

Nov. 12, 1935.

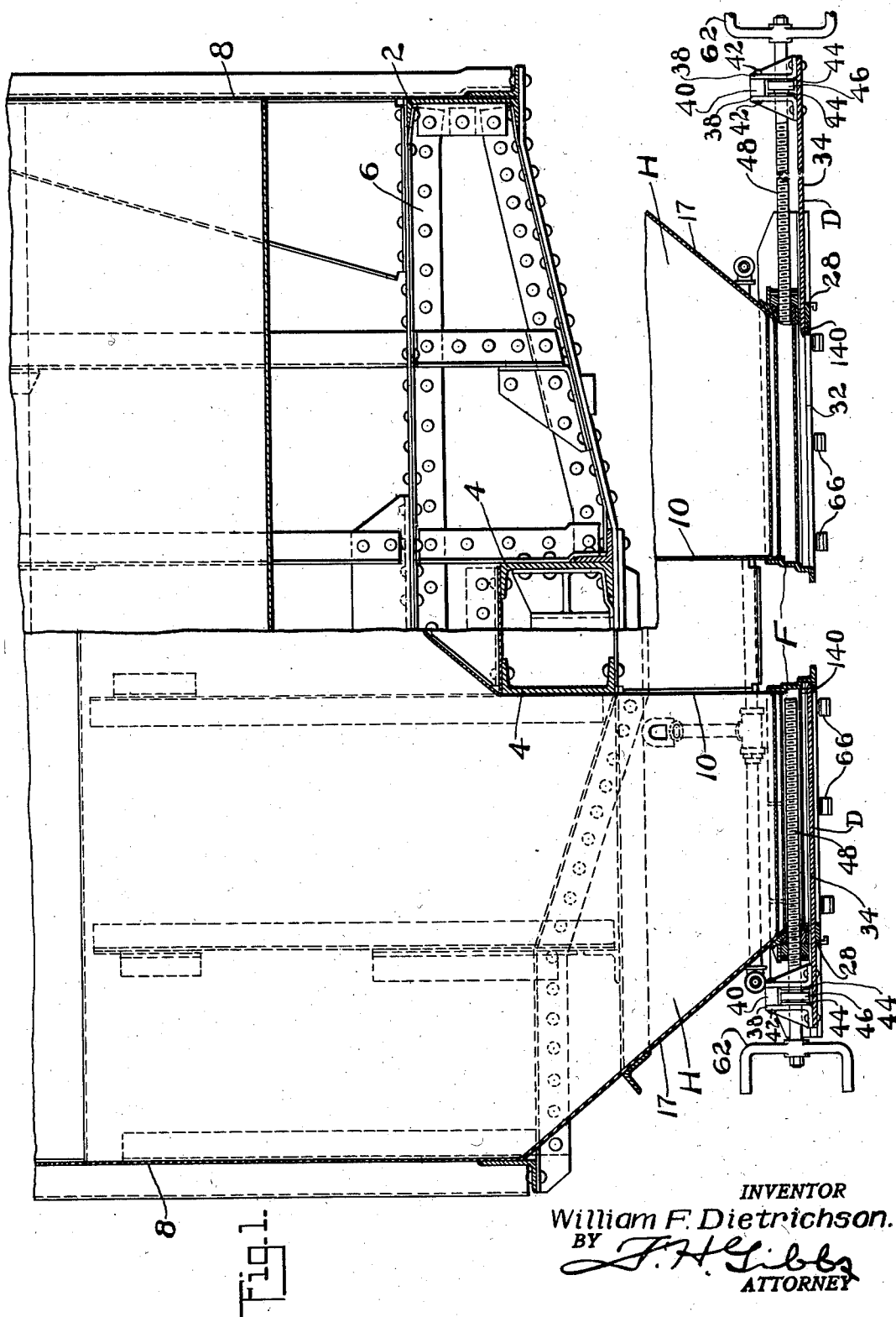
W. F. DIETRICHSON

2,020,880

RAILWAY HOPPER CAR

Filed June 19, 1933

3 Sheets-Sheet 1



INVENTOR
William F. Dietrichson.
BY *J. H. Gibbs*
ATTORNEY

Nov. 12, 1935.

