

Sept. 8, 1931.

R. B. HUNTER

1,822,700

ELECTRIC CONTROL DEVICE

Filed July 7, 1930

Fig. 1

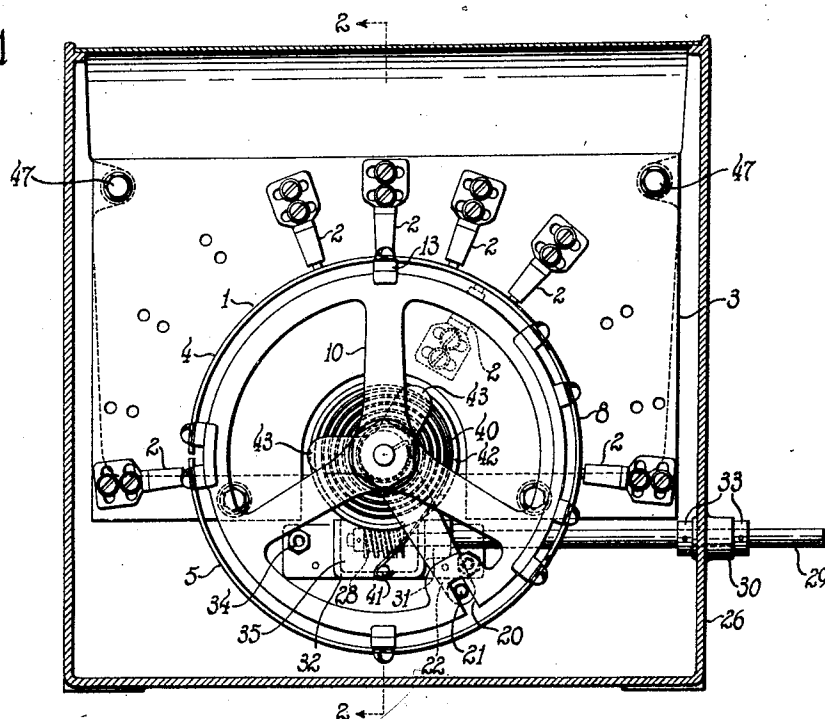


Fig. 2

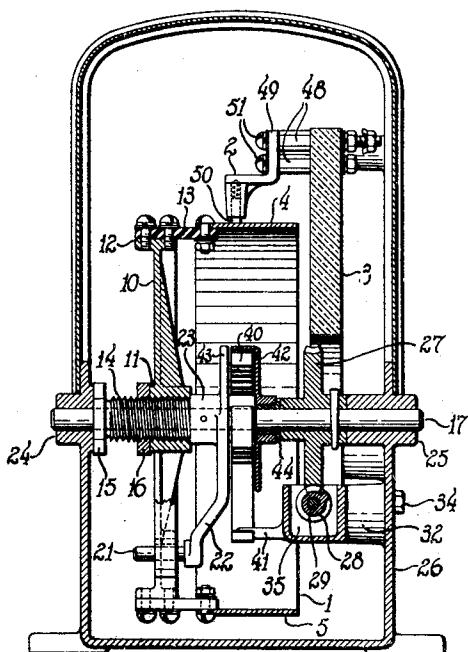
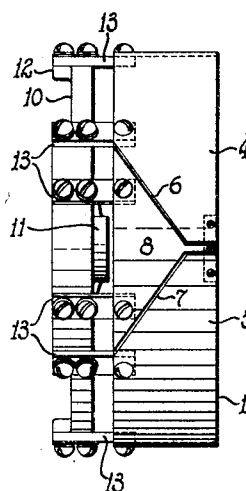


Fig. 3



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ELECTRIC CONTROL DEVICE

Application filed July 7, 1930. Serial No. 466,071.

This invention relates to electric control devices.

While not limited thereto the invention is particularly applicable to floor selector devices for push button controlled elevator systems.

The co-pending application of Edwin W. Seeger, Serial No. 460,951, filed June 13, 1930, discloses a push button elevator system wherein a floor selector device selectively controls the direction of operation of the driving motor to effect travel of the elevator car to a preselected landing, also provides for slowdown of the driving motor during approach of the elevator car to a selected landing. The floor selector employed in this system includes a plurality of stationary contacts, certain of which correspond to each of the landings, and a co-operating rotatable drum which is driven at a speed proportional to that of the elevator car. The drum is provided with a pair of contact segments and during approach of the elevator car in its up direction to a selected landing one of said contacts is adapted to disengage the stationary contact corresponding to such landing to effect slowdown of the driving motor, while the other of said contacts is adapted to act in a similar manner during operation of the elevator car in its down direction. The points at which the selector device is adapted to effect slowdown of the elevator car are determined by the angular positions at which the drum segments disengage the stationary contacts corresponding to the various landings, and in practice it is desirable to adjust such points to suit various operating conditions, as for example, the speed at which the elevator operates and the degree of braking during slowdown.

