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S. L. TRUEBLOOD.

GRAIN CAR DOOR.

(Application filed Oct. 1, 1897.)

(No Model.)

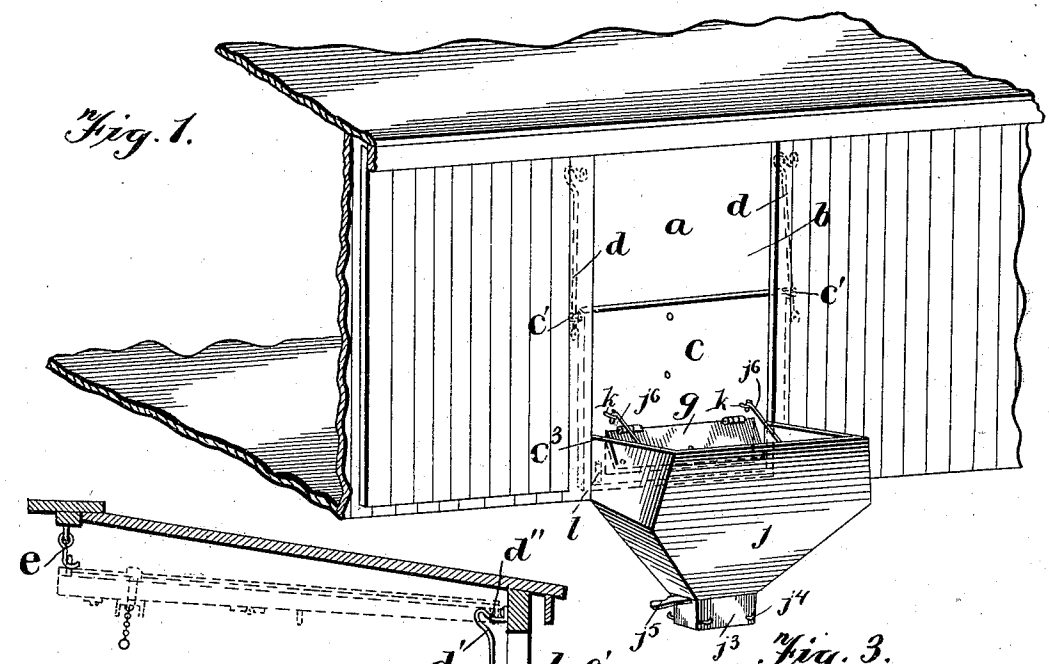


Fig. 1.

Fig. 2.

