No. 828,458. PATENTED AUG. 14, 1906

A. CHRISTIANSON.

CAR DOOR MECHANISM.

APPLICATION FILED APR. 21, 1906.

2 SHEETS—SHEET 1

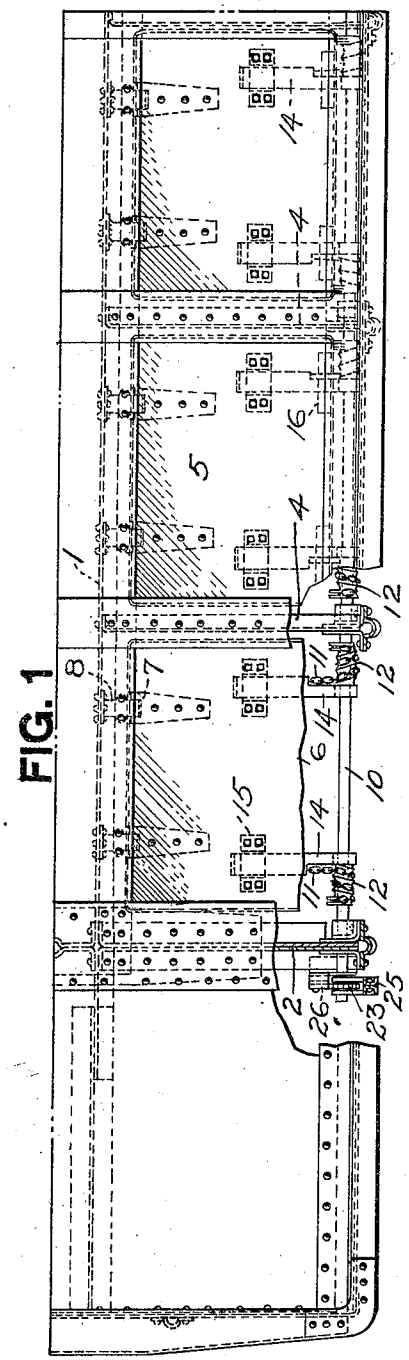

FIG. 1

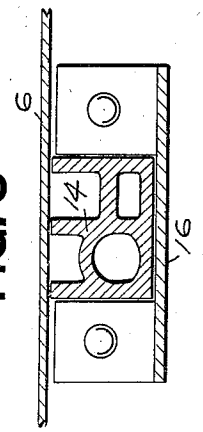

FIG. 8

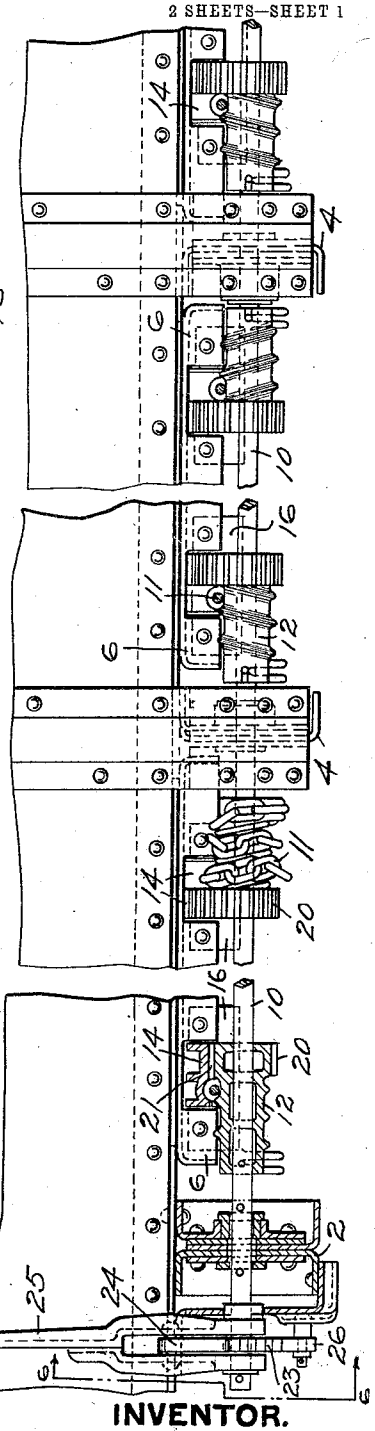

FIG. 2

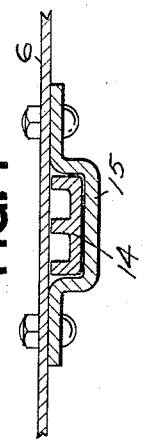

FIG. 7

WITNESSES.

J. R. Keller

Robert C. Potter

INVENTOR.

Andrew Christianson

By Key Potter & Winter

attorneys

No. 828,458. PATENTED AUG. 14, 1906.

A. CHRISTIANSON.

CAR DOOR MECHANISM.

APPLICATION FILED APR. 21, 1906.

