March 26, 1957 H. R. STRAIGHT 2,786,587

COMBINATION DOOR OPENER AND GRAIN CHUTE FOR CAR DUMPERS

Filed Nov. 9, 1954 3 Sheets-Sheet 1

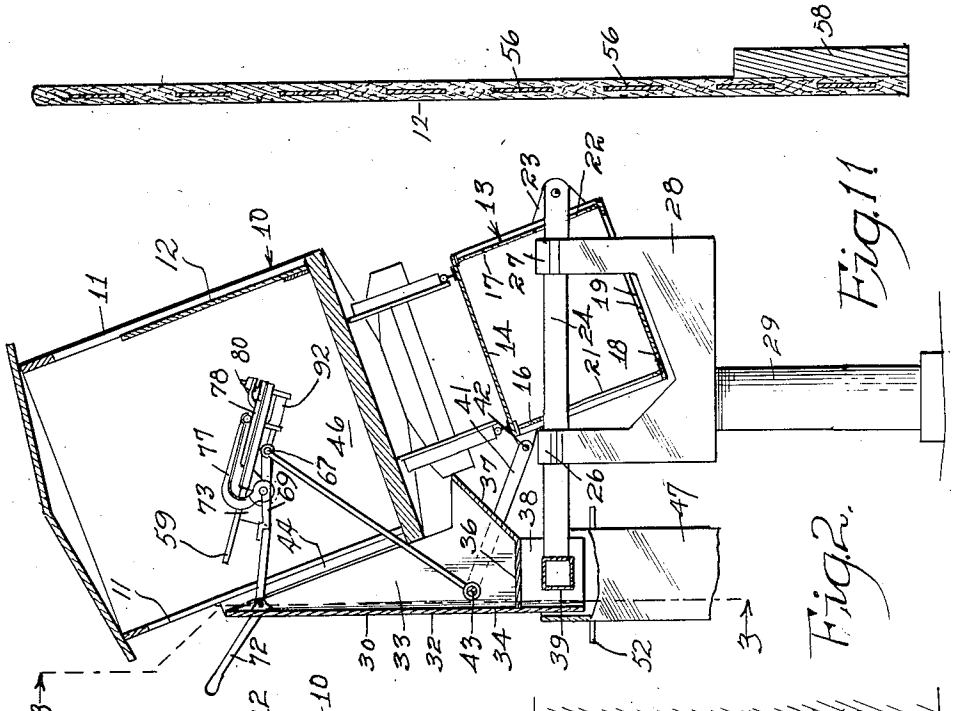

Fig. 1.

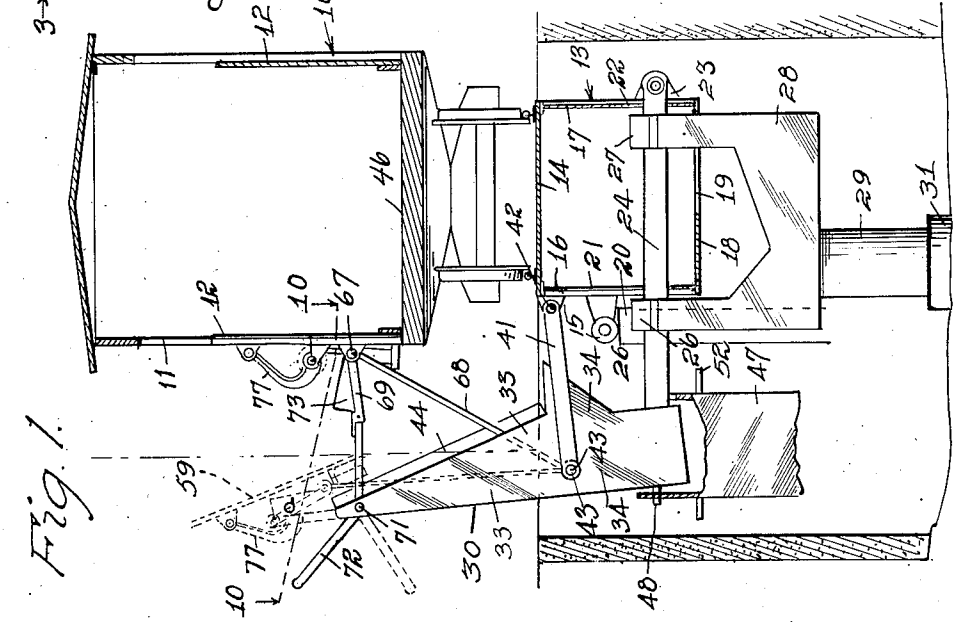

Fig. 2.

