

B. J. O'NEILL & M. VOORHEES.
J. CONNERS, ADMINISTRATOR OF M. VOORHEES, DEC'D.
CAR DOOR.

968,073.

APPLICATION FILED AUG. 24, 1908.

Patented Aug. 23, 1910.

2 SHEETS—SHEET 1.

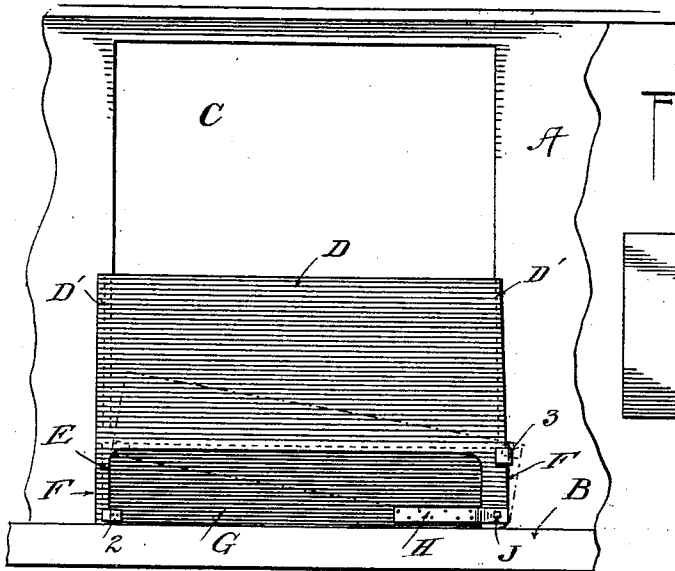


FIG. 1.

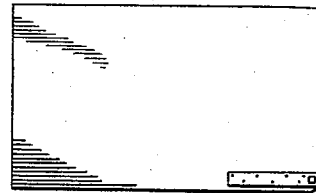


FIG. 4.

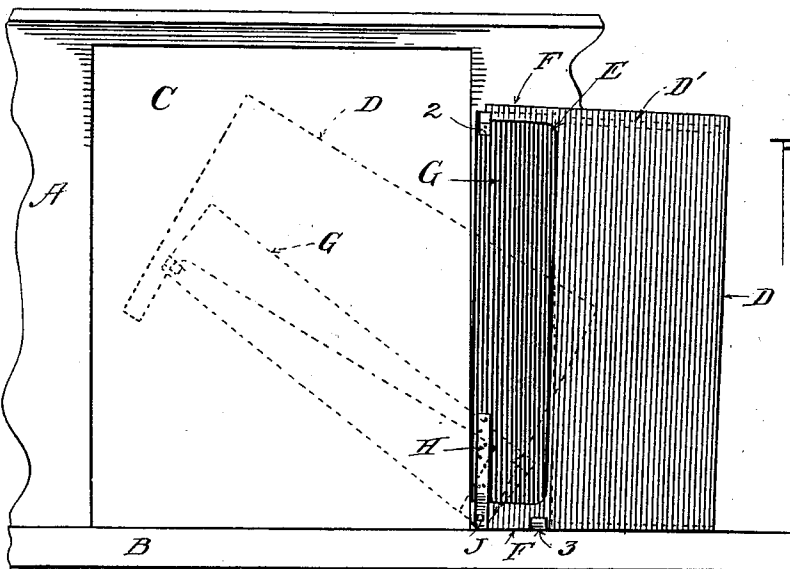


FIG. 2.

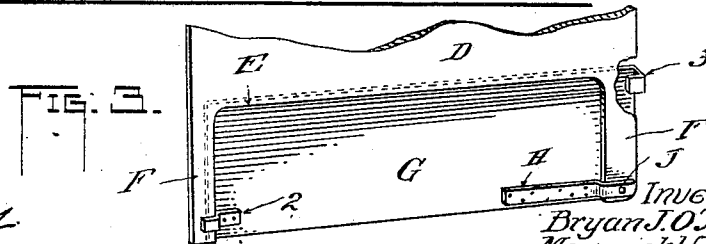


FIG. 3.

