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A. CAMPBELL

DOOR OPERATING MECHANISM

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2 Sheets-Sheet 1

Fig. 1

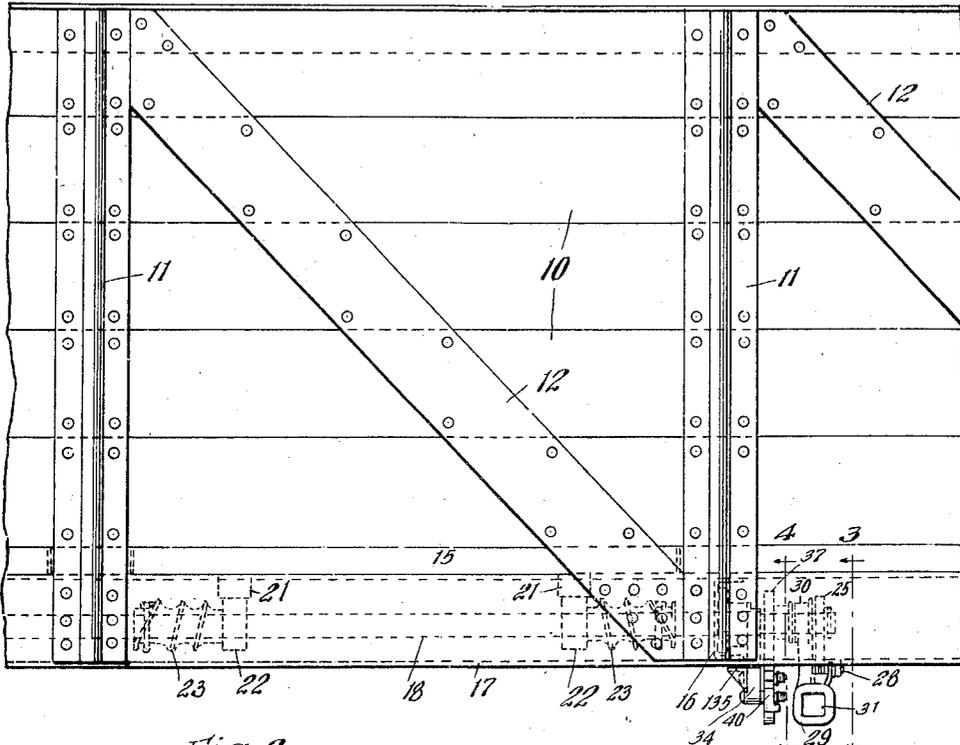
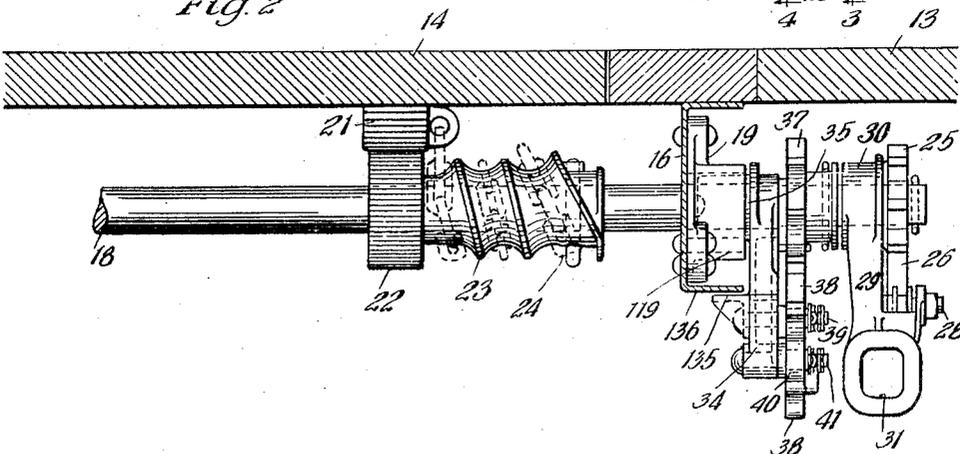


Fig. 2



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UNITED STATES PATENT OFFICE.

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DOOR-OPERATING MECHANISM.

Application filed December 5, 1921. Serial No. 519,827.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Door-Operating Mechanisms, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in door operating mechanisms.

One object of the invention is to provide a simple and efficient mechanism for closing and maintaining in closed position, dump doors of a car, particularly for that type of car known as a general service car.

Another object of the invention is to provide a door operating mechanism for dump cars which employs an operating lever preferably provided with a socket to receive a stick or bar to increase the leverage, the lever with its socket being so disposed that it will have a portion thereof extending outside of the plane of the side sill of the car so as to facilitate the operation when the shaft itself is difficult of access behind the side sill.

More specifically, the object of my invention is to provide a door operating mechanism for general service cars wherein the mechanism employs a traveling or rolling shaft and a pawl and ratchet device movable with the shaft for rotating it in combination with means for locking the shaft against rotation in an unwinding direction in any position which the shaft may assume.

