E. H. KIDDER.

GRAIN CAR DOOR OPENING MECHANISM.

APPLICATION FILED JUNE 7, 1916. RENEWED FEB. 11, 1918.

1,268,580.

Patented June 4, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

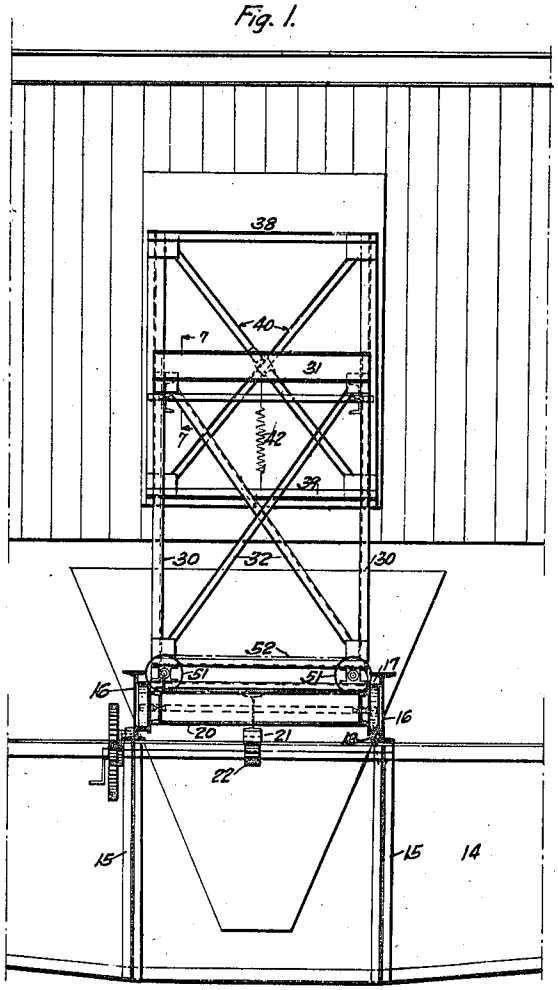
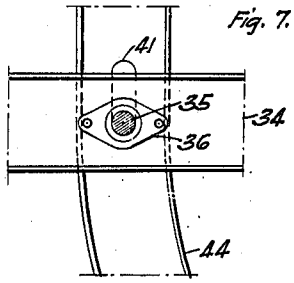


Fig. 7.



WITNESS:

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2 SHEETS—SHEET 2.

Fig. 2.