Fig. 11

Inventor
Healer R. Straight
by Alfred G. Teague
Atty

March 26, 1957 H. R. STRAIGHT 2,786,587

COMBINATION DOOR OPENER AND GRAIN CHUTE FOR CAR DUMPERS

Filed Nov. 9, 1954 3 Sheets-Sheet 2

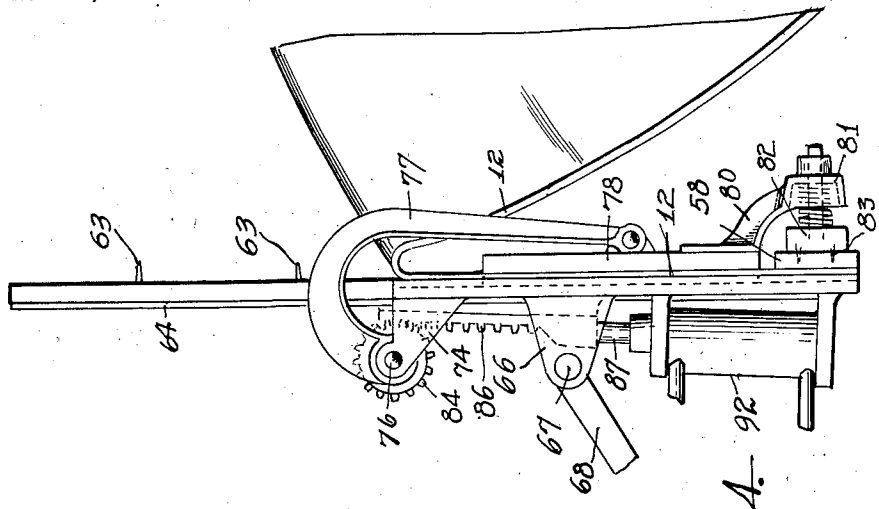

Fig. 4.

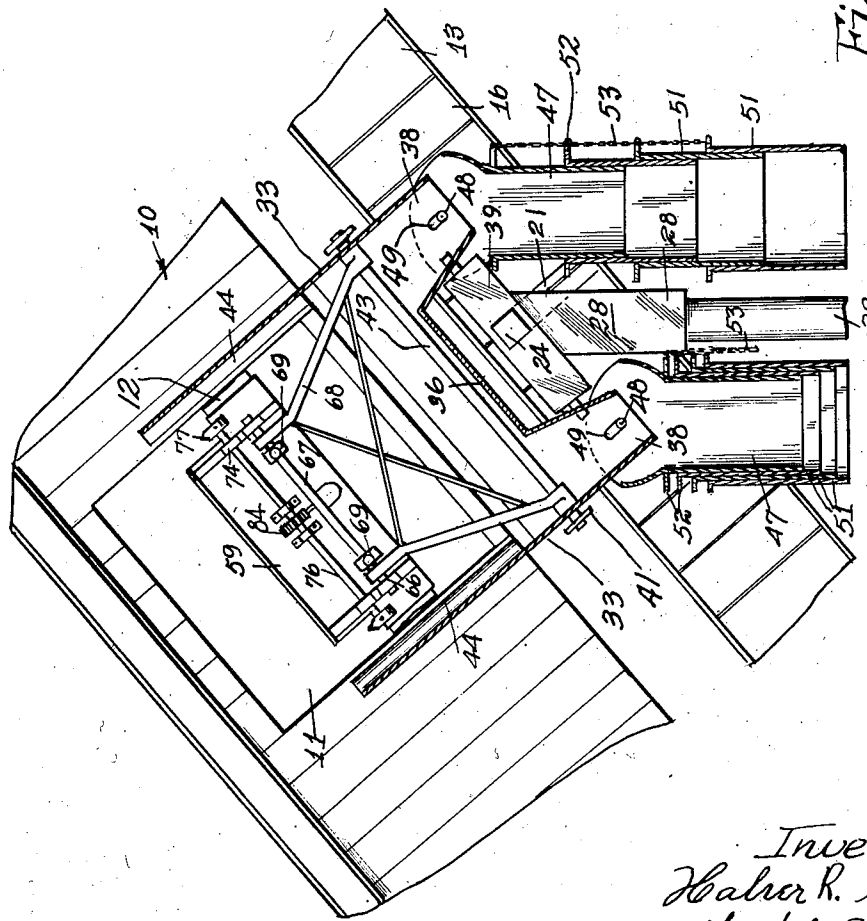

Fig. 3.

