

Feb. 7, 1933.

H. R. NORTON

1,896,784

POSITION AND DIRECTION INDICATOR FOR ELEVATORS

Original Filed Sept. 10, 1927 3 Sheets-Sheet 1

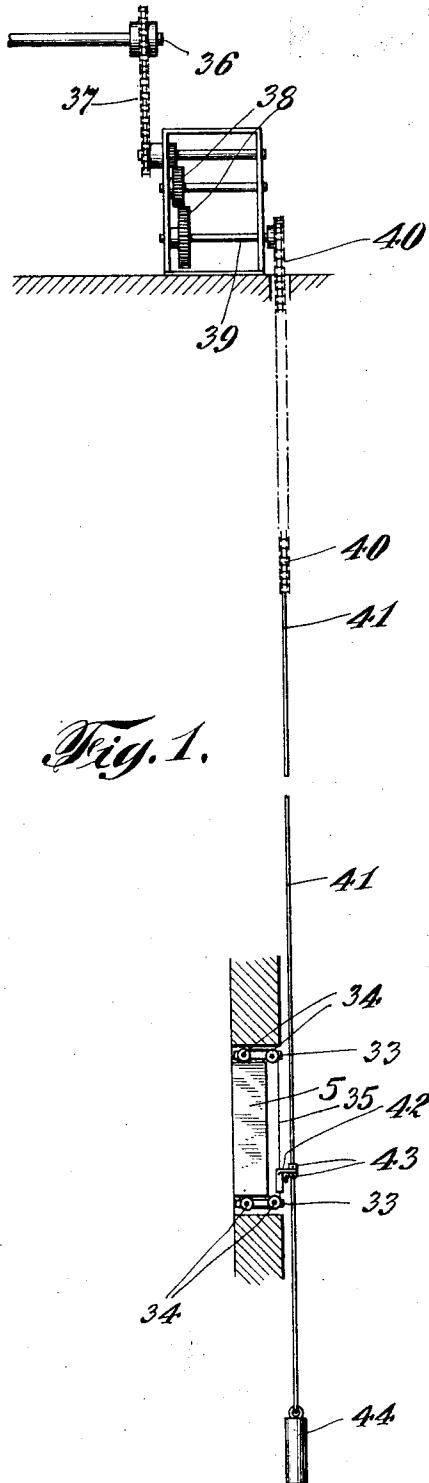


Fig. 1.

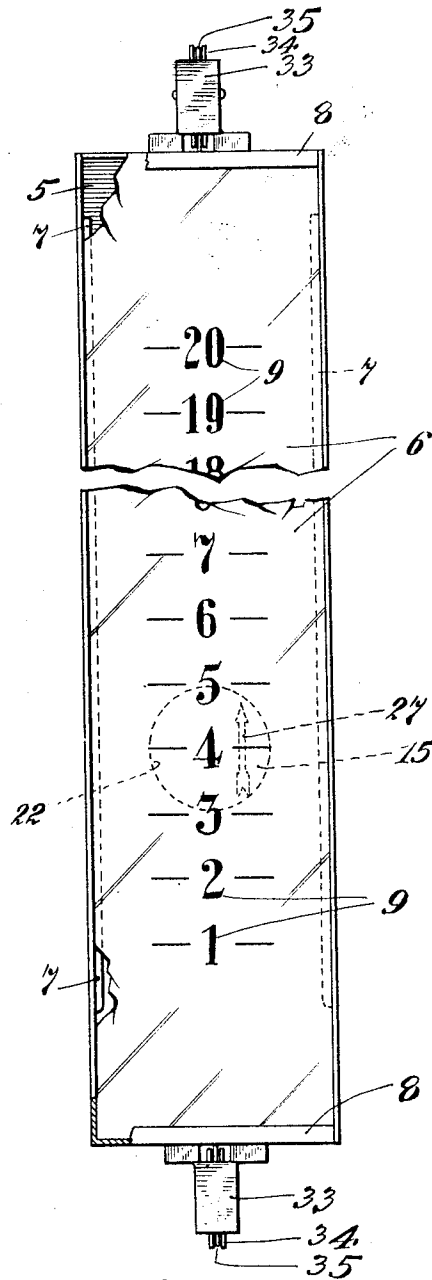


Fig. 2.