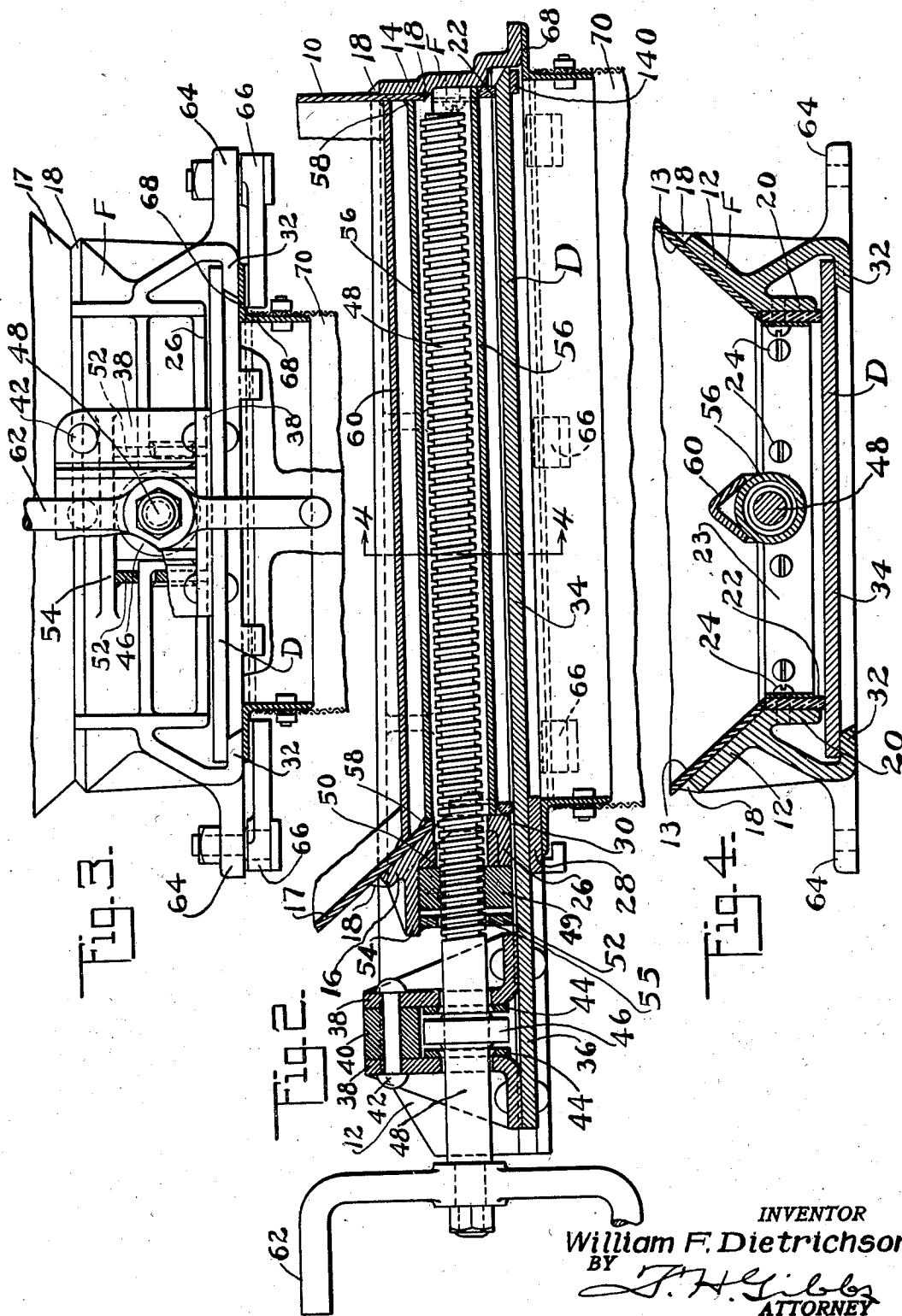
W. F. DIETRICHSON

2,020,880

RAILWAY HOPPER CAR

Filed June 19, 1933

3 Sheets-Sheet 2



INVENTOR
William F. Dietrichson
BY
J. H. Gibbs
ATTORNEY

Nov. 12, 1935.

