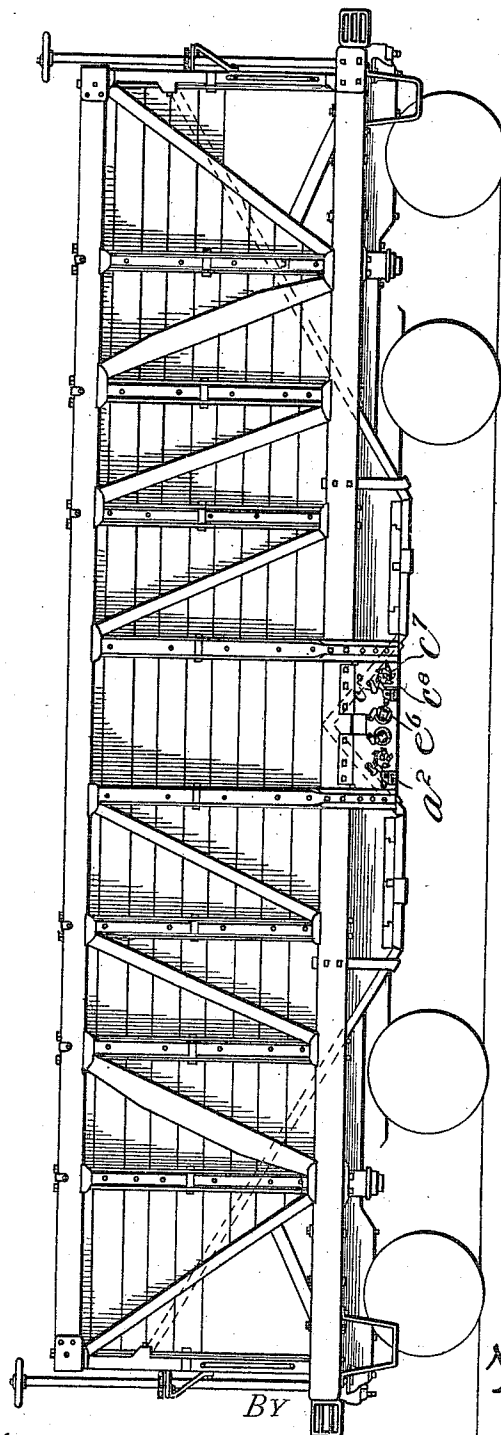


W. L. COUGHTRY.
DISCHARGING DOORS FOR DUMPING CARS AND OTHER RECEPTACLES.
APPLICATION FILED APR. 27, 1910.

983,026.

Patented Jan. 31, 1911.
6 SHEETS—SHEET 1.



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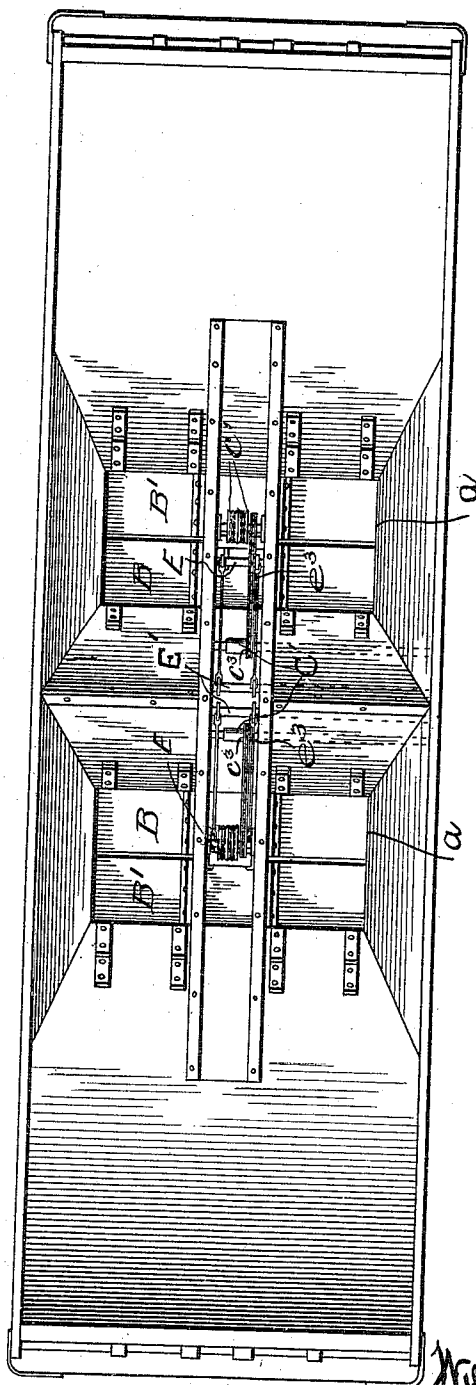
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6 SHEETS—SHEET 2.

FIG. 2.



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6 SHEETS—SHEET 3.

FIG. 3.

