

No. 691,824.

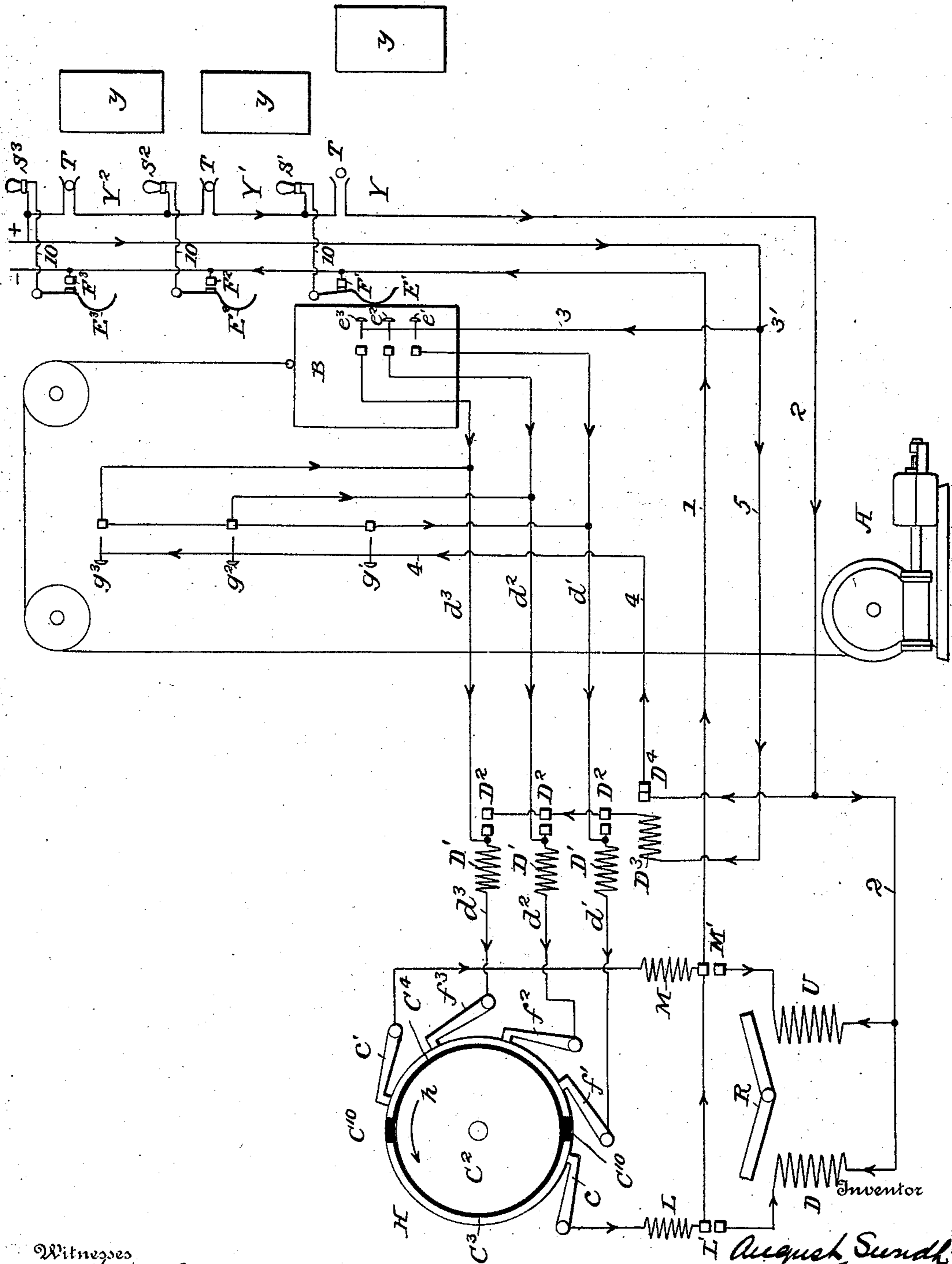
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A. SUNDH.

CONTROLLING APPARATUS FOR ELEVATORS OR HOISTS.

(Application filed Sept. 6, 1901.)

(No Model.)



Witnesses

*J. G. Hinkel*  
*Samuel Gillman, Jr.*

*August Sundh*  
*Frederick Freeman,*  
Attorneys

# UNITED STATES PATENT OFFICE.

AUGUST SUNDH, OF YONKERS, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF EAST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## CONTROLLING APPARATUS FOR ELEVATORS OR HOISTS.

