Dec. 4, 1951 H. W. SANFORD 2,577,040

MINE CAR SEALING DEVICE

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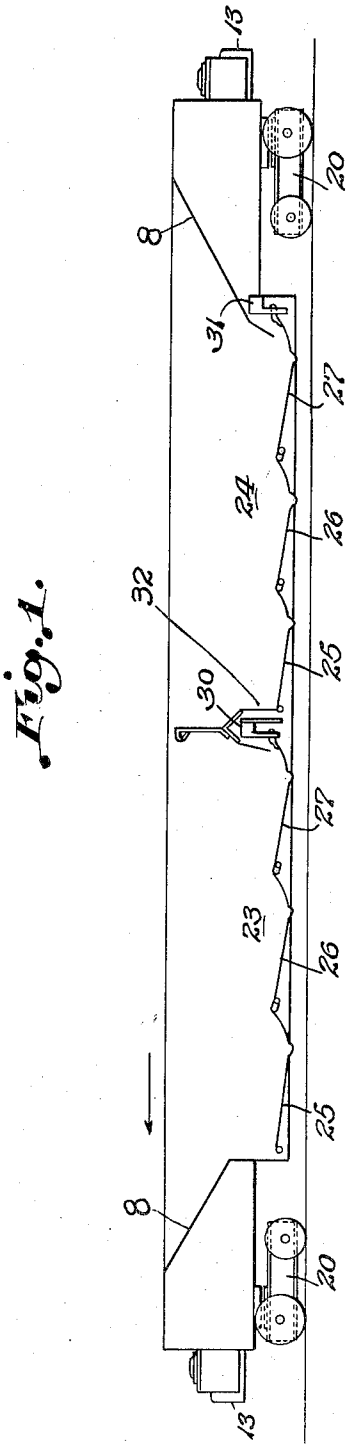


Fig. 1.

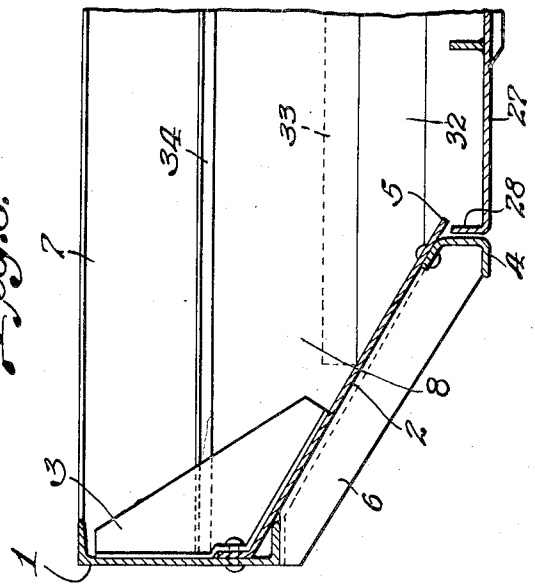


Fig. 3.

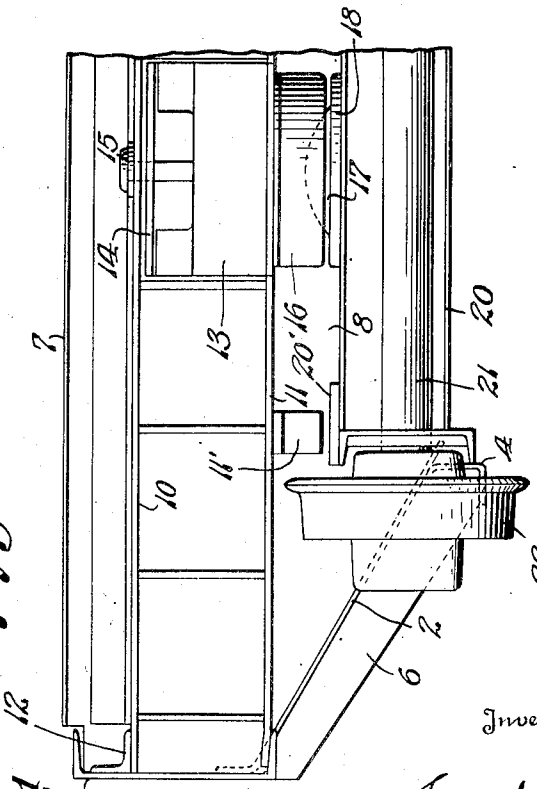


Fig. 2.

