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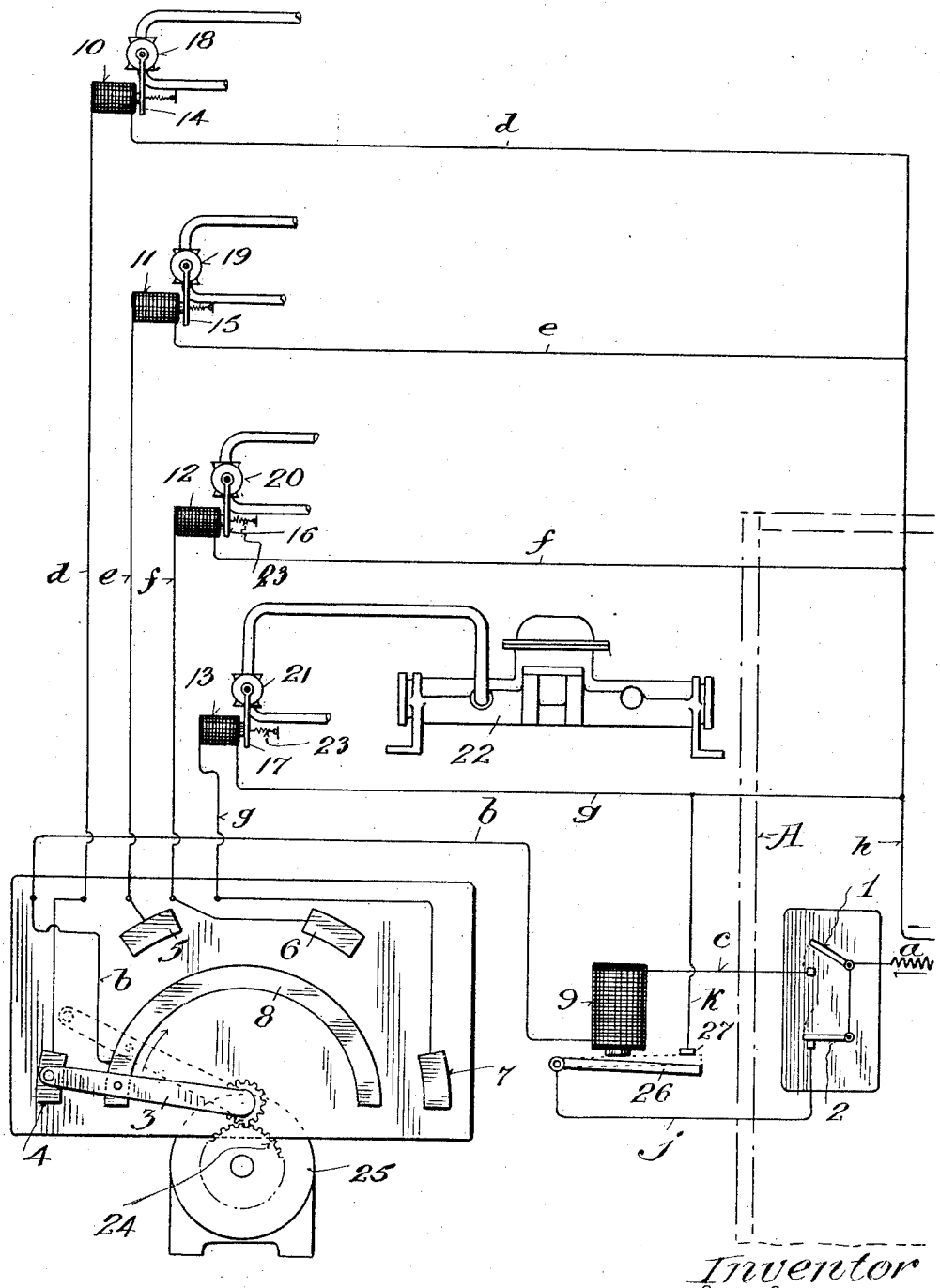
PUSH BUTTON CONTROL SYSTEM FOR ELEVATOR DOOR OPERATING DEVICES.

APPLICATION FILED JUNE 16, 1917.

1,329,712. Patented Feb. 3, 1920.



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UNITED STATES PATENT OFFICE.

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PUSH-BUTTON CONTROL SYSTEM FOR ELEVATOR-DOOR-OPERATING DEVICES.

