July 21, 1953 G. B. DOREY 2,646,006

DISCHARGE OUTLET AND CLOSURE ASSEMBLY

Filed Dec. 24, 1948 3 Sheets-Sheet 1

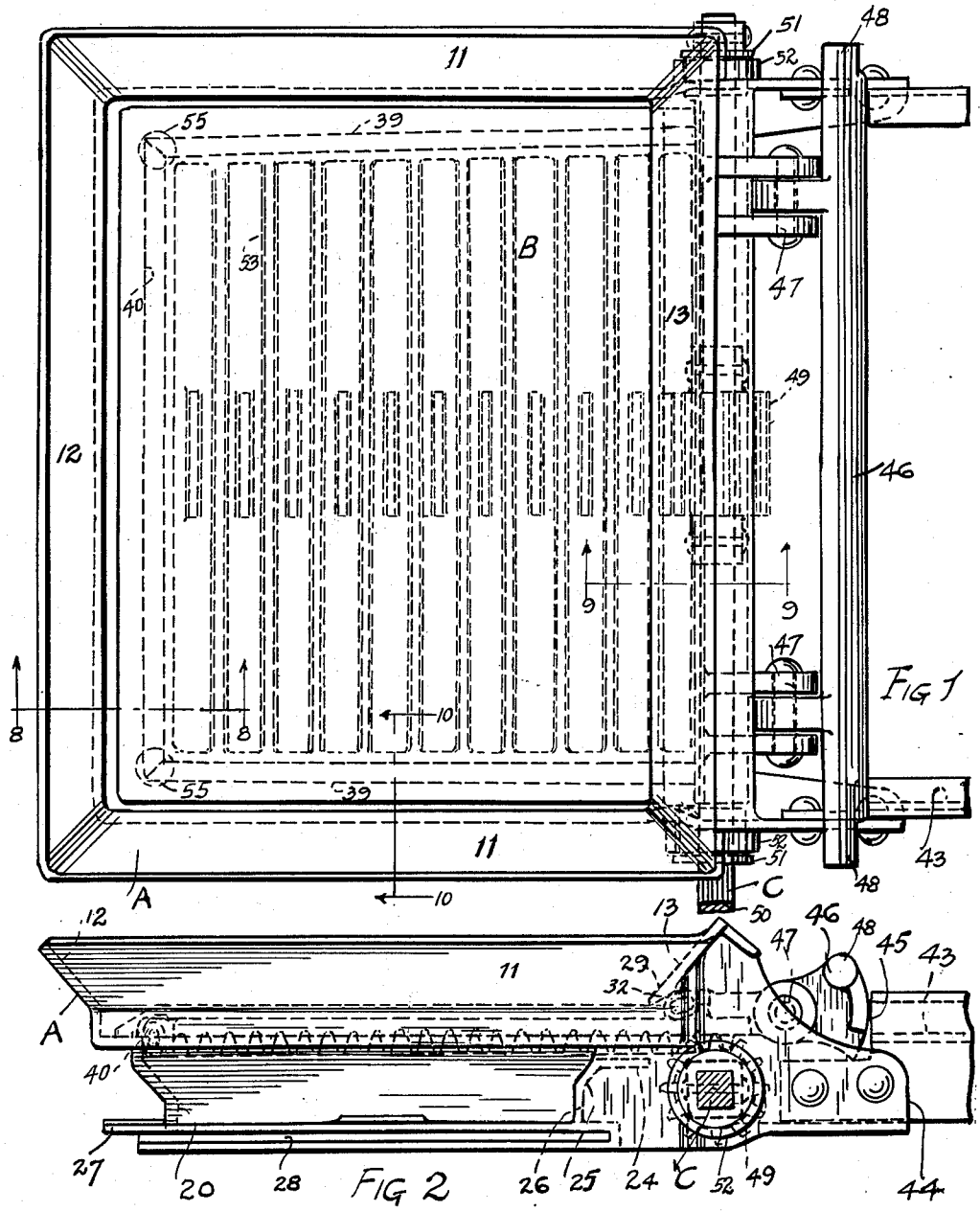