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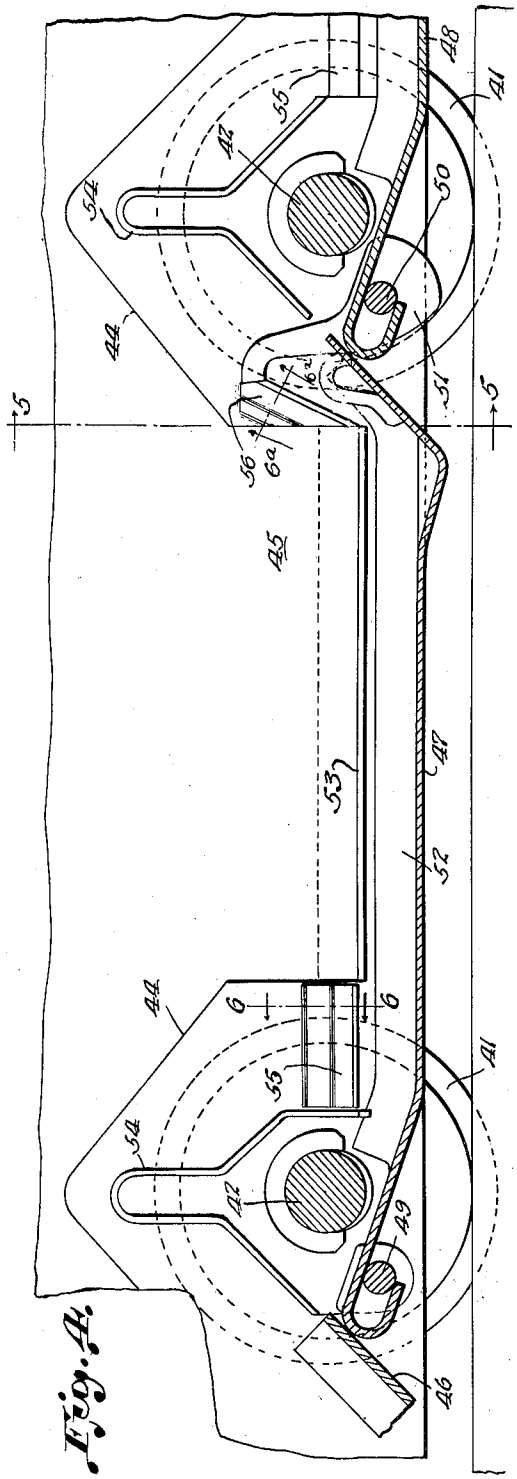


Fig. 4.

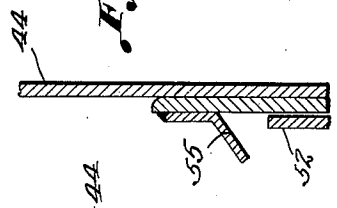


Fig. 6.

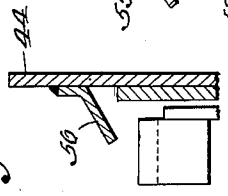


Fig. 6a.

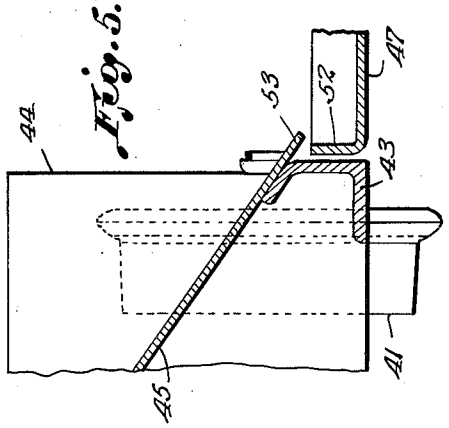


Fig. 5.

