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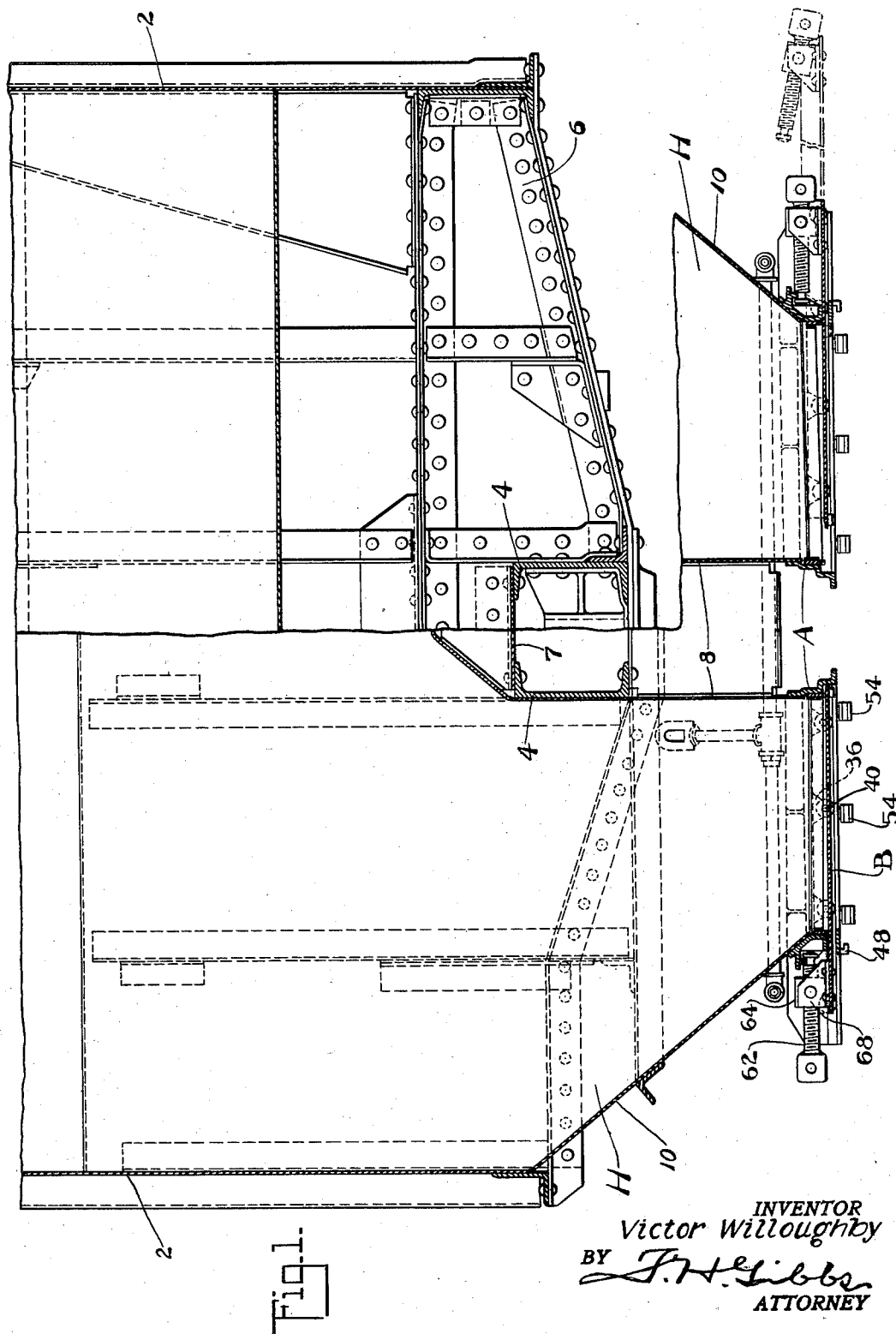
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RAILWAY CAR