The present invention has among its objects to provide a floor selector for elevator systems of the aforesaid character having improved means associated therewith for varying the slowdown points with respect to the landings to suit the operating conditions.

Another object is to provide a floor selector wherein the drum is adjustable to

vary the angular positions at which the segments thereof are adapted to disengage the stationary contacts corresponding to the various landings.

Another object is to provide a floor selector having improved driving means associated therewith to prevent variation in the points of slowdown due to backlash in the driving connections.

Various other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate an embodiment of the invention which will now be described, it being understood that various modifications may be made in the embodiment illustrated without departing from the spirit and scope of the appended claims.

In the drawings,

Figure 1 is a front view of a floor selector embodying the invention, the enclosing casing therefor being shown in section.

Fig. 2 is a sectional view on line 2—2 of Fig. 1, and

Fig. 3 is a side elevational view of the drum shown in Figs. 1 and 2.

Referring to Fig. 1, the same illustrates a floor selector including a rotatable drum 1 which cooperates with a plurality of stationary contacts 2 fixed to an insulating panel 3 arranged to one side of said drum and at right angles to the axis thereof. Drum 1 is adapted to be driven at a speed proportional to that of the elevator car through the medium of driving connections which will be hereinafter more fully described, and the same is provided with a pair of ring shaped segments 4 and 5 which are arranged in opposed relation and are adapted to cooperate with the stationary contacts 2. The number of stationary contacts 2 is determined by the number of landings served by the floor selector, and said contacts are arranged so that when drum 2 is in a position corresponding to a given landing the stationary contact corresponding to such landing is located between the ends 6 and 7 of segments 4 and 5, respectively.

As shown in Fig. 3, the ends 6 and 7 of drum segments 4 and 5 diverge with respect

to each other, and a triangular segment 8 is arranged between the diverging ends of said segments in spaced relation with respect thereto. The segments 4, 5 and 8 are mounted upon a supporting spider 10 provided with a hub 11 and a circular rim 12, and said segments are spaced axially with respect to said spider and are mounted upon insulating bars 13 fixed to rim 12. The hub 11 of spider 10 is provided with a threaded opening for receiving a screw bushing 14, and said bushing is provided with a hexagonal head 15 to facilitate adjustment thereof within said hub and carries a lock nut 16 for engaging the hub 11 of spider 10. Bushing 14 is rotatably mounted upon a shaft 17, and as hereinafter set forth said bushing is held against axial movement upon said shaft while the spider 10 is fixed against rotation with respect to said shaft.

From the foregoing it is apparent that by releasing lock nut 16 the screw bushing 14 can be turned to adjust the axial position of spider 10 to thereby vary the angular positions at which segments 4 and 5 are adapted to disengage the contacts 2 upon rotation of the drum in opposite directions. As is apparent from Fig. 3, axial adjustment of drum 1 towards the right with respect to stationary contacts 2 advances the points at which segments 4 and 5 disengage the stationary contacts 2 upon rotation of the drum in opposite directions, while axial adjustment of the drum to the left has an opposite effect. Thus the aforedescribed control means may be used in elevator systems of the character disclosed in the aforementioned co-pending application of Edwin W. Seeger, to vary the points at which slowdown is effected during approach of the elevator car to its various landings.

As shown in Fig. 1, the rim 12 of spider 10 is provided with a radial recess 20 for receiving a pin 21 fixed to an arm 22 and said arm is provided with a hub 23 fixed to shaft 17. The spider 10 is thus fixed against rotation with respect to shaft 17 and is axially adjustable with respect to said shaft upon rotation of bushing 14. Shaft 17 is rotatably mounted within bearings 24 and 25 provided in opposite walls of an enclosing casing 26 and bushing 14 is arranged between bearing 24 and the hub 23 of arm 22 to prevent axial movement thereof. Shaft 17 is driven through the medium of a worm wheel 27 and a worm 28, and as shown in Fig. 2 worm wheel 27 is fixed to shaft 17 and the hub thereof abuts the inner end of bearing 25 while the worm 28 is fixed to a shaft 29. Shaft 29 is rotatably mounted within a bearing 30 in casing 26 and the same is supported adjacent the worm 28 by a bearing 31 provided in a bracket 32. Shaft 29 has collars 33 fixed thereto which are arranged on opposite sides of bearing

30 to prevent axial movement of said shaft and bracket 32 is fixed to casing 26 by bolts 34 and is provided with an oil reservoir 35 for receiving worm 28.

