Oct. 4, 1932. L. G. JACOBSON 1,881,017

ENTRANCE INCLOSURE OPERATING AND CONTROL MEANS

Filed May 27, 1931

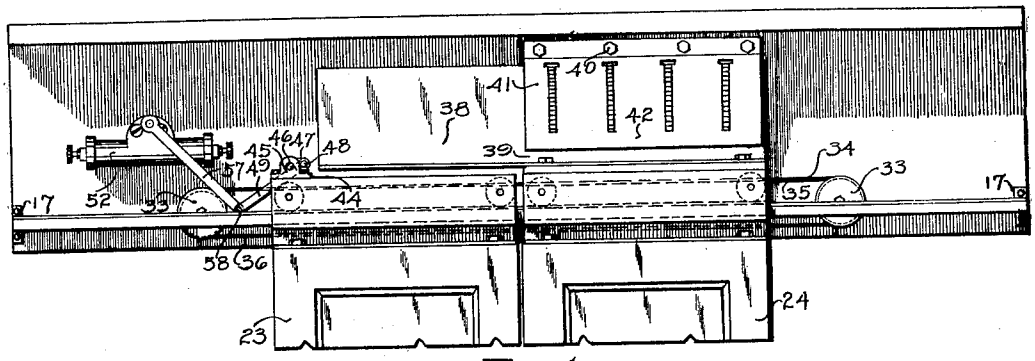


FIG 1

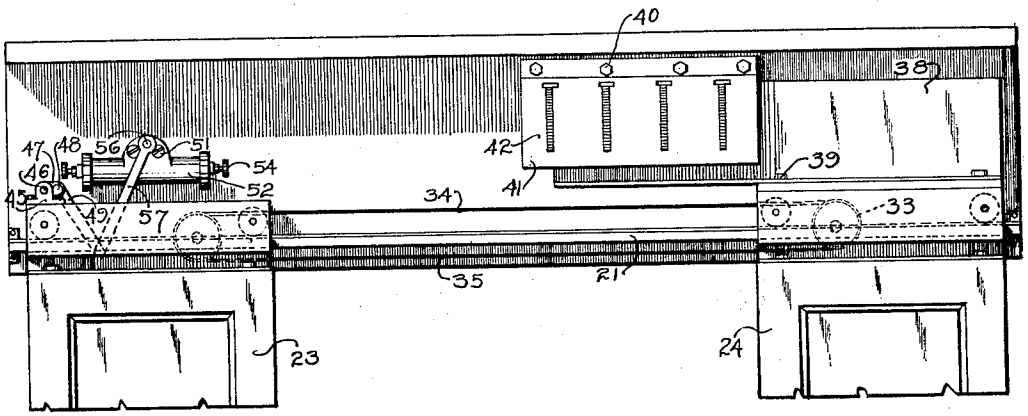


FIG 2

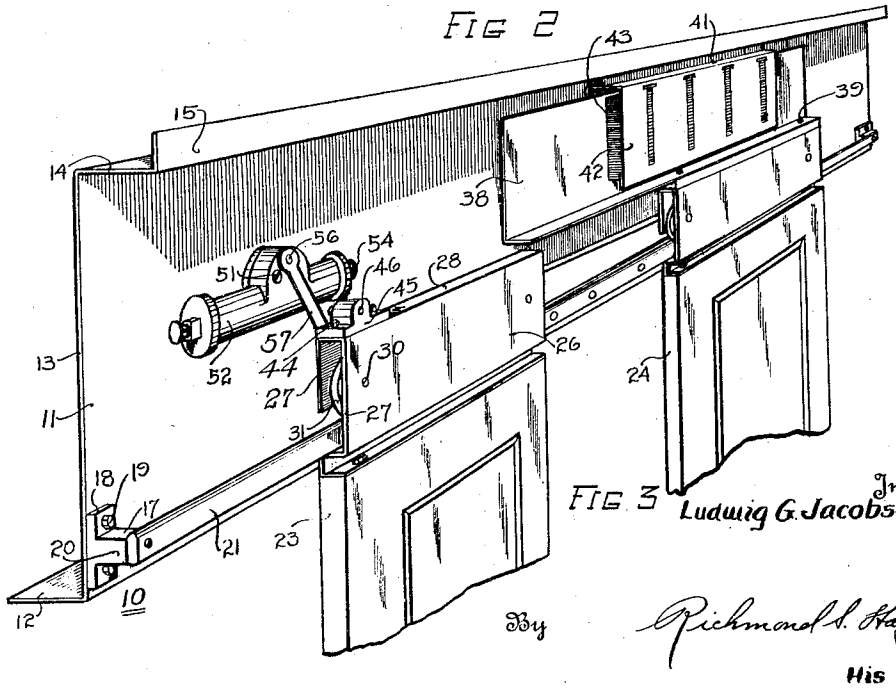


FIG 3

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UNITED STATES PATENT OFFICE

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ENTRANCE INCLOSURE OPERATING AND CONTROL MEANS

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This invention relates to an improvement in entrance door inclosure structures and more particularly to operating and control means therefor.

Erection of entrance inclosure structures recently has been fraught with many obstacles. This is principally due to the fact that the present trend in building has been to reduce the width of the door entrance structure to little more than twice the door width, reduce the height between floors without altering the door height, reduce the building wall depth and, on occasion, advance the door to the edge of the inclosure sill. Since the manufacturer of an entrance inclosure structure is required to produce a smaller and more compact structure, it necessarily evolves that the manufacturer of the door operating equipment must likewise alter his structure to conform to the confines of the inclosure. Great difficulty has been encountered in reconciling and overcoming these changes to the extent that door control equipment is not easily managed, resuting in a somewhat unsatisfactory set up. It is therefore apparent that where heretofore there was ample space, beyond the open position of a sliding door, in which to mount door control equipment, this space has been so reduced as to necessitate moving the door control equipment up above the door into that portion of the inclosure known as the header. As brought out above, this portion of the inclosure structure is generally of a reduced height as well as depth and, consequently, defines and limits the size of the control equipment which may be used.

The present invention is, therefore, directed to the provision of an entrance door inclosure structure in which the door control equipment is located in the space directly above the door. This equipment is attached to a header which forms part of the inclosure structure and which spans the wall opening, being so attached or mounted in the factory for the express purpose of permitting installation of the inclosure structure header with the door control equipment thereon as a unit in the field. This arrangement, obviously, leads to quicker and easier assembly, precision arrangement of elements as well as overcoming the ever present objection in all field assembly or installation work which is performed partly by one manufacturer or contractor and partly by another.