Inventor
Halver R. Straight
by Alfred G. Heagney
Atty

March 26, 1957 H. R. STRAIGHT 2,786,587

COMBINATION DOOR OPENER AND GRAIN CHUTE FOR CAR DUMPERS

Filed Nov. 9, 1954 3 Sheets-Sheet 3

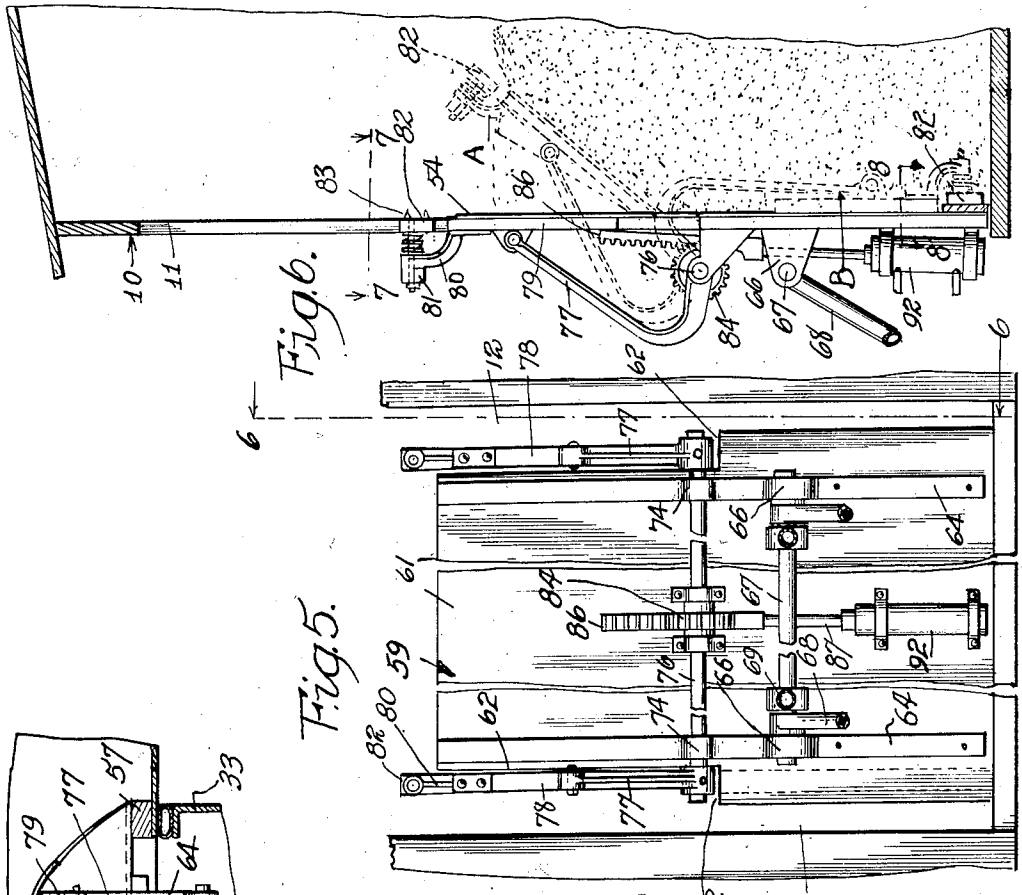

Fig. 6.

Fig. 5.

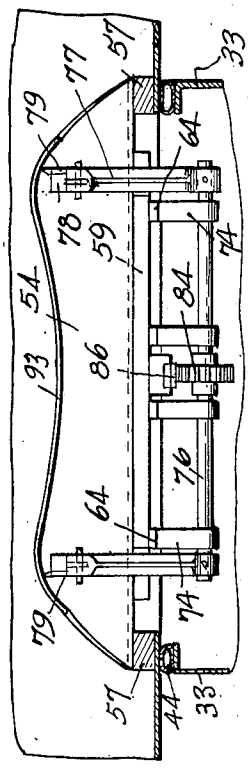

Fig. 7

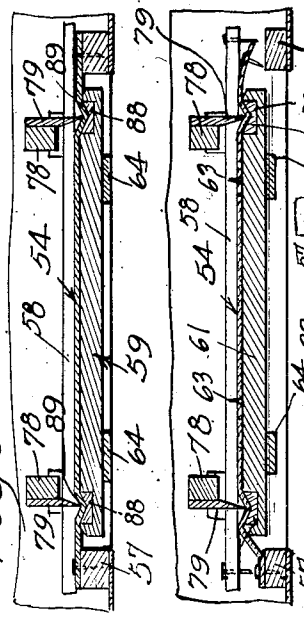

Fig. 8.

Fig. 9.

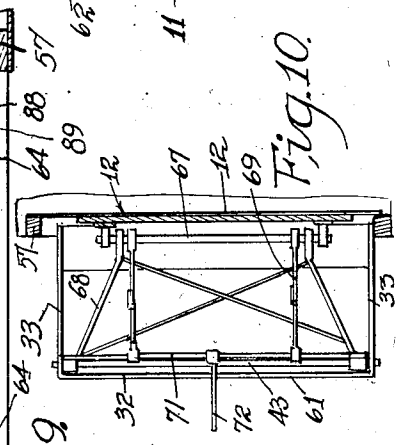

Fig. 10.

Inventor
Halver R. Straight
by Alfred G. Hague
Atty

United States Patent Office

2,786,587

Patented Mar. 26, 1957

2,786,587

COMBINATION DOOR OPENER AND GRAIN CHUTE FOR CAR DUMPERS

Halver R. Straight, Adel, Iowa, assignor to Straight Engineering Co., Adel, Iowa, a corporation of Iowa

Application November 9, 1954, Serial No. 467,821

12 Claims. (Cl. 214—46.26)

My invention relates to improvement in mechanism adapted to be used in connection with railway car dumpers for automatically opening the grain doors and for automatically conducting the grain from the opened door to a suitable conveyor hopper beneath the discharge opening of the grain car, simultaneously as the car is moved to dumping position.