Filed June 3, 1933

4 Sheets-Sheet 1



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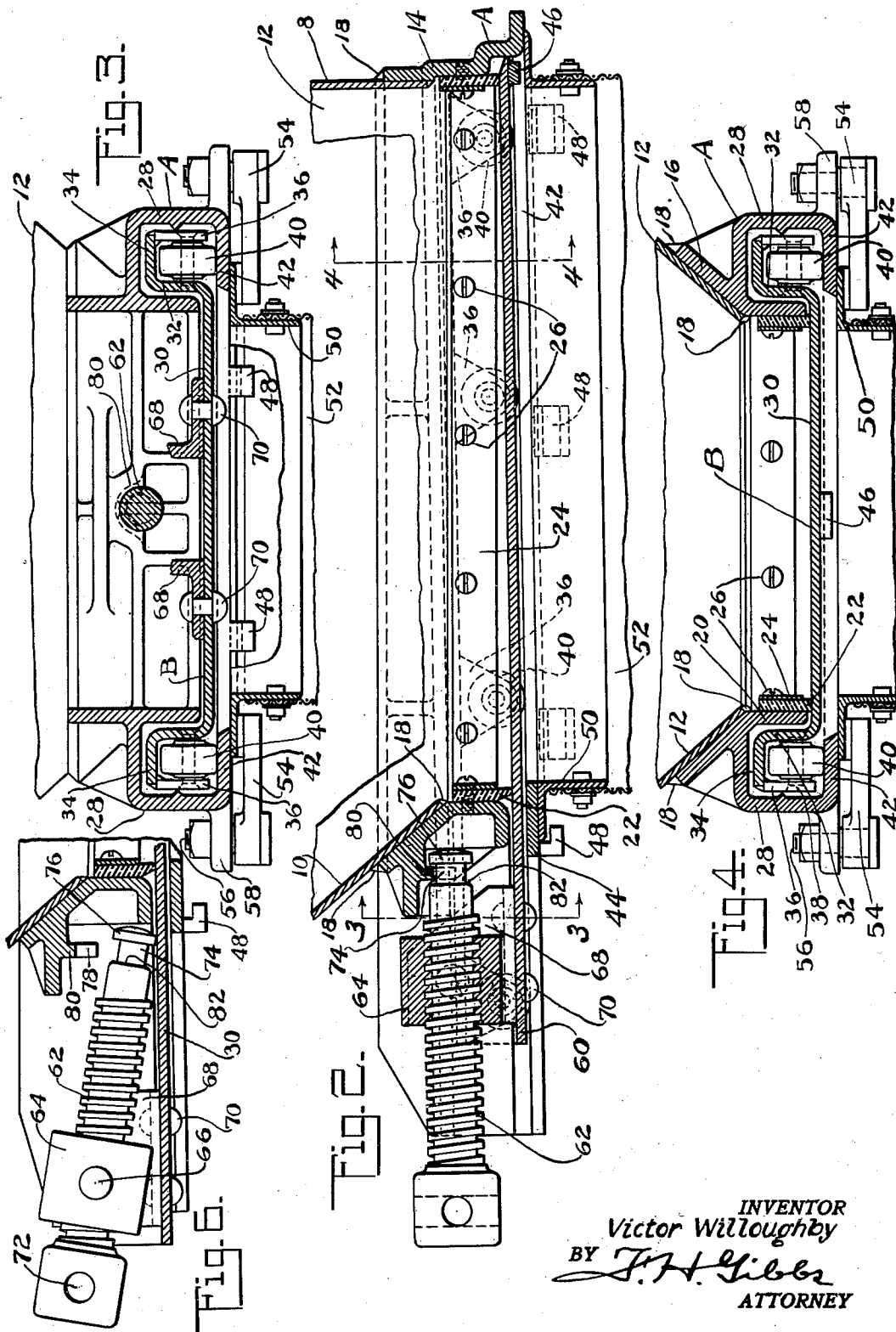
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RAILWAY CAR