2 SHEETS—SHEET 2.

FIG. 3

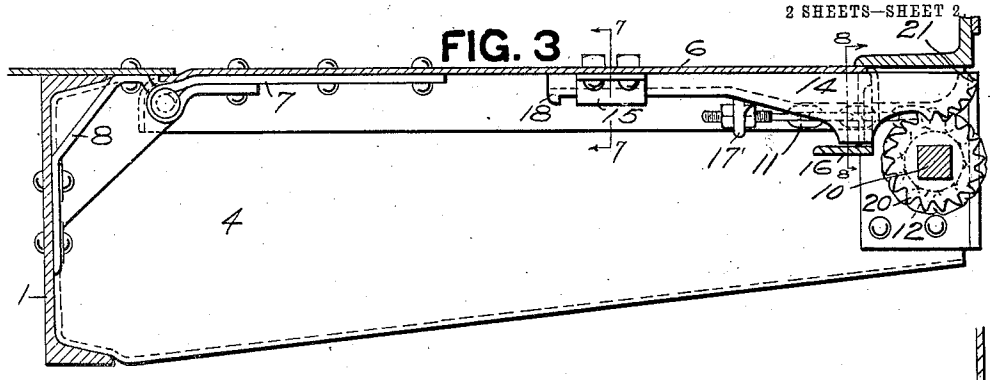

FIG. 4

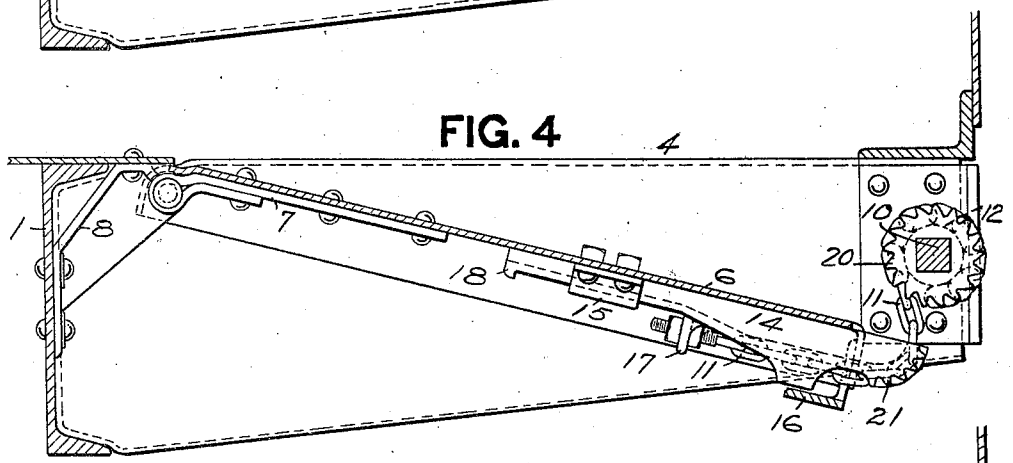

FIG. 5

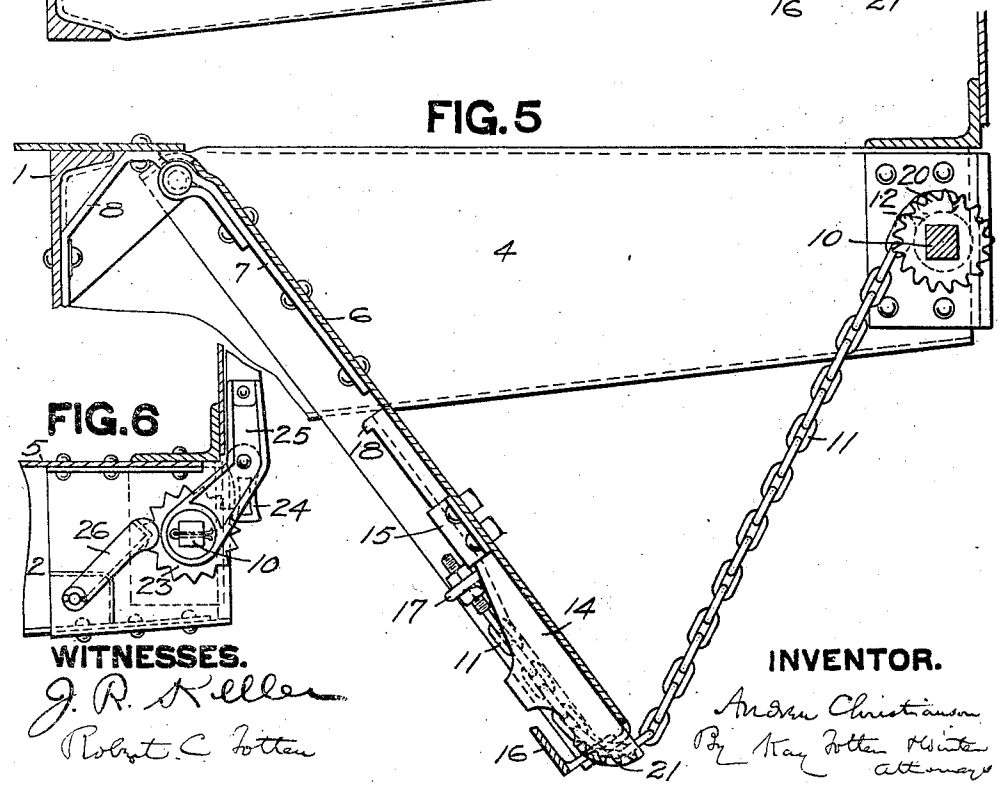

FIG. 6

WITNESSES.

J. R. Keller

Robert C. Potter

INVENTOR.

Andrew Christianson

By Ray Potter & Winter

attorneys

UNITED STATES PATENT OFFICE.

ANDREW CHRISTIANSON, OF BUTLER, PENNSYLVANIA, ASSIGNOR TO STANDARD STEEL CAR COMPANY, A CORPORATION OF PENNSYLVANIA.

CAR-DOOR MECHANISM.

No. 828,458. Specification of Letters Patent. Patented Aug. 14, 1906.

Application filed April 21, 1906. Serial No. 313,061.

To all whom it may concern:

Be it known that I, ANDREW CHRISTIANSON, a resident of Butler, in the county of Butler and State of Pennsylvania, have invented a new and useful Improvement in Car-Door Mechanism; and I do hereby declare the following to be a full, clear, and exact description thereof.

This invention relates to door-operating mechanism, and especially mechanism for operating flush horizontal drop-doors for flat-bottom railway-cars.

The object of the invention is to provide mechanism for this purpose which is simple and cheap of construction and wherein the door is held in closed position by means independent of the lifting connection, so as to relieve the latter from heavy strains.