FIG 1

FIG 2

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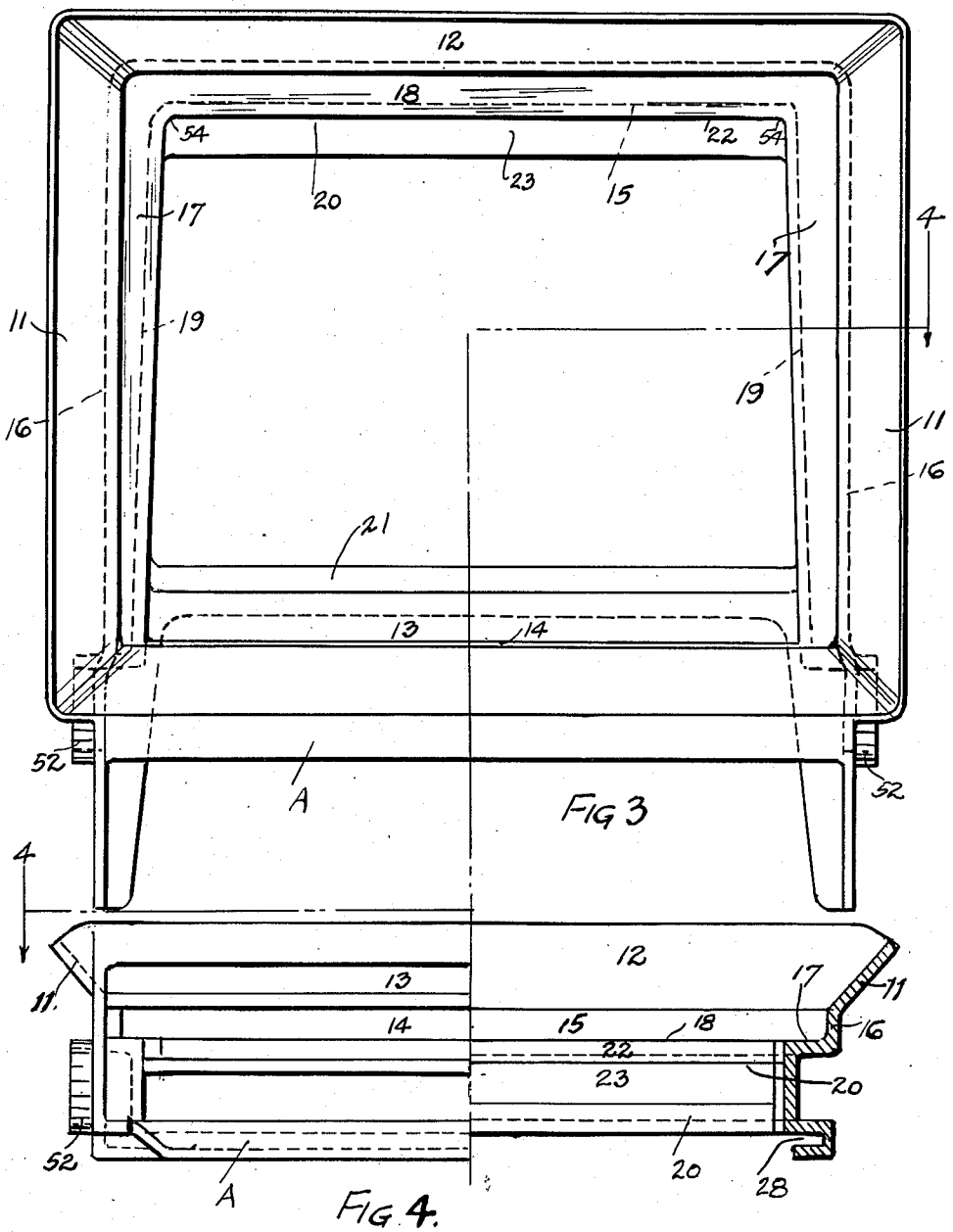

FIG 3

FIG 4.

