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F. DITCHFIELD.
CAR DOOR OPERATING MECHANISM.
APPLICATION FILED JAN. 4, 1909.

988,983.

Patented Apr. 11, 1911.

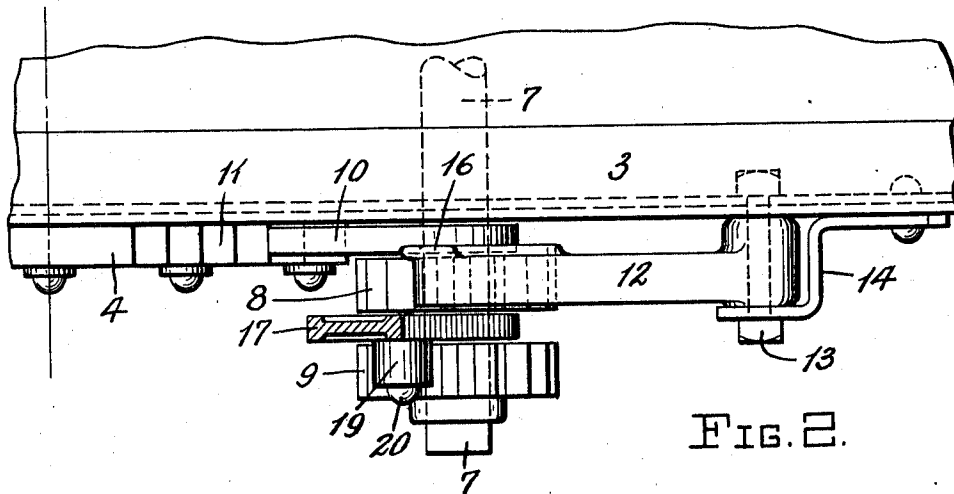


FIG. 2.

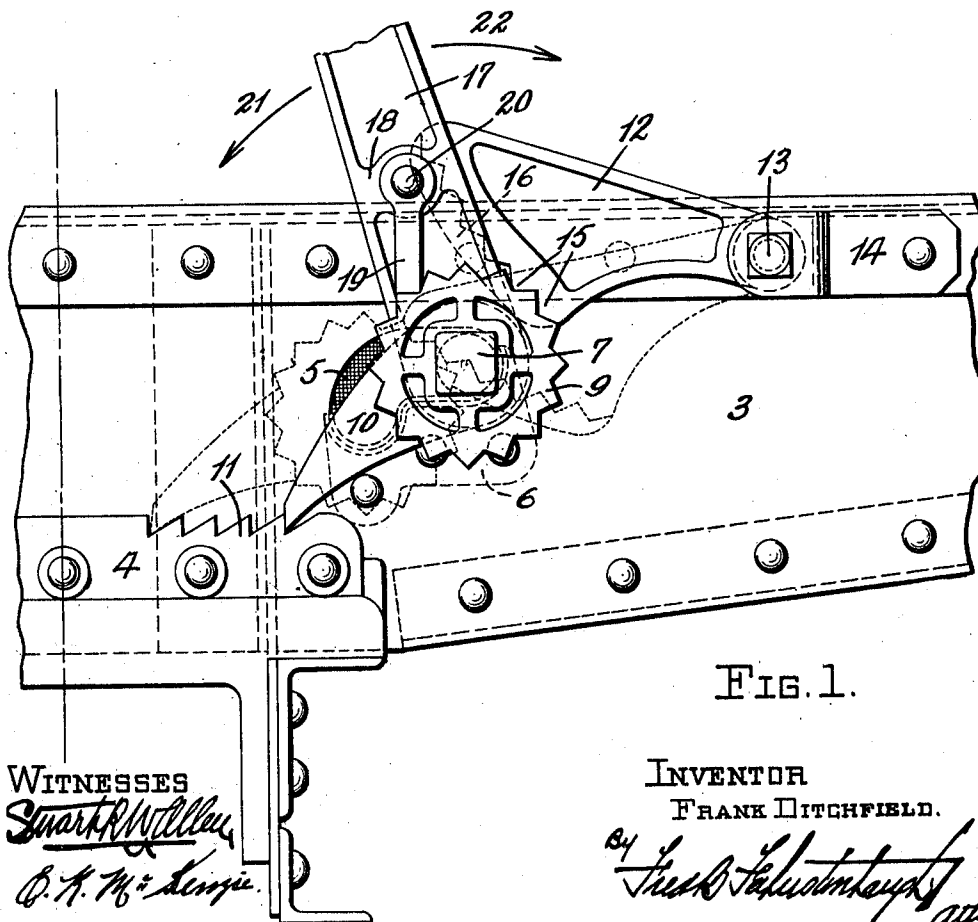


FIG. 1.

