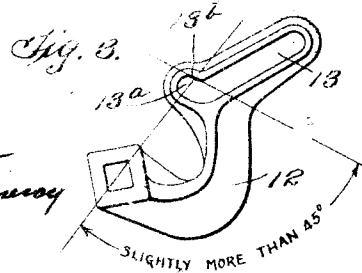
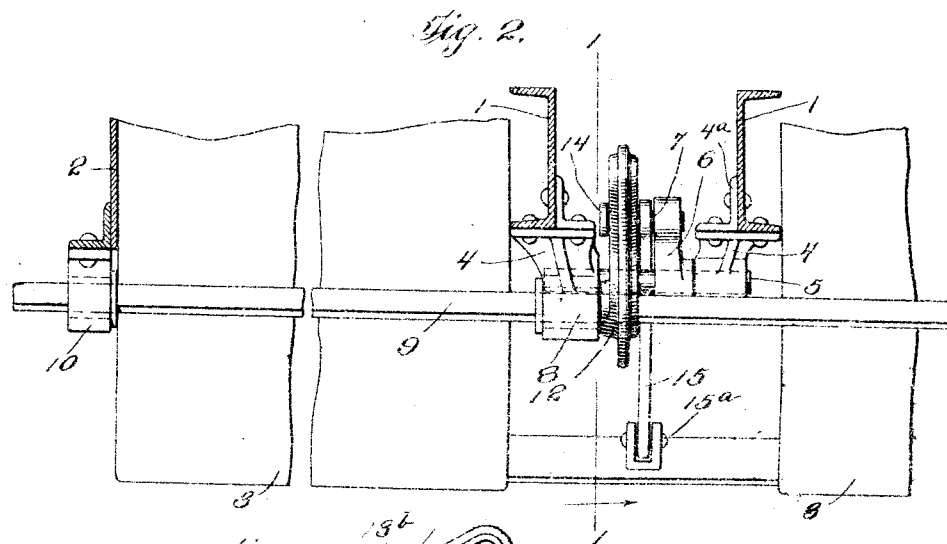
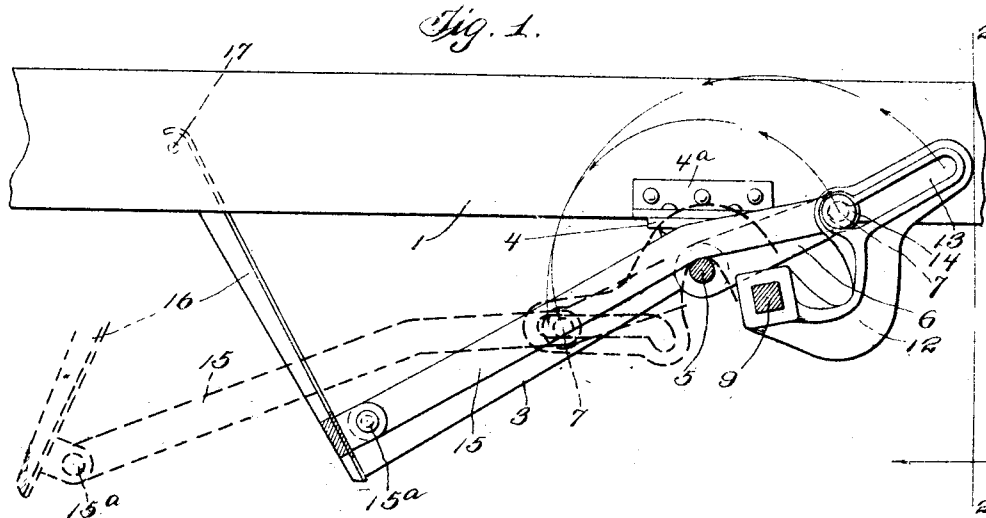


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CAR DOOR OPERATING DEVICE.
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1,031,925.

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CAR-DOOR-OPERATING DEVICE

1,031,925.

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To all whom it may concern:

Be it known that I, LEVIN GESSFORD HANDY, residing at Rutherford, Bergen county, New Jersey, and being a citizen of the United States, have invented certain new and useful Improvements in Car-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 longitudinal sectional view of a portion of a car illustrating my invention applied thereto, said section being taken approximately on line 1—1 of Fig. 2. Fig. 2 is a transverse sectional view through a portion of a car, said section being taken on the plane indicated by line 2—2 of Fig. 1, and looking in the direction of the arrow. Fig. 3 is a detail view of the crank-arm.