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4 Sheets-Sheet 2



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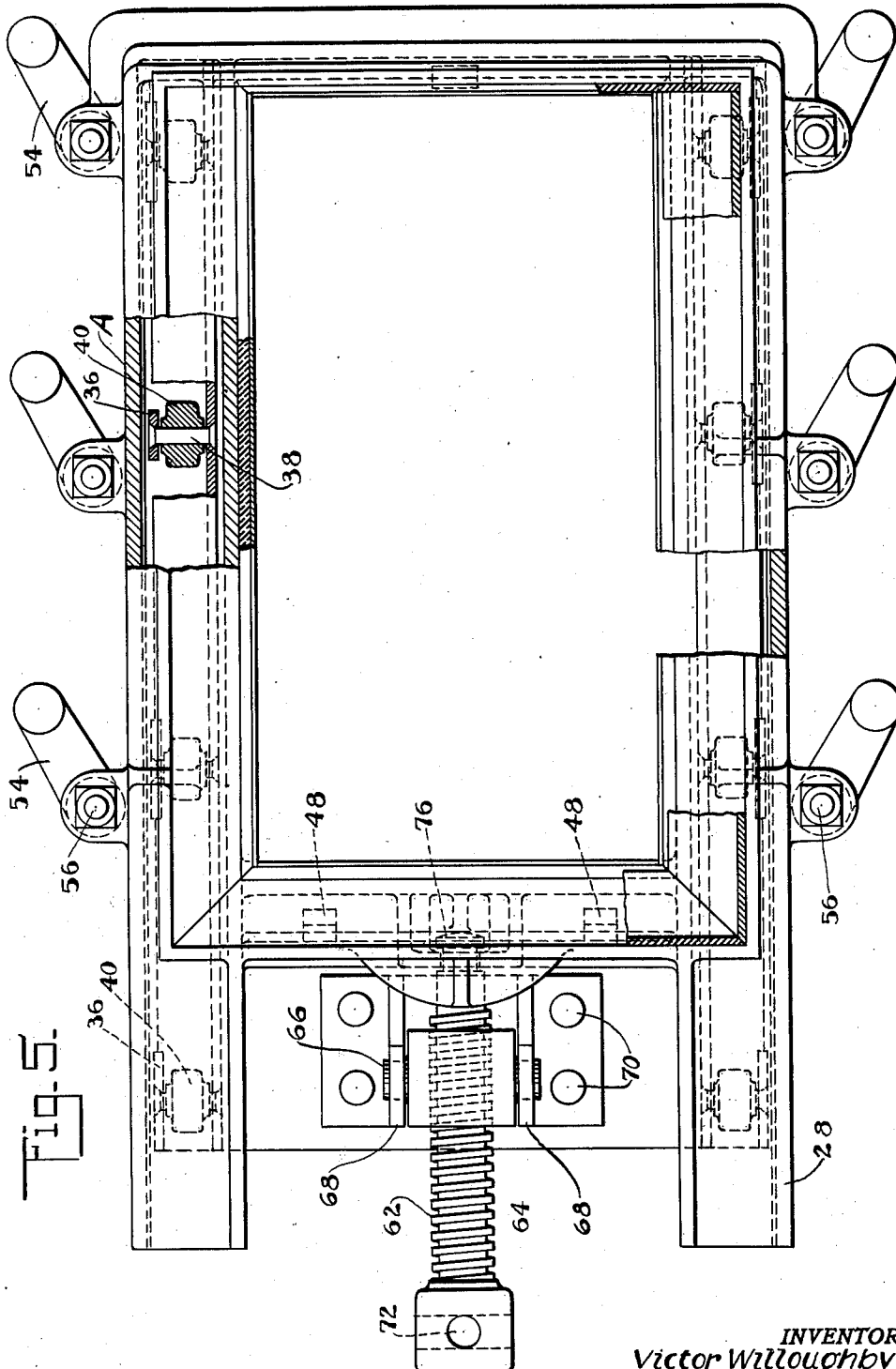
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RAILWAY CAR