The principal object of the invention, therefore, is to provide in an entrance door inclosure structure, a header which, while conforming to building requirements, provides space in which to mount sliding door control equipment.

Another object of the invention is to provide, in an entrance door inclosure structure, a header having all door control equipment assembled thereon at the factory, said header and said equipment being installed as a unit.

A further object of the invention is to provide, in an entrance door inclosure structure, a header, within the confines of which is located a rectilinear motor by which to operate a sliding door.

A still further object of the invention is to provide in an entrance door inclosure structure, a header, within the confines of which are located both door operating and checking mechanisms.

Other and further objects of the invention will be more clearly understood from a consideration of the following specification which is taken in conjunction with accompanying drawing, and in which

Fig. 1 is a fragmentary rear elevation of a door inclosure structure, showing a pair of bi-parting doors in closed position, a door operator and check, mounted on the inclosure and connected with the doors;

Fig. 2 is a view similar to Figure 1, showing the doors open and the new position of the door operator and check; and

Fig. 3 is a perspective view showing the general arrangement of the parts which comprise this structure.

Referring to the drawing, and particularly to Figure 3, the invention is shown mounted upon a header 11 which forms a part of the horizontal portion of an inclosure 10. The header in the instant disclosure includes a horizontal flange 12, which may be utilized as the lintel for the door opening, and vertical wall 13 which connects the lintel with

the rearwardly projecting horizontal flange 14. The horizontal flange 14 terminates in a vertical flange 15 which defines the inner wall limit in which the inclosure structure is mounted. It is pointed out that the doors, door operator and check are, of necessity, mounted on the rear face of the wall 13 and must be confined within the space defined by the depth of the flange 14 and the length of the header.