SPECIFICATION forming part of Letters Patent No. 691,824, dated January 28, 1902.

Application filed September 6, 1901. Serial No. 74,555. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST SUNDH, a citizen of the United States, residing in the city of Yonkers, county of Westchester, State of New York, have invented certain new and useful Improvements in Controlling Apparatus for Elevators or Hoists, of which the following is a specification.

My invention relates to controlling apparatus for elevators or hoists; but it is particularly applicable for the operation and control of dumb-waiters.

The object of my invention is to provide a safe and simple means for the operation and control of elevators, hoists, or dumb-waiters; and my invention consists, primarily, in providing means whereby the operating-motor may be controlled from a station after the operation of the control device on the car; or, more particularly stated, my invention consists in providing means for starting the motor of the elevator, hoist, or dumb-waiter from a station after the operation of the controlling device or push-button on the car or cage.

It has hitherto been customary in systems of control for those species of hoists, and more particularly dumb-waiters, in which the operator does not enter the car or cage to provide means at the stations only for controlling the operation of the car or cage. In my system, however, I provide controlling devices on the car or cage itself, which are first operated to predetermine the limit of travel of the cage, and then the cage is started by the operation of controlling devices at the stations.

My invention is more fully shown and described in its many details of construction and operation in the accompanying drawing and specification.

The drawing is a diagrammatic representation of the circuits and connections embodying my invention.

Referring to the drawing, A represents any suitable motor, in this instance shown as an electric motor connected to operate the car or cage B. I am not to be understood, however, as limiting myself to an electric motor, nor to the means shown for operating the same,

as my invention is applicable to any form of motor for use in connection with an elevator or hoist, whether electric, hydraulic, steam, &c.

Y Y' Y<sup>2</sup> represent floors or stations, provided with the usual doors y, operating the door-contacts T at each floor or station, to which passes the controlling-circuit, as will hereinafter be described.

R represents a starting and reversing switch for the motor A, it merely being shown diagrammatically, and adapted to be operated by relays D and U, the connections for the starting and reversing switch and motor not being shown in this instance, as they may be of any suitable character.

H represents a floor-controller for limiting the travel of the car. This may be of any suitable character; but I have shown it of substantially the same form as is described in application, Serial No. 660,873, filed December 6, 1897, entitled "Electric operation of elevators by a single push-button system," and the same will not be herein described in detail. It will suffice to say that this floor-controller H is connected in some suitable way to be operated in unison with the motor for the car, and the controller embodies a cylinder or drum C<sup>2</sup>, on the periphery of which I have shown contacts in the form of two semicircles C<sup>3</sup> C<sup>4</sup>, insulated from each other by suitable insulation C<sup>10</sup>. There is a brush c normally engaging the contact C<sup>3</sup> and connected by a conductor with the coils of the electromagnet L, while there is another brush c' normally bearing on the contact C<sup>4</sup> and connected to the coils of the magnet M, and it will be observed that both of these magnets are connected directly to the negative feeding-main by a wire 1 and that these magnets L and M (which may be, however, electroreceptive devices of any suitable character) control switches L' L<sup>2</sup>, in turn controlling the circuits of the relays D and U for operating the starting and reversing switch of the motor A, the relays D and U being connected by a wire 2 with the positive main. Also arranged in connection with the floor-controller are series of brushes f' f<sup>2</sup> f<sup>3</sup>, one for each

floor, station, or stopping-place of the elevator car or cage and numbered to correspond with the stations  $Y Y' Y^2$ . Connected to each brush  $f' f^2 f^3$  is a conductor  $d' d^2 d^3$ , each including a circuit-making magnet  $D'$  and each leading to a position corresponding with the respective floor and terminating at the push-button or other switch device for that floor (shown as buttons or switches  $g' g^2 g^3$ ) and also leading, by means of parallel circuits, to buttons or controlling devices  $e' e^2 e^3$  on the car corresponding to the several floors or stations. But three floors or stations are shown in this instance; but it is to be understood that there may be any number with a corresponding number of buttons on the car. A common conductor 3 connects the push-buttons on the car with the positive main, while a common conductor 4 does the like for the buttons at the stations. The magnets  $D'$  control contacts  $D^2$ , included in the circuit of a non-interference magnet  $D^3$ , controlling contacts  $D^4$ , the function of which will hereinafter appear, and the circuit of the contacts  $D^2$  and magnet  $D^3$  is connected with the positive main by a wire 5. The door switches or contacts  $T$  are adapted to be operated by the opening and closing of the doors  $y$ .