INVENTOR
Harry R. Norton

BY *C. P. Gopfel*
his ATTORNEY

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3 Sheets-Sheet 2

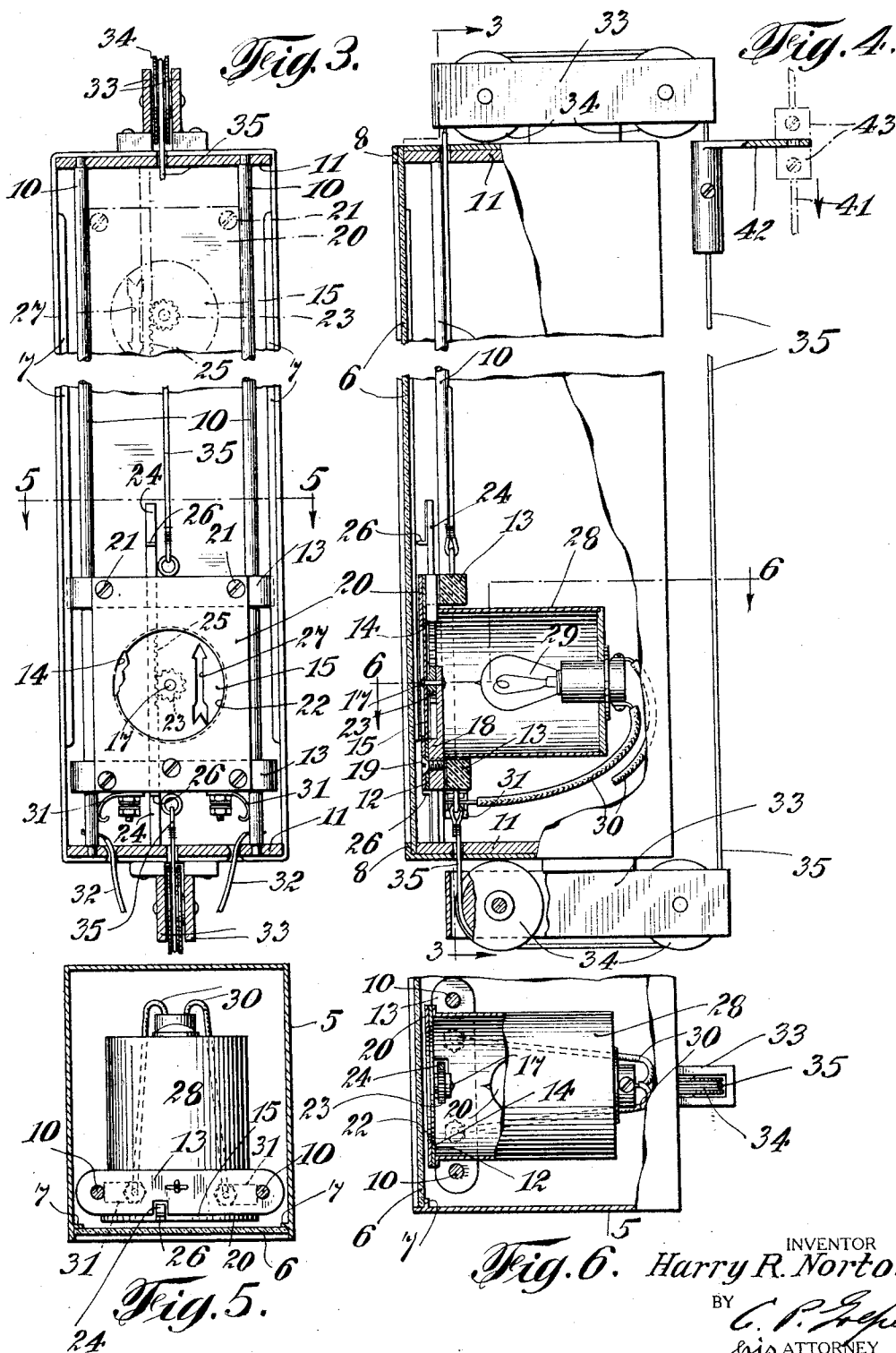


Fig. 6. Harry R. Norton

INVENTOR
BY C. P. Engel
his ATTORNEY

Feb. 7, 1933.

