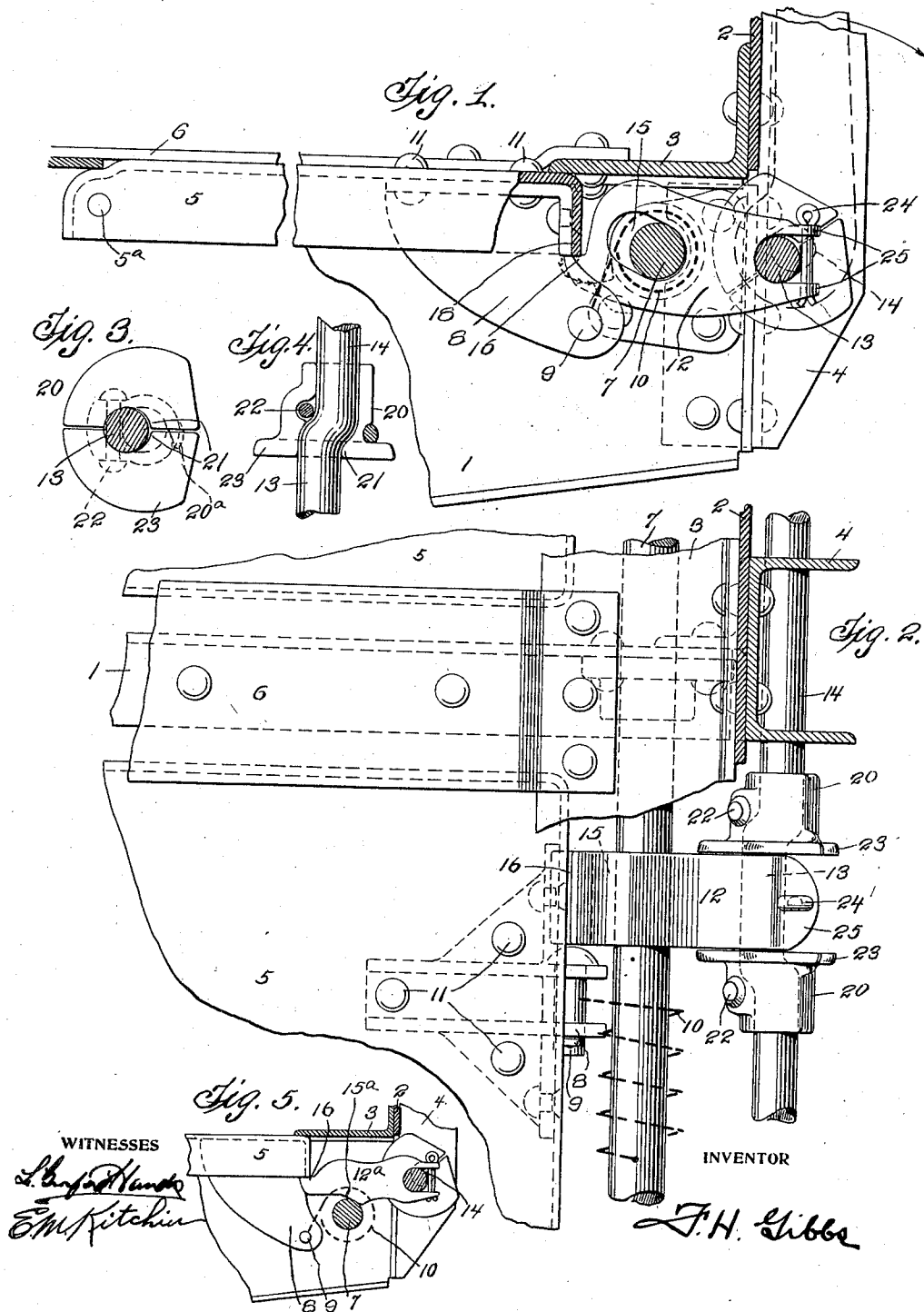


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DOOR OPERATING MECHANISM.
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UNITED STATES PATENT OFFICE.

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DOOR-OPERATING MECHANISM.