1,329,712. Specification of Letters Patent. Patented Feb. 3, 1920.

Application filed June 16, 1917. Serial No. 175,242.

To all whom it may concern:

Be it known that I, FRANK JOHNSON, a citizen of the United States, residing at Wilmette, county of Cook, State of Illinois, have made a certain new and useful Invention in Push-Button Control Systems for Elevator-Door-Operating Devices, of which the following is a specification.

The object of the invention is to provide a push button control system for elevator hatchway door operating motors, which is simple and efficient in operation, and economical to manufacture, install and maintain.

A further object is to provide a push button control system, of the nature referred to, wherein the elevator hatchway door operating motor, at any particular landing or floor, can only be operated when the car is within a predetermined distance from the landing at that floor, whether the car is approaching or is proceeding from that landing.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing, and finally pointed out in the appended claims.

The drawing shows, in diagrammatic view, an arrangement of push button control system embodying the principles of the invention.

It is a common practice to employ motors for operating elevator hatchway doors, and various arrangements have been proposed and employed for controlling the operation of the door motors from the elevator car. A common expedient has been to mount a tripshoe or other similar device upon the car, and to project the same by means of a lever, chain, or other connection operated from the car, into position to strike an arm, pin, or other connection, associated with the control valve of the motor, as the car approaches a landing at which a stop is to be made and the hatchway door is to be opened. Such arrangement requires the use of complicated control apparatus on the car, including foot levers, chains, or other connections, to effect the projection of the shoe. Moreover, it has frequently occurred in practice that when the tripshoe has been projected into position to engage the pin or other stop device connected with the motor controlling valve, such pin or other connection, or the tripshoe itself, is broken off by the impact, thereby necessitating frequent repairs of broken parts. Besides complicated lever or chain connections, tripshoes, or the like are expensive in installation, as well as in maintenance, and the operation of such devices is ordinarily accompanied by an objectionable noise, particularly when the tripshoe strikes the valve control arm or other connection.

It is among the special purposes of my present invention to provide a simple and efficient arrangement wherein these and other objections are eliminated, which is noiseless in operation, and is simple and economical to manufacture, install and maintain. In carrying out my invention I employ two switches or push button devices on the car A which I have indicated respectively 1 and 2, both connected to a current supply source through wire *a*. At a convenient or suitable point in the elevator plant, but preferably at or adjacent the elevator car hoisting motor, and suitably connected to work in synchronism with the operation of the hoisting motor, is a contact arm or lever 3 which operates in conjunction with a series of contacts 4, 5, 6, 7, and so on, corresponding, respectively, with the various floors or landings at which the car is to stop. The contact arm 3 also coöperates with contact segment 8 which is connected through wiring connections *b* and through a magnet coil 9 and wire *c*, to the push button or switch device 1 on the car. The contacts 4, 5, 6, 7 are respectively connected by wires *d*, *e*, *f*, *g*, etc., through the coils of magnets 10, 11, 12, 13, etc., to a return wire *h*. Each magnet coil 11 controls an armature which is associated with an arm 14, 15, 16, 17, etc., for controlling the valve mechanism 18, 19, 20, 21, etc., of the associated door operating motor, only one of which is shown at 22, for operating respective doors throughout the elevator hatchways. The valve operating levers 14, 15, 16, 17, etc., are normally restrained or maintained in one position in any suitable manner, as for instance, by means of a spring 23 or otherwise. This position, if desired, may correspond to such a position of the motor control valve as to maintain the motor in position for its door to be kept closed. When, however, the as-

sociated magnet coil 10, 11, 12 13, etc. is energized by the completion of its circuit, the associated valve arm is operated and the valve actuated to cause the motor to open or move the door. Of course these details of movement and operation of the doors may be varied throughout a wide range and other methods employed, and other types of motors, electrically controlled or otherwise, may be used without departure from the spirit or scope of my invention. The contact arm 3, as above indicated, is synchronized in its movement relatively to the contacts 4, 5, 6, 7, etc., with reference to the travel of the car. This can be accomplished by moving said arm coincidently with the actuation of the car hoisting motor. Such an arrangement is indicated wherein the arm 3 is driven through gearing 24 from a motor 25, which operates the elevator car. In its movement the contact arm 3 remains constantly in contact with the segment 8 and is brought into contact with the segments 4, 5, 6, 7, etc., as the car approaches the respective floors or landings in the course of its travel. Arrangement should be made, however, that the arm 3 will not come into connection with a contact, 4, 5, 6, 7, etc., until the car has approached to a point within a predetermined distance from the corresponding floor or landing. Likewise the contact arm 3 should leave segments 4, 5, 6, 7, etc., as soon as the car has proceeded a predetermined distance away from a floor or landing. Even though a contact arm 3 should come into contact relation between the segment 8 and one or another of the segments 4, 5, 6, 7, etc., as the car approaches a particular landing or floor, the corresponding door will not be operated unless the push button 1 is operated.