Adjacent the lintel 12 and secured to the wall 13 of the header are a number of brackets 17, having upper and lower flanges 18 by which they are attached to said wall with bolts 19. A central outwardly projecting portion 20 supports a track 21 by which a pair of doors are supported. The doors 23 and 24 have attached to their upper edges pendent plates 26. These plates are formed to provide inner and outer vertical flanges 27, connected by a horizontal flange 28. Mounted on bearing pins 30 are track rollers 31. The ends of the pins 30 project into and are supported by the flanges 27.

In connection with bi-parting doors, it is common to provide a mechanism by which a driving force applied to one door causes reverse directional movement of the other door. In the present case two gears, sprockets or pulley wheels 33 are mounted on the vertical wall of the header, being spaced apart a distance slightly greater than the combined width of the doors 23 and 24. An endless cable or chain 34 connects the wheels 33. The top portion 35 of the cable is attached to door 24 and the lower portion 36 of the cable is attached to door 23. Movement of door 24 in one direction or the other reciprocates the cable about the wheels 33, causing the other door to travel in the opposite direction.

Mounted on the horizontal flange 28 of the pendent plate 26, attached to the driving door 24, is a motor armature or translator 38. The armature is preferably L-shaped, the horizontal flange of which is attached in any suitable manner, as by bolts 39, to said pendent plate. One end of the armature terminates adjacent one end of the pendent plate whereas the other end projects beyond said plate a distance approximately the width of the door. Joined to the wall 13, through bolts 40, is a field structure 41. The field structure comprises two spaced coil and core groups secured to casing plates 42. The longitudinally extending vertical slot 43, occurring between the two coil and core groups, receives the vertical flange of the armature 38. The space 43 is such that the armature may freely travel longitudinally of the field structure without contact therewith, thus eliminating friction between the fixed and movable elements of the motor.

Attached in any suitable manner, as by bolts 44, to the horizontal flange 28 of the pendent plate which supports the door 23, is a bearing bracket 45. An opening in the bracket 45 receives a pin 46, on the inner end of which is mounted a short link 47. Connected with the other end of the link 47, through pin 48, is a link 49. Mounted on the header wall 13, by means of bolts 51, is a double acting checking device 52. This device comprises a cylinder in which a reciprocating piston is mounted. Fluid in the device is caused to move from one end of the cylinder to the other, the rapidity of which is determined by adjustment of valves 54. Projecting from the central portion of the device, and connected with the inclosed piston, is a pin 56. Mounted on this pin is a crank 57 which is pivotally connected with the link 49 through a pin 58.

The motor, comprised of the armature 38 and field structure 41, is one of the rectilinear alternating current type, being identical in construction and operation with that described in the co-pending application Serial No. 540,362 for an improvement in an alternating current induction motor of the rectilinear type. By mounting the field structure on the header and the armature on one of the doors, said doors may be reciprocated without frictional wear or strain other than that incident to the door supporting rollers. The checking device 52 is linked with the door 23, rather than the driving door 24, to effectively reduce the required depth of the operating and checking structures whereby to keep them well within the limits of structural wall requirements. Where this is not an important factor or in the case of a single sliding door, the checking device is connected with the driving door in any preferred manner. The checking device is adapted to check the speed of the door in either direction when said doors approach their travel limit. No other means than this device is necessary to prevent slamming the doors to open or closed position. Through the use of a checking device of this type, the usual felt or rubber bumpers are unnecessary and the driving motor may move the doors at full speed throughout a greater portion of the door travel. Prior to the inclusion of a checking device of this type, it was necessary to reduce the door operating speed when said door approached the limit of travel in order to prevent slamming. Through the use of a motor of this type by which to drive one or more sliding doors and a fluid check by which to retard and stop the doors at their limit of travel, applicant is enabled to effectually reduce the required opening and closing time of power operated doors. While in many instances a matter of seconds gained or lost in the operation of opening or closing doors is of no consequence, there is considerable demand for elevator entrance inclosure doors for use in large buildings which may be safely and quietly op-

erated in the shortest possible time. The present invention may therefore be understood to include the use of an inclosure header as supporting means for a door control mechanism, unit installation and the combination of a checking device with a rectilinear motor.