1,030,808.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FREDERICK H. GIBBS, residing at city, county, and State of New York, and being a citizen of the United States, have invented certain new and useful Improvements in Door-Operating Mechanism, 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 fragmentary view showing partly in full lines and partly in section the invention applied to a single door of a flush bottom car. Fig. 2 is a fragmentary view showing portions of two doors in plan with the floor and side angle and car side plate broken away. Fig. 3 is a sectional view taken through the shaft hereinafter referred to as the locking shaft. Fig. 4 is a plan view of one half of the retaining collar shown in Fig. 3, with the locking shaft in plan. Fig. 5 is a view, showing slightly modified construction.

The object of the invention is to provide means for raising to closed position the flush bottom doors of gondola cars and to lock said doors in closed position, the locking means comprising cams which are adapted to be actuated by a locking shaft which is independent of the door operating shaft, the cams riding upon said door operating shaft and being sustained thereby in operative position.

It is well known that a door operating shaft in this type of cars possesses great strength, but chain held doors are apt to sag more or less, owing to the stretching of the chains, due to weight of the load, etc. To avoid the gap between the upper surface of the door and the fixed inwardly projecting portion of the car side under which the outer ends of the doors ride, the invention has been produced whereby a locking shaft, independent of the door operating shaft, is provided, which locking shaft need only be sufficiently strong to actuate the locking cams to close the doors, after which the

weight of the doors is carried, principally, by the door operating shaft thus relieving the locking shaft of the weight of the load.

Referring to the parts which are illustrated after the conventional type of gondola car constructions well known in the art:—1 indicates a cross-bearer which may be either a pressed or rolled member of any suitable section, extending either entirely across the car or from the center sills outwardly toward the sides of the car, as may be desired.

2 is the side plate which, with the intumed angle 3 and stakes 4, forms the bottom portion of a plate girder side sill and car side combined, this being also of conventional form in metallic car construction, and it is understood that the side plates 2, angles 3 and stakes 4, form parts of the side walls which in themselves constitute side sills in the sense in which the word sill is generally understood as being a supporting member.

5—5 are the flush bottom doors and 6 is a cover plate extending transversely of the car and longitudinally of the cross-bearers 1, said cover plate extending entirely across the cars or terminating at the center sills, as may be desired.

The doors 5 are hung at their inner ends on pintles extending through the pintle bearings 5^a and supported either from the center sills or from any other convenient supports at their inner ends, these supports being now well known in steel car construction and requiring no special illustration.

Extending longitudinally of the car and beneath the angles 3 is a door operating shaft 7 which may be operated in any well known manner, there being no special feature of novelty connected with the operation of this shaft. Connected with the operating shaft 7 and extending to horns 8 or to pins 9 carried thereby, chains 10 are provided which are adapted to wind upon the door operating shaft 7 or on suitable drums carried on said operating shaft. The horns 8 being secured by rivets 11 to the doors 5, it is evident that rotation of the shaft 7 in a clock-wise direction, as shown, will lift said doors to closed position, as is common in this class of cars.

Riding on the shaft 7 are cams 12 or 12^a, as may be desired, which cams 12—12^a are slotted at their outer ends and pass over

cranked portions 13 of the locking shaft 14, which locking shaft may pass through the stakes 4 or may be carried at the side of the car in any suitable manner. The cams 12 are slotted longitudinally and obliquely, as shown in Fig. 1 and the slot 15 riding on the door operating shaft 7 and said cams 12—12^a being provided with shoulders 16 which project inwardly below the depending flange 18 of the door 5. At each side of the cams 12 are retaining collars 20, comprising two parts shown in detail in Figs. 3—4 which parts are so formed as to interlock with the cranked portion 13 of the locking shaft 14. Each of said collars 20 is provided with a nose 21 which, as shown in Fig. 4, meets and inter-locks with the inwardly bent cranked portion 13 of the shaft 14, while rivets 22 unite the collar sections, and said rivets 22 extend upon the opposite side of the bent portion of the cranked locking shaft 14 so that the rivets 22 and the nose 21 cooperate to prevent a longitudinal shifting of collars 20. The collars 20 are provided with outstanding flanges 23 between which are held the cams 12, thereby retaining the cams 12 in fixed position on the cranked portions 13 of the locking shaft. As many of the cams as may be desired may be placed along the line of the shafts 7—14, though preferably one is provided at each outer corner of each door.

The modified construction shown in Fig. 5 illustrates a locking cam 12^a which is provided with an eccentric locking face and is adapted to ride on the door operating shaft 7 and be operated by a locking shaft 14, the difference in this respect being that the device of Fig. 5 may be added after the door operating shaft 7 is in position, and a part of the car, while the device shown in the other figures should be applied before the car parts are assembled.