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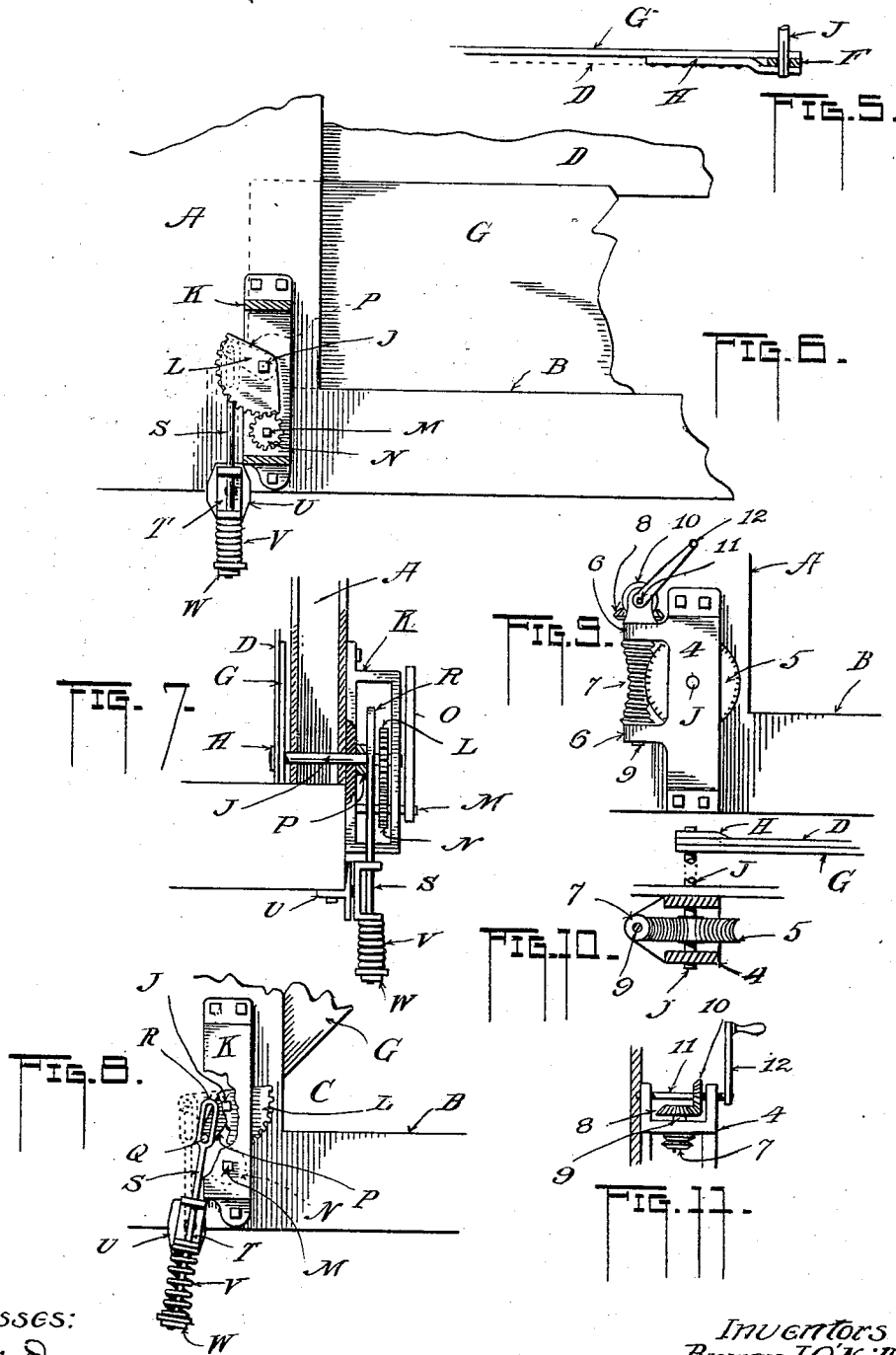
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UNITED STATES PATENT OFFICE.