Hereinbefore when a railway box car is used for the transportation of freely flowable material, such as grain, the lower part of the door opening is closed by detachable and horizontally arranged grain doors formed of wooden planks, pressed fiber board, or reinforced fiber, having their ends secured to the door frame by nails, or other means. If the car is loaded with grain against the inner face of the grain door and it is desired to empty the car, the grain door is removed by a mechanically operated ram to which lateral inward pressure is applied to the outer surface of the door to move it inwardly and loosen it from the door jams, to an inclined position. The inner face of the ram is usually provided with inwardly and laterally projecting prongs which enter the grain door and retain it in substantially its original shape, with space between the lower edge of the grain door and the bottom of the car to permit grain to flow outwardly as the car is tilted transversely. The above arrangement worked quite satisfactory for the removal of the wooden doors, but very unsatisfactory when used to remove the fiber, or the reinforced fiber grain doors, as the fiber doors would become torn and shredded. The torn portions of the door would flow out with the grain and cause trouble in the processing of the grain.

It is therefore an object of my invention to provide in a railway dumping apparatus; improved means for removing the fiber doors without becoming torn and shredded with the door held against being moved out with the grain.

Another object of my invention is to provide in a door opener, an improved ram, whereby either the wooden grain door or the fiber door may be moved to open position.

Another object of my invention is to provide in that type of car dumpers employing a car supporting cradle adapted to rock in a vertical plane longitudinal of itself and mounted to tilt transversely of its longitudinal axis; improved means of simple, durable and inexpensive construction for automatically causing the grain doors to be loosened from their supports and swung inwardly to an open position as the car is tilted to its inclined position, and to maintain the doors in said opened position during the entire time the car is in any of its elevated and longitudinal rocked positions.

A further object of my invention is to provide in a car dumper of the type above described, improved means for conducting the grain from the opened doors to a suitable conveyor hopper beneath the discharge side of the car when the car is in any of its tilted or rocked positions without interference from the wind and other weather conditions.

A further object of my invention is to provide in a combined chute and door opener employing a support and a door engaging element; improved means carried by the support for moving the door engaging element to and from its position engaging the door.

A further object of my invention is to provide in a grain chute and door opener for tiltable car dumping cradles; improved means for attaching the chute and opener to the cradle whereby the tilting movement of the cradle will cause the chute and opener to be actuated.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated and attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Fig. 1 is an end elevation of my improved grain chute and door opener, showing the manner that they are attached to the dumper cradle, the car and cradle being shown in cross section, with the car in its normal horizontal position.

Fig. 2 is the same as Fig. 1 with the car in its transverse horizontal tilted and dumping position.

Fig. 3 is a view looking substantially along the line 3—3 of Fig. 2 showing the car tilted in a direction longitudinally thereof with portions of the ends of the car being broken away.

Fig. 4 is an enlarged detail end elevation of the door opening ram and the manner the same is clamped to a fiber door before being moved to open position.

Fig. 5 is an enlarged segmental side elevation of the door opening ram mounted in the door frame of a box car.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5 some of the parts being shown in various operative positions in dotted lines.

Fig. 7 is a sectional plan view taken on the line 7—7 of Fig. 6 with the movable element of the ramp in its dotted line position.

Figs. 8 and 9 are sectional views taken on the line 8—8 of Fig. 6.

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 1.

Fig. 11 is an enlarged detail sectional view of the reinforced type of fiber door.

Referring to Figs. 1, 2 and 3, I have used the reference numeral 10 to indicate a box car having door openings 11, and grain doors 12 of the type formed of reinforced fiber, such as paper. The car 10 being supported by a cradle 13 formed of fabricated sheet metal and rectangular in cross section, having a top portion 14, side members 16 and 17 and a bottom 18, the central portion of the bottom having an opening 19. The side member 16 is provided with a vertical slot 21, the side member 13 having a shorter slot 22 and a bracket 23 adjacent to said slot.

Extending through the slots 21 and 22 I have provided a square shaft 24 having one end pivoted to the bracket 23 and the other end extending beyond the side member 16 some distance, as illustrated in Fig. 2. The shaft 24 is provided with rounded portions mounted in bearings 26 and 27. The bearings are mounted on the upper ends of a yoke 28 carried by the upper end of a vertical hydraulic piston 29. The piston 29 is slidably mounted in a fixed and vertically arranged cylinder 31 to cause the shaft 24 to move in a vertical path as the piston is moved vertically to cause the car 10 to be tilted transversely, as illustrated in Fig. 2, by the initial upward movement of the piston. A wheel 15 mounted on the cradle and supported by a fixed track 20 serves as a pivot for the tilting cradle. Further upward movement of the piston causes the car to be rocked in its longitudinal plane as illustrated in Fig. 3 in a manner more

fully disclosed in a copending application Serial No. 378,037, filed September 2, 1953.

