Jan. 21, 1941. M. M. BROCKWAY 2,229,273

EMERGENCY DOOR ACTUATOR FOR VEHICLES

Filed July 29, 1938

FIG. 1.

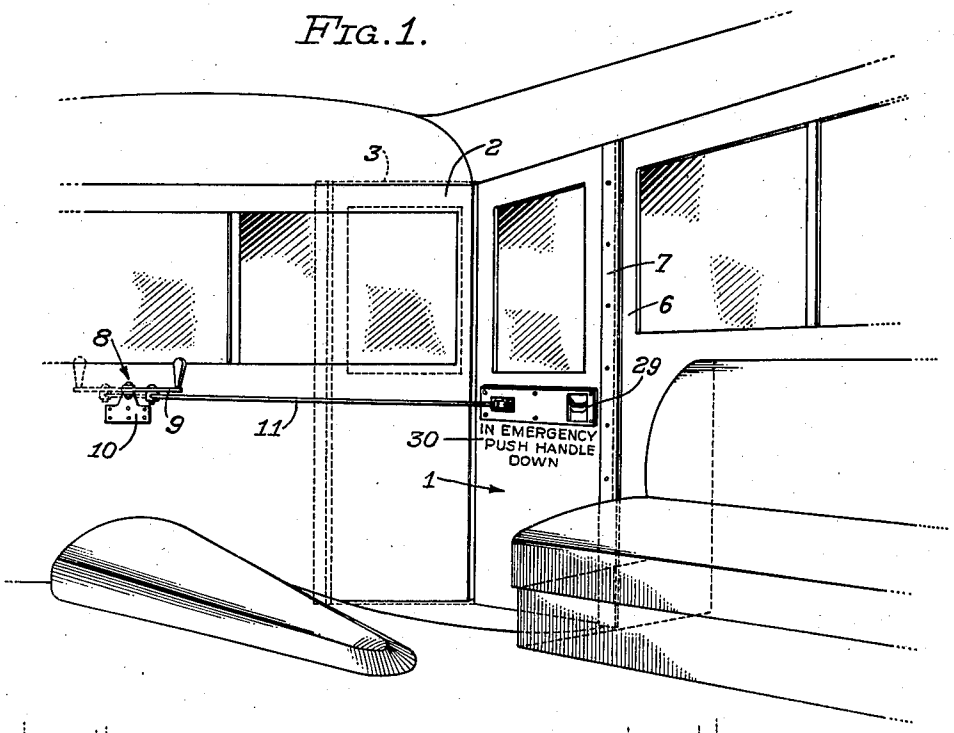


FIG. 2.

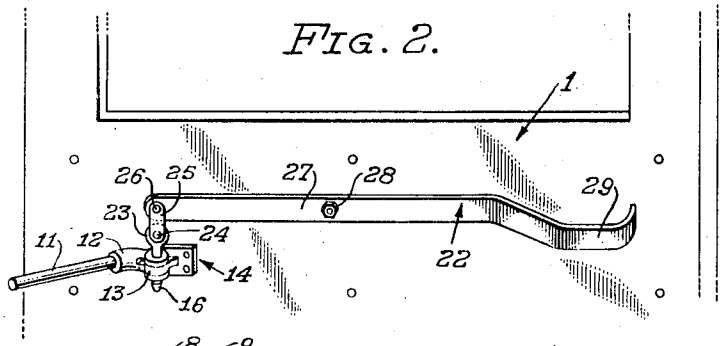
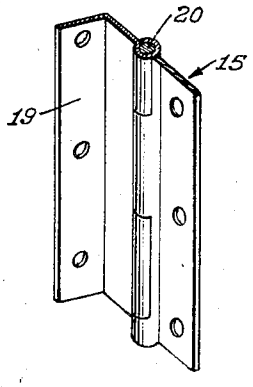


FIG. 5.



