No. 720,368. PATENTED FEB. 10, 1903.

E. F. LUCE.

BOX CAR DOOR.

APPLICATION FILED SEPT. 6, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

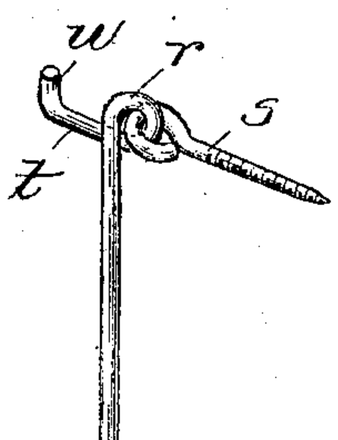
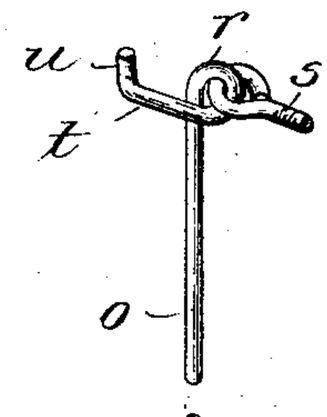
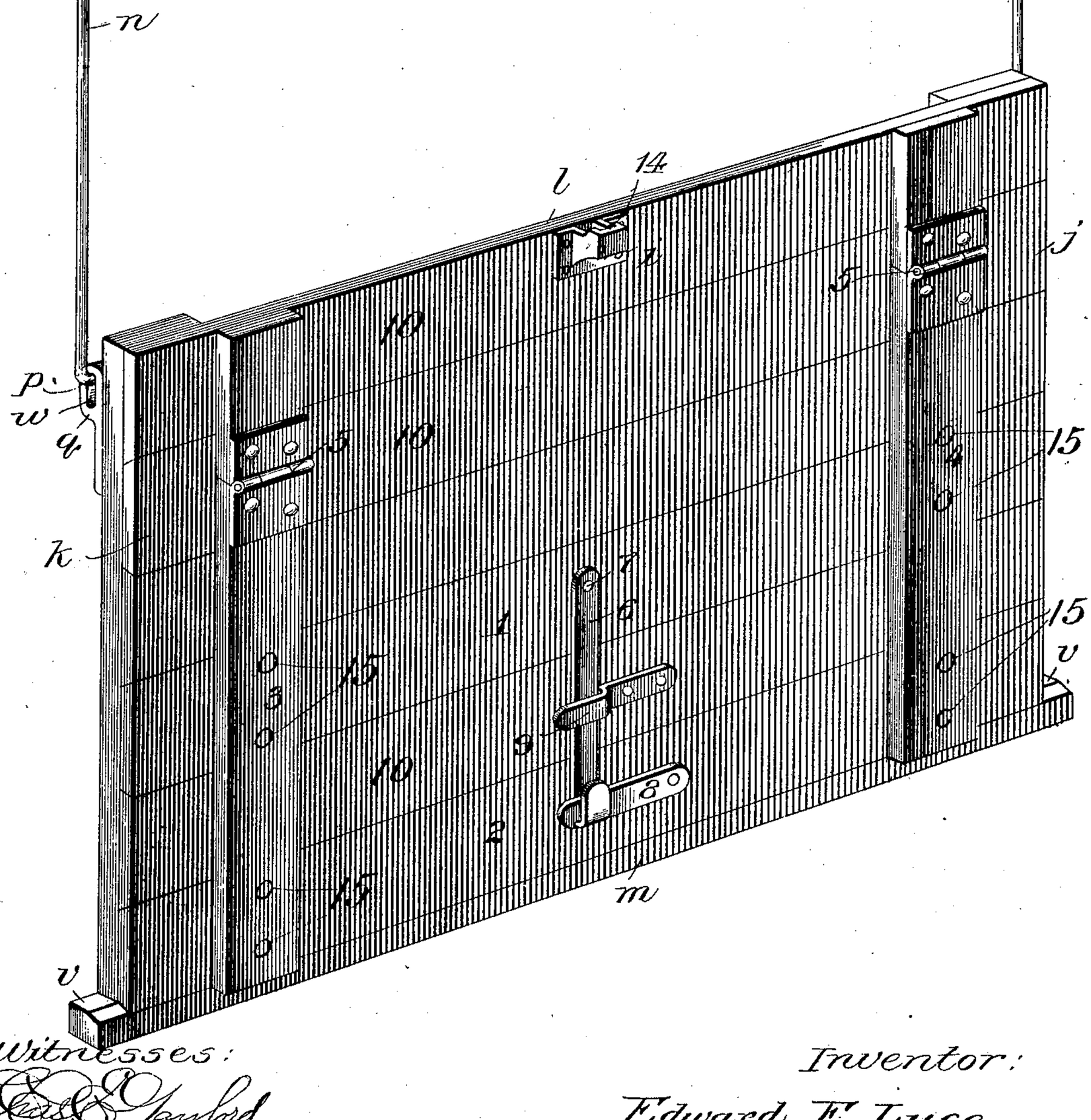


