June 24, 1930. T. E. GRIFFITH ET AL 1,768,249

SWITCH MECHANISM

Filed March 5, 1923

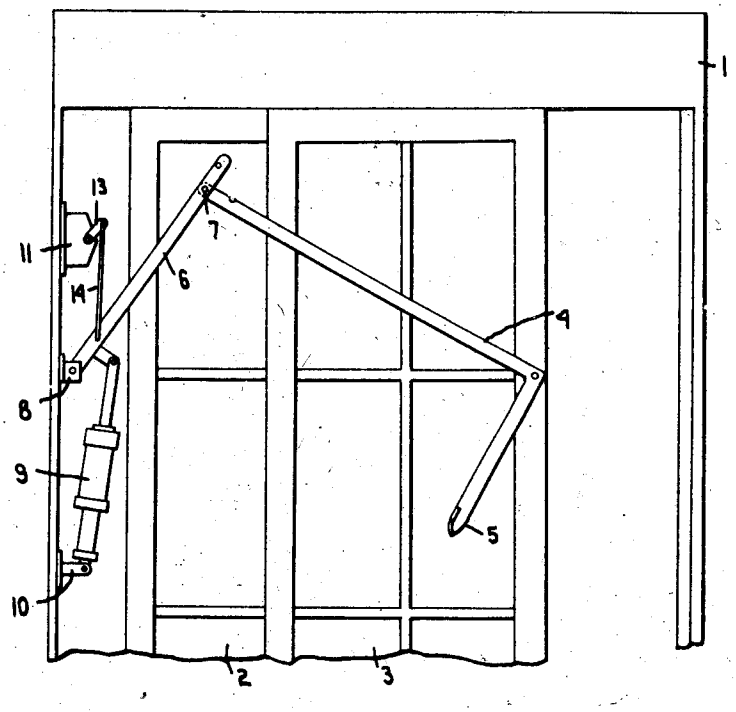


Fig. 2.

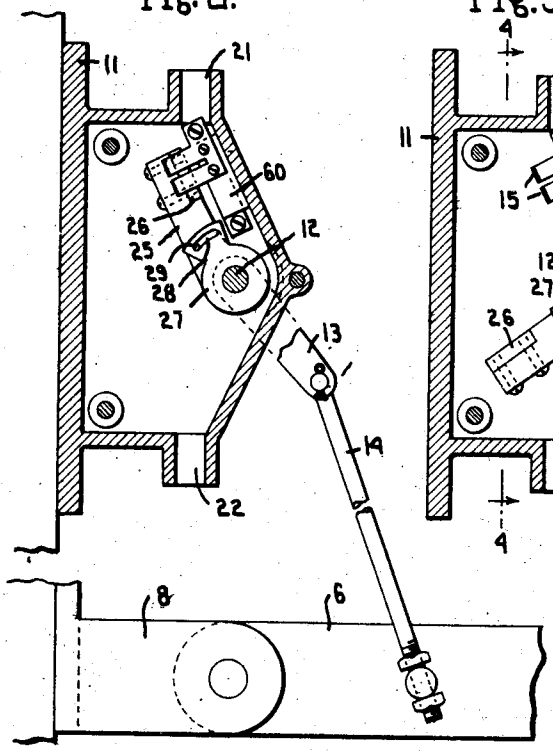


Fig. 3.

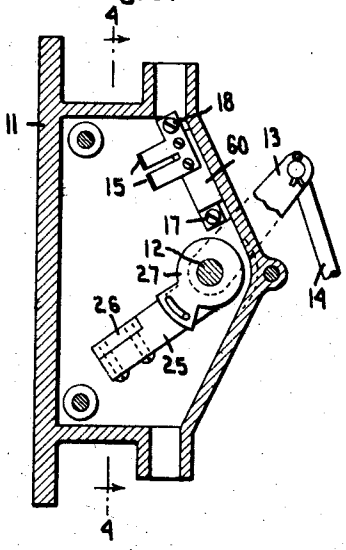
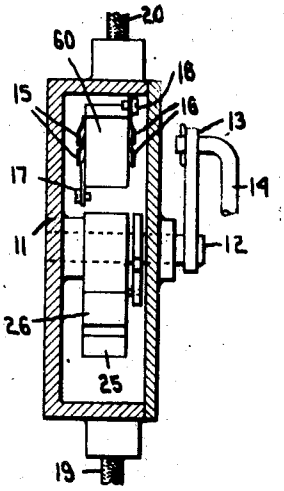


Fig. 4.