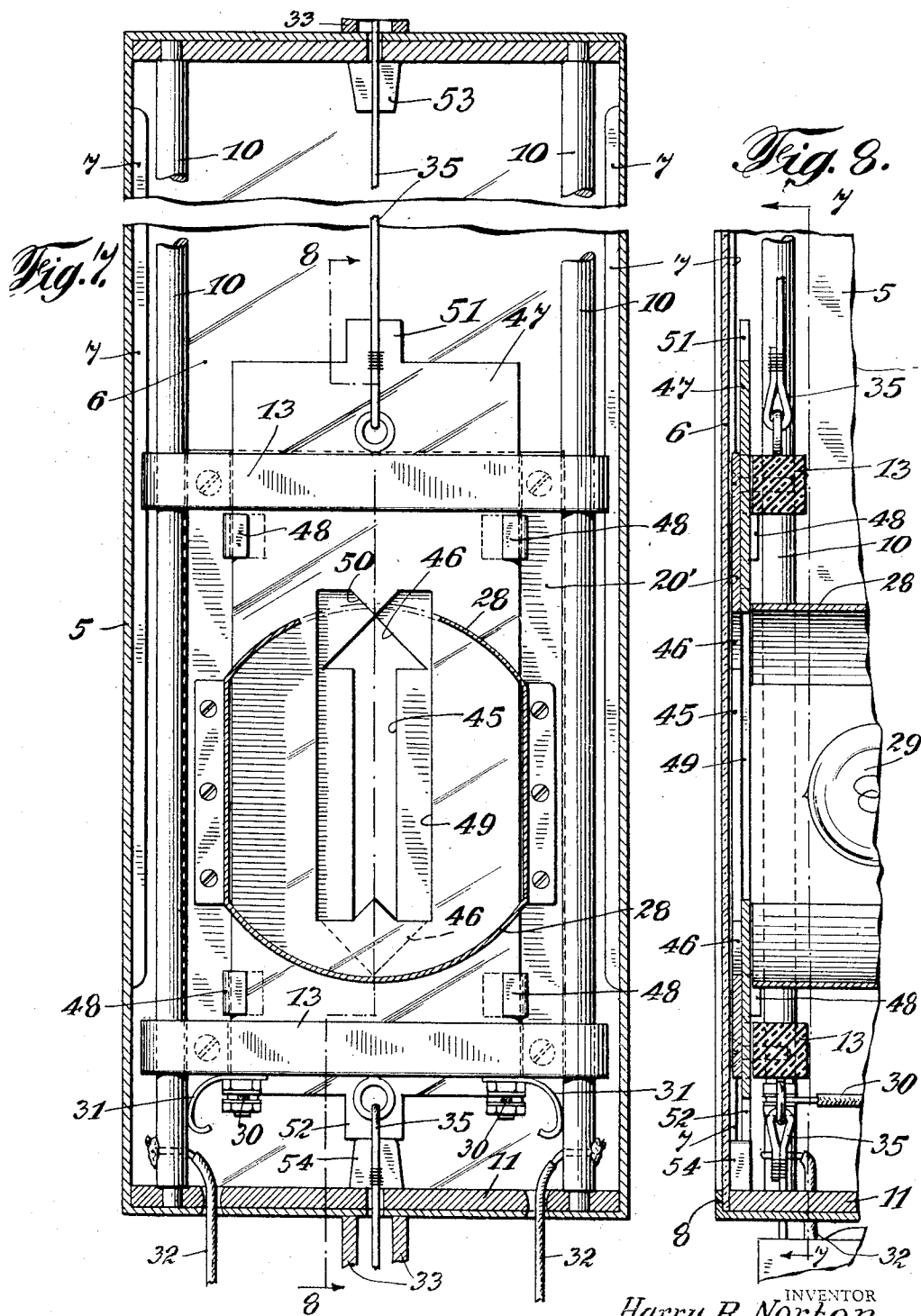
H. R. NORTON

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Original Filed Sept. 10, 1927

