(No Model.) J. A. HAGAN, Dec'd., 2 Sheets—Sheet 1.

J. F. THOMS, Administrator.

GRAIN CAR DOOR MECHANISM FOR FREIGHT CARS.

No. 304,683. Patented Sept. 2, 1884.

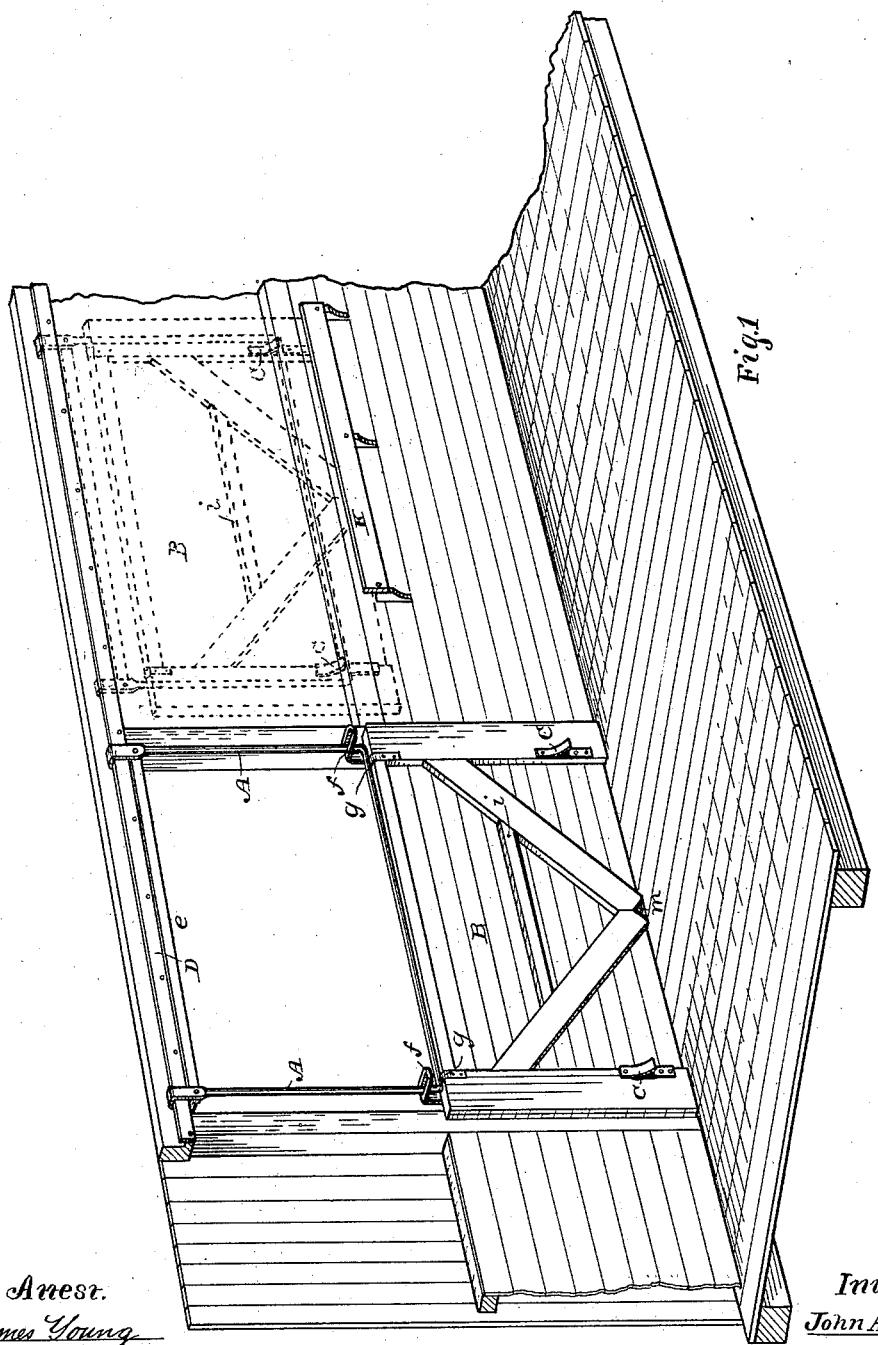

Fig. 1

Witnesses.
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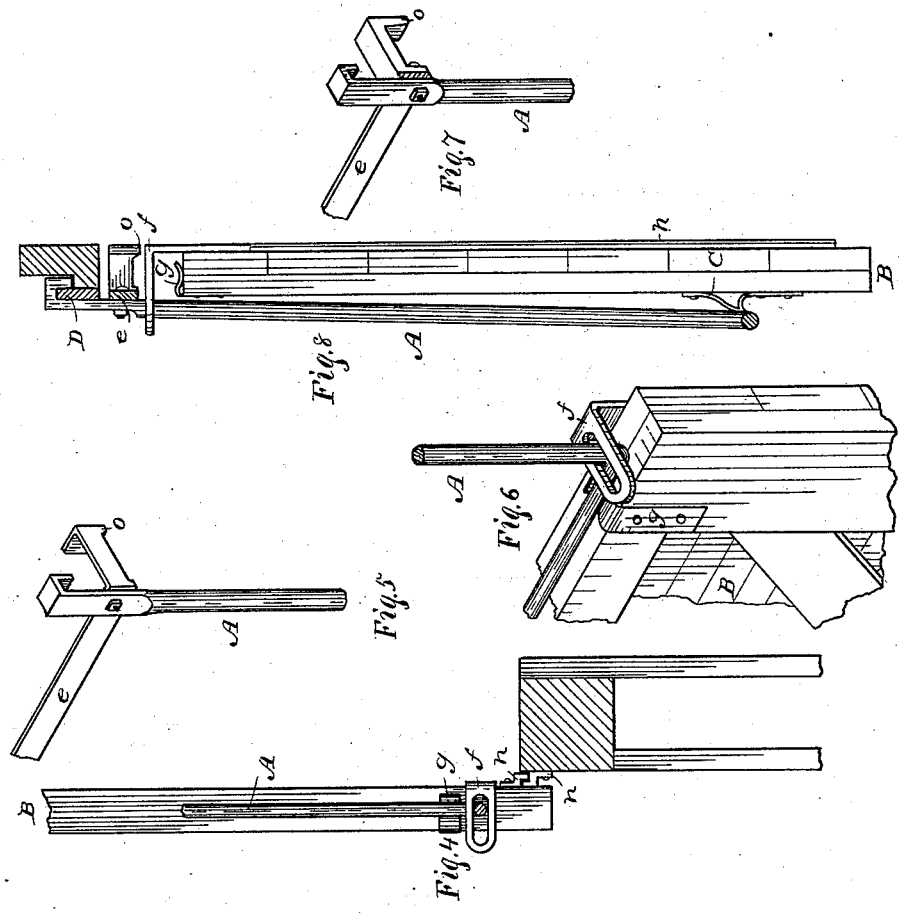

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UNITED STATES PATENT OFFICE.

JOHN A. HAGAN, OF THREE RIVERS, MICHIGAN, (JAMES F. THOMS ADMINISTRATOR OF SAID HAGAN, DECEASED,) ASSIGNOR OF ONE-HALF TO THE SHEFFIELD VELOCIPEDE CAR COMPANY, OF SAME PLACE.

GRAIN-CAR-DOOR MECHANISM FOR FREIGHT-CARS.

SPECIFICATION forming part of Letters Patent No. 304,683, dated September 2, 1884.

Application filed February 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. HAGAN, of Three Rivers, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Grain-Door Mechanism for Use in Freight-Cars, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a portion of the inside of an ordinary box or freight car with my improved door applied; Fig. 2, an end view of the door when closed and secured; Fig. 3, an end view of the door when raised; Fig. 4, a plan view of a portion of the door, showing the manner of securing the door when closed, and the grain-door guides. Fig. 5 is an enlarged perspective view of the upper portion of the door-hanger and a portion of the hanger-brace; Fig. 6, a view of the lower portion of the hanger, the hanger-guide, and the concaved straps; Fig. 7, an enlarged perspective view of the door-hanger and hanger-brace, showing a formally different construction; and Fig. 8, an end view of the grain-door when nearly open, the door-hanger, hanger-brace, and door-rail being in section.

The object of my invention is to provide improved extra doors to be used in the better class of box or freight cars, their use being to close tightly the openings in the sides of the cars when they are used for transporting grain; and my invention relates, particularly, to the class of grain-doors disclosed in my United States Patent No. 285,258—that is to say, to grain-doors which rise up and slide to one side out of the way.