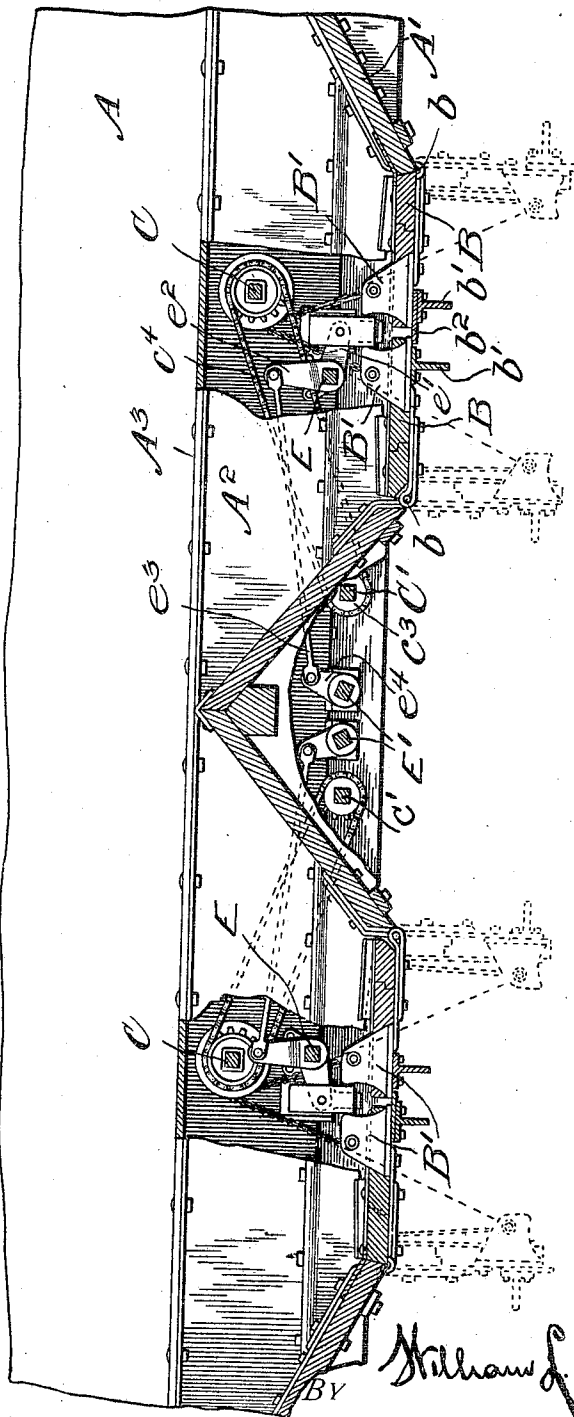


FIG. 15.

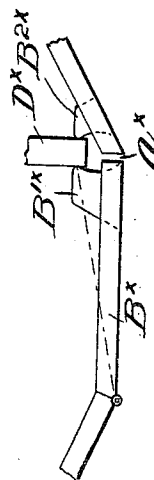
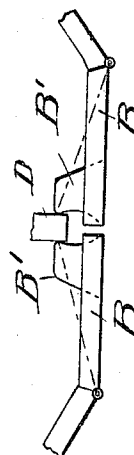


FIG. 14.



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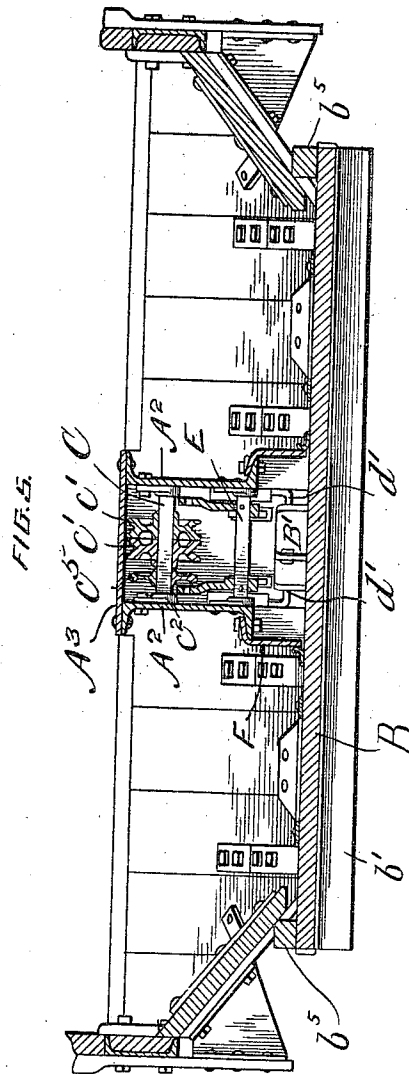
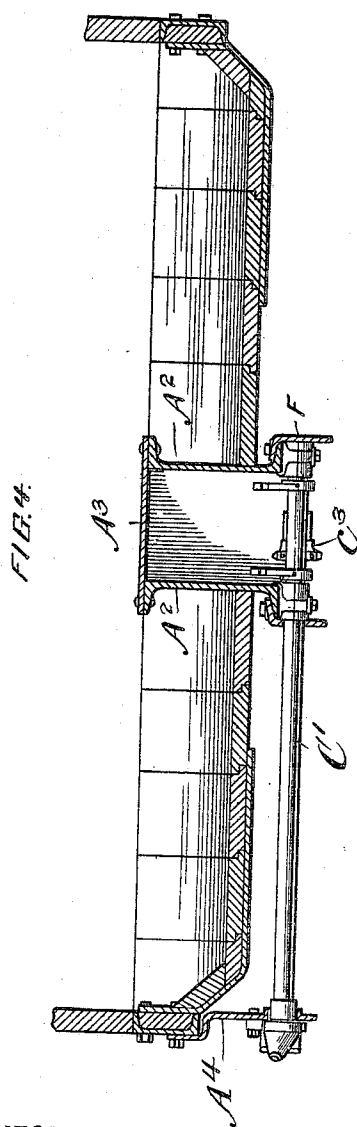
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6 SHEETS—SHEET 4.



