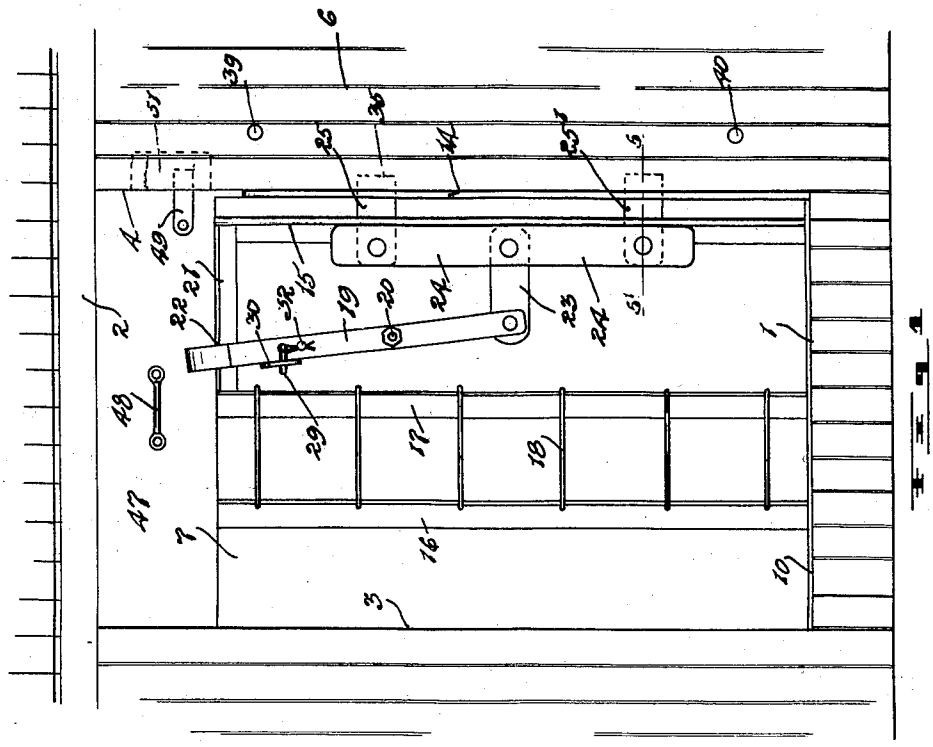
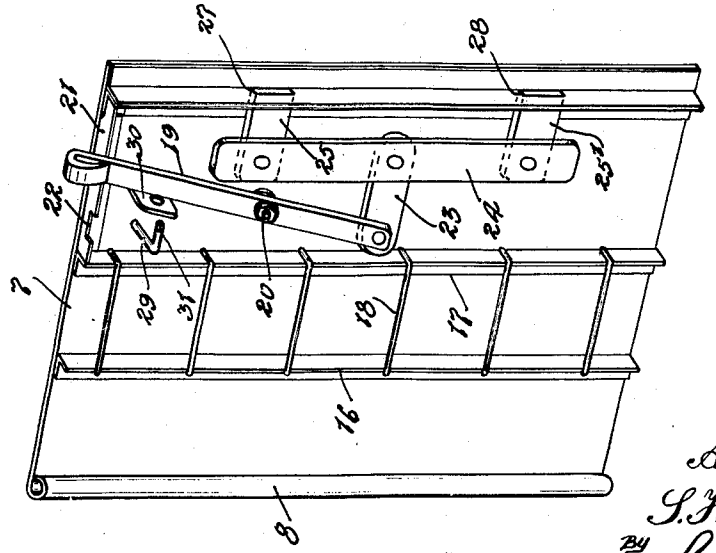
April 7, 1931. S. H. HENDERSON ET AL 1,799,232