My improved grain chute and door opener comprises a chute **30** including a rectangular side **32** having tapered end members **33**. The lower ends of the ends **33** and the side **32** terminating in a hopper portion **34** including a bottom **36** having an upwardly and outwardly inclined portion **37** to provide a grain receiving portion. Each end of the bottom **36** terminates in a spout **38**. The inner side of each spout **38** is pivotally mounted on the ends of a beam **39** fixed to the free end of the shaft **24**, as illustrated in Fig. 3, thus providing means whereby the hopper and the chute mounted on said shaft will be raised and lowered simultaneously with the piston **29** and at the same time permitting it to rock in unison with the cradle and also at the same time permit the upper end of the chute **30** to oscillate slightly toward and from the car **10** in a manner hereinafter more fully set forth.

To accomplish the oscillation of the upper end of the cradle I have provided links **41**, each having one of its ends connected to the cradle by means of pivots **42** and their other ends connected to corresponding outer ends of a shaft **43**. Said shaft **43** is mounted in the ends of the hopper **34** with the links substantially in a horizontal position, when the car is in its normal horizontal position, with the chute inclined upwardly and outwardly and with the upper end of the chute spaced from the car a distance greater than the clearance distance required by the "American Railway Engineering Association." The links **41** are moved to an inclined position at the time the cradle and car are moved to a tilted position as illustrated in Fig. 2, causing the upper end of the chute to be moved toward the car with the inner edges of the side members **33** near the adjacent side of the car. The space between the car and said side edges are filled by means of yieldable members **44**, such as rubber tubes, to make a tight joint between said car and the edges of said side members **33**. The inner edge of the member **37** is moved to position beneath the lower edge of the car floor **46** at the time the chute is moved inwardly.

Pivotally connected to the lower end of each of the spouts **38** I have provided a telescopic grain conductor **47** by means of pins **48** slidably mounted in slots **49** in the ends of the spouts **38**, best illustrated in Fig. 3. Each of the spouts **47** is provided with a slidable sleeve **51**, each having a lateral flange **52** at its upper end. The flanges **52** being connected by chains **53** to limit their downward movement. The pivots **48** and the slots **49** provide limited universal movement for the upper ends of the spouts **47**.

The lower portion of the door opening **11** is closed by the grain door **12** formed of reinforced fiber. The reinforcing members being of thin steel strips **56**. The ends of the strips are nailed to the door jams **57**. The lower edge of the door **12** is fixed to a reinforcing plank **58**, the ends of which are also fixed to the door jams by nailing.

For automatically moving the door to open position as the car is tilted to its transverse inclined position, I have provided the following mechanism: Said mechanism including a door engaging ram **59** and link mechanism **41** for operating the ram.

The ram comprises a rectangular plate **61** (see Fig. 5) having the upper corner of each of its edges provided with a notch **62**. The ram being of a width slightly less than the width of the door opening and of a height substantially equal to the height of the grain door. The inner face of the ram is preferably provided with a plurality of prongs **63**, more particularly when the ram is used in connection with the plank form of door.

For operating the ram I have provided on the outer face of the ram vertically arranged bars **64** each having a bracket **66** supporting a shaft **67** adapted to support the upper end of a pusher frame **68**. The lower end of the frame **68** being mounted on the shaft **43** (see Fig. 3). The upper end of the pusher frame is pivotally connected to toggle joints **69** having their inner ends connected to the shaft **67** and their outer end connected to a shaft **71** mounted in the upper end of the side members **33**. An operating lever **72** is fixed to the central portion of the shaft **71** by means of which the toggle joints may be actuated to swing them from their solid line position to their dotted line position, as illustrated in Fig. 1 and to move the ram from its inoperative position to position adjacent to the grain door, as illustrated in dotted and solid lines in Fig. 1. It will thus be seen that the ram is firmly held against the grain door, as the car is tilted transversely the grain door will be moved inwardly to the position shown in Fig. 2 and resting on the bracket **73**, to permit grain to flow under the door and around its ends and through the door opening.

When the fabric form of grain door is encountered, some trouble develops due to tearing of the fabric and due to the fact that sometimes one end of the reinforcing strips will pull loose before the other end, as illustrated in Fig. 9, and in a manner above referred to in the objects.