BRYAN J. O'NEILL AND MAVERICK VOORHEES, OF PEORIA, ILLINOIS; JAMES CONNERS
ADMINISTRATOR OF SAID VOORHEES, DECEASED.

CAR-DOOR.

968,073.

Specification of Letters Patent. **Patented Aug. 23, 1910.**

Application filed August 24, 1908. Serial No. 450,114.

To all whom it may concern:

Be it known that we, BRYAN J. O'NEILL and MAVERICK VOORHEES, citizens of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Car-Doors; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to inside doors for freight cars and generally known as grain doors.

One of the objects of the invention is to provide a practically indestructible door for a freight car adapted for use with all classes of cargoes such as grain, coal and ordinary freight.

A further object is to provide a steel door which cannot be damaged by freight handlers and which can be manipulated readily from a position outside the car whether the car is loaded or empty.

A further object is to provide a steel door and use in connection therewith a simple mechanism by which it may be easily and freely operated.

A further object is to provide a door of two portions operated by mechanism common to both.

The invention also relates to certain details of construction as will be pointed out in the following description and form the subject matter of certain of the claims.

Before entering upon the description of my invention I shall outline the disadvantages attending the use of the ordinary grain door in use at this time constructed of wood usually the cheapest kind. In installing such a door it is the practice to nail the boards to the door-jamb inside the car. When the car reaches its destination the boards are knocked loose and broken out of the car to release the load. This method damages the car considerably in that the door-jamb is broken and split and even the floor is often torn up and the lumber of which the door is constructed is of course rendered entirely useless and therefore represents a total loss of the money invested in it. The door-jamb after continued use are so filled with nails and split by the nailing operation that they must be renewed at considerable expense. It is generally known

that elevator owners and others who furnish and put grain doors of this kind in place before the car can be loaded, are allowed several dollars by the railroad whose property the car is for each car handled for the cost of the lumber and the time used so that at the end of the year the railroad company has paid out a considerable sum of money running as a matter of fact, into thousands of dollars as a dead loss; there being no salvage whatever to say nothing of the expense of repairing the damaged cars. In view of this it is our purpose herein to provide a metal door that will be a permanent fixture and which cannot be injured in any way except that caused by collisions or other unavoidable accidents. And even in the case of a collision where the door is damaged it can be straightened and used again. But in the event that it is so badly damaged as to be beyond repair it still has a value since it can be sold to be worked over at the steel mills.

Having clearly shown the advantage in the use of such a door we will proceed to its description, aided by the accompanying drawing in which—

Figure 1 is an elevation of the inner side of a portion of the wall of a car showing the door opening and our improved door in place covering the lower portion of the said door opening. Fig. 2 is a similar view with the door occupying its raised or open position leaving the door opening free. Fig. 3 is a perspective view of a portion of the door which is preferably constructed of two parts. Fig. 4 is an elevation of a door consisting of but a single part. Fig. 5 is a plan of a portion of the door shown in part section. Fig. 6 is an elevation of a portion of the outside of a car showing the door opening and the mechanism employed to swing the door. Fig. 7 is a transverse section of a car showing a part of the door, the shaft which carries it, and the mechanism by which the door is operated. Fig. 8 is a view similar to that in Fig. 6 with the parts placed in a different position. Fig. 9 is an elevation of a modified form of door operating mechanism. Fig. 10 is a plan of the same. Fig. 11 is a side elevation of part of the same.

The side of the car is represented by the letter A, B indicates the floor of the car, and C the door opening.

D represents an upper or main portion of

our improved door which preferably consists of a plate of steel which extends from the floor to the desired height usually about the middle of the height of the door opening and whose ends rest against the door jamb. It is provided with a recess E on its bottom as plainly shown in several of the figures by which an opening of the desired height say 10 or 12 inches is created, said opening preferably extending substantially the full width of the door opening although this is not absolutely necessary. As shown in the drawing a leg F is left at each end of this section which legs constitute supports therefor. A smaller door section indicated at G is next provided which is adapted to entirely cover the recess E and extends slightly above and beyond it at each end; this being indicated in broken lines in Figs. 1 and 3 and partially by the continuous lines in Fig. 6, said section G preferably lying between the section D and the door jambs, there being indicated in broken lines in Figs. 1 and 2, a strip D' at each end of the section D to rest against the door jamb and of a thickness substantially equal to the thickness of the section G whereby the body of said section D will be held a sufficient distance away from the door opening to permit the section G to have free movement between it and the jambs.