In the drawings forming a part of this specification, Figure 1 is a side elevational view of a portion of a dump car of the general service type showing my improvements in connection therewith. Figure 2 is a longitudinal, vertical, sectional view taken inside of the side sill of the car, Figure 2 being upon a somewhat larger scale than Figure 1. And Figures 3 and 4 are enlarged vertical, transverse, sectional views corresponding respectively with the lines 3—3 and 4—4 of Figure 1, except that, in Figures 3 and 4, the shaft is shown in its outermost position whereas in Figures 1 and 2, the shaft is shown under the doors in position to sustain the latter.

In said drawings, the side wall of the car is shown as composed of a plurality of planks 10, side stakes 11 and diagonal braces 12. The floor of the car, as customary in general service cars, comprises stationary or fixed end boards 13 and a plurality of floor doors 14, the latter being pivoted along their inner edges adjacent the center sill of the car and adapted to swing downwardly about axes parallel with the center line of the car. As is also customary, an edge board 15 extends lengthwise of the car on each side thereof, thus completing the floor with the doors 14.

The underframe of the car, as shown, comprises transversely extending diaphragms or cross beams 16, preferably in the form of steel pressings, a suitable center sill construction (not shown) and channel side sills 17.

In this type of general service car, the floor doors 14 occur between the trucks, and the stationary floor boards 13 are at the end portions of the car, as will be understood.

The door operating mechanism, as shown, comprises, on each side of the car, a rolling or traveling shaft 18 which moves back and forth in suitable bearing castings 19 riveted to the diaphragms 16, said castings 19 having horizontally extending elongated bearing slots 20 and the diaphragms being correspondingly recessed to accommodate the movements of the shaft back and forth. Each of the floor doors 14 is preferably provided on the under side thereof near the edges with shoes 21 rounded at their outer ends and serrated to cooperate with correspondingly disposed serrated wheels 22 rigidly secured to the shaft 18. Adjacent each serrated wheel 22 is a chain winding drum 23 having a helical groove around which winds a lifting chain 24, one end being secured to the drum and the other end to the door, as will be understood. In this general type of mechanism, as the shaft 18 is turned in a closing direction, the chains wind around the drums 23, thus lifting the doors 14 until the latter are almost in closed position, at which time further winding of the chains on the drums pulls the shaft 18 inwardly along the bearing slots until the serrated wheels 22 engage with the rounded ends of the shoes 21 and thereafter the shafts are rolled under the doors, thus forcing the

latter to fully closed position and also holding them closed with the load transferred to the shaft.

For rotating the shaft 18, I employ the following arrangement. Secured to one end of the shaft under a fixed part of the car floor, is a ratchet wheel 25 having a series of radially extending teeth with which are adapted to cooperate two pawls 26 and 27 pivotally mounted on a pivot bolt 28 carried by an operating lever 29. The latter, at its upper end, is provided with a bearing 30 freely oscillatably mounted on the shaft 18 so as to adapt the lever 29 to swing back and forth as will be apparent. At its bottom end, the lever 29 is provided with a transversely extending socket 31, adapted to accommodate the end of a rod or bar to facilitate the operation. The lever 29, above the socket 31, is of more or less reduced width considered transversely of the car so that, when the shaft 18 is in its outermost position with respect to the diaphragms of the underframe and as shown in Figures 3 and 4, the operating lever 29 may be swung to an extreme position indicated by dotted lines at 32 in Figure 3, in which position it will be noted that a portion of the lever is outside of a vertical plane corresponding to the outer face of the side walls 17 and thereby adapting the bar or rod indicated by dotted lines at 33 to swing upwardly clear of the side sill and thus render it extremely convenient for the operator to manipulate the lever even though the operating shaft and ratchet wheel thereon are concealed behind the side sill and otherwise difficult of access. Preferably the bearing slots 20 in the castings 19 are formed with a depression at their outer ends as indicated as 119 to allow the shaft 18 to drop slightly when in its extreme outer position. The pawls 26 and 27 are used alternatively, one for winding up the chain and rotating the shaft in a closing direction and the other to rotate the shaft in the opposite direction to release the doors.

To hold the shaft 18 against rotation in an unwinding direction, regardless of the position of the shaft, I employ the following arrangement. Mounted on the shaft 18 is what may be termed a fulcrum casting 34 having a bearing 35 around the shaft so that the latter is free to rotate with respect to the casting 34. Said fulcrum casting 34 is located between the lever 29 and the adjacent diaphragm 16. Said fulcrum casting 34, at its upper end, is provided with a horizontally extending flange 36 which moves within the corresponding bearing slot 20 and by which the fulcrum casting 34 will be held against rotation to any appreciable extent although the fulcrum casting will be allowed a small amount of play, as will be clear from an inspection of Figure 4. Near its central

portion, the fulcrum casting 34 is provided with an integral horizontally extending second flange 135 which extends under the bottom flange 136 of the adjacent diaphragm 16. A slight amount of clearance is left between said flanges 135 and 136 to allow of a slight amount of oscillation of the fulcrum casting 34 but, as will be understood, said flange 135 will also serve to prevent the fulcrum casting 34 from turning with the shaft 18, although the fulcrum casting is allowed to travel horizontally in unison with the shaft 18.