GRAIN CAR DOOR

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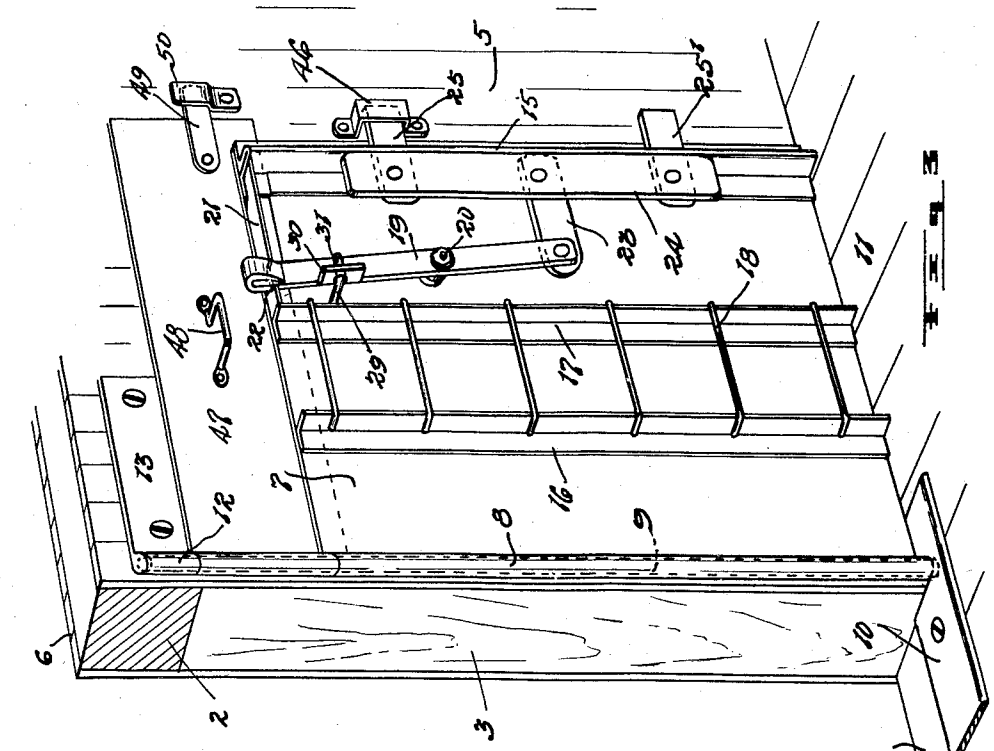


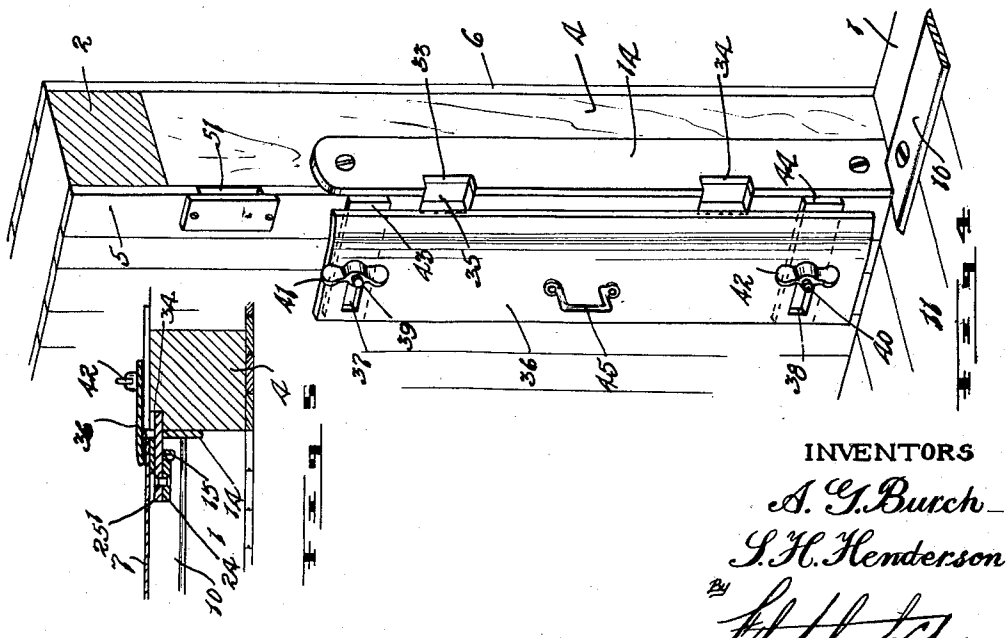
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GRAIN CAR DOOR

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UNITED STATES PATENT OFFICE

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GRAIN-CAR DOOR

Application filed August 23, 1929. Serial No. 388,002.