3 Sheets-Sheet 3



INVENTOR
Harry R. Norton
 BY *C. P. Gehl*
 ATTORNEY

UNITED STATES PATENT OFFICE

HARRY R. NORTON, OF NEW YORK, N. Y.; MARY ELLEN NORTON AND ARTHUR G. BLAIR,
ADMINISTRATORS OF SAID HARRY R. NORTON, DECEASED, ASSIGNORS, BY MESNE
ASSIGNMENTS, TO WESTINGHOUSE ELECTRIC ELEVATOR COMPANY, OF CHICAGO,
ILLINOIS, A CORPORATION OF ILLINOIS

POSITION AND DIRECTION INDICATOR FOR ELEVATORS

Application filed September 10, 1927, Serial No. 218,594. Renewed February 6, 1929.

This invention relates to a position and direction indicator for elevators, and has for its primary object to provide a simply constructed and efficient device of this kind synchronously operated from the elevator operating mechanism whereby the starter on the ground floor of the building will be at all times apprised of the position and direction of travel of the elevator in the hatchway and whether or not the elevator has made a complete trip in either direction of travel.

It is another and more particular object of the invention to provide a device of this kind embodying a suitable casing or housing having a translucent front plate or wall upon which the numbers of the floors of the building are painted or otherwise delineated, and a carriage arranged in said housing and operatively connected with the elevator operating mechanism, said carriage carrying a lamp housing and a rotatable disc at the front open end of said housing provided with a slot therein preferably in the form of an indicating arrow, and means for automatically rotating said disc at opposite ends of travel of the carriage to position the same in accordance with the direction of travel of the elevator whereby said arrow is outlined by the light rays on the translucent plate for movement relative to the floor indicating numerals. Thus, it will be apparent that if, when the elevator arrives at the ground floor, the arrow is pointing upwardly, the starter will be thereby apprised of the fact that in its previous upward travel in the hatchway, the elevator did not make a complete trip.

It is also a further general object of the invention to provide an indicating device for the above purpose, the several parts of which are simple in construction, positive and reliable in their operation and in which the various elements are compactly mounted and arranged so that the device may be operatively mounted in a relatively small space upon the elevator frame work or in the face of the building wall.

With the above and other objects in view, the invention consists in the improved position and direction indicator for elevators,

and in the form, construction and relative arrangement of its several parts, as will be hereinafter more fully described, illustrated in the accompanying drawings, and subsequently incorporated in the subjoined claims.

In the drawings, wherein I have described one simple and practical embodiment of the invention, and in which similar reference characters designate corresponding parts throughout the several views,—

Figure 1 is a fragmentary section through a building wall or other suitable support in or upon which the indicator is mounted and showing the indicator operatively connected with a part of the elevator operating mechanism;

Fig. 2 is an enlarged front elevation of the indicator, parts thereof being broken away;

Fig. 3 is a vertical sectional view through the indicator casing taken substantially on the line 3—3 of Fig. 4;

Fig. 4 is a side elevation of the indicator certain of the parts being illustrated in section;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a similar sectional view taken on the line 6—6 of Fig. 4;

Fig. 7 is a rear elevation on an enlarged scale of the sliding carriage as indicated by the line 7—7 in Fig. 8 illustrating a slightly modified form of the invention, and

Fig. 8 is a vertical sectional view taken substantially on the line 8—8 of Fig. 7.

Referring in detail to the drawings, the casing for the indicator mechanism generally indicated at 5 is of elongated rectangular form and may be readily produced from sheet metal. This casing is open at its front side and a front plate or screen 6 of translucent glass or other material suitable for the purpose is arranged therein against the flanges 7 provided on the side walls of the casing, suitable flanges 8 being also provided on the upper and lower end walls of the casing 5 and turned inwardly over the ends of the plate 6 to retain the latter in position.

