July 12, 1960 G. T. UPHUES 2,944,303

RAILWAY CAR FLUSH TYPE SIDE DOOR

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FIG. 1.

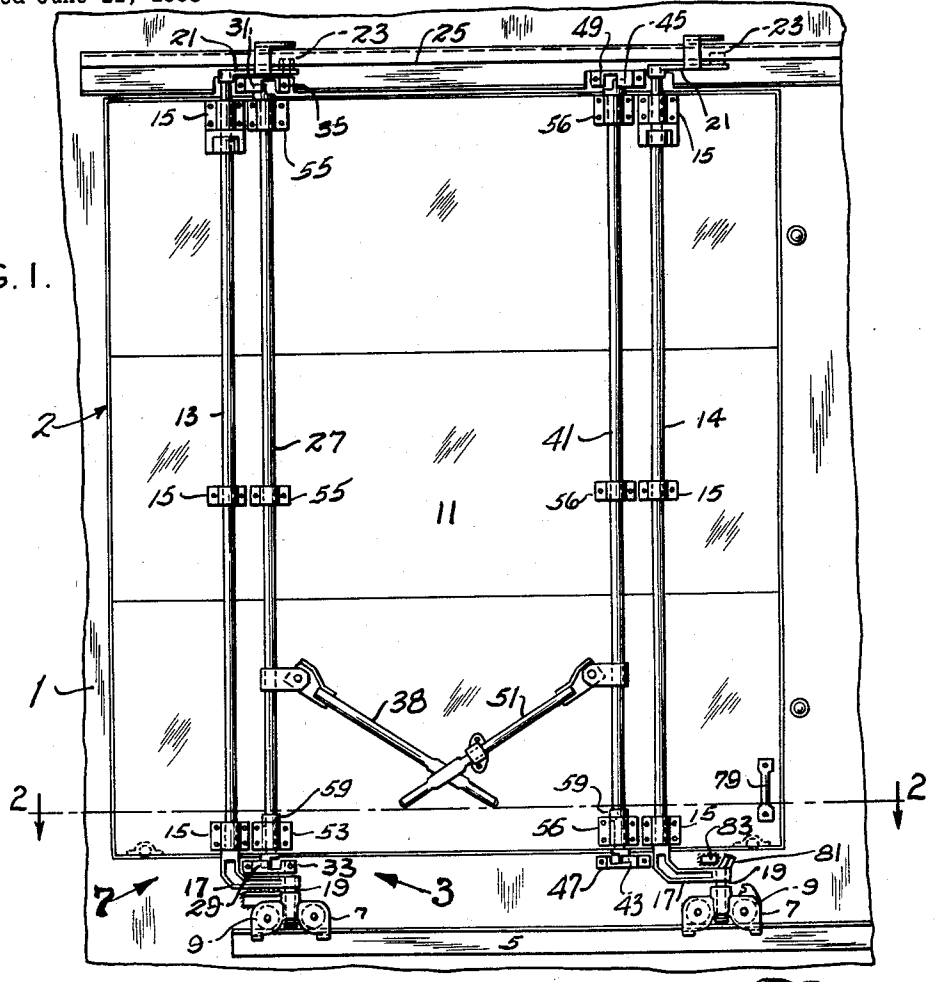


FIG. 5.

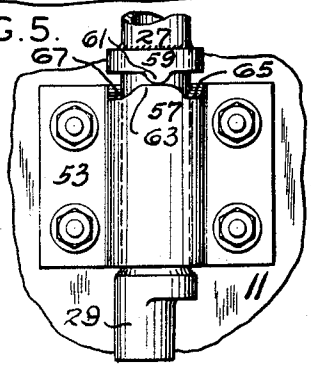


FIG. 3.

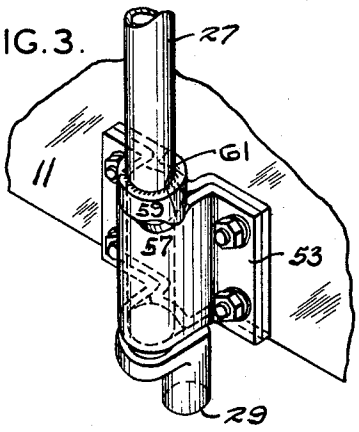
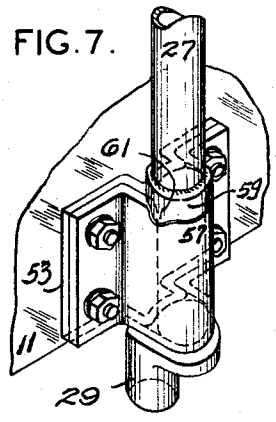


FIG. 7.