To overcome this difficulty I have provided the following mechanism: Mounted in brackets **74** carried by the bars **64** is a shaft **76** having fixed at each end a curved arm **77** mounted to swing in the corresponding notch **62** of the ram **59**. Pivotally connected to the free end of the arm **77** is a clamp bar **78** having one of its faces provided with a tapered bar **79** with its sharp edge adjacent to the outer surface of the upper end of the grain door as illustrated in solid lines of Fig. 6, the lower end of the clamps **79** terminating some distance above the vertical center of the grain door. The upper end of each clamp being provided with a bracket **80** having a socket **81** for supporting a spring actuated block **82** having inwardly projecting prongs **83** on its inner surface. The central portion of the shaft **76** is provided with a gear pinion **84** to impart rotation thereto. A slidably mounted rack **86** provides means for rotating said shaft. Reciprocating movement is imparted to the rack by means of a hydraulically operated double acting piston rod **87**. The inner face of the ram is provided with vertical bars **88** each having a groove **89**, said bars **88** having their upper ends terminating at the vertical center of the ram **59** with the grooves **89** in vertical alignment with the sharp edges of the clamps **78**.

The practical operation of my invention is as follows: Assuming that the car **10** and the grain chute are in their normal positions as shown in Fig. 1 with the door operating ram in dotted position. The operator then grasps the lever **72** and moves it to its solid line position causing the toggle joints **69** to be moved to their closed position with the ram **59** adjacent to the outer surface of the grain door **12**, with the hopper beneath the floor **46**. If the door is of the flexible fiber type, fluid under pressure is admitted to the upper end of the hydraulic cylinder **92** to move the rod **87** downwardly and with it the rack **86** causing the pinion **84** to rotate in a clockwise direction and in turn causing the arms **77** and the bars **79** to move inwardly to the dotted line position A of Fig. 6, and also that of Fig. 7, with the ends of the upper ends of the door **54** loosened from the jams **57**. This inward pressure of the bars **79** will cause the central portion of the door **12** to bulge outward and in turn the loosened ends of the door to pull toward each other to such an extent that the bars **78** and **79** will slide past said loosened ends, to dotted line position B (Fig. 6) with the sharp edges of the bars **79** against the inner face of the door **12** and with the inner face of the block **82** against the inner face of the strip **58**, further outward pressure applied to the bars causes the thin fiber door and its reinforcing strips **56** to be

dented into the grooves 89 (see Fig. 9) with the prongs 83 imbedded in the strip 58, the door is at this time firmly clamped to the ram 59 (see Figs. 4, 8 and 9). Further tilting movement of the car will cause the ram to be moved inwardly and with it the door 12 finally moved to the position illustrated in Fig. 2, with the ram 59 resting on the bracket 73. The tilting movement of the cradle causes the links 41 to be inclined and the upper end of the chute to be moved inwardly toward the car with the yieldable member 44 sealing the space between the side members 33 and the car.

It will therefore be seen that I have provided a grain chute and car door opener of simple construction adapted to be used in connection with car dumpers which is automatically operated by the tilting and rocking movements car supporting cradle. And also a door opener adapted to be used with the ordinary plank grain doors in which case the clamp mechanism is retained in an inoperative position, illustrated in solid lines in Fig. 6. And further a door opener mechanism particularly adapted to be operated on the fiber type of doors wherein the door may be loosened from the door jams without tearing and shredding it into smaller pieces. It will also be seen that I have provided a grain conveying chute in which the grain or other flowable material may be conducted to a receiving hopper mounted beneath the ground surface into a substantially closed chute and conducting pipes, so that the material is not affected by the elements of the weather. My improved construction also provides means whereby the large amount of dust which usually accompanies materials to be unloaded, may be conducted by any air exhausting mechanism now in common use.

I claim:

1. In combination, a vertically movable lift device, a car supporting cradle carried by said lift device, mounted to tilt transversely and to rock longitudinally by upward movement of said lift, said cradle being adapted to support a railway car having a grain door opening in one side, an upright grain chute having one side open and opposite said grain door, a hopper having a receiving side at the lower end of said chute for receiving grain from said door opening as the car is moved to its transverse tilted position, the width of the chute being equal to or greater than the width of the door opening, each end of the hopper terminating in a discharge spout, means pivoting the lower end of said hopper to said lift to permit it to rock in unison with said cradle, and the upper end of said chute to oscillate toward and from said car with the receiving side of the hopper beneath the lower end of said door opening when the car is transversely inclined, and link means operatively connecting said cradle and chute, to actuate the upper end of said chute.

2. In combination, a vertically movable lift device, a car supporting cradle carried by said lift device, mounted to tilt transversely and to rock longitudinally by upward movement of said lift, said cradle being adapted to support a railway car having a grain door opening in one side, an upright grain chute having one side open and opposite said grain door, a hopper having a receiving side at the lower end of said chute for receiving grain from said door opening as the car is moved to its transverse tilted position, the width of the chute being equal to or greater than the width of the door opening, each end of the hopper terminating in a discharge spout, means pivoting the lower end of said hopper to said lift to permit it to rock in unison with said cradle, and the upper end of said chute to oscillate toward and from said car with the receiving side of the hopper beneath the lower end of said door opening when the car is transversely inclined, and link means operatively connecting said cradle and chute, actuated by the tilting movement of the cradle for oscillating the upper end of said chute, and upright telescopic tubular conveyors each having its upper end pivoted to the lower end of a corresponding discharge spout.