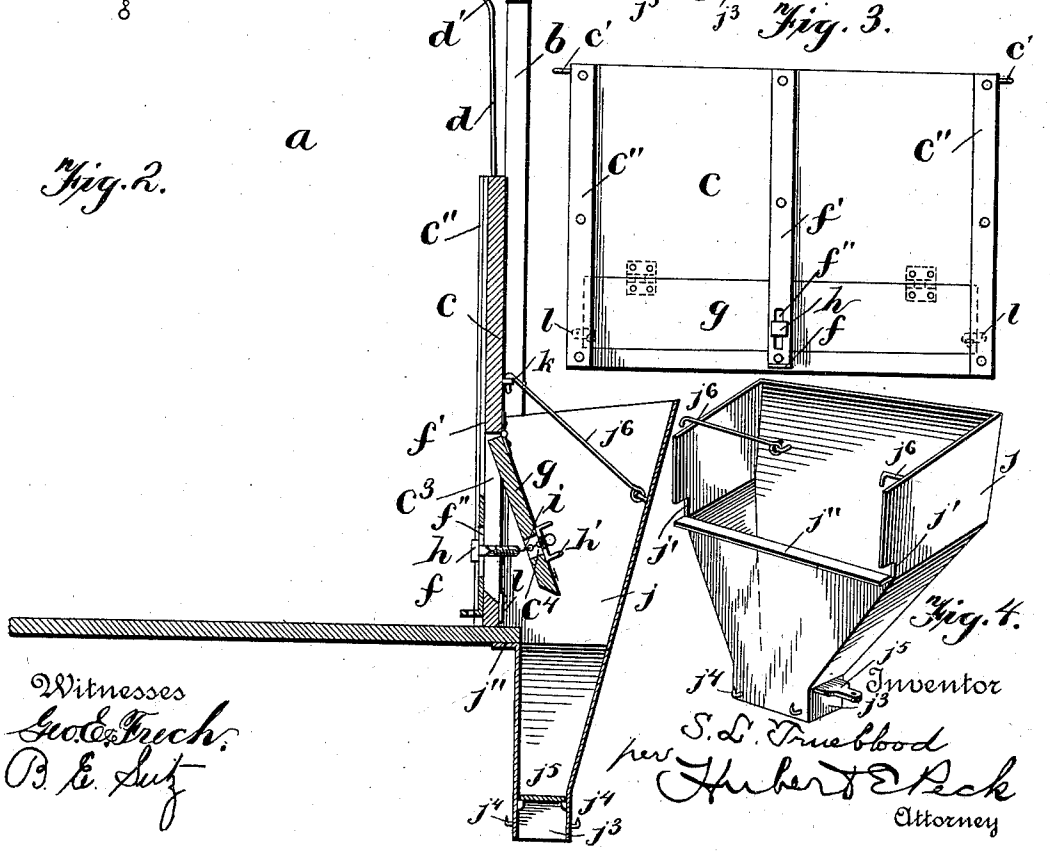


Fig. 3.

Fig. 4.

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GRAIN-CAR DOOR.

SPECIFICATION forming part of Letters Patent No. 612,445, dated October 18, 1898.

Application filed October 1, 1897. Serial No. 653,700. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL L. TRUEBLOOD, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Grain-Car Doors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain improvements in grain-doors for freight-cars, and also embodies a grain spout or hopper for such doors.

The invention consists in certain novel features in construction and in arrangements and in combinations of parts, as more fully and particularly described and pointed out hereinafter.

Referring to the accompanying drawings, Figure 1 is a perspective view showing part of a freight-car having the improved grain-door applied thereto and in operative adjustment as when grain is being discharged therethrough, the improved hopper being shown in operative position applied to the car at the door. Fig. 2 is a cross-section through part of a freight-car, with the parts in the position and adjustment shown in Fig. 1, dotted lines showing the door in its elevated position. Fig. 3 is a detail elevation of the inner side of the grain-door, the subdoor or valve therein shown in its closed position. Fig. 4 is a detail perspective view of the detachable discharge-hopper, looking at the inner side thereof.

In the drawings, *a* is a freight or other car adapted for the transportation of grain and of any suitable or desirable construction, with the large opening *b* for receiving and discharging freight, a sliding door (not shown in the drawings) being usually provided at the outer side of the car for closing such opening. *c* is the grain-door arranged to partially close said opening *b* and to leave ample room at the top of the door for the entrance of the grain-discharge spouts used in loading the car. This door is preferably constructed of planking or other suitable material and is rectangular in shape and wider than the opening *b*, so as to extend across the same, with its ends beyond the opening engaging the inner faces of the car sides, as clearly shown by the dotted lines in Fig. 1, whereby the pressure of the grain on the door is sustained by the car sides and in no measure by the means employed to guide the door during its elevation.

c' c' are metal loops or eyes projecting outwardly from the upper portions or ends of the end edges of the door and each with its opening arranged vertically to receive the metal guide and supporting-rod *d*. These rods *d d* are arranged vertically at the inner sides of the car and on opposite sides of the opening *b* in the car and are strongly secured at their opposite ends to the car, so that their intermediate portions are arranged a distance from the car side. The rods extend up to a point near the roof of the car, and at that point each rod is formed with the outward and upward deflection *d'*, with the portion of the rod at the upper side of the deflection extending inwardly to the car side to the securing-point and depressed or deflected downwardly to form the inwardly-inclined seat *d''*. It will thus be noted that the grain-door is arranged between these two rods, which are located at the end edges of the door, and that each rod is embraced by one of the eyes or loops *c'*. The rods hold the door against edgewise movement incident to the jar and vibration and shock of the car, while the eyes hold the door in its vertical movement and against falling inward when there is no grain in the car. When it is desired to elevate the door from the opening *b*, as is usual in operating such devices, the door is moved up by the operator between the rods *d d*, and when it reaches the upper ends of the rods its lower end is swung inwardly and upwardly approximately to the horizontal position, and a hook *e*, depending from the roof of the car, is placed within the opening *f* in the laterally-bent end of the metal bar *f'*, secured on the door. As the door assumes this position the metal eyes *c'* move out into the deflections *d'* of the rods and then inwardly onto the portions *d''* of said rods, with the outer side of each eye resting down in the said depression *d''*, which by reason of its inward inclination holds the end of the door constantly against the inner surface of the car side and tends to lock and

hold the door in its elevated position against extensive play or movement.

The grain-door is preferably provided at its inner surface with the vertical metal strips or bars c'' c'' at the ends of the door and with the central or intermediate vertical metal bar f' extending approximately from the top to the bottom of the door and having its lower end turned outwardly and perforated at f, as before described and as more fully shown in Fig. 2.

