July 19, 1955 C. W. LERCH 2,713,645

AUTOMATIC CONTROL MECHANISM FOR ELEVATORS

Filed March 19, 1953

Fig. 1

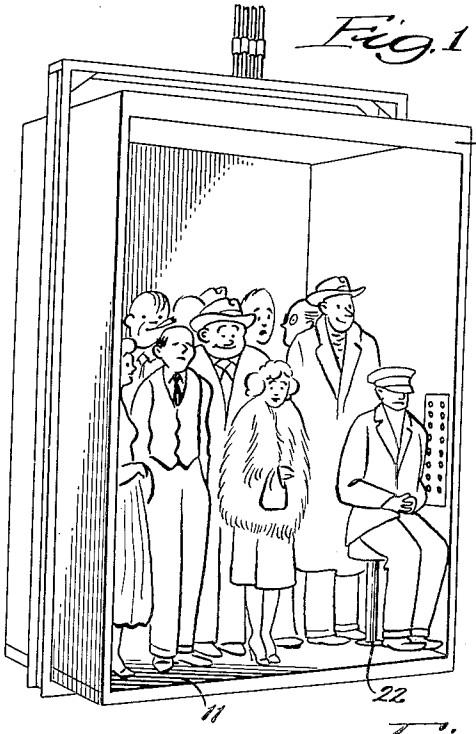


Fig. 3

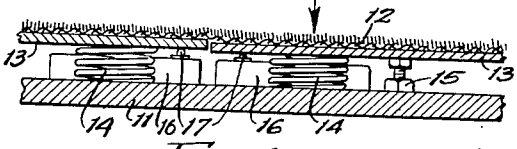


Fig. 4

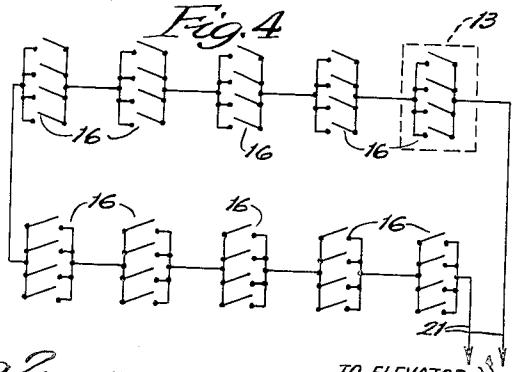
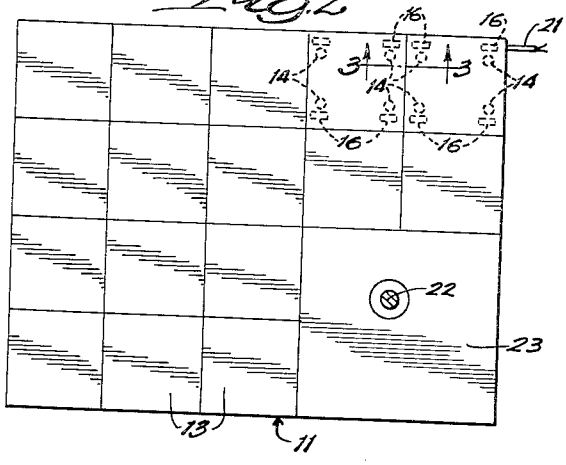


Fig. 2



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United States Patent Office

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AUTOMATIC CONTROL MECHANISM FOR ELEVATORS

Charles W. Lerch, Wilmette, Ill.

Application March 19, 1953, Serial No. 343,370

6 Claims. (Cl. 307—119)

This invention relates to automatic control mechanisms for elevators, and in particular it is directed to apparatus for automatically rejecting floor-stop signals in an automatic elevator system at times when the car is loaded to capacity.

In the early stages of development of electrical elevator controls, the actual acts of starting and stopping the elevator car were invariably performed by a human operator, under the guidance of signals, such as buzzer or light signals, automatically transmitted to the car responsively to manual actuation of buttons situated on the various floors served by the car.

