

April 30, 1940.

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2,198,796

DOOR OPERATING MECHANISM

Filed June 6, 1938

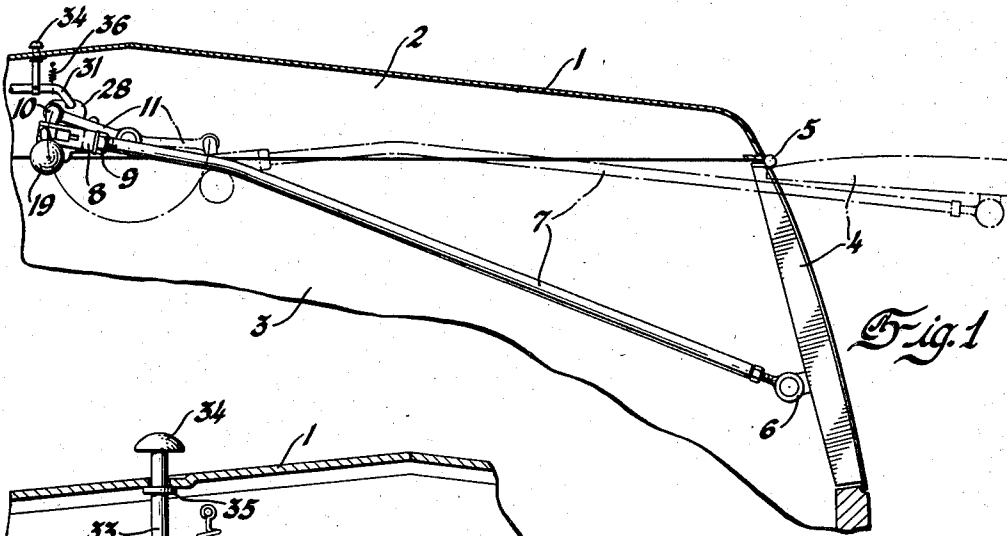


Fig. 1

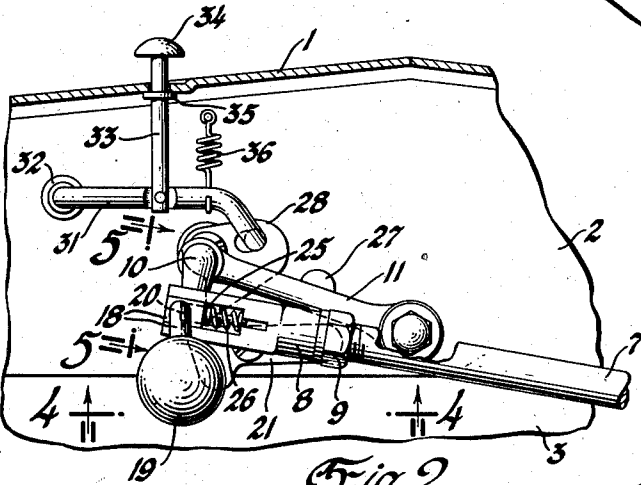


Fig. 2

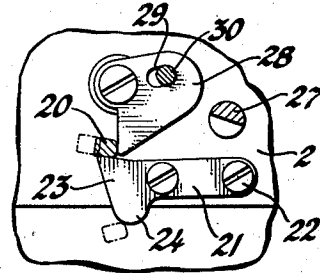


Fig. 3

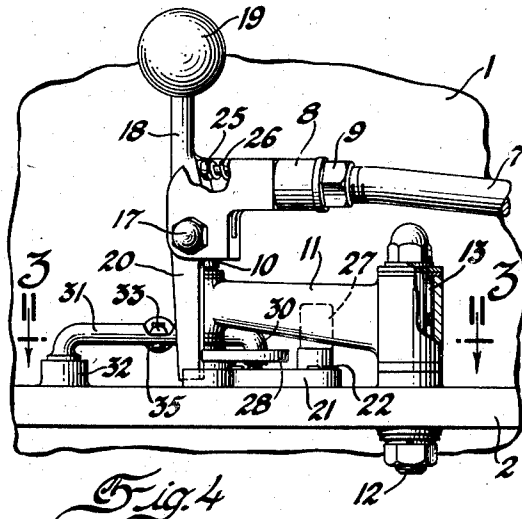


Fig. 4

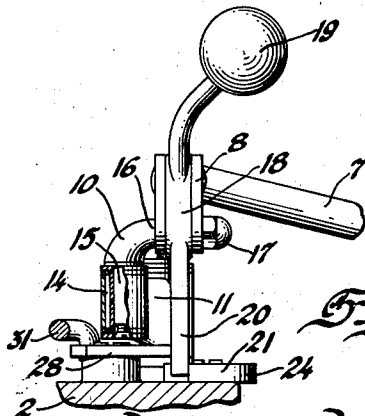


Fig. 5

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UNITED STATES PATENT OFFICE

2,198,796

DOOR OPERATING MECHANISM

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Application June 6, 1938, Serial No. 211,984

3 Claims. (Cl. 268—3)

This invention relates to door operating mechanisms of the type used in motor coaches for opening and closing the front entrance door at the curb side of the vehicle from the operator's station on the far side of the vehicle. The operating linkage in a preferred embodiment involves a toggle joint arrangement wherein a short lever arm has a fixed pivot mounting near the driver's seat and is connected by a long link with the door for opening and closing the door as the lever arm is swung manually.

An object of the invention is to provide for the mounting of an operating handle on the linkage, which in the door closing position of the parts is locked securely against accidental release and whose release is effected in the hands of the operator by force applied in the direction of door opening movement. Thus effort applied in a single direction both unlatches the handle and opens the door thereby reducing work and complications for the coach driver. Similarly no abrupt changes in direction of handle movement is involved in closing the door and returning the handle to latched position. The arrangement is such that both the door opening movement and the door closing movement are natural movements for the operator, the door being opened by pushing the handle outwardly or away from the operator and the door being closed by pulling the handle inwardly. Because the folded links are securely held the long rod may serve safely as a grab rail at the loading platform without danger of throwing open the door.

