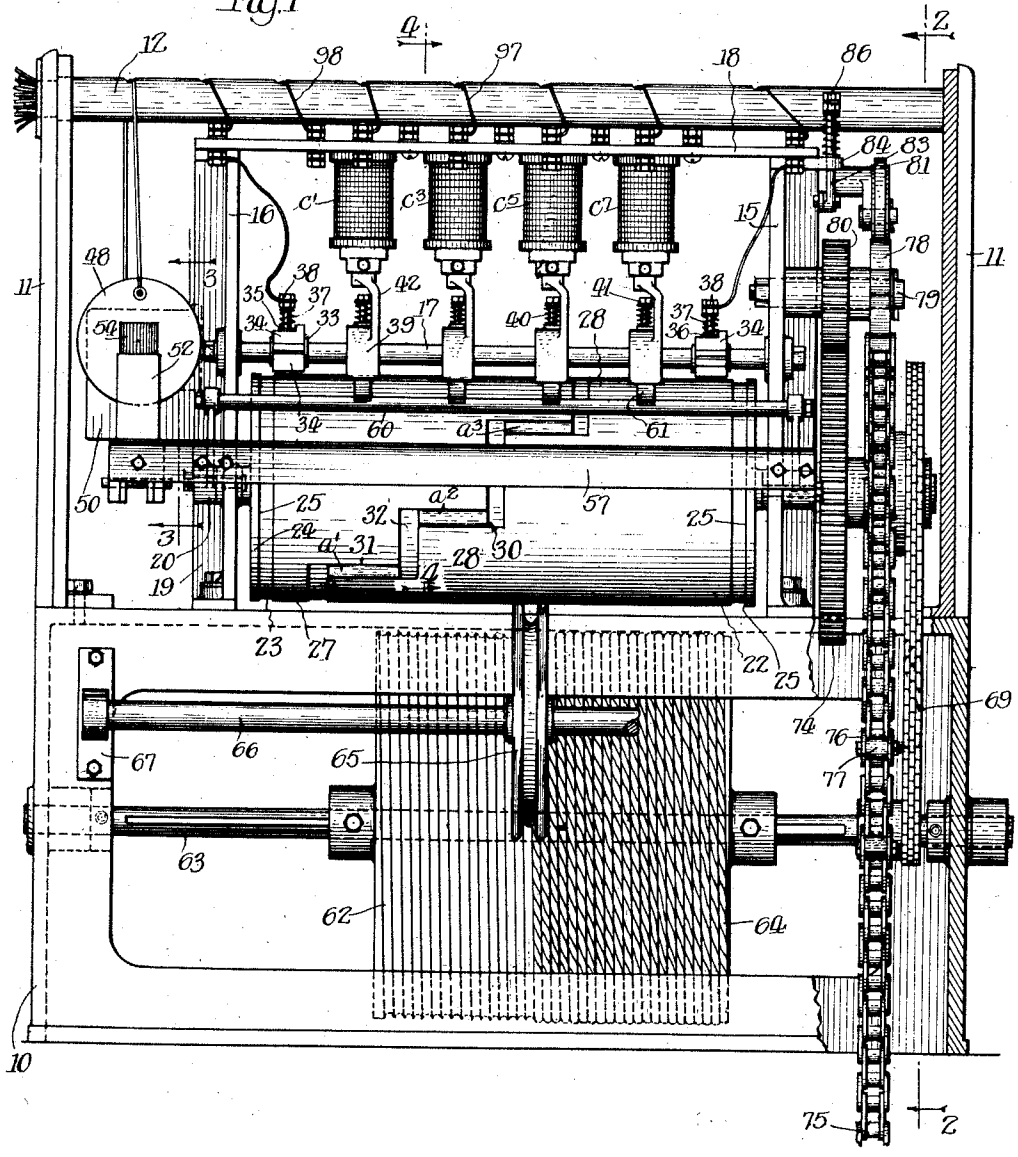
May 3, 1927. 1,627,320

J. DUNLOP ET AL

FLOOR SELECTOR FOR ELEVATORS

Filed June 29, 1925 4 Sheets-Sheet 1

Fig. 1



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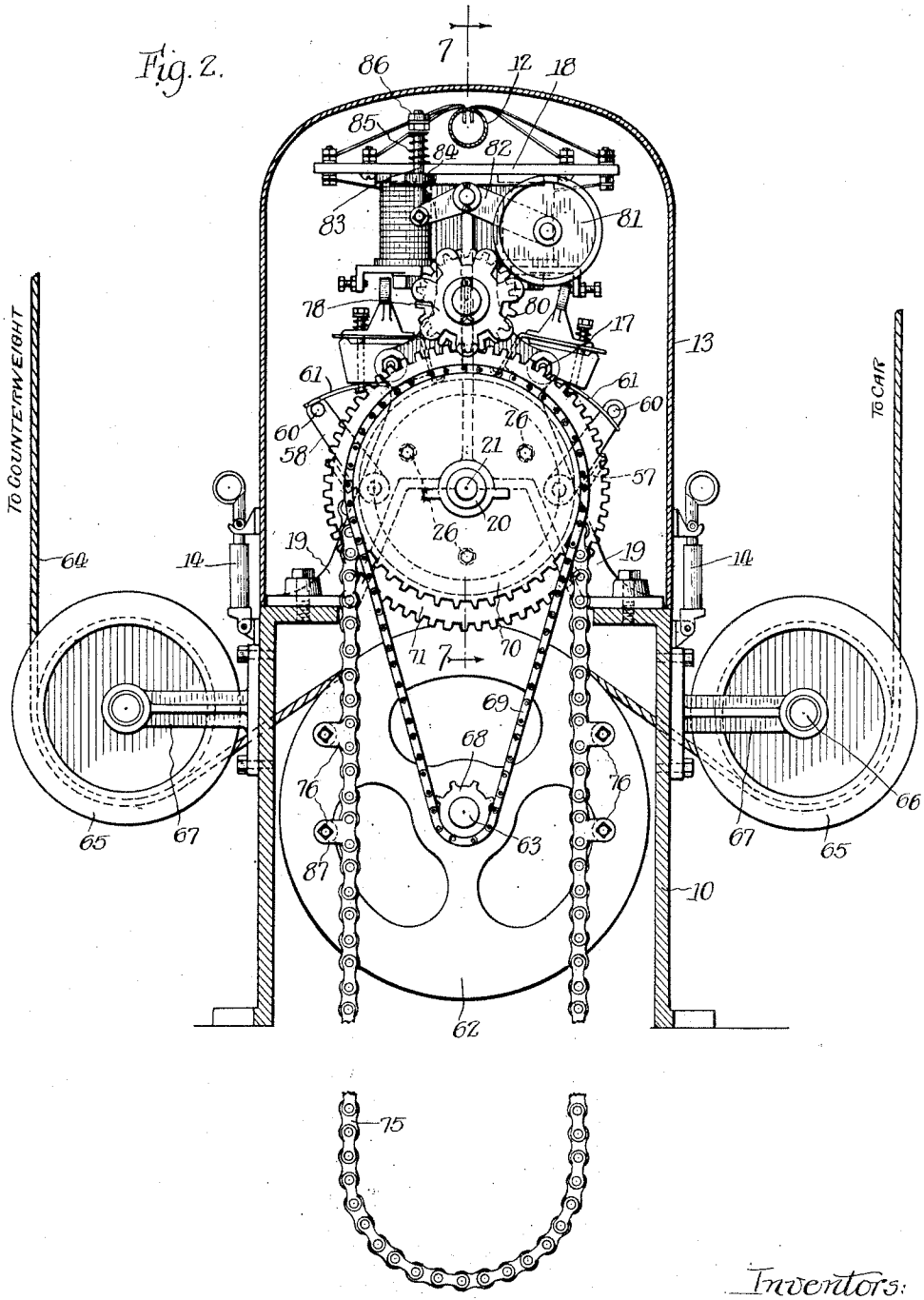
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FLOOR SELECTOR FOR ELEVATORS

