Aug. 15, 1939. J. D. WATERBURY 2,169,889

DETACHABLE GRAIN DOOR UNIT FOR BOX FREIGHT CARS

Filed Dec. 10, 1936 3 Sheets-Sheet 1

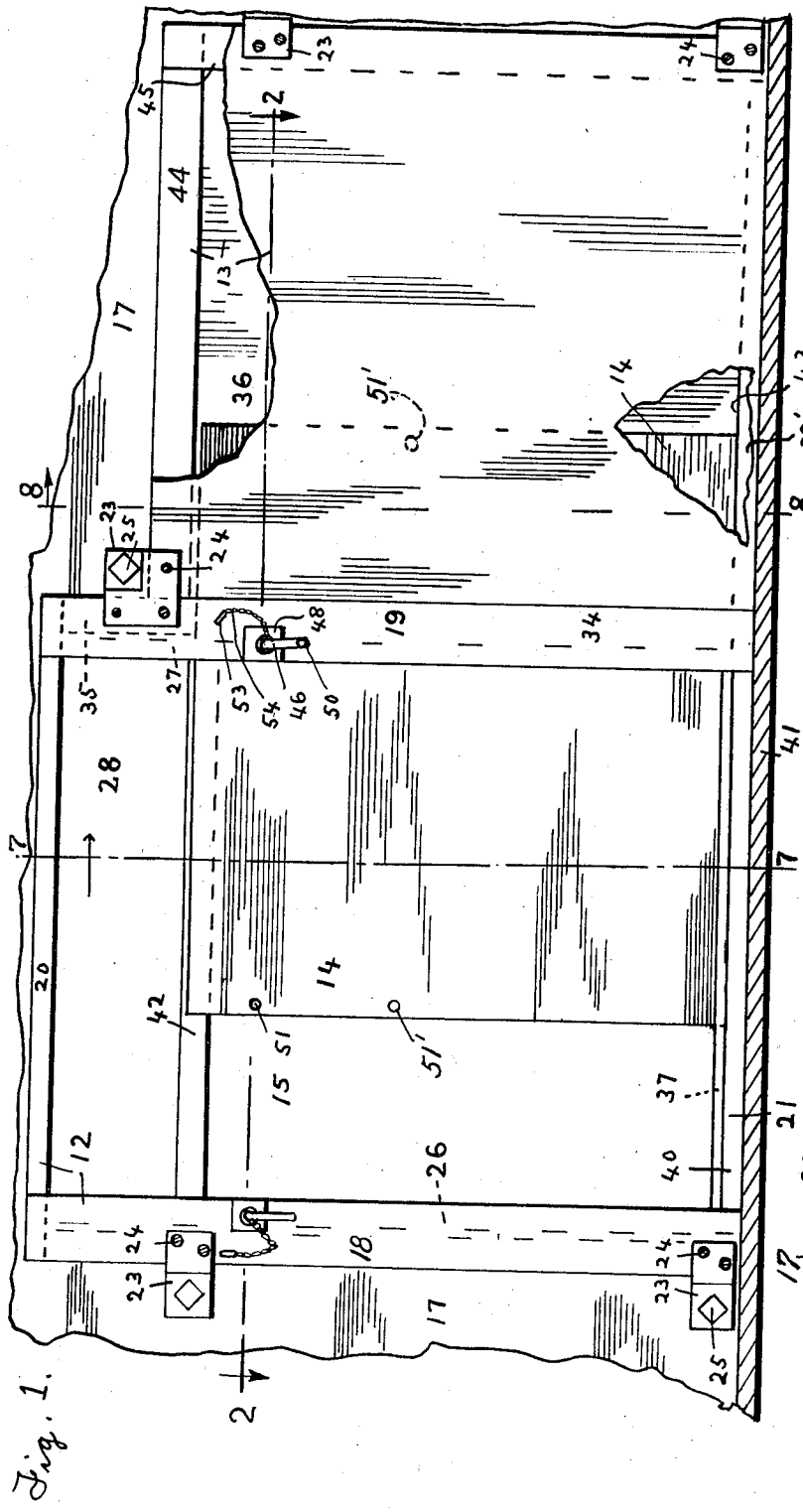


Fig. 1.

