

C. E. SIEVERT.
GRAIN CAR DOOR.

APPLICATION FILED AUG. 30, 1909.

991,248.

Patented May 2, 1911.

4 SHEETS—SHEET 1.

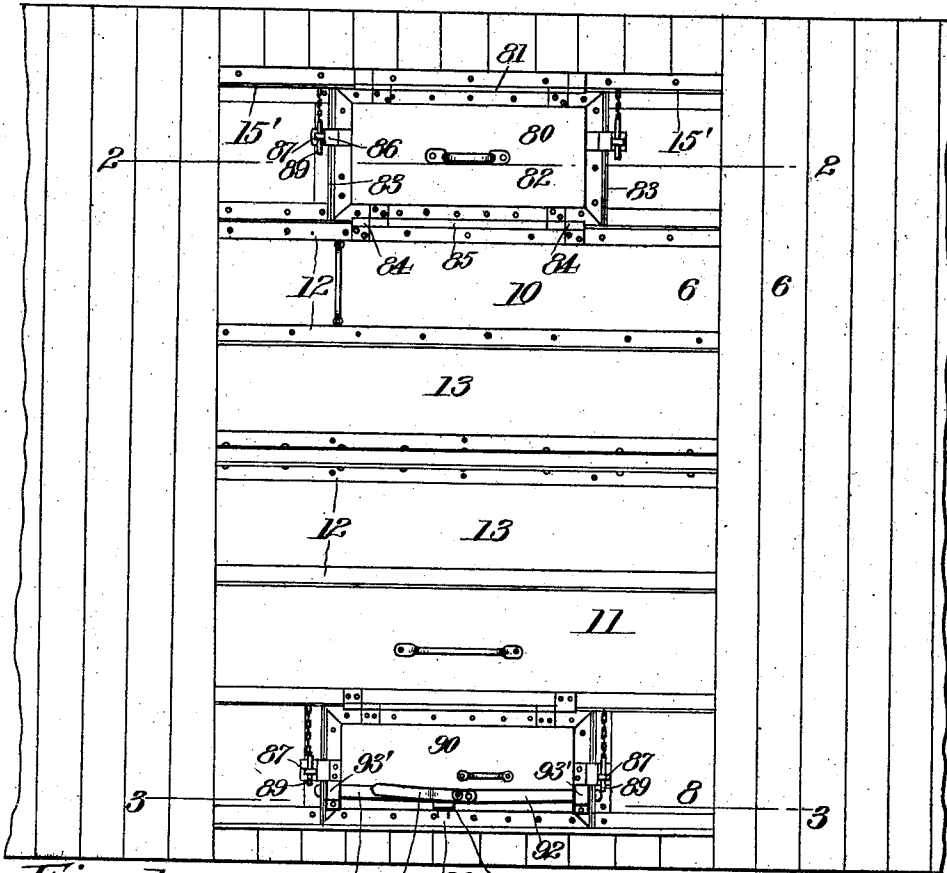


Fig. 1.

Fig. 2.

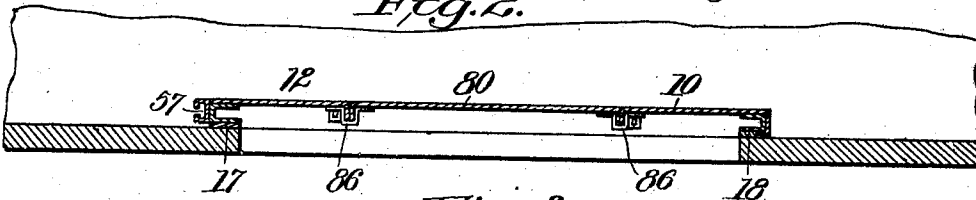
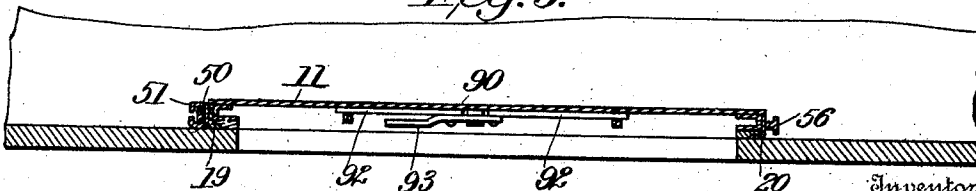


Fig. 3.