Filed June 29, 1925 4 Sheets-Sheet 2

Fig. 2.



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FLOOR SELECTOR FOR ELEVATORS

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Fig.3.

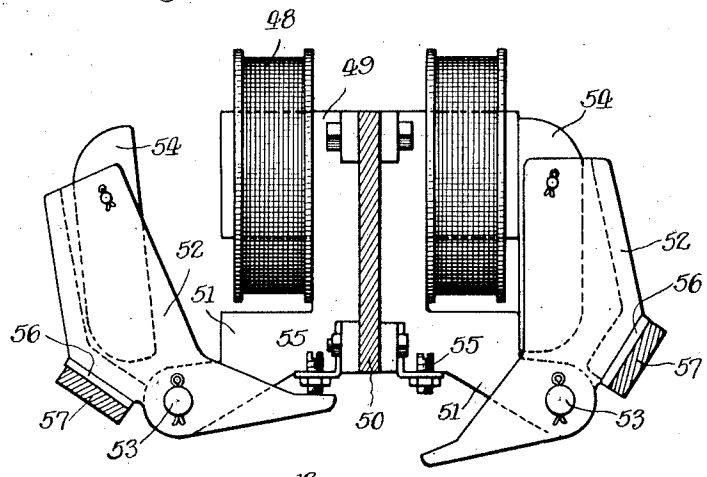


Fig.4.

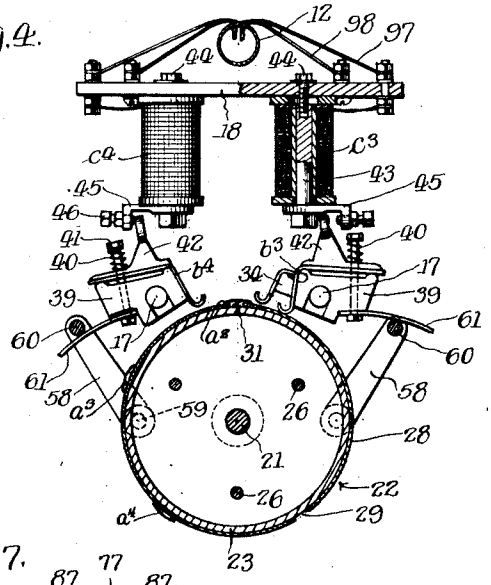
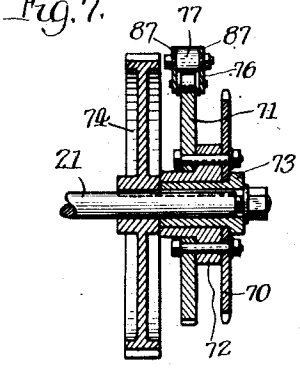


Fig.7.