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4 Sheets-Sheet 3



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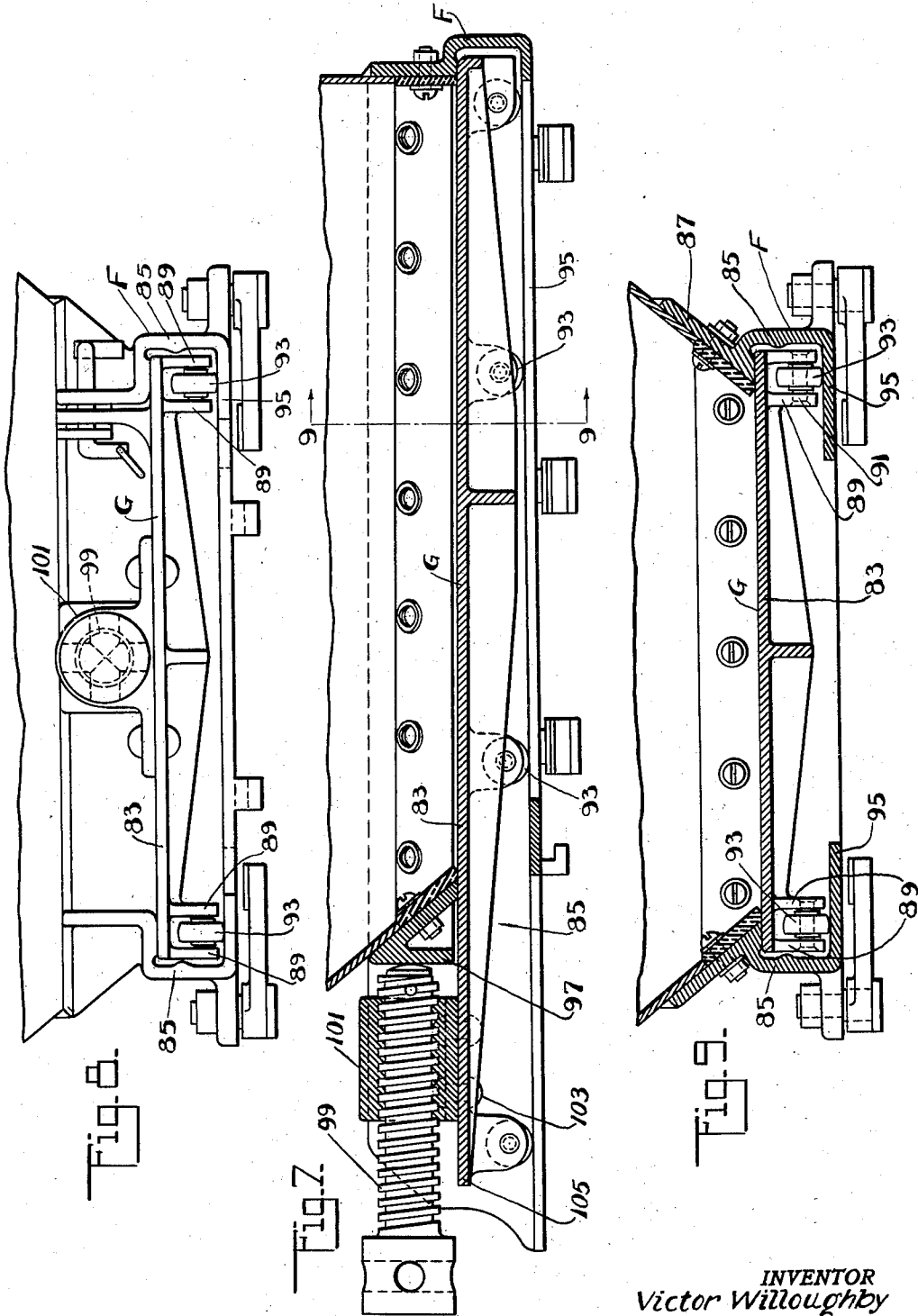
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UNITED STATES PATENT OFFICE

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RAILWAY CAR

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Application June 3, 1933, Serial No. 674,156

11 Claims. (Cl. 105—282)

This invention relates generally to railway hopper cars and has particular reference to hopper doors or gates and mounting and operating means therefor.

5 One object of this invention is the provision of a hopper car having means by which the hoppers may be quickly and tightly closed in such a manner as to prevent the loss of lading particularly very fine dry commodities such as fine coal, grain or cement.

10 Another object of this invention is the provision of a railway hopper car having a door or a gate for closing the hopper and simple and quick operating means for shifting the door to either
15 open or closed position.

Still another object of this invention is the provision of new and improved means for actuating the gate or door of a hopper.

20 A further object of this invention is the provision of a new and improved railway hopper car.

A still further object of this invention is the provision of a new and improved hopper door and operator therefor which is comparatively inexpensive to manufacture and which is strong
25 and durable in operation.

