D. S. BARROWS.

DOOR OPERATING DEVICE.

APPLICATION FILED JULY 6, 1911.

1,066,573.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

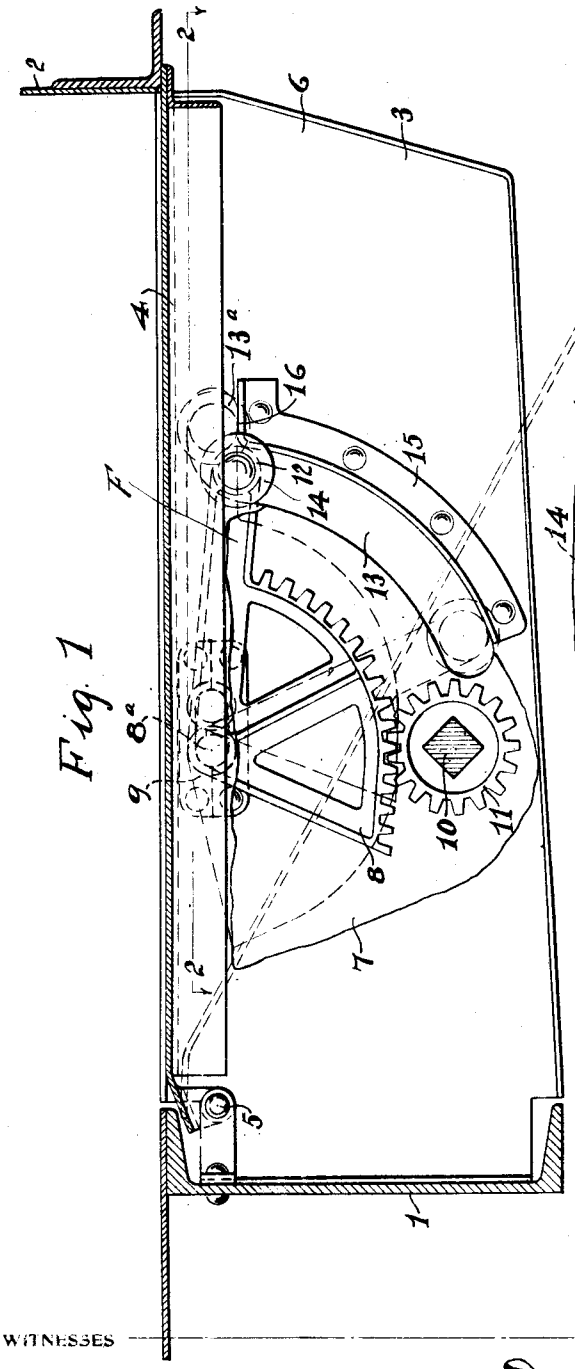


Fig. 1

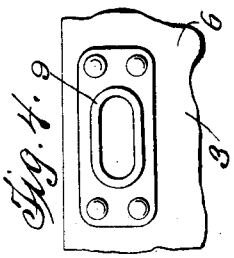


Fig. 4.