WITNESSES

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UNITED STATES PATENT OFFICE.

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CAR-DOOR-OPERATING MECHANISM.

988,983.

Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed January 4, 1909. Serial No. 470,807.

To all whom it may concern:

Be it known that I, FRANK DITCHFIELD, of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Car-Door-Operating Mechanisms, of which the following is a full, clear, and exact description.

This invention relates to improvements in operating mechanism for dump-car doors and more particularly to that class of dump-cars having a plurality of hinged drop doors operated by means of laterally moving revolving shafts extending thereunder parallel with the center sill of the car.

The main object of the invention is to provide a fixed means for locking the shaft against revolution in one direction at any part of its lateral travel.

A further object is to provide means for locking the shaft against lateral motion in one direction during the operation of raising the dumping doors.

To accomplish these objects, I provide a pivoted pawl having a toothed engaging face, said face being at an angle to the arc of the pawl's travel. A pair of ratchet wheels are fixed to the extremity of the shaft, the inner one of said wheels being engaged by the toothed pawl. A second pawl is pivotally mounted on the shaft and engages a fixed rack. An actuating lever is mounted on the shaft between the ratchets and provided with a pivoted dog engaging the outer ratchet.

In the drawings which illustrate my invention:—Figure 1 is a front elevation of the device. Fig. 2 is a plan view of the same.

In the drawings, 3 designates the end sill of a dump car and 4 a member forming part of the draft rigging. A slot 5, preferably curved as shown in Fig. 1, is formed in the web of the end sill, the edge of the slot being stiffened by a suitable member 6. A shaft 7, parallel with the center sill of the car, extends through the slot, the projecting portion thereof being squared, as seen in the drawings. A pair of star toothed ratchet wheels 8 and 9, are fixed to the squared end of the shaft and a pawl 10 pivotally mounted on the shaft between the ratchet 8 and the end sill. This pawl 10 extends downwardly toward the center line of the car and engages a fixed rack 11, the length of the rack

being approximately equal to the lateral travel of the shaft. A second pawl 12 is pivoted to the end sill, the pivot bolt 13 thereof passing through a substantially Z shaped plate 14 riveted to the sill for the purpose of reducing the bending stress on the bolt, as is well known. The pawl 12 is provided with a plurality of teeth 15 at varying distances from its pivotal center, said teeth being strengthened by a shroud 16 on the back of the pawl. It will be seen in the drawings, that the contour of the pawl 12 is such that the teeth 15 thereof will engage the ratchet wheel 8 at any point of its lateral travel. As the pivotal point of the pawl is fixed and as it engages the ratchet wheel 8 at varying distances from its pivotal center, the pawl may be described as a variable length pawl. An actuating lever 17 is pivotally mounted on the shaft between the ratchet wheels 8 and 9, said lever having a boss 18 to which a dog 19 is pivoted at 20, the dog being of such a length as to engage the teeth of the ratchet wheel 9. The arrow 21 indicates the direction of the shaft's revolution when the dumping doors are being raised, and the arrow 22 the direction when the doors are falling.

Assuming the parts to be in the relation shown in full lines, which relation indicates that the doors are in raised or closed position, the operation of lowering the doors is as follows:—The dog 19 is thrown up so that the shaft may revolve independently of the lever 17, and the pawl 10 raised clear of the rack in order that the shaft may be free to travel in the slot 5, and the toothed pawl 12 also raised clear of the ratchet wheel 8. A kick or blow to start the shaft revolving in the direction of the arrow 22, with the weight of the doors tensioning the chains, is all that is now necessary. If desired, the pawl 12 may be left in engagement with the ratchet wheel 8 while the shaft is traveling in the slot, as the meshing of the ratchet and pawl teeth will in no way hinder the travel of the shaft. However, when the shaft reaches the bottom of the slot, it will be necessary to raise the pawl 12 in order that the shaft and ratchet wheel may revolve and allow the unwinding of the door chains.