Although but one type of header, motor and check has been shown in connection with sliding door structures, it is contemplated that other applications or modifications of this structure may be made without departing from the spirit and scope of the invention as defined in the hereunto annexed claims.

Having thus set forth my invention what I claim as new and for which I desire protection by Letters Patent is:

1. In an entrance inclosure, a self-contained door supporting and operating unit comprising a header having a track mounted thereon, a pendent plate mounted on and adapted to travel over said track, to which pendent plate a door is secured, a motor mounted on said header and operatively connected with and adapted to move said pendent plate along said track.

2. In an entrance inclosure, a door supporting and operating unit comprising a header having a track mounted thereon, a pendent plate mounted on and adapted to travel over said track, to which pendent plate a door is secured, and an electric motor comprising an armature and field structure, said armature being attached to said pendent plate and said field structure being secured to said header whereby said motor will cause said pendent plate to move along said track when connected with a suitable source of current supply.

3. A header for an entrance inclosure provided with the requisite track and door supporting pendant plate, a motor mounted on said header and operatively connected with said pendant plate for moving a door suspended from said pendant plate.

4. A header for an entrance inclosure provided with the requisite track and door supporting pendant plate, and electric motor mounted on said header and operatively connected with said pendant plate for moving a door suspended from said pendant plate.

5. A header for an entrance inclosure provided with the requisite track and door supporting pendant plate, an electric motor having fixed and movable elements, said fixed element being mounted on said header, said movable element being connected with said pendant plate for moving a door suspended from said pendant plate.

6. A header for an entrance inclosure provided with the requisite track and door supporting pendant plate, a rectilinear induction motor having fixed and movable elements, said fixed element being mounted on said header, said movable element being connected with said pendant plate for moving a door suspended from said pendant plate.

7. A header for an entrance inclosure provided with the requisite track and door supporting pendant plate, a rectilinear induction motor having a fixed field structure and movable armature, said field structure being mounted on said header and said armature being connected with said pendant plate for moving a door suspended from said pendant plate.

8. A header for an entrance inclosure provided with the requisite track and door supporting pendant plate, a rectilinear induction motor having a fixed field structure and movable armature, said field structure being mounted on said header, and said armature being secured to and contiguous with said pendant plate for operating a door suspended from a pendant plate.

9. A header for an entrance inclosure provided with the requisite track and door pendant plate, a motor mounted on said header, checking means mounted on said header, said motor and said checking means being operatively connected with said pendant plate for moving and retarding movement of a door suspended from said pendant plate.

10. A header for an entrance inclosure provided with the requisite track and door pendant plate, an electric motor mounted on said header, checking means mounted on said header, said motor and said checking means being operatively connected with said pendant plate for moving and retarding movement of a door suspended from said pendant plate.

11. A header for an entrance inclosure provided with the requisite track and door pendant plate, an electric motor having fixed and movable elements, said fixed element being mounted on said header, said movable element being connected with said pendant plate, said checking means being operatively connected with said pendant plate for retarding movement imparted by said motor to said pendant plate and door suspended therefrom.

12. A header for an entrance inclosure provided with the requisite track and door pendant plate, a rectilinear induction motor having a field structure and armature, said field structure being mounted on said header, said armature being mounted on said pendant plate, checking means mounted on said header, said checking means being operatively connected with said pendant plate for retarding movement imparted by said motor to said pendant plate and door suspended therefrom.

13. In an entrance inclosure structure, a self-contained door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header, a track on said header, a pendant plate mounted on and adapted to move over

said track, door operating means on said header, said means including a motor operatively connected with said pendant plate and adapted to move a door suspended from said pendant plate relative to said inclosure.

14. In an entrance inclosure structure, a self-contained door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header, a track on said header, a pendant plate mounted on and adapted to move over said track, door operating means on said header, said means comprising a motor and checking device operatively connected with said pendant plate for moving and retarding movement of said pendant plate and door suspended therefrom.