The invention relates to improvements in grain car doors and an object of the invention is to provide a grain tight door hinged to one side of the door frame in a manner so that the same can be swung to stored position against the side wall of the car and is free when released to swing under the pressure of the grain into an open position substantially at right angles to the car and to arrange the general door structure so that it is not necessary to change the existing structure of the car in order to install the door.

A further object of the invention is to provide an all metal main door amply braced and to associate with the main door a metal upper door section, the latter section being also swung from one side of the door frame and adapted to take a stored position against the wall of the car and swing outwardly to an open position substantially at right angles to the car.

A further object is to construct a hinged door having manually operated means at the exterior thereof for effectively releasably locking it to the adjacent post and to associate with the door a ladder which not only braces the door but gives convenient approach to the locking lever employed and to the upper door section for grain testing purposes.

A further object of the invention is to provide an adjustable guard plate against which the door can be closed and subsequently locked, the guard plate also assuring of a grain tight joint between the swinging end of the door and the post to which it is locked.

With the above more important and other minor objects in view which will become more apparent as the description proceeds, the invention consists essentially in the arrangement and construction of parts hereinafter more particularly described, reference being had to the accompanying drawings, in which:—

Fig. 1 is an exterior view of the door as it appears in use and in the locked position.

Fig. 2 is a perspective view of the main door.

Fig. 3 is a perspective view of the door as it appears in its stored position.

Fig. 4 is a perspective view of one side of the door frame and showing the guard plate and adjacent parts.

Fig. 5 is an enlarged detailed horizontal sectional view at 5—5′ Figure 1.

In the drawings like characters of reference indicate corresponding parts in the several figures.

We have not considered it necessary to show the complete body of the car in which the door is used, it being considered sufficient for the purposes of the present disclosure to simply show the doorway opening bounded as usual by the sill 1, lintel or upper cross beam 2, door posts 3 and 4, the inner lining boards 5 forming the interior wall of the car and the outer face boards 6 forming the outer wall of the car.

The main door or lower section 7 is substantially rectangular and is an all metal one formed from plate steel of good grade. The one edge of the plate is rolled to provide a vertical tube 8 adapted to receive a vertically disposed rod 9 which has the lower end thereof bearing in a threshold plate 10 secured to the car floor 11 and extending between the posts and the upper end thereof extended considerably above the door and received in a sleeve like bearing 12 formed at one end of a bearing plate 13 fastened to the interior wall of the car.

The rod and tube 8 form a pivot support for the main door permitting the same to be swung back against the interior face boards 5 of the car when not in use and as shown in Figure 3 and to be swung outwardly through the doorway opening into a position substantially at right angles to the side wall of the car, the width of the door being such that the free end thereof will just nicely clear a vertically disposed locking bar 14 secured to the face of the door post 4. The threshold plate has the opposite edges thereof tapered and it underlies the closed door and there is very little clearance space between the lower edge of the door and the plate so that there is no possibility of grain leaking out at such point.

The free end of the door is amply reinforced on the outer side by a vertically disposed T-bar 15 spot welded thereto. This

T-bar can be made as shown or can be formed from two angle irons placed back to back. Centrally to the outer face of the door, we spot weld two vertically disposed spaced angle bars 16 and 17 which amply reinforce the body of the door and to the outturned flanges of the angle bars, we spot weld spaced cross rods 18, the angle irons and cross rods forming a ladder which permits one to easily approach the locking lever later described and also to take samples of grain from the car when desired.