In the operation of an elevator, hoist, or dumb-waiter with my improved system of control it is to be understood that to send the car or cage from the first floor or station (in which position it is shown in the diagram) the door  $y$  at that station is first opened, opening contacts  $T$ , at station 1, while it is to be presumed that the doors at the other stations are closed, closing the contacts  $T$  at those stations. The circuits of the starting and reversing relays  $D$  and  $U$  are thus broken, the relays are deenergized, and the floor-controller is stopped in the position shown in the diagram. Then to send the car or cage to the third floor or station the push-button or controlling device  $e^3$  on the car or cage is first operated or pressed, in which case the circuit will be completed as follows: Starting from the positive main, (indicated by + in the diagram,) current passes by the wire 3 through button  $e^3$ , by wire  $d^3$  through magnet  $D'$ , still by wire  $d^3$  to brush  $f^3$ , thence to brush  $c'$ , through magnet  $M$  and wire 1 to the negative main, (indicated by - in the diagram,) thus energizing magnet  $D'$ , corresponding to the third floor or station, and the magnet or other electric controlling device  $M$ . The energizing of magnet  $D'$ , as described, will cause it to close the corresponding contacts  $D^2$ , thus completing a circuit from the point 3' on the positive main by wire 5 through magnet  $D^3$  to the contacts  $D^2$  and thence through the floor-controller and magnet  $M$  to the negative main, cutting out the push-button  $e^3$  on the car and rendering it unnecessary to keep this button or controlling device closed, so that the finger may be removed therefrom. The energizing of the magnet  $D^3$  in the circuit which short-cir-

cuted the car push-button will operate contacts  $D^4$ , opening them, and therefore opening the circuit including wire 4, leading to the push-buttons or controlling devices at the stations, so that the operation of the car or cage cannot be interfered with from the controlling devices at the stations during the travel of the car. The energizing of magnet  $M$  in the floor-controller circuit operates to close the normally open contacts  $M'$ , controlling the circuit of the relay  $U$ ; but it will be seen that the relay  $U$  will not be energized by any of the means so far described, since it is directly connected to the positive main through the wire 2, which includes door-contact  $T$  and the door  $y$  at the floor 1, at which the car is stationed, or, in other words, by the operation of the controlling device or button  $e^3$  on the car corresponding to the floor or station 3 a certain part of the controlling-circuits have been energized, energizing circuit-controlling devices; but another part of the controlling-circuits still remains open, and that part remaining open or deenergized includes the starting and reversing relays  $D$  and  $U$  for the motor, and it is clear that the motor cannot be started until these are energized and the starting and reversing switch  $R$  is operated. By simply closing the door  $y$  at station 1 relay  $U$  will be energized, throwing the starting and reversing switch  $R$  to a position to cause the motor to start and rotate in a direction to cause the car  $B$  to travel upward, the rotation of the motor causing the floor-controller to rotate synchronously therewith, as described in the application above referred to, Serial No. 660,873, in the direction indicated by the arrow  $h$  on the floor-controller  $H$  until the insulation  $C^{10}$  passes beneath the brush  $f^3$  and breaks the circuit of the floor-controller, which is timed to occur as the car or cage reaches the third floor or station, thereby deenergizing the magnet  $M$ , which causes the contacts  $M'$  to separate, thereby deenergizing the relay  $U$ , which breaks the circuit of the motor through switch  $R$  and stops the motor.

The same operation, as hereinbefore described, will take place if the car or cage were to be sent from any one station to any other station by the operation first of a controlling device on the car and then by the operation of a controlling device at a station, described in this instance as contacts connected with the doors, although it is to be understood that I do not limit myself to contacts connected with the doors, as any other suitable controlling means or devices might be arranged at the stations adapted to be operated after the controlling devices on the car are operated to start the motor and send the car to its destination.

The magnet  $D^3$ , controlling contacts  $D^4$ , prevents interference between the controlling devices  $g' g^2 g^3$  at the stations and controlling devices on the car, while magnets  $L$  and  $M$  in the floor-controller circuits controlling the

switches L' M' are also adapted to prevent interference, since when the circuit of one relay, as U, is closed that of the other relay, as D, is normally broken, as will readily be seen.

5 Means are provided at each floor or station for signaling the approach of the car, so that an operator at the station to which the car is being sent will know when the car approaches. Any suitable means may be provided for ac-  
10 complishing this result; but, as shown, circuits 10 are connected across the mains at the floors or stations, including lamps S' S<sup>2</sup> S<sup>3</sup> and suitable switches F' F<sup>2</sup> F<sup>3</sup>, operated by means shown in this instance as cams E' E<sup>2</sup> E<sup>3</sup>, adapt-  
15 ed to be engaged by the car. As the car approaches the floor or station, therefore, the lamp is caused to burn and give a signal on the approach of the car.