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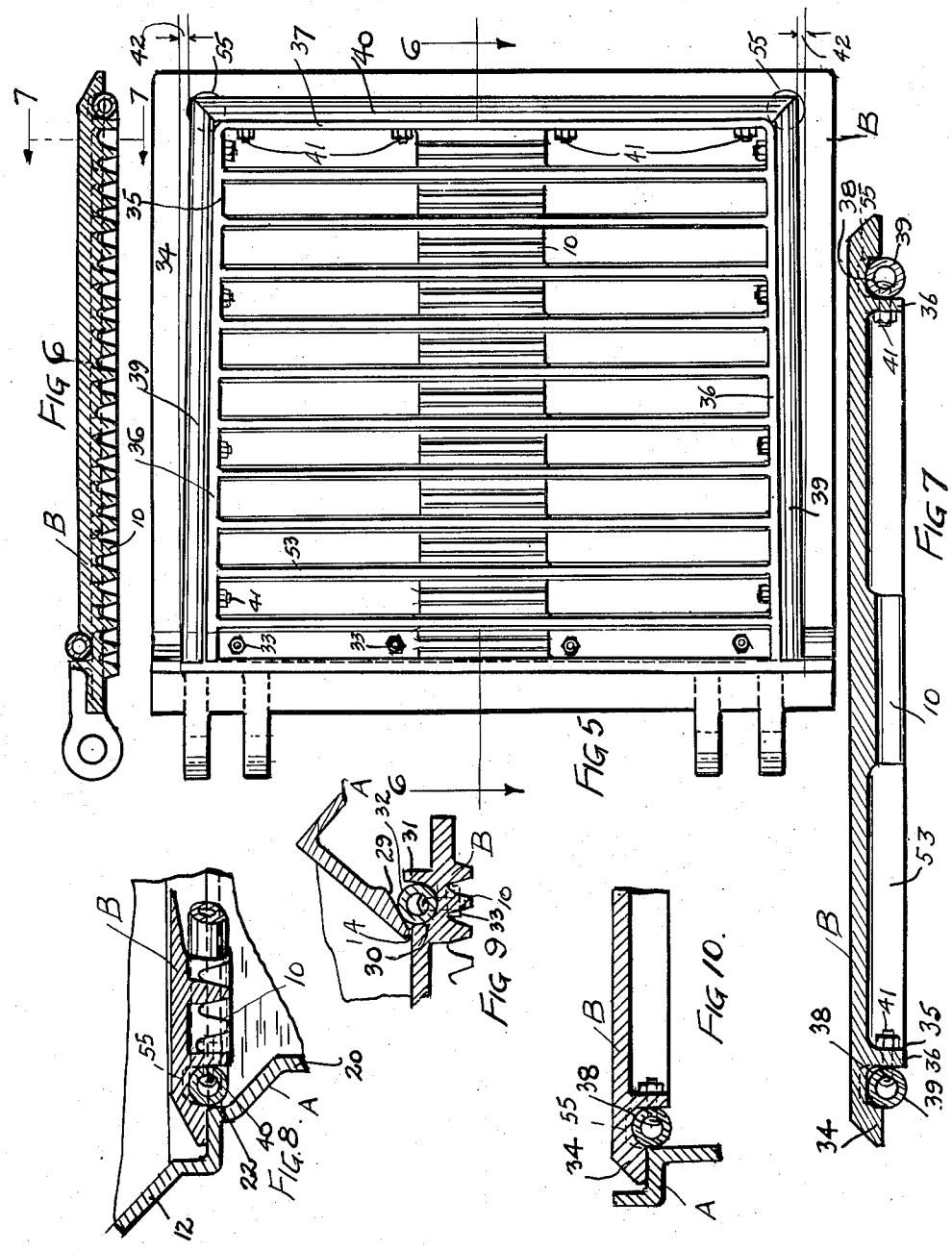

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Patented July 21, 1953 2,646,006

UNITED STATES PATENT OFFICE

2,646,006

DISCHARGE OUTLET AND CLOSURE ASSEMBLY

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Application December 24, 1948, Serial No. 67,215

10 Claims. (Cl. 105—282)

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My invention relates, generally, to the construction of hopper closures and it has particular relation to discharge outlets and closure assemblies therefor.