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FLOOR SELECTOR FOR ELEVATORS

Filed June 29, 1925 4 Sheets-Sheet 4

Fig. 5.

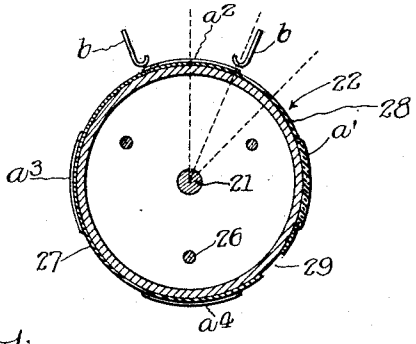


Fig. 8.

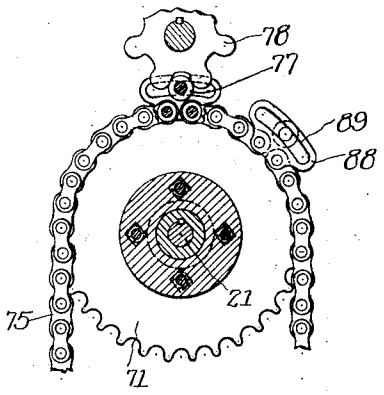


Fig. 6.

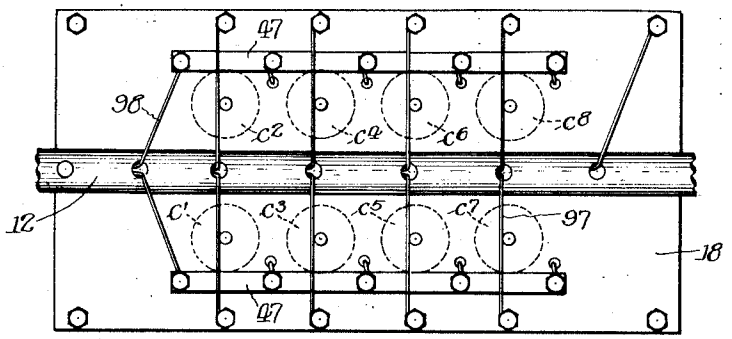
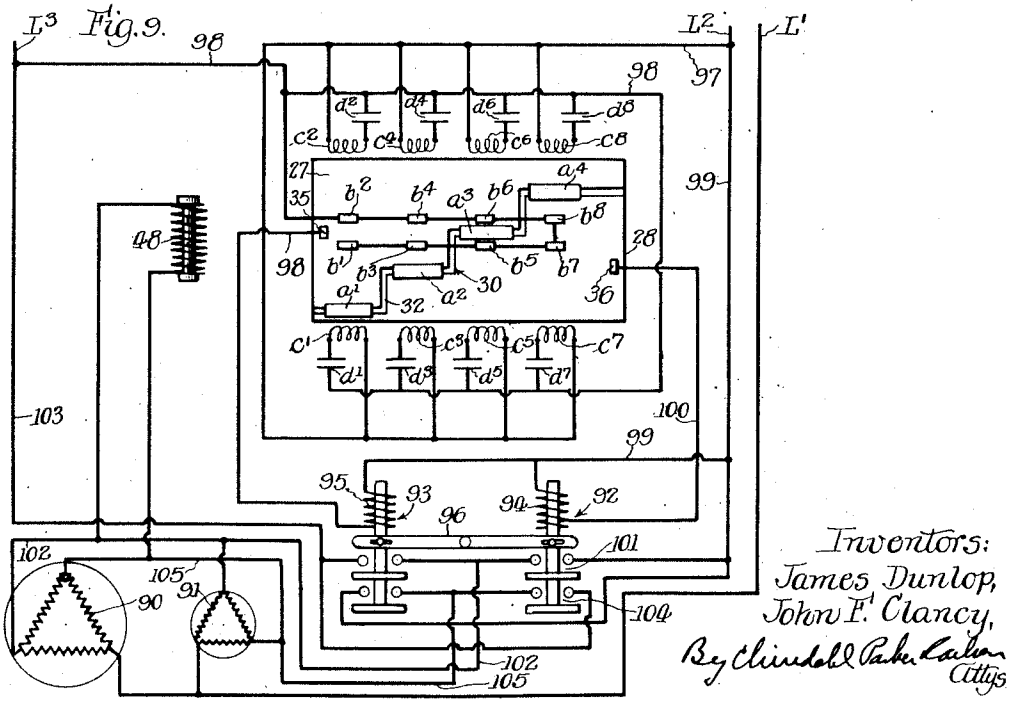


Fig. 9.



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UNITED STATES PATENT OFFICE.

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FLOOR SELECTOR FOR ELEVATORS.

Application filed June 29, 1925. Serial No. 40,206.

The invention relates to improvement in floor selecting means for electric elevators, particularly automatic push button elevators.

The primary object of the present invention is to provide a floor selector of novel construction which is complete in itself, and can be manufactured, sold and installed as a unitary device.