Witnesses

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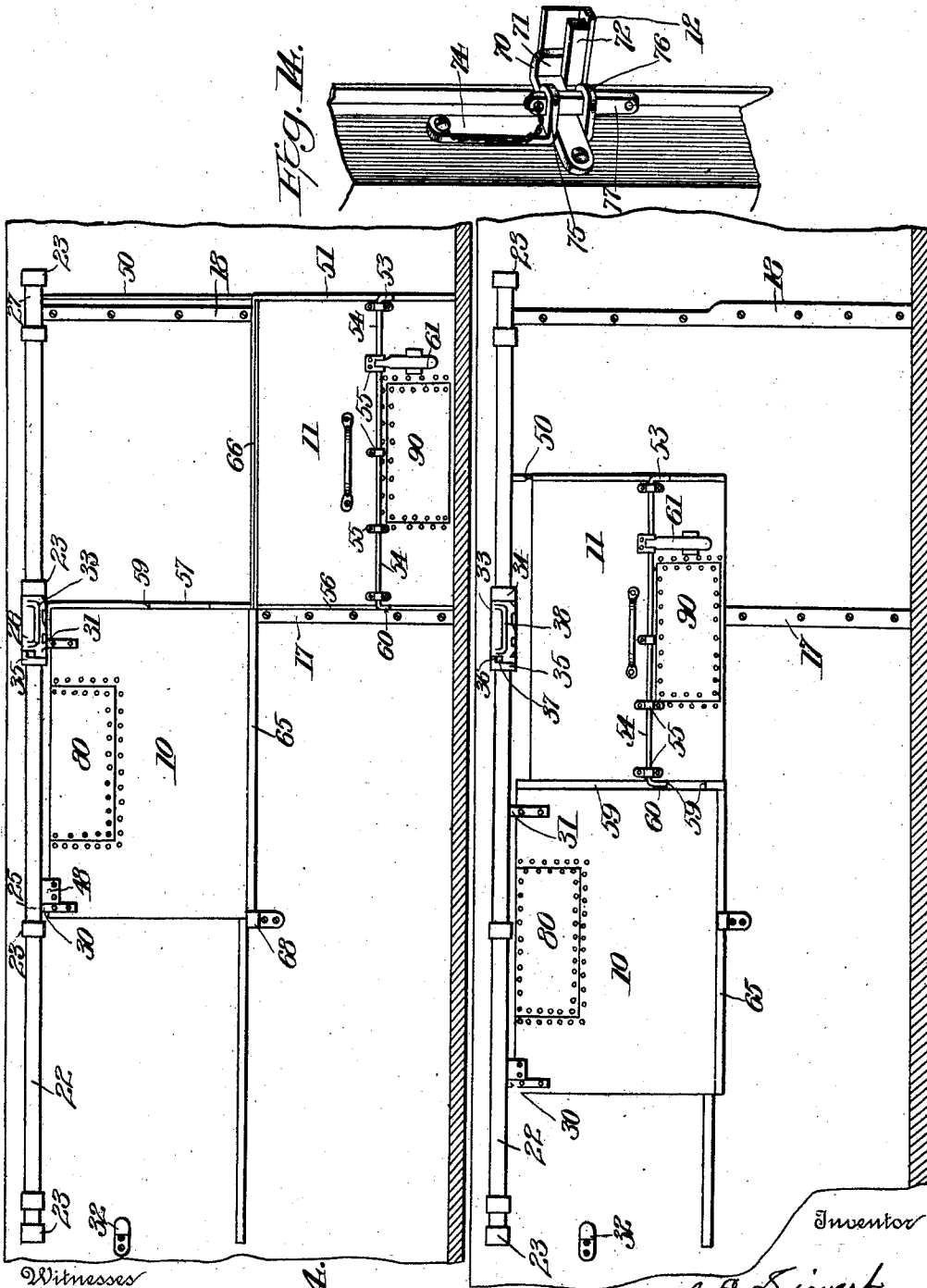
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4 SHEETS—SHEET 2.