It will be seen that with my apparatus for  
20 controlling elevators, hoists, or dumb-waiters means are provided for controlling the operation of the motor from a station (as embodied in the door-contacts and circuits) after the operation of a controlling device on the car,  
25 or, in other words, means are provided for starting the motor from a station or floor after the operation of a controlling device on the car. I have shown controlling devices con-  
30 nected to the car and stations and means for controlling the motor by the operation of a door at a station after the operation of a controlling device or push-button on the car, the  
controlling devices being connected to the car and station switches, together with means for  
35 operating the car from a station-switch after the operation of a car-switch. It will also be seen that push-buttons are provided on the car or cage corresponding to the several floors or stations, while there are controlling-cir-  
40 cuits and connections between the push-buttons and the motor for controlling the operation of the motor, and there are means for energizing part of the controlling-circuits by the  
operation of a car push-button without start-  
45 ing the motor, or, in other words, means are shown for completing the circuit from the car through the floor-controlling device, while maintaining the starting devices deenergized  
until a door-switch is operated.

50 In my system of control there are provided in connection with a floor-controller and motor-operating relays circuits connecting the car and stations with the floor-controller and relays, with means for controlling the floor-  
55 controller circuits from the car and means for controlling the relay-circuits from the stations. The controlling devices on the car-control circuits include the floor-controller, and they are adapted to be operated in ad-  
60 vance of the devices at the stations, which controlling-circuits include the motor-operating relays, and the controlling means on the car are for determining the limit of travel of the car or for determining its destination,  
65 while the controlling means at the stations are for operating the car, the controlling means at the stations being indicated, as be-

fore described, by contacts connected with the doors, the controlling means at the sta-  
tions for operating the car being adapted to  
70 be operated after its limit of travel has been determined. The controlling circuits and de-  
vices, in connection with the controlling de-  
vices on the car, may be said to be for pre-  
determining the limit of travel of the car or  
75 for predetermining the limit of travel of the car or cage from the cage, which devices on  
the car, as described, are operated, but with-  
out starting the motor, the starting of the mo-  
tor being controlled from the stations. Other  
80 means (shown as push-buttons at the stations) are also provided for controlling the opera-  
tion of the car or cage after the cage has reached its destination.

Without limiting myself to the precise con-  
85 struction and arrangement of parts shown and described, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for controlling elevators or hoists, the combination with a motor, of  
90 means for controlling its operation from a station after the operation of a controlling device on the car, substantially as described.

2. In an apparatus for controlling elevators or hoists, the combination with a motor, of  
95 means for starting the motor from a station after the operation of a controlling device on the car, substantially as described.

3. The combination with a motor, car, and stations, of controlling devices connected to  
100 the car and stations, and means for controlling the motor by the operation of a door at a station after the operation of a controlling device on the car, substantially as described.

4. The combination with a motor, car, and  
105 stations, of controlling devices connected to the car and stations, and means for starting the motor by the closure of a door at a station after the operation of a switch on the car, substantially as described. 110

5. The combination with a motor, car, and stations, of controlling devices connected to  
car and station switches, and means for oper-  
115 ating the motor from a station-switch, after the operation of a car-switch, substantially as described.

6. The combination with a motor, car, and stations, of controlling devices connected to  
the car and stations, and means for operating  
120 the motor from a station after a controlling device on the car has been operated, substantially as described.

7. In an apparatus for controlling elevators or hoists, the combination with a car and its  
operating-motor, of push-buttons on the car  
125 corresponding to the several floors or stations, controlling-circuits and connections between the push-buttons and motor for controlling the operation of the motor, and means for en-  
energizing part of the controlling-circuits by the  
130 operation of a car push-button without starting the motor, substantially as described.

8. In an apparatus for controlling elevators or hoists, the combination with a car, operat-

ing-motor, starting and floor-controlling devices, of push-buttons on the car corresponding to the several floors or stations, controlling-circuits and connections between the push-buttons and controlling devices, and means for completing a circuit from the car through the floor-controlling device, while maintaining the starting devices deenergized until a door-switch is operated, substantially as described.