Another object is to provide a novel floor selecting means which is adapted to be operated directly through the movement of the cage, and which will not be affected by stretching or slipping of the main elevator cable, serving thereby to maintain at all times a correct relation of its parts to the position of the cage, and resulting in an accurate and invariable selection of floors.

A further object is to provide a novel push button controlled floor selector which is readily adapted to be used in conjunction with a manually operated car switch to obtain a dual elevator control, the selector and the car switch being selectively available as such to the operator, and the selector being available as an annunciating device when the car switch is instituted as the controlling means for the elevator.

Another object is to provide a floor selecting means in which the commutator member is driven by a jump gearing to open or close the electrical contacts quickly, thereby preventing creepage on drawing the spark, and avoiding excessive sparking and uncertain selection of floors.

A more specific object is to provide a commutator drum of special construction comprising a pair of contact plates separated by a zigzag space, and a raised insulation secured in said space, said insulation being available in various widths for elevators operating at different speeds, and serving to prevent catching against the edges of the plates, and to open the proper switch and prevent its closure when the cage is at the corresponding floor.

Still another object is to provide a floor selector of the above character which is adapted for high and low speed elevators serving any desired number of floors, which is precise and positive in operation, and which is sturdy and simple in construction.

Ancillary objects and advantages will become apparent as the description proceeds.

In the accompanying drawings, Figure 1 is a side view partially in section of a floor selector construction according to my invention, the selector being shown with the hood removed.

Fig. 2 is a vertical sectional view of the floor selector taken in the plane of line 2—2 of Fig. 1.

Fig. 3 is a view of the interlocking electromagnet and armatures taken along line 3—3 of Fig. 1.

Fig. 4 is a partial sectional view taken in the plane of line 4—4 of Fig. 1.

Fig. 5 is a diagrammatic view in section showing the commutator drum with insulating blocks of special width for high speed elevators.

Fig. 6 is a partial top view of the selector.

Fig. 7 is a sectional view of the jump gearing taken along line 7—7 of Fig. 2.

Fig. 8 is a fragmentary view showing a section of the selecting chain provided with adjustable links adapted for low speeds.

Fig. 9 is a wiring diagram of a simple elevator system illustrating the use and operation of the floor selector.

While our invention is susceptible of various modifications and alternative constructions, we have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that we do not thereby intend to limit the invention to the construction disclosed, but aim in the appended claims to cover all modifications and alternative constructions falling within the spirit and scope of the invention.

Referring to the exemplary embodiment of the invention illustrated in the drawings, the floor selector comprises a suitable base 10 which can be supported in any desirable position with reference to the elevator cage, (not shown), but preferably at the top of the hatchway, (not shown), and which in the present instance is hollow, rectilinear in dimension, and open at the sides and top. Mounted on opposite ends of the base 10 are a pair of end cover plates 11 which are connected at the top by a tube 12. A cover or

hood 13 is adapted to fit over the end plates 11, and can be removably secured in place by a plurality of spring clamps 14.

Upright end brackets 15 and 16 are mounted between the cover plates 11 adjacent the right and left ends of the base, and are rigidly connected at opposite sides by a pair of rods or fixed rocker shafts 17, and at the top by a horizontal board 18 of suitable insulating material. While the end brackets can be provided in any other desirable form, in the present instance, they are V-shaped, and are formed with inclined legs 19 secured to opposite sides of the base 10.

Journaled in bearings 20 in the end brackets 15 and 16 is a spindle 21 on which a commutator drum 22 is mounted. The drum comprises an elongated cylinder 23 of insulating material, such as bakelite which is suitably mounted on a pair of spaced circular heads 24 on the spindle 21. The heads are formed with annular notches 25 in their adjacent peripheral edges for receiving the opposite ends of a cylinder 23, and are held rigidly in assembly therewith by a plurality of bolts 26 extending longitudinally through the drum. Two contact plates 27 and 28 of conducting material such as copper are secured to the cylinder 23, and are insulated from each other at their longitudinal edges by a narrow space 29 and a zigzag space 30. The space 30 extends generally in an inclined direction with reference to the space 29, and comprises alternate spaces 31 and 32 respectively parallel and perpendicular to the axis of the drum 22. The spaces 31 and also the spaces 32 are equal in length, and the number of each is determined by the number of floors for which the elevator is intended. In the present instance, we have provided four spaces 31 thereby adapting the selector to an eight floor elevator as will be subsequently disclosed. A raised insulation, in the form of a series of blocks a_1 to a_4 is provided, one block being positioned in each space 31. The purpose of the insulation is to break electrical contact with the drum 22 when the cage is at the desired landing, and its width (as shown in Fig. 4) need be sufficient only to prevent overrunning due to momentum of the cage. When high speed elevators are used, a wide insulation, such as is shown in Figure 5, is preferably employed.

Rigidly clamped to opposite ends of one of the shafts 17 and insulated therefrom as by sleeves 33, are a pair of fixed arms 34 provided respectively with contact strips or brushes 35 and 36. These brushes are mounted to continually engage the contact plates 27 and 28 respectively for all positions of rotation of the drum 22, and are resiliently clamped to the arms 34 by individual coil springs 37 supported by elongated binding posts 38.