At or near its lower end the grain-door is formed with a horizontally-elongated discharge-opening c^3, comparatively narrow vertically and extending approximately the full width of the door, although the invention is not limited to these exact proportions. An outwardly-swinging valve or subdoor g is provided to control the outflow of grain through said discharge-opening, and this valve is at its upper end hinged to the grain-door above the discharge-opening, while the lower edge of the valve is preferably beveled to engage the beveled edge of the grain-door to prevent the valve sticking or jamming when closed, although the inward movement of the valve can also be limited by the vertical bars c'' and f' at the inner side of the grain-door.

Suitable devices are provided to lock the valve in its closed position and also to limit and control the outward swing thereof, and thereby control and vary the outflow of grain through the discharge-opening. Such means or device can consist of a bolt h, having a squared portion near its head and located in vertical adjustment in a vertical slot f''' in the bar f', with the head of the bolt at the inner side of the bar and the threaded end of the bolt extending outwardly. A vertical slot c^4 is formed in the swinging valve to receive the threaded end of said bolt, which when the valve is closed projects outwardly through said slot in the valve and receives a thumb-nut h' at the outer side of the valve to hold the valve closed. By forming the bolt of sufficient length to project outwardly a suitable distance beyond the valve when closed the valve can be permitted to open various distances by unscrewing the nut partially, the vertical slot in the valve allowing for the arc in which the valve swings, which can also be allowed for by moving the bolt in the slot f''' in the bar f'. To permit a still greater opening of the valve, a small chain i can be attached to the end of the bolt and passed through the nut with a ring at its outer end at the outer side of and of greater diameter than the internal diameter of the bore of the nut, which thereby limits the outward swing of the valve when the nut is released from the bolt, as shown in Fig. 2. j is a detachable hopper, which can be applied to the car to receive the grain discharged through the said discharge-opening, so that said grain can be easily and quickly bagged and its flow controlled below the said valve. Said hopper is preferably formed of sheet metal, with an open top, usually formed rectangular to fit snugly within the opening b of the car outside of and at the lower end of the grain-door. The inner side of said upper portion of the hopper is open, and the ends thereof at said open side are formed to fit snugly within the side frames of the car-opening b and preferably to extend to and abut against the outer face of the grain-door, and at their lower portions said ends are notched or recessed at j' to receive the projecting edge of the car-floor. Beneath said notches an outturned flange j'' is provided to fit beneath the said projecting edge of the car-floor. From said enlarged open upper end the hopper tapers downwardly to a spout j^3, of a proper size to receive and enter the upper open end of a bag. Said spout is preferably provided with exterior hooks j^4, on which to hang the bag, and at a point above said hooks with a sliding cut-off j^5, extending to and operative from the exterior of the spout, so that the operator can entirely close the spout or regulate the flow of grain through the same.

The upper open end of the hopper can be provided with suitable means for detachably securing the same to the car—such, for instance, as swinging hooks j^6, pivoted at the inner side of the front of the hopper and arranged to catch in suitable eyes k on the grain-door. These hooks serve merely to hold the hopper upright and from sliding off the car-floor while the weight of the hopper and its contents are carried by the car-floor where the hopper fits on the same. These hoppers are usually formed to fit any grain-car irrespective of the grain-door employed, but are particularly advantageous when employed in combination with the herein-described grain-door, which, however, can be employed without this hopper.

By employing the grain-door herein described the grain in the car behind the door and exerting a tremendous outward pressure thereon can be removed in regulated quantities through the discharge-opening and without attempting to raise or otherwise move the grain-door itself with the great pressure of the grain against it. The grain can be discharged without employing the hopper directly into a conveyer beside the car, or the hopper can be employed and the grain bagged therefrom until the grain behind the door is discharged, so that the door can be easily raised without injury thereto and a space be formed for the men to enter the car.

To those skilled in the art the many practical advantages of providing a discharge-opening at the bottom of a grain-door with a controlling-valve will be readily appreciated. Waste of the grain is thereby avoided and the grain is so under control that it can be readily handled and disposed of as discharged.

