while permitting movement of the control element relative to the elevator car in said directions, and translating means mounted on the elevator car, said translating means being responsive to the positions of said control devices, the mounting means for the control element comprising means for fixing a first end of the control element, and means biasing the

second end of the control element to maintain the control element in taut condition.

3. In an elevator system, a structure having a plurality of floors spaced in a first direction and an elevator hoistway extending in said direction, an elevator car, means mounting the elevator car for movement in said first direction and in a second direction opposite to the first direction relative to the structure through the hoistway to serve the floors, and control mechanism for said elevator car, said control mechanism comprising a flexible control element extending along said hoistway in said directions, means mounting the control element to be substantially fixed relative to the structure in said directions but to permit appreciable movement transverse to said directions, said control element having a plurality of magnetic control devices spaced in said directions along said control element, guide means positioning a portion of the control element adjacent the elevator car against movement relative to the elevator car transverse to said directions while permitting movement of the control element and associated control devices relative to the elevator car in said directions, and an inductor relay mounted on the elevator car for cooperation with the control devices, said inductor relay comprising a partial magnetic circuit which is substantially completed by the presence of one of the control devices, and contact means responsive to magnetic flux passing through said magnetic circuit.

4. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, and control mechanism comprising a flexible, non-extensible, control element mounted on the structure and extending vertically past the elevator car from a position adjacent the lowest travel of the elevator car to a position adjacent the highest travel of the elevator car, and guide means for guiding the control element through a path adjacent the elevator car which is horizontally fixed relative to the car.

5. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, and control mechanism comprising a flexible, non-extensible, control element mounted on the structure and extending vertically past the elevator car from a position adjacent the lowest travel of the elevator car to a position adjacent the highest travel of the elevator car, mounting means for mounting a first end of the control element in fixed position relative to the structure, biasing means for biasing the second end of the control element relative to the structure for maintaining the control element taut, and guide means for guiding the control element through a path adjacent the elevator car which is horizontally fixed relative to the car.

6. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, and control mechanism comprising a flexible, non-extensible, control element mounted on the structure and extending vertically past the elevator car from a position adjacent the lowest travel of the elevator car to a position adjacent the highest travel of the elevator car, translating means mounted on the elevator car, said translating means and said control element cooperating to operate the translating means for predetermined positions of parts of the control element relative to the translating means, and guide means mounted on the elevator car for guiding the control element through a path adjacent the translating means which is horizontally fixed relative to the translating means.

7. In an elevator system, a structure having a plu-

5 rality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, and control mechanism comprising a flexible, non-extensible, non-magnetic control element mounted on the structure and extending vertically past the elevator car from a position adjacent the lowest travel of the elevator car to a position adjacent the highest travel of the elevator car, vertically-spaced magnetic control devices secured to said control element, and guide means for guiding the control element through a path adjacent the elevator car which is horizontally fixed relative to the car.

8. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, and control mechanism comprising a flexible, non-extensible, non-magnetic control element mounted on the structure and extending vertically past the elevator car from a position adjacent the lowest travel of the elevator car to a position adjacent the highest travel of the elevator car, vertically-spaced magnetic control devices secured to said control element, a control unit mounted on the elevator car and having an air path, said control unit having control mechanism responsive, when in effective condition, to the entry of one of said control devices into the air path for transferring from a first condition to a second condition, and guide means mounted on the elevator car for guiding said control element accurately relative to the control unit to direct the magnetic control devices through said air path.

9. A control unit comprising an inductor relay, said inductor relay having a magnetic circuit defining an air gap and contact means responsive when the inductor relay is in effective condition to the presence of a magnetic device in the air gap, an enclosure for the inductor relay, said enclosure having a non-magnetic wall positioned between said air gap and the inductor relay, a non-magnetic tape, guide means secured to the enclosure for guiding the tape adjacent said air gap, and a magnetic device secured to the tape for movement through said air gap.

10. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, said mounting means comprising first guide mechanism fixed relative to the structure and extending vertically in said hoistway to guide the elevator car therealong, second guide mechanism mounted on the elevator car, said first and second guide mechanism cooperating to guide the elevator car along said hoistway in a vertical path within tolerance limits, a continuous control element extending vertically along said hoistway for the length of said vertical path, said control element being held substantially fixed relative to the hoistway against vertical movement and being movable in a transverse direction at any elevator car position for at least distances corresponding to said tolerance limits, and third guide mechanism mounted on the elevator car for guiding the portion of the control element adjacent the car through a fixed horizontal position relative to the elevator car with substantially less tolerance than said distances while permitting free vertical movement of the elevator car relative to the control element, said control element having a plurality of control devices spaced vertically therealong, and translating means responsive when in effective condition to said control devices, said translating means being mounted on the elevator car.

11. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, said mounting means comprising first guide mech-

anism fixed relative to the structure and extending vertically in said hoistway to guide the elevator car therealong, second guide mechanism mounted on the elevator car, said first and second guide mechanism cooperating to guide the elevator car along said hoistway in a vertical path within tolerance limits, a continuous control element extending vertically along said hoistway for the length of said vertical path, said control element being held substantially fixed relative to the hoistway against vertical movement and being movable in a transverse direction at any elevator car position for at least distances corresponding to said tolerance limits, and third guide mechanism mounted on the elevator car for guiding the portion of the control element adjacent the car through a fixed horizontal position relative to the elevator car while permitting free vertical movement of the elevator car relative to the control element, said control element having a plurality of magnetic control devices spaced vertically therealong, and translating means responsive when in effective condition to said control devices, said translating means being mounted on the elevator car, said translating means comprising a magnetic circuit having an air gap positioned to be bridged substantially by successive ones of the magnetic control devices when the elevator car occupies successive predetermined positions in the hoistway, means effective when energized for applying a magnetomotive force to the magnetic circuit and control means responsive to the change of magnetic flux in the magnetic circuit resulting from said bridging of the air gap by one of the control devices.

12. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, and control mechanism comprising a flexible, non-extensible, control element mounted on the structure and extending vertically past the elevator car from a position adjacent the lowest travel of the elevator car to a position adjacent the highest travel of the elevator car, mounting means for mounting a first end of the control element in fixed position relative to the structure, biasing means for biasing the second end of the control element relative to the structure for maintaining the control element taut, and guide means for guiding the control element through

a path adjacent the elevator car which is horizontally fixed relative to the car, and a supporting device for mounting an intermediate portion of the control element on the structure, said supporting device permitting substantial movement of the control element relative to the structure in a horizontal direction, said supporting device and the guide means being configured to permit movement of the guide means in a vertical direction past the supporting device.

13. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, and control mechanism comprising a flexible, non-extensible control element mounted on the structure and extending vertically past the elevator car from a position adjacent the lowest travel of the elevator car to a position adjacent the highest travel of the elevator car, and a plurality of vertically-spaced translating means mounted on the elevator car, said translating means and said control element cooperating to operate the translating means successively in response to movement of the elevator car successively through vertically-spaced positions relative to the structure.

14. In an elevator system, a structure having a plurality of vertically-spaced floors and a vertical hoistway, an elevator car, means mounting the elevator car for movement vertically through the hoistway to serve the floors, and control mechanism comprising a plurality of side-by-side non-extensible control elements mounted on the structure and extending vertically past the elevator car from a position adjacent the lowest travel of the elevator car to a position adjacent the highest travel of the elevator car, guide means for guiding each of the control elements through a separate path adjacent the elevator car which is horizontally fixed relative to the elevator car, and separate translating means mounted on the elevator car for each of the control elements, each of the translating means when in effective condition cooperating with the associated one of the control elements to operate the translating means in response to arrival of the elevator car at predetermined positions relative to the structure.

No references cited.