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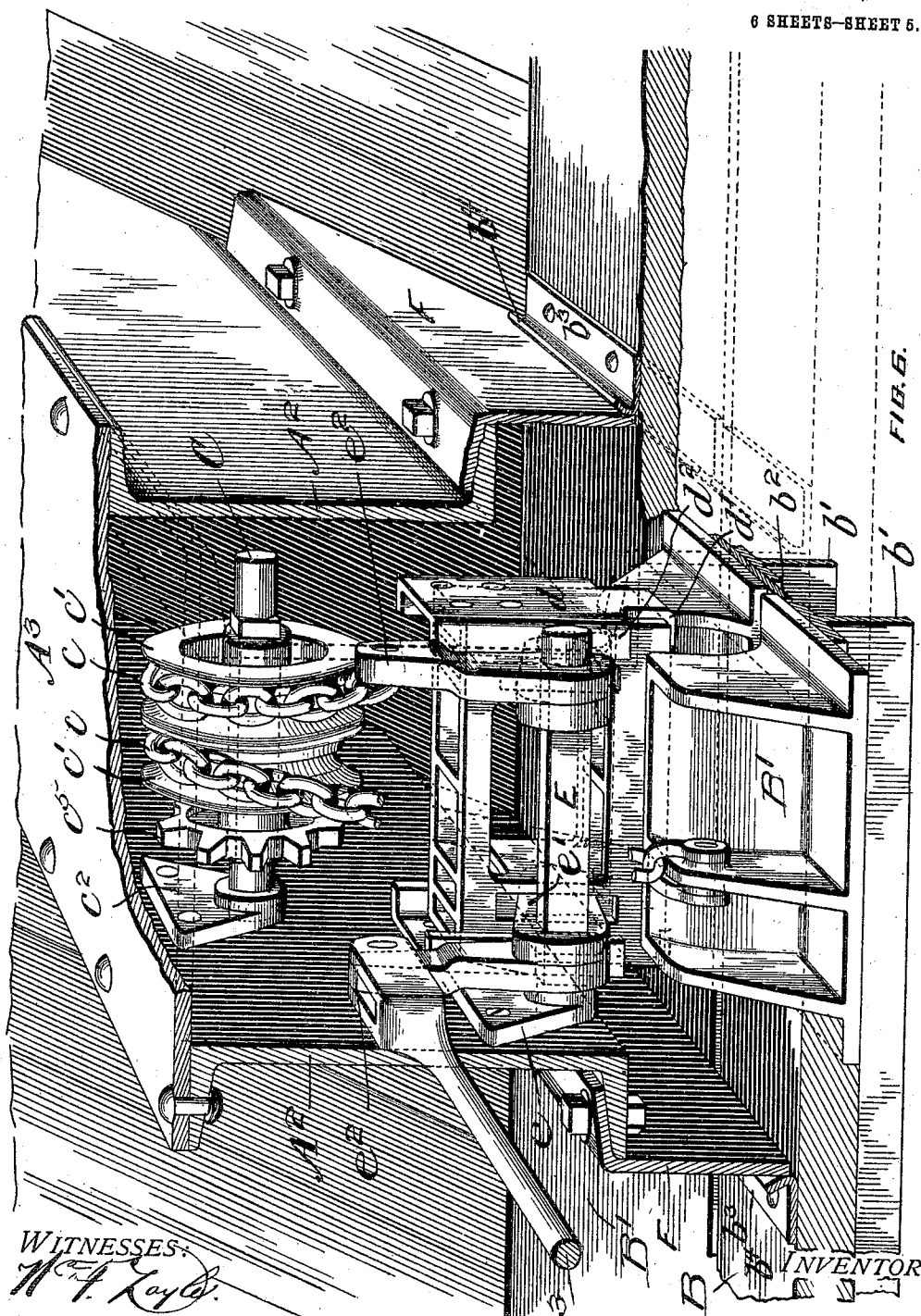
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983,026.

Patented Jan. 31, 1911.

6 SHEETS-SHEET 5.



WITNESSES:
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6 SHEETS—SHEET 6.