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UNITED STATES PATENT OFFICE

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SWITCH MECHANISM

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The present invention, relating to switch mechanism, is more particularly directed to an improved switch for use in elevator cars for breaking the operating circuit of the car upon the opening of the door of the elevator enclosure. One of the important purposes of the present mechanism is to provide a switch which will open quickly and positively, and eliminate, so far as possible, all arcing, while a further object is the provision of a device which shall be extremely simple in construction. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a front elevation taken from the inside of an elevator shaft and showing the door-operating mechanism therefor, together with the present switch mechanism; Fig. 2 is a vertical central section through the switch mechanism showing the same in its closed position; Fig. 3 is a similar view, but showing the switch when open; and Fig. 4 is a section on the line 4—4, in Fig. 3.

In Fig. 1 there is shown an elevator enclosure 1, provided with co-operating door sections 2 and 3, which are opened by means of an angled lever 4, provided with a handle 5, and a second lever 6, which is pivotally connected at the point 7 to the first lever, and is pivotally mounted upon a bracket 8 positioned at the side of the enclosure 1. An automatic door-closing device 9 of any desired construction is attached between a second bracket 10 on the enclosure and the lever 6 for closing the doors when the handle 5 is released.

Mounted also on the side of the enclosure 1 is a switch casing 11, in which is mounted a shaft 12 provided with an exteriorly extending operating arm 13, the end of which is connected by means of a rod 14 to the lever 6, so that the shaft 12 is rotated, and the switch mechanism, presently to be described, is operated, upon movement of the lever 6 during opening and closing of the doors. The switch mechanism proper consists of spaced resilient contact members 15 and 16, secured to an insulating base 60 by suitable screws, and which are provided with screws 17 and 18, respectively, for the convenient connection of electrical conductors 19 and 20, respectively. These conductors pass out from the switch casing through openings 21 and 22, and lead to the operating circuit for controlling the operation of the elevator car motor.

Pivotally mounted on the shaft 12 is a switch arm 25, which is adapted in one position, (see Fig. 2) to engage between the contact fingers 15 and 16 and be held there by the rod 14, lever 13 and the pin 29, to be presently described, and also by the frictional pressure of these fingers. This member 25 is formed of insulating material, but is provided with a metallic strip 26 extending around one face and along opposite sides for engagement with the contacts 15 and 16, and this strip serves to complete the circuit through these fingers. The switch element 25 is operated by means of an arm 27 attached to the shaft 12 and provided with a slot 28 therein, fitted over a pin 29 mounted on the switch member 25.

In the position shown in Fig. 2 the enclosure doors are shut and the switch member is engaged to close the circuit by contact with the fingers 15 and 16. In this position the pin 29 is at the lower end of the slot 28 so that upon opening the doors 2 and 3 the inward movement of the doors serves to swing the member 27 in a counterclockwise direction. Upon engagement of the other end of the slot 28 against the pin the switch member is pulled rapidly out of contact, and as soon as it is freed from the spring fingers 15 and 16 it drops by gravity entirely clear of these members until the left-hand end of the slot 28 stops the further movement of the member by engagement of the pin 29 thereagainst.

Upon the closing of the doors the member 25 is returned positively to the circuit closing position by the movement of the pin 29

against the left side of the slot 28, and this provides that the switch member is not closed until the doors are entirely shut since the engagement of the switch member is produced by the last portion of the travel of the doors.

The present switch mechanism is simple and positive in action, easily attached and connected to the door opening mechanism, and has been found to substantially eliminate all arcing. The lost motion in the operating connections between the door and the switch member proper permit an extremely rapid opening and closing of the switch, and the result is a minimum of arcing. A further advantage is that this lost motion insures that the switch is opened as soon as the enclosure door has opened a predetermined distance, but is not closed until the final travel of the door, so that as long as the door is open the operating circuit for the car motors is disconnected, and the car cannot be started until the door is entirely shut.

We therefore particularly point out and distinctly claim as our invention:—

In an elevator switch mechanism, operating means therefor, a pivotally movable arm, connections between said arm and said means, a horizontal shaft for mounting such arm, a switch means including two spaced contacts positioned above the plane of said shaft, a closing member for said switch carried by said shaft, said member normally hanging below and out of engagement with said contacts and having a projecting pin thereon, and means including an element fixed to said shaft and having a lost-motion slot therein engaging over said pin on said member, said element being operated by the movement of said arm.

Signed by us, this 20th day of February, 1923.

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