Rigidly secured to the shaft 18 between the fulcrum casting 34 and the operating lever 29 is a second ratchet wheel 37 with which is adapted to cooperate a locking dog 38 pivotally mounted on the fulcrum casting 34 as by the pivot bolt 39. The dog 38 is preferably of the gravity type, the same being weighted at its lower end so as to normally maintain it in engagement with the teeth of the ratchet wheel 37. To positively lock the dog 38 in engagement with the ratchet wheel 37, a locking cam 40 may be employed, the same being pivotally mounted on the fulcrum casting 34 as by the pivot bolt 41. With the arrangement shown, it will be evident that the shaft 18 is prevented against rotation in an unwinding direction, that is, in a clockwise direction as viewed in Figure 4, regardless of the position of the shaft 18 in the bearing slots 20.

I have herein shown and described what I now consider the preferred manner of carrying out the invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a dump car, a sill, a bodily movable and rotatable shaft behind said sill, and an operating lever mounted on said shaft and bodily movable therewith, said lever having a socket portion depending below said sill.
2. In a dump car, a sill, a rotatable and bodily movable shaft behind said sill, and a lever mounted on said shaft, said operating lever having a portion thereof depending below the bottom of said sill.
3. In a car, the combination with a sill; of car door mechanism having a lifting shaft arranged to support the door directly when the door is raised, said shaft being located behind said sill; a flexible connection between the shaft and door; and pawl and ratchet mechanism for rotating said shaft and including a lever depending below said sill.
4. In a car, the combination with a side sill; of car door mechanism comprising a lifting device and flexible means whereby it is moved automatically into supporting position under the door when the door is closed, said lifting device being located behind said

sill; and an operating lever mounted on said device, said lever having a portion thereof depending below said side sill and accessible for manipulation.

5 5. In an operating mechanism for a car having a side sill, a pivoted floor door, a 55
bodily movable and rotatable operating shaft, and flexible connections between said shaft and the door; the combination with
10 an operating lever supported from and bodily movable with said shaft and depending below said sill.

6. In a dump car, a sill, a bodily movable and rotatable shaft behind said sill, an 15
operating lever mounted on said shaft and movable therewith, said lever being accessible below said sill, and means movable with the shaft and cooperable therewith to prevent accidental rotation of the shaft in
20 an opening direction.

7. In a dump car, a sill, a discharge door operating shaft behind said sill, a ratchet wheel mounted on said shaft, an operating 25
lever rotatably mounted adjacent said ratchet wheel and accessible below said sill, and reversely operable pawl means carried by said lever and cooperable with said ratchet wheel to rotate it in either direction.

8. In an operating mechanism for cars 30
having a pivoted discharge door, the combination with a rotatable shaft movable to a position underneath the door to support it in closed position; of a flexible connection between said shaft and door; and means for
35 rotating said shaft including a ratchet wheel, a pawl and an operating lever supported by and movable in unison with said shaft, the pawl being mounted on said lever.

9. In a dump car having a pivoted floor 40
door and a side sill, the combination with an operating shaft for said door, said shaft being located above the bottom of the side sill and behind the latter, said shaft being rotatable and bodily movable to a position beneath the door when the latter is in closed 45
position; and means for rotating said shaft including an operating lever depending below said side sill, said operating lever being movable in unison with the shaft.

50 10. In a dump car having a pivoted floor

door and a side sill, the combination with an operating shaft for said door, said shaft being located above the bottom of the side sill and behind the latter, said shaft being rotatable and bodily movable to a position 55
beneath the door when the latter is in closed position; means for rotating said shaft including an operating lever depending below said side sill, said operating lever being movable in unison with the shaft; and 60
means for locking said shaft against accidental rotation in an opening direction including elements carried by the shaft and movable bodily in unison therewith.

11. In a dump car, having a side sill and 65
a diaphragm, both located below the level of the floor, and a pivoted floor door, the combination with a bodily movable and rotatable shaft located behind said side sill; of an elongated bearing for said shaft secured to 70
said diaphragm; a flexible connection between said shaft and door; pawl and ratchet mechanism for effecting rotation of said shaft and adapted, in conjunction with said flexible connection, to move the shaft be- 75
neath the door to hold the latter in closed position; and means for preventing accidental reverse rotation of said shaft, said means including a member movable bodily with 80
said shaft and having a projection extending beneath said diaphragm whereby to prevent rotation of said member during the bodily travel of said shaft.

12. In a dump car, the combination with a side sill; of a discharge door operating 85
shaft located behind said sill, said shaft being bodily movable and rotatable; an operating lever mounted on said shaft and movable therewith; and means adapted to travel with said shaft for preventing rotation of 90
the latter accidentally in an unwinding direction.

In witness that I claim the foregoing I have hereunto subscribed my name this 15th day of Nov. 1921.

ARGYLE CAMPBELL.

Witnesses:

UNA C. GRIGSBY,
ANN BAKER.