Mounted for selective movement into and out of engagement with the drum 22 are a plurality of contact members or brushes which can be arranged in any suitable manner, and one of which is provided for each floor. In the present instance we have provided eight brushes arranged in two parallel rows of four each, and numbered from left to right and front to rear as b_1 to b_8 respectively. The brushes are also arranged laterally of the drum 22 in groups of two, and are properly spaced to bring each pair from left to right into line with the insulating blocks a_1 to a_4 respectively. The space between the contacting points on each pair of brushes is made equal to one half the perpendicular distance between any two successive insulating blocks. By this construction, each block serves two floors, thereby resulting in a simplified and compact device; and movement of the drum 22 through a distance equal to that between each pair of brushes corresponds to a movement of the cage from one floor to the next.

The brushes b_1 to b_8 are individually supported by rocker arms 39, four or which are pivotally mounted on each shaft 17. Preferably, each brush is resiliently clamped to its arm 39 by a coil spring 40 mounted on a bolt 41 extending therethrough, and is adapted to be raised against the force of said spring when riding onto one of the insulating blocks a_1 to a_4. The insulating blocks thus prevent the brushes b_1 to b_8 from engaging the edges of the contact plates 27 and 28, and insure a good electrical break. The brushes b_1 to b_8 are electrically connected in series through the shafts 17.

To provide means for selectively oscillating the arms 39, each one is formed integral with an upstanding projection 42. A series of electromagnets c_1 to c_8 for the brushes b_1 to b_8 respectively are mounted on the lower side of the insulating board 18 and are provided with cores 43 positioned to attract the projections 42. Each electromagnet is preferably attached to the board 18 by suitable bolt 44 threaded into the upper end of the core 43, and is provided with a rocker stop 45 mounted on the core 43 and having an adjustable screw 46 for limiting the outward movement of the projection 42. The electromagnets are electrically connected in parallel by two metallic strips 47 on the board 18 (see Figures 6 and 9).

Means is provided for interlocking the brushes, b_1 to b_8, to prevent interference, and to provide a holding means for the selected brush after its electromagnet is deenergized and before the circuit has been interrupted by the proper insulating block to stop the cage. Referring to Fig. 3, a double coil electromagnet 48 is provided with a core

49 mounted on a lateral extension 50 of the left end bracket 16. The core 49 is formed on its lower side with oppositely extending projections 51 which support a pair of bell-crank levers 52 on pivot pins 53. The outer arms of these levers 52 are U-shaped in cross section and loosely and pivotally support two armatures 54 adapted to be attracted by opposite ends of the electromagnet 48, and the lower arms thereof extend toward each other and are positioned to engage two individual adjustable stops 55 on the core 49 to limit the outward movement of the armatures 54. Individual plates 56 are formed integral with the levers 52, and support a pair of actuating members or bars 57 extending along opposite sides of the drum 22. The bars 57 are connected to individual pairs of levers 58 which are mounted on pivot pins 59 in the end brackets 15 and 16, and support a pair of interlocking bars or rods 60. Upon excitation of the electromagnet 48, the rods 60 are adapted to engage with a plurality of strips 61, one of which is provided for each arm 39 and is secured thereto by the bolt 41. The rods 60 will engage the upper sides of the strips 61 when the arms 39 rest against the rocker stops 45, and will engage the lower sides of the strips when the arms rest against the electromagnet cores 43. Thus when one of the electromagnets c_1 to c_8 is excited, the rods 60 will positively lock the associated commutator brush against the drum 22, and the other brushes out of engagement therewith. This condition will ensue as long as the electromagnet 48 is excited, irrespective of whether the brush electromagnet is subsequently deenergized or not.

Means is provided for driving the commutator drum 22 in synchronism with the movement of the elevator cage. This means comprises a winding drum 62 which is adjustably mounted on a drum shaft 63 journaled in the base 10. A cable 64 wound around the drum 60 is connected at its opposite ends to the elevator cage and the counterweight (not shown), and in leading thereto is directed over a pair of sheaves 65 slidably mounted on two bars 66 which are supported by brackets 67 secured to opposite sides of the base 10. Since the cable 64 supports no weight and connects the selector directly to the cage, the operation of the selector is precisely controlled by the position of the cage in the hatchway, and is not affected by stretching of the main cables (not shown) or slipping thereof on the main winding drum (not shown).

To insure a sharp electrical make or break, the commutator drum 22 is driven by the shaft 63 through a jump gearing. This gearing includes a small sprocket wheel 68 mounted on the shaft 63 and connected by a drive chain 69 to a second sprocket wheel 70. The latter is rigidly connected with a third sprocket wheel 71 by a hub 72 which is rotatably mounted on a bushing 73 on the spindle 21. The bushing 73 is tightly clamped against the hub of a large spur gear 74 keyed to the spindle 21. A closed selector chain 75 provided with a plurality of special links 76 having rollers 77 passes over the sprocket wheel 71. The rollers 77 are adapted to successively engage the arms of a star wheel 78 which is mounted on a stub shaft 79 in the right end bracket 15, and thereby to drive the gear 74 through an intermediate gear 80 also mounted on the shaft 79. The velocity ratio of the gearing is such that upon each engagement of the star wheel 78 by one of the rollers 77, the commutator drum 22 will be rotated through a distance equal to one half of the distance between each pair of the selector brushes b_1 to b_8, and corresponding to a movement of the cage through one half floor.