Assuming now that the push button 1 has been closed with the parts in the relative positions shown in the drawing. Thereupon circuit is completed as follows:

From wire *a* through the closed push button 1, wire *c*, the coils of magnet 9, wire *b*, segment 8, lever 3, contact 4, wire *d*, magnet 10, wire *d*, to return wire *h*. The closing of this circuit energizes magnets 9 and 10. It will be observed that two conditions must coincide in order to effect the closing of this circuit. One is, the car must be in such a position with reference to the landing or floor corresponding to the contact segment 4 as to cause the contact arm 3 to bridge the space between said contact 4 and segment 8. The other is, that the push button must also be closed. If the contact 4 is so disposed as not to be contacted by arm 3 until the car arrives within a predetermined distance, say two feet, from the landing or floor corresponding to the contact 4, then if the push button 1 is also closed, the motor control magnet 10 at that floor will be energized and the door motor put into operation. If it be desired to permit the car to pass that floor without operating the door, this is accomplished by merely refraining from pushing the button, in which case, the car will pass on by that landing or floor without operation of the door actuating motor. If the push button is closed, as in the instance given, then the door motor will commence to operate when the car is within the predetermined distance from the floor or landing and will remain in its actuated state until the car leaves the floor and proceeds the distance away from the floor or landing as predetermined by the position of the contact 4. The same operation applies to each of the contacts 4, 5, 6, 7, etc., there being as many of these contacts as there are floors or landings or door operating motors to be controlled. When the contact arm 3 has passed beyond a segment 4, 5, 6, 7, etc., the corresponding motor control magnet 10, 11, 12, 13, etc., will become deënergized by the opening of its circuit, thereby permitting the motor valve which it controls to be returned to its normal or initial position. It may sometimes be desired to cause a door to be closed before the car leaves its floor or landing, even though push button 1 is closed and the contact arm 3 remains in bridging relation to the corresponding contact 4, 5, 6, 7, etc. To accomplish this, the push button 2 on the car is employed. This push button is connected to the current supply source *a* and also through wire *j* to an armature 26 of the magnet 9. When the magnet 9 is energized by the closing of circuit 1 the armature 26 closes upon a contact 27 which is connected by wire *k* to return wire *h*. As long as the circuit of magnet 9 remains closed the auxiliary or short circuit of push button 2 is also closed to the push button. Now by closing push button 2, the magnet 9 is short circuited and current will be cut off from the motor control magnet 10, 11, 12, 13, etc., and hence the corresponding motor will operate to close its door.

Having now set forth the objects and nature of my invention, and a construction and arrangement embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent is:—

1. The combination with an elevator car, its hoisting motor, a hatchway door operating motor, of an electrically operated control device for the door operating motor, a circuit therefor, a magnet included in said circuit, contact devices arranged in said circuit and controlled by the hoisting motor, and a short circuit controlled by said magnet.

2. The combination with an elevator car, its hoisting motor, a hatchway door operat-

ing motor, of an electrically operated control device for the door operating motor, a circuit therefor, a magnet included in said circuit, contact devices arranged in said circuit and controlled by the hoisting motor, a contact device on the car and also arranged in said circuit, and a short circuit controlled by said magnet.

3. The combination with an elevator car, its hoisting motor, a hatchway door operating motor, of an electrically operated control device for the door operating motor, a circuit therefor, a magnet included in said circuit, contact devices arranged in said circuit and controlled by the hoisting motor, a contact device on the car and also arranged in said circuit, a short circuit controlled by said magnet, and a contact device on the car for also controlling said short circuit.

In testimony whereof I have hereunto set my hand on this 14th day of June, A. D. 1917.

FRANK JOHNSON.