

July 8, 1952

H. W. SANFORD
MINE CAR SEALING DEVICE
Filed Dec. 23, 1947

2,602,404

Fig. 1.

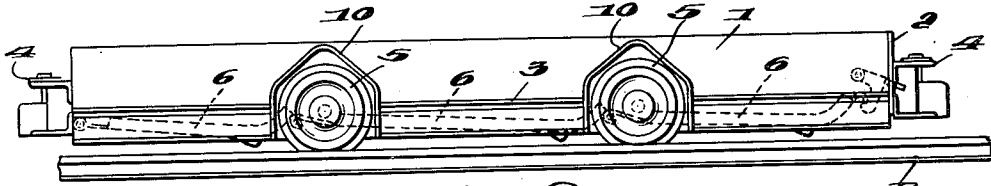


Fig. 2.

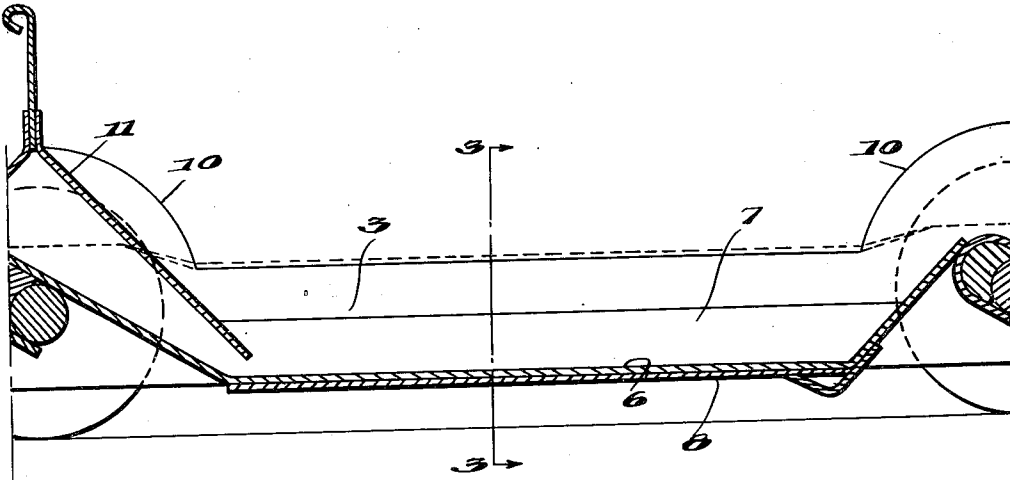


Fig. 3.

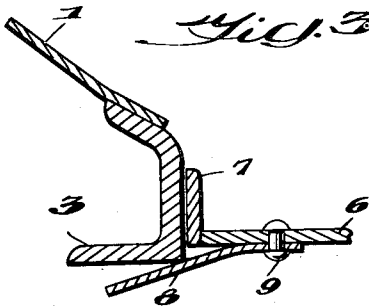


Fig. 4.

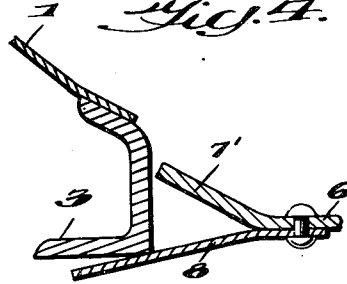
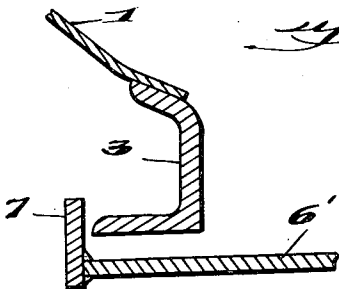


Fig. 5.



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UNITED STATES PATENT OFFICE

2,602,404

MINE CAR SEALING DEVICE

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Application December 23, 1947, Serial No. 793,399

14 Claims. (Cl. 105—364)

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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.

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 edges 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.

The object of this invention is to improve the construction of mine cars, especially of large capacity, and particularly the means for sealing the lateral edges of the drop bottom doors, whereby a wide door opening will be sealed effectively at its lateral edges when the door is closed against the leakage of coal therethrough.

This object may be accomplished, according to certain embodiments of this invention, by the provision of means provided in cooperating relation with the edge of the door and the adjacent portion of the car structure in overlapping relation with the crack between each edge of the door and the adjacent side sill structure for sealing this crack effectively against the leakage of coal or other loose lading therethrough and without interfering with the normal opening and closing movements of the door. Such a closing may be provided, for instance, by the attachment of a flexible steel strip to one or the other of the members in position to overlap the crack and without interfering with the relative vertical movements therebetween.