Upon the central portion of the translucent plate 6, the row of numerals indicated at

9 are painted or otherwise delineated, said numbers corresponding to the number of floors which are served by the elevator and reading from the lower end of the plate 6 upwardly.

Within the casing 5 and adjacent to the plate 6, the spaced vertically extending rods 10 are positioned and have their upper and lower ends suitably fixed to the members 11 which extend over the inner sides of the top and bottom walls of the casing and may be secured thereto in any desired manner. Upon these rods 10 a carriage is slidably guided. This carriage includes the metal plate 12, to the upper and lower ends of which the horizontal bars 13 are fixed, said bars having openings in their opposite ends loosely receiving the rods 10. The plate 12 is provided with a circular opening 14 therein and a disc 15 is positioned within said opening in the plane of the plate. This disc is rotatably supported upon a stud 17 fixed in the upper end of an arm 18 secured by screw 19 to the rear side of the plate 12 below the opening therein, the lower bar 13 being recessed to accommodate this arm.

A second plate 20 is secured to the front side of the plate 12 by the screws 21 which secure both of said plates to the bars 13, and this plate 20 also has a circular opening 22 therein of slightly less diameter than the opening 14 in the plate 12 so that the edge of the opening 22 extends over the edge of the rotatable disc 15. To the rear side of said disc the pinion 23 rotating upon the stud 17 is secured.

At one side of the center of the disc 15 and in the plane of the pinion 23 a vertically movable rack bar 24 is arranged and guided in suitable recesses provided in the bars 13. The intermediate portion of this bar has a toothed edge 25 to mesh with the teeth of the pinion 23 and said bar in spaced relation to each of its ends, is provided with a stop lug 26 which are adapted to engage with the upper and lower ends respectively, of the plates 12 and 20 and limit the movement of the rack bar in each direction.

The disc 15 at one side of its center has a slot 27 cut therein, preferably in the form of an arrow, so that the disc may be employed as a pointer for indicating the direction of travel of the car.

To the rear side of plate 12, the front open end of a lamp housing 28 is suitably secured. The lamp indicated at 29 is mounted in a socket attached to the rear wall of said housing. The current supply wires 30 for this lamp are electrically connected with the resilient contact plates 31 which have sliding engagement with the rods 10 as clearly shown in Fig. 1 of the drawings. To these rods at their lower ends the current supply wires 32 are connected.

Upon the upper and lower ends of the casing 5 suitable bracket members 33 are secured and in these brackets the spaced guide sheaves 34 for the wire or other flexible element 35 are mounted. One end of the flexible element 35 is suitably attached to the upper end of the travelling carriage in said casing while the other end of said element is connected to the lower end of the carriage.

Referring now to Fig. 1 of the drawings, 36 designates a shaft of the elevator operating mechanism which is connected by means of the sprocket chain or other equivalent means shown at 37 to a gear train 38, the gears of which are in such predetermined ratio as to drive the shaft 39 at a predetermined speed relative to the speed of travel of the elevator car. One end of this shaft 39 has a sprocket fixed thereto engaged by the endless chain 40. To one side of this chain, the upper end of a cable or other flexible member 41 is suitably attached. A horizontally disposed arm 42 is fixed to the flexible element 35 at the rear side of the indicator casing at the lower side of the bracket members 33 and the end of this arm is provided with an opening loosely receiving the flexible member 40. Collars indicated at 43 fixedly secured to the member 41 and engaging the upper and lower sides of the arm 42, prevent movement of the flexible member relative to said arm. The member 41 extends downwardly below the arm 42 and has a suitable weight 44 attached to its lower end.