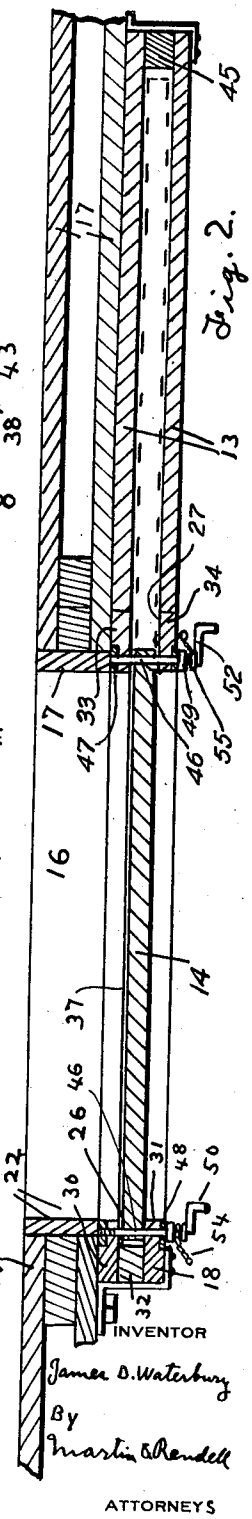


Fig. 2.

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Filed Dec. 10, 1936 3 Sheets-Sheet 2