The grain-doors now in general use are often temporary structures, which are put in while the car is being loaded with grain, and secured by being nailed to the car-door posts. The preferred method of unloading cars of grain is to shovel the grain through the car-door into a hopper arranged to receive it; but when these temporary doors are used they cannot be removed conveniently, on account of being secured, as described. Consequently, they are generally so broken up while being removed that they are unfit for further use, and when they are new they are liable to be lost or stolen, on account of not being secured to the car. These temporary doors, however, are often preferred, because when they are securely nailed to the car-door posts no grain can leak and be lost, whereas with the forms of grain-doors now in use, other than the temporary doors, there is often a serious loss of grain on account of the door not fitting in the grooves in which it slides, or because it has grooved door-guides at one end only, or because it is not properly secured when closed, so that it opens slightly by the jarring of the car when it is in motion, whereby much grain is lost. My improved grain-door is so constructed that when closed both its ends rest in guides that are absolutely grain-tight, (this tightness not being affected by any shrinkage of the lumber of which the door may be made,) and the fastenings used to secure it when closed cannot be loosened by the motion of the car, as will be hereinafter more fully explained. I construct and apply my improved extra doors so that they are permanently attached to the car, and are therefore not liable to be lost or stolen, and yet are attached in such a manner that when the cars are used for transporting other freight than grain these extra doors can be slid to one side, and neither the doors nor their hangings will be in the way of loading or unloading miscellaneous freight, nor be liable to be injured by it.

My improvements are applicable to any kind of car in which grain can be transported, and may also be useful elsewhere than in cars.

The objects of my invention, therefore, are to provide a first-class and permanent grain-door, and particularly, first, to so construct the door that when it is closed and secured it will be absolutely grain-tight; second, to so construct the door that when the car is loaded with grain it can be opened from the outside and moved entirely out of the way; third, to so construct the door and its guides that should the door shrink from being made of unseasoned lumber, neither its tightness nor security will be affected; fourth, to so construct the door-hangings that when the door is closed

they secure it in place, so that it cannot become loosened by the motion of the car; fifth, to so construct the door-hangings that they will support the grain-door out of the way of miscellaneous freight when grain is not being transported; sixth, to so construct the door-hangings that they securely attach the grain-door to the car, so that it cannot be lost or stolen.

My improved grain-door has a vertical and horizontal movement both in a plane parallel with the door-opening, and when it is closed it rests in and against metallic guides, which allow it to be operated easily, while preventing loss of grain. It is opened by raising it vertically, and when raised a distance equal to about its own height may, if desired, be slid to the side of the door-opening, where I provide that it may be secured entirely out of the way of ordinary freight.

Referring to the letters on the drawings, the grain-door B is preferably constructed with vertical end pieces, to which are securely nailed the matched sheathing forming the main portion of the door. This is further strengthened by the diagonal braces shown in Fig. 1, the braces resting on a metallic lift similar to that described in my said United States patent. The strip *i* forms a convenient hand-hold for raising the door; but the hand-hold may be nearer than illustrated to the lower edge of the door, which by preference rests on the ordinary metallic door-threshold.

The door-hanger A, preferably of round iron, rests on top of the door B when it is closed, but engages with the metal hooks C C on the lower portion of the door and sustains its weight when open, as shown by the dotted outline in Fig. 1. The upper ends of the hanger are hook-shaped and are permanently engaged with the metal door-rail D, on which they slide. The door-rail is preferably a flat bar of iron, and is permanently secured above the door-opening, as shown in Fig. 1.

e is a brace, preferably of a flat bar of iron, between the upper ends of the door-hanger A. It lies immediately below the door-rail, and thus prevents the hanger from being unhooked from the rail.

Secured to the door, near its corners, are the hanger-guides *f f*, of either malleable iron or steel castings or forgings. Their upper ends are slotted to allow the door-hanger to swing inward sufficiently, so that the door can be raised, and they also secure the door to the hanger, thus preventing the door from being removed from the car.

g g are metallic bearing-straps with concaved upper surfaces, as shown by Fig. 8, in which the lower portion of the door-hanger rests when the door is closed and secured. They should be sufficiently elastic, so that when the door-hanger has been placed in the position shown in Fig. 2 (it then being held down by the brace *e* abutting against the door-rail D) some force is required to remove it, thereby preventing the door from becoming loose by the motion of the car, this motion making any form of cam-fastening insecure.

A top end view of the grain-door guides is shown at *h h*, Fig. 4. They are preferably of wrought-iron rolled to shape. One is secured at each end of the door, and they engage with similar pieces secured to the door-posts of the car, as shown.