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MINE CAR SEALING DEVICE

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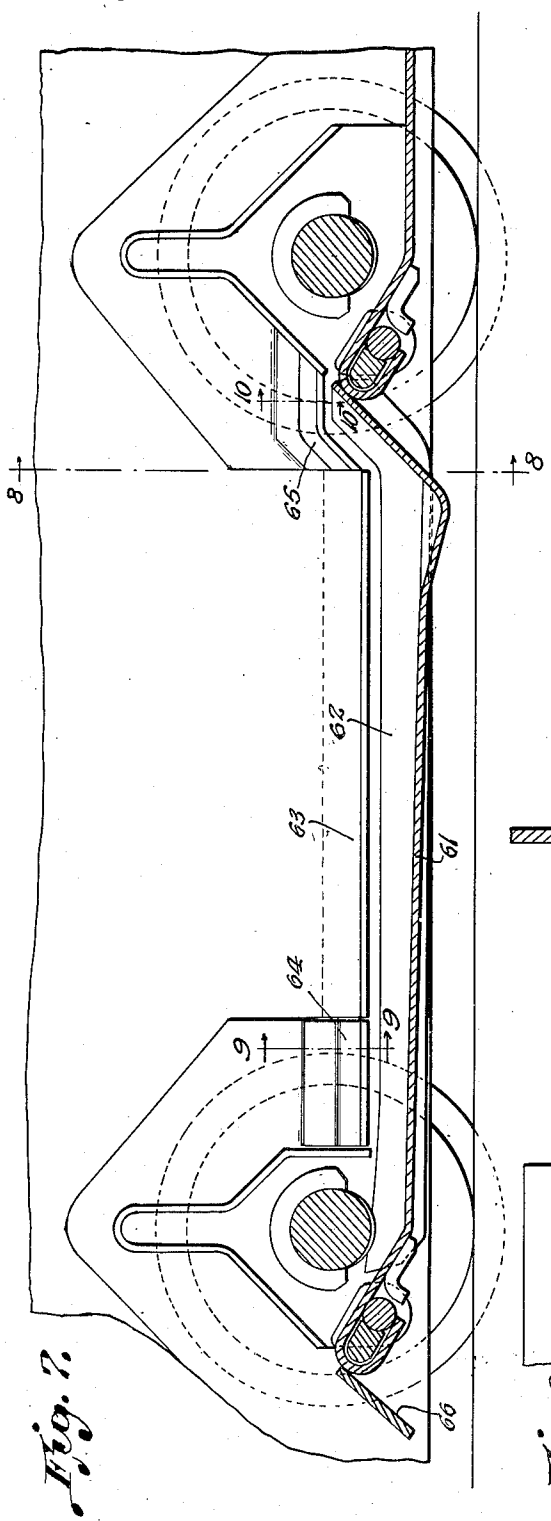


Fig. 7.

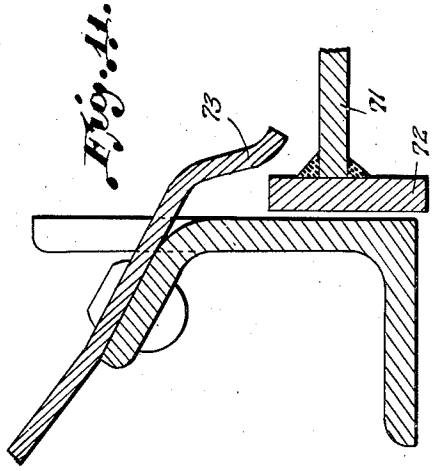


Fig. 11.

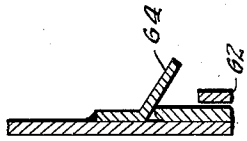


Fig. 9.

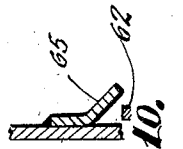


Fig. 10.

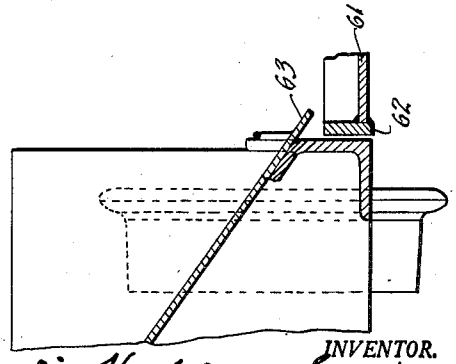


Fig. 8.

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2,577,040

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2,577,040

MINE CAR SEALING DEVICE

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Application April 7, 1947, Serial No. 739,796

12 Claims. (Cl. 105—253)

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This invention relates to improvements in mine car sealing devices, particularly for sealing the drop bottom doors of mine cars used for transporting coal or other materials from a loading point to a point of discharge, where such materials are discharged through the bottom of the car upon release of the drop bottom doors therein.

This application is a continuation-in-part of my prior application, Serial No. 563,885, filed November 17, 1944, now Patent No. 2,558,391, dated June 26, 1951.