The cams 12—12^a are both held in position by cotters 24 which pass through perforations in the outward extensions 25 of the bifurcated end of the cams 12—12^a, this being permissible owing to the fact that practically no strain is placed on the cotters.

The operation of the device is as follows:—To close the doors, the door operating shaft is rotated in the proper direction thus drawing the doors upwardly through the shafts 10 and horns 8 connected with the doors until doors are in approximately closed position, after which the locking shaft 14 is rotated so that cranked portions 13 thereof will impinge the inner face of the opening of the bifurcations at the outer ends of the cams 12—12^a thereby throwing said cams inwardly. As the cam 12 is provided with an obliquely upwardly disposed slot 15 it is evident that said cam will ride upwardly and under the depending flange 18 of the door 5 thereby squeezing said door

5 to its tightest closed position, the shoulder 16 of the cam 12 meanwhile impinging the depending flange of the door for this purpose.

In the modified construction, the operation is the same except that the cam 12^a rides on the shaft 7, the eccentricity of its lower face permitting it to travel inwardly and upwardly beneath the door 5, shown in fragment in said Fig. 5, the inclined face 15^a riding on the door operating shaft 7, forcing said cam 12^a upwardly while in contact with the depending flange of the door 5.

Thus it will be apparent that the door operating shaft carries the usual shaft winding mechanism for closing the door, after which the door is sealed and locked by supplemental locking means, independently operable yet of such relatively frail proportions as to be within economical construction, the door operating means being adapted to close the door and the locking means being adapted to tighten such closure and lock the door in closed position. Thus practically the major weight of the load is carried by the door operating shaft at all times and the locking means may be readily manipulated without releasing the winding shaft thereby avoiding probability of accident through careless manipulation.

One of the collars 20 is provided with a projecting nose 20^a shown in dotted lines in Fig. 3, adapted to be seated in a corresponding socket in the cooperating member 20 and this nose and socket cooperating with rivet 22 to lock the collar members in proper position.

What I claim is:

1. In a flush door operating device, a swinging door, a door operating shaft, means for closing said door through rotation of said shaft and a supplemental locking means carried on said shaft when the door is open.

2. In a flush bottom car, a swinging door, a winding shaft, a longitudinally slidable cam supported on said winding shaft when the door is open and means for sliding said cam to locking position below said door.

3. In a flush door operating device, a swinging door, a door operating shaft, means for closing said door through rotation of said shaft, a locking shaft, door tightening means operated by said locking shaft and rockable on said door operating shaft.

4. In a flush bottom car, a swinging door, closing means therefor, including a door operating shaft, a supplemental shaft and longitudinally slidable means, resting on said operating shaft when the door is open, said means being adapted to be projected inwardly and upwardly to tighten said door in closed position.

5. In a device of the character described, a swinging door, means for closing said door

comprising a door operating shaft, a supplemental crank shaft substantially parallel with the first mentioned shaft, and slidable locking means actuated by both said shafts, said locking means impinging said door.

6. In a device of the character described, a swinging door, a door operating shaft, means connecting said door with said operating shaft for closing said door through rotation of the shaft, longitudinally slidable door tightening and locking means riding on said shaft and a supplemental shaft adapted to operate said door tightening and locking means.

7. In a device of the character described, a swinging door, a rotatable shaft adapted through chain connections to close said door, a rockable shaft paralleling said first mentioned shaft and means impinged by both shafts adapted to tighten and lock said door.

8. In a door operating device, a swinging door, a horn depending from and forwardly of said door, a door operating shaft, chain connection between said door and said horn, a cam slidable on said door operating shaft adapted to impinge said door, and means adapted to slide said cam under said door.

9. In a door operating device, a swinging door, a horn depending from and forwardly of said door, a door operating shaft, chain connection between said door and said horn, a cam slidable on said door operating shaft adapted to impinge said door, means adapted to slide said cam under said door, and to rock said cam on a fixed support.

10. In a door operating device, a swinging door, a door operating shaft, flexible connection between said door and shaft adapted to close said door through rotation of the shaft, and rockable and slidable means carried on said shaft adapted to impinge said door in combination with means for actuating said slidable means.