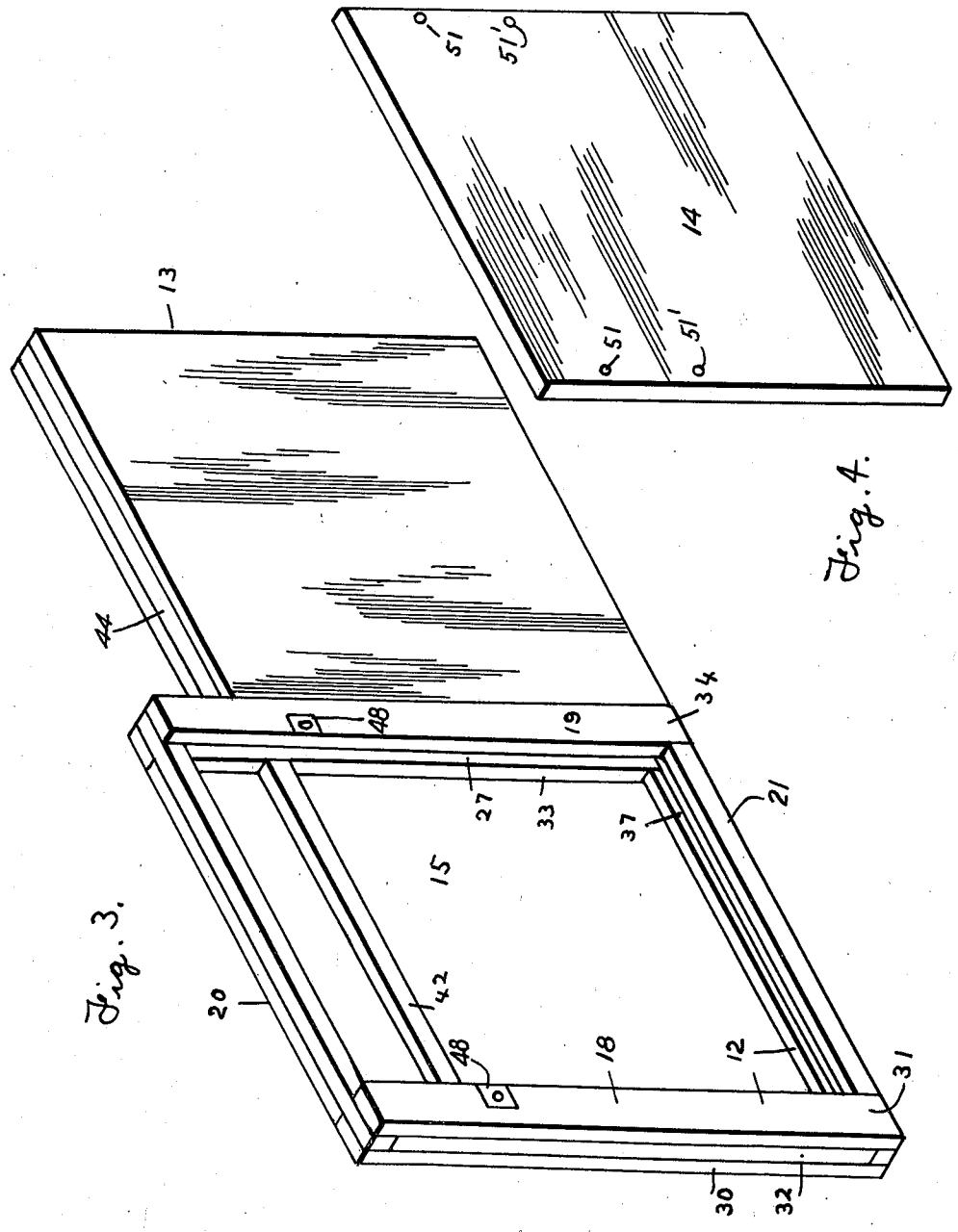


Fig. 3.

Fig. 4.

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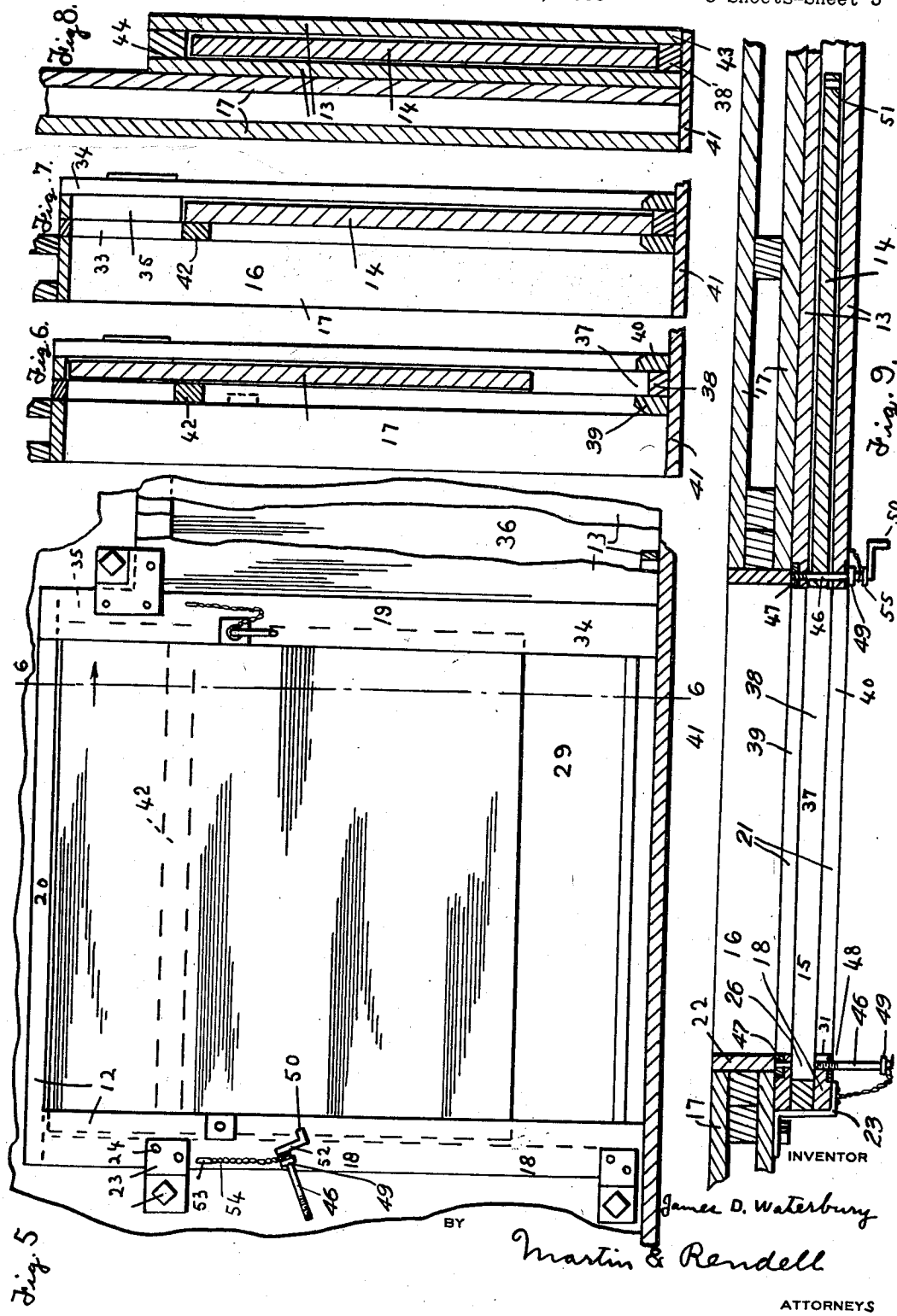
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DETACHABLE GRAIN DOOR UNIT FOR BOX FREIGHT CARS