Fig. 1.





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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

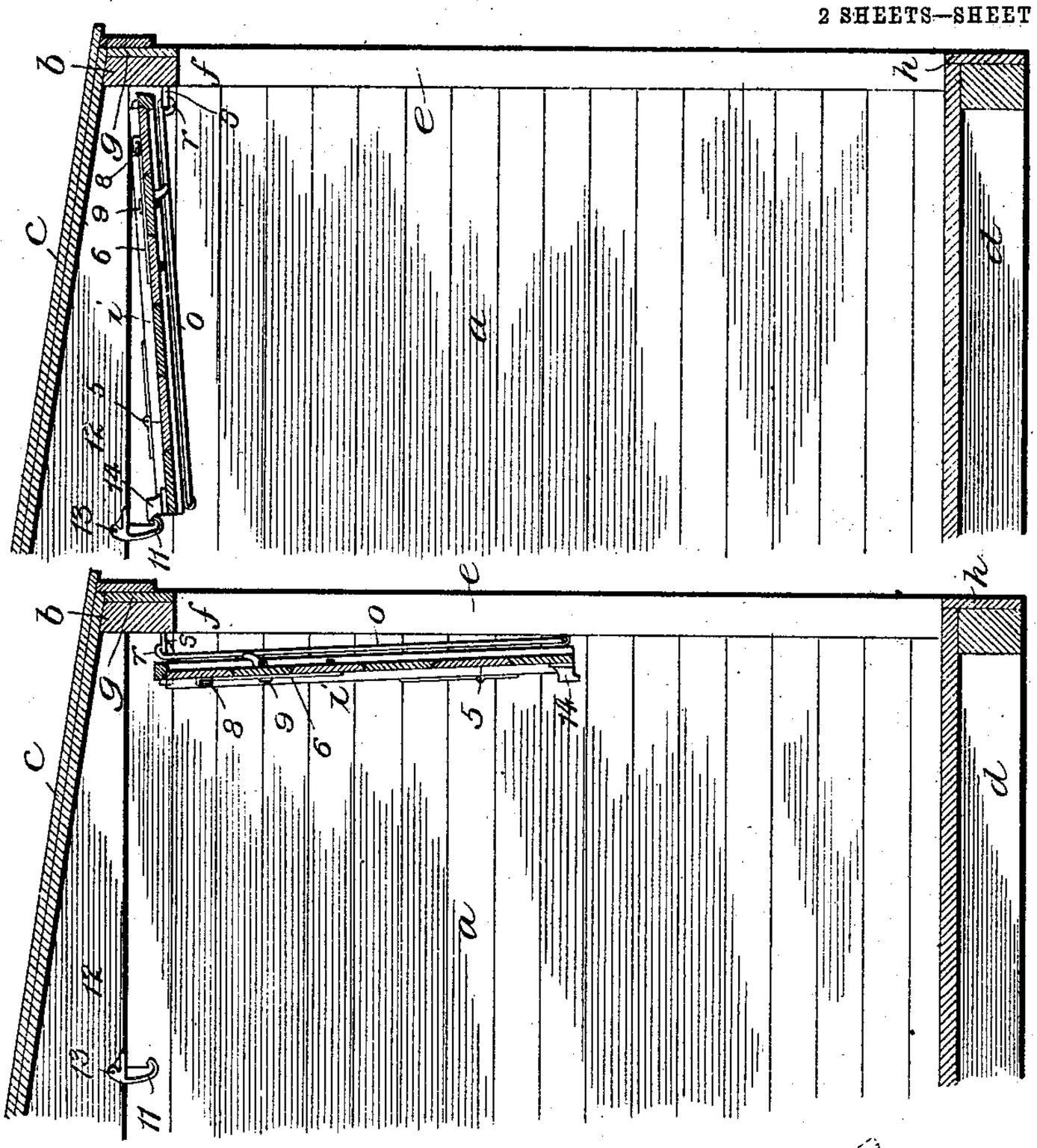
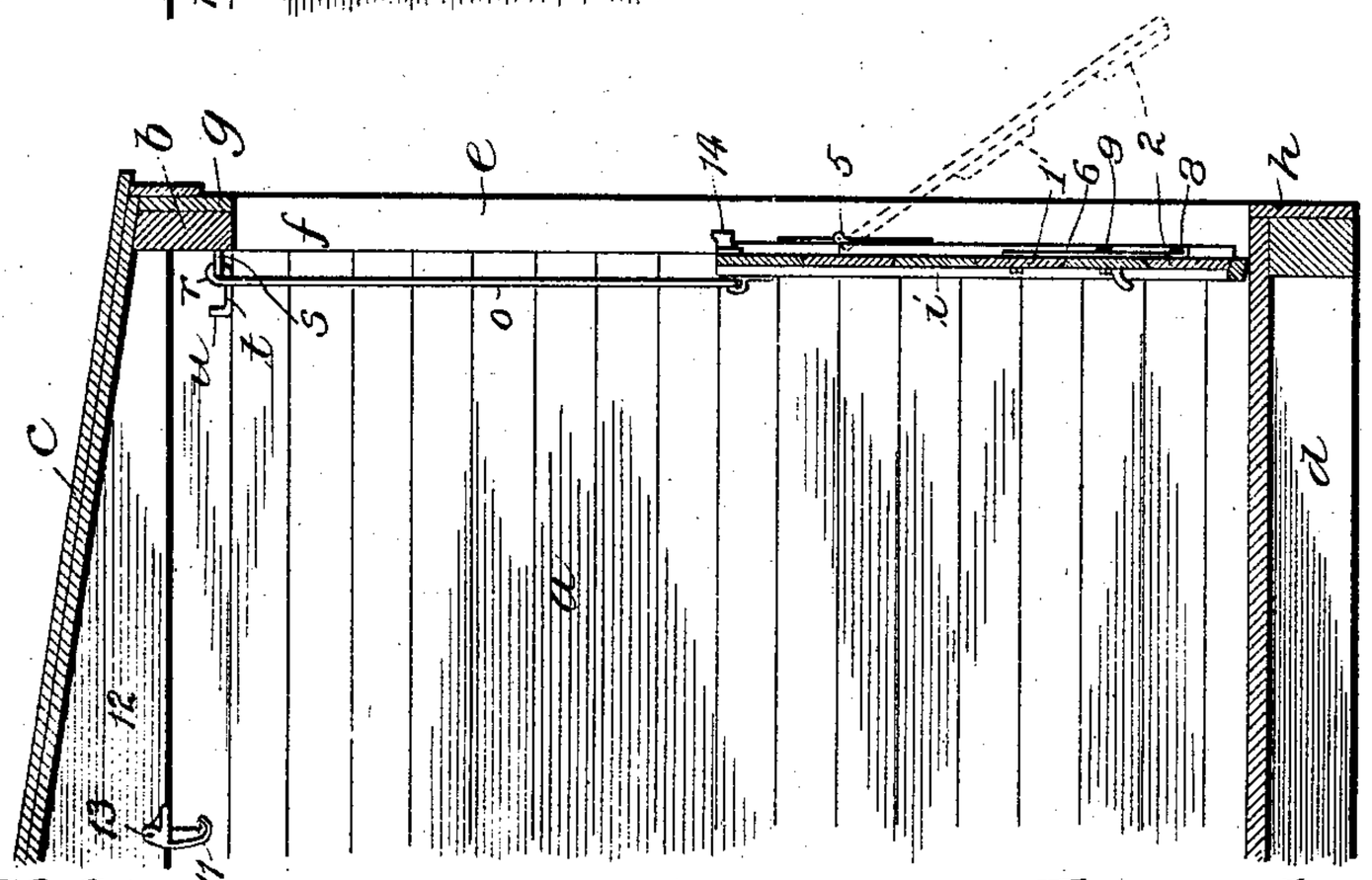


Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE.