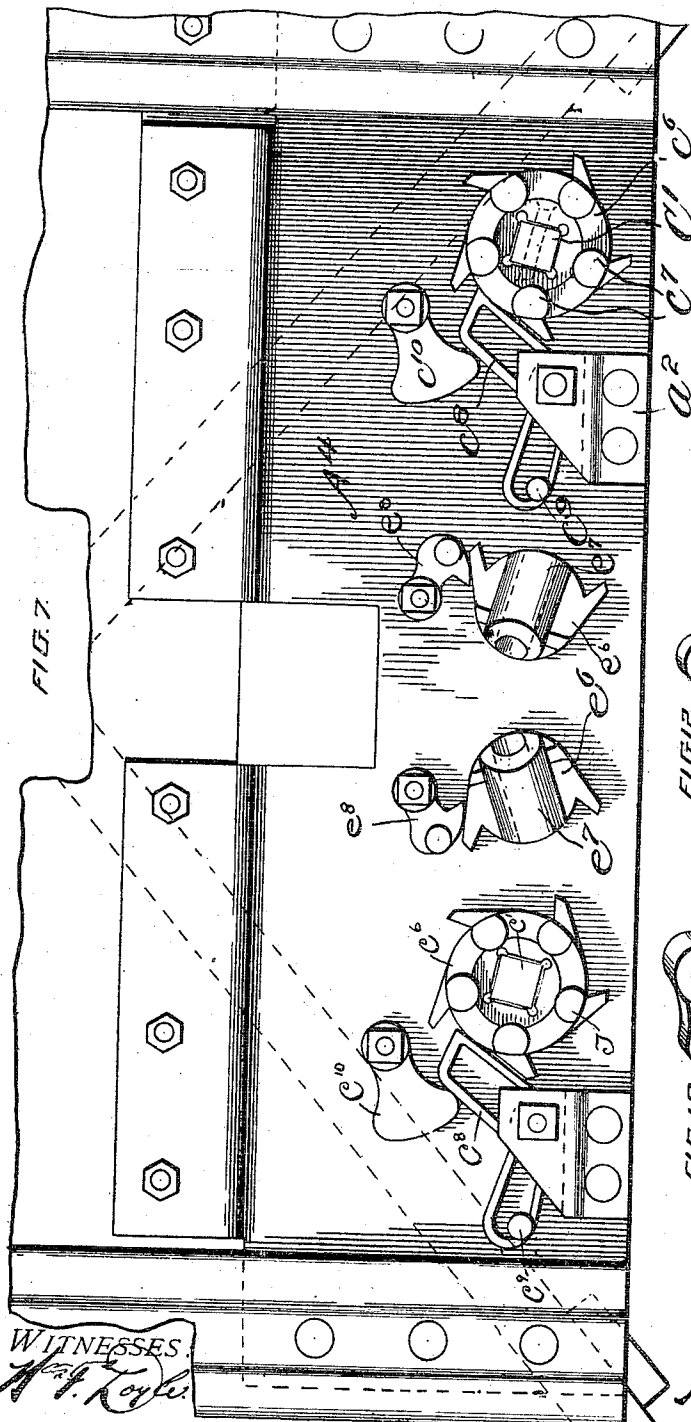


FIG. 13.

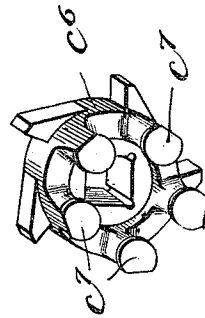


FIG. 11.

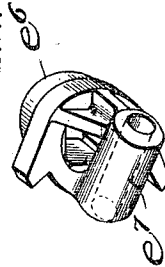


FIG. 12.



FIG. 10.



FIG. 9.

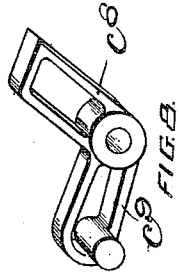
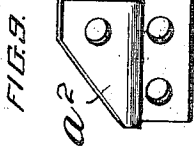


FIG. 8.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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DISCHARGING-DOORS FOR DUMPING-CARS AND OTHER RECEPTACLES.

983,026.

Specification of Letters Patent. Patented Jan. 31, 1911.

Application filed April 27, 1910. Serial No. 557,932.

To all whom it may concern:

Be it known that I, WILLIAM L. COUGHTRY, citizen of the United States, residing at Slingerlands, in the county of Albany and State of New York, have invented certain new and useful Improvements in Discharging-Doors for Dumping-Cars and other Receptacles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawings which illustrate one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

My invention relates to mechanism for locking and operating discharging doors of dumping cars and other hopper like receptacles and consists particularly of mechanism for sustaining the dumping doors in their closed position and for releasing and for closing said doors.

In the forms of dumping cars now in general use which employ doors for discharging the contents of the car the devices which lift the doors into closed position, usually chains or link and crank connections, must support the weight of such portion of the load as rests upon the doors when the car is loaded. As a result of these constructions the doors frequently sag, so as to partly open and discharge some of the contents of the car, and in some cases the strain is so great as to break the supporting devices.