In mine cars used for the transportation of coal and other loose lading, it is important that the drop bottom doors be sealed at the opposite elges thereof against the leakage of coal between the edges of the doors and the side sills of the car. It is difficult to form the doors so these will fit so closely to the inside faces of the side sills as to prevent the leakage of loose coal therebetween. Consequently, special provision should be made for sealing the space between the edges of the doors and the side sills against the leakage of coal therebetween, but no adequate means for this purpose has been available heretofore with respect to large capacity mine cars of modern design.

It is one object of this invention to improve the construction of mine cars, especially of large capacity, by providing sealing means for the lateral edges of the doors which is in cooperating relation therewith even though applied to the side wall flare plates of the car close to the track gauge line. This provides a very wide door opening which is sealed effectively at its lateral edges and yet increases materially the capacity of the car.

A further object of the invention is to provide complete sealing of the drop bottom door from end to end thereof, not only between the wheel hoods, but also along the inside faces or vertical walls of the hoods. All large capacity four-wheel drop bottom door cars have vertical walls on wheel hoods with respect to which the doors must be sealed, as well as between the hoods, for effective sealing of the doors.

This object may be accomplished by the wide spacing of the side sills close to the track gauge line, which will locate the flare plates below the tops of the wheels. These flare plates may be provided with extensions or attachments that project inwardly in overlapping relation with the lateral edges of the doors to seal the edges against the leakage of coal therebetween.

Certain embodiments of the invention are

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shown in the accompanying drawings in which:

Fig. 1 is a longitudinal diagrammatical view of a car to which the invention may be applied.

Fig. 2 is a partial end elevation thereof.

Fig. 3 is a cross section therethrough.

Fig. 4 is a longitudinal section through the car showing a modified form thereof.

Fig. 5 is a detail cross section therethrough on the line 5—5 of Fig. 4.

Fig. 6*a* is a detail cross section of one of the deflector sealing plates, on the line 6*a*—6*a* in Fig. 4.

Fig. 6 is a similar view of the other deflector sealing plate on the line 6—6 of Fig. 4.

Fig. 7 is a longitudinal sectional view similar to Fig. 4 but showing another modified form of car.

Fig. 8 is a cross section therethrough on the line 8—8 of Fig. 7.

Fig. 9 is a detail cross section on the line 9—9 of Fig. 7.

Fig. 10 is a similar view on the line 10—10 of Fig. 7.

Fig. 11 is a detail cross section showing still another modified form of sealing means.

Referring to Figs. 1 to 3, the car body is shown as formed of a pair of opposed side channels 1 turned inward at opposite sides of the car and forming the upper portions of the side walls of the car. Extending downwardly and inwardly from the side channels 1 are side flare plates 2 riveted to the lower edge portions of the side channels 1, as shown in Fig. 3, embraced with respect thereto by inside gusset brackets 3 which bear against the side channels 1 and the flaring side plates 2 at the inner faces thereof.

The inner edges of the side flare plates 2 are secured to longitudinal side sill members 4 that are shown to be of modified channel form having an out-turned flange at the upper edge jointed to the adjacent side flare plate 2 by rivets, and an out-turned reinforcing side flange at the lower edge of said sill member 4. Each side flare plate 2 projects inwardly beyond the attached sill member 4 to form an extended lip, designated 5, to increase the sealing relation thereof with the adjacent door as hereinafter described.

The side plates 2 are braced externally by gusset brackets 6 each of which extends upwardly from the side sill member 4 to the under edge of the side channel 1. These gusset members 6 are spaced at intervals along the length of the car sufficiently to brace the side flare plates 2, and preferably are at the same points as the inside gusset brackets 3.

The opposite ends of the car comprise I-beams 7 extending transversely between the side channels 1, but spaced from the outer ends of the side channels, so that said channels project beyond the I-beams and have the draft and draw bar structure attached thereto as hereinafter described. End plates 8 are attached to the inner faces of the beams 7 and extend downwardly and inwardly therefrom, being joined to opposite ends of the side flare plates 2 and sill members 4 and cooperating therewith to enclose the drop bottom opening in the car, as will be evident from Fig. 1.