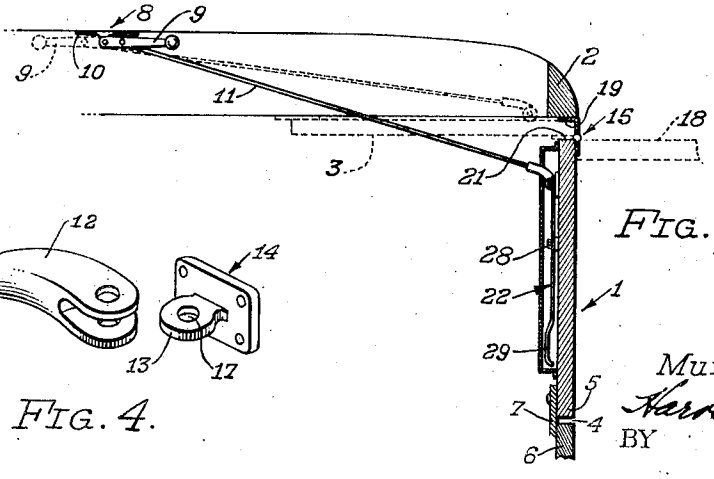


FIG. 3.

FIG. 4.

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EMERGENCY DOOR ACTUATOR FOR VEHICLES

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7 Claims. (Cl. 268—3)

My invention relates to door opening equipment for passenger vehicles and has particular reference to an emergency door releasing device permitting the passengers themselves to open the exit door of the vehicle in case of an emergency and thus prevent trapping of passengers within the coach.

In the operation of motor coaches, particularly those used for city traffic, it is the common practice to mount the entrance and exit door to swing inwardly of the coach as it is moved from its closed position. Such arrangement is preferred for the reason that, in order to save time in loading and discharging passengers, the driver or attendant frequently opens the door before the coach comes to a stop at a curb or loading station. In such case, an outwardly swinging door would project beyond the side of the coach and might strike either a prospective passenger standing near the curb or some stationary object, such as a light standard installed near the curb.

Such doors are usually moved between their closed and open positions by means of door operating mechanism rigidly connected to the doors so that in the event of an emergency or panic condition, passengers within the coach, crowding against the door, in an attempt to get out, prevent the normal inward swinging of the door, and thus tend to trap themselves within the coach.

It is, therefore, an object of my invention to provide a hinged mounting for a coach door of such a nature that the door may swing either way from its closed position without damaging the door or the mounting.

Another object of my invention is to provide a device which may be used to temporarily disconnect a normally inwardly opening coach door from its door operating mechanism, in order to permit the door to be swung outwardly in case of emergency.

Another object of my invention is to provide a device for temporarily disconnecting a coach door from its door operator for emergency operation, in which a handle is provided, accessible to a person who may be standing close to the door on the inside, and yet, locate the handle in such a manner as to discourage operation of the emergency release due to carelessness or intentional tampering.

Other objects of my invention will be apparent from a study of the following description and the accompanying drawing, wherein.

Fig. 1 is a perspective view of the interior of a typical motor coach illustrating the application of my invention to the exit door thereof.

Fig. 2 is a perspective view of a portion of a door equipped with my door operator disconnecting device and the emergency operating handle therefor, the cover thereof being removed.

Fig. 3 is a horizontal sectional view taken through a door equipped with my emergency door releasing device.

Fig. 4 is a perspective exploded type of view of one end of a door operating rod and the bracket employed to connect such rod to the door.

Fig. 5 is an enlarged perspective view of one form of door hinge which may be employed in the plugs of my invention.

Referring to the drawing, I have illustrated in Fig. 1 a portion of the interior of a typical motor coach, including the usual inwardly swinging exit door 1 which may be hinged to the front corner post 2 of the coach frame to swing from a normally closed position shown in full lines in Figs. 1 and 3 to a normally open position inwardly of the coach as indicated by dotted lines 3 in Figs. 1 and 3. Such doors are usually arranged to provide a vertical opening or gap 4 between the outer or swinging edge 5 of the door and the stationary door jamb 6 to prevent crushing of the fingers of any person who might be clasping the jamb to steady himself at the moment the door is being closed. In order to prevent the entrance of rain, dust or drafts through the gap 4, a flexible strip or flap 7 may be attached to the door 1 along its outer edge 5, to cover the flap 4 when the door is in its closed position.

For the purpose of demonstrating the application of my invention herein, I have illustrated in Fig. 1 a common type of manual door operator 8, including a crank handle 9 which may be rotated from left to right and vice-versa upon a bracket 10, which in turn may be mounted rigidly upon the front wall or frame of the coach. The door operator 8, illustrated in Fig. 1 also includes a door operating rod 11, one end of which may be pivoted at a suitable point on the arm of the crank handle 9, while the opposite end of the rod 11 extends toward the door 1, and is provided with a clevis 12 the arms of which straddle and are coupled to a flange 13 of a pivot bracket 14 secured to the door 1 at a point sufficiently far from the axis of hinge 15 so that opening or closing torque may be applied to the door 1 around the axis of hinge 15 when pivot bracket 14 is drawn inwardly or outwardly with respect to the coach. The coupling between the clevis 12 and the pivot bracket 14 may be accomplished by means of a coupling pin 16 (Fig. 3) insertable

through the eyes of the clevis 12 and through a hole 17 in the flange 13 of the pivot bracket 14.