To this end the invention consists, generally stated, of a lifting-shaft connected to the door, and independent door-locking means operable both for locking and unlocking from the lifting-shaft.

The invention also comprises certain arrangements and construction of parts, hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view, a part being broken away, of one-fourth of a metallic gondola car provided with drop-doors and showing my invention applied thereto. Fig. 2 is a side view, on an enlarged scale, of the door-operating mechanism, a part being in section. Fig. 3 is a cross-section through the car and a door, showing the same closed. Fig. 4 is a similar view showing the door when nearing closed position. Fig. 5 is a similar view showing the door open. Fig. 6 is a cross-section on the line 6 6, Fig. 2; and Figs. 7 and 8 are vertical sections taken, respectively, on the lines 7 7 and 8 8, Fig. 3.

The invention is shown applied to an all-metal gondola car provided with drop-doors, but obviously can be applied to various forms of cars. The car shown is provided with center sills 1, body-bolsters 2, and intermediate cross-bearers or floor-supports 4. The floor 5 of the car is provided with a series of drop-doors 6, the drawings showing a series of such doors extending on either side of the center sills between the body-bolsters. These doors are hinged at 7 on brackets or castings 8, secured to the outer faces of the center sills, and are arranged to have their outer edges drop to discharge the load. As illustrated, a door is placed between adjacent pairs of cross-bearers or floor-supports.

The door-operating mechanism comprises a lifting-shaft 10, extending longitudinally of the car and mounted in suitable bearings secured to the outer ends of the body-bolsters and cross-bearers. This shaft is connected to the door by suitable lifting means, such as the chains 11 or other suitable flexible connectors, which are arranged to wind upon drums 12, secured to the winding-shaft. The rotation of the shaft winds up these chains and closes the door in the usual way.

In order to lock the doors in closed position and take the strain off the lifting-chains, I provide suitable latches or bolts 14, mounted to slide in suitable bearings or hangers 15 and 16, secured to the lower faces of the doors and arranged to be projected outwardly beyond the edges of the doors and engage suitable stationary supports, such as the lifting-shaft itself. The winding-chains 11 are attached directly to these latches or bolts—such as to lugs 17, formed on the latter—so that in the final closing movement of the door the chains pull outwardly practically in a direct line on these latches and slide them outwardly into engagement with the supporting means. Suitable stops 18 prevent the latches from being pulled too far out.

The ends of the latches may be projected above any suitable stationary support, such as a stirrup or hanger secured to the car-body, but preferably are supported from the shaft 10 itself, such as by resting upon suitable gears 20, secured to the shaft. These gears engage teeth 21, formed on the outer ends and lower faces of the latches and serve to push said latches positively inwardly to unlock the door when the winding-shaft is rotated backwardly. The winding-shaft can be rotated by any suitable mechanism, the drawings showing for this purpose a ratchet-wheel 23 secured to the shaft and engaged by a pawl 24 on a lever 25. A pawl 26 is also provided for locking the shaft against accidental rotation.

The operation of the mechanism is as follows: When the doors are open, the rotation

of the shaft 10 winds up the chains 11, thus raising the doors. As the doors approach a horizontal position the chains pull outwardly practically in a straight line, thus drawing the latches 14 outwardly and projecting their ends above the shaft 10 or other support. The engagement of the gears 20 with the rack-teeth 21 guide and assist the latches in their outward movement. When fully closed, the weight of the lading is taken off the chains 11 and the doors are supported from the shaft 10. To unlock the doors, the shaft 10 is rotated backwardly, and the interengaging gears 20 and racks 21 cause the latches to be pushed inwardly until they clear the shaft 10, when the doors drop to open position by gravity.

The door-operating mechanism described comprises a minimum number of parts and is therefore economical of construction and application. All of said parts are of simple construction, so that derangemeent is practically impossible, and the doors are positively locked in closed position, so that there is no danger of the accidental discharge of the lading on account of the failure of the winding-chains or their connections. All of the operating mechanism is located practically within the outer face of the car sides, so that it is protected from injury, and this also permits a maximum width of car-body.