The combined bumper and draw bar structure at each opposite end of the car comprises a transverse channel member supported at the top and bottom, respectively, by plates 10 and 11 that extend lengthwise of the beam 7 and are joined at opposite ends to the side channels 1, the top plate 10 being spaced downwardly from the upper edges of the side channels but braced by angle bars 12. The bumper is mounted between the plates 10 and 11, as indicated at 13, enclosed by a yoke 14 that receives the draft pin 15.

Secured at the under side of each opposite end of the car body is an upper block 16 seated on a universal mounting 17 of a lower block 18. The upper and lower blocks 16 and 18 are connected together by a king pin for relative swinging movement about the axis of the king pin and also for limited universal movement.

The block is fixed upon a truck structure, designated generally at 20, having mountings for a pair of transverse axles 21 on which wheels 22 are mounted at opposite ends of the axles. This truck including the wheels and axles, supports an end of the car thereon, but is capable of bodily swinging movement relative to the body portion of the car to accommodate for curves in the track in the usual manner.

Also interposed between the truck 20 and the transverse plate structure is a side bearing on each opposite side of the supporting block structure 16—18. This lateral bearing comprises a side bearing block 11', in position to bear upon a bearing plate 20', as shown in Fig. 2.

The space between the sides and ends of the car is adapted to be opened for discharge of the lading therethrough, but is normally closed by two batteries of three doors each, in the form illustrated, which batteries of doors are indicated generally in Fig. 1, by the numerals 23 and 24, at the forward and rearward portions of the car. Each battery of doors includes forward, middle and rearward doors 25, 26 and 27, pivotally supported at their forward edges for downward swinging movement to dumping positions. The free edges of the forward and middle doors, in the form shown, are supported upon the hinge edges of the next succeeding rearward door, which latter, nevertheless, is slidable endwise on its pivot to release the supported edge of the next forward door for dropping when the rearward door has dropped.

Whereas the construction here referred to comprises overlapping doors which operate in 1–2–3 order as frequently used heretofore, the same general car construction could be used in a car having drop bottom doors which mutually support each other in any of the various fashions that have been in use heretofore, or which may, in fact, be relatively independent of each other.

Each of the doors is mounted in the space between the side sill members 4 as shown in Fig. 3, and extends transversely substantially to said side sill members in relatively close relation therewith. Each of the doors 25—27 has an upstanding flange 28 along the edge thereof substantially in sealing relation with the adjacent sill member 4, but overlapped at the top by the edge portion 5 of the sloping side flare wall 2. This construction eliminates the longitudinal leak crack which has been in use heretofore, existing between the edge of the door and the adjacent sill, which would allow some coal to leak from the doors in closed positions.

As shown in Figs. 2 and 3, the lateral flare plates 2 extend upward from the upper edges of the sill members 4 at a very low level, while the sill members 4 are disposed with their inner edges in very close relation to the inner faces of the track wheels 22, and therefore very close the track gauge line. This provides for an increased width of drop bottom door which, in the form illustrated, is approximately three inches less than the track gauge, thus providing a large capacity car. The lateral edges of the drop bottom doors will be disposed very close to the base of the rails when the doors are dropped. If necessary, the inner edges of the bases of the rails may be trimmed off on the bin side at the point of dumping to allow increased clearance for the doors. This arrangement locates the upright web of the sill member 4 at the lateral edge of the door opening in an upright longitudinal plane located very close to the inner face of the wheels 22, and at a point outside the inner edge of the wheel hub, as shown in Fig. 2.

The free edge of the door 27 of each battery of doors is adapted to be latched for release when desired by latching means that may be released from a point externally of the car. Preferably such latching means is adapted to be actuated from a point beneath the car by a tripping device mounted in the track in position to engage and operate each latch as the car passes thereover. While the latch device itself may be of any suitable or desirable construction, I have shown as one form of latches for this type of car latch devices that are mounted to move transversely, rather than longitudinally, of the car, as designated respectively at 30 and 31 in Fig. 1.

The latch devices 30 are mounted on a transverse plate 32 which extends from side-to-side of the car and is supported at opposite ends thereof by the side sill members 4. The plate 32 is located beneath a cross tie and shield angle 33 that extends between the side plates 2, with an upstanding tie plate 34 (Fig. 3) thereabove.