Rotation of the star wheel 78 is opposed and overrunning is prevented by a spring pressed roller 81 positioned to engage between the teeth. The roller 81 is mounted on one arm of a bell-crank lever 82 pivotally supported by the right end bracket 15. The other arm of the lever 82 is connected with an eye bolt 83 that extends vertically through a lug 84 secured to the bracket 15 and which is pressed upwardly by a coil spring 85 positioned between adjustable nuts 86 on its upper end and the lug. By this construction, sparking is substantially avoided, thereby resulting in an efficient and invariable floor selection and stop.

Any desired number of special links 76 can be employed, provided the construction of the drum 22 and the speed ratio of the gearing is made to suit the same. In the present construction, two links 76 are required for each floor except the first and last which need only one each, thereby providing two movements of the commutator drum 22 for moving the cage one floor. Timing the rotation of the drum 22 with the movement of the cage is effected by properly spacing the links 76 in the chain 75. Thus the spacing of the links in pairs is made to correspond to the distances between floors. The spacing of the links 76 of each pair should be such that when the cage is at the corresponding landing, and the drum 22 is stationary, they are similarly positioned at opposite sides of the star wheel 78. To provide for differences in momentum, the links 76 of each pair are spaced quite close together for slow speed elevators, and farther apart for high speed elevators.

For high speed elevators wherein the control is unusually transferred to some special means, such as an automatic leveling device, the links 76 shown in Fig. 2 are satisfactory. In this form, the roller 77 is rotatably but

not adjustably mounted between two extensions 87 on the link 76. In low speed elevators or elevators in which a slow down is effected, a precise and invariable stop can be obtained by the selector due to the absence of momentum. It is there desirable to provide links 76 in which the rollers 77 are adjustable. A suitable form, shown in Fig. 8, comprises extensions 88, each having an elongated slot 89 in which the roller 77 is adjustably mounted.

As described in the foregoing, the drum 22 is given two jumps or movements for each floor. Ordinarily contact is broken on the final jump. When operating at high speeds, the insulating blocks a_1 to a_4 are made of a width sufficient to break the contact on the second last jump, thereby causing the selected brush to ride on the insulation during the last jump and preventing overrunning.

To illustrate the operation of our invention, we have shown the floor selector as forming part of a simple elevator system, but it is to be understood that the selector is adapted to many other types of elevators. Referring to Fig. 9, the elevator system comprises generally three mains, L_1, L_2, and L_3, an A—C motor 90 having a suitable brake 91, and "up" and "down" directional switches 92 and 93. The switches 92 and 93 are provided with coils 94 and 95 respectively, and are held from being closed simultaneously by a connecting lever 96. Excitation of the coils is controlled by a set of push buttons d_1 to d_8 connected in series with the electromagnets c_1 to c_8 respectively. The buttons can be located in any suitable position such as in the cage or at the floors, and can be provided in duplicate sets connected in parallel. The contact plates 27 and 28, are developed in Fig. 9 to show the true dimensions.

In operation, let it be assumed that the cage is at the first landing. In this position, the insulating block a_1 will be directly below the brush b_1, and the remaining brushes b_2 to b_8 will be positioned over the contact plate 28. If for instance the push bottons d_6 is now pressed, a circuit through the electromagnet c_6 will be closed as follows: from L_2, through wire 97, electromagnet c_6, push button d_6, and wire 98 to the main L_3. Excitation of the electromagnet c_6 oscillates the brush b_6 into engagement with the contact plate 28 to close the following circuit: from the main L_2 through wire 99, coil 94, wire 100, brush 36, contact plate 28, brush b_6, and the wire 98 to the main L_3. Excitation of the coil 94 actuates the "up" switch 92 that closes circuits from the mains L_2 and L_3 to the motor 90 as follows: from L_2, through the wire 99, switch contact 101 and wire 102 to the motor 90, and from L_3 through wire 103, switch contacts 104, and wire 105 to the motor 90, thereby also closing a circuit through the holding electromagnet 48 which is connected directly across the wires 102 and 105. The main L_1, is connected directly to the motor 90, and the brake 91 directly across the motor windings, so that the brake is now released and the motor begins to operate to lift the cage. Immediately after closure of the switch 92, the electromagnet 48 moves the interlocking bars 60 into engagement with the strips 61 to hold the brush b_6 in contact with the plate 28 and the remaining brushes out of contact with the drum 22 even after the button d_6 is released and the electromagnet c_6 is de-energized. Upward movement of the cage is transmitted through the cable 64 to the drum 62 that in turn drives the selector chain 75. As the cage moves from the first to the second floor, two rollers 77 successively engage the star wheel 78 to intermittently rotate the drum 22 and move the block a_1 through two jumps into a position directly below the brush b_2. Two further movements bring the block a_2 below the brush b_3, and so on. In moving the blocks a_1 to a_3 from one side of the brushes b_1 to b_5 to the other, the latter are positioned to engage the contact plate 27 to actuate the "down" switch 93 upon pressing one of the buttons d_1 to d_5. As the cage arrives at the sixth floor, the block a_3 engages the brush b_6 and raises it out of engagement with the contact plate 28, thereby opening the switch 92 and bringing the motor 90 to a stop. When the "down" switch 93 is closed, the wires 99 and 103 will be connected with the wires 102 and 105 through contacts 106 and 107 respectively, and the motor 90 will operate to lower the cage.