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Witnesses

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Fig. 4.

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Fig. 5.

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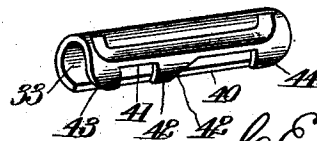
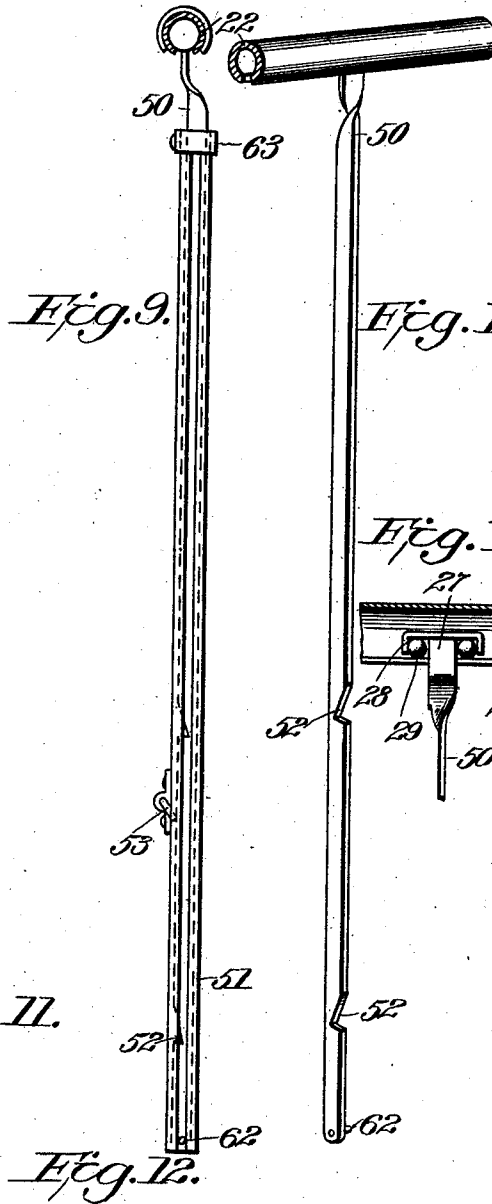
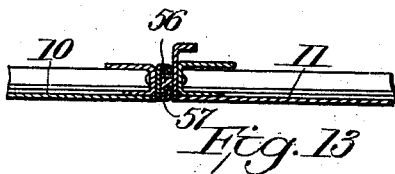
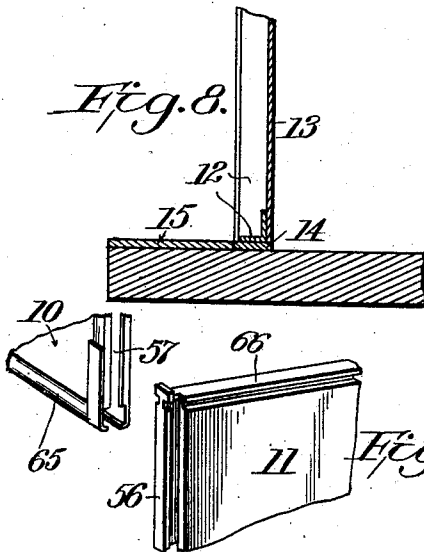
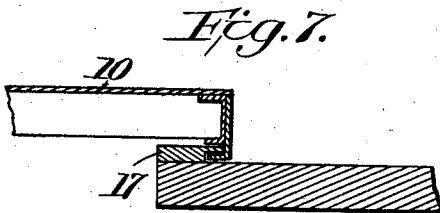
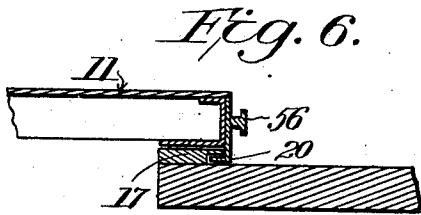
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4 SHEETS—SHEET 3.



Witnesses
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4 SHEETS-SHEET 4.

Fig. 17.