3. In combination, a vertically movable lift device, a car supporting cradle carried by said lift device, mounted to tilt transversely and to rock longitudinally by upward movement of said lift, said cradle being adapted to support a railway car having a grain door opening in one side, a grain chute comprising a substantially rectangular back portion and tapered end members, the lower ends of said chute terminating in a hopper having a bottom with its forward edge terminating in an upwardly inclined portion to form a receiving edge, each end of the bottom including a discharge spout, means connecting the lower end of said chute to said lift to permit the chute, with its open side opposite the door opening, to rock in unison with the rocking movement of said cradle and also to permit oscillation of the upper end of said chute toward and from said car, means operatively connecting the chute to said cradle to cause the chute to move toward the car as the cradle is tilted to its transverse inclined position, with the edges of said end members adjacent to the sides of the car and with the receiving edge of said hopper beneath the door opening and means for operating the chute to rock in unison with the cradle.

4. For use with car dumping apparatus which includes a vertically movable lift device, a cradle adapted to support a railway car having a door opening in one side thereof, and means movably mounting said cradle on said lift device for rocking movement relative thereto, a grain chute comprising a substantially rectangular back portion and tapered end members, yieldable sealing means mounted on the free edge of each tapered end member, the lower ends of said chute terminating in a hopper having a bottom with its forward edge terminating in an upwardly and outwardly inclined portion to form a receiving edge, each end of the bottom including a discharge spout, means connecting the lower end of said chute to said lift to permit the chute, with its open side opposite the door opening, to rock in unison with the rocking movement of said cradle and also to permit oscillation of the upper end of said chute toward and from said car, means operatively connecting the chute to said cradle to cause the chute to move toward the car as the cradle is tilted to its transverse inclined position, with the sealing edges of said end members adjacent to the sides of the car and with the receiving edge of said hopper beneath the door opening, and means operating the chute to rock in unison with the cradle.

5. In a car dumping apparatus including a cradle substantially rectangular in cross section having each side provided with a vertical slot midway between its ends, a shaft mounted in said slots near their lower ends, means pivoting one end of said shaft to its corresponding side member, the other end of said shaft extending beyond its corresponding side member, means pivotally and horizontally mounting the shaft to the upper end of said piston, whereby the pivoted side of the cradle will be elevated by the initial upward movement of said piston with the top end of the slot of the last side member resting on said shaft with the cradle inclined transversely substantially 20° to the horizontal, said cradle being adapted to support a railway car having a door opening in one side, a grain chute for receiving grain from said door opening when the car is in its inclined position comprising, an upright side portion having tapered end portions their lower ends terminating in a hopper spaced from said cradle with its lower end pivoted on an axis substantially parallel with the side of said cradle, means supported by the free end of said shaft pivotally connecting the lower end of said hopper to said shaft, and links having one of their ends pivoted to said cradle and their other end pivotally connected to said side members at points intermediate their ends whereby the upper end of said side member will be oscillated toward and from the car as the cradle is tilted transversely.

6. In a car dumping apparatus including a cradle substantially rectangular in cross section having sides

each provided with a vertical slot midway between its ends, a shaft mounted in said slots near their lower ends, means pivoting one end of said shaft to its corresponding side member, the other end of said shaft extending beyond its corresponding side member, means pivotally and horizontally mounting the shaft to the upper end of said piston, whereby the pivoted side of the cradle will be elevated by the initial upward movement of said piston with the top end of the slot of the last member resting on said shaft with the cradle inclined transversely, substantially 20° to the horizontal, said cradle being adapted to support a railway car having a door opening in one side, a grain chute for receiving grain from said door opening when the car is in its inclined position comprising, an upright side portion having tapered end portions their lower ends terminating in a hopper spaced from said cradle, a pivot beam fixedly mounted on the free end of said shaft and parallel with said cradle, means pivoting the lower end of said hopper to the ends of said beam, and links having one of their ends pivoted to said cradle and their other ends pivotally connected to said side members at points intermediate their ends whereby the upper end of said side member will be oscillated toward and from the car as the cradle is tilted transversely.

7. In combination, a vertically movable lift device, a car supporting cradle carried by said lift device, mounted to tilt transversely and to rock longitudinally by upward movement of said lift, said cradle being adapted to support a railway car having grain door openings, one in each side, an upright grain chute having one side open and opposite one of said grain door openings, means pivoting the lower end of the grain chute to said lift to provide for vertical and rocking movement of the grain chute in unison with the movement of said cradle, so that the upper end of said chute is oscillatable toward and from said car, and means operatively connecting said cradle to said chute to cause the upper end of the chute to move to and from the car as the cradle is tilted transversely.