11. In a device of the character described, a swinging door, a door operating shaft, connections between said shaft and said door for closing the door, slidable and rockable means extending transversely in contact with said shaft and adapted to impinge and to lock said door in closed position, and a shaft adapted to operate said means, and stops on said shaft adapted to hold said means in operative position.

12. In a device of the character described, side sill or supporting girder, a rotatable door operating shaft below and within the principal vertical member of said girder, a swinging door, a winding chain actuated by said door operating shaft, door closing means slidable transversely over and in contact with said shaft and inwardly of said girder.

13. In a device of the character described, a door closing means comprising a rotatable shaft connected by flexible connection

with the door and a door tightening and locking means normally resting on said shaft and slidable transversely of said shaft.

14. In a device of the character described, a swinging door, a rotatable shaft, a connection between said shaft and said door for operating the door, and rockable and slidable means resting on the shaft when the door is open and adapted to be moved transversely of said shaft to lock said door in closed position.

15. In a device of the character described, means for closing a door including a shaft, and door tightening and locking means normally resting on and slidable transversely of said shaft.

16. In a device of the character described, means for closing a door, including a shaft, and door tightening and locking means slidable transversely of said shaft and supported upon said shaft when the door is in open position.

17. In a device of the character described, cross-bearers, a shaft extending longitudinally of the car through said cross-bearers, flexible connections from said shaft, a door united to said flexible connections and adapted to be closed thereby through rotation of said shaft in combination with slidable and rockable locking means carried on said shaft.

18. In a device of the character described, a door, means for closing said door comprising a rotatable shaft, means positively connecting said door and shaft, and means riding on said shaft when the door is open and supported thereby adapted to tighten and lock said door in closed position.

19. In a device of the character described, a swinging door, means for closing said door comprising a rotatable shaft, and means positively connecting said door and shaft, means riding on said shaft when the door is open and adapted to lock said door in closed position and means actuating said first mentioned means.

20. In a device of the character described, a swinging door, means for closing said door comprising a rotatable shaft, a rockable shaft paralleling said rotatable shaft and longitudinally slidable and rockable means cooperating with both of said shafts for closing and locking said doors.

21. In a device of the character described, a swinging door, means for closing said door comprising a rotatable shaft, a supplemental crank shaft paralleling the first mentioned shaft and means resting on said first shaft when the door is open and adapted to be actuated by said crank shaft for locking said door in closed position.

22. In a door operating device comprising a shaft, a crank shaft, longitudinally slidable means actuated thereby cooperating

with the first mentioned shaft for locking a door in closed position.

23. A lock for a flush bottom car door comprising a rockable and slidable member adapted to impinge said door when in relatively closed position and to lock said door in said closed position, a door lifting shaft serving as a support for said member, and means positively connecting said door with said shaft.

24. A lock for a flush bottom car door comprising an operating shaft, a rockable and slidable member adapted to impinge said door when in relatively closed position to lock said door in said closed position, said means being supported upon, and slidable transversely of, the door operating shaft.

25. In a door operating device, the combination comprising a door, a support therefor, a crank-shaft in proximity to the free edge of said door, a longitudinally movable slide secured on said crank-shaft, and a fixed support in proximity to said door on which said slide is adapted to move in closing the door.

26. In a door operating device, the combination comprising a door, a support therefor, a crank-shaft in proximity to the free edge of said door, a longitudinally movable rockable member on said shaft, and means secured in proximity to said door adapted

to cause said rockable member to impinge said door at predetermined times.

27. In a door operating device, the combination comprising a door, a support therefor, a crank-shaft in proximity to the free edge of said door, said crank shaft being provided with stops and a transversely slidable latch positioned between said stops, said latch being adapted to be projected below a closed door.

28. In a door operating device, the combination comprising a door, a support therefor, a crank-shaft in proximity to the free edge of said door, said crank-shaft being supported beyond the door and a longitudinally movable latch on said shaft adapted to be projected below a closed door.

29. In a door operating device, the combination comprising a door, a support therefor, a crank-shaft in proximity to the free edge of said door, separately formed stops on said shaft held in juxtaposition to the crank portion of said shaft and a longitudinally movable latch on said shaft in proximity to said stops.

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

FREDERICK H. GIBBS.

Witnesses:

C. A. HUMPHRIES,

FRANK V. COOPER.