Certain embodiments of the invention are illustrated in the accompanying drawings in which:

Fig. 1 is a side elevation of a mine car to which the invention may be applied;

Fig. 2 is a longitudinal sectional view thereof;

Fig. 3 is a cross section on the line 3—3 of Fig. 2;

Fig. 4 is a similar view showing a modified form of door structure; and

Fig. 5 is a similar view showing still another form of sealing device.

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The invention is shown as applied to a mine car of the four-wheel type, although it is equally applicable to eight-wheel or other types of bottom dump cars, or vehicles, shown merely for purpose of illustration, as adapted to travel on a track formed by rails R. The car is shown as comprising a body having side and end walls 1 and 2 supported on side sills 3, at each opposite side of the body. The frame structure of the car comprising the side sills 3 and the combined end sills and bumpers 4, is supported on wheels 5, adapted to travel on the track R.

The car illustrated is of the bottom dumping type, the space between the side sills 3 being open, except as it is closed by drop bottom doors generally designated 6, three of which are shown. These doors 6 are latched in closed positions and are adapted to be released to discharge the lading from the car.

Each door 6 extends from side-to-side of the lading body between the opposed side sills 3, with a crack between each edge of the door 6, and the adjacent side sill, as will be evident in the drawings. Usually each edge of the door 6 is provided with a flange on the edge thereof, either formed integral with the door plate or separate, as shown, and indicated at 7 in Fig. 3. In this form, the flange bar 7 extends lengthwise of the door plate and is welded thereto. Preferably a substantially straight bar may be used for the purpose, the door 6 also being substantially straight and plane throughout the major portion of its length. This flange bar 7 at each edge of the door 6 is adapted to extend up into the space between the opposed side sills when the door is in closed position. Usually the doors are closed by closing devices mounted in the track R, and are latched at their free edges. This requires the upward movement of the doors to points above the closed positions thereof in the latching or unlatching of the doors.

In the hauling of coal or other loose lading, the latter often sifts out through the cracks provided between the door and the adjacent side sill unless provision is made to seal the space between the edges of the door and the sills. The sealing means here provided is constructed so as to overlap the crack between each lateral edge of the door and the adjacent side sill, which will prevent leakage through the crack and yet will permit upward movement of the door to a point where it may be latched, and then to settle down again in latched position, relative to the side sill.

In the form shown in Figs. 2 to 4, this sealing means is provided by a leaf spring generally

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indicated at 8, which may be formed of a strip of spring steel extending lengthwise throughout the major portion of the length of the door 6, at each lateral edge thereof, and attached thereto at 9, as by riveting, welding or other suitable means for the purpose. The leaf spring 8 is shown as secured to the under side of the door plate 6 and of sufficient width to overlap the crack between the edge of the door and the adjacent side sill 3. The spring steel should be of sufficient stiffness to hold any soft coal or other lading that may sift down through the crack against leakage from the car, and yet sufficiently yieldable to permit upward movement of the door 6, above its normally closed position in Fig. 3, in moving to its latched position by the interconnection of the doors and the latching of the rearmost door as normally operated. The steel spring 8 is so placed that it will yield in varying tension as the door moves to different positions relative to the side sill.

In closing these doors, they do not always come exactly to the point where they should come theoretically. Therefore, an important feature of this invention is the fact that even if the door is a little higher than it should be, the flexing of the member 8 will permit the seal to be made effectively. The lower edge of the door, throughout the major portion of its length, normally will be supported above the lower edge of the side sill, and yet the spring member 8, due to its resiliency and flexing, will seal this crack effectively against the sifting of fine coal between the door and the side sill.

Even if the door is supported so low as to hold the sealing member 8 below the side sill, out of contact therewith, the relatively wide horizontal overlapping of the side sill and sealing member 8, will be effective to prevent the sifting of fine coal therebetween.

Wheel hoods are provided at 10 over the wheels 5. The spring steel plate 8 is intended to extend substantially throughout the space between the hoods 10 and from each hood to the adjacent end of the car, so as to seal the doors substantially from end-to-end of the car, except where the door is adjacent to the inside vertical wall of the wheel hood. As shown in Fig. 2, the door plate is substantially horizontal between the wheel hoods and is bent upward at its opposite ends toward the car axles on which the doors are supported in the form illustrated. Deflecting tie plates 11 extend over the axles which will seal the door adjacent to the wheel hoods, and additional deflector plates may be provided along the inner faces of the wheel hoods, if desired, as set forth more fully in my prior application for Mine Car Sealing Devices, Serial No. 739,796, filed April 7, 1947, which has become Patent Number 2,577,040.