A spiral spring 40 surrounds the hub 23 of arm 22 and the inner end of said spring is provided with a hooked portion which is located within a recess in said hub while the outer end of said spring is provided with a hooked portion which engages a projecting lug 41 on bracket 32. Spring 40 is placed under tension, and as is apparent from Fig. 1, the same is adapted to bias drum 1 in a clockwise direction to thereby prevent backlash between the worm wheel 27 and worm 28 upon reverse operation of drive shaft 29. As shown in Fig. 2, spring 40 is mounted within a recessed casing member 42 and is held within the recess in said casing member by projecting lugs 43 on arm 22. Casing 42 is rotatably mounted upon a bushing 44 carried by shaft 17 and arranged between the hub of worm wheel 27 and the hub 23 of arm 22.

Panel 3 is fixed to projecting lugs on casing 26 by bolts 47 and the several contacts 2 are arranged radially with respect to drum 1 and each is mounted upon a pair of projecting studs 48—48 fixed to panel 3. Each of the stationary contacts 2 includes a bracket member 49 having a spring pressed contact 50 mounted within an opening therein, and each of the brackets 49 is secured to its associated studs 48 by screws 51. As shown in Fig. 1 each of the brackets 49 is provided with slotted openings for receiving its securing screws 51 whereby said brackets may be adjusted to vary the angular positions of contacts 2 with respect to drum 1. Also as shown in Fig. 1 the contacts 2 may be arranged to cooperate with the outer surfaces of ring segments 4 and 5 as shown in full lines, or with the inner surfaces of said segments as illustrated by dotted lines.

What I claim as new and desire to secure by Letters Patent is:

1. In a floor selector device, the combination with a plurality of stationary contacts and a rotatable drum having segments to cooperate with said stationary contacts, each of said segments having an oblique end, of a drive shaft for said drum, and means for holding said drum against rotation with respect to said shaft and for adjusting the same axially with respect thereto.

2. In a floor selector device, in combination, a plurality of stationary contacts and a rotatable drum having contact segments cooperating with said stationary contacts, said contact segments being shaped whereby variation of the axial position of said drum varies the angular positions at which said segments are adapted to disengage said stationary contacts.

3. In a floor selector device, in combina-

tion, a plurality of stationary contacts, a rotatable drum having contact segments to cooperate with said stationary contacts, said contact segments being shaped whereby variation of the axial position of said drum varies the angular positions at which said segments are adapted to disengage said stationary contacts and a drive shaft for said drum, said drum being fixed against rotation with respect to said shaft and being adjustable axially thereon.

4. In a floor selector device, in combination, a pair of ring shaped contact segments having oblique ends, said segments being arranged in opposed relation with the oblique ends thereof diverging with respect to each other, a plurality of stationary contacts disposed in different angular positions with respect to said drum, said segments being adjustable axially to vary the angular positions at which the oblique ends thereof cooperate with said stationary contacts.

5. In a floor selector device, in combination, a rotatable drum including a pair of ring shaped contact segments each having an oblique end, said segments being arranged in opposed relation with the oblique ends thereof diverging with respect to each other, of a plurality of stationary contacts cooperating with said contact segments, said drum being adjustable axially to vary the positions at which the oblique ends of said segments are adapted to disengage said stationary contacts, and screw means for effecting axial adjustment of said drum.

6. In a floor selector device for electric elevators, the combination with a rotatable drum, a drive therefor including a driving worm and a driven worm gear, and spring means tending at all times to rotate said drum and said worm gear in a given direction with respect to said worm.

7. In a floor selector device for electric elevators, the combination with a plurality of stationary contacts, of a cooperating contact drum including a supporting member having ring shaped contact segments mounted thereon, each of which is provided with an oblique end, a supporting shaft for said drum, an operating connection between said drum and said shaft for holding said drum against rotation with respect to said shaft and for permitting axial movement of said drum with respect to said shaft, and means for adjusting the axial position of said drum on said shaft including a bushing rotatably mounted upon said shaft and threaded into an opening in the supporting member for said drum.

In witness whereof, I have hereunto subscribed my name.

RICHARD B. HUNTER.