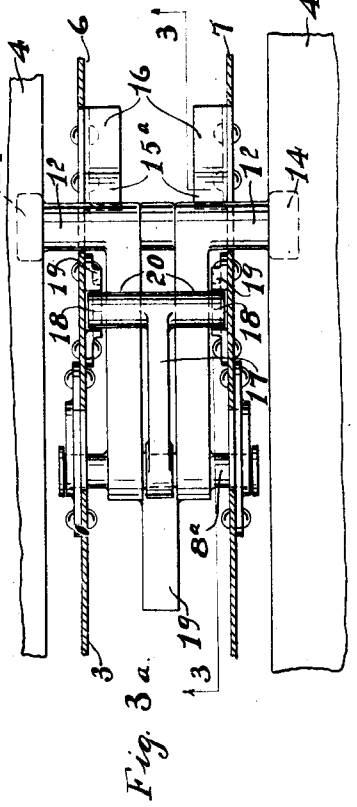


Fig. 3a.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2

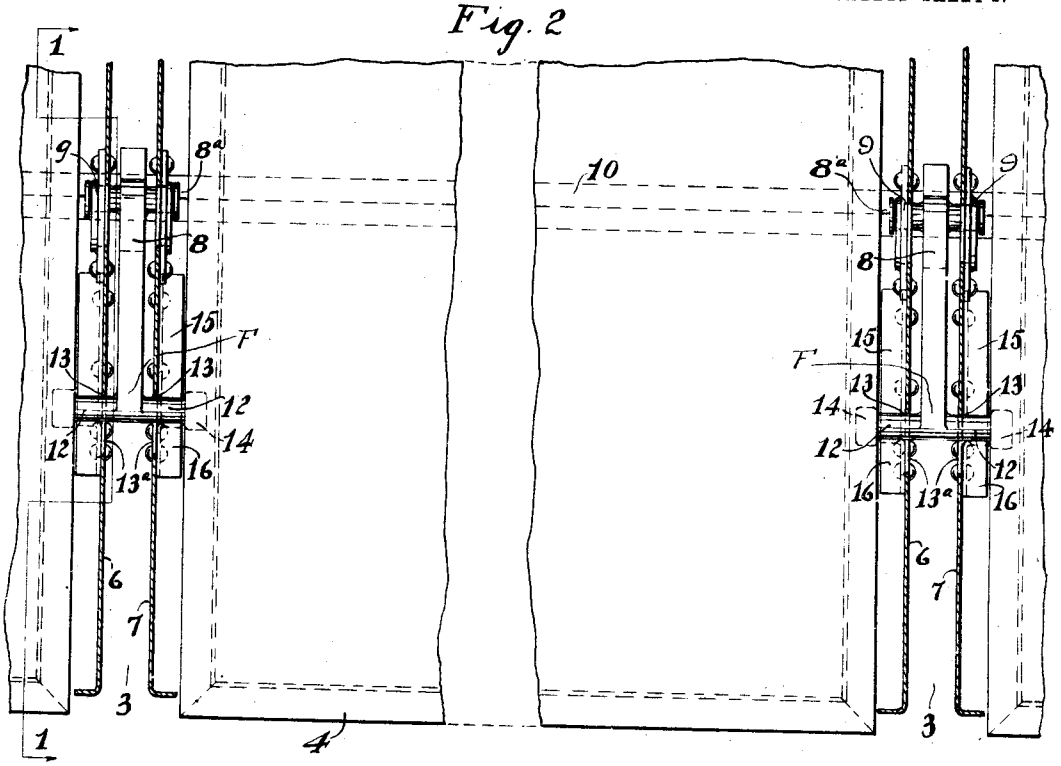
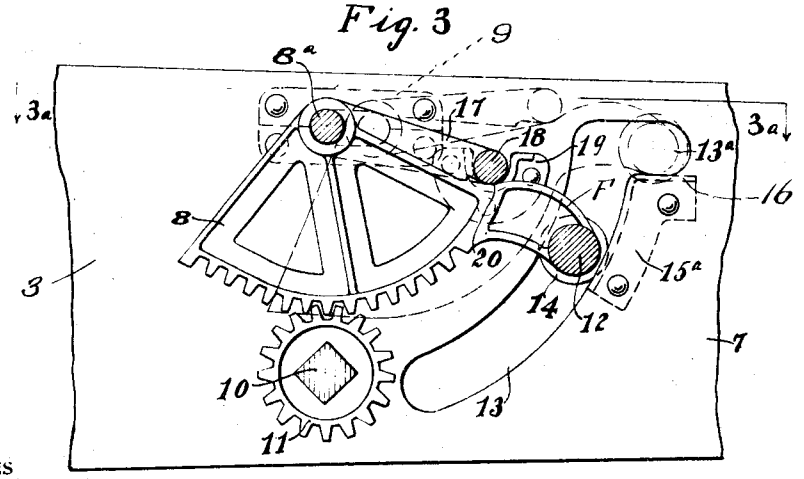


Fig. 3



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DOOR-OPERATING DEVICE.

1,066,573. Specification of Letters Patent. Patented July 8, 1913.

Application filed July 6, 1911. Serial No. 637,204.