Other objects and advantages of this invention will be apparent from the following description taken in conjunction with the accompanying
30 drawings, in which;

Figure 1 is a transverse vertical sectional view through a hopper car of the present invention, a portion of the view showing a section through the car at the bolster; the view showing a pair of
35 hoppers with the door or gate of one thereof in partially open position, the view also showing, in dotted lines, this particular door in fully open position;

40 Fig. 2 is an enlarged sectional view through the lower end portion of one of the hoppers;

Figure 3 is a sectional view on the line 3—3, Figure 2;

Figure 4 is a sectional view on the line 4—4, Figure 2;

45 Figure 5 is a top plan view of the door support and door and the operating means for the latter, a portion of the figure being shown in section and other parts being broken away to more fully disclose the details;

50 Figure 6 is a fragmentary detail view of a portion of the hopper and the door operating means; the door being in partially open position;

55 Figure 7 is a sectional view through the lower portion of a hopper showing a modified form of the invention;

Figure 8 is a front elevation of the modification shown in Figure 7, and

Figure 9 is a sectional view on the line 9—9, Figure 7.

Referring now more particularly to the drawings in which similar characters of reference designate similar parts in the several views, the car of the present invention comprises a body including side walls 2, a center sill 4 and bolsters 6. The side walls and bolster may be of any preferred or desired construction and the center sill, in the instance shown, comprises a pair of channels connected by top cover plate 7. Arranged on opposite sides of the longitudinal center line of the car body are hoppers indicated generally 15 at "H", the inner walls 8 of which depend substantially vertically from the respective channels of the center sill as shown clearly in Figure 1. The hoppers "H" also include outer walls 10 and side walls 12. Due to the specific arrangement 20 of the several walls of the hoppers it is apparent that the load is discharged between the track rails.

The present invention is designed to provide means which can be quickly and easily operated 25 to provide a tight closure for the discharge end or outlet of each hopper. Inasmuch as the means are identical for each hopper a description of one will suffice for all. As clearly shown in the drawings the means for closing the discharge 30 end of the hopper comprises, in the main, a door frame casting indicated generally as "A" and a door or gate indicated generally as "B", the door "B" being slidable relative to the frame "A" and having a door operating device mounted thereon 35 as more specifically described hereinafter.

The door frame "A" comprises a casting and is preferably of the form shown more clearly in Figures 2, 3, 4 and 5 wherein it can be seen that the casting is generally of rectangular shape to fit 40 around the lower edge portions of the hopper walls. As shown in Figure 2 the rear portion 14 of the door frame casting "A" is substantially vertical and rests against the inner wall 8 of the hopper at the lower edge portion of the latter. The side and front portions of the frame "A" have attaching portions 16 inclined in accordance with the slope 45 of the front and side walls of the hopper and resting against the latter; said door frame being welded as at 18, or otherwise suitably secured to said hopper walls. The remainder of the side and end portions of the frame "A" depend vertically below the lower edge portions of the hopper walls and are indicated in the drawings at 55

20 and have secured thereto suitable flexible gaskets 22 by means of retainer strips 24 and fasteners 26; the gaskets 22 engaging the upper surface of the gate or door "B" as clearly shown in Figures 2 and 4 to furnish a seal to prevent leakage.

Formed with the side portions of the frame "A" are inwardly facing channel shaped tracks or guides 28 which support the gate "B" for sliding movement as presently to be described.

The gate "B" comprises a main or body portion 30 having its side edge portions upwardly and then outwardly flanged as shown at 32 and 34 respectively; the side edge portions of the gate "B" thus being offset and, as clearly shown in the drawings, particularly Figs. 3 and 4, arranged within the channel shaped tracks or guides 28. Supported by the vertical flanges 32 of the gate "B" and by bearing members 36 depending from the outwardly projecting or horizontal flanges 34 are axles 38 supported by rollers 40 mounted on the inwardly extending lower flanges 42 of the tracks 28 and shiftable thereon for opening and closing the door "B". In the instance shown in Figs. 2 and 5, three rollers 40 are provided along opposite sides of the gate "B" but this is merely by way of example as obviously the number of supporting rollers may be varied in accordance with requirements.

The tracks 28 extend outwardly beyond the hopper (see Fig. 5) in order to support and guide the gate or door "B" to its fully open position and a transversely arranged tie 44 is provided beneath the forward end portion of the door frame casting "A" and preferably, though not necessarily, is formed integral with said casting and serves as an abutment with which a stop 46 secured to the lower surface of the door at its forward end portion is adapted to contact to limit the extent of opening movement of the door. The tie 44 is provided with angle shaped lugs 48 for supporting the metal frame 50 of a detachable flexible discharge boot 52. The boot 52 is secured in position for receiving material from the hopper when the door "B" is in fully open position by means of clamps 54 supported on bolts 56 carried by lugs 58 projecting from the tracks 28 as clearly shown in Figs. 3, 4 and 5.