A further object of the invention is to arrange the linkage so that an overcenter relation is established when the links are extended to hold the door open.

A still further object is to provide latch releasing mechanism operable from outside the vehicle to enable entry to a closed body.

Additional objects and advantages will become apparent during the course of the following specification having reference to the accompanying drawing wherein Figure 1 is a top plan view of the door controlling mechanism with a forward portion of the body shown in horizontal section; Figure 2 is an enlarged plan view of the toggle linkage and associated parts; Figure 3 is a detail plan view of the latch striker plate mounting with parts in section as on line 3—3 of Figure 4 and Figures 4 and 5 are side and end elevations looking in the direction of the arrows on line 4—4 and on line 5—5, respectively, of Figure 2.

In the drawing the reference numeral 1 indicates the panel just below the windshield in the

front wall of a motor coach and 2 is a structural framing element and may consist, for example, of an aluminum casting and affords a horizontal shelf located about waist high above the floor 3. The floor 3 at the front of the vehicle and to one side of the longitudinal center line constitutes a loading platform leading from the door opening in the side wall of the coach. This opening normally is closed by a door 4 shown as being of the hinged type hinged at 5 at its forward edge. In spaced relation to the axis of the hinge 5 and near its free edge the door 4 carries a bracket 6 to which is pivoted an adjustable end connection of a drag link or tie rod 7 which extends inwardly and constitutes a part of the toggle linkage connected at its inner end with the shelf 2 and located at a convenient height to afford a hand grip for any passenger standing on the loading platform 3 when the door is closed.