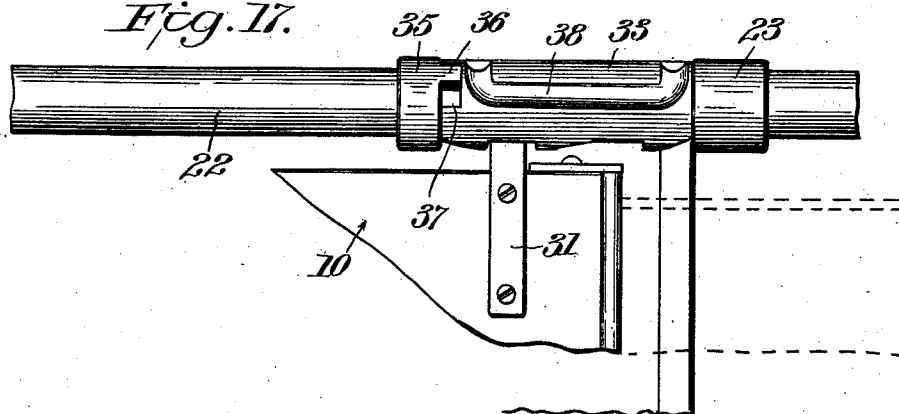


Fig. 18.

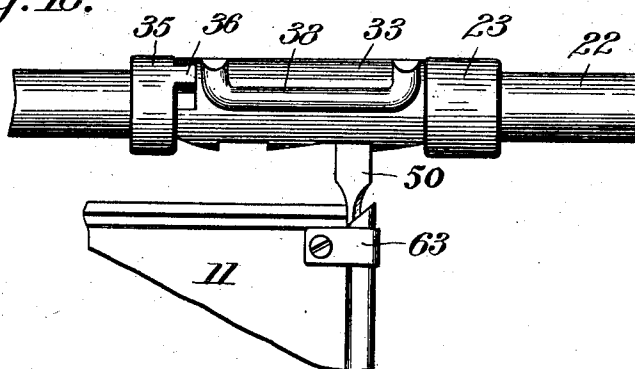


Fig. 16.

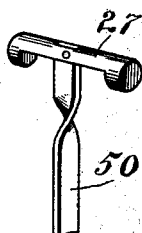


Fig. 19.

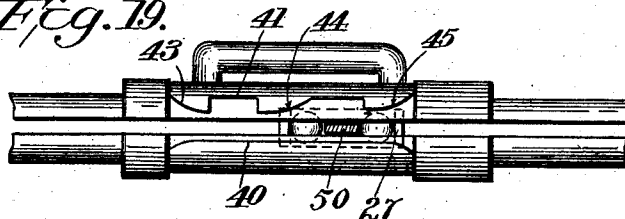
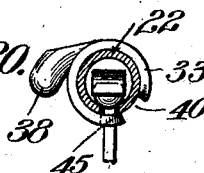


Fig. 20.



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UNITED STATES PATENT OFFICE.

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GRAIN-CAR DOOR.

991,248.

Specification of Letters Patent.

Patented May 2, 1911.

Application filed August 30, 1909. Serial No. 515,176.

To all whom it may concern:

Be it known that I, CHARLES E. SIEVERT, a citizen of the United States, residing at Council Bluffs, in the county of Pottawattamie and State of Iowa, have invented certain new and useful Improvements in Grain-Car Doors, of which the following is a specification.

This invention relates to grain car doors, and has for its principal object to provide a door of strong, durable construction which may be readily opened and closed and which, in closed position, will prevent leakage and will fully protect the contents of the car.

A further object of the invention is to provide a sectional door in which the members are inter-engaged in such manner as to form a very close joint and prevent leakage and which furthermore are so arranged as to be relatively slidable in both horizontal and vertical planes.

A still further object of the invention is to provide an automatic means for positively locking the door sections in both open and closed positions.

A still further object of the invention is to provide a locking or holding means for supporting the lower door section in various positions for the purpose of facilitating unloading.

A still further object of the invention is to so arrange and construct the door section as to form interlocked joints with stationary members or guides at the sides of the doorway so as to prevent leakage of the contents of the car or the ingress of rain, snow or the like.

With these and other objects in view, as will more fully hereinafter appear the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions and arrangement of parts may be made without departing from the spirit of the invention.