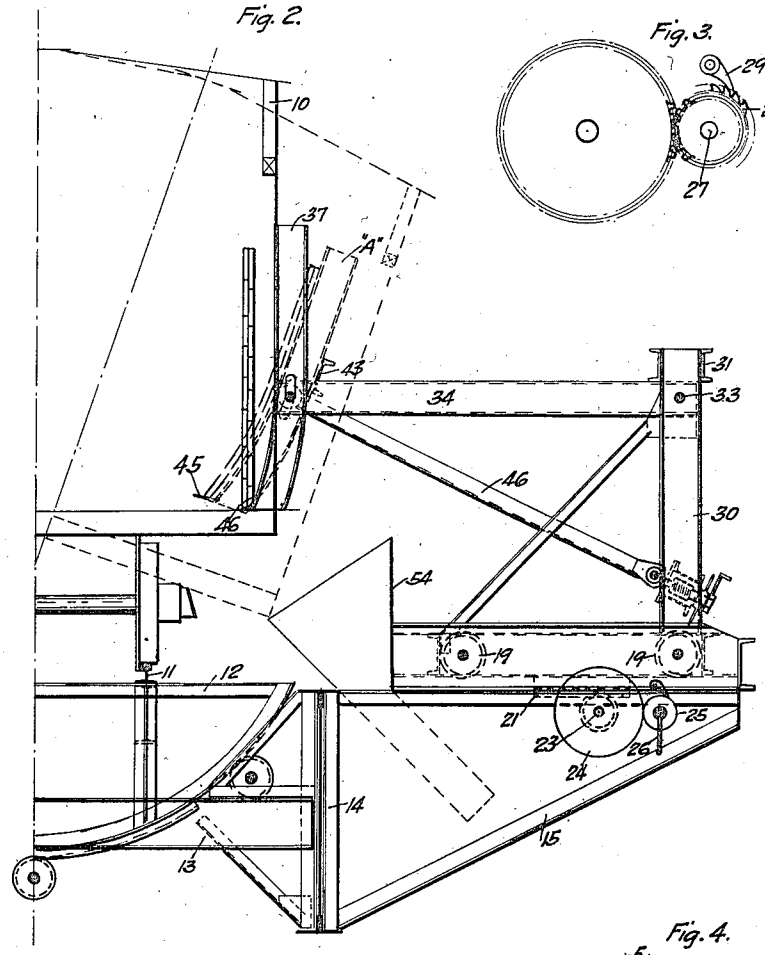


Fig. 3.

Fig. 4.

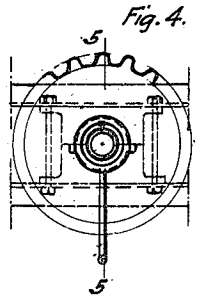


Fig. 5.

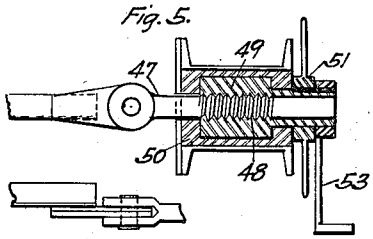


Fig. 6.

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UNITED STATES PATENT OFFICE.

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GRAIN-CAR-DOOR-OPENING MECHANISM.

1,268,580. Specification of Letters Patent. Patented June 4, 1918.

Application filed June 7, 1916, Serial No. 102,168. Renewed February 11, 1918. Serial No. 216,649.

To all whom it may concern:

Be it known that I, ELWIN H. KIDDER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Grain-Car-Door-Opening Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in grain car door opening mechanism.

As is well known, in shipping grain in box cars, it is the most common practice to form the grain doors by nailing a series of boards or planks across the side door openings, the boards or planks being nailed to the inner sides of the side door posts. In unloading the cars with this type of door, great difficulty has been heretofore experienced since it has been necessary to chop the boards out with an ax, thus requiring much time and labor and causing considerable loss of grain.

The object of the present invention is to provide simple, strong and durable means, associated with a tiltable table, for automatically prying off the grain doors as the car is tilted to one side and, more specifically, the object of this invention is to provide such a means to coöperate with the car unloader described and claimed in the patent issued to me, No. 1,176,966, on March 28, 1916, to which reference is hereby made for a more detailed description of the car unloader proper.

In the drawing forming a part of this specification, Figure 1 is a side elevation of a portion of a grain car shown in position on the car unloader disclosed in said Patent No. 1,176,966 and showing in connection therewith my improved door opening mechanism. Fig. 2 is a vertical, transverse sectional view of the car unloading device and door opening mechanism, the full lines illustrating the position of the car before it is tilted and the dotted lines indicating the relative positions of the door opening mechanism and car when the latter is tilted laterally. Fig. 3 is a detail elevational view showing gearing and ratchet by which a part of the mechanism is operated. Fig. 4 is an end elevation of part of the mechanism for effecting the vertical adjustment of the door opening mechanism. Fig. 5 is a sectional view taken substantially on the line 5—5 of Fig. 4. Fig. 6 is a detail view of a portion of the structure illustrated in Fig. 5. And Fig. 7 is a detail view, upon an enlarged scale, illustrating the pivotal connection between the door pry-off member and support therefor, Fig. 7 corresponding substantially to the line 7—7 of Fig. 1.

In said drawing, 10 denotes an ordinary box car adapted for carrying grain, the same being run on to tracks 11 carried by an oscillatable cradle 12 which, in turn, is mounted on a longitudinally tiltable table 13, one of the side frame members or girders 14 being illustrated in Figs. 1 and 2. The arrangement and operation of the tiltable table and oscillatable cradle, together with the means for clamping the car thereon while being tilted, is fully described in my said Patent No. 1,176,966 and need not here be detailed.