Thus when the attendant moves the crank handle 9 between the right and left positions, the door 1 is moved between its normally closed position as shown in full lines (Figs. 1 and 3) and its normally open position as shown by dotted lines 3 (Figs. 1 and 3). Moreover, this crank handle 9 is usually arranged to rotate slightly past dead center position with respect to the extended position of the door operating rod 11 when rotated to close the door 1 in such a manner that it not only locks the door from being inadvertently moved outwardly beyond its normally closed position, but it also prevents the door from being inadvertently opened inwardly.

It will therefore be seen that, in the event of an emergency, or panic among the passengers of the coach, such as might result from collision or fire, the foregoing arrangement of coach exit door and door operator may actually constitute a serious hazard to the escape of the passengers. In such an emergency the passengers might rush to the door, and even though the first passenger to reach the door realized the necessity and tried to step back to allow the door to be opened, the other passengers crowding him from behind would press him against the door and prevent the normal inward swinging of the door while the door operator construction kept the door locked against outward movement.

In order to overcome this hazardous condition which now exists on coaches of this character, I have provided in my invention; first, an exit door 1 that can be swung outwardly from its closed position in an emergency, and second, a means easily accessible to a passenger for releasing the door from its normal door operating mechanism and permitting him to open the door outwardly, even though he may be pressed tightly against the door by the crowding frightened passengers behind him.

Referring particularly to Figs. 3 and 5 it will be observed that I have illustrated a door hinge 15, so designed as to allow the door 1 to swing between the normal inwardly open position (shown by dotted lines 3, Figs. 1 and 3) and an emergency outwardly open position (shown by dotted lines 18, Fig. 3). To accomplish this, the hinge 15 may have one of its wings 19 so secured to the post 2 as to dispose the hinge pin 20 a sufficient distance from the post 2 to accommodate the edge 21 of the door 1 when the door is swung to the inwardly open position. Thus the hinge 15 will not restrain the door from swinging outwardly beyond the normally closed position.

It will also be noted that the flexible flap 7, which covers the gap 4 between the door edge 5 and the door jamb 6 does not restrain the door from swinging outwardly beyond the closed position. Therefore, it will be seen that the only device positively locking the door 1 from swinging outwardly beyond the normally closed position is the coupling mechanism between the door 1 and the door operator 8.

I arrange this coupling mechanism to be readily disconnected by the passengers themselves as by forming the coupling pin 16 to remain in its coupling engagement with the clevis 12 and the pivot bracket 14 by gravity, and provide a suitable lifting mechanism or handle mechanism 22 by which the coupling pin 16 may be lifted out of its coupling relation.

Referring to Fig. 2 it will be noted that the coupling pin 16 may be formed as a smooth pin having an enlarged head 23 through which a pin 24 may extend to connect one end of a link 25 thereto. The other end of the link 25 is loosely connected by pin 26 to one end of a handle lever 27. This handle lever 27 may comprise a metal bar positioned across the inside of the exit door 1 and fulcrumed approximately at its center upon a short spindle 28, which may be rigidly secured to the door 1 as by welding. The end of the handle lever 27 opposite link 25 may constitute an emergency handle 29 positioned near the jamb side of the door.

In the form of the device illustrated herein, I have shown the emergency handle 29 as being located approximately at the level of the waist of an average passenger, that is, at about the level of the hands of a person who might be crowded against the door, so that the emergency handle 29 may be readily grasped and moved downwardly by such a person without requiring him to back away from the door. Obviously if desired the emergency handle 29 could be located at any other suitable position, such as at some higher point on the door where it will be within the view of the attendant, even though passengers might be standing between the attendant and the door 1. It will be readily seen that such a person may pull down on the emergency handle 29, and thus lift the coupling pin 16 out of the clevis 12 and pivot bracket 14, uncoupling the door 1 from the door operating rod 11, and since this coupling has been the only locking means holding the door 1 in its normally closed position, the door is then free to swing outwardly.