On the outer face of the door, we mount a more or less vertically disposed locking lever 19 which is suitably pivoted to the door at 20 and the upper end of the lever operates over the inturned flange of a horizontally disposed reinforcing angle bar 21 spot welded to the door and extending between the angle iron 17 and the T-bar 15. The latter flange is provided with a notch 22 into which the end of the lever escapes, it being understood that the lever is sufficiently resilient to spring into the notch when the same is swung towards the same.

To the lower end of the lever, we pivotally connect a link 23 which is pivotally connected also centrally to a vertical bar 24 located adjacent the inner side of the inturned flange of the T-bar and the bar 24 carries upper and lower horizontally disposed locking bolts 25 and 25′ which pass slidably through suitable openings 27 and 28 provided in the flange of the T-bar. In actual practice, when the upper end of the lever is swung to the right, the inner end of the link 23 will strike the bar 17 and limit the in travel of the bolts and when the bolts are in their inner positions, their outer ends are approximately flush with the outer face of the T-bar flange.

Means is provided for locking the lever when in the notch 22, such embodying a hook 29 permanently welded to the door and having the outer end adapted to overlie the lever when in the notch and at such time to pass through a suitable opening provided in the lug 30 secured to the lever. The end of the hook is supplied with a hole 31 adapted to receive a car seal 32 of any approved design. The lever is shown as locked by the seal in Figure 1.

The bar 14 hereinbefore mentioned is provided at the inner edge with cross slots 33 and 34 adapted to receive the projected locking bolts 25 and 25′ when the door is in the closed position, the plate 14 and projected bolts preventing the opening of the door under pressure of the grain in the car. The adjacent portions of the door frame are also cut away as indicated at 35 to receive the projected bolts.

In the interior of the car in a location adjoining the bar 14, we locate a vertically disposed guard plate 36 which is transversely slotted at 37 and 38 to receive the projecting ends of bolts 39 and 40 passed through the adjacent post 4, the inner screw threaded ends of the bolts being provided with winged nuts 41 and 42 preventing escapement of the plate 36. Between the latter plate and the wall of the car, we insert rubbing or wear plates 43 and 44, these being fastened to the wall and the guard plate has the edge thereof towards the doorway opening slightly curved as best shown in Figure 5 and the said plate is adapted to take a position to the inner side of the door when the same is locked in closed position by the locking bolts.

By releasing the winged nuts, one can laterally shift the guard plate on the bolts and when withdrawn, it permits the door to be swung to closed position and when extended, it takes a position with the curved edge thereof engaging the inner face of the door as best shown in Figure 5 and here it will be observed that the arrangement is such that when the winged nuts are tightened up, the curved edge of the plate is tightly pressed into contact with the rear face of the door to insure of a tight grain proof contact. A handle 45 is supplied for manipulating the guard plate.

When the door is not in use, it is swung to a stored position against the inner wall of the car as best shown in Figure 3 and in this position it can be releasably locked against swinging by a strap 46 secured to the wall of the car and adapted to receive the upper locking bolt as shown in said figure.

Above the main door section, we locate an auxiliary door 47 which is made from a metal plate pivotally supported from the rod 9 in the same manner as the main door. The auxiliary door is supplied centrally with a handle 48 and at the free end with a pivoted latch 49, the latch being adapted to engage a catch 50 secured to the wall board 5 and hold the auxiliary door in stored position as best shown in Figure 3. The length of the door 47 is such that it will close against the inner face of the opposing post 4 and in such position the latch is adapted to swing down and enter a suitable slot 51 provided. The lower edge of the auxiliary door laps the upper edge of the outer door being to the inner side thereof when both doors are closed.

When it is desired to close the main door, one can extend the plate 36 and fasten it by the winged nuts, then swing the door inwardly against the plate and then throw the upper end of the lever to the left to project the locking bolts into the slots 33 and 34. At this time the lug 30 will have received the hook and the car seal can be applied. The upper door section can obviously be closed by swinging it into contact with the post 4 and then throwing down the latch to enter the slot 51.