It will be seen that we have provided a very useful device which is complete in itself and can be installed as an elevator unit, which is simple and compact in construction, and which is efficient and accurate in operation due to its capacity to compensate for stretching or slipping of the main cable. The device is also susceptible of adjustment over a wide range, and can be used with facility in elevators of widely varying requirements. Due to its direct connection to the cage and its unitary character, the device is well adapted to be used in conjunction with a manual control lever, and to be utilized as an annunciator when the latter is used in operating the cage.

We claim as our invention:

1. An elevator floor selector having, in combination with the cage, counterweight, and directional switches, a base, a commutator drum having a pair of contact plates separated from each other by a longitudinal space and an inclined zig-zag space, said contact plates being electrically connected with the directional switches, a plurality of

contact members pivotally mounted over said drum for movement into and out of engagement with said contact plates, means for selectively actuating said contact members, and means connected to said cage and said counterweight for intermittently rotating said drum in timed relation to the movement of the cage.

2. An elevator floor selector having, in combination, a base, end plates on said base, and brackets on said base between said end plates, a commutator drum rotatably mounted in said end brackets, said commutator drum having a pair of contact plates separated by a longitudinal space and a zig-zag space, a plurality of contact members pivotally mounted for movement toward and from said drum, means for selectively actuating said members, means for interlocking said members, a winding drum mounted in said base, a cable on said drum adapted to be connected at its opposite ends to the elevator cage and the counterweight, a jump gearing between said winding drum and said commutator drum to drive the latter intermittently, said members being arranged to be positioned successively over said zig-zag space when the cage is successively located at corresponding landings.

3. An elevator floor selector having, in combination, a base, a commutator drum rotatably mounted on said base, said drum having two contact plates adapted to be electrically connected with the directional switches of the elevator and being separated by a longitudinal space and a zig-zag space, a plurality of contact members pivotally mounted for movement toward and from said commutator drum, said contact members being arranged to move relatively to and successively from over one contact plate to over the other in timed relation to the movement of the cage, and means directly connected to the cage for rotating said drum.

4. An elevator floor selector having, in combination, a base, a commutator drum mounted on said base and having a pair of contact plates, said plates being adapted to be electrically connected to the directional switches of the elevator system and being separated by a longitudinal space and a zig-zag space, a plurality of contact members mounted for movement toward and from said drum, and means for driving said drum directly from the cage, the relative arrangement of said members and said zig-zag space and the rotation of said drum being such that said members are successively positioned over said zig-zag space as the cage moves from one floor to the other.

5. An elevator floor selector having, in combination, a base, a commutator drum mounted on said base and having a pair of contact plates, said plates being adapted to be electrically connected to the directional switches of the elevator system and being separated by a longitudinal space and a zig-zag space, a plurality of contact members mounted for movement toward and from said drum, and means including a jump gearing for driving said drum directly from the cage, the relative arrangement of said members and said zig-zag space and the rotation of said drum being such that said members will successively be positioned over said zig-zag space as the cage moves from one floor to the other.

6. An elevator floor selector having, in combination, a base, a commutator drum rotatably mounted on said base, means for rotating said commutator drum in timed relation to the movement of the cage, a plurality of contact members movably mounted to engage said commutator drum and adapted to be connected in the elevator control circuits, means for selectively actuating said contact members, and means for automatically breaking engagement between said contact members and said drum respectively for different positions of the elevator at the corresponding floors.

7. An elevator floor selector having, in combination, a base, a winding drum adapted to be operatively connected to the cage, a floor selecting drum mounted on said base and geared to said winding drum, and a plurality of relays including contact members corresponding respectively to the different floors mounted over said floor selecting drum.

8. An elevator floor selector having, in combination, a base, a commutator drum rotatably supported by said base, a winding drum rotatably mounted in said base and connected to said commutator drum to drive the latter, means adapted to connect said winding drum directly to the elevator cage, a plurality of relays corresponding respectively to the floors and having contact members mounted for selective movement toward and from said commutator drum.

9. An elevator floor selector having, in combination, a base, a commutator drum rotatably supported by said base, a winding drum rotatably mounted in said base and connected to said commutator drum to drive the latter, means adapted to connect said winding drum directly to the elevator cage, a plurality of relays corresponding respectively to the floors and having contact members mounted for selective movement toward and from said commutator drum, and means for interlocking said contact members.

10. An elevator floor selector having, in combination, a base, a commutator drum rotatably supported by said base, a winding drum rotatably mounted in said base, means including a jump gearing connecting said winding drum to said commutator drum to drive the latter, means adapted to connect

said winding drum directly to the elevator cage, a plurality of relays corresponding to the floors and having contact members mounted for selective movement toward and from said commutator drum.

11. An elevator floor selector having, in combination, a commutator member, means for driving said commutator member in timed relation to the movement of the elevator cage, a plurality of relays mounted over said commutator member, said relays having contact members corresponding respectively to the floors and adapted to be moved selectively into engagement with said commutator member, and means on said commutator member for breaking electrical engagement with the selected contact member when the cage arrives at the corresponding floor.