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RAILWAY CAR FLUSH TYPE SIDE DOOR

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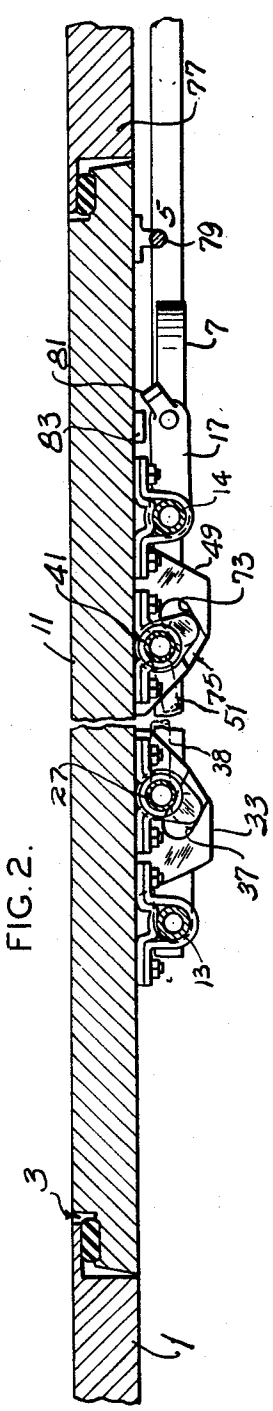


FIG. 2.

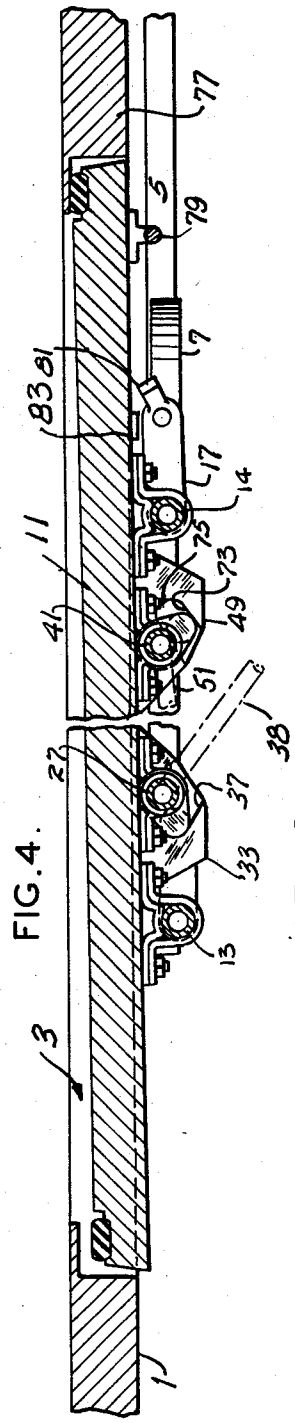


FIG. 4.

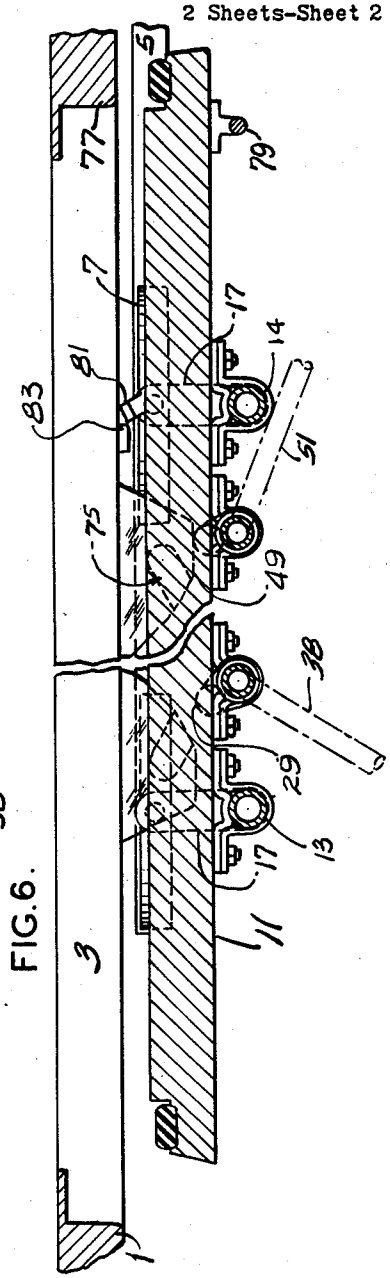


FIG. 6.