To all whom it may concern:

Be it known that I, DONALD S. BARROWS, residing at Paterson, Passaic county, New Jersey, and being a citizen of the United States, have invented certain new and useful Improvements in Door-Operating Devices, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings: Figure 1, is a transverse vertical sectional view of approximately one-half of a car under-frame, illustrating a drop door in the floor thereof with the invention applied thereto. Fig. 2, is a top plan view, partly in horizontal section on the plane of line 2—2 of Fig. 1. Fig. 3, is a fragmentary view similar to a portion of Fig. 1, illustrating a modified construction, and Fig. 3ª, is a top plan view of the mechanism shown in Fig. 3 parts of the adjacent car structure being illustrated in horizontal section on the plane of line 3ª—3ª of Fig. 3. Fig. 4 is a fragmentary view illustrating the application of the bearing 9, hereinafter referred to, to the walls of a cross-bearer, as hereinafter explained.

The object of this invention is to provide a simple, efficient and positive means for operating the discharge doors in the floors of railway cars.

A further object is to arrange the door operating mechanism in such manner as to be entirely protected from all possible injury when the doors are opened and the material of the lading is being dumped.

With these and other objects in view, the invention comprises a segmental gear pivotally mounted in the car under-frame, below the level of the car floor; an operating shaft fitted with a pinion engaging said segmental gear; the segmental gear, being provided, at one point on its periphery, with means extending into engagement with the door in such manner that when the operating shaft is rotated and the gear swung upon its pivot, the door engaging means will lift the door from its open position to closed position.

The invention further provides that when the door is closed the segmental gear, with the door engaging means, will be thrust into position for positively locking the door closed.

It will be understood that there may be any desired number of doors throughout the length of the car, and upon opposite sides of the median line thereof, as illustrated in the drawings or disposed to swing upon hinges arranged transversely of the car as may be desired, and that each of said doors is pivotally mounted in the frame work of the car. It will also be understood that the elements comprising this invention, when used in cars having longitudinally disposed doors, are duplicated, at each of the cross bearers and upon opposite sides of the center sills. Only such parts of a car frame are illustrated in the drawings as are necessary to a complete understanding of the operation of the device.

Referring to the drawings, 1 indicates one of the center sills, 2 one of the side sills and 3 one of the cross bearers, all of which are well known rigid members of the car underframe where the side walls serve as side sills. The door 4 is pivotally mounted in a suitable bracket 5 fixed as shown, to one of the center sills 1 and extends from said center sill toward the outer side of the car and underlaps a portion of the side sill 2, though it will be understood that the door may equally well be hinged upon any transverse member of the underframe as a cross bearer if desired. The cross bearers 3 illustrated may be constructed in any manner which will provide the spaced walls 6 and 7 between which the elements of the invention may be placed.

The segmental gear, as 8, is pivotally mounted on the stub shaft 8ª in suitable bearing members 9—9 fixed to the opposite walls 6 and 7 of the cross bearer. The operating shaft 10, extending lengthwise of the car, through suitable bearings formed in the cross bearers, is provided with a pinion 11, the teeth of which are adapted to engage continuously with the teeth of the segmental gear 8. The segmental gear 8 is provided with an arm F, which extends radially beyond the periphery of the teeth

of the segmental gear and said arm is formed, at its end, with oppositely laterally projecting arms 12—12 which are extended through coincident slots 13—13 formed through the diaphragms 6 and 7. Rollers 14 are mounted upon the ends of the arms 12 which rollers are adapted to engage constantly and move longitudinally along the under surface of the doors 4 at opposite sides of the cross bearer. The slots 13 are made concentric with the center of the stub shaft 8^a of the segmental gear except at their extreme upper ends where said slots are extended horizontally radially from said pivot as at 13^a. A reinforcing member 15 is fixed to each of the walls 6 and 7, said reinforcing members being provided with substantial horizontal extensions 16 and bent to the contour of the slots 13—13^a so as to adapt said reinforcing member to serve as supporting means for the arms 12 and thus support the doors when the doors are being swung upon their pivots, as well as when the doors are in closed and locked position.