At H is a horizontally disposed member suitably secured to the section G as, for instance, by means of rivets and having a free end off-set from the main riveted portion as clearly shown in Figs. 3 and 5 to admit one of the legs F of the section D to enter between it and the section G. A horizontal rock shaft J extends through the wall of the car, its inner end having the member H rigidly secured thereto in any good manner as, for instance, by having a square hole in said member to fit a square end of the shaft, the latter also having the section G similarly held thereon. The shaft also passes through the leg F just mentioned there being a hole (not shown) in said leg slightly larger in diameter than the diameter of the shaft by which said section D can move independent of said shaft. Said portion G as viewed in Figs. 1 and 3 carries on its inner surface near its outer free end a stop 2 which is adapted to engage the edge of the door section D to raise the latter. As the section G is raised the stop, when it reaches the position indicated in broken lines in said Fig. 1, will meet the lower edge of the section at the recess E and a continued movement of the said section G will cause it to then raise the section D as shown in dotted lines in Fig. 2, and, still continuing the movement the door will be finally brought to a point where, after its weight has passed over the pivot point at the shaft J, it will naturally be carried by its own weight

to its open full line position indicated in Fig. 2. In addition to its weight at this position where it is now stationary, the door D is beveled at the pivoted end in such a manner as to carry its weight still farther behind the shaft so that no jarring of the car, as in switching, will cause the door to drop to the closed position. Unless some provision is made for controlling the upper section D when raised by the lower one it will fall to the open position by its own weight since, as before intimated, it is free to move upon the said shaft J. We provide for controlling the section by securing to the pivoted end of the section G, near its top, an ear or stop 3 to catch the section D as it passes over the center. This stop 3 also is provided for raising the section D in the closing movement of the door, and the stop 2 will limit the fall of that section in said closing movement.

The means employed for operating the door includes any suitable housing or bracket 4 supported on the car and through which the shaft J extends; there being a worm wheel secured to said shaft. Said housing or bracket is provided with two arms 6 through which extends a shaft 9 provided with a worm 7 to engage the worm-wheel there being a beveled pinion 8 on the shaft 9 of the worm with which a similar gear 10 engages and which is carried on a horizontal shaft 11 turned by means of a crank 12. In using the worm and the worm-wheel the door will be maintained in any position in which it may be placed and such a structure admits of a very free and easy handling of said door. Furthermore this form of gear will safely lock the door at any position to which it may be raised and there will be no danger of accident to those working about the car since the door cannot fall upon them.

We are aware that car doors have been made in sections each being operated separately although they are but little use when the grain rests against them as they are almost immovable without some special operating mechanism and to our knowledge no mechanism has been employed by which to manipulate them in the easiest manner. In using a door of single section or even two sections of considerable area the friction to be overcome due to the grain resting thereagainst is very great but by the use of proper leverage it may be handled readily. The weight of grain resting upon the door is first slightly released by raising the lower section of the door as explained. This creates an opening through which the grain passes to remove the friction and weight on the main portion which can then be readily lifted. The lower door portion being smaller and therefore having a comparatively small weight of grain upon it, is very

readily raised and by raising it the weight of grain on the large door portion is released permitting easy movement of it also.

While a worm and worm wheel form of power gearing is old in many arts, it is believed to be new as applied to a grain door in the manner herein shown and described and whether applied to a door of a single part or one of a plurality of parts. A grain door having an immense weight of loose grain lying against it is moved by the older methods with the greatest difficulty, as above stated but with our form of mechanism the work is made easy and the doors are never damaged.

Not only is the new structure provided herein as to the grain door itself advantageous, but the form of gear applied to the door constitutes an advancement in the art and provides advantages not heretofore produced by any other. These advantages include ease of operation, simplicity of structure and safety to those engaged in working about the car as pointed out. In addition to this we are not aware of a door constructed like ours nor one of two sections one operated by itself and then in conjunction with the other through a common mechanism at a single operation.