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RAILWAY CAR FLUSH TYPE SIDE DOOR

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Filed June 11, 1958, Ser. No. 741,362

9 Claims. (Cl. 20—23)

The invention relates to railway house cars such as box cars and refrigerator cars, and consists of the assembly of the door with the car body wall by a door mounting and operating structure whereby the door may be moved transversely of the door opening into and out of flush relation with the side wall and then moved alongside the side wall to clear the door opening. The construction includes the mounting of the door on rotatable upright shafts with crank arms pivoted at their outer ends on traveling carriages, and the movement of the door transversely of the car wall, and locking it in closed position by upright shafts rotatably mounted on the door with crank arms having lugs at their outer ends engageable with cam keepers on the car side wall. The main object of the invention is to control the swivelling of the latter mentioned shafts and crank arms due to inertia or momentum which may result from opening and closing movements of the door by an operator, or may result from acceleration or deceleration forces applied to the car, and to insure the positioning of the crank arms properly for correlation with the cam keepers on the car side wall.

In the accompanying drawings illustrating a selected embodiment of the invention:

Figure 1 is a side view of a portion of a railway car wall and a door mounted thereon.

Figure 2 is a horizontal section on line 2—2 of Figure 1, and drawn to an enlarged scale.

Figure 3 is a detail perspective of the door operating shaft at the left hand end of the door, looking in the direction of arrow 3 in Figure 1.

Figure 4 is a horizontal section corresponding to Figure 2 but showing the position of the parts during the initial door opening movement.

Figure 5 is a detail side view of the parts shown in Figure 3 when the door is in the position shown in Figure 4.

Figure 6 is a section corresponding to Figures 2 and 4 but showing the door at its point of maximum movement away from the car side.

Figure 7 is a detail corresponding to Figures 3 and 5 but showing the parts in the position shown in Figure 6, and looking in the direction of arrow 7 in Figure 1.

The details of the car body are unimportant. It includes a side wall 1 having an opening 3. A track 5 is fixed to wall 1 beneath opening 3 and extending to the right beyond the opening. Carriages 7 include rollers 9 mounting the carriages on the track. Door 11 fits into opening 3. Spaced upright mounting shafts 13, 14 are journaled at 15 on the door and each has a crank arm 17 at its lower end terminating in a trunnion 19 pitvotally received in a carriage 7 whereby the door is supported but is free to swing inwardly and outwardly of the opening, and when swung outwardly of the opening, to move lengthwise of the car side. A similar crank arm 21 at the upper end of each shaft mounts a roller 23 engaging a guide track 25.

Adjacent mounting shaft 13 is an operating shaft 27

provided at its lower and upper ends with offset crank lugs 29 and 31 respectively. Fixed to the car side are lower and upper keepers 33 and 35, each having cam-like slot faces 37 inclined to the car side and engageable by lugs 29, 31 when shaft 27 is rotated by handle lever 38, forcing the door inwardly or outwardly of the door opening, according to the direction of the rotation of the operating shaft. A corresponding operating shaft 41 is similarly journaled on the door adjacent mounting shaft 14 and has similar offset lugs 43, 45 coacting with keepers 47, 49 and actuated by handle lever 51.

The present invention relates to additional features applied to the above described structure, which is illustrated and described in detail in a co-pending application in the name of Thomas C. Soddy, filed April 24, 1958, Serial No. 730,624.

Operating shaft 27 is journaled on the door by brackets 53 and 55. The lower bracket 53 provides a sleeve having an upwardly facing bearing-forming surface 57 supporting the shaft through a collar 59 fixed on the shaft and having a downwardly facing bearing-forming surface which is flat except for a downwardly facing projection 61 which rides upon the bearing-forming surface 57 which has an elevated portion 63 and downwardly recessed portions 65, 67 spaced apart angularly of the shaft axis and having arcuate ends to facilitate the movement of projection 61 upwardly when the shaft is positively rotated.