The improved door opening mechanism proper is preferably constructed as follows: Secured to the side frame or girder 14 of the table, and at the center thereof, are two outwardly extending built-up supports 15—15, the tops of which extend horizontally and flush with the top of the side girder 14. Mounted on the tops of said supports 15—15 are a pair of I beams 16—16, the same having secured on their inner sides upper and lower angle irons 17 and 18 to form a guide or track or channel having a plurality of wheels 19—19 which carry a rectangular frame 20 built-up from channel or other suitable structural shapes. By the means above described, it is apparent that the rectangular frame 20 is adjustable inwardly and outwardly, or laterally with respect to the car, on the I beams 16—16. To effect this lateral movement, the frame 20 has secured to its underside a horizontal rack 21, at its center, with which coöperates a pinion 22 mounted on a longitudinally extending shaft 23. The latter is mounted in suitable bearings provided in the supports 15 and at one end thereof has a gear wheel 24 with which meshes a smaller driving gear wheel 25, the latter being preferably manually operated as by the crank 26. As is clearly illustrated in Fig. 3, short shaft 27 which carries the gear 25 is also provided with a ratchet wheel 28 with which is adapted to coöperate a locking pawl 29 suitably pivotally mounted on the adjacent I beam 16. From the foregoing, it will be apparent that

the operator can adjust the frame 20 inwardly and outwardly by turning the crank 26 and that the frame 20 can be locked in any desired position by means of the pawl 29.

Carried by the frame 20 and near the outer edge thereof, are two upstanding channels 30—30 connected at their tops by longitudinally extending channels 31. The tops of said channels 30—30 are also rigidly connected with the inner portion of the frame 20 by suitable diagonally extending tension elements 32. Pivotally connected to the channels 30, as indicated at 33, is a substantially horizontally arranged frame work having side channels 34, the latter extending inwardly substantially to the side wall of the car when the latter is in normal position on the cradle 12. Extending between the channels 34, at their inner ends, is a horizontally arranged shaft or pivot 35 mounted in suitable bearings 36 secured to the channels 34, as clearly illustrated in Fig. 7. Pivotally mounted on the pivot member 35 is the grain door pry-off member which, as shown, preferably comprises a substantially rectangular frame designated generally by the reference A. The pry-off frame A comprises two substantially vertically extending side members in the form of I beams 37, a cross top angle 38 and a cross bottom angle 39, said parts being further braced and strengthened by diagonal angle members 40—40. The side members or I beams 37 of the pry-off member A are provided with elongated slots 41 to permit a vertical movement of the member A on the pivot pin 35. The normal position of the pry-off member A is as most clearly illustrated in Fig. 2 by the full lines and this is preferably accomplished by means of a spring 42, under tension, and connected at one end to the lower angle 39 and at the other end to a longitudinally extending channel 43 extending between and rigidly connected to the channels 34. As clearly illustrated in Figs. 2 and 7, the end I beams 37 of the pry-off member A are curved inwardly at their lower ends as indicated at 44 and at their extreme lower ends are provided with knife edges 45 so arranged that the same are adapted to slip under the lower board 46 of the grain door.

To adapt the door opening mechanism for cars having the floors at different levels, the pry-off member A and the horizontal thrust members by which it is supported are made adjustable vertically about the pivots 33. This is accomplished by means of a pair of diagonally extending angle irons 46 pivotally connected at their upper inner ends to the shaft 35 and at their lower outer ends pivotally attached to eye bolts 47. The latter are provided with threaded sections 48 (see Fig. 5), which coöperate with rotatable threaded sleeves 49 mounted in suitable bearings 50 affixed to the vertical posts 30. Each of the sleeves 49 is extended rearwardly to the outside of the bearing and has keyed thereto a sprocket wheel 51. The sprocket wheels 51 as shown in Fig. 1, are connected by a chain belt 52 so that the same will be operated simultaneously and equally. One of the sleeves 49, preferably the one adjacent the mechanism for adjusting the frame 20 inwardly and outwardly, has keyed thereto a crank handle 53, to effect the vertical adjustment as will be apparent.

A chute 54 is located between the supporting members 15—15 to receive the grain as discharged from the car and diverted to the desired point.