In such relatively simple elevator installations, the operator was normally free to respond to or ignore floor-stop signals, subject only to whatever supervision might be exercised by the elevator starter. When, in making a down trip, for example, the elevator became filled to capacity, at an intermediate floor, the operator could proceed directly to the main floor, either ignoring subsequent stop signals or operating a manual switch within the car to make his own signal panel unresponsive to such signals.

In more modern elevator installations, considerable effort has been expended in developing control apparatus which can make the car respond automatically to floor-stop signals. Such control apparatus works effectively, but has been subject to one substantial disadvantage—the lack of any simple, effective means of making the car reject stop signals after it has become loaded to capacity. Obviously, it is irritating to patrons to have the car stop after there is no longer room for additional passengers. Furthermore, such stops tend to cause a greater number of persons to crowd into the car than it can safely handle, thus adding a hazard to the operation of the elevator.

Many efforts have been made to develop a suitable control mechanism to meet that situation. The usual approach to the problem has been to devise some sort of switch automatically responsive to the weight being carried by the elevator and causing it to reject floor-stop signals after the weight exceeds a certain critical value, such structures have not been particularly satisfactory, due primarily to the fact that weights of passengers vary so greatly and to the face that weight-responsive mechanisms are difficult to keep in good condition to provide accurate operation.

The present invention has for its object the provision of an automatic elevator-control mechanism wherein occupancy of floor space in the car, rather than weight, is the critical factor which determines when the elevator will reject floor-stop signals.

In furtherance of that object, it is a secondary object of the present invention to provide an elevator in which the floor is especially constructed to function as an occupancy-responsive switch, operative to effect automatic rejection of floor-stop signals whenever the floor space is fully occupied, regardless of the weight being carried by the car.

Other objects and advantages of the invention will appear from the detailed description of the invention which follows.

In the accompanying drawing, I have illustrated a typical embodiment of my invention. Figure 1 is a perspective view showing a typical elevator car; Fig. 2 is a diagrammatic plan view of the floor of elevator 1, showing the arrangement of the special floor sections which form an important part of my invention; Fig. 3 is a sectional view through the elevator floor, taken along the line 3—3 of Fig. 2, showing parts of two floor sections made according to my invention; and Fig. 4 is a schematic diagram showing the electrical wiring circuit of the floor switches which form an important part of my invention.

In the drawing, as may be noted from Fig. 1, I have shown a conventional elevator car 10 having a floor 11 which, in normal installations, will customarily be covered with carpeting or some suitable floor surface such as rubber tile or lineoleum, shown illustratively in Fig. 3 as a piled carpet 12.

Beneath floor covering 12, the floor 11 is covered over substantially its entire surface by a plurality of rectangular or square floor panels 13, in the example shown, each of which is independent of its neighbors. Each of the panels 13 may have an area in the neighborhood of from one to three square feet. Panels 13 may be made from any rigid material capable of supporting a reasonable amount of weight; plywood is a particularly suitable choice, although any other material having the necessary physical strength may be used.

Each of the panels 13 is supported near each of its respective corners on a coil spring 14. The springs 14 are relatively strong springs, calculated, with the resilience of floor covering 12, to provide an over-all "feel" characteristic of a deep-pile rug. Adjacent each of the of the springs 14 I provide a limiting stop member 15, seated firmly in the floor 11 and adjusted to provide for each of the panels 13 a maximum range of downward movement of perhaps one-sixteenth of an inch or thereabouts.

In the floor construction which I have described, a person entering the elevator car will have the sensation of walking on a slightly yieldable, springy floor. When he takes up his standing position within the car, his feet will be resting on one or more of the individual panels 13 and will force them downward against the force of the springs 14 until they are brought to rest on limit members 15.