It is one of the main objects of my invention to provide an outlet assembly having a closure of the sliding type which will be absolutely tight under all conditions.

It is a particular object of my invention to provide an assembly including a discharge outlet frame and a co-operating sliding closure having auxiliary sealing means around the edges thereof.

Another object of my invention is to provide a frame and closure assembly in which auxiliary sealing means are employed to supplement the sealing security normally provided by the weight of the closure and lading resting upon runways.

Still another object of the invention is to provide improved, simple and effective means for retaining a sliding closure in a definitely closed position.

My invention further resides in certain other details of construction such as will be pointed out hereinafter.

For further comprehension of my invention reference may be had to the accompanying drawings wherein:

Fig. 1 is a top plan view of an outlet assembly embodying my improvements;

Fig. 2 is a side elevational view of the assembly shown in Fig. 1;

Fig. 3 is a top plan view of the outlet frame proper illustrating the frame shown in Fig. 1 except that the sliding closure and associated parts are omitted;

Fig. 4 is an elevational view of the outlet frame shown in Fig. 1, said view being partly sectional and partly an end view as taken on a line 4—4 of Fig. 3;

Fig. 5 is a bottom plan view of the closure shown in Fig. 1;

Fig. 6 is a vertical sectional view taken through the closure on a line 6—6 of Fig. 5;

Fig. 7 is a vertical sectional view on an enlarged scale taken along a line 7—7 of Fig. 6;

Fig. 8 is a fractional elevational sectional view on an enlarged scale taken on a line 8—8 of Fig. 1 and showing the sealing gasket in contact with the rear wall of the frame;

Fig. 9 is a fractional elevational sectional view on an enlarged scale taken on a line 9—9 of Fig. 1 and showing the sealing gasket in contact with the under surface of the upper wall

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of the slot at the front sloping wall of the frame; and

Fig. 10 is a fractional elevational sectional view on an enlarged scale taken on a line 10—10 of Fig. 1 and showing the sealing gasket in contact with the surface of the adjacent side wall of the frame.

In said drawings my improvements are shown as applied to an outlet assembly of the conventional type including a frame A, a sliding closure or gate B having a series of rack teeth 10 on the underside thereof, and shaft and pinion means C co-operable with the said teeth 10 for moving the gate lengthwise. The frame A includes an upper attaching portion including side sloping walls 11—11 and end sloping walls 12 and 13, the latter being slotted at 14 for accommodating the sliding closure therethrough. The end sloping wall 12 and the side sloping walls 11—11 lead downwardly to substantially vertical wall sections 15 and 16—16, the latter being disposed in substantially parallel relation and operating as guides between which the edges of the side walls of the closure B are guided and the movement of the closure restricted to a rectilinear movement.

Extending inwardly from the said walls 15 and 16—16, as shown in Figure 3, are substantially horizontally disposed side and end runways as indicated at 17 and 18 respectively on which the closure B is arranged to have sliding movement.

The outlet frame below the runways 17 and 18 is in the form of a four-sided discharge chute of appreciable depth which includes substantially vertically disposed side walls 19—19 and end walls indicated at 20 and 21 respectively, the end wall 20 at the inner end of the outlet frame includes a vertically disposed section 22 and thereafter is deflected inwardly downwardly as at 23. The wall 21, which is located at the outer end of the outlet, includes a horizontal ledge in the form of an upper wall 24, a downwardly inclined section 25 and a vertically disposed lower section 26.

The walls 19—19 are disposed slightly out of parallelism diverging outwardly towards the slotted end of the outlet whereby said respective walls 19—19 in combination with the end walls 20 and 21 present a substantially wedge shaped four sided discharge opening. The lower portion of the frame A is provided with outwardly laterally extending portions including a flange 27 on two adjacent sides and a horizontally disposed groove 28 on the two other adja-

cent sides, said flange and groove being for the purpose of receiving and holding a removable spout structure for directing lading away from the outlet frame.