To raise the doors, the pawls are dropped into the position shown in dotted lines in Fig. 1, and the dog 19 returned to engage

ment with the ratchet wheel 9. The lever 17 is moved in the direction of the arrow 22, the dog 19 slipping over the teeth of the ratchet. The direction of the lever is now reversed, and the dog engaging the ratchet wheel 9, the shaft and ratchet wheels 8 and 9 are revolved in the direction of the arrow 21. As the ratchet wheel 8 revolves, the teeth thereof lift the pawl 12 but any motion in the reverse direction, when the lever 17 is shifted for a fresh grip, is checked by the teeth of the pawl 12 and ratchet meshing, as will be easily understood. The oscillatory motion of the lever 17 is continued, the pawl 12 engaging the ratchet wheel 8 and preventing the shaft revolving in the direction of the arrow 22. As the chains wind on the shaft, the latter climbs in the slot 5 carrying the pawl 10 with it, which slips over the inclined faces of the rack teeth, but engages their vertical faces to prevent the shaft slipping down in the slot. As the shaft climbs in the slot, the ratchet 8 raises the pawl 12 which, as before described, is constructed so as to mesh therewith at any point of its travel. This continues until the parts regain the positions shown in full lines.

For a more complete understanding of the operation of the dumping doors and the connection and relation between the same and the shaft 7, reference may be had to Letters Patent No. 890,224, granted to me June 9th, 1908, for dump cars. The drawings in the present application depict the invention applied to a car constructed according to the above mentioned patent but it is obvious that the same may be applied to any dump car having a laterally moving, revoluble, operating shaft.

Having thus described my invention, what I claim is:—

1. A car door operating mechanism comprising a rotatable shaft operating in a slot, a ratchet mounted on said shaft, and a pawl fixed at its pivotal point and having a series of teeth for engaging the ratchet during the lateral movement of the shaft in said slot, substantially as described.

2. A car door operating mechanism comprising a rotatable shaft operating in a slot, a ratchet fixed to said shaft, and a fixed pivoted pawl adapted to engage the ratchet during the entire lateral movement of the shaft in said slot, substantially as described.

3. A car door operating mechanism comprising a rotatable shaft having lateral movement in a slot, a gear carried by said shaft, and a variable length pawl adapted to engage said gear during the lateral movement of the shaft in the slot, substantially as described.

4. A car door operating mechanism comprising a shaft operating in a slot, a gear carried by said shaft, and a fixed pawl having means for engaging said gear during the

lateral movement of the shaft within the slot, substantially as described.

5. A car door operating mechanism comprising a rotatable shaft operating in a slot, a ratchet mounted on said shaft, a pivoted device fixed at its pivotal point for engaging in said ratchet during the lateral movement of the shaft within the slot, and means for preventing lateral movement of the shaft within the slot in one direction, substantially as described.

6. A car door operating mechanism comprising a rotatable shaft operating in a slot, a ratchet mounted on said shaft, and a pivoted pawl having a plurality of teeth adapted to engage the ratchet during the entire lateral movement of the shaft within the slot, substantially as described.

7. A car door operating mechanism comprising a shaft operating in a slot, a ratchet wheel mounted on said shaft, and a pivoted pawl having a plurality of teeth at variable distances from the pivotal point, substantially as described.

8. A car door operating mechanism comprising a rotatable shaft operating in a slot, a ratchet mounted on said shaft, a pivoted pawl having a plurality of teeth at variable distances from its pivotal point, and means for preventing lateral movement of the shaft in one direction, substantially as described.

9. A car door operating mechanism comprising a shaft operating in a slot, a ratchet mounted on said shaft, a pivoted pawl having teeth at variable distances from the pivotal point adapted to engage the ratchet during the lateral movement of the shaft within the slot, said pawl being adapted to prevent rotation of the shaft in one direction, and means for preventing lateral movement of the shaft, substantially as described.

10. A car door operating mechanism comprising a shaft having a ratchet mounted thereon, a pivoted pawl having teeth at variable distances from its pivotal point adapted to engage said ratchet wheel, a second ratchet wheel mounted on said shaft, an operating lever fixed to the shaft, a pawl fixed to said lever and adapted to engage the second ratchet wheel to rotate the shaft, a toothed rack, and a pawl pivotally mounted on the shaft and adapted to engage said rack, substantially as described.

11. A device of the character described comprising a shaft operating in a slot, a gear fixed to said shaft, a variable length pawl adapted to permanently engage said gear, a second gear mounted on the shaft, a lever and pawl adapted to cooperate with said second gear to rotate the shaft, a toothed rack, and a pawl cooperating with said rack to prevent lateral movement of the shaft in one direction.

12. A device of the character described

comprising a shaft operating in a slot, a gear mounted on said shaft, a variable length pawl adapted to engage said gear, a second gear mounted on said shaft, a lever and pawl device adapted to cooperate with said second gear to rotate said shaft, means for preventing rotation of the shaft in one direction, and means for preventing lateral movement of the shaft in one direction, substantially as described. 10

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

FRANK DITCHFIELD.

Witnesses:

C. W. TAYLOR,
W. S. ATWOOD.

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