This invention relates to mechanism for closing the doors of hopper bottom cars.

The object of the invention is to provide mechanism which will furnish positive locking means for said doors when in their closed position without the use of the customary pawl and ratchet mechanism.

A further object is to provide an increasing leverage upon the locking arm of the mechanism as the door is swung to its final closed position.

A further object is to provide, in combination with the above, means for maintaining the door practically rigid in its fully open position.

Referring to the drawings, 1—1 indicate the center sills of the car structure, 2 the side girders and 3 the inclined floor of the hopper chutes. Hanger brackets 4—4 are fixed one to the under side of each of the center sills. A short shaft 5 is journaled in the brackets 4, and fixed upon the shaft 5, between said brackets, is a radially projecting link-arm 6. At its free end said link-arm carries a wrist-pin 7.

Journaled in a suitable bearing as 8 formed in one of the brackets 4 and extend-

ing to one adjacent side of the car, or entirely across the car if desired, is an operating shaft 9. A journal bearing 10 is fixed to the under side of one or each of the adjacent side girders for supporting the outer end or ends of said shaft.

The shaft 9 extends through and is supported in the bearing 8 and carries a radial lever, or crank-arm 12, which arm is slotted as at 13. The wrist-pin 7 projects into said slot and has free sliding movement therein. A suitable head as 14 is formed upon the end of the wrist-pin, outside the slot 13, to prevent dislocation of the parts.

The door actuating link 15 is pivotally connected, as at 15^a, to the lower or free edges of the doors 16, it being understood that there is a door 16 for each of the hopper chutes 3 and that the said doors are pivoted along their upper edges as at 17, as is common in the art.

The operating shaft 9 is spaced slightly below and somewhat to the right of the shaft 5, Fig. 1. The slot 13 in said crank-arm is arranged practically radial with the shaft 9, but is preferably disposed so that a line along the center thereof will pass slightly to one side of the said shaft 9, so as to prevent the binding of the wrist-pin in the said slot, by arranging the locking position of the slot above the radial line of the crank-arm, and the unlocking position thereof co-incident with the extreme throw of the crank-arm, thereby permitting a variable relative movement of the wrist-pin as to the crank-arm. As the crank-arm 12 is swung to close the door, the wrist-pin 7 will move gradually toward the inner end of the slot 13 and nearer the shaft 9, thus gradually increasing the available leverage of the crank-arm upon the wrist-pin until the maximum leverage is reached when the doors are fully closed and the door operating link is in engagement with the upper surface of the shaft 5.

A pocket as 13^a is formed at the extreme inner end of the slot 13 and is adapted to engage the wrist-pin after said wrist-pin has reached its final forward or locked position and thus retaining the wrist-pin against possible return. It will be noted that the outer wall of the pocket 13^a as at 13^b, while practically at a right angle to a line drawn therefrom through the center of the shaft 9, is preferably arranged at a slight incline

relative to said line as is graphically illustrated in Fig. 3 of the drawings, and that thus said wall will readily disengage itself from the wrist-pin when the operating shaft is rotated for opening the doors. When the wrist-pin is in the pocket 13^a, as illustrated in Fig. 1, said wall serves to prevent movement of the wrist-pin and hence of the doors, the entire dead weight of the free end of the crank-arm being disposed to maintain the engagement. With the wrist-pin thus positively held against movement all necessity for the customary pawl and ratchet mechanism is obviated.

Assuming the parts to be in the position shown by full lines in Fig. 1. The center of the wrist-pin 7 is in alinement with the center of the shaft 5 and the pivot pin 15^a, or preferably slightly below said alinement, so that the door is positively locked in its closed position. The severe jolting to which the parts are subject in use would, however, were it not for the engagement of the wrist-pin with the outer wall of the pocket 13^a, cause the rear end of the door actuating link 15 and the link-arm 6 to rise and so permit the door to open. The engagement of the wrist-pin within the pocket 13^a positively prevents movement of the wrist-pin and thus obviously no further retaining means is required. As the operating shaft is rotated and the crank-arm swung for opening the door, the pocket 13^a will first be lifted from its engagement with the wrist-pin and said wrist-pin will be free to travel along the slot 13. As the operating shaft is further turned, the wrist-pin will move toward the outer end of said slot and finally, as the parts reach the position illustrated by the heavy dotted lines, the body of the crank-arm strikes the shaft 5 so that further rotation of said crank-arm is prevented, and the free end of the door actuating link 15 is supported in such manner as to maintain the door practically rigid.