From the above description, the operation of the device will be readily understood. Thus, when current is supplied to the lamp 29, the light rays therefrom are obstructed by the opaque wall of the disc or pointer 15 and pass only through the slot 27, thereby outlining the arrow form of this slot on the translucent front plate or screen 6 of the casing. Assuming that the elevator is moved upwardly in the hatchway, the arrow will also point upwardly as shown in Figs. 2 and 3 of the drawings, and as the chain 40 is moved, the flexible member 41 connected to said chain is kept taut by the weight 44 which descends and thus through the medium of the flexible element 35 effects the upward travel of the carriage. When the elevator stops at any floor, the arrow is positioned opposite the proper floor designation 9 on the front plate 6. If the elevator completes its upward travel to the top floor, as the arrow arrives opposite the floor designating number, the upper end of the rack 24 strikes the member 11 on the top wall of the casing and said rack is forced downwardly, thereby rotating pinion 23 and the disc 15. This rotation of the disc is limited to 180° by the upper stop lug 26 on the rack bar striking the upper end of the carriage. Therefore, the position of the arrow will be reversed and said arrow will be disposed at

the opposite side of the row of numbers 9 pointing downwardly. Accordingly, when the downward travel of the car is completed and the lower floor reached, the starter will know that the operator of the elevator made a full upward trip. On the other hand, if the operator had not served all of the floors on the upward trip, when he again reached the main floor, the arrow would be pointing upwardly, thereby apprising the starter of the fact that a complete trip had not been made.

When the position of the arrow has been reversed at the end of the upward trip, as above explained, the same operation occurs at the end of the downward trip, and when the car reaches the main floor, the lower end of the rack 24 will strike the bottom member 11 in the casing 5, thus pushing the rack upwardly and rotating the disc 15 to reverse the position of the arrow, said upward movement being limited by the engagement of the lower stop 26 with the lower end of the carriage. It will of course, be understood that in the downward movement of the elevator car, the chain 40 is operated in a direction to move the flexible connection 41 upwardly against the gravity action of weight 44.

In Figs. 7 and 8 of the drawings I have shown another form of the device wherein the plate 20' constituting the front end wall of the lamp housing is centrally provided with a vertically extending slot 45 terminating at each of its ends in an arrow head 46. Upon the rear side of this plate 20' a relatively narrow vertically slidable plate 47 is mounted, said sliding plate being closely held against the rear face of the plate 20' by suitable guide tongues 48 struck from the plate 20' and engaged over the opposite side edges of the plate 47. The latter plate is also provided centrally thereof with a vertically extending opening 49 therein of greater width than the slot 45, the opposite end edges of the opening 49 being preferably provided with pyramidal shaped parts 50 projecting into the opening 49 in the plane of the plate 47.

On its upper and lower ends, the plate 47 is formed centrally thereof with longitudinally projecting lugs 51 and 52 respectively, which are adapted to engage the stops 53 and 54 on the upper and lower ends of the enclosing casing for the mechanism. The actuating means for the sliding carriage connected with the elevator operating mechanism is the same as that formerly described.

In the operation of this alternative form of the device, it will be understood that when the elevator is travelling upwardly in the hatchway, and the lamp carriage is therefore, moving upwardly within the outer casing, the plate 47 is frictionally held by the guide tongues 48 in the position with respect to the plate 20' as shown in Fig. 7 of the

drawings, and the part of the plate 47 at the lower end of opening 49 extends over or covers the arrow head 46 at the lower end of slot 45, while the arrow head at the upper end of this slot is uncovered so that the light rays from the lamp 29 may pass therethrough, thus outlining the form of the upwardly pointing arrow on the translucent plate or front wall 6 of the casing. When the carriage reaches the upper end of its sliding movement, the lug 51 on plate 47 engages stop 53 and the plate 47 is forced downwardly relative to plate 20' so that the arrow head 46 at the upper end of slot 45 will then be covered by the plate 47 while the lower arrow head 46 will be uncovered so that in the subsequent downward movement of the elevator, a downwardly pointed arrow will be outlined on the translucent plate 6. The projections 50 extending into the ends of the slot 45 adjacent the arrow heads 46 also obstructs the passage of light through the end portion of the slot, thus simulating an indentation in the end of the arrow shank and more accurately representing the conventional arrow. However, it will be understood that if desired, these projecting parts 50 can be eliminated.