8. In a device of the class described, a door opener ram adapted to be moved into and out of a door opening, and into contact with the outer face of the lower portion of a flexible grain door, said ram comprising a substantially rectangular plate of a width slightly less than that of the door opening, the inner face of said plate having a vertical groove near each of its side edges, a co-acting clamp having a beveled edge for each of said grooves, means mounting each of said clamps to swing inwardly and downwardly from a vertical position adjacent to the outer surface of the upper portion of the side edges of the grain door to positions opposite said grooves, to first engage and loosen the ends of the upper portion of the grain door, and then to swing past said loosened ends as the clamps move inwardly and downwardly and to clamp the lower portion of the flexible door between the clamps and their corresponding grooves, and means for moving the ram inwardly and upwardly from said door opening.

9. In a device of the class described, a door opener ram adapted to be moved into and out of a grain door opening of a box car and into contact with the outer face of a flexible grain door, having a reinforcing strip at its bottom edge, comprising a substantially rectangular plate of a width slightly less than the door opening, a shaft mounted on said plate near the vertical center of said door, an arm fixed to said shaft near the ends of said plate, an upright clamp bar connected to the free end of said arm for limited pivotal movement, a yieldable gripper block fixed to the upper end of said clamp bar, mechanically operated means for imparting rotation to said shaft, to swing the clamping bars inwardly and downwardly to grip the lower portion of the flexible door between the clamp bars and their corresponding portions of the inner face of said plate with the reinforcing strip between the gripper block and said plate, and means for moving the ram inwardly from the door opening.

10. In a device of the class described, a door opener ram adapted to be moved into and out of a door opening of a box car and in contact with the outer face of a flexible grain door, comprising a substantially rectangular plate of a width slightly less than the door opening, and of a height substantially equal to the height of the grain door, the upper corners of the side edges of said plate each having a notch, a shaft mounted on said plate near the lower edges of said notches, an arm fixed to said shaft opposite each notch, a clamp bar pivoted to the free end of each of said arms for limited pivotal movement and mounted normally in a corresponding notch, mechanically operated means for imparting rotation to said shaft, to swing the clamping bar inwardly and downwardly, to first engage the ends of upper portion of the grain door, to loosen the ends of the door as the clamp bar is moved inwardly and downwardly, to grip the lower portion of the flexible door between the clamp bars and their corresponding portions of the inner face of said plate and means for moving the ram inwardly from the lower edge of the door opening.

11. In a device of the class described, a door opener ram adapted to be moved into and out of a door opening, and into contact with the outer face of the lower portion of a flexible grain door, said ram comprising a substantially rectangular plate of a width slightly less than the door opening, the inner face of said plate having a vertical groove near each of its side edges, a co-acting clamp having a beveled edge for each of said grooves, a rotatably mounted shaft supporting said clamps to swing inwardly and downwardly from a vertical position adjacent to the outer surface of the upper portion of the side edges of the grain door to positions opposite said grooves, as the shaft is rotated, to first engage the ends of the upper portion of the grain door, to loosen said ends, as the clamps move inwardly and downwardly, and to clamp the lower portion of the flexible door between the clamps and their corresponding grooves, a pinion gear on said shaft, a rack bar operatively connecting said pinion, hydraulic means for imparting reciprocating movement to said rack bar, and means for moving the ram inwardly and upwardly from the lower end of said door opening.

12. In a device of the class described, a vertically movable lift device, a car supporting cradle carried by said lift device, mounted to tilt transversely and to rock longitudinally by upward movement of said lift, said cradle being adapted to support a railway car having a grain door opening and a flexible grain door in said opening, an upright grain chute having one side open and positioned opposite said grain door opening, means pivoting the lower end of the grain chute to said lift to permit said chute to move vertically and to rock in unison with the movement of said cradle, with the upper end of said chute to oscillate toward and from said car, and means operatively connecting said cradle to said chute to cause the upper end of the chute to move toward and from the car as the cradle is tilted transversely, means for opening said grain door, comprising an upright door opening ram adapted to be moved into and out of said door opening, and into contact with the outer face of the lower portion of said flexible grain door, said ram comprising a substantially rectangular plate of a width slightly less than that of the door opening, a horizontal shaft mounted on said plate near the vertical center of said door, an arm fixed to said shaft near the side edges of said plate, a clamp bar pivoted to the free end of each of said arms for limited pivotal movement and mounted in an upright position in a plane common to said plate, mechanically operated means for imparting rotation to said shaft, to swing said arms and clamp bars inwardly and downward-

ly, a pusher frame, means pivotally connecting one end of the pusher frame to said ram near the lower end of said ram with the pusher frame inclined downwardly and outwardly, means pivotally connecting the lower end of said frame to said chute intermediate its upper and lower ends, means supported by the upper end of said chute for moving the ram toward and from the upper end of chute.

References Cited in the file of this patent

UNITED STATES PATENTS

1,576,360 Richardson ---------- Mar. 9, 1926

FOREIGN PATENTS

496,706 Germany ---------- Apr. 25, 1930