The sliding closure B which is mounted for movement on the runway surfaces 17 and 18 is extended beyond the longitudinally extending side runways 17 of the frame, and through the slot 14. The upper wall of the slot 14 slopes upwardly and outwardly as at 29, Fig. 2, to provide a wedge shaped flared mouth for the slot 14.

The outer end of the closure B is provided with a groove 30, Fig. 9, extending throughout its entire width to form, in combination with vertical wall 31, a pocket for receiving a resilient deformable gasket 32, which is bolted or otherwise secured to the gate at 33. Said gasket is arranged to jam in the flared mouth of the slot 14 when the closure is forced home and thus effectively to seal the opening through the frame A at the outer edge thereof.

The closure B is stepped, Fig. 7, to provide a main upper section 34 resting on the runways 17 and 18 and a lower section 35 inset in the frame or chute A. The inset portion 35 corresponds in shape to the interior wedge shaped contour presented by walls 19 and 20 of the frame A and includes side and end depending walls 36 and 37, Fig. 5, and outwardly of immediately adjacent said walls 36 and 37 the upper main section 34 is formed with grooves 38. Said walls 36 and 37 of the gate are spaced away from the interior face of the walls of the frame A to accommodate tubular shaped gaskets 39 and 40 which are preferably bolted to the associated walls 36 and 37 as indicated at 41. The walls 36—36 diverge outwardly towards the slot 14 in the frame A so that they are parallel to the walls 19—19 respectively and provide a wedge shaped section on the closure B.

The respective gaskets 39 and 40 preferably meet in mitered relation and combine to form a wedge shaped resilient deformable binding around three sides of the lower inset section 35 of the closure. The outer ends of the side gaskets 39 are extended to intersect and have bearing contact with the end gasket 32.

The extent of divergence of the side gaskets 39 is indicated at 42, Fig. 5. The wedging structure on the closure or gate B, as presented by the outer surfaces of the expanded gaskets 39 and 40, is slightly larger than the interior contour of the opening through the frame A in order to ensure deformation of the gaskets 39 when the closure or gate B is forced home to fully closed position and thus provide a tight seal between the lower inset section 35 and the walls 19 and 20 of the frame A.

In order to support the closure or gate B in open position, the closure structure A is fitted with extension rails 43, Figs. 1 and 2, which are secured to brackets 44 formed integrally with the frame.

The rails 43 are provided with upward extensions, the edge portions 45 of which form abutments for co-operation with a locking element 46. The locking element 46, which is pivotally mounted on the closure at 47, extends from side to side of the closure and is provided at each end with an operating lug 48. This locking mechanism is claimed in divisional application Serial No. 310,203, filed September 18, 1952.

The means for moving the closure longitudinally includes the rack teeth 10 in co-operation with the shaft and pinion means C. The pinion which is indicated at 49, is non-rotatably mounted on the shaft 50 and the latter is preferably of rectangular shape and fitted with bushings 51 whereby it is rotatably mounted in bearings 52 of the frame A. Any suitable handle may be employed for rotating the shaft 50.

The rack teeth 10 are disposed centrally of the closure and each alternate tooth is extended across the closure B as indicated at 53, Fig. 5, to unite integrally with the depending side walls 36 of the inset section 35.

The function of the gaskets, 32, 39 and 40 as will be understood, is to provide sealing security in addition to that normally provided by such sealing contact that is obtained by the weight of the closure B and lading resting upon the runways 17.

Upon movement of the closure B in a closing direction, the side gaskets 39 impinge on the divergently disposed side walls 19 of the chute and they are compressed, thus ensuring tightly fitting seals. Movement of the closure B being continued in a closing direction operates to compress gasket 40 against the end wall 20 of the frame A and also operates to jam the front gasket 32 in the wedged shaped opening to the slot 14.