The object of my invention is to provide a construction in which the doors practically sustain themselves and the load upon them when in closed position and relieve the mechanism for elevating the doors into closed position of all strain. I accomplish this result by lifting a door higher than the closed position and placing a wedge or block in position to be engaged by a part secured to the door adjacent to its outer edge to hold the door in closed position. Ordinarily I employ two doors hinged to opposite sides of the door opening but the invention is equally applicable to a door opening fitted with a single door.

According to my present invention I prefer to arrange the parts so that the doors shall be held in alinement with each other,

or in other words in a horizontal position, and I also provide for protecting the wedge or block from the material in the car, so that said material shall offer no obstruction to the wedge when it is lifted and shall not interfere with the other operative parts of the mechanism. To this end I provide each door near the central portion thereof with a wedge engaging bracket, which engages the wedge at a point slightly above the plane of the door, thus permitting the doors to assume a horizontal position, and I provide the car (or other receptacle) with a hollow beam or frame extending transversely of the meeting edges of the doors and forming a protecting covering for the wedge, its actuating mechanism and the mechanism for raising the doors into closed position.

My invention also contemplates other details of construction and combination of parts which are hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a side elevation of a dumping car embodying my invention. Fig. 2 is a top plan view of the same, with the top plate of the central longitudinal beam removed. Fig. 3 is a longitudinal vertical section of the central portion of the car body, showing the discharging doors, portions of the hollow beam or frame being broken away to show parts located within the same. Figs. 4 and 5 are partial transverse vertical sectional views of the car body. Fig. 6 is an enlarged perspective view of a portion of the car body, the central beam or frame being broken away to more clearly illustrate the parts. Fig. 7 is an enlarged elevation of the central portion of the car body. Figs. 8, 9, 10, 11, 12 and 13 are detail perspective views of parts shown in Fig. 7. Fig. 14 is a diagrammatic view of the doors and locking block or wedge. Fig. 15 is a detail view illustrating a modification in which a single door is employed in the door opening.

In the drawings A represents the body of a freight car of the gondola type, provided with a double hopper bottom, and having my invention embodied therein. The car body is provided with a central longitudinal hollow beam which extends through each of the hoppers A', A', and consists in this instance of two lateral plates A², A² and a top plate A³ of structural steel, bolted or riveted together, although it may be formed in other ways.

Each of the hoppers A' is provided below

the central beam, with a discharge aperture a , fitted with a pair of doors B, B hinged at b, b to opposite sides of the aperture and having a combined width slightly less than the width of the aperture, so that they can be swung simultaneously through the said aperture. The doors B, B are shown as made of wood and reinforced with metal, preferably steel, but they may be made entirely of metal or other material. The mechanism for locking the doors in closed position, and for operating the doors and the locking mechanism being the same for each hopper, a description of the mechanism for one hopper will be sufficient for both.

Each of the doors B, B is provided with a striker plate b' (preferably in the form of a T-bar,) disposed parallel to the outer edge of the door, and bolted or riveted thereto to strengthen the door and prevent injury thereto when the doors swing open. One of the doors is preferably provided adjacent to its outer edge with a projecting lip or plate b^2 which extends over the outer face of the opposite door to prevent the material in the car from escaping through the crack between the meeting edges of the doors.

Each of the doors B, B is provided adjacent to its outer edge, and in line with the central longitudinal beam with a bracket B' on the inner face of the door, which bracket is adapted to extend above the door and into the space below the hollow beam, to engage the locking block D , or "wedge" as it may be conveniently termed. The construction is such that when the doors are in closed position and the locking block is in engagement with said brackets B' , the doors will be substantially horizontal, or parallel to the plane of the hopper aperture a and the distance from the opposite hinges to the wedge engaging portions of the brackets B' , plus the width of the wedge D , will be greater than the width of the door aperture, as clearly indicated in dotted lines Fig. 14. The construction, is therefore, analogous to a flat arch, in which the wedge or locking block is the keystone and the pressure upon the upper or inner surfaces of the doors is transmitted to the lateral faces of the wedge or locking block and to the hinges, thus relieving from strain the devices hereinafter described by which the doors are raised into their closed position.

C represents a winding shaft mounted in bearings c^2 secured to the inner faces of the lateral plates A^2, A^2 of the central beam, and carrying within said beam a pair of sheaves or drums c', c' to which are secured chains or other flexible connections c, c the opposite ends of which are connected to the doors B, B , in this instance by connecting them to the brackets B', B' , so that by rotating shaft C , the connections c, c are wound upon the drums or sheaves, and the doors are

drawn into closed or locking position. The flexible connections might be wound directly upon the shaft C but I prefer to employ the sheaves or drums as fewer revolutions of the shaft are necessary to lift the doors into closed position.