In closing and locking the door the shaft 9 is rotated in a reverse direction and during this rotation the pin 7 will move toward the inner end of the slot, that is, toward the operating shaft or center of force, thus gradually increasing the degree of leverage upon the door actuating link. It should be noted in this connection that the link-arm 6 at this time, aside from its function of transmitting the weight of the doors to the shaft 5, serves to guide the wrist-pin 7 and the free end of the door actuating link concentrically around the shaft 5 and consequently, owing to the relative positions occupied by the shafts 5 and 9, the wrist-pin is moved along the slot 13 as the operating shaft is rotated. The hanger brackets 4-4 with the upwardly extending angular flanges 4^a may comprise integral castings, each connected as are the members 4-4^a herewith shown.

What I claim is:

1. In a door operating device, a door, a door actuating link, a pivotally mounted link-arm, means of connection between said link-arm and link, a slotted crank-arm and means formed in the slot of said crank-arm for engaging said link connecting means when said door is closed, whereby said door is maintained closed without independent securing means.

2. In a door operating device, a door, a door actuating link, a pivotally mounted link-arm, means of connection between said link-arm and link, an operating shaft and means carried by said operating shaft for engaging said connecting means when said door is locked, the construction and arrangement of parts being such that forces upon said door tending to open same are transmitted through the pivot upon which said link-arm rotates.

3. In a door operating device, a door, a door actuating link, a pivotally mounted link-arm, means of connection between said link-arm and link, an operating shaft, a slotted crank-arm carried by said operating shaft and means formed at the inner end of the slot of said crank-arm for engaging said link connecting means when said door is closed, whereby said door is maintained closed without independent securing means.

4. In a door operating device, a door, a pair of shafts in different planes and means carried by one of said shafts and being adapted to contact with the other shaft for supporting said door in an open position.

5. In a door operating device, a door actuating link, a pair of shafts disposed in different planes and an arm carried by each of said shafts adapted to engage said door actuating link, the arm on one of said shafts being disposed to engage the other shaft for limiting the movement of the arm, whereby the door is supported in an open position.

6. In a door operating device, a door actuating link, a link-arm connected to said door actuating link, a pivot shaft for said link-arm, an operating shaft disposed in a plane below said pivot shaft, a slotted crank-arm carried by said operating shaft and means formed at the inner end of the slot of said crank-arm for engaging said link connecting means when said door is locked, whereby said door is maintained locked without independent securing means.

7. In a door operating device, a door actuating link, a link-arm connected to said door actuating link, a pivot shaft for said link-arm, means for rotating said pivot shaft and means carried by said last mentioned means for limiting rotation of said shaft in one direction.

8. In a door operating device, a door; a

door actuating link pivotally attached at one end of said door; a link-arm pivotally connected to the other end of said link; a shaft comprising the pivot for said link-arm; said actuating link being on one side of the axis of said shaft, and a straight line passing through the axes of the pivots at the ends of said link being on the other side of the axis of said shaft and between it and the axis of the crank-shaft when the parts are in locked position; and means for actuating said link-arm.

9. In a door operating device, a door; a door actuating link pivotally attached at one end to said door; a link-arm pivotally connected to the other end of said link; a shaft forming the pivot for said link-arm; said actuating link being on one side of the axis of said shaft, and a straight line extending through the axes of the pivots at the ends of said actuating link being on the other side of the axis of said shaft and between it and the axis of the crank-shaft when the parts are in locked position; means for maintaining said parts in locked position; and means for actuating said link-arm.

10. In a door operating device, a pivotally mounted link-arm, a crank-arm engaging said link-arm, and a door actuating link engaging said crank-arm.

11. In a door operating device, a pivotally mounted link-arm, a crank-arm engaging said link-arm, and a door actuating link slidably engaging said crank-arm.

12. In a door operating device, a pivotally mounted link-arm, a door actuating link, a pivot connection therefor and means engaging said pivot for actuating said links.

13. In a door operating device, a pivotally mounted link-arm, a door actuating link pivoted thereto and a crank-arm engaging said link-arm pivot for actuating said links.

14. In a door operating device, a pivotally mounted link-arm, a door actuating link, a pivot therefor and a crank-arm slidably engaging said pivot for actuating said links.

15. In a door operating device, a pivotally mounted link-arm, a crank-arm slidably engaging said link-arm and a door actuating link engaging said crank-arm.