Adjacent each of the floor panels 13, I provide a normally open microswitch 16, having its actuating button 17 in contact with the under side of floor panel 13. Downward movement of the panel 13 between its normal rest position on spring 14 and its depressed position against stop members 15 causes actuation of the microswitches 16.

Obviously, a person standing near one corner of one of the panels 13 might cause downward movement of only a small portion of the panel. Nevertheless, any such pressure, wherever applied, will force at least one corner of such panel down against its stop member 15 and thereby cause one of the switches 16 to be actuated.

Fig. 4 shows the manner in which the various switches 16 are wired together. Each of the panels 13 is provided with four switches 16, as schematically indicated in Fig. 4, and all of the switches 16 under any given panel 13 are connected in parallel. Those switches, in turn, are connected in series with the corresponding array of switches under each of the other panels. The terminal leads 21 connecting to the aforesaid circuit may be connected in any appropriate manner to the elevator control circuits for the purpose of causing the

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SELF-STARTING ALTERNATING CURRENT MOTORS

Filed April 15, 1954

FIG. 1.

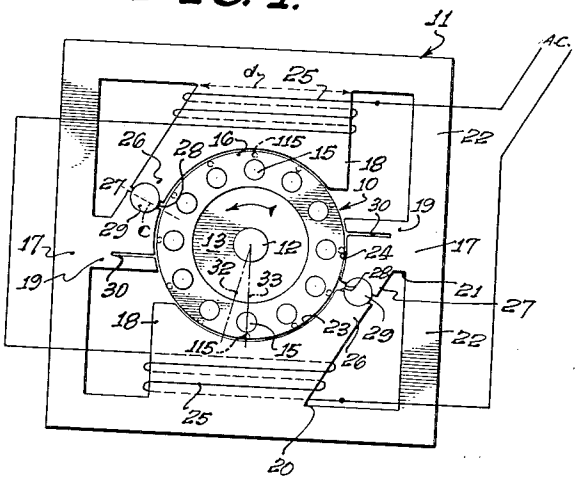


FIG. 3.

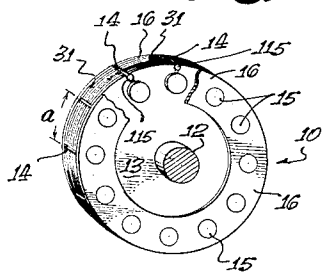


FIG. 4.

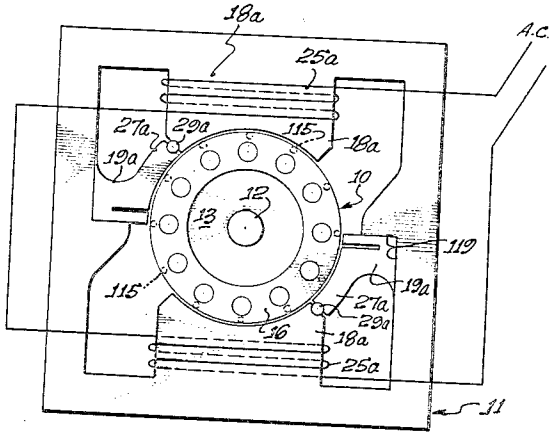


FIG. 2.

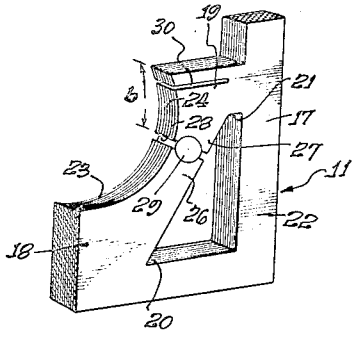
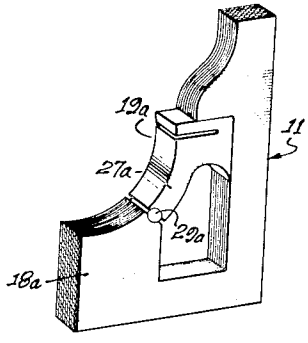


FIG. 5.



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