Thus, in an emergency, the first passenger to reach the door will grope for some method of opening the door to permit his escape. A suitable sign or legend, such as indicated at 30 (Fig. 1) may be located on the door at about the level of the eyes of a person to notify him that there is an emergency release provided and how to operate it. By locating the emergency handle in a position where he can readily grasp it, though he may be crushed against the door by other panic stricken passengers, he will be able to operate the emergency handle to release the door and allow himslf and his companions to escape.

Referring again to Fig. 2, it will be noted that the lower end of coupling pin 16 is tapered to facilitate its ready insertion back through the eyes of the clevis 12 and through the hole in pivot bracket 14 after the releasing mechanism 22 has been used and it is desired to put the door operator again into normal operation.

While for purposes of illustration I have shown the door operator as of the manually actuated type, it will be understood by those skilled in the art that my invention is equally applicable to door operators which are actuated by power mechanism.

While I have shown and described one embodiment of my invention, it will be apparent that minor changes or alterations thereof may be made without departing from the principles of my invention. Therefore, I do not desire to be limited to any of the details of construction shown or described, except as defined in the appended claims.

I claim:

1. In combination with a vehicle having an exit door: means mounting said door on said vehicle for swinging movement from a normally closed position either inwardly or outwardly from said closed position; locking means for positively

locking said door against outward movement while permitting inward movement thereof; releasable connecting means for connecting said locking means to said door; and means for releasing said connecting means.

2. In combination with a vehicle having an exit door: means mounting said door on said vehicle for swinging movement from a normally closed position either inwardly or outwardly from said closed position; locking means for positively locking said door against outward movement while permitting inward movement thereof; releasable connecting means for connecting said locking means to said door; and means, accessible to a person pressed against the inside of said door, for releasing said connecting means.

3. In combination with a vehicle having an exit door: means mounting said door on said vehicle for swinging movement from a normally closed position either inwardly or outwardly from said closed position; locking means for positively locking said door against outward movement while permitting inward movement thereof; releasable connecting means for connecting said locking means to said door; releasing means for releasing said connecting means; and handle means, accessible to a person pressed against the inside of the door, for actuating said releasing means.

4. In combination with a vehicle having an exit door: means mounting said door on said vehicle for swinging movement from a normally closed position either inwardly or outwardly from said closed position; a door operating device for moving the door between its normally closed position and the inward door opening position and for locking said door against outward movement; releasable connecting means for connecting said door operating device to said door to positively lock said door against outward movement; and means for releasing said connecting means to permit said outward movement of the door.

5. In combination with a vehicle having an exit door: means mounting said door on said vehicle for swinging movement from a normally closed position either inwardly or outwardly from said closed position; a door operating device including a control means mounted for limited movement from one position corresponding to the inwardly open position of the door to another position corresponding to the normally closed position of the door, a connecting link coupled to said control means and extending toward said door, a bracket attached to said door, and a pin intercoupling the link with the bracket for causing movement of said door in response to movement of said control means and for positively locking said door against outward swinging movement; and means for moving said pin to a position disengaging said link from said bracket to permit outward swinging movement of said door.

6. In combination with a vehicle having an exit door: means mounting said door on said vehicle for swinging movement from a normally closed position either inwardly or outwardly from said closed position; a door operating device including a control means mounted for limited movement from one position corresponding to the inwardly open position of the door to another position corresponding to the normally closed position of the door, a connecting link coupled to said control means and extending toward said door, a bracket attached to said door, and a pin intercoupling the link with the bracket for causing movement of said door in response to movement of said control means and for positively locking said door against outward swinging movement; and means, accessible to a person pressed against the inside of said door, for moving said pin to a position disengaging said link from said bracket to permit outward swinging movement of said door.

7. In combination with a vehicle having an exit door: means mounting said door on said vehicle for swinging movement from a normally closed position either inwardly or outwardly from said closed position; a door operating device including a control means mounted for limited movement from one position corresponding to the inwardly open position of the door to another position corresponding to the normally closed position of the door, a connecting link coupled to said control means and extending toward said door, a bracket attached to said door, and a pin intercoupling the link with the bracket for causing movement of said door in response to movement of said control means and for positively locking said door against outward swinging movement; and handle means, accessible to a person pressed against the inside of said door, for moving said pin to a position disengaging said link from said bracket to permit outward swinging movement of said door.

MURILLO M. BROCKWAY.