Filed Dec. 10, 1936 3 Sheets-Sheet 3



Patented Aug. 15, 1939 2,169,889

UNITED STATES PATENT OFFICE

2,169,889

DETACHABLE GRAIN DOOR UNIT FOR BOX FREIGHT CARS

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Application December 10, 1936, Serial No. 115,159

6 Claims. (Cl. 20—27)

This invention relates to a detachable grain door unit for box freight cars and particularly to a separate door and door frame therefor especially adapted to hold grain and with the door and its frame assembled as a unit and removabe or replaceable as a unit relative to the freight car.

The purpose of my present invention is to provide a grain door for freight cars of new and improved construction and one wherein the grain door proper is separately mounted in its own door frame and housing so as to slide either vertically or horizontally therein and with the whole device adapted to be readily attached as a unit to a freight car and to be detached therefrom as readily.

A further purpose is to provide a grain door for freight cars including as above mentioned the door and its frame and housing where simple but effective means are provided forming a complete housing for the grain door when moved away from the doorway of the freight car and with the unitary structure also providing a slideway for allowing the door to be moved vertically in its frame opposite the doorway of the freight car so as to provide an exit for the grain beneath the grain door.

A further purpose is to provide a structure of the class described wherein the housing and frame for the grain door are strong and well braced and compact in structure so that they will securely hold the grain door in any of its allowable positions and so that the structure as a unit including the door may be removed bodily without weakening the structure or rendering it liable to be injured or any of its parts lost.

A further purpose is to provide a structure of the class described which is complete in itself and of simple outline so that it may be attached by simple connections to practically any standard freight car without alterations or modifications or mutilation.

Further purposes of my invention will appear from the specification and claims herein.

Fig. 1 is a side elevation of my grain door construction embodying the door proper and its framework and housing seen from the inside of a freight car to which it has been applied, the grain door being shown partly open, that is slid part way horizontally into its housing.

Fig. 2 is a horizontal sectional view on line 2—2 of Fig. 1 but showing the grain door closed and locked.

Fig. 3 is an isometric projection of the framework and housing of my device but for the sake of clearness without the door itself in the frame.

Fig. 4 is an isometric view of the door proper apart from its frame and housing.

Fig. 5 is a view similar to Fig. 1 of the door proper, its frame, but only the adjacent part of the housing, the door being shown raised vertically in its frame so as to provide an outlet below the grain door.

Fig. 6 is a transverse sectional view on line 6—6 of Fig. 5, the grain door being still in vertically raised position.

Fig. 7 is a transverse sectional view on line 7—7 of Fig. 1 showing the door in lowered position but in the door frame thereof.

Fig. 8 is a transverse sectional view on line 8—8 of Fig. 1 and so showing part of the door as slid horizontally into its housing.

Fig. 9 is a horizontal sectional view similar to Fig. 2 but with the door slid to its full extent into its housing to one side of the door frame of the grain door.

Referring to the drawings in a more particular description, it will be seen that a freight car grain door embodying my invention comprises an open frame 12, a housing 13 projecting laterally from one side of the frame and a door proper 14 slidingly mounted in the said frame and adapted to be slid laterally into the housing.

The frame 12 is of rectangular construction and has its aperture 15 of approximately the size both as to height and width as the standard doorway 16 of the freight car 17. The frame 12 is conveniently formed either of wood or of metal or a suitable combination thereof and comprises opposite side posts 18 and 19 connected respectively at the top and bottom by a top 20 and a doorsill 21.