When the door is in closed position (Figures 1, 2, 3) projection 61 is seated in recess 65. When handle 38 is rotated clockwise, looking downwardly, lugs 29, 31 are moved along cam faces 37 until they engage the inner ends of the keeper slots and then the shaft rotates about the lugs so as to move the door outwardly (Figure 4). At this point, projection 61 rides upwardly out of recess 65 onto surface 63, and further rotation of the shaft by handle 38 is unnecessary (Figure 5). Operating shaft 27 has now rotated about 20° into the position shown in Figure 4 and the door has pivoted about its right hand edge to the position shown in Figure 4.

Handle 51 on operating shaft 41 is then raised manually and the shaft is rotated in its brackets 56 in an anticlockwise direction (looking down) to thrust lugs 43, 45 (Figures 1, 2) along cam faces 73 of keepers 47, 49 (Figures 2, 4) and to the inner ends of keeper slots 75 which will cause the right hand door frame post 77 to serve as a fulcrum about which the left hand edge of the door swings to its outermost position. Continued anticlockwise movement of handle 51, or manual pull on hand-hold 79, now swings the right hand end of the door outwardly and moves the door on its carriages 7 along track 5 to the right to expose the door opening.

This movement causes operating shaft 27 to rotate by inertia further on the door in a clockwise direction from the position shown in Figure 5 to the position shown in Figures 6 and 7 in which operating shaft lugs 29, 31 are opposite the open ends of the slots in keepers 33, 35. During this movement lug 61 drops into recess 67.

When the door is to be closed, the operator pulls to the left on hand-hold 79, or on operating shaft handle 38. If the pull is on the hand-hold, projection 61 is held in recess 67 by the weight of shaft 27 on its bearing 59 until a lug 81 on right hand carriage 7 engages a stop 83 on the car side (Figure 6). This causes the corresponding crank arms 17, 21 on mounting shaft 14 to rotate by momentum to swing the right hand of the door into the door opening but the crank arms 17, 21 on mounting shaft 13 remain at right angles to the car side because of the resistance offered by the upright por-

tion of shoulder 57*a* on bearing 57 to the anticlockwise rotation of shaft 27. Accordingly, at the end of the left hand movement of the door, offset lugs 29, 31 are abreast of the open ends of the cam slots in keepers 33, 35. The workman then utilizes handle lever 38 to positively rotate operating shaft 27 in an anticlockwise direction, against the resistance offered by the rise in the bearing surface between 67 and 63. The rotation of lever 38 causes lugs 29, 31 to enter the keeper cam slots and by thrusting against cam surfaces 37 force the door into closed position (Figure 2) flush with the car side wall.

The projections and depressions on the opposed surfaces of bearings 57, 39 avoid the possibility of shaft 27 being partially rotated by momentum, or other unintended movement, during the shifting of the door lengthwise of the car which would interfere with the alignment of the offset lugs and the openings to the cam slots.

The arrangement of the projection 61 on the shaft bearing and the recesses 65, 67 on the bracket bearing may be reversed if desired and the cooperating parts of the bearings and particularly that on the shaft-journaling bracket 53 may be formed integrally with the shaft and bracket respectively, or separately therefrom and welded thereto. Other variations in the details of the construction may be made without departing from the spirit of the invention, and the exclusive use of modifications coming within the scope of the claims is contemplated.

What is claimed is:

1. In combination with a house car sliding door and a mounting therefor, gear for moving the door transversely of the car side, into and out of a door opening, comprising an upright shaft, a bracket journaling the same on the door and having an upwardly facing bearing fixed therewith, said shaft having a downwardly facing bearing fixed therewith, one of said bearings having a vertically recessed area elongated angularly of the shaft axis and the other of said bearings having a relatively shorter projection supporting the shaft on the lower bearing and receivable in said recessed area, said bearings being relatively rotatable on each other freely during the movement of said projection along said recessed area about said axis for a limited distance, until such relative rotation is resisted by contact of said projection with the end of said recessed area, a manually actuated handle lever on said operating shaft for effecting further rotation thereof by riding of said projection over the end of the recessed area, and an offset lug on said operating shaft for engaging a cam-like keeper on the car side to move the door transversely of the car wall as said operating shaft is rotated.