In the form of the invention shown in Figs. 2 to 6 inclusive, the door "B" is of greater length than the length of the hopper at its discharge end and its projecting portion, indicated at 60 provides a support for the door operator, the latter comprising a jack screw 62 threadedly engaged in a nut 64 pivotally supported by trunnions 66 in spaced brackets 68 secured to the projecting portion 60 of the door "B" by means of suitable fasteners 70. The rear end portion of the jack screw 62 is provided with apertures 72 for receiving a suitable bar or other tool by which said jack screw may be rotated in the nut 64, while the opposite end portion of the jack screw is provided with a reduced portion 74 which defines a head 76 at the forward end of the jack screw; the reduced portion being adapted to be arranged in a slot 78 formed in a lug 80 depending from the casting "A", in such a manner that it provides a bearing with which the head 76 cooperates when the jack screw is rotated in a direction such as to force the door to closed position. The reduced portion 74 also provides a shoulder 82 adapted to engage the outer surface of lug 80 when the jack screw is rotated in a direction such as to open the door.

Figs. 7 to 9 inclusive disclose a modification of

the construction just described. The door frame casting, indicated generally at F, is so formed as to be fitted around the several walls of the hopper but in the construction shown in these figures the gate "G" is not provided with offset side edge portions, but comprises a reinforced plate 83 which, in the instance shown, is straight from side to side. The track members are indicated at 85 and they depend from the attaching portions 87 of the casting "F" and the lower edges of the attaching portions 87 are substantially engaged by the upper surface of the gate "G", the latter having a plurality of depending bearing elements 89 in which axles 91 are supported, the axles extending through the rollers 93 which are mounted for shifting movement on turned flanges 95 forming parts of the track members 85. At the forward end portion the frame "F" is provided with an abutment 97 against which a jack screw 99 abuts; the latter being threadedly engaged in a nut 101 riveted as at 103 to the projecting portion 105 of the gate "G". In the instance shown in Figs. 7 to 9 inclusive movement of the jack screw 99 in one direction causes an outward shifting of the gate "G" because of the abutting engagement of the screw 99 with the abutment 97. In the instance shown in Fig. 7 the door or gate "G" is not aided in its closing movement by the jack screw 99 but must be manually forced to fully closed position.

In the construction shown in the remainder of the figures of the drawings, with the parts in the position shown in Fig. 2, it is apparent that operation of the jack screw in one direction will cause the shoulder 82 to act against the lug 80 and effect an outward movement of the gate or door "B". When the screw has reached the limit of its movement, it is freed from its engagement with the lug 80 by being turned in the brackets 68 to the position shown in Fig. 6 whereupon the door may be fully opened by being forcibly and manually shifted on its rollers 40 until the stop 46 contacts with the tie 44. In closing the door "B" the door is manually and forcibly urged inwardly until the head 76 of the jack screw 62 may be engaged with the lug 80 whereupon operation of the said jack screw in the reverse direction will cause the door to be moved to fully closed position. It is apparent, therefore, that while the jack screw 62 is a door actuator it is also a starter, rotation thereof causing the jack screw to cooperate with the door frame in starting the door from closed to open position. In closing the door it is apparent that when the door has been shifted to a position such that the jack screw may be engaged with the lug 80, rotation of the jack screw will effect complete closing of the door.

From the description just above it is believed that the construction and operation of the invention will be fully apparent to those skilled in the art without further elaboration. The drawings disclose certain forms of the invention, but it is to be understood that they are for illustrative purposes only and various changes in the form and proportion of the construction may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. In a railway hopper car, means for closing the discharge end of the hopper comprising a door frame secured to the hopper and formed with inwardly facing oppositely arranged tracks, a door adapted to close the discharge end of the hopper and having a portion projecting outward

from the side of the hopper when the door is in closed position, rollers supporting the door and arranged in said tracks, and door actuating means supported on the projecting portion of the door and adapted to cooperate with the door frame upon operation thereof during a portion of the movement of the door in both opening and closing directions.