Having thus described our invention, we claim:—

1. A car door, consisting of two door sections, together adapted to form a complete closure for a door opening, there being a recess in one of them, the other of them partially covering that having the recess to close said recess, means for operating the covering section and means on said section adapted, after a predetermined movement thereof, to engage and cause the other section to move in unison therewith.

2. A car door consisting of two door sections, operating means connected with one of them to move it, there being a recess in the other of said sections covered by the first described one, and means associated with one of the sections to engage and lift the other of the sections after the recess has been exposed.

3. A car door, consisting of a plurality of sections, one of said sections having a transverse recess at its lower end, the other of said sections normally covering the recessed end of said first mentioned section, means for moving said last mentioned section the distance of the recess across said recessed section, and means associated with said last mentioned section for engaging the wall of the recess of said recessed section, whereby said sections are moved in unison.

4. The combination of a railway car with its door opening, an inside grain door to cover said opening consisting of two independent sections, a shaft carried on the car at the lower corner of the door opening, and

adapted to oscillate, one of the sections being rigidly secured thereto, the other section adapted to freely rock adjacent to the first described one independent of the shaft and adapted to be operated when the said first described one has been moved a predetermined distance, means to cause said operation, and intermeshing gearing carried by the shaft and the car to oscillate said shaft.

5. In combination, a car door consisting of a plurality of sections, a pivotal member connected with one of said sections, means on said section for engaging and moving the other of said sections after a predetermined movement thereof, an operating member, and gearing connecting the operating and pivotal members.

6. The combination of a railway car with its door opening, an inside grain door to cover said opening consisting of two independent sections, a shaft carried on the car at the lower corner of the door opening to oscillate, one of the sections being rigidly secured thereto, the other section adapted to freely rock adjacent to the first described one independent of the shaft and adapted to be moved when the first described one has been moved a predetermined distance, means for imparting said movement, a worm wheel carried by and secured to the shaft and a worm carried by the car to mesh with and turn said worm-wheel and oscillate the shaft.

7. An inside grain door for railway cars consisting of a single section adapted to extend in its longest measurement across the door opening and adapted to pivot at its lower edge at one side of the said door opening, a shaft extending into the car at one side of the opening above the floor line and affixed to the door to carry and tilt the same, a worm-wheel on the shaft and a worm therefor carried both outside of the freight containing space.

8. The combination with a car having a door opening in its wall, of a door normally extending across the opening just within said wall and pivoted near one end to swing vertically parallel to the wall, a worm wheel operatively connected with the pivoted end of the door and carried outside the freight containing space, a worm engaging the said wheel and also carried outside said space, and means to rotate said worm.

9. The combination with a car having a door opening in its wall, of a door normally extending across the opening just within said wall and pivoted near one end to swing vertically parallel to the wall, a worm wheel rigidly connected with the pivoted end of the door, a worm engaging said wheel, and means for rotating the worm, both the worm wheel and the worm being outside the containing space of said car.

10. The combination with a car having a

door opening in its wall, of a door normally extending in its longest measurement across the opening and adapted to pivot vertically at its lower corner parallel to the wall to expose said opening, a shaft to carry and tilt the door, a worm wheel operatively connected with the shaft and lying outside the freight containing space, a worm engaging said wheel and also lying outside said space, and means to rotate the worm.

11. The combination with a car having a door opening in its wall, of a door normally extending across the opening and adapted to pivot at its lower edge and tilt vertically parallel to the wall toward one side of said opening, a shaft rigidly connected with the door and having its bearings in the wall, a worm wheel rigidly carried by the shaft and lying outside the freight containing space of the car, a worm engaging said wheel and also lying outside said space, and means to rotate the worm.

12. A car door comprising two normally independent door sections, a shaft to which one of them is secured, the other of them adapted to rock on said shaft, mechanism to partially rotate the shaft and adapted to rock the same to carry the door to any position, and means on one of the sections to engage the other to move it when the first section has moved a predetermined distance.