Rigidly projecting from one side of this frame, that is at the right side as my device is shown in the different views thereof, there is provided the housing 13. It will be understood that the frame and housing are connected so as to be one rigid unit and that slidingly mounted in said unit is the grain door proper. This nit is constructed as a separate structure and is intended to be placed bodily against the inner face of the door frame 22 of the freight car itself 17 and fastened thereto by suitable members as by a plurality of brackets 23 preferably permanently fastened to the frame and housing unit as by screws or bolts 24 passing through the various brackets into the edge members of the combined unit. Lug screws 25 or the equivalent are then inserted through suitable holes provided in the projecting portions of the brackets 23 with said lug screws projecting into the freight car 17 opposite the respective brackets 23.

In the aperture face of the side posts 18 and 19 of the frame there are provided slideways 26 and 27 respectively. These slideways extend from the doorsill 21 to the top 20 of the frame and provide means for slidingly mounting the opposite vertical sides of the grain door per se in said frame. As will be seen from several views of the drawings, the said door 14 is of appreciably less

height than the frame 12 so that when the door is in its lowermost position there will be a space 28 at the top of this grain door frame which will not be closed by the grain door 14. The tight joint required for a grain door of a freight car does not need to extend to the top of the regular freight car door frame 22 because a freight car cannot be filled to the top with grain. Furthermore, one of the advantages of my construction is to allow the grain door 14 itself to be moved vertically upwardly in the frame 12 and allow a space 29 below the bottom of the raised door 14 and the doorsill 21. The position of the parts in this situation is illustrated in Figs. 5 and 6. This position allows the grain door 14 to be raised from the door sill so that the grain may be allowed to slide out from the freight car through the said lower opening 29. It will be understood of course that in many cases especially during the first interval of time when the car is being unloaded the door 14 will not be raised to the full extent of its possible movement, but may be raised only say two or three inches so as to allow a limited supply of grain to flow outward according to the facilities for receiving or carrying away such grain when it is being unloaded.

Assuming that the frame 12 is built in the main of wood, the slideways 26 and 27 may conveniently be constructed as follows: The left hand post 18 as seen in Figs. 1, 3 and 5 may be composed of three parts, namely an outer board 30 which will be against the inner surface of the freight car, an inner board 31 spaced therefrom and preferably of the same width as the outer board 30 and, thirdly, a middle or intermediate board 32 of less width than the boards 30 and 31 so that when these parts are assembled with their vertical left hand edges flush with each other as seen in Figs. 2, 3 and 9, the right hand edges of the outer and inner boards 30 and 31 will project farther towards the aperture of the frame than does the right hand edge of the middle board 32 and so there will be produced the slideway 26 already mentioned.

The slideway 27 in the right hand post 19 is conveniently formed in the same way, namely by said post being composed of an outer board 33 which will be against the inner surface of the freight car, an inner board 34 spaced therefrom and thirdly a middle or intermediate board 35 of less width than the boards 33 and 34 so that when these three parts are assembled the left hand edges of the outer and inner boards 33 and 34 will project farther towards the aperture of the frame than does the left hand edge of the middle board 35 so that there will be produced the right hand slideway 27. It is to be noticed however, that this middle or intermediate board 35 in the right hand post 19 is not present in the part of the post that extends from its bottom to the level of the top edge of the door 14 when in lowered position. The opening of a standard freight car door is seven feet six inches high and on that basis I preferably form the grain door proper 14 of my device six feet high thus leaving a space of about eighteen inches in height over the top of the grain door 14 when the grain door is in its lowered position as shown in Figs. 1 and 7. On this basis the intermediate board 35 will be omitted for slightly more than the lower six feet of the right hand post 19 so that the slideway 27 for six feet up from the door sill will extend clear through the post 19 and in fact this space between the outer and middle boards 33 and 34 of the post below the short length of intermediate board 35 forms a part of the chamber 36 formed in the main by the housing which extends to the right from the post 19.

The top 20 of the frame rigidly connects the upper ends of the two door posts 18 and 19 but is of simple construction in that there does not need to be provided upon said top 20 any slideway for the door 14 as in the upper position of the said door 14 as shown in Fig. 5 the door simply comes up flush with or into contact with the said top 20. But the joint or contact between the door 14 and the top 20 does not need to be grain-tight as under no circumstance can the grain come this high up in the freight car.