In the accompanying drawings,—Figure 1 is an elevation looking from the exterior of the car, of a door constructed in accordance with the invention. Fig. 2 is a sectional plan view of the same on the line 2—2 of Fig. 1. Fig. 3 is a similar view on

the line 3—3 of Fig. 1. Fig. 4 is an elevation looking from the interior of the car, showing the upper section of the door in open position. Fig. 5 is a similar view showing the upper section moved back and the lower section in partly open position. Fig. 6 is a detail section, on an enlarged scale, of a portion of the lower member of the door. Fig. 7 is a similar view of a portion of the upper member of the door. Fig. 8 is an enlarged detail vertical section, showing the bracing bar for engagement with the metal sill of the doorway. Fig. 9 is an elevation, looking at one edge of the door member, showing the guiding and supporting bar. Fig. 10 is a detail perspective view of the guiding and supporting bar and a portion of its trackway. Fig. 11 is a detail perspective view of portions of both door members, showing the inter-engaging portions thereof. Fig. 12 is a detail view of the gravity lock for holding the door sections in both open and closed positions. Fig. 13 is an enlarged detail horizontal sectional view taken through the upper and lower door sections when vertically interengaged as in Fig. 5. Fig. 14 is a detail perspective view of the door-locking and sealing means. Fig. 15 is a detail sectional view taken through the track-way and showing one of the carriages. Fig. 16 is a detail perspective view of one of the carriages and a portion of a guiding and supporting bar. Fig. 17 is an enlarged detail fragmentary view illustrating the gravity locking means, with the upper door section held thereby in position for the vertical sliding movement of the lower door section. Fig. 18 is a similar view showing the lower door section locked in its elevated position against horizontal sliding movements. Fig. 19 is an inverted plan view of the trackway and gravity lock. Fig. 20 is a detail sectional view taken transversely through the trackway and showing the gravity lock in elevation.

Similar numerals of reference indicate corresponding parts throughout the several figures of the drawings.

The door forming the subject of the present invention is made of a number of sections two of which, 10 and 11, are illustrated in the present embodiment of said invention, and these sections are so arranged as to permit movement independent of each other to open and closed positions.

The main frame of each door is composed of a plurality of angle bars 12 which extend around the edge of the door and in a longitudinal direction across the width of the door, and to these angle bars are riveted or otherwise secured plates 13 formed of metal or wood and having smooth inner faces so that they may freely slide to open or closed position even when slightly indented or distorted. The bottom of the lower door is provided with a stop bar 14 that extends the full width of said door and is designed for engagement throughout its entire length with a metal door-sill 15 that forms a brace to prevent outward movement of the door from pressure of the contents of the car. The top of the upper door is provided with a similar strengthening bar 15' which engages against vertically-disposed metallic bars 17, 18, that are secured to the inner wall of the car at the opposite sides of the doorway.

The strip 17 is somewhat narrower at the upper than at the lower portion and is flanged throughout its entire vertical height in order that it may interlock with similar flanges carried by both members of the door for the purpose of forming a very tight joint. The bar 18 is flanged throughout only the lower half of its length and it is designed for engagement with a similar flange that is formed at one edge of the lower door member, so that as a result said lower door member, when in closed position, will be firmly held from longitudinal movement in either direction and will also be held closely against the side of the car.

The upright flanges 19 and 20 of said lower door member are formed of auxiliary channel-bars or the like that are riveted or otherwise secured to the outer face of the door at points adjacent the opposite edges thereof, and these flange members are spaced from each other a distance greater than the distance between the extreme outer edges of the upper portions of the bars 17 and 18, so that when the lower door section is elevated it will be free from the bars 17 and 18 and can then move laterally toward the position indicated in Fig. 5. When moved back to a position covering the upper half of the doorway and then lowered, the flanges 19 and 20 will engage with the lower portions of the bars 17 and 18 and will interlock therewith.