In employing my invention, the loaded grain car is first run on to the tracks 11 and clamped as described in my said Patent No. 1,176,966. The frame 20 with the parts carried thereby is then adjusted laterally to the proper position depending upon the location of the grain door. The pry-off member A is also adjusted vertically to such a position that the knife edges thereof will lie flush with the threshold of the door opening. As the car is tilted laterally by oscillating the cradle 12, in the manner described in said patent, it is apparent that the knife edges 45 are underneath the lowermost boards of the grain door and as the car continues its tilting movement, the lowermost boards of the door will first be pried off and gradually the succeeding higher boards. On account of the curved faces provided on the pry-off member A, it is apparent that the grain door boards will be forced off in succession rather than simultaneously, thereby facilitating the operation as will be understood. In this operation, it will be apparent that the frame 20 is prevented from outward movement and hence the thrust members 34 will be held stationary. The pry-off member A is permitted to swing or tilt about the pivot 35 and thus accommodate itself to the gradually changing position of the car and its door. As the movement of the car is continued, the pry-off member A will be forced downwardly somewhat against the action of the spring 42, this movement being limited by the length of the slots 41, and the final angle to which the pry-off member A can be tilted, is determined by the channel 43 which serves as a combined stop and backing for said member A. The dotted lines in Fig. 2 represent the car when it has been tilted laterally to the full extent and as there shown, it will be seen that the door boards have been pried off and forced inwardly and the grain permitted to flow out beneath the lower edge of the grain door. The grain can be permitted to flow sufficiently to clear the door, after which the same may be removed and the car then

tilted longitudinally to empty all the grain in the manner described in my said patent. When the car is returned to its normal position, it is apparent that the pry-off member will readily clear the door opening and the entire door opening mechanism retracted so as to clear the side of the car and permit the latter to be hauled away.

From the preceding description, it will be seen that the arrangement which I have provided is simple, may be readily applied to different types of grain car unloaders and particularly that type disclosed in my said Patent No. 1,176,966; the same may be cheaply constructed from commercial structural shapes; the same can be adjusted for cars of different widths and having different floor heights; and the entire operation of prying-off the door is accomplished automatically and simultaneously with the tilting of the car laterally in the unloading operation.

I claim:

1. In mechanism of the character described, the combination with a member provided with rails and means for tilting a car laterally while on said rails and immovable with respect thereto, of a relatively stationary device located to one side of the car for forcing a side grain door of the car inwardly while the car is being tilted laterally toward said device.

2. In mechanism of the character described, the combination with means for tilting a car laterally, of a relatively stationary device located to one side of the car for forcing a side grain door of the car inwardly while the car is being tilted laterally toward said device, said device being adjustable inwardly and outwardly relative to the car to thereby coöperate with cars of different widths.

3. In mechanism of the character described, the combination with means for tilting a car laterally, of a relatively stationary device located to one side of the car for forcing a side grain door of the car inwardly when the car is tilted laterally toward said device, said device having elements thereof adjustable vertically to thereby adapt the same for use with cars having different floor levels.

4. In mechanism of the character described, the combination with means for tilting a car laterally, of a relatively stationary device located to one side of the car for forcing a side grain door of the car inwardly when the car is tilted laterally toward said device, said device being adjustable laterally as an entirety and having portions thereof adjustable vertically whereby to adapt the device for coöperation with cars of different widths and having different floor levels.

5. In a mechanism of the character described, the combination with a relatively stationary supporting framework, of a unitary, relatively rigid frame horizontally and slidably adjustably mounted on said framework, a pry-off member carried by said frame and adapted to engage the grain door of a car and force the same inwardly when the car and said pry-off member are moved relatively to each other, and means for locking said frame as a unit with respect to said framework during said relative movement.

6. In a mechanism of the character described, the combination with a supporting framework, of a frame adjustably mounted thereon bodily as a unit, a pry-off member pivotally attached to said frame and arranged to engage the grain door of a car and pry the same inwardly of the car when the latter and said pry-off member are moved relatively to each other, and means for locking said frame as a unit in adjusted position with respect to said framework during said relative movement.