In the form shown in Fig. 4, a door 6 has an upturned flange 7' on the edge thereof, instead of the separate flange bar 7, as in Fig. 3, the other parts being substantially the same as described above and functioning in the same manner.

In Fig. 5, the door is shown at 6' of greater width than the space between the side sills 3, so as to extend laterally between the side sills with the flange bar 7 outside each adjacent side sill 3. The mounting of the door 6' is such as to allow a crack of substantial depth between the door plate and the side sill 3 to permit upward movement of the door in its closing action before

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it is latched, without such movement being prevented by the side sill.

In Fig. 5, a constant clearance is provided between the bottom of the sill and the top of the door, so the door can be raised above its normal position for latching without coming in contact with the bottom of the angle sill 3. The flange bar 7 may be omitted entirely, if desired, because there would be little loss of coal working out laterally through a wide crack of little vertical depth.

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 separated side sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a drop bottom door for closing said opening and having cracks between said edges of the door and the side sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structures to a point about the closed position thereof for movement of the engaging means into holding position relative thereto, and means carried by the door and extending laterally therefrom in underlying relation with the adjacent side sill structures in different positions of the door relative thereto and in position for closing the cracks therebetween.

2. In a vehicle having a lading body with separated side sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a drop bottom door for closing said opening and having cracks between said edges of the door and the side sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structures to a point about the closed position thereof for movement of the engaging means into holding position relative thereto, and resilient means carried by the door adjacent each lateral edge thereof in underlying relation with the adjacent side sill structure in different positions of the door relative thereto and substantially closing the crack therebetween for preventing leakage therethrough, said resilient means being arranged to vary the tension on the side sill structure for different adjusted positions of the door relative to the side sill structure.

3. In a vehicle having a lading body with separated side sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a drop bottom door for closing said opening and having cracks between said edges of the door and the side sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative

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to the side sill structures to a point about the closed position thereof for movement of the engaging means into holding position relative thereto, and a spring member carried by the door adjacent each lateral edge thereof and extending in underlying relation with the adjacent side sill structure in different positions of the door relative thereto and, substantially closing the crack therebetween, said spring being arranged to vary the tension on the side sill structure for different adjusted positions of the door relative thereto.

4. In a vehicle having a lading body with separated side sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a drop bottom door for closing said opening and having cracks between said edges of the door and the side sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structures to a point about the closed position thereof for movement of the engaging means into holding position relative thereto, and a spring member carried by the door adjacent each lateral edge thereof and extending in underlying relation with the adjacent side sill structure in different positions of the door relative thereto and, substantially closing the crack therebetween both prior to and after movement of the door into engaged position, said spring member being in position to yield to upward movement of the door relative to the side sill structures to an abnormal position with respect thereto, said spring being arranged to vary the tension on the side sill structure for different adjusted positions of the door relative thereto.

5. In a vehicle having a lading body with separated side sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a drop bottom door for closing said opening and having cracks between said edges of the door and the side sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structures to a point about the closed position thereof for movement of the engaging means into holding position relative thereto, and a plate carried by the door and forming an extension thereon at each lateral edge thereof underlying the side sill structure for closing the crack therebetween.

6. In a vehicle having a lading body with separated sill structures and having an opening therebetween for the discharge of lading therethrough, a door for closing said opening and having cracks between said edges of the door and the sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structures to a point about the closed position thereof for movement of the engaging means into holding

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position relative thereto, and means carried by the door and extending laterally therefrom in underlying relation with the adjacent sill structures in different positions of the door relative thereto and in position for closing the cracks therebetween.

7. In a vehicle having a lading body with separated sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a door for closing said opening and having cracks between said edges of the door and the sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structures to a point about the closed position thereof for movement of the engaging means into holding position relative thereto, and resilient means carried by the door adjacent each lateral edge thereof in underlying relation with the adjacent sill structure in different positions of the door relative thereto and substantially closing the crack therebetween for preventing leakage therethrough, said resilient means being arranged to vary the tension on the side sill structure for different adjusted positions of the door relative to the side sill structure.

8. In a vehicle having a lading body with separated sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a door for closing said opening and having cracks between said edges of the door and the sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structures to a point about the closed position thereof for movement of the engaging means into holding position relative thereto, and a flexible metal cantilever spring member carried by the door adjacent each lateral edge thereof and extending in underlying relation with the adjacent sill structure in different positions of the door relative thereto and substantially closing the crack therebetween, said spring being arranged to vary the tension on the side sill structure for different adjusted positions of the door relative thereto.