Extending along the upper portion of the inner wall of the car at a point just above the lintel of the doorway is a tubular trackway 22 that is supported by a plurality of brackets 23 that are secured to the vertical wall of the car side. This tube is slit throughout its lower side in order to form a continuous slot 24, which slot also extends through the brackets. Within the tube are arranged a series of carriages 25, 26 and 27

all of approximately the same construction, and each provided with recesses 28 for the reception of anti-friction balls 29 that are of a diameter greater than the width of the slot, so that the balls may ride freely against the inner faces of the edge portions of the slot with minimum friction. The two carriages 25 and 26 are provided with depending bars 30, 31, from which the upper door section 10 is suspended and the door may be freely moved in the direction of the length of the car with the carriages as supports, movement in one direction being limited by a fixed stop 32 that projects inward from the inner wall of the car.

In addition to the stop 32 a gravity lock 33 is provided. This lock is in the form of a collar that partly surrounds the tube 22 and is held from longitudinal movement in one direction by one of the brackets 23 and from movement in the opposite direction by an auxiliary collar 35 that is secured to the tubular trackway. The auxiliary collar 35 is provided with a projecting tongue 36 that enters a recess 37 formed in one end of the locking collar 33 for the purpose of limiting the partial rotative movement of the locking collar around the tubular trackway 22. Under normal conditions, however, the collar 33 is held in locking position by a counterweight 38 in the form of a handle secured to said collar.

The collar 33 is provided with a slot 40 that extends from end to end thereof, and one wall of this slot is cut away to form a straight walled locking recess 41 and a locking lug 42, the approach to these being defined by curved or inclined cam portions 43, 44 and 45.

The notch 41 is designed for the purpose of engaging with the suspension bar 31 of the carriage 26 for the purpose of holding the upper door member in the position shown in Fig. 4, and the arrangement of parts is such that as the suspension bar engages with either of the cam faces 43, 44 on movement of the door member in either direction the gravity lock will be partly rotated and will allow the suspension bar to pass until it comes opposite the notch, whereupon the lock will return to its normal position by gravity and hold the door member in the open position. In order to prevent the gravity lock from engaging with the suspension bar 30 of the carriage 25, an auxiliary plate 48 is employed at one side of the suspension bar, said plate being of such width that in connection with the suspension bar 30 it will operate to hold the gravity lock in inoperative position whenever the carriage 25 is moved past the lock.

The carriage 27 supports the bar 50, the lower end of which is guided within a channel bar 51 that is arranged at one edge of the lower door member, and this guiding

and supporting bar is free to move along the trackway as the lower door member is moved in the direction of the length of the car. The bar is provided with a number of inden-

tations or notches 52 arranged to be engaged by a detent 53 that is carried at one end by a rock-shaft 54 journaled in suitable brackets 55 on the inner face of the lower door member. The opposite edge of the

lower door member is provided with a bar 56 of T-shape in sectional plan, and the outer flange of this T-bar is arranged to slide within a channel bar 57 that is formed at one edge of the upper door member, this arrangement of inter-fitting bar serving as a means for guiding the lower door member in its vertical movement. One of the webs of the channel bar 57 is provided with a number of projecting ratchet teeth 59 that are arranged in horizontal alinement with the indentation 52, and with these teeth 59 engages a detent 60 carried by the rock-shaft 54. The rock-shaft 54 is provided at a point intermediate its ends with an operating handle 61 which, under normal conditions, will fall by gravity to a position flat against the inner surface of the lower door, and this handle will operate to maintain the detent in engagement with the teeth or indentations when the door is raised, so that said door may be maintained at any desired height to facilitate unloading. In order to prevent excessive downward movement of the lower door member, the lower portion of the bar 50 is provided with a projecting pin 62 which engages a cross-bar 63 that straddles the channel bar 51. The bar 56 is notched at its upper end to form a T-head to slide in the channel bar 65 along the lower edge of the upper door section.

The upper edge of the lower door member is provided with a T-bar 66 that is arranged to slide within the channel bar 65 so that when the parts are in the position shown in Fig. 4, the upper door member may be slid to the right or to the closed position shown in Fig. 1, the connection being such as to form a perfectly close fitting joint and prevent the escape of the contents of the car or the ingress of rain, snow or the like. The two door members are at all times inter-engaged and when in the position shown in Fig. 4, the upper door member may be slid in a horizontal direction to closed position or the lower door member may be elevated to the horizontal plane of the upper member.