EDWARD F. LUCE, OF CHICAGO, ILLINOIS.

BOX-CAR DOOR.

SPECIFICATION forming part of Letters Patent No. 720,368, dated February 10, 1903.

Application filed September 6, 1902. Serial No. 122,368. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. LUCE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Box-Car Doors, of which the following is a specification.

My invention relates to that class of box-car doors comprising a hinged upwardly and downwardly swinging grain-door, a door-frame forming a doorway across which such grain-door is adapted to be hung, and means attached to such grain-door by which it may be suspended and adapted to be folded with the door in a substantially horizontal position.

It relates, further and particularly, to the mechanism for suspending such grain-door and the manner of connecting such mechanism to the door and door-frame, whereby both the door and mechanism for suspending it may be readily folded up into a substantially horizontal position and down into closed position when desired.

The principal object of the invention is to provide a simple, economical, and efficient box-car door.

A further object of the invention is to provide a box-car door comprising a suspensible grain-door adapted to be arranged across the doorway of a car and provided with means foldably connected to such grain-door for suspending it and adapted to be folded therewith into a substantially horizontal position above the doorway.

Another and further object of the invention is to provide a simple, economical, and efficient swinging grain-door adapted to extend across the doorway of a car and be swung upward to a position above the doorway, suspending mechanism pivotally attached to the upper portion of the grain-door and adapted to hold it in substantially perpendicular closed position and also permit such grain-door and suspending mechanism to be folded together and upwardly into a substantially horizontal position above the doorway, such suspending mechanism being hinged to the car adjacent to the doorway and to the upper portion of the grain-door and adapted to hold the weight of the top and bottom of such grain-door alternately while such door is being raised and lowered.

The invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a perspective view of my improved grain-door and suspending mechanism; Fig. 2, a cross-sectional elevation of a portion of a box-car provided with my improvements, showing the grain-door in closed position; Fig. 3, a similar view showing the grain-door in position intermediate the closed and uppermost open position, and Fig. 4 a similar view showing the grain-door and suspending mechanism folded together and in their uppermost position.

In illustrating and describing my invention I have only shown it in connection with so much of a box-car with which it is intended to be used and of which it forms a part as is necessary to properly disclose the invention to others and enable those skilled in the art to practice the same, leaving out of consideration other and well-known elements.

In constructing a device in accordance with my improvements a box-car *a* is provided having side frames *b*, a roof *c*, a base portion *d*, and end portions which form a car-frame having a fixed door-frame *e*, comprising side frames *f*, only one of which is shown, top frame *g*, and bottom frame *h*, forming a doorway. A movable grain-door *i* is then provided, adapted to extend across the doorway. Both sides *j* and *k* of the grain-door overlap the inner side of the door-frame, so as to be held firmly in position thereby against the weight of the grain within the car.

In order to permit the grain-door to be raised above the doorway and provide means for suspending the upper end *l* and the lower end *m* thereof, each alternately, while the other is being raised, thus avoiding the necessity of raising the entire weight of the door, and in order to permit such suspending mechanism to be folded with the door upward above the doorway, so as to afford when such parts are in their uppermost position a substantially "clear" car, suspending rods *n* and *o* are provided and attached to the upper portion of the grain-door on opposite sides thereof, preferably by means of hook portions *p* upon the swinging ends of the suspending rods, which extend into elongated eye portions *q*, attached to the grain-door in any ordinary and well-known manner. In this way a hinged connection is formed between the suspensible

rods and the grain-door. The upper ends of these suspensible rods are each provided with eye portions *r* in pivotal or hinged connection with eyebolts *s*, which are preferably mounted in the main car-door frame at one side of the opening formed by such frame and outward beyond the edge of the grain-door.