In order that the arms 12 may be moved into the extensions 13^a of the slots 13 and rest upon the upper surface of the ledges or horizontal walls 16 of said extensions for locking the doors in closed position, the bearings in the bearing members 9—9 are elongated and the pivot shaft 8^a of the gear 8 is slidable laterally therein, being retained at the inner end of said bearings by engagement of the arms 12 with the outer walls of the slots 13 and the reinforcing members 15, until said arms are raised to position at the upper end of the slots whereupon said pivot shaft is free to move into the outer end of said bearings, such movement being caused by continued rotation of the operating shaft 10.

The teeth of the gear 8 are not entirely concentric with the pivot shaft 8^a but are extended at a tangent at one end in such manner as to be maintained in constant engagement with the teeth of pinion 11 when the pivot shaft 8^a is moved along the bearings 9.

The operation of the device is as follows: Rotation of the operating shaft 10 and pinion 11 in a clock-wise direction, Fig. 1, will rotate the gear 8 thus moving the arms 12 upward along the slots 13, lifting the doors before them, until said arms reach the ledges 16 below the portion 13^a of said slot 13 whereupon further rotation of the operating shaft will force said arms on to said ledges for positively supporting and locking the doors, the pivot shaft 8^a accommodating such movement of the arms by traveling along the bearings 9.

The structure shown in Fig. 3 is substantially the same as that already described except that it provides means for maintaining the pivot shaft of the segmental gear at the inner end of the bearings 9 without necessity for continued engagement of the arms 12 with the walls of the slots 13. To accomplish this result the modified structure employs a link 17 pivotally mounted upon the pivot shaft 8^a of the gear 8 and rotatable freely on said shaft, said link being formed at its free end with oppositely laterally extending fingers 18—18 adapted to engage fixed pockets 19—19 carried upon the opposite walls of the cross bearers. The pockets 19 are adapted to support the end of the link 17, when the arms 12 on the gear 8 are in the lower end of the slot 13, as when the door is open in such manner as to positively maintain the pivot shaft of the gear at the inner end of the bearings 9 and the arms 12 free of the edges of the slots 13. When the operating shaft is rotated for lifting the arms 12 and the doors, an upper surface 20 of the arms F engages the under surface of the fingers 18, lifting said fingers out of engagement with the pockets 19, permitting the gear to move as before described. The fingers 18, however are not lifted from the pockets 19 until the arms 12 have reached substantially a position in the upper end of the slots 13 from whence they may be thrust almost directly into locking position over the ledges 16 as indicated by dotted lines in Fig. 3. This modified structure avoids the necessity for the heavy guiding members 15 throughout the length of the slots, a short length as 15^a of said members as shown in Fig. 3 providing the ledges 16 at their upper ends, being sufficient. It also avoids the element of friction present in the previous structure throughout the movement of the arms 12 along the length of said guiding members.

What I claim is:—

1. In a door operating device, the combination comprising a car frame, a door, an operating shaft, slidable means engaging said door adapted to close and lock the door, a guide for said means, and a pinion on said shaft in engagement with said means.

2. In a door operating device, the combination comprising, a car frame, a door, a member slidably mounted on said car frame, means carried by said member in constant engagement with said door, a guide adapted to retain said slidable member against sliding except when said door is closed, and means for sliding said member when said door is closed to move said door engaging means along said guide for locking said door.

3. In a door operating device, the combination comprising a car frame, a door, an operating shaft rotatably mounted in fixed position and having a pinion thereon, the member slidably mounted on the car frame and in mesh with said pinion, a door lock-

ing part formed on said member, a guide for said door locking part adapted to retain said slidable member against sliding except when said door is closed and means for sliding said member when said door is closed to move said door locking part into door locking position.

4. In a door operating device, the combination comprising, a car frame, a door, an operating shaft, a rockable member slidably mounted on the car frame, means carried by said operating shaft for rocking said member, a door engaging and locking part formed upon said member continually engaging said door, and adapted to close said door when said member is rocked, and means for retaining said member against sliding except when said door is closed.

5. In a door operating device, the combination comprising, a car frame, a door, an operating shaft, a rockable member slidably mounted on the car frame, means carried by said operating shaft for rocking and sliding said member, a locking part continually engaging the door formed upon said member, and a guide for said door engaging and locking part formed on said car frame adapted for retaining said member against sliding except when said door is closed.