It will be noted that the gravity lock 33 is so positioned as to maintain the upper door section with the channel bar 57 in direct vertical alinement with the T-bar 56, so that the door members will always be in proper position for movement in either direction. This connection between the adjacent corners of the door members serves the purpose of preventing any inward sway of either member while the opposite edge of the upper door member is held from swinging inboard by an auxiliary bracket or clip 68.

When the two door members are in the position shown in Fig. 5 and are moved farther toward the left, the suspension and guiding bar 50 will pass under the cam 45 of the gravity lock moving the latter partly around the tubular trackway 22 and the suspension bar will then be caught and held against the shoulder 42 of said gravity lock, thereby holding the door in full open position. In order to lock both bars in closed position, a pivoted locking lever 70 is arranged at one side of the doorway, the inner end of said lever being provided with a tongue 71 that is arranged to engage a retainer or keeper 72 that projects from the outer face of the upper door member. When the lever has been moved to retaining position it is locked in place by a pivoted arm 74 having a laterally-projecting lug 75 that is brought into alinement with a corresponding lug 76 projecting from the lever 70, and these two lugs are provided with alining openings for the passage of a tapered pin 77 of the type ordinarily employed in devices of this general class, said pin being provided at its lower smaller end with an opening for the passage of any of the ordinary sealing devices.

In the upper door member is a small loading door 80 that is formed of a plurality of marginal angle bars 81 and a plate 82, the inner face of which normally lies flush with the inner face of the door proper. This small door fits within a space that is bounded by a vertical angle bar 83 and one of the main cross angle bars 12, and said angle bar 12 and the lower angle bar of the smaller door are provided with hinge leaves 84 that are connected by a hinge pin 85 so that the door may be swung to open position and leave the entire door space clear for the insertion of a grain spout or the like. Secured to the opposite edges of the smaller door are approximately U-shaped clips 86 that are provided with openings for the passage of lugs 87 that project from the main door, and these lugs have openings for the passage of the ordinary sealing pins 89.

In the lower portion of the lower door member is a small unloading door 90 of a construction somewhat similar to the upper door member previously described and provided with locking devices of the same character. As this small unloading door is subjected to considerable pressure from the contents of the car it is found advisable to employ additional locks. These locks are formed of slidable bars 92 that are pivoted at their inner ends to an operating lever 93 at points on opposite sides, respectively, of the fulcrum of said lever. The outer ends

of these locking bars slide in keepers 93 that are secured to the outer face of the unloading door, and said bars are arranged to pass through alining openings that are formed in the webs of the angle bars constituting the marginal member of the unloading device and the doorway. When in locked position, the locking levers and the operating lever are all disposed in approximately the same horizontal plane, and one of said locking levers is provided with a projecting lug 95 having an opening for the passage of a tongue 96 that is carried by the operating lever. The tongue 96 has an opening for the passage of a sealing device of any ordinary type so that the levers cannot be moved to release position without breaking the seal.

What is claimed is:—

1. A sliding door including upper and lower sections, a slidable connection between the bottom of the upper section and the top of the bottom section, and a slidable connection between upright ends of the sections.

2. A sliding door including upper and lower sections, a horizontally slidable connection between the sections, and a vertically slidable connection between the sections.

3. A sliding door including a horizontal guideway, an upper door section slidable upon the guideway, a lower door section, a slidable engagement between the door sections to permit horizontal sliding of the upper section upon the lower section, and a vertically slidable engagement between the vertically alined ends of the door sections, when the upper section has been moved to a diagonal position with respect to the lower section.

4. A door including a guideway, an upper section slidable thereon, a lower section, a slidable engagement horizontally between the door sections, a vertically slidable engagement between ends of the door sections, a hanger slidable upon the guideway, and a vertically slidable engagement between the lower door section and the hanger.

5. A door including a guideway, an upper door section slidable upon the guideway, a lower door section, a horizontally slidable engagement between the door sections, a vertically slidable engagement between ends of the door sections, a hanger slidable upon the guideway, a vertically slidable engagement between the lower door section and the hanger, and means to adjustably support the lower door section upon the upper door section and the hanger.