On the other hand, the door sill 21 is provided in its upper face with a slideway 37. This slideway is in line with the two slideways 26 and 27 in the respective door posts 18 and 19 and is wide enough to slidingly mount therein the bottom edge of the grain door 14. Assuming that the construction is to be made principally of wood, a convenient form of making this door sill 21 as illustrated in Figs. 2, 3 and 6 in that a strong middle strip 38 slightly wider than the thickness of the door 14 has secured thereto on its outer and inner sides the slightly higher cleats 39 and 40 respectively. These three pieces are assembled with their lower edges flush with each other and adapted to rest conveniently upon the floor 41 of the freight car. Accordingly the cleats 39 and 40 project upwardly farther than the middle strip 38, thus forming the said lower slideway 37. This lower slideway it will be seen guides the bottom edge of the door 14 when it is being slid towards or from closed position. When the door is either closed or partly opened the said door sill and its slideway 37 securely hold the bottom edge of the door against displacement either from the weight of the grain inside of the freight car or from any other force brought against the door 14.

In order to brace the upper portion of the door 14 against the weight and pressure of grain in the freight car and especially to aid in keeping the door in proper position when the door is moved part way from the left hand door post 18, there is provided a bar 42 having its opposite ends strongly secured to the door ports 18 and 19. This bar is preferably placed vertically about as indicated in Figs. 1, 6 and 7 so as to be on a line with the upper two or three inches of the door 14 when the door is in lowered position. In practice I find that this brace bar 42 only needs to be on the outside of the door 14. All the substantial strain upon the door comes from within as from the grain weight and pressure already mentioned. When the door is in lowered position and part way open as in Fig. 1 the lower slideway 37 in the door sill and the housing of a considerable part of the right hand side of the door as the parts are seen in the drawings herein between the full width of the two parts of the right hand post 19 beside the extending of a part of the door at its right hand side into the chamber 36 of the housing 13 holds the door securely in place against any ordinary pressure that will be placed against it from the outside. The brace bar 42 it will be understood is located as close as possible to the outer face of the door 14, but still allows the door 14 to be slid upwardly therepast when it is desired to raise the door vertically after it has been brought into the left hand slideway 26.

The housing 13 already mentioned as extending to the right from the right hand door post 19 and providing the inside chamber 36 for the door 14 is so constructed as to be rigid with the door frame already mentioned and also so constructed as to provide a housing that will completely enclose the door 14 when said door is in lowered position and slid open so as not to project at all from the right hand door post 19. This housing is also so constructed as to allow the door to be easily slid thereinto from its position in the door frame and to be easily slid from the housing into or partly into the said door frame. To this end the bottom part of the housing forms a slideway 43 in line with and on the level of the bottom slideway 37 of the door sill 21. Accordingly the housing 13 includes a middle bottom strip 38' which conveniently and preferably is really an integral extension of the middle strip 38 of the opposite door sill 21. By making these parts integral, one element is provided tending to not only make the slideways 37 and 43 on the same level, but also there is provided a means for making the door frame and the housing strongly and rigidly connected. At the top of the housing 13 there is provided a middle strip 44 having its left hand end adjacent the lower portion of the short intermediate board 35 at the upper part of the right hand door post 19. This piece 44 is so located as to have its lower edge slightly above the top edge of the door 14 when the door is slid into the housing as particularly appears from Figs. 1, 5 and 8. The strip 44 also is slightly thicker than the door 14 and is in the same vertical plane as the intermediate board 35 and the bottom strip 38' of the housing. The right hand extremities of this upper strip 44 and the bottom strip 38' are rigidly connected by a vertically placed post 45 which is conveniently of the same thickness as the parts 44 and 38'.