As shown in Fig. 2, the side flare plates 2 are at a very low level, appreciably below the upper edges of the walls, while the side sills 4 are in close proximity to the inside faces of the wheels and therefore close to the track gauge lines. This provides a very large capacity car. At the same time, leakage is prevented between the lateral edges of the door and the inside faces of the side sills 4 due to the overlapping relation of the projecting edge portions 5 with the upturned flanges 28 formed on the drop bottom doors. This sealing action is accomplished directly by an extension of the side wing bottoms projecting inside the vertical plane of the inside wall of the sill structure over the sealing flange of the door.

The invention is shown in Figs. 4 to 6 as applied to a four-wheel mine car of the character in which the doors close in 1–2–3 order, but the

mine car is of the four-wheel type. In this form, the wheels are designated at 41 mounted on axles 42, which axles are connected to side sills 43. Each of the side sills extends longitudinally of the car in the space between the walls at the corresponding side and between wheel hoods 44 to cover the wheels and form indentations in the sides of the car to receive the wheels. The body of the car includes side wall flare plates 45 which extend inwardly between the hoods 44 and are secured to the upper flanges of the side sills 43. The planes of the side wall flare plates 45 cut through the wheels 41, as shown in Fig. 5, to locate the side wall flare plates 45 at low levels for large capacity.

The doors are shown at 46, 47 and 48, respectively, pivotally mounted at 49 and 50 for downward swinging movement to open positions. These doors in this form of the invention are adapted also for longitudinal sliding movement relative to the pivots 49 and 50 for inter-engagement and locking action. The sliding movement of the doors lengthwise may be accomplished by a wedging element 51 shown as in position to engage the free edge of the door 47 to cause lengthwise sliding movement of the latter.

The bottoms of the doors are shown as extending substantially horizontal and flat. Each door extends laterally between the side sills 43 and has an up-turned lateral flange 52 in close proximity to the inner face of each side sill 43, as shown in Fig. 5, but overlapped by an inwardly extending portion 53 of the adjacent side wall flare plate 45, which portion 53 forms a roof over the crack at each edge of the door. This portion 53 is shown as spaced above the upper edge of the flange 52 at each side of the door, for convenient operation of the door closing device which usually requires a raising of the door above its normal position before the door is latched. Nevertheless, the flare plate extension 53 in coaction with the up-turned flange 52 effectively prevents the leakage of coal between the side sill 43 and the adjacent edge of the door.

As shown in Fig. 4, the side wall flare plates 45 extend only between the wheel hoods 44. For effective sealing of the side edges of the door throughout its length, additional sealing devices must be provided inside the hoods, except where the hoods on opposite sides of the car are connected together through an axle covering generally indicated at 54. Accordingly, deflector sealing plates are provided inside the wheel hoods at the respective opposite ends of the door, as indicated respectively at 55 and 56, extending laterally from the vertical faces thereof at an angle to shed the coal over the flanges 52 of the door edges and to prevent leakage at the edges. These deflector plates 55 and 56 are secured to the inner walls of the hoods and are located substantially at the same height and angles as the projecting portions 53 of the side wall flare plates, and therefore are in the same relation to the door flanges at this point as the wing bottom extensions are intermediate the wheel hoods.

The invention is shown in Fig. 7 as applied to overlapping doors hinged for swinging movement without longitudinal bodily movement in moving to open and closed positions. This eliminates the necessity for the wedge device shown at 51 in Fig. 4. Moreover, the door 61 in Fig. 7 is shown as curved longitudinally instead of being flat. This longitudinal sloping of the door through most of its entire length would require substantial trimming and weakening if flanges were formed on the opposite edges thereof. Consequently, such flanges are provided in this form by welding a bar 62 to each opposite edge of the door 61, which bars 62 are so attached to the edges of the door that the upper edges of the bars will be substantially horizontal through most of their lengths, and spaced downwardly from the projections 63 on the side wing bottoms. The deflector plate 64 is in longitudinal alignment with the deflector portion 63 at the left in Fig. 7, while a deflector plate 65 at the right follows the contour of the bar 62 which slopes upwardly and horizontally as indicated. These deflector sealing plates 64 and 65 are secured to the inner faces of the wheel hoods.

Otherwise, the form shown in Figs. 7 to 10 operates and functions substantially the same as described above.

A further modification is shown in Fig. 11 in which the side wall flare plate has a downwardly projecting portion 73 which overlaps vertically the side bar 72 on the door 71. This may be desirable when especially fine material is being transported as a further means of preventing leakage or as desired.