The shaft may be operated in any desired manner. I prefer to operate it by means of a special winding or operating shaft C' located below the plane of the central beam and outside of the hopper A' (on the side thereof adjacent to the center of the car, in the case of a car provided with a double hopper bottom as here shown), said winding or operating shaft being mounted in bearings near the center of the car which may be conveniently supported from the central beam, and being extended transversely to one or both sides of the car body. In the present instance I have shown it extended to one side only of the car body where it is supported by a winding shaft plate A^4 (see Figs. 4 and 7) through which it projects.

The operating shaft C' is provided with a sprocket wheel c^3 , connected by a sprocket chain c^4 with a sprocket wheel c^5 on the winding shaft C . On the outer face of the winding shaft plate A^4 the operating shaft C' is provided with a ratchet wheel c^6 (see Fig. 13) provided with outwardly extending lugs c^7 on its outer face arranged in a circle to permit the insertion of a bar between them to enable the operating shaft to be rotated. The winding shaft plate A^4 is also provided with a weighted pawl c^8 (see Fig. 8) pivoted between the said plate and a pawl plate a^2 (see Fig. 9) having a part for engaging the ratchet wheel, and a weighted arm c^9 which normally holds the pawl out of engagement therewith.

c^{10} represents a pawl weight (see Fig. 10) pivoted to the winding shaft plate A^4 in such position that it may be swung into engagement with the pawl c^8 , to hold the same in engagement with the ratchet wheel c^6 , as clearly shown in Fig. 7.

D represents the vertically movable locking block or wedge, which is located partially within the hollow beam of the car, and transversely thereof, in position to be engaged by the door brackets or lugs B', B' when in its lowest position. The block D is preferably made of cast iron or steel and cored out to obviate unnecessary weight, and to provide means for connecting the operating devices thereto. It is substantially rectangular in cross section and is mounted to slide vertically in a pair of wedge guides d, d , which are bolted or otherwise secured to the lateral plates A^2, A^2 of the central beam. Each guide d is provided with a horizontal stop lug d' at its lower end to limit the downward movement of the block or wedge, and with lateral guiding flanges d^2 which are cut away at their lower ends to

avoid interfering with the proper engagement of the door lugs B' with the lower part of the wedge or block.

The wedge or block D may be raised and lowered by any suitable means. In this instance I have shown my preferred form of wedge operating mechanism which consists of the following instrumentalities. E represents a bell crank shaft mounted in bearings *e* secured to the inner faces of side plates A² of the central beam, and provided with a pair of bell cranks each having a horizontal arm *e'* extending into a recess in the wedge or block D to which it is secured by a suitable bolt, and a vertically disposed arm *e''*, connected by a rod *e'''* with a shaft arm *e''''* on a wedge operating shaft E' located outside of the hopper, (and adjacent to the center of the car in the case of a double hopper bottom car, such as is here shown). The wedge operating shaft is mounted in bearings secured to the lateral plates A² of the central beam, and extends to one side, or both sides of the car. In this instance it is shown as extending to the same side as the door operating shaft C', and mounted in a bearing in the winding shaft plate A⁴. The wedge operating shaft is provided at its outer end with a ratchet *e⁶* (see Fig. 11) adapted to be engaged by a pivoted weighted pawl *e⁸* (see Fig. 12). In this instance the ratchet is shown as provided with only two teeth, disposed oppositely on opposite sides of the part, and having formed therewith (or secured thereto) a tubular socket *e⁷* to permit the insertion of a bar to facilitate the turning of the shaft. The ratchet *e⁶* is preferably formed with a square aperture to fit a squared portion of the shaft to which it is secured by a driven pin, or set screw, and in case of the breakage of one of the teeth of either ratchet, they may be readily removed and replaced by others. On a double hopper car, as here shown, in case of the breakage of a ratchet tooth of either of the ratchets *e⁶* they may be removed from their respective shafts and transposed, thus enabling each to operate effectively with the other tooth.

It will be seen that the locking wedge D and the door lugs B', B' are protected from the weight of the material above them by the central beam A², A², A³ and in order to prevent any of the material in the hopper from working in around these parts, I provide in each hopper, lateral extension plates F, F secured to the side plates A² of the beam and extending downwardly into position to engage the inner faces of the doors when the latter are in closed position. The doors B, B are also provided with transversely disposed guard plates *b³*, *b³* having upwardly and outwardly curved lips *b⁴*, *b⁴* to engage the lower edges of the extension plates F, F so as to make a practically tight

joint. It will also be seen that all the mechanism for operating the doors and the wedge is located either within the central beam or outside of the hopper altogether, so that the material in the car cannot come into contact with the parts and interfere with their proper operation, and the hopper is left clear for the free discharge of the load.

When it is desired to close and lock the doors of a hopper, the operator will insert a bar in the ratchet wheel *e⁶* and rotate the door operating shaft C' thus rotating the shaft C and winding up the chains until the doors are drawn up into a substantially horizontal position or slightly above a horizontal position. The wedge during this operation is in its raised position having been previously raised by a partial rotation of the wedge operating shaft E', and is held in raised position by the engagement of ratchet *e⁶* and pawl *e⁸*. As soon as the doors are closed the pawl *e⁸* is disengaged and the wedge is allowed to fall between the door lugs or brackets B', B' when the doors will be held securely locked. The pawl *e⁸* can be disengaged from the ratchet *e⁶*, so that no strain on the doors is borne by the door operating devices. The car being loaded, if it is desired to dump the contents, the operator will insert a bar in the ratchet in the socket *e⁷* of ratchet *e⁶*, and rock the wedge operating shaft until the tooth is engaged by pawl *e⁸*, thus lifting the wedge from between the door lugs B', B' and permitting the doors to fall into vertical position and discharge the contents of the car.