When it is desired to unload the grain from the car, one breaks the seal and swings

the upper end of the lever to the right, at which time the main door will swing outwardly under the pressure of the grain to a position substantially at right angles to the car and here we might point out that at such time the angle bar 16 is clear of the door frame. If it be desired at any time to take a sample of grain from the car, this can be done by releasing the upper door section.

What we claim as our invention is:—

1. The combination with the door posts of a car, of a grain door pivotally connected to one of the posts and free to swing outwardly through the doorway opening to open position, shiftable locking bolts carried by the door, manually operated means carried by the door for shifting the locking bolts into engagement with the other of the posts to lock the door in closed position and for withdrawing the bolts to release the door to open and a guard plate slidably carried by the latter post and adapted when extended to lap the adjoining end of the door at the inner side.

2. The combination with the door posts of a car, of a grain door pivotally connected to one of the posts and adapted to swing outwardly between the posts to open position, a vertically disposed locking bar permanently secured to the other post, locking bolts slidably carried by the door and engageable when extended with the locking bar to lock the door against opening, manually operating means carried by the outer face of the door for extending and withdrawing the locking bolts and a guard plate slidably attached to the inner side of the latter post and adapted when shifted inwardly towards the closed door to take a position to the inner side of the free end of the door.

3. The combination with the door posts of a car, of a vertically disposed pivot rod positioned adjacent the inner corner of one of the posts, said rod having the upper and lower ends thereof suitably mounted, a grain door formed from a metal plate having one edge rolled around the rod to pivotally support the door therefrom, said door being adapted to swing outwardly through the doorway opening to open position and means for releasably locking the free end of the door to the other door post, said locking means being operable from the exterior of the door.

4. The combination with the door posts of a car, of a vertically disposed pivot rod positioned adjacent the inner corner of one of the posts, said rod having the upper and lower ends thereof suitably mounted, a grain door formed from a metal plate having one edge rolled around the rod to pivotally support the door therefrom, said door being adapted to swing outwardly through the doorway opening to open position, a vertically disposed locking bar secured to the other of the posts, locking bolts carried by the outer face of the door, manually operated means mounted on the outer face of the door for extending and withdrawing the bolts, said bolts in their extended position engaging the locking bar and preventing outward swinging of the door and a guard plate slidably attached to the latter post and adapted to be extended to lap the inner face of the door in the closed position thereof.

5. The combination with the door posts and sill of a car, of a threshold plate secured to the sill and crossing the doorway opening, a vertically disposed pivot rod positioned adjoining the inner corner of one of the posts and having the lower end thereof bearing in the threshold plate, a stationary bearing receiving the upper end of the rod, an all metal grain door having one end thereof rolled around the rod and forming with the rod a pivot support for the door, said door being adapted to swing outwardly through the doorway opening to open position, vertically disposed, flanged, suitably positioned, reinforcing bars secured to the outer face of the door, one of the said bars being located adjacent the free end of the door, a locking lever pivotally secured to the outer face of the door, horizontally disposed locking bolts carried by the outer face of the door and passing slidably through the flange of the latter reinforcing bar and operating connections between the lever and the locking bolts, said locking bolts being adapted in the closed position of the door to be extended by the manipulation of the lever into engagement with the other of the posts to lock the door against opening.

6. The combination with the door posts and sill of a car, of a threshold plate secured to the sill and crossing the doorway opening, a vertically disposed pivot rod positioned adjoining the inner corner of one of the posts and having the lower end thereof bearing in the threshold plate, a stationary bearing receiving the upper end of the rod, an all metal grain door having one end thereof rolled around the rod and forming with the rod a pivot support for the door, said door being adapted to swing outwardly through the doorway opening to open position, vertically disposed, flanged, suitably positioned, reinforcing bars secured to the outer face of the door, one of the said bars being located adjacent the free end of the door, a locking lever pivotally secured to the outer face of the door, horizontally disposed locking bolts carried by the outer face of the door and passing slidably through the flange of the latter reinforcing bar, operating connections between the lever and the locking bolts adapted to extend the locking bolts in the swinging of the lever in one direction and to withdraw the same in the reverse movement of the lever and a vertically disposed locking

bar secured to the other of the posts and adapted to be engaged by the extended locking bolts and lock the door against opening.