16. In a door operating device, a pivotally mounted link-arm, a crank-arm slidably engaging said link-arm and a door actuating link slidably engaging said crank-arm.

17. In a door operating device, a pivotally mounted link-arm, a door actuating link pivoted thereto and a slotted crank-arm slidably engaging one of said members.

18. In a door operating device, a slotted crank-arm, a pivotally mounted link-arm engaging the slot of said crank-arm, and a

door actuating link engaging one of said members.

19. In a door operating device, a pivotally mounted link-arm, a slotted crank-arm, means carried by said link-arm for engaging the slot of said crank arm and a door actuating link connected to said engaging means.

20. In a door operating device, a pivotally mounted link-arm, a crank-arm, means connecting said members and a door actuating link engaging said connecting means.

21. In a door operating device, a pivotally mounted link-arm, a crank-arm, means slidably connecting said members and a door actuating link engaging said connecting means.

22. In a door operating device, a door, a pivotally mounted link-arm, a door actuating link pivoted thereto, means engaging the pivot between said links and being adapted to increase the leverage upon said links as said door is moved toward its closed position.

23. In a door operating device, a door, a link-arm mounted pivotally on a fixed shaft, a door actuating link pivoted thereto, and a crank-arm for actuating said members, said crank-arm being provided with means for facilitating an increase of leverage upon said links as said door is moved toward its closed position.

24. In a door operating device, a link-arm mounted pivotally on a fixed shaft, a fixed pivot shaft for said link-arm, a crank-arm for actuating said link-arm, an operating shaft for said crank-arm, means of connection between said link-arm and crank-arm, and a door actuating link engaging said connecting means, said operating shaft and crank-arm being so arranged as to increase the leverage upon said links as said door is moved toward its closed position.

25. In a door operating device, a door actuating link, a crank-arm, means of connection between said crank arm and link, and means adapted to shift said connecting means along said crank arm.

26. In a door operating device, a door, a door actuating link, an operating shaft, a crank-arm, means of connection between said crank-arm and link, and means adapted to shift said connecting means toward said operating shaft as said door is moved toward its closed position.

27. In a door operating device, a door, a door actuating link, an operating shaft, a crank-arm, means of connection between said crank arm and link, and means adapted to shift said connecting means along said crank-arm and to maintain said connecting means at a point nearer said operating shaft when said door is closed than when said door is fully opened.

28. In a door operating device, a shaft, a

- link-arm, mounted upon said shaft, a door actuating link pivoted at the free end of said link-arm, a door connected to said door actuating link, an operating shaft and a crank arm carried by said operating shaft and being connected to said link-arm, said operating shaft being relatively nearer to the point of connection between said crank-arm and said link-arm than said first mentioned shaft when said door is closed.
29. In a door operating device, a pivotally mounted link-arm, a door actuating link pivoted thereto, an operating shaft, a slotted crank-arm fixed to said operating shaft and means engaging the slot of said crank-arm and being adapted to move toward the inner end of said slot as said door is being closed, and to stand in engagement with said slot when said door is fully closed, the point of said engagement being relatively nearer to the operating shaft than to the first mentioned shaft.
30. In a door operating device, a door actuating link, a slotted crank-arm, an operating shaft for said crank-arm, means connected to said link and engaging the slot of said crank-arm, and means adapted to shift said engaging means toward said operating shaft for increasing the leverage upon said link as the door is moved toward its closed position.
31. In a door operating device, a pivotally mounted link-arm, a door actuating link, and a slotted crank-arm for actuating said links and for supporting said door in an open position.
32. In a door operating device, a door actuating link, a crank-arm, means of connection between said crank-arm and link and means engaging said connecting means for supporting said door in open position.
33. In a door operating device, a pivotally mounted link-arm, a door actuating link, a slotted crank-arm for actuating said link and means engaging the slot of said crank arm for limiting the extent of the movement of one of said members.
34. In a door operating device, a door, a pair of shafts disposed in different planes and means carried by said shafts for supporting said door in open position.
35. In a door operating device, a door, a door actuating link, a pair of shafts disposed in different planes, an arm carried by each of said shafts and means connecting said arms and said door actuating link for supporting said door in open position.
- In witness whereof I have hereunto set my hand in the presence of two witnesses.
- L. GESSFORD HANDY.
- Witnesses:
FRANK V. COOPER,
JOHN SMITH.