15. In an entrance inclosure structure, a self-contained door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header, a track on said header, a pendant plate mounted on and adapted to move over said track, door operating means on said header, said means including an electric motor operatively connected with said pendant plate for moving said pendant plate and door suspended therefrom.

16. In an entrance inclosure structure, a self-contained door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header, a track on said header, a pendant plate mounted on and adapted to move over said track, door operating means on said header, said means comprising an electric motor and checking device operatively connected with said pendant plate for moving and retarding movement of said pendant plate and door suspended therefrom.

17. In an entrance inclosure structure, a self-contained door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header, a track on said header, a pendant plate mounted on and adapted to move over said track, door operating means on said header, said means including a rectilinear induction motor having fixed and movable elements, said fixed element being mounted on said header, said movable element being joined to said pendant plate for moving said pendant plate and door suspended therefrom.

18. In an entrance inclosure structure, a self-contained door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header, a track on said header, a pendant plate mounted on and adapted to move over said track, door operating means on said header, said means comprising a rectilinear induction motor having fixed and movable elements, and a checking device, said fixed motor element being mounted on said header, said movable element being joined to said pendant plate, said checking device being operatively connected with said pendant plate for retarding movement imparted by said motor to said pendant plate and door suspended therefrom.

19. A self-contained bi-parting door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header provided with the requisite track and door supporting pendant plates, means for imparting motion from one to the other of said pendant plates, an electric motor mounted on said header and operatively connected with one of said pendant plates for moving a pair of doors suspended from said pendant plates.

20. A self-contained bi-parting door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header provided with the requisite track and door supporting pendant plates, means for imparting motion from one to the other of said pendant plates, an electric motor mounted on said header, a checking device mounted on said header, said motor and said checking device being operatively connected one to each of said pendant plates for moving and retarding movement of said pendant plates and doors suspended therefrom.

21. A factory assembled door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header provided with the requisite track and door supporting pendant plates, an electric motor mounted on said header, said motor being operatively connected with said pendant plate for moving a door suspended from said pendant plate.

22. A factory assembled door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header provided with the requisite track and door supporting pendant plate, an electric motor mounted on said header, a checking device mounted on said header, said motor and said checking device being operatively connected with said pendant plate for moving and retarding movement of said pendant plate and door suspended therefrom.

23. A factory assembled door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header provided with the requisite track and door supporting pendant plates, means for imparting motion from one to the other of said pendant plates, an electric motor mounted on said header, a checking device mounted on said header, said means, motor and checking device being operatively connected with said pendant plates for synchronously moving and retarding movement of said pendant plates and doors suspended therefrom.

24. A self-contained door supporting and

operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header having a horizontally extending flange, a track mounted on the vertical wall of said header, a pendant plate mounted on and adapted to move over said track, and an electric motor mounted on said header, said motor having suitable operating connection with said pendant plate, said track, motor, and pendant plate being located within the confines of the header determined by vertical planes through the edges of said horizontal flange.

25. A self-contained door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header having a horizontally extending flange, a track mounted on the vertical wall of said header, a pendant plate mounted on and adapted to move over said track, an electric motor mounted on said header and having suitable operating connection with said pendant plate, a checking device mounted on said vertical wall and having further suitable connection with said pendant plate, said track, pendant plate, motor, and checking device being located within the confines of the header determined by vertical planes through the edges of said header flange.

26. A self-contained bi-parting door supporting and operating unit, insertable into and adapted to form part of an entrance inclosure, comprising a header having a horizontally extending flange, a track mounted on the vertical wall of said header, pendant plates mounted on and adapted to move over said track, means on the vertical wall of said header for imparting motion from one to the other of said pendant plates, an electric motor mounted on said header having suitable operating connection with one of said pendant plates, a checking device mounted on said vertical wall and having suitable connection with the other of said pendant plates, said track, pendant plates, motor, checking device and means being located within the confines of the header determined by vertical planes through the edges of said header flange.

In testimony whereof I have affixed my signature.

LUDWIG G. JACOBSON.