7. The combination with the door posts and sill of a car, of a threshold plate secured to the sill and crossing the doorway opening, a vertically disposed pivot rod positioned adjoining the inner corner of one of the posts and having the lower end thereof bearing in the threshold plate, a stationary bearing receiving the upper end of the rod, an all metal grain door having one end thereof rolled around the rod and forming with the rod a pivot support for the door, said door being adapted to swing outwardly through the doorway opening to open position, vertically disposed, flanged, suitably positioned, reinforcing bars secured to the outer face of the door, one of the said bars being located adjacent the free end of the door, a vertically disposed lever pivotally attached to the outer face of the door, upper and lower locking bolts passing slidably through the flange of the latter reinforcing bar, a bar connecting the bolts, a link connecting the lower end of the lever to the bar and a locking bar permanently secured to the other of the door posts and adapted to engage the extended locking bolts to prevent the out swinging of the closed door.

8. The combination with the door posts and sill of a car, of a threshold plate secured to the sill and crossing the doorway opening, a vertically disposed pivot rod positioned adjoining the inner corner of one of the posts and having the lower end thereof bearing in the threshold plate, a stationary bearing receiving the upper end of the rod, an all metal grain door having one end thereof rolled around the rod and forming with the rod a pivot support for the door, said door being adapted to swing outwardly through the doorway opening to open position, vertically disposed, flanged, suitably positioned, reinforcing bars secured to the outer face of the door, one of the said bars being located adjacent the free end of the door, a vertically disposed lever pivotally attached to the outer face of the door, upper and lower locking bolts passing slidably through the flange of the latter reinforcing bar, a bar connecting the bolts, a link connecting the lower end of the lever to the bar, a locking bar permanently secured to the other of the door posts and adapted to engage the extended locking bolts to prevent the out swinging of the closed door, a guard plate slidably carried by the inner face of the latter post and adapted when shifted in one direction to pass to the inner side of the adjacent end of the closed door and means for locking the guard plate in shifted position.

9. The combination with the door posts of a car, of a vertically disposed pivot rod positioned adjacent one of the inner corners of one of the posts and having the upper and lower ends thereof suitably mounted, a substantially rectangular door formed from a metal plate having one end thereof rolled around the rod to form a pivot support for the door, said door being outwardly swingable through the doorway opening to open position and said pivot rod being located such that the rolled end of the door makes a grain tight joint with the adjacent post in all positions of the door and manually operated means carried by the outer face of the door for releasably locking the door in closed position to the other of the posts.

10. The combination with the door posts of a car and a grain door pivotally carried by one of the posts and adapted to swing through the doorway opening to open position, of a locking bar permanently fastened to the other of the posts, locking bolts slidably carried by the door, manually operated means carried by the door for extending and withdrawing the locking bolts, said locking bolts in their extended position being engageable with the locking bar to prevent out swinging of the door, a guard plate carried by the latter post and adapted to be passed to the rear of the adjacent end of the closed door and means for pressing the plate into tight contact with the door in the latter position.

11. In combination, a door forming metal plate, a reinforcing element in the form of an all metal vertical ladder permanently secured centrally to the outer face of the door plate, locking bolts mounted on the outer face of the door, a vertically disposed lever pivotally attached to the outer face of the door and having the upper end thereof adjacent the upper end of the ladder and operating connections between the lower end of the lever and the locking bolts.

Signed at Sedgewick, Alberta, Canada, this 19th day of April, 1929.

SIMON H. HENDERSON.
ALFRED G. BURCH.