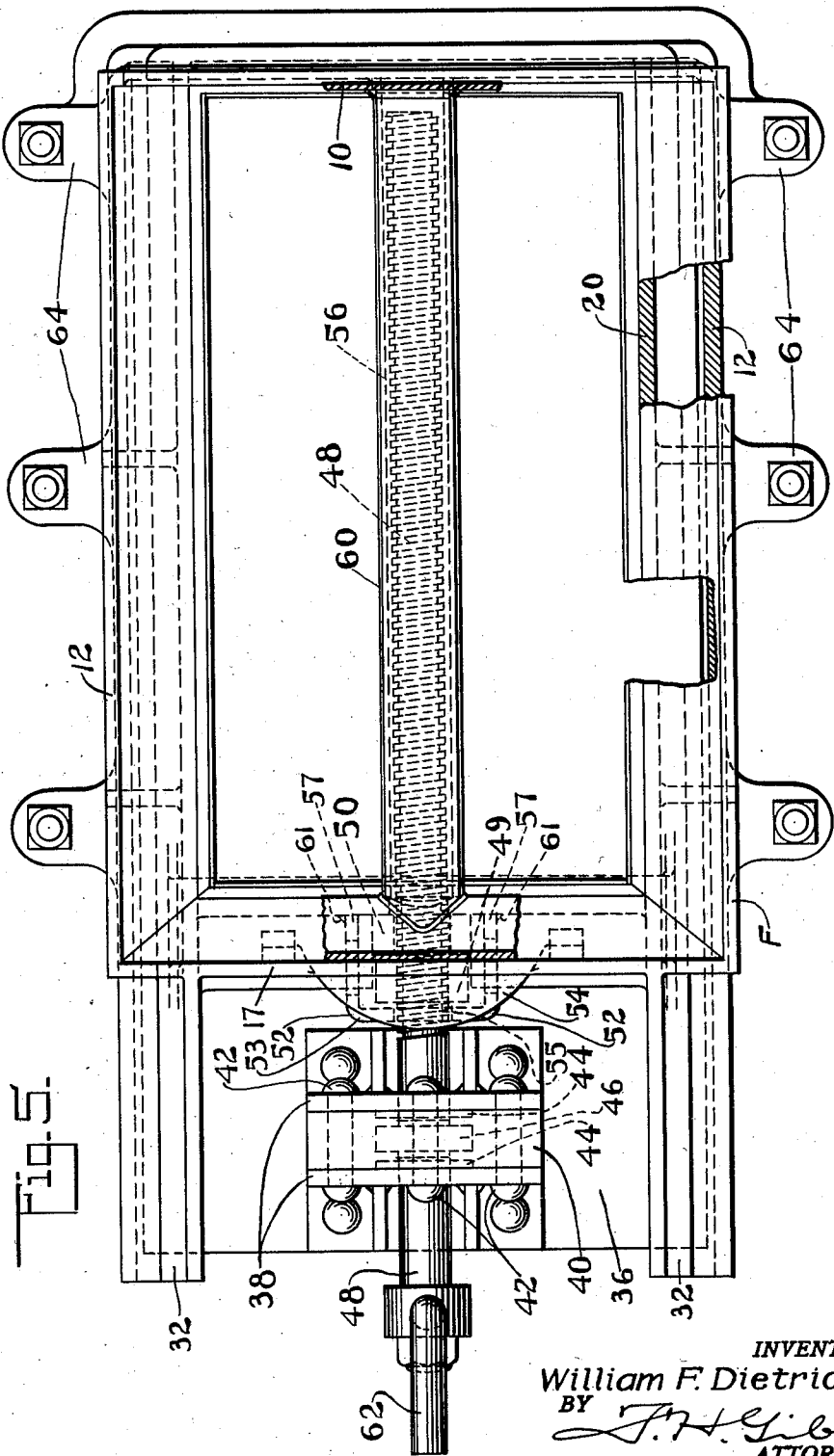
W. F. DIETRICHSON

2,020,880

RAILWAY HOPPER CAR

Filed June 19, 1933

3 Sheets-Sheet 3



INVENTOR
William F. Dietrichson.
BY *J. H. Gibbs*
ATTORNEY

UNITED STATES PATENT OFFICE

2,020,880

RAILWAY HOPPER CAR

William F. Dietrichson, Berwick, Pa., assignor to
American Car and Foundry Company, New
York, N. Y., a corporation of New Jersey