7. In combination with means for tilting a car sidewise, a door pry-off member mounted on a relatively fixed support, said member being curved on its inner face and adapted to engage the grain door of a car, said curved face causing different portions of the grain door to be pried off in succession.

8. In a grain car door opening mechanism, the combination with a suitable support, of a pry-off member pivotally mounted on said support, said pry-off member having a curved operating face adapted to pry different portions of the door in succession.

9. In a grain car door opening mechanism, the combination with a suitable support, of a pry-off member carried by said support, said pry-off member being curved on its inner operating face and having knife edges at the bottom thereof whereby to engage the lowermost portion of the grain door first and force the same inwardly of the car upon relative movement between the car and said member.

10. In combination with means for tilting a car sidewise, a grain door opening mechanism including, a frame adjustable inwardly and outwardly relatively to the side of the car, and a pry-off member pivotally mounted on said frame and located to engage the grain door of the car when the latter is tilted sidewise.

11. In mechanism of the character described, the combination with means for tilting a car to one side, of a grain door opening mechanism associated therewith including, a supporting frame work, and a pry-off member pivotally mounted on said frame work, said pry-off member being adjustable vertically and located so as to engage the grain door of the car when the latter is tilted.

12. In mechanism of the character described, the combination with a suitable support, of a frame adjustably mounted on said support, a thrust member carried by said frame and arranged to extend inwardly toward the side of a car, a pry-off member pivotally mounted on said thrust member, and means for adjusting the thrust member to thereby vary the height of the pry-off member.

13. In mechanism of the character described, the combination with a tiltable table having a cradle rockably mounted thereon, the latter being adapted to support a car and tilt the latter to one side, of supporting elements rigidly fixed to said table, a frame adjustable inwardly and outwardly relatively to the car when on said cradle, means for locking said frame in adjusted position, thrust members carried by said frame, and a pry-off member pivotally mounted on said thrust member and arranged to engage the grain door of a car when the latter is tilted to one side to thereby pry off the door as the car is being tilted.

14. In mechanism of the character described, the combination with a tiltable table having a cradle rockably mounted thereon, the latter being adapted to support a car and tilt the latter to one side, of supporting elements rigidly fixed to said table, a frame adjustable inwardly and outwardly relatively to the car when on said cradle, means for locking said frame in adjusted position, thrust members carried by said frame and a pry-off member pivotally mounted on said thrust member and arranged to engage the grain door of a car when the latter is tilted to one side to thereby pry off the door as the car is being tilted, said thrust member being adjustable in a vertical plane to thereby vary the height of said pry-off member to permit the same to be used with grain cars having different floor levels.

15. In mechanism of the character described, the combination with a tiltable table having a cradle rockably mounted thereon, the latter being adapted to support a car and tilt the latter to one side, of supporting elements rigidly fixed to said table, a frame adjustable inwardly and outwardly relatively to the car when on said cradle, means for locking said frame in adjusted position, thrust members carried by said frame, and a pry-off member pivotally mounted on said thrust member and arranged to engage the grain door of a car when the latter is tilted to one side to thereby pry off the door as the car is being tilted, said pry-off member being curved inwardly at its lower edge to thereby engage the lowermost boards of the door first and pry the boards of the door off in succession as the car is tilted.

16. In combination with mechanism arranged to support a car and to tilt it both endwise and sidewise after it is in position on the support and relatively stationary thereto, of car side door pry-off means associated with said mechanism, said means being adjustable vertically and laterally to thereby adapt the same for operating on cars of different dimensions, said means being arranged to engage a side door for its full height and operable to pry off the entire side door while the car is supported on said mechanism.

17. The combination with mechanism for unloading a car filled with material in bulk, of means in juxtaposition with respect to said mechanism, said means being adjustable vertically and laterally to thereby operate on cars of different dimensions, said means having a member arranged to engage the door from top to bottom and thereby adapted to pry off the entire door of the car at one operation when the car is on said mechanism.

In witness that I claim the foregoing I have hereunto subscribed my name this 5th day of June, 1916.

ELWIN H. KIDDER.

Witness:
JOSEPH HARRIS.