The grain-doors ordinarily employed in shipping grain in freight-cars are solid, and hence great force and power is needed to raise

these doors with the pressure of the grain in a fully-loaded car against the door. The useful life of such doors is very short, usually only about from one to five months, before the doors are so broken and injured as to be useless because of the implements, blows, and force required to raise the doors to permit outflow of the grain behind them, and of the bulging out thereof because of such great weight and outward pressure of the grain. By means of my improvement the great body of grain behind the door can be gradually discharged in a perfectly-controlled stream of just the volume desired and capable of being cared for and not beyond the capacity of the conveyer or receptacle into which it is being discharged. When all the grain behind the door has thus been discharged in a stream of the desired volume through the long narrow opening at the lower end of the door, the door can be easily moved up without wear, tear, or blows and secured at the top of the car.

When grain-doors ordinarily employed are raised even slightly, or when a small or square opening with a swinging door be suddenly released, the grain, because of the pressure, will be discharged out with such force and in such volume as to be entirely beyond the capacity of the conveyers and beyond the control of the operators, hence resulting in spilling and waste of and damage to the grain by piling up in the yard or on the ground. By employing a narrow opening approximately the full width of the door and at the bottom or lower end thereof I am enabled to discharge all the grain behind the door, and hence relieve pressure against the door and permit raising thereof easily, and by employing a valve or auxiliary door for said opening, with means whereby the same can be gradually opened and held at the desired angle, the flow of grain is entirely under control and its volume can be easily regulated, so as not to be beyond the capacity of the conveyer or power of the operators to remove. Furthermore, advantages are attained by employing rotating or screwing means for gradually opening said valve, for otherwise the great pressure thereon would necessitate destructive force and blows to release the fastening means thereof, if such solely depended on mere swinging latches or sliding outside retaining means. As the grain-door is located behind the sliding car-door when sealed, and a comparatively narrow space only intervenes between the car and grain doors, the fastening and regulating means I employ for said valve or auxiliary door is such as to take up little space without projecting materially beyond the said auxiliary door when closed.

I do not limit my invention to the peculiar means for guiding and confining the grain-door in its vertical movements, nor, where a hopper is employed, do I wish to limit myself to employing a lip or flange to fit beneath the car-floor, as such lip or flange can be otherwise located.

The hoppers are usually kept in the yards or by merchants and are applied to the cars as they are to be unloaded to catch and control the outflow of grain from behind the grain-doors and permit easy bagging and handling thereof without waste or spilling. When the grain is removed from the doors so that the doors can be raised, the hoppers are removed.

Buttons *l l* can be provided at the outer side of the grain-door to swing over the corners of the valve when closed to prevent bulging of the same at such points under the outward pressure of the grain within the car.

It is evident that various changes might be made in the forms, constructions, and arrangements of the parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the construction disclosed, but consider myself entitled to all such modifications as fall within the spirit and scope of my invention.

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

1. A vertically-movable grain-door for cars having the discharge-opening provided with a controlling-valve having screw-regulating means passing loosely therethrough, substantially as described.

2. A grain-door for cars having the elongated discharge-opening at its lower portion, a support across the same, a controlling swinging valve therefor, and adjustable regulating means extending from said support through the valve, substantially as described.

3. A grain-door for cars having the discharge-opening, a support extending across the same, an outwardly-swinging valve for said opening, said support and valve formed with vertical slots, an outwardly-extending bolt in the support-slot and arranged to extend into the valve-slot, a nut for the outer end of the bolt to control or lock the valve, and a loose connection between the nut and bolt, substantially as described.

4. A grain-door for cars having the discharge-opening, a support extending centrally across the same at the inner side of the door, a valve for said opening at its upper edge hinged to the door to swing outwardly, locking and regulating means from the support through the valve, and corner-locking means for the valve at the outer side of the door, substantially as described.

5. A grain-car door having a bottom initial discharge-opening, an auxiliary outwardly-swinging door hinged to said grain-car door to normally close the opening, and adjustable regulating means normally locking the auxiliary door closed and arranged to regulate the opening angle thereof, said means provided with a loose stop section or connection arranged to extend and permit continued outward swing of said door, and to drop at

the exterior of the door when said auxiliary door is locked by said regulating means, substantially as described.

6. A vertically-movable grain-car door having the narrow initial bottom discharge-opening extending approximately the full width of the door, the outwardly-swinging auxiliary door to close said opening and pivotally fixed at its upper edge to the grain-door, brace-locks or fastenings for the end portions of said auxiliary door, and a stop mechanism from the grain-door at about the central or an intermediate portion of the auxiliary door to permit, and to limit or control, the outward swing thereof and prevent too great an outrush of grain at the initial discharge, substantially as described.