Means are provided for positively and tightly locking the door 14 in closed position, that is when the door is moved to the left as shown in the drawings to occupy the full width of the opening 15 of the frame 12 and with the door at the lowermost position in the frame. Suitable means for so locking the door may conveniently consist, as shown clearly in the drawings, of a pair of crank-arm bolts 46, one at each side of the door, and each passing through the inner member of the door frame 31 or 34, then through one of the upper apertures 51 in the door itself and into a nut 47 in the outer member of the door frame. Each of these bolts 46 as best appears in Fig. 2 has a screw-threaded section at its outer end to engage the nut 47 which is preferably countersunk from the outside into the outer member 36 or 33 of the sides of the door frame 12. To prevent undue wear a metal washer 48 is countersunk into the inner surface of the inner side frame members 31 and 34 which washer is engaged by the adjacent outer surface of a collar 49 located rigidly on the bolt towards the inner end of its shank and so placed as to engage the washer when the threaded end of the bolt has a good hold in the nut. At the inner end of the bolt it is provided with a short crank-arm 52 terminating in an offset handle 53 whereby the bolt may be rotated by hand in an obvious manner. Assuming that the door has been placed in closed position, the two upper bolt-receiving apertures 51 in the opposite sides of the door will be in alignment with the corresponding holes in the washers 48 and nuts 47 in the sides of the door frame.

Upon inserting the two crank arm bolts in the aligned sets of holes therefor and turning the crank arms of the bolts the screw-threaded ends thereof will engage the respective nuts. This action it will be seen by causing the bolts to go through the two upper apertures in the door positively locks the door down and from being opened. Furthermore, by tightening up the bolts the pressure of the collars 49 upon the outside washer together with the pull of the bolt upon the nut located in the outer member of each side frame will draw the parts of the frame and the door together more or less so as to overcome any rattle or looseness and so prevent the grain from working past the door into the housing.

Preferably means are provided to loosely connect these bolts to their respective sides of the door frame so that they will not be lost even when not being used. A convenient means for so loosely attaching the bolts to the frame and yet allowing the bolts to be readily inserted or removed and rotated as required consists of a screw eye 53 provided at the inner surface of the side posts 18 and 19. From each eye there extends a short length of chain 54 the free end of which is loosely secured to the inner end of the shank of the bolt as to the neck portion of said bolt provided between the collar 49 and an enlargement 55 provided at the extreme inner end of the bolt where the crank arm 52 begins. When the door is opened, these bolts may hang down from the side posts of the door as shown with the left hand bolt in Fig. 5 or the bolt may be left sticking out from the inner frame member of the side post. If it is desired to positively lock the door in inward open position, the right hand bolt may be used to engage the left hand upper aperture in the door as shown in Fig. 9.

When the door is in upper position in the grain door frame as shown in Fig. 5, the lower set of bolt-receiving apertures 51' in the door are in alignment with the holes in nuts 47 in the outer members of the door frame and also in alignment with the holes in the metal washers 48 in the inner side frame members 31 and 34, so that the crank arm bolts 46 can be inserted and used to hold and lock the door in this position as has already been described in detail for the down and closed position and illustrated in Fig. 2.

Purposely no projections are provided upon the inner surface of the door for raising the door as such projections would require corresponding clearances to be cut in the adjacent surface of the right hand side member 34 of the door frame in order to slide the door open and such necessary clearances would allow the grain to sift through such clearances into the chamber of the housing and that grain would prevent or seriously delay or impede the door from sliding into the chamber of the housing. In practice the grain door is not opened upward from inside the car but is easily and quickly opened by a man applying a pinch bar to the door from the outside of the car.

What I claim as new and desire to secure by Letters Patent is:

1. In a readily attachable and detachable grain door unit for application to the inside of a box freight car, the combination of an open frame having a top, a doorsill and opposite side posts, the aperture of said frame being approximately the size of the doorway of a box freight car, slideways in the aperture faces of said side posts

and doorsill, a door of less height than said aperture and slidingly mounted in the slideways of the said posts for vertical movement therein and a housing extending laterally at one side of the frame and interiorly as high as said door and having at its bottom a slideway in continuation of the slideway in the doorsill, said housing being grain-tight and composed of two complete, spaced walls connected permanently and rigidly by a top, a back strip, said bottom slideway and the adjoining side post of the said open frame, the side post adjacent the housing having its slideway extended through the post for the height of the door whereby the door may be slid laterally partway or wholly from the door aperture into said housing.