It is very desirable that means be provided whereby the lower portion *m* of the grain-door when raised to its uppermost position will be held in place and removably attached to the suspending-rods. In order to accomplish this purpose, the upper ends of the suspending-rods are each provided with hooked portions extending inwardly and away from the main car-door frame and having upwardly-extending ends *u*. The lower edge of the grain-door is provided with lugs *v*, which extend outward beyond the sides of such door and are adapted to engage the upper hooks *l* of the suspending-rods and be held removably in position thereby. As will be readily seen, the distance from the hinge upon the upper portion of the grain-door to the lug *v* corresponds substantially to the length of the rod from the lower to the upper hook portions thereof, and in order to permit the door to be raised sufficiently to allow the lug to pass over the upwardly-projecting end of the upper hook the perforations *w* of the hinge-eyes *q* are elongated, as shown in Fig. 1.

To permit the grain immediately back of and bearing against the door to run out, so as to enable the door to be readily raised, such door is provided with a hinged portion consisting of what may be termed "false" panels 1 and 2, connected together by means of tie-braces 3 and 4, to which they are connected by means of screws 15, such tie-braces being hinged to the main portion of the grain-door by means of hinges 5 and provided with a hasp 6, pivotally connected thereto by means of a pivot 7, a hook 8 for such hasp also pivotally connected to one of such false panels, and a retaining guide-lug 9, attached to one of the main panels 10 of the door and adapted to receive and hold the hasp and thereby the false-panel portion of the door in position.

In operation, the door being in closed position and the car loaded with grain, the hasp is loosened and the portion of the grain immediately adjacent to the grain-door permitted to run out from behind such door, so as to allow it to be readily raised. The lower portion *m* of the door is then raised into the position shown in Fig. 3, while the upper portion *l* is suspended by the suspending-rods. The projecting lugs being engaged by the upper hooks of the suspending-rods, the other end of the door *l* is then raised into the position shown in Fig. 4, while the end *m* is hinged and held in position by the suspending-rods and eyebolts. The first step in the operation—that which brings the door into the position shown in Fig. 3—folds the suspending-rods and door together, and the second step—that which brings the door to the position shown in Fig. 4—raises both the suspending-rods and door-frame above the opening of the main door-frame, in which position such parts are held by means of a hook 11, attached to the rafter 12 of the car by means of a pivot-pin 13, which permits such hook to swing into and out of engagement with the lug 14 on the edge of the door. While the door is being swung into closed position it hinges first upon the eyebolts and upper ends of the suspending-rods and again upon the eye-hinges at the lower ends of such rods. It will thus be readily appreciated by those skilled in the art that this arrangement of the door and suspending-rods, with the double-hinged connections above shown and described, permits the door, which is necessarily extremely heavy, to be swung into and out of closed position and into and away from its uppermost open position without the necessity of at any time raising the entire weight of such door, and also permits the suspending mechanism to be folded with the door upward into position above the opening of the main car-door frame, thus affording a substantially clear car and leaving the suspending mechanism above and away from all danger of injury by articles other than grain which may be loaded into the car as well as out of the way of the operators in loading and unloading.

I claim—

1. In a car of the class described, the combination of a fixed door-frame, a movable grain-door, suspending-rods in hinged engagement with the door and also in hinged engagement with the car at a distance from the pivotal point of the door equal to the distance from such pivotal point to the lower edge of the door, a hook upon the upper end of each suspending-rod, lugs on the door adapted to engage such hooks, and means for holding the door and suspending-rods in position substantially on the same plane with the upper hinged portions of the suspending-rods, substantially as described.

2. In a car of the class described, the combination of a fixed door-frame, a movable grain-door, suspending-rods in hinged engagement with the door and also in hinged engagement with the car at a distance from the pivotal point of the door equal to the distance from such pivotal point to the lower edge of the door, a hook upon the upper end of each suspending-rod, lugs on the door adapted to engage such hooks, means for holding the door and suspending-rods in position substantially on the same plane with the upper hinged portions of the suspending-rods, and means for forming an opening in the movable door to permit the grain to escape therethrough while such door is in closed position, substantially as described.

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