9. In an apparatus for controlling elevators or hoists, the combination with a car, operating-motor, starting and floor-controlling devices, of push-buttons on the car corresponding to the several floors or stations, controlling-circuits and connections between the push-buttons and controlling devices, and means for energizing a circuit from the car, including a floor-controlling device, while maintaining the starting devices deenergized until a controlling device at a station is operated, substantially as described.

10. In an apparatus for controlling elevators or hoists, the combination with a car and its operating-motor, of controlling devices on the car corresponding to the several floors or stations, circuits and connections between said controlling devices and motor for controlling the operation of the motor, and means for energizing part of the controlling-circuits by the operation of a controlling device on the car without starting the motor, substantially as described.

11. The combination with a motor, car and stations, of push-buttons on the car, circuits including the push-buttons and a floor-controller, connections between the floor-controller and starting-relays, said connections being controlled by magnets in the floor-controller circuits, and door-contacts at the stations controlling the operation of the relays, substantially as described.

12. In an elevator or hoist, the combination with a motor, car, and stations, of a floor-controller and motor-operating relays, circuits connecting the car and stations with the floor-controller and relays, means for controlling the floor-controlling circuits from the car, and means for controlling the relay-circuits from the stations, substantially as described.

13. In an elevator or hoist controlling apparatus, the combination with a motor, car, and stations, of devices on the car controlling circuits including a floor-controller, electrically-controlled connections between the floor-controller and motor-operating relays, and devices at the stations controlling circuits including the relays, substantially as described.

14. In an apparatus for controlling elevators or hoists, the combination with a motor, car, and stations, of devices on the car controlling circuits including a floor-controller and adapted to be operated in advance of devices at the stations controlling circuits including the motor-operating relays, substantially as described.

15. In an apparatus for controlling elevators or hoists, the combination with a motor, car, and stations, of controlling circuits and devices for the motor, and controlling means connected to the car for determining its destination adapted to be operated in advance of controlling means connected to the stations, for starting the car, substantially as described.

16. In an elevator or hoist, the combination with a motor, car, and stations, of means connected to the car for determining the travel of the car in advance of its operation, and means connected to the stations for operating the car after its limit of travel has been determined, substantially as described.

17. In an apparatus for controlling elevators or hoists, the combination with a motor, car, and stations, of a floor-controller, means on the car controlling circuits including the floor-controller to determine the limit of travel of the car, motor-operating relays, and means at the stations for controlling the relays to start the car after its limit of travel has been determined, substantially as described.

18. In a dumb-waiter adapted to be operated from the floors or stations, the combination with a cage and operating-motor, of push-buttons on the cage for determining its destination, controlling-circuits and connections between the push-buttons and the motor, and means at the stations for starting the motor after the destination of the cage has been determined, substantially as described.

19. In a dumb-waiter, the combination with a motor, car, and stations, of means for pre-determining the limit of travel of the cage from the cage, adapted to be operated in advance of means for starting the cage from a station by the operation of door-contacts, substantially as described.

20. In a dumb-waiter, the combination with a motor, car, and stations, of means for pre-determining the limit of travel of the cage from the cage, adapted to be operated in advance of means for starting the cage from the stations by the operation of door-contacts, and other means at the stations for operating the cage, substantially as described.

21. In a dumb-waiter, the combination with a motor, car, and stations, of means for pre-determining the limit of travel of the cage from the cage, adapted to be operated in advance of means for starting the cage from the stations by the operation of door-contacts, and other means at the stations for operating the cage after it has reached its destination, substantially as described.

22. In a dumb-waiter, the combination with a motor, car, and stations, of means for pre-determining the limit of travel of the cage from the cage, adapted to be operated in advance of means for starting the cage from the stations by the operation of door-contacts, and push-buttons at the stations for operating the cage after it has reached its destination, substantially as described.

23. In a dumb-waiter, the combination with  
a motor, car, and stations, of means for pre-  
determining the limit of travel of the cage  
from the cage, means for starting the cage  
5 from the stations by the operation of door-  
contacts, and signaling means for giving no-  
tice when the cage approaches a station, sub-  
stantially as described.

24. In a dumb-waiter, the combination with  
10 a motor, car, and stations, of means for pre-  
determining the limit of travel of the cage  
from the cage, means for starting it from the  
stations after its limit of travel has been de-

termined, other means at the stations for con-  
trolling the cage, and means for preventing 15  
interference between said other controlling  
means and the means for limiting the travel  
of the cage, substantially as described.

In testimony whereof I have signed my  
name to this specification in the presence of 20  
two subscribing witnesses.

AUGUST SUNDH.

Witnesses:

W. R. MARSDEN,  
WM. J. KEENAN.