7. In a car having the outside main door, the combination of a vertically-movable inside grain-door having the narrow initial discharge-opening at its lower portion extending approximately the full width of the door, whereby the grain in the car behind the grain-door can be initially discharged and the pressure against the same relieved, an outwardly-swinging auxiliary door to normally close said opening and hinged at its upper portion to said grain-door against vertical reciprocation independent of the grain-door, fastening or locking means between the grain-door and the auxiliary door, and loose stop mechanism between the grain-door and the auxiliary door to permit outward swing and limit the opening angle of the auxiliary door, and to hang beside said door when closed.

8. A grain-car discharge-hopper formed to hang vertically from the edge of the car-floor at the car-opening, said hopper having the large body with sides or ends arranged to project into or fit in the car-opening, the side of the hopper open between said ends and to the car-floor, and hooks secured to the body of the hopper and arranged to extend inwardly across the hopper to the car-door.

9. A car having an opening, in combination with a detachable hopper fitting in said opening with an open side at the same, said hopper notched to fit and receive the edge of the car-floor at said opening and tapering down to a spout, and means for detachably securing the hopper to the car, substantially as described.

10. As an article of manufacture, the hopper formed to extend into and fit in a grain-car opening, the ends of the hopper fitting the sides or door-posts of said opening, the hopper from thence extending downwardly and having a projection or flange engaging the car-floor, and detachable securing means, substantially as described.

11. As an article of manufacture, a detachable hopper for grain-cars having the enlarged top open at the inner side and notched to receive the car-floor with a flange to fit the car-floor and provided with means, such as hooks, for detachable connection to the car, said hopper tapering down to a spout, said spout provided with a sliding cut-off, and with exterior bag-supporting means, substantially as described.

12. A vertically-movable grain-car door having the discharge-opening at its lower end provided with an outwardly-swinging hinged auxiliary door having regulating means passing centrally through the same, substantially as described.

13. A grain-door having the narrow discharge-opening at its bottom or lower end extending approximately the full width of the grain-door, whereby the grain in the car behind the door can be discharged and the pressure against the door relieved, an outwardly-swinging auxiliary door hinged to swing into and close said opening, and screw-operated regulating and fastening means for said door whereby the same can be held at the desired angle and the stream of discharging grain easily controlled, said means, when the auxiliary door is closed, projecting but a slight distance beyond the same so as not to interfere with the regular sliding car-door, substantially as described.

14. A vertically-movable grain-car door having the narrow discharge-opening at its lower portion approximately the full width of the door, said door being beveled down and out at the bottom of the opening, the auxiliary door fitting in said opening with its lower edge beveled and hinged at its upper edge to the grain-door to swing outwardly, and regulating and fastening means for and passing through said auxiliary door, whereby the stream of grain discharging through said opening can be controlled in volume.

15. A vertically-movable grain-car door having the narrow discharge-opening at its lower portion extending approximately the full width of the door, the outwardly-swinging auxiliary door to close said opening, whereby the grain behind the door can be discharged and the pressure thereof released from the door, and loose regulating and fastening means for said door extending to the front or outer face thereof and operative from such point, and normally projecting a slight distance only beyond the same whereby the operator can control the angle of the door when open and thereby easily control the stream of grain passing out under such auxiliary door, substantially as described.

16. A grain-car door having the long bottom discharge-opening, supports at the inner side of the door across said opening, the swinging auxiliary door for said opening closing against said supports, and regulating means controlling the outward swing of the door and secured to a support and extending therefrom to and operative from the outer face of the auxiliary door, whereby the stream of grain discharging through said opening can be easily controlled.

17. As an article of manufacture, a detachable hopper formed at its top to fit in the width of the side opening of a freight-car and to par-

tially embrace and hang from the edge of the car-floor at said opening, said hopper reduced down to a small discharge end or opening, substantially as described.

18. As an article of manufacture, a hopper formed to detachably fit in and the width of the side opening of a grain-car and having the top and the side toward the car-opening open, the hopper fitting the car-floor and having a reduced bottom discharge, and detachable securing means, substantially as described.

19. A grain-car door having a side opening, in combination with a detachable hopper for initial discharge of grain arranged vertically and having a large body fitting in and extending the width of said opening and open toward the same, said hopper fitting and supported from the car-floor, and detachable securing means.

20. The detachable hopper arranged to extend up at and fit in the side opening of a car and open at its inner side and formed with notches or recesses to receive the edge of the car-floor, substantially as described.

21. As an article of manufacture, the grain-car hopper having the large body having the bottom valved discharge, and open side with projecting ends, and the securing means secured to the outer upper side of the hopper and arranged to extend across the top of the hopper to the car-door, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL L. TRUEBLOOD.

Witnesses:
HUBERT E. PECK,
DAVID E. MOORE.