Application June 19, 1933, Serial No. 676,465

13 Claims. (Cl. 105—282)

This invention relates generally to railway hopper cars adapted particularly for transportation of cement or other fine or granular materials and has particular reference to means for closing the hoppers against discharge of lading there-through.

One object of the present invention is the provision of a new and improved hopper and door arrangement.

Another object of this invention is the provision of a new and improved sliding door arrangement for hopper cars.

Still another object of this invention is the provision of a new and improved means for operating the sliding door for the hopper of a railway car.

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

Figure 1 is a sectional view through a hopper car embodying the present invention, certain parts being broken away to disclose other parts of the car more clearly, the view showing a pair of hoppers with closure means associated therewith, one of which is in open position;

Fig. 2 is an enlarged sectional view through the lower portion of a hopper showing one form of door operating means;

Fig. 3 is a front end view of the construction shown in Fig. 2, certain parts being broken away to disclose other parts in section;

Fig. 4 is a sectional view on the line 4—4, Fig. 2; and

Fig. 5 is a top plan view of the door frame shown in section in Figs. 2 and 4, certain parts being broken away to disclose other parts in section.

Referring now more particularly to the drawings in which similar characters of reference designate similar parts in the several views, Figure 1 shows a portion of a hopper car which is more or less conventional and comprises side sills 2, a center sill 4, a bolster 6 and side walls 8. The car includes spaced hoppers indicated generally at "H" arranged respectively on opposite sides of the center sill 4 and each thereof formed in such a manner that the inner hopper sheet 10 depends substantially vertically from the center sill 4, while the remainder of the hopper sheets slope inwardly and downwardly to the mouth or lower end of the hopper as clearly shown in Figs. 2 to 4 inclusive.

The present invention is directed primarily to the door arrangement for closing the lower ends

of the hoppers, and inasmuch as the closure means for the several hoppers are identical a description of one will suffice for all. Secured to the lower end of the hopper is a frame indicated in the drawings (see Fig. 3) at "F", said frame being adapted to support the hopper door "D" and also serving to reinforce the walls of the hopper as will be apparent. The frame "F" is preferably, though not necessarily, a casting and comprises side portions 12 which conform to the inclination of the side hopper sheets 13, a rear end portion 14 which, as shown clearly in Fig. 2 is substantially vertical, and an inclined front portion 16 which conforms to the slope of the outer hopper sheet 17. The frame "F" may be secured to the hopper sheets in any suitable manner but, in the instance shown, is indicated as being welded thereto as at 18. Formed with the side portions 12 and front portion 16 of the frame "F" are attaching flanges 20 which depend below the lower edge portions of the hopper sheets (see Fig. 4). Secured to flanges 20 by means of a retainer strip 23 and fasteners 24 is a gasket 22 which also extends across the rear portion 14 of the frame (see Fig. 2) and sealingly cooperates with the hopper door "D" to prevent leakage of material from the hopper when the door is in closed position.

The front portion 16 of the frame "F" is provided with an out-turned base 26 and with a shelf 28 arranged in spaced relation below the base 26 and providing a support for the door "D"; the base 26 and shelf 28 defining therebetween an opening or slot 30 through which the door "D" is slidable to and from closed position. As clearly shown in Fig. 4 the door "D" is also supported by track members 32 which depend from the side portions 12 of the frame and provide guideways for the door. The side portions 12 of the frame as shown in Fig. 2 extend beyond the front portion 16 of the frame so as to provide for supporting the door "D" during the full extent of its sliding movement.