In some cases it may be desired to employ only one door, in an embodiment of my invention and such a construction is illustrated in Fig. 15. In this figure *a^x* represents the door aperture in the hopper of a car or other receptacle. B^x represents the door hinged at one edge of the aperture and provided adjacent to its opposite edge with the wedge engaging lug or bracket B^x. The adjacent edge of the aperture is provided with a stationary lug or bracket B^x to engage the opposite side of the wedge. D^x represents the vertically movable locking block or wedge. The apparatus for operating the door and the wedge is not shown in the figure but may be similar to that shown in the other figures of the drawings, or of any preferred construction. It is obvious that the locking block or wedge will hold the single door in closed position, and that the door can be released by simply raising the wedge or block.

It will be noted that the pressure is equal on both sides of the wedge or locking block so that there is no tendency on the part of the latter to bind in its guides and the brackets are so formed as to engage the block with the smallest possible amount of surface to reduce the friction to a minimum.

To this end the wedge engaging portions of the door lugs or brackets are preferably made curved as shown and the engagement of the faces of the wedge or locking block therewith is tangential. The lateral lug engaging faces of the wedge or locking block may, therefore, be made parallel to each other as shown in the drawings, or they may be made to slightly converge toward the lower end of the block or wedge if preferred or found desirable.

It is to be understood that my present invention covers the use of the door lugs and wedge whether the same are employed within or outside of the discharging hopper, as I may find it advantageous for example in some instances, to locate the door lugs at each side of the hopper and exterior thereto and to employ two locking wedges, one at each side and outside of the hopper. This construction is really a duplication of the construction herein shown and described and I have, therefore, not illustrated it specifically. In such cases the wedges may be raised and lowered simultaneously by a single actuating device or independently as preferred.

In order to prevent the leakage of finely divided material from the hopper, the doors are preferably extended laterally beyond the sides of the hopper, as shown in Fig. 5, and are provided with suitable cleats or other devices indicated at *b*⁵ to engage the hopper side walls and make a tight joint. I also prefer to locate the hinges *b* of the doors in line with the outer faces of the doors and to so construct the edges of the doors adjacent to the hinges that when the doors are in closed position they will make a substantially tight joint and prevent the leakage of finely divided material at these points, as clearly shown in Figs. 3 and 14.

In some instances I may provide an arrangement of gearing whereby the operation of the locking wedge and the raising of the doors can be secured by the operation of a single shaft. In some cases when the car or receptacle is provided with a plurality of discharge apertures equipped with my improved devices, I may provide suitable gear connections between the operating shafts so that both of the locking wedges can be simultaneously raised or lowered by means of a single shaft, and so that both sets of doors may be simultaneously raised by means of a single shaft. In some cases also I may provide suitable connections whereby a single operating shaft is made to control the raising and lowering of the wedges and also the raising of the doors into operative position.

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

1. The combination with a receptacle provided with a discharge aperture, of a door

hinged to one edge thereof, and adapted to swing through said aperture, said door being provided adjacent to the edge opposite the hinge with a part adapted to extend through the said aperture beyond the plane of the door, and a locking block movable in a vertical plane, and having a lateral engagement only with said part, when in operative position, to support the door in closed position, in the plane of the said aperture.

2. The combination with a receptacle provided with a discharge aperture, of a door hinged to one edge thereof, and adapted to swing through said aperture, said door being provided adjacent to the edge opposite the hinge with a part adapted to extend through the said aperture beyond the plane of the door and provided with a curved block engaging portion, and a movable locking block having a straight lateral face for tangentially engaging the curved face of said part, to support the door in closed position.

3. The combination with a receptacle provided with a discharge aperture, of a door hinged to one edge of said aperture, and provided at its opposite edge with a part of less length than said edge, adapted to project into said receptacle, and a locking block movable in a vertical plane, said block being of less length than the edge of the door carrying said part, and having a lateral engagement only with said part when in operative position for holding the door in closed position.

4. The combination with a receptacle provided with a discharge aperture, of a pair of doors hinged to opposite edges of said aperture, each provided with a block engaging part adapted to extend into the receptacle when the doors are closed, beyond the plane of the doors, and a movable locking block having opposite faces for engaging said parts, to hold the doors in closed position in the plane of the said aperture.

5. The combination with a receptacle provided with a discharge aperture, of a pair of doors hinged to opposite edges of said aperture each provided adjacent to its free edge with a block engaging part of less length than said edge, adapted to extend into the receptacle when the door is closed beyond the plane of the door, and a movable locking block of less length than the meeting edges of the doors, having opposite faces for engaging the said parts to hold the doors in closed position.