2. In a readily attachable and detachable grain door unit for application to the inside of a box freight car, the combination of an open frame having a top, a doorsill and opposite side posts, the aperture of said frame being approximately the size of the doorway of a box freight car, slideways in the aperture faces of said side posts and doorsill, a door of less height than said aperture and slidingly mounted in the slideways of the said posts for vertical movement therein and a housing extending laterally at one side of the frame and interiorly as high as said door and having at its bottom a slideway in continuation of the slideway in the doorsill, said housing being grain-tight and composed of two complete, spaced walls connected permanently and rigidly by a top, a back strip, said bottom slideway and the adjoining side post of the said open frame, the side post adjacent the housing having its slideway extended through the post for the height of the door whereby the door may be slid laterally partway or wholly from the door aperture into said housing, said housing and open frame movably but permanently and non-removably holding said door whether said housing and open frame be attached to a freight car or detached therefrom, and said open frame and housing and contained door being attachable to and removable from the freight car as a complete unit.

3. In a readily attachable and detachable grain door unit for application to the inside of a box freight car, the combination of an open frame having a top, a doorsill and opposite side posts, the aperture of said frame being approximately the size of the doorway of a box freight car, slideways in the aperture faces of said side posts and doorsill, a door of less height than said aperture and slidingly mounted in the slideways of the said posts for vertical movement therein, a housing extending laterally at one side of the frame and interiorly as high as said door and having at its bottom a slideway in continuation of the slideway in the doorstill, said housing being grain-tight and composed of two complete, spaced walls connected permanently and rigidly by a top, a back strip, said bottom slideway and the adjoining side post of the said open frame, the side post adjacent the housing having its slideway extended through the post for the height of the door whereby the door may be slid laterally partway or wholly from the door aperture into said housing, and means adjacent the edges of the frame and housing for detachably securing the structure as a unit to the inside of a freight car.

4. In a readily attachable and detachable grain door unit for application to the inside of a box freight car, the combination of an open frame having a top, a doorsill and opposite side posts, the aperture of said frame being approximately the size of the doorway of a box freight car, slideways in the aperture faces of said side posts and doorsill, a door of less height than said aperture and slidingly mounted in the slideways of the said posts for vertical movement therein, a housing extending laterally at one side of the frame and interiorly as high as said door and having at its bottom a slideway in continuation of the slideway in the doorsill, said housing being grain-tight and composed of two complete, spaced walls connected permanently and rigidly by a top, a back strip, said bottom slideway and the adjoining side post of the said open frame, the side post adjacent the housing having its slideway extended through the post for the height of the door whereby the door may be slid laterally partway or wholly from the door aperture into said housing, and means including brackets secured adjacent the edges of the frame and housing for detachably securing the structure as a unit to the inside of a freight car.

5. In a readily attachable and detachable grain door unit for application to the inside of a box freight car, the combination of an open frame having a top, a doorsill, an intermediate horizontal brace bar, and opposite side posts, the aperture of said frame being approximately the size of the doorway of a box freight car, slideways in the aperture faces of said side posts and doorsill, a door of less height than said aperture and slidingly mounted in the slideways of the said posts for vertical movement therein, said brace bar being immediately outside the path of the door and opposite the upper part of the door when the door is in lowered position in the frame and a housing extending laterally at one side of the frame and interiorly as high as said door and having at its bottom a slideway in continuation of the slideway in the doorsill, said housing being grain-tight and composed of two complete, spaced walls connected permanently and rigidly by a top, a back strip, said bottom slideway and the adjoining side post of the said open frame, the side post adjacent the housing having its slideway extended through the post for the height of the door whereby the door may be slid laterally partway or wholly from the door aperture into said housing.

6. In a readily attachable and detachable grain door unit for application to the inside of a box freight car, the combination of an open frame having a top, a doorsill and opposite side posts, the aperture of said frame being approximately the size of the doorway of a box freight car, slideways in the aperture faces of said side posts and doorsill, a door of less height than said aperture and slidingly mounted in the slideways of the said posts for vertical movement therein, a housing extending laterally at one side of the frame and interiorly as high as said door and having at its bottom a slideway in continuation of the slideway in the doorsill, said housing being grain-tight and composed of two complete, spaced walls connected permanently and rigidly by a top, a back strip, said bottom slideway and the adjoining side post of the said open frame, the side post adjacent the housing having its slideway extended through the post for the height of the door whereby the door may be slid laterally partway or wholly from the door aperture into said housing, and means cooperating with said door and said attachable door frame for locking the door in closed and down position and in closed and raised position.

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