The door "D" comprises a metal plate 34 of a length sufficient to fully close the hopper against discharge of lading therethrough when in closed position and to provide an extension 36 upon which is mounted a bracket comprising spaced angle members 38 are thrust bearing plates 44 rivets 42. Secured to the inner surfaces of the angle members 38 are thrust bearing plates 44 between which is arranged a collar 46 fixedly secured to one end portion of an operating screw shaft 48 which extends through suitable openings in the bracket and through a nut 49 non-rotat-

ably held at the front portion 16 of the frame "F" as shown in Fig. 2. The nut 49 is positioned between thrust bearing members comprising a filler block 50 secured to the end portion 16 of the frame "F" and a nut retainer 52 welded to a projection 54 formed with the front portion 16 of the frame "F" and extending horizontally therefrom in such a manner as to cooperate with the nut 49 in restraining the latter against rotation. The retainer 52 comprises a plate 53 having an aperture 55 through which the screw shaft 48 extends, and integral side portions 57 welded or otherwise secured to the projection 54 as shown at 59 (see Fig. 3) and so formed as to extend to the front portion 16 of the frame "F" and be welded thereto at 61 (see Fig. 5). The nut 49 is preferably square or otherwise suitably formed to cooperate with the projection 54 whereby it is restrained against rotation relative to screw shaft 48. The screw shaft 48 extends through the filler 50 and through a tubular housing 56 extending between the front and rear hopper walls and welded thereto at 58 and to the frame; the housing 56 thus covering the screw shaft 48. As shown in Fig. 4 an angle shaped deflector 60 is welded to the upper portion of the housing 56 to facilitate discharge of lading from the hopper when the door "D" is in open position. Secured to the extended end portion of the screw shaft 48 is a handle member 62 for actuating said screw shaft.

The frame "F" is provided with a plurality of laterally projecting attaching lugs 64 for supporting clamp elements 66 which are adapted to engage the angular frame 63 of a flexible discharging conduit or boot 70 so as to direct material discharged from the hoppers to any desired place of storage.

In the form of the invention shown in the drawings it is apparent that upon operation of the handle 62 the screw shaft 48 is rotated in the nut 49, rotation of the shaft 48 in one direction causing the collar 46 to cooperate with one of the bearing plates 44 to cause shifting of the door "D" from closed to open position. Outward movement of the door "D" is limited by contact of a stop 140 secured to the under surface of the door "D" at its forward end portion with the shelf 28. Obviously, rotation of the screw shaft 48 in the reverse direction will cause reversal of movement of the door "D" to closed position.

The drawings herein disclose certain embodiments of the invention, but it is to be understood that they are for illustrative purposes only and various changes in the form and proportions of the invention 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, a door arrangement comprising a frame secured to the hopper at its discharge end portion and provided with oppositely arranged guideways, a door slidably supported in the guideways adapted to close the discharge end of the hopper and having a supporting portion projecting beyond the hopper, and a screw shaft having one portion supported by the projecting portion of the door in such a manner as to be shifted with the door upon movement of the latter and another portion in cooperative engagement with the frame, said shaft being operative to effect sliding movement of the door in the guideways.

2. In a railway hopper car, a hopper door arrangement comprising a frame secured to the

hopper at its discharge end portion and provided with spaced guideways, a door mounted in the guideways and adapted to close the discharge end of the hopper, a gasket secured to the frame and arranged to cooperate with the door to seal the hopper against leakage when the door is in closed position, a screw shaft associated with the door and frame and operative through its screw threads to shift the door the full extent of its movement in the guideways, and a housing covering said screw shaft.

3. In a railway hopper car, a hopper door arrangement comprising a frame secured to the hopper at its discharge end portion and provided with door supporting guideways and an attaching flange, a door supported in the guideways, a gasket secured to the attaching flange and cooperating with the door when the latter is in closed position to seal the hopper against leakage, and threaded actuating means associated with the door and frame, said means being arranged above the door and being operative through its threads to shift the door the full extent of its movement.

4. In a railway hopper car, a hopper door arrangement comprising a frame secured to the hopper at its discharge end portion and provided with door supporting guideways, a door mounted in the guideways, sealing means at the discharge end portion of the hopper cooperating with the door to seal the hopper against leakage when the door is in closed position, and a screw shaft associated with the door and frame and arranged above said door, said screw shaft being operative through its threads to slide the door the full extent of its movement in the guideways.