12. An elevator floor selector having, in combination, a base, a commutator member supported by said base, means including a jump gearing for driving said commutator member in timed relation to the movement of said elevator cage, a plurality of relays corresponding to the different floors and mounted next to said commutator member, a plurality of contact members arranged to be operated by said relays for selective movement toward and from said commutator member, said commutator member being constructed to break contact with the selected contact member when the cage arrives at the corresponding floor.

13. An elevator floor selector having, in combination, a base, a pair of end brackets mounted on said base, said end brackets being connected at their opposite sides by two rods and to the top by an insulating plate, a commutator drum rotatably mounted in said brackets, a plurality of contact members pivotally mounted on said rods for movement into and out of engagement with said drum and corresponding respectively to the elevator floors, a plurality of relays mounted on said board for selectively actuating said contact member, and means for driving said drum in timed relation to the movement of the cage, said drum having means for breaking contact with the selected contact member when the cage arrives at the corresponding floor.

14. An elevator floor selector having, in combination, a base, end brackets mounted on said base, a commutator member rotatably mounted in said brackets, a plurality of contact members mounted for movement toward and from said commutator drum, a like movement of relays mounted to selectively actuate said contact members, means for interlocking said contact members, and means for rotating said commutator member.

15. An elevator floor selector having, in combination, a base, a pair of end brackets mounted on said base, a commutator drum rotatably mounted in said brackets, said commutator drum having a pair of contact plates separated by a longitudinal space and a zig-zag space of transverse sections and longitudinal sections, contact members arranged in two rows and in pairs alined respectively with said longitudinal sections for movement toward and from said contact members, a like number of relays for selectively actuating said contact members, and means for rotating said drum in timed relation to the movement of the cage, the perpendicular distance between two successive longitudinal sections being equal to twice the distance between the contact members of each pair and corresponding to a movement of the cage through two floors.

16. In an elevator floor selector, a commutator drum having, in combination, a pair of heads, an insulating drum secured to said heads, two contact plates on said drum, said contact plates being separated by a longitudinal space and by a zig-zag space having longitudinal sections and transverse sections, and raised insulating blocks mounted in said longitudinal sections.

17. In an elevator floor selector, a commutator drum having, in combination, an insulating drum, a pair of contact plates mounted on said drum and separated by a narrow zig-zag space extending the width of said plates, and insulating members mounted in alternate sections of said space.

18. In an elevator floor selector, a commutator drum having, in combination, a drum, a pair of contact plates separated by a zig-zag space, and raised insulating means mounted in said space.

19. An elevator floor selector having, in combination, a commutator drum adapted to control the movement of the cage, a winding drum adapted to be connected directly to said cage, and a jump gearing connecting said winding drum to said commutator drum to drive the latter in timed relation to the movement of the cage.

20. An elevator floor selector having, in combination, a commutator member adapted to control the movement of the cage, a driving member connected directly to said cage, a star wheel geared to said commutator member, means for preventing overrunning of said star wheel, a chain having a plurality of roller links spaced to correspond respectively to the floors and adapted to engage said star wheel to move said commutator intermittently, and means connecting said chain to said drive member.

21. An elevator floor selector having, in combination, a commutator member, a plurality of contact members pivotally mounted to engage said commutator member, means for actuating said contact members, means for driving said commutator member, and electromagnetic means for interlocking said

contact members after said first mentioned means is rendered inoperative.

22. An elevator floor selector, having, in combination, a base, a commutator member mounted on said base, a plurality of contact members mounted to engage said commutator member, each contact member having a strip extending outwardly therefrom, means for selectively actuating said contact members, an electromagnet mounted on one end of said frame and having an armature, and means carried by said armature for engaging said strips to interlock said contact members.

23. An elevator floor selector having, in combination, a base, a commutator drum mounted on said base and having a pair of contact plates, said plates being adapted to be electrically connected to the directional switches of the elevator system and being separated by an irregular insulation, a plurality of contact members mounted for movement toward and from said drum, and means for driving said drum in timed relation to the movement of the cage, said irregular space and said members being so related to each other and to the rotation of said drum that said members will be successively positioned over said space as the cage moves respectively from one floor to the other.

24. An elevator floor selector having, in combination, a base, a floor selecting means mounted on said base, a plurality of relays including contact members which correspond respectively to the different floors mounted over said floor selecting means, and a driving mechanism in said base connected directly to the cage and operatively to said floor selecting means.

25. An elevator floor selector having, in combination, a base, a commutator drum rotatably mounted in said base, means including a jump gearing for driving said commutator drum in timed relation to the movement of the cage, and a plurality of relays corresponding respectively to the floors and having individual contact members mounted for selective movement toward and from said drum.

26. An elevator floor selector having, in combination, a commutator drum, means connected directly to said cage for rotating said drum, a plurality of yielding contact members corresponding respectively to the floors and adapted to be moved into resilient engagement with said drum, and means for selectively actuating said members to institute movement of the cage when the latter is not at the corresponding floor and to stop movement of the cage when at the corresponding floor.

In testimony whereof, we have hereunto affixed our signatures.

JAMES DUNLOP.
JOHN F. CLANCY.