Deformation of the gasket 32 within the confining limits of slot 14 reacts upon the longitudinally disposed gaskets 39 in view of the intersecting contact between said respective members and thus operates effectively to seal the outer end of the outlet.

At the junction of the end and side walls 19 and 20 there is a tendency to fullness in the amount of gasket material displaced due to variations in the size of the fillets 54 Fig. 3. In order to ensure that such displacement will not react upwardly against the closure, a recessed chamber 55, Fig. 5, is provided in the upper section of the closure A directly above each mitered joint between the gaskets 39 and 40.

It will be understood that the resilient nature of the gaskets 32, 39 and 40 will tend to move the closure B outwardly in an opening direction. Therefore I provide the locking and wedging means in the form of the pivoted locking element 46 to exert direct longitudinal pressure on the closure B for the purpose of locking the same closed.

The gaskets 32, 39 and 40 are so located on the closure or gate B as to be readily accessible for inspection and renewal. My invention, as disclosed herein, further renders the possible interchange of closures from one frame to another. This eliminates the necessity for close machining and fitting of the parts entering into each individual assembly.

Since the gaskets 32, 39 and 40 are formed of resilient material, they act to absorb shock between the closure or gate B and the frame A. This ensures that the sealing engagement therebetween will be maintained and the escape of lading, even when finely divided, will be prevented.

I claim as my invention:

1. In a railway car discharge outlet and closure assembly for location on the underside of said car, in combination, a frame having a four sided discharge opening defined in part by side walls diverging outwardly to present a wedge shaped opening therebetween, a runway above each side wall, a sliding closure mounted for lengthwise movement above said walls on said runways, said closure having a wedge shaped section on its underside extending in the space between the divergently disposed side walls of the frame to co-

operate therewith upon movement of the closure to closed position.

2. In a railway car discharge outlet and closure assembly for location on the underside of said car, in combination, a four sided discharge opening defined in part by side walls diverging outwardly to present a wedge shaped opening therebetween, a closure slidably mounted above said walls for lengthwise movement relative thereto, a wedge shaped section associated with said closure and positioned between the dirverging side walls of the frame to cooperate therewith on movement of the closure to closed position, and gaskets interposed between said respective side walls of the frame and closure.

3. In a railway car discharge outlet and closure assembly for location on the underside of said car, in combination, a frame having a four sided discharge opening defined in part by an end wall and a pair of side walls, said side walls leading outwardly from the respective ends of the end wall and diverging outwardly to form a wedge shaped opening, a sliding closure having an upper section mounted for sliding movement above said diverging walls and having a lower wedge shaped inset section lying in the plane of said end and side walls, said lower wedge shaped section having an end wall and side walls respectively disposed in parallelism with the end and side walls of the frame and lying adjacent thereto when the closure is in closed position, and resilient deformable gaskets carried by said end and side walls of the lower section for engagement with the frame.

4. In a railway car discharge outlet and closure assembly for location on the underside of said car, in combination, a frame and sliding closure therefor, said frame having a four sided discharge opening including side and end walls, one of said end walls having a slotted aperture and the side walls leading from the ends of the end wall opposite to the aperture in divergent relation to present a wedge shaped opening having its greatest width adjacent the aperture, said sliding closure extending through the aperture and having a wedge shaped section projecting downwardly in the wedge shaped opening of the frame and formed with side and end walls arranged to cooperate with the side walls of the frame and with the end wall of the frame opposite the aperture upon movement of the closure to closed position; and resilient deformable gaskets interposed between said respective side and end walls of the frame and closure.

5. In a railway car discharge outlet and closure assembly for location on the underside of said car, in combination, a four sided frame having an opening and a slidingly mounted closure for closing the opening, said frame having at one end an aperture for the passage of the closure therethrough and having at the end of the opening opposite to the aperture and at each side of the opening means for supporting the closure when in closed position, said means including angularly related walls including a wall underlying the closure and another wall extending downwardly from said underlying wall, said downwardly extending walls adjacent the sides of the closure diverging outwardly towards the apertured end of the frame, a section formed on the underside of the closure extending downwardly to lie adjacent the said downwardly extending end and side walls of the frame, and resilient deformable gaskets interposed between said downwardly extending end and side walls and the downwardly extending section of the closure.