From the foregoing description considered in connection with the accompanying drawings, the construction and several advantages of my improved direction and position indicator for elevators will be readily understood. It will be seen that by means of such a device, the starter, whose duty it is to keep the elevator cars running upon a proper schedule, is at all times apprised of the direction of movement and the position of each car in its hatchway, it being understood of course, that in large buildings equipped with a plurality of elevator cars one of the indicating devices is provided in connection with each car. The mechanism as herein described consists of relatively few parts of simple form and which can therefore, be manufactured and assembled at comparatively small cost. The essential feature of my present disclosure resides in the automatic means which I provide for reversing the position of the indicating arrow so that the direction of movement thereof relative to the upper and lower ends of the translucent plate will correspond with the direction of movement of the elevator car. While I have found the construction herein disclosed to be very efficient and satisfactory for this purpose, it is contemplated that the same result might also be secured by means of various other alternative mechanical structures, and I accordingly reserve the privilege of incorporating my present improvements in other desirable constructions, and of resorting to all such legitimate modifications in the form, proportion and relative arrangement of the several elements as may be fairly considered within the spirit and scope of the invention as claimed.

I claim:

1. In a direction and position indicator for elevators, an indicator plate having a row of floor indicating numbers thereon, a carriage, means mounting said carriage at one side of said plate for movement longitudinally thereof, means operatively connecting the carriage to a part of the elevator operating mechanism, means movable with said carriage and with respect to said plate including a part movable relative to the carriage and having means for indicating the direction of travel of the car, and means for automatically actuating said movable part at the end of the travel of the carriage in each direction to reverse the direction indicated by said direction indicating means.

2. A direction and position indicator for elevators including a casing having a translucent wall provided with floor indicating numbers thereon, a carriage, means mounting said carriage to travel within the casing longitudinally of said wall, means operatively connecting said carriage with a part of the elevator actuating mechanism, a lamp housing on the carriage open at one end, a disc, means rotatably mounting said disc at the open end of said housing, said disc having an elongated slot therein terminating at one of its ends in an arrowhead and through which the light rays pass to outline the form of said slot upon said translucent plate, said outline form of the slot moving along one side of the row of floor indicating numbers in the travel of the carriage and indicating the direction of travel of the elevator car, and means for automatically rotating said disc at each end of the travel of said carriage to reverse the position of the slot therein.

3. A direction and position indicator for elevators including a casing having a translucent wall provided with floor indicating numbers thereon, a carriage, means mounting said carriage to travel within the casing longitudinally of said wall, means operatively connecting said carriage with a part of the elevator actuating mechanism, a lamp housing on the carriage open at one end, a disc, means rotatably mounting said disc at the open end of said housing, said disc having an elongated slot therein terminating at one of its ends in an arrowhead and through which the light rays pass to outline the form of said slot upon said translucent plate, said outline form of the slot moving along one side of the row of floor indicating numbers in the travel of the carriage and indicating the direction of travel of the elevator car, a pinion fixed to said disc, and a rack meshing with said pinion and moving longitudinally of the carriage, the opposite ends of said rack adapted to engage the opposite ends of the casing when the elevator car completes its travel in each direction to thereby rotate

said disc and reverse the position of the slot therein.

4. A direction indicator for elevators comprising a casing having a translucent wall, a carriage mounted to travel longitudinally within said casing, a lamp housing on said carriage open at one end, an opaque disc, means rotatably mounting said disc at the open end of said carriage, said disc having a slot in the form of an indicating arrow at one side of its center through which the light rays are projected from the lamp housing upon said translucent wall to outline an arrow thereon indicating the direction of travel of the elevator car, means operatively connecting said carriage with a part of the elevator actuating mechanism, and means for automatically rotating said disc to reverse the position of the slot therein when the elevator car arrives at the end of its travel in each direction.