13. A car door comprising two door sections, a shaft to carry and control one of them, the other section adapted to have free pivotal movement on said shaft, mechanism to rock the shaft and its door section, and devices on one of the sections to engage the other and cause the movement of the free section during a movement of the controlled section.

14. A car door comprising an upper and a lower section, there being a recess in the said upper section covered by the said lower section, a shaft for tilting the latter, means to rock the shaft, there being provision on the lower door-section to engage the said upper section at the time and for the purposes described.

15. A car door comprising an upper section having a recess in its lower edge and adapted to rest upon the floor of the car, a lower door-section adjacent thereto to close the recess, a rock-shaft to carry and raise said lower section to expose the recess, means to rock the shaft, and means on the lower section to engage and raise said upper section.

16. A car door comprising an upper section having a recess in its lower edge, and supported in position at the door opening, a lower door section adjacent thereto to cover the recess, a rock shaft to carry said lower section, means to rock the shaft, means on the lower section to engage and raise the upper section in the opening movement of the

door and other means in said lower section to engage said upper section for the closing movement.

17. In combination with a car, a car door comprising an upper and a lower section, there being an opening in the lower portion of the first normally covered by the second, a pivotal member carried on the car connected with one of the door sections the other section having free pivotal movement, a worm wheel secured on the pivotal member, a worm carried on the car in engagement with the worm wheel, and means on one of the sections to engage the other whereby to move the free section in a movement of the other said section.

18. In combination with a car, a grain door comprising an upper pivoted section and a lower pivoted section movable relatively there being a space between the upper section and the floor of the car, the lower section adapted to normally cover said space, a rock-shaft to which the lower section is secured, and mechanism outside the car and carried by said shaft to partially raise the lower section independent of the upper section and devices on said lower section to engage the upper section.

19. In a car door the combination of an upper and a lower section thereof, a shaft in permanent engagement with one of the sections and forming a pivot for the other section, means to rock the shaft, and means on one of the sections to operate the pivoted section from the section carried by the shaft.

20. In a car door the combination of an upper and lower section, there being a recess beneath said upper section adapted to be closed by the lower section, a shaft extending through both sections and having the lower one of the two rigidly connected therewith, the upper section being free to pivot thereon, and a member secured to the lower section and to one end of the shaft and inclosing the pivoted portion of the upper section between it and the said lower section, and means to rock the shaft.

21. A car door comprising two sections pivoted adjacent to one another and adapted to have pivotal movement relative to one another to swing across and away from the door opening, a shaft having a position at the side of the door-opening near the floor, means to rock the shaft from a position outside of the car, and means carried by one of the sections to limit its movement relative to the other section and to carry said other section in the opening or closing movement.

22. A car door comprising a section to rest on the floor of the car and having a recess in its lower edge, a second section also adapted to rest upon the car floor and arranged to cover the recess, a shaft forming a pivot for both of the sections at one side of the door opening near the floor, and having the sec-

ond described section secured thereto, means on the shaft to rock it from a position outside the car, and means carried by said second section to engage and lift the first described section from either of its extreme positions.

23. In combination with a car, an inside door of two sections pivoted substantially at the same point at one side of the door opening, a shaft to which one of them is affixed, the said shaft extending outside the car, a worm wheel on said shaft, a worm to engage the worm wheel, and means carried by one of the sections to engage the other to impart movement from the operated section to the other section.

24. In combination with a car, an inner door of two sections pivoted at the side of the door-opening near the floor of the car and adapted to shift upon one another, both

being pivoted substantially at the same point, one of said sections having an opening in its lower portion, the other being normally free to pivot and adapted to cover said opening, a shaft on which one of the sections is secured, the same extending to the outside of the car, a worm wheel carried by the shaft, a worm in engagement therewith, a shaft to carry the worm, and means on the one section to impart movement to the freely pivotal section in certain movements of the section carried by the shaft.

In testimony whereof we affix our signatures, in presence of two witnesses.

BRYAN J. O'NEILL.

MAVERICK VOORHEES.

Witnesses:

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L. M. THURLOW.