2. In a hopper car, closure means for the outlet of the hopper comprising a door frame secured to the hopper walls and formed to provide oppositely arranged inwardly facing tracks, a door for closing said hopper, rollers secured to the door and arranged in the tracks for movement thereon, said door being of such dimensions as to project outward from the side of the hopper when in fully closed position, an actuating member pivotally supported on the projecting portion of the door, and a bearing lug on the door frame with which said member cooperates during a portion of the movement of the door in both opening and closing directions.

3. Closure means for hoppers comprising a frame secured to the hopper at the outlet end portion thereof, said frame being formed to provide oppositely arranged tracks, a door for closing the hopper having a portion projecting in a horizontal plane, rollers for supporting the door arranged for movement on the tracks, and a jack screw pivotally mounted on the projecting portion of the door in such a position as to detachably engage the frame in such a manner that actuation of said screw will start the door in its opening movement.

4. In combination with a railway hopper car, a door frame secured to the outlet portion of the hopper and provided with oppositely arranged track members, a door having upwardly offset side edge portions arranged in the track members, rollers connected to the door at the offset portions thereof and mounted in the track members, and door actuating means supported by the door including a pivotally mounted jack screw detachably engaged with the door frame in such a manner as to cooperate therewith upon rotation to actuate the door during a part of its movement in both the opening and closing directions thereof.

5. In a railway hopper car, means for closing the discharge end of the hopper, comprising a door frame, a door having a horizontally projecting portion, and means comprising a jack-screw pivotally supported on the projecting portion of the door and adapted to cooperate with the door frame to force the door to both closed and open positions.

6. In a railway hopper car, means for closing the discharge end of the hopper, comprising a door frame, a door slidably mounted in said frame, a bearing lug supported by the frame, and means for actuating the door comprising a jack-screw pivotally mounted on the door and provided at its inner end with a pair of shoulders, one of said shoulders being adapted to co-operate with said lug to move the door in one direction when the jack-screw is turned in one direction, and the other shoulder being adapted to co-operate with said lug to move the door in the opposite direction when the jack-screw is turned in the opposite direction.

7. In a hopper car, closure means for the outlet

of the hopper comprising a door frame secured to the hopper walls and having inwardly facing tracks formed integral therewith, a door for closing said hopper, rollers secured to the door and arranged in the tracks for movement thereon, said door being so formed as to project outward from the side of the hopper when in fully closed position, an actuating member supported by the projecting portion of the door, and a bearing lug on the door frame with which the forward end portion of said member cooperates during a portion of the movement of the door in both opening and closing directions.

8. In a combination with a railway hopper car, a door frame secured to the outlet portion of the hopper and having integrally formed track members, a door for closing said hopper so formed as to provide a supporting portion projecting horizontally therefrom when the door is in fully closed position, flexible sealing means secured to the inner surface of the door frame and arranged to cooperate with the door to seal the hopper against leakage, rollers supporting said door arranged for movement on the track members, and door actuating means pivotally mounted on the projecting supporting portion of the door and detachably engaged with the door frame, said actuating means being operative to shift the door relative to the track members during a portion of the movement of said door in both the opening and closing directions.

9. In combination with a railway car having a hopper, of means for closing the hopper comprising a door frame secured to the outlet end portion of the hopper and formed to provide oppositely arranged channel shaped track members, a door for closing the hopper discharge end travelling in said track members and of greater length than the hopper discharge end and projecting outward from the same when in its closed position, and a jack screw mounted on the projecting portion of said door and adapted to engage the door frame to cause a relative movement of parts upon rotation.

10. Closure means for hoppers comprising a frame secured to the hopper at the outlet end portion thereof, said frame being formed to provide oppositely arranged tracks, a door for closing the hopper, said door being of greater length than the hopper outlet whereby a portion thereof projects beyond the hopper when the door is in closed position, rollers for supporting the door arranged for movement on the tracks, and a rotatable jack screw mounted on the projecting portion of the door in such a position as to detachably engage the frame in such a manner that actuation of said screw will start the door in its opening movement.

11. In a railway hopper car, means for closing the discharge end of the hopper comprising a door frame, a door slidable in said frame and of a greater length than the discharge end of the hopper whereby a portion thereof projects beyond the hopper when the door is in closed position, and means comprising a jack screw pivotally supported on the door and adapted to cooperate with the door frame to force the door to both closed and open positions.

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