The operation of my improved mechanism is as follows: Suppose it is desired to open the door when it is closed and secured, as shown in Figs. 1 and 2, the operator being in the car, the door-hanger is first pulled out of the concaved surfaces of the bearing-straps *g g* to the position indicated by the dotted lines in Fig. 2. The door may then be raised by the hand-hold *i*, being guided vertically by the guides *h h* and the sides of the door-hanger. As the door is raised it passes behind or on the outside of the door-hanger, as shown by Fig. 8, and when nearly at its full height the tops of the hanger-guides *f f* strike the dependent portions *o* on the L-shaped ends of the brace *e*. This swings the door-hanger back to the vertical position and automatically engages the lower horizontal part of it with the hooks C C, as shown in Fig. 2, when the door thus suspended may be slid to the position indicated by the dotted outline in Fig. 1, the bracket K retaining it securely in place. When the car is loaded with grain and it is desired to raise the door from the outside, the door-hanger is pushed out of the concaves in the bearing-straps, as already explained, when, by means of a bar inserted in the outer recess of the door-lift *m*, Fig. 1, as explained in my said patent, the grain-door may be raised sufficiently to allow a portion of the grain to run out, (the usual practice,) or it may be raised to its full height, the door-hanger then engaging automatically with the hooks, in the manner already explained, and permitting the door to be moved on the door-rail, so as to leave the door-opening entirely clear. To close the door the order of operation is simply reversed.

In the ordinary service in which cars are used the grain-doors only require to be opened or closed at so considerable intervals that the expense necessary to produce a movement as nearly automatic as would be required in a machine is unwarranted, and therefore my improved mechanism is only designed to insure that the grain will be carried without loss, and that the door will be in place, ready for use when required. To secure the latter, however, it is necessary to protect it against careless use, and the door-hanger, besides preventing the door from being removed from the car, securing it in a convenient position when open, and securing it absolutely grain-tight when closed, serves the further purpose of protecting the upper edge of the door from being cut away to allow the use of grain-spouts that have not been constructed at the proper height; but it does not obstruct the doorway, or interfere with the use of those that are

properly constructed. The metallic door-guides also, in addition to their allowing the door to be easily operated, while preventing the loss of grain, serve the further purpose of preventing the door from being nailed to the car-door posts—a practice found necessary with the form of grain-door fastenings generally used.

While I consider the construction just described the best, it would be possible to make formal changes without departing from the spirit of my invention—such as arranging the door-hanger to secure the door when it is closed, and to protect its upper edge without either the door or hanger, or with only one of them, having the movements described, so that I do not limit myself to the exact construction shown or described; but I recommend that construction as the best.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as set forth, of the door, the hanger, the stationary support on which the hanger slides, and the guides secured to the door that slide vertically on the hanger.

2. The combination, substantially as set forth, of the door, the swinging door-hanger, and guard that locks the door when closed, and the guides secured to the door through which the hanger extends.

3. The combination, substantially as set forth, of the grain-door having a vertical or horizontal movement, a door-hanger having a horizontal movement in a plane parallel with the door-opening, and metallic straps having concaved upper surfaces arranged to receive the door-hanger, substantially as described.

4. The combination, substantially as set forth, of the door, the hanger to which the door is connected, the guides on the door that slide vertically on the hanger, and the supports for holding the door in its elevated position.

5. The combination, substantially as set forth, of a grain-door having a horizontal movement in a plane parallel with the door-opening, a door-hanger having a similar movement, devices for connecting the hanger to the door at the top and bottom thereof, and a door-rail secured within the car, and forming the support for the door-hanger.

6. The combination, substantially as set forth, of a grain-door hanger, a grain-door having a vertical movement in a plane parallel with the door-opening, and similar angle-irons forming metallic door-guides and secured to the door and door-posts, and arranged to interlock with each other.

7. The combination, substantially as set forth, of a grain-door having a vertical movement, a door hanger or support, and devices that automatically connect the hanger and the door and support the latter in its elevated position when it is raised to its full height.

8. The combination, substantially as set forth, of a grain-door having a vertical and horizontal movement, both movements being in a plane parallel with the door-opening, a grain-door mechanism consisting of a door-rail secured within the car, a door hanger or support which moves on the door-rail, and devices that automatically engage with and support the door when raised to its full height, and secure it when it is closed.

In testimony whereof I have hereunto subscribed my name this 6th day of February, A. D. 1884.

JOHN A. HAGAN.

Witnesses:
L. B. HARWOOD,
O. P. SLOTE.