While in the drawings the mechanism is shown applied to horizontal doors mounted on pivots extending longitudinally of the car, it will be understood that the same arrangement can be used with inclined doors or doors mounted on pivots extending transversely of the car, the lifting-shaft in the latter case also extending transversely of the car. Furthermore, while the latches are shown as supported by gears on the winding-shaft it will be understood that they might be supported by any suitable stationary support, such as hangers secured to the car-body.

What I claim is—

1. Car-door mechanism comprising a winding-shaft, flexible connections therefrom to the door, and door-locking means operated from said winding-shaft.

2. Car-door mechanism comprising a lifting-shaft, connections therefrom to the door, locking means for the door, and connections from the lifting-shaft for operating said locking means and arranged to move the same to locking position at the end of the closing movement of the door.

3. Car-door mechanism comprising a winding-shaft, flexible connections therefrom to the door, locking means for the door, and connections from the winding-shaft for operating said locking means.

4. Car-door mechanism comprising a lifting-shaft, connections therefrom to the door, a latch for locking said door in closed position, and connections from the lifting-shaft for operating said latch and arranged to move the same to locking position at the end of the closing movement of the door.

5. Car-door mechanism comprising a winding-shaft, flexible connections therefrom to the door, a latch for locking the door in closed position, and connections from the winding-shaft for operating said latch.

6. Car-door mechanism comprising a winding-shaft, flexible connections therefrom to the door, and independent means actuated from the shaft for supporting the door in closed position from the shaft.

7. Car-door mechanism comprising a lifting-shaft, connections therefrom to the door, and a latch arranged to support the door in closed position from the lifting-shaft.

8. Car-door mechanism comprising a lifting-shaft, connections therefrom to the door, means for supporting the door in closed position from said shaft, and connections whereby said supporting means is operated from the lifting-shaft.

9. Car-door mechanism comprising a lifting-shaft, connections therefrom to the door, a latch for supporting the door in closed position from said shaft, and connections for operating said latch from said shaft.

10. Car-door mechanism comprising a lifting-shaft, connections therefrom to the door, a lock for supporting the door in closed position, and lock-actuating connections between said lock and the means connecting the door and shaft and arranged to move the lock to locking position at the end of the closing movement of the door

11. Car-door mechanism comprising a winding-shaft, a flexible connection therefrom to the door, a latch for supporting the door in closed position, and connections between said latch and flexible connection.

12. Car-door mechanism comprising a lifting-shaft, a flexible connector between the same and the door, a lock mounted on the door and arranged to support the same in closed position, and connections between said lock and said flexible connector and arranged to move the same to locking position at the end of the closing movement of the door.

13. Car-door mechanism comprising a winding-shaft, flexible connections therefrom to the door, means for locking the door in closed position, and connections operated by the winding-shaft for releasing said lock.

14. Car-door mechanism comprising a lifting-shaft, connections therefrom to the door, a lock for supporting the door in closed position, and a rack-and-pinion connection between the shaft and said lock.

15. Car-door mechanism comprising a lifting-shaft, connections therefrom to the door, a latch arranged to support the door in its closed position, a pinion on the shaft, and a rack on the latch engaging said pinion.

16. Car-door mechanism comprising a lifting-shaft, a flexible connector between the same and the door, a lock on the door, connections between the lock and said flexible connector, and other connections operable from the lifting-shaft for releasing said lock.

17. Car-door mechanism comprising a lifting-shaft, a locking-latch on the door, a flexible connector connecting said shaft and lock, and interengaging means between the shaft and latch for retracting the latter.

In testimony whereof I, the said ANDREW CHRISTIANSON, have hereunto set my hand.

ANDREW CHRISTIANSON.

Witnesses:
C. M. STEIRS,
W. R. COWDEN.