6. A door including a guideway, an upper door section slidable thereon, a lower door section, a horizontally slidable engagement between the door sections, a vertically slidable engagement between ends of the door sections, a hanger slidable upon the guideway, a vertically slidable engagement between the lower door section and the hanger,

and means carried by the lower door section and having an adjustable engagement with the upper door section and hanger to adjustably support the lower door section.

7. A door including a guideway, an upper section slidable thereon, a lower door section, a horizontally slidable engagement between the door sections, a vertically slidable engagement between ends of the door sections, a hanger slidable upon the guideway, a vertically slidable engagement between the lower door section and the hanger, detents on the lower door section, and seats on the upper door section and hanger for engagement by the detents.

8. A door including a horizontally slidable upper door section, a lower door section, a horizontally slidable engagement between the door sections, means to permit vertical sliding of the lower door section upon the upper door section including vertical interengageable slide elements upon the door sections, and means to stop the slidable movement of the upper section when the vertical slide elements of the door section come into vertical alinement.

9. In a door, the combination of a guideway, an upper door section slidable thereon, a lower door section, a horizontally slidable engagement between the door sections, vertical interengageable slide elements carried by the door sections, and means on the guideway to stop the upper door section when the vertical guide elements come into alinement.

10. In a door, the combination of a guideway, an upper door section slidable thereon, a lower door section, a horizontally slidable engagement between the door sections, vertical interengageable slide elements carried by the door sections, and a gravity locking device on the guideway to stop the upper door section when the vertical guide elements come into alinement.

11. In a door, the combination of a guideway, an upper door section slidable thereon, a lower door section, a horizontally slidable engagement between the door sections, a vertically slidable engagement between the door sections, means to slidably support the lower section upon the guideway and to permit combined sliding of the door sections in the elevated position of the lower section, and means to stop the sliding movement of the upper section in position to permit vertical sliding of the lower section upon the upper section.

12. The combination of a sliding door, means intermediate the limits of the sliding movement of the door to limit sliding movement in the open position of the door, and means carried by the door in position for engagement with the limiting means when the door is in closed position to render said limiting means inoperative.

13. In a sliding door, the combination of

a guideway, a door slidable thereon, and a limiting device for engagement with the door to limit its movement, said limiting device being rotatably mounted upon the guideway for movement into and out of operative position.

14. In a sliding door, the combination of a guideway, a door slidable thereon, a limiting device for engagement with the door to limit its movement, said limiting device being rotatably mounted upon the guideway for movement into and out of operative position, and means carried by the door for engagement with the limiting means in the closed position of the door to hold the limiting means inactive.

15. In a door, the combination of a guideway, an upper door section slidable upon the guideway, a lower door section, a horizontally slidable engagement between the door sections, a vertically slidable engagement between the door sections, the door sections capable of combining sliding movement in the elevated position of the lower section, a limiting device upon the guideway to limit the sliding movement of the door, and devices upon the door sections disposed to successively come into engagement with the limiting device to successively limit the combined sliding movement of the two door sections.

16. A door formed of upper and lower sections, the upper and one side edge of one of said sections being provided with T bars that terminate at their juncture in a knob that aligns with the main webs of both bars, the lower and one side edge of the other sec-

tion being provided with channel bars for the reception of said knob and said T bars.

17. A door formed of upper and lower slidably connected sections, the upper section forming a partial support for the lower section, an auxiliary upright supporting bar for said lower section, a trackway, a carriage mounted on the trackway supporting the upper door section, and another carriage supporting the supporting bar.

18. A door formed of upper and lower slidably connected sections, a trackway, carriages mounted on the trackway and supporting the upper section, an auxiliary upright bar movable with the lower section, a carriage for the auxiliary bar traveling upon the trackway there being teeth or indentations in the bar and in one edge of the upper door section, and a plurality of pawls carried by the lower door section and arranged to engage said teeth or indentations.

19. In a slidable door, an upper trackway, a door made up of upper and lower sections connected for slidable movements upon one another in a horizontal direction, the upper section being hung from the trackway, and an upright bar hung from the trackway, the lower door section having a vertically-slidable connection with the upper door section and with the upright bar.

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

CHARLES E. SIEVERT.

Witnesses:

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LUCIUS WELLS.