2. The combination of a house car sliding door and a mounting therefor according to claim 1 in which the recessed bearing has two angular recessed areas spaced apart, there being a relatively high intermediate area between them whereby the relative rotation of said bearings in opposite directions is yieldingly resisted by successive contacts of the projection lug with oppositely facing ends of said recessed areas.

3. The combination of a house car sliding door and a mounting therefor according to claim 1 in which said upright shaft and a similar upright shaft are journaled on the door near opposite ends thereof respectively and are rotatable relative to each other.

4. A railway house car sliding door mounting and operating gear including an upright shaft journaled on the door and having a crank arm with a trunnion at its outer end supporting the door on a carriage movable along the car side, a bracket on the door having an upright axis, an upright operating shaft journaled in said bracket and having an offset lug for engaging a cam-like keeper on the car side to move the door toward and away from the car side as the operating shaft is rotated, said bracket and operating shaft having vertically opposing lower and upper bearings supporting the shaft, there being a vertical projection on one of said bearings and an opposing horizontally elongated recess in the other bearing receiving said projection, the bearings being relatively rotatable about the shaft axis and shifting the operating shaft vertically as the projection and the recess are disaligned vertically whereby the shaft is yieldingly retained in the angular position in which said projection is in said recess.

5. In a railway house car side wall and flush door assembly, keepers fixed to the side wall with cam-like faces inclined thereto, a track fixed to the side wall, spaced carriages traveling on said track, spaced upright mounting shafts journaled on the door with crank arms having trunnions at their outer ends pivoted on said carriages whereby the door may swing toward and from the side wall and move parallel thereto, an upright operating shaft journaled on the door, near one of said mounting shafts, and having offset lugs engageable with said keepers, a lever handle on said operating shaft for manual rotation thereof to move said lugs along said keepers and thereby thrust the door transversely of the side wall, a supporting bearing on the door and an opposing supported bearing on the operating shaft, said bearings having opposing vertical offsets whereby the shaft is raised and lowered as it is rotated on the door, said offsets yieldingly limiting the free relative rotation of the operating shaft and supporting bearing by inertia or impact induced travel of the door along said track.

6. A railway house car side wall and flush door assembly according to claim 5 in which there is a similar operating shaft adjacent to the other each mounting shaft, said operating shafts being rotatable relative to each other by selective manual actuation of their respective handle levers and by inertia and impact-induced movement of the door along the track.

7. In combination with a house car side wall, having a door opening, and a flush type sliding door and means mounting the door on the side wall including a track and carriages movable thereon and mounting shafts spaced lengthwise of and freely journaled on and supporting the door and having horizontal crank arms with their swinging ends pivotally mounted on the carriages, a door shifting mechanism comprising an upright operating shaft, a bracket journaling the operating shaft on the door independently of the mounting shafts, the operating shaft having a crank and offset lug at its end, a keeper on the car side wall having a slot adapted to receive said lug and terminating at one end in an opening facing away from the car side, said slot having opposed faces for selective engagement by said lug, when the operating shaft is rotated, to move the door transversely of the side wall, a handle on said operating shaft for manual rotation of the operating shaft to swing said lug into and out of said opening and along a selected one of said faces, and cooperating means on the operating shaft and its bracket on the door interengaged when the operating shaft is rotated to swing said lug out of said keeper opening and yieldingly holding said operating shaft in position to present said lug to said opening when the door is moved lengthwise to be abreast of the door opening, said interengaging means yielding to angular thrust on the operating shaft by its handle.

8. The combination as set forth in claim 7 in which the operating shaft holding means comprises adjacent members on the operating shaft and the side wall having vertically opposed faces, the opposing face of one of said members including a vertical projection element and the opposing face of the other member including a vertical recess element, the element on the wall member having a predetermined position relative to the open end of the keeper slot and engaging the element on the operating shaft member to hold the members against accidental rotation.

9. The combination of a house car sliding door and a mounting therefor according to claim 1 in which the bearing on the upright shaft comprises a collar projecting radially of the shaft with a substantialy continuous flat horizontal lower face except for a single downward projection with an arcuate bearing surface, and the bearing on the door comprises a sleeve-like member surrounding the shaft and having angularly spaced recesses

in its upper bearing-forming face with arcuate ends and adapted to receive the projection on the shaft bearing.

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