6. In a door operating device, the combination comprising a car frame, a door, an operating shaft, a pivotally mounted member continually engaging said door and adapted to close and lock the same, a laterally slidable pivot shaft for said member, means for retaining said pivot shaft against sliding during closing movement of said door, and means for sliding said pivot shaft for locking said door.

7. In a door operating device, the combination comprising, a car frame, a door, an operating shaft, a pivotally mounted door actuating member adapted to raise said door from its open position, a laterally slidable pivot shaft for said member, means for retaining said pivot shaft against sliding during closing movement of said door, said means permitting said pivot shaft to slide when said door is closed for locking said door.

8. In a door operating device, the combination comprising, a car frame, a door, an operating shaft rotatably mounted in fixed position, a pivotally mounted member adapted to close said door from open position, a laterally slidable pivot shaft for said member, a guide for retaining said pivot shaft against sliding while closing said door, a locking part formed on said pivotally mounted member, said guide being formed with a part adapted to permit said pivot shaft to slide when the door is closed and be engaged by said locking part for maintaining said door locked.

9. In a door operating device, the combination with a car frame comprising a cross bearer, of a pair of drop doors disposed upon opposite sides of said cross bearer, slidably mounted means extending through said cross bearer engaging said doors for closing and locking said doors, a rockable slidably mounted member engaging said last mentioned means within said cross bearer, and means for sliding said member to lock said doors.

10. In a door operating device, the combination with a car frame comprising a cross bearer, of a pair of drop doors disposed upon opposite sides of said cross bearer, a pivotally mounted member within said cross bearer adapted to close and lock said doors, a laterally slidable pivot shaft for said member, means for retaining said pivot shaft against sliding for closing said doors, and means for sliding said pivot shaft for locking said doors.

11. In a door operating device, the combination comprising, a car frame, a door, a member slidably mounted on said car frame, means carried by said member adapted to rest continuously in engagement with said door, a guide adapted to retain said slidable member against sliding except when said door is closed, and means for sliding said member when said door is closed to move said door engaging means along said guide for locking said door.

12. In a door operating device, the combination comprising a car frame, a door, an operating shaft rotatably mounted in fixed position, a pivotally mounted member adapted to close said door from open position and to lock said door when in closed position, a laterally slidable pivot shaft for said member, a guide for retaining said pivot shaft against sliding while closing said door, a locking part formed on said pivotally mounted member, said guide being formed with a part adapted to permit said pivot shaft to slide when the door is closed and to be engaged by said locking part for maintaining said door locked.

13. In a door operating device, a suitable support for a door, a segmental gear supported on a slidable pivot, an extension on said gear adapted to contact with a door, and means for causing partial rotation of the gear to close and to lock a door.

14. In a door operating device, an eccentric segmental gear comprising means adapted to close a door, and means adapted to cause partial rotation and sliding of said gear.

15. In a door operating device, the combination of a slotted support, of a swinging and slidable eccentric segmental gear comprising means adapted to actuate a door, an operating shaft and a pinion on said shaft in engagement with said gear.

16. In a door operating device, a slidable segmental gear, a suitably supported elongated bearing for said gear, means for retaining said gear in operating position, and means for sliding said gear to locked position.

17. In a door operating device, the combination of a slidable segmental gear, with means adapted to lock said gear in relatively fixed position during partial rotation, said means being releasable after partial rotation of the gear.

18. In a door operating device, the combination of a slidable segmental gear, with pivotally supported means adapted to lock said gear in relatively fixed position during partial rotation, said means being releasable after partial rotation of the gear.

19. In a device of the character described, an eccentric segment, a locking arm thereon, means for giving partial rotation to said segment and causing said arm to travel longitudinally.

20. In a dumping car, the combination of a door, an underframe supporting said door and having a plurality of slots therein, a pivoted slidable segmental gear supported in said slots and provided with an arm adapted to contact with said door, and means adapted to swing and to slide said gear.

21. In a door operating device, a slidable and swinging segmental gear, an extension on said gear adapted to contact with a door, and means adapted to swing and slide said segment to close and to lock said door.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

DONALD S. BARROWS.

Witnesses:

G. V. WASHINGTON,

A. KASSLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."