In four-wheel drop bottom mine cars of the character shown in Figs. 4 to 11, in which the wheels are recessed deeply in the side wall flare plates, it is desirable to seal the edges of the doors approximately throughout the length thereof, including the portions along the inner faces of the wheel hoods. This is made possible by the deflector sealing plates 55, 56, 64 and 65, provided on the inner faces of the wheel hoods.

Even though the inner edge of the deflector plate is spaced above the upper edge of the door flange or bar, as shown in Figs. 5, 6a, 6, 9 and 10, the deflector plate will serve effectively to seal the edges of the door. The angle of repose of any fine material that may be hauled in the car is such that it will not reach the edge of the door flange or bar after passing over the deflector edge.

While the invention has been illustrated and described in certain embodiments, it is recognized that variations and changes may be made therein without departing from the invention except as specified in the claims.

I claim:

1. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels for supporting the lading body, longitudinally spaced deeply recessed wheel hood coverings in the lading body on opposite sides thereof over the wheels, said body having side wall flare plates between the wheel hood coverings, the combination of a door for closing said bottom opening and extending along the vehicle between the longitudinally spaced hood coverings and between opposite disposed hood coverings, said door having upstanding edge portions in close proximity to the side sill structures, and deflector plates carried by the flare plates and by the inner faces of the hood coverings overlapping said door edge portions for sealing the edges of the door.

2. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels for supporting the lading body, longitudinally spaced wheel hood coverings in the lading body on opposite sides thereof over the wheels, said body having side wall flare plates between the wheel hood coverings, the combina-

tion of door means for closing said bottom opening and extending along the vehicle and between oppositely disposed wheel hood coverings, said door means having edge portions in close proximity to the side sill structures, and means carried by the wheel hood coverings and extending inwardly therefrom in overlapping relation with the edge portions of the door means for sealing said edge portions.

3. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels for supporting the lading body, longitudinally spaced deeply recessed wheel hood coverings in the lading body on opposite sides thereof over the wheels, said body having side wall flare plates between the wheel hood coverings, the combination of door means for closing said bottom opening and extending along the vehicle between longitudinally spaced wheel hood coverings and between oppositely disposed hood coverings, said door having edge portions in close proximity to the side sill structures, and deflector plates carried by the inner faces of the wheel hood coverings and extending inwardly in overlapping relation with the adjacent edges of the door means and along said edges for sealing said edges of the door.

4. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels for supporting the lading body, longitudinally spaced deeply recessed wheel hood coverings in the lading body on opposite sides thereof over the wheels, said body having side wall flare plates between the wheel hood coverings, the combination of door means for closing said bottom opening and extending along the vehicle between longitudinally spaced wheel hood coverings and between oppositely disposed hood coverings, said door having edge portions in close proximity to the side sill structures, and deflector plates carried by the inner faces of the wheel hood coverings and extending inwardly in overlapping relation with the adjacent edges of the door means and along said edges for sealing said edges of the door, said side wall flare plates extending inwardly of the side sill means between the longitudinally spaced hood coverings with the inner edges thereof substantially in longitudinal alignment with the inner edges of the deflector plates and cooperating therewith for sealing said edges of the door means.

5. In a drop bottom mine car, the combination of a lading body having side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels for supporting the lading body, said body having side wall flare plates extending upwardly and outwardly from the upper edge portions of the side sill structures, wheel hoods in the side wall flare plates extending over the wheels with inner faces toward the interior of the lading body, a plurality of doors spaced lengthwise of the car and interconnected for joint opening and closing movements, each of said doors being hinged about a transverse axis and having the major portion of the body thereof substantially flat and in a plane extending lengthwise of the car and with upstanding edge portions substantially horizontal in closed position and spaced in close proximity to the side sill structures, and means at the inner edges of the side wall flare plates forming inward continuations thereof with approximately horizontal inner edges overlapping the opposite edges of the doors for sealing said edges of the doors, and additional sealing means extending along the inner face of the wheel hoods substantially in longitudinal alignment with the first mentioned sealing means for sealing the edges of the doors along the wheel hoods.

6. In a drop bottom mine car, the combination of a lading body having side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels for supporting the lading body, said body having side wall flare plates extending upwardly and outwardly from the upper edge portions of the side sill structures, a plurality of doors spaced lengthwise of the car and interconnected for joint opening and closing movement, each of said doors being hinged about a transverse axis and having the major portion of the body thereof substantially flat and in a plane extending lengthwise of the car and with upstanding edge portions substantially horizontal in closed position and spaced in close proximity to the side sill structures, each of the side wall flare plates projecting inwardly from the side sill means with inner edge substantially horizontal, for sealing said edges of the doors.

7. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels and axles for supporting the lading body, side wall flare plates and wheel hood coverings at opposite sides of the body and connected with the side sill structures, doors for closing said bottom opening and extending lengthwise of the vehicle beneath the axles, means separate from the axles for pivotally supporting the doors on the body for downward swinging movement about transverse axes, said doors having the opposite edge portions thereof in close proximity to the side sill structures and extending between the opposite wheel hood coverings, and means forming deflecting surfaces extending inwardly in overlapping relation with said opposite edge portions of the doors along the inner edges of the side wall flare plates and along the inner faces of the wheel hood coverings.

8. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels and axles for supporting the lading body, side wall flare plates and wheel hood coverings at opposite sides of the body and connected with the side sill structures, doors for closing said bottom opening and extending lengthwise of the vehicle beneath the axles, means separate from the axles for pivotally supporting the doors on the body for downward swinging movement about transverse axes, said doors having the opposite edge portions thereof in close proximity to the side sill structures and extending between the opposite wheel hood coverings with cracks therebetween, and roof surfaces extending inwardly from the side sill structures and the wheel hood coverings in overlapping relation with said cracks substantially throughout the length of the doors whereby the lading will not leak from the lading body through said cracks when the doors are closed.

9. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels and axles for supporting the lading body, side wall flare plates and wheel hood coverings at opposite sides of the

body and connected with the side sill structures, doors for closing said bottom opening and extending lengthwise of the vehicle beneath the axles, means separate from the axles for pivotally supporting the doors on the body for downward swinging movement about transverse axes, said doors having the opposite edge portions thereof in close proximity to the side sill structures and extending between the opposite wheel hood coverings, tie plates extending between opposite wheel hood coverings over the axles, and means forming roof surfaces extending laterally of the side sill structures at each opposite side of the lading body in overlapping relation with a door thereof and continuously from one tie plate substantially to another tie plate along the inner edge portions of the side wall flare plates and of the wheel hood coverings.

10. In a drop bottom car for running on track rails and adapted for discharge of its lading between oppositely disposed track rails, a lading body having a central longitudinal opening, oppositely disposed and longitudinally extending side sill structures with a central longitudinal opening therebetween for discharge of the lading, at least one drop door structure which is pivotally supported about a transverse axis and which is substantially horizontal in a closed position, wheels for supporting the lading body, the sill structures extending inside of the wheels and in close proximity thereto and having inner portions in close proximity to the adjacent outer portions of the drop door structure when in closed position with working clearance therebetween, said lading body having outwardly extending and upwardly sloping wing bottoms sealed with respect to the side sill structures adapted to shed the lading by gravity into the central opening upon release of the drop door structure, shielding means for the car wheels against contact with the lading of the car, and a roof over said openings at opposite edges of the door structure and extending along the inner edge portions of the sloping wing bottoms and of the shielding means, whereby the lading will not leak from the lading body through said opening when said door structure is closed, said roof being a part of the lading body structure.

11. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, wheels for supporting the lading

body, side wall flare plates connected with the side sill structures and extending upwardly therefrom in planes which intersect the wheels below the upper edges thereof, said side wall flare plates having wheel hood coverings connected therewith extending over the wheels, a door for closing the bottom opening and extending along the vehicle and between the side sill structures and sealing means extending lengthwise of the lading body along the side sill structures and the wheel hood coverings in lateral overlapping relation with the edge portions of the door for sealing said edge portions.

12. In a vehicle having a lading body with side sill structures separated and having a bottom opening therebetween for the discharge of lading therethrough, oppositely disposed wheels for supporting the lading body, axles for the wheels and extending therebetween, side wall flare plates connected with the side sill structures and extending upwardly therefrom in planes which intersect the wheels below the upper edges thereof, said side wall flare plates having oppositely disposed wheel hood coverings connected therewith and extending over the wheels, hoods over the axles and connected with the wheel hood coverings, doors for closing the bottom opening and extending along the vehicle and between the side sill structures, and sealing means extending lengthwise of the lading body along each of the sill structures including the wheel hood coverings connected therewith from one of the axle hoods substantially to the next adjacent axle hood on the corresponding side of the lading body and substantially throughout the length of the bottom opening.

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