At its inner end the long rod 7 is threaded into a yoke 8 and held by a jam nut 9 and which yoke is secured by an elbow 10 in the eye of a short swinging arm 11 pivoted to the casting 2 near the vehicle center line. The pivotal mounting includes a pin 12 fixed to the casting 2 and projected upwardly through an eye on the end of the arm 11, there being small rollers 13 between the pin and eye to afford an anti-friction bearing. Similar anti-friction elements 14 are interposed between the eye on the free end of the lever 11 and the vertical pin 15 of the elbow 10, affording a pivoted connection between the links. The horizontal leg 16 of the elbow 10 is shouldered and projects through the yoke member 8 secured thereon by a cap nut 17. Pivoted in the yoke and on the leg 16 is a lever 18 having its upwardly extending arm terminating in a hand grip or ball 19 while its downwardly extending arm 20 cooperates with a striker plate 21 to afford a latch for the parts in the folded position of the links. The striker plate 21 is secured to the casting 2 by screws 22 and has a projecting ear 23, the rear face of which forms a latching abutment for the lower end of the arm or leg 20 of the handle as seen in Figure 3. The rounded nose 24 of the ear and the edge thereof provide a camming surface for engagement with the lever during the door closing operation, the camming action serving to rock the lever about its fulcrum pin 16 until the end of the ear 23 is reached when the lever snaps into latched position under influence of a spring pressed detent bearing on the lever above the fulcrum point and being in the nature of a headed pin 25 slidably mounted in an opening of the yoke 8 and pushed outwardly by a coil spring 26. 55

- The door latching mechanism is located within convenient reach of the operator, who is seated to one side of the center line of the vehicle opposite the loading platform, and to open the door the operator merely pushes outwardly on the ball or knob 19 which releases the latch and simultaneously swings the arm 11 about its pivot mounting causing extension of the levers and outward swinging of the door about its hinge 5.
- 10 In the dotted line position of the parts, as seen in Figure 1, the joint between the links is just beyond dead center relation so that the door is held in open position and against any closing effort exerted on the door. To close the door
- 15 the operator pulls on the knob 19 causing the links to fold until the arm 11 engages with the stop 27 carried by the casting 2 and the parts are again latched by the cooperative engagement of the leg 20 with the striker plate 21.
- 20 As an additional latch releasing agency there is provided the pivoted pawl 28 whose path of movement intersects the locked position of the leg 20 and which has an elongated slot 29 to receive the dependent pin 30 on the end of a swinging arm 31 pivoted in the mounting boss 32 on the casting 2. This arm 31 has pinned thereto an operating plunger 33 which extends through an opening in the wall panel 1 and terminates in a rounded head or button 34 which is of such
- 30 size and finish as to be an inconspicuous part of the front wall. This plunger also has an abutment collar 35 formed thereon to engage the interior of the panel 1 and a coil spring 36 serves to hold the collar 35 in its projected position.
- 35 Should the button 34 be depressed it will swing the arm 31 inwardly, which in turn rocks the

pawl 28 thereby moving the leg 20 clear of the striker plate 21 and with the release of the latch the door 4 may be swung open. With this arrangement the door can be held shut when the vehicle is not in use and furthermore the door 5 can be opened in the event the operator inside the vehicle accidentally becomes disabled.

I claim:

1. In a closed vehicle having a door, folding links located interiorly of the vehicle for opening 10 the door by the extension of the links, a link operating lever pivotally mounted on one of the links, a striker plate engageable by said lever for locking the links in folded door closing relation and means operable from outside the vehicle to 15 swing said lever out of engagement with the striker plate.

2. In a motor vehicle having a door, folding links for operating the door, an L-shaped pin having one leg secured to the end of one of the 20 links and the other leg pivotally connected to the companion link, a fixed pivotal mounting for one of the links, a latch striker in fixed relation to said pivotal mounting, a hand lever pivotally carried by one of the legs of said L-shaped pin for 25 latching engagement with the striker and spring means active on the lever to resist unlatching.

3. In a vehicle having an outwardly opening hinged closure member, a pair of folding links operably connected therewith, a pivot joint between adjacent ends of said links arranged in 30 over-center relation for member open position with the links unfolded, and a releasable latch carried by said joint to retain the links in folded member closed position. 35

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