5. In a railway hopper car, a door slidably mounted in position to close the hopper, a screw shaft connected with the door and associated with the hopper, said screw shaft being bodily movable with the door and being operative through its screw threads to slide the door when actuated, and thrust bearing members supported by the door with which the said screw shaft cooperates during its actuation.

6. In a railway hopper car, a frame secured to the discharge end portion of the hopper, a door slidably mounted in the frame in position to close the hopper, a screw shaft connected with the door, a nut engaged with the screw shaft, means on the frame restraining the nut against rotation relative to the screw shaft, and bearing members with which said screw shaft cooperates during its actuation in such a manner as to effect sliding movement of the door.

7. In a railway hopper car, a door slidably mounted in position to close the hopper, a rotatable screw shaft connected with the door and bodily shiftable therewith, a nut engaged with the screw shaft, means restraining the nut against movement relative to the screw shaft, and bearing members mounted on the door and with which said screw shaft cooperates during its actuation to effect sliding movement of the door.

8. In a railway hopper car, a frame secured to the hopper at its discharge end portion and provided with oppositely arranged guideways, a hopper door slidably supported by the guideways, spaced bracket members mounted on the door, and a screw shaft extending through said bracket members, said screw shaft having one end portion arranged in cooperative relation with said door frame and having means thereon arranged between said bracket members adapted to con-

tact with the latter during actuation of said screw shaft to cause sliding movement of the door in said guideways.

5 9. In a railway hopper car, a hopper door arrangement comprising a frame secured to the discharge end portion of the hopper and provided with spaced guideways, a hopper door supported in the guideways for sliding movement in a direction transversely of the car, a screw shaft 10 connected with the door and associated with the frame in such a manner as to be operative to slide the door in the guideways, said screw shaft extending across the discharge end portion of the hopper when the door is in closed position, 15 and a housing extending across the hopper opening and enclosing said screw shaft.

10 10. In a railway hopper car, a hopper door arrangement comprising a frame secured to the hopper and provided with spaced guideways, a hopper door supported in the guideways and slidable transversely of the car, a screw shaft, a nut with which said screw shaft is engaged, means on the frame cooperating with the nut to restrain the latter against rotation, said screw 25 shaft extending across the discharge end portion of the hopper when the door is in closed position, a housing extending across the hopper opening and enclosing said screw shaft, means limiting longitudinal shifting of the nut, and 30 bracket means carried by the door and cooperatively engaged with the screw shaft in such a manner that upon rotation of the latter in the nut said door and screw shaft are simultaneously shifted relative to the hopper.

35 11. In a railway hopper car, a door arrangement comprising a frame secured to the hopper at its discharge end portion and provided with

oppositely arranged guideways, a door slidably supported in the guideways adapted to close the discharge end of the hopper, said door having a supporting portion projecting beyond the hopper, and a screw shaft supported adjacent one 5 end by the projecting supporting portion of the door, said shaft being so supported as to permit shifting thereof with the door upon actuation of said shaft, said shaft having another portion thereof in cooperative relation with the 10 door frame in such a manner as to slide said door the full extent of its movement during actuation of said screw shaft.

12. In a railway hopper car, a hopper door arrangement comprising a frame secured to the 15 hopper at its discharge end portion constituting an extension of the hopper and provided with spaced guideways, a door mounted in the guideways and adapted to close the discharge end of the hopper, a gasket secured to the frame and 20 arranged to cooperate with the door to seal the latter against leakage when the door is in closed position, a screw shaft associated with the door and frame, said screw shaft extending across the hopper opening and being operative to shift the 25 door the full extent of its movement in the guideways, and a housing within the hopper opening arranged to cover said screw shaft.

13. In a railway hopper car, a door slidably mounted in position to close the hopper, a rotat- 30 able screw shaft carried by the door and associated with the frame, said screw shaft being bodily movable with the door through its threads to shift the door when actuated, and bearing elements supported by the door with which the 35 screw shaft cooperates during its rotation.

WILLIAM F. DIETRICHSON.