6. In a railway car discharge outlet and closure assembly for location on the underside of said car in combination, a frame having a four sided wedge shaped discharge opening defined in part by an end wall and a side wall adjacent each end of the end wall, said walls being of appreciable depth and said respective side walls diverging outwardly to form the wedge shaped opening, a sliding closure having an upper section mounted on said end and side walls, said closure having a lower section of wedge shape projecting downwardly into said wedge shaped opening, said lower section having side and end walls lying adjacent to and in parallelism with the divergently related side walls, and resilient deformable gaskets secured to said end and side walls of said lower section with the end and side gaskets meeting in mitered relation, there being a cavity in the closure above the mitered joint for accommodating such portions of the gaskets as may be displaced upwardly upon compression of the gaskets consequent upon the movement of the closure to closed position.

7. In a discharge outlet and closure in combination, a frame having an opening and a sliding closure for closing the opening, said frame having at one end an aperture for the passage of the closure therethrough, said aperture having an upwardly and outwardly inclined upper wall surface, and a resilient deformable gasket carried by the closure and extending lengthwise of the aperture and arranged to be wedged between the closure and the upwardly inclined upper surface of the aperture when the closure is moved to closed position.

8. In a discharge outlet and closure assembly, in combination, a frame and sliding closure therefor, said frame having a four sided wedge opening including side and end walls of appreciable depth, one of said end walls being formed with a slotted aperture for the accommodation of the sliding closure therethrough, said frame adjacent the aperture having an outwardly and upwardly inclined upper surface, said side walls extending outwardly from the ends of the end wall opposite to the aperture in divergent relation to form the wedge shaped opening with its maximum width adjacent the apertured end of the frame, said closure having an upper section overlapping the side walls of the frame and a lower wedge shaped section including side walls lying adjacent to and in parallelism with the diverging side walls of the frame, compressible gaskets carried by said side walls of the lower section and movable therewith for engagement with the diverging side walls of the frame upon movement of the closure to closed position; and a compressible gasket extending transversely across the outer edge of the closure on the upper side thereof and located to contact the divergently related side gaskets in intersecting relation whereby upon movement of the closure to closed position the said transverse gasket will be wedged under the inclined upper surface of the aperture and increased contact pressure between the intersecting gaskets obtained.

9. In a railway car discharge outlet and closure assembly for location on the underside of said car, in combination, a frame having a discharge opening and a closure slidably mounted to close said opening, said frame including at each side of the opening a substantially horizontally ex-

tending wall forming a runway on which the closure is mounted, each said runway having a downwardly extending wall on the inner side thereof to form one of the walls of the opening and an upwardly extending wall at the outer edge of said runway forming a guide for the closure, said respective downwardly extending walls being divergently related to provide a wedge shaped opening and said upwardly extending walls being disposed in parallelism and extending in the direction of movement of the closure, said closure including an upper secton lying between the upwardly extending walls and a lower section lying between the divergently related walls, said upper section having the outer edges thereof contained between and guided by the pair of upwardly extending walls and said lower section being of wedge shaped formation and arranged to cooperate with the divergently disposed walls of the frame on movement of the closure to closed position.

10. In a discharge outlet and closure assembly, in combination, a frame having a four-sided discharge opening defined by walls of appreciable depth including side and end walls, said side walls being divergently related to provide a wedge shaped opening whereby one of the end walls is longer than the other, there being an

aperture formed in the longer of the end walls, a sliding closure movably mounted above the side walls and projecting through said aperture, means for moving the closure, said closure having depending side walls projecting into the frame and disposed adjacent to and in parallelism with the divergent side walls of the frame, and gaskets secured to the side walls of the closure for engagement with the side walls of the frame on movement of the closure to closed position.

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