6. The combination with a receptacle provided with a discharge aperture, of a pair of doors hinged to opposite edges of said aperture each provided adjacent to its free edge with a block engaging part of less length than said edge, adapted to extend into the receptacle when the door is closed beyond the plane of the door, and a movable

locking block of less length than the meeting edges of the doors, having opposite faces for engaging the said parts to hold the doors in closed position, and means for inclosing the said locking block to protect it from contact with the contents of the receptacle.

7. The combination with a receptacle provided with a discharge aperture, of a pair of doors hinged to opposite edges of said aperture, each door being provided adjacent to its free edge with a block engaging lug, extending therefrom on the face adjacent to the interior of said receptacle, a movable locking block having opposite lug engaging faces supported within said receptacle, above the plane of said doors, and means for raising said block to disengage it from said lugs.

8. The combination with a receptacle provided with a horizontally disposed discharge aperture, of a pair of doors hinged to opposite edges of said aperture, each door being provided adjacent to its free edge with a block engaging lug, a vertically movable locking block supported in said receptacle transversely of said aperture, and having opposite lateral faces for engaging said lugs, guide plates engaging the ends of said block and provided with lateral guiding flanges and a bottom flange for limiting the downward movement of said block and means for raising said block to disengage it from said lugs.

9. The combination with a receptacle provided with a discharge aperture, of a pair of doors hinged to opposite edges of said aperture each provided adjacent to its free edge with a block engaging part of less length than said edge, adapted to extend into the receptacle when the door is closed beyond the plane of the door, and a movable locking block of less length than the meeting edges of the doors, having opposite faces for engaging the said parts to hold the doors in closed position, means for inclosing said locking block and said block engaging parts, to protect them from the contents of the receptacle, and devices secured to the doors and extending transversely thereof for engaging said inclosing means when the doors are in closed position to effect a tight joint therewith.

10. The combination with a receptacle provided with a hopper bottom having a horizontally disposed aperture therein, and a hollow beam extending through said hopper bottom longitudinally and centrally of said receptacle, of a pair of doors hinged to opposite edges of said aperture, each provided with an inwardly extending block engaging lug adjacent to its free edge, and of such width and so located as to lie below said hollow beam, a vertically movable locking block mounted in vertical guides within said hollow beam and having opposite lug engaging faces, means located within said

hollow beam for raising said doors into closed position, means located within said hollow beam for raising and lowering said block, operating devices located outside of said hopper and operatively connected to the mechanism for raising said doors and operating devices located outside of said hopper bottom and connected with said mechanism for raising and lowering the said block.

11. The combination with a receptacle provided with a hopper bottom having a horizontally disposed aperture therein, and a hollow beam extending through said hopper bottom longitudinally and centrally of said receptacle, of a pair of doors hinged to opposite edges of said aperture, each provided with an inwardly extending block engaging lug adjacent to its free edge, and of such width and so located as to lie below said hollow beam, a vertically movable locking block mounted in vertical guides within said hollow beam and having opposite lug engaging faces, mechanism for raising said doors into closed position located in said hollow beam, bell cranks located in said hollow beam and operatively connected with said block, operating shafts located outside of the hopper bottom, and having portions extending to a side of the receptacle, one of said shafts being connected to the mechanism for raising the doors, and the other of said shafts being operatively connected with said bell cranks.

12. The combination with a receptacle provided with a discharge aperture, of a door hinged to one edge thereof, said door being provided adjacent to the edge opposite the hinge with a part adapted to extend above the plane of the door when the door is closed, and a locking block movable in a vertical plane and having a lateral engagement only with said part, when in operative position to support the door in closed position, in the plane of the said aperture.

13. The combination with a receptacle provided with a discharge aperture, of a pair of doors hinged to opposite edges thereof, each door being provided on the face adjacent to the discharge aperture with a projecting lug, and a vertically movable locking block adapted to be inserted between the opposing lugs of the said doors to lock said doors in closed position.

14. The combination with a receptacle provided with a discharge aperture, of a pair of doors hinged to opposite edges thereof, each door being provided on the face adjacent to the discharge aperture with a projecting lug, and a vertically movable locking block adapted to be inserted between the opposing lugs of the said doors to lock said doors in closed position, said doors being extended laterally beyond the walls of said receptacle and being provided with de-

vices for making a substantially tight joint with the said lateral walls.

15. The combination with a receptacle provided with a discharge aperture, of a pair of doors for closing said aperture, hinges connecting said doors to opposite edges of said aperture and located in the plane of the exterior faces of said doors, the edges of said doors adjacent to said hinge connections being constructed to make a substantially tight joint with the adjacent edge of the said aperture, opposing lugs secured

to the inner faces of said doors, adjacent to their meeting edges, and a vertically movable locking block adapted to enter between said lugs to hold said doors in closed position, substantially as described. 15

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

WILLIAM L. COUGHTRY.

Witnesses:

W. L. COUGHTRY, Jr.,

W. E. WALSH.