5. A direction indicator for elevators comprising a casing having a translucent wall, longitudinally extending guide means in said casing, a carriage, means mounting said carriage to travel upon said guide means, a lamp housing on said carriage having an open end position adjacent the rear side of said translucent wall, an opaque disc, means rotatably mounting said disc at the open end of said lamp housing, said disc having a slot therein at one side of its center in the form of a direction indicating arrow through which the light rays from said housing pass to define the form of said slot on the translucent plate, a flexible element connected with the opposite ends of said carriage, guide means for said flexible element mounted on said casing, means operatively connecting said flexible element with a part of the elevator actuating mechanism to move said carriage in synchronized relation to the travel of the elevator car, and means for automatically rotating said opaque disc at the end of the travel of the elevator car in each direction to reverse the position of said slot therein.

6. In a direction indicator for elevators, a casing having a translucent front wall, a lamp carriage, a lamp carried thereby, means mounting the carriage to travel within the casing longitudinally of said wall, relatively movable parts on said carriage between the lamp and said translucent wall, one of said parts having an opening therein and the other of said parts being also provided with an opening in the outline form of a direction indicating symbol, means for reciprocating the carriage adapted to be connected with the elevator operating mechanism and actuated thereby, and means operating at each end of the sliding movement of the carriage to move one of said parts relative to the other and position the openings in said parts with respect to each other to reverse the direction indicating symbol outlined

upon the translucent wall by the passage of the light rays through the said second named opening.

5 7. In a direction and position indicator for an elevator, the combination of a movable direction designating indicator, connections between the said indicator and the elevator mechanism for moving the indicator bodily in accordance with the movements of the elevator, and means controlled by said connections for reversing the direction designation of said indicator at each end of travel of said elevator.

10 8. In a direction and position indicator for an elevator, the combination of a stationary scale graduated in accordance with the number of floors traversed by the elevator, a direction designating indicator associated with said scale adapted to designate on the scale the direction of movement and relative position of the elevator, a carrier for the indicator adapted to move it along the scale, connections between the carrier and the elevator mechanism for moving the carrier in accordance with the movements of the elevator, and means controlled by said carrier for reversing the direction designation of said indicator at each end of travel of the elevator.

15 9. In a direction and position indicator for an elevator, the combination of an indicator for designating the direction of movement of the elevator, a carrier therefor, a source of illumination for said indicator mounted on said carrier, connections between the elevator mechanism and the carrier whereby it is moved in simulation of the movement of the elevator and the indicator designates the direction of the elevator, and means controlled by said connections for reversing the direction designation of the indicator at each end of travel of the elevator.

20 10. In a direction and position indicator for an elevator, the combination of a screen and indicator having a direction designating aperture, a carrier for said indicator, a source of illumination on said carrier for projecting upon said screen an image of said aperture, connections between the elevator and said carrier for moving it in simulation of the movement of the elevator, and means controlled by movement of the elevator at its end of its travel for shifting the indicator relatively to the source of light to reverse the direction designation of said aperture.

25 11. In a direction and position indicator for an elevator, the combination of a scale having a series of characters designating the floors traversed by the elevator, a direction designating indicator, means mounting said indicator for movement along the series of floor designating characters of said scale, means connecting said indicator mounting means to a part of the elevator mechanism for moving said indicator along said scale in accordance with the movements of the ele-

vator, and means controlled by the movement of the elevator at its end of travel for reversing the direction designation of the indicator whereby said indicator designates the direction of movement and position of the elevator. 70

12. In a direction and position indicator for an elevator, the combination of a scale having a series of characters designating the floors traversed by the elevator, an indicator having a direction indicating aperture therein, a carrier for said indicator, a source of illumination on said carrier behind the direction indicating aperture for illuminating said direction indicating aperture, means mounting said carrier for movement along said scale in accordance with the movement of the elevator, connections between the carrier and some part of the elevator mechanism for so moving the carrier, and means controlled by movement of the elevator at its end of travel for shifting the indicator relatively to the source of illumination to reverse the direction indication of said direction indicating aperture. 80

In testimony that I claim the foregoing as my invention, I have signed my name hereto.

HARRY R. NORTON. 90

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