9. In a vehicle having a lading body with separated side sill structures and having an opening therebetween for the discharge of lading therethrough, a plurality of drop bottom doors between the side sill structures for closing said opening and having cracks between the lateral edges of the doors and the sill structures, means mounting an edge portion of each of the doors for swinging movement about an axis extending transversely of the vehicle and with adjacent edge portions in overlapped relation in supported positions, one of the doors being movable on the mounting means relative to the side sill structures above the lower edges thereof to a point appreciably above the closed position thereof, and resilient means carried by each door adjacent each lateral edge thereof in underlying relation with the adjacent side sill structure and substantially closing the crack therebetween for preventing leakage therethrough, said resilient means being arranged to vary the tension on the

side sill structure for different adjusted positions of the door relative to the side sill structure.

10. In a vehicle having a lading body with separated side sill structures and having an opening therebetween for the discharge of lading therethrough, a plurality of drop bottom doors between the side sill structures for closing said opening and having cracks between the lateral edges of the doors and the sill structures, means mounting an edge portion of each of the doors for swinging movement about an axis extending transversely of the vehicle and with adjacent edge portions in overlapped relation in supported positions, one of the doors being movable on the mounting means relative to the side sill structures above the lower edges thereof to a point appreciably above the closed position thereof, and a leaf spring carried by each door adjacent each lateral edge thereof and throughout the major portion of the length thereof and underlying the adjacent side sill structure substantially closing the crack therebetween for preventing leakage therethrough, said spring being arranged to vary the tension on the side sill structure for different adjusted positions of the door relative thereto.

11. In a vehicle having a lading body with separated side sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a drop bottom door for closing said opening and having cracks between said edges of the door and the side sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structure to a point above the closed position thereof for movement of the engaging means into holding position relative thereto, and means for closing the crack against the leakage of lading therethrough, including a member carried by the door at the edge thereof in overlapping relation with the crack and in position to engage the adjacent side sill structure during the closing movement of the door.

12. In a vehicle having a lading body with separated sill structures and having an opening therebetween for the discharge of lading therethrough, a door for closing said opening and having cracks between said edges of the door and the sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structure to a point above the closed position thereof for movement of the engaging means into holding position relative thereto, and means for closing the cracks between the door and the sill structures and forming a wiping action therebetween in the closing movement of the door, said closing means comprising a cantilever leaf spring fixed at one edge to the edge of the door and having the

opposite edge thereof free in wiping relation with the sill structure, said leaf spring being arranged to vary the pressure on the adjacent element in wiping relation therewith in different positions of the door.

13. In a vehicle having a lading body with separated side sill structures and having an opening therebetween for the discharge of lading therethrough, a plurality of drop bottom doors between the side sill structures for closing said opening and having cracks between the lateral edges of the doors and the sill structures, means mounting an edge portion of each of the doors for swinging movement about an axis extending transversely of the vehicle and with adjacent edge portions in overlapped relation in supported positions, one of the doors being movable on the mounting means relative to the side sill structures above the lower edges thereof to a point appreciably above the closed position thereof, and a resilient member carried by each door adjacent a lateral edge thereof in position to engage the adjacent side sill structure in wiping relation therewith during the closing movement of the door for preventing leakage of lading therethrough, said resilient member being arranged to vary the coacting wiping pressure on the adjacent element in different positions of the door.

14. In a vehicle having a lading body with separated side sill structures and having a bottom opening therebetween for the discharge of lading therethrough, a drop bottom door for closing said opening and having cracks between said edges of the door and the side sill structures, means mounting an edge portion of the door on the vehicle for swinging movement about an axis extending transversely of the vehicle, movable means for engaging the opposite edge portion of the door for holding the door closed and movable to release the door for opening, said door being movable on the mounting means relative to the side sill structure to a point above the closed position thereof for movement of the engaging means into holding position relative thereto, and means for closing the crack against the leakage of lading therethrough, including a member carried by one of said members in overlapping relation with the crack and in position to engage the other of said members during the closing movement of the door.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
973,840	Anson	Oct. 25, 1910
987,877	Harrigan	Mar. 28, 1911
1,256,323	Ingoldsby	Feb. 12, 1918
1,762,667	Sanford et al.	June 10, 1930
1,851,214	Sanford et al.	Mar. 29, 1932
1,918,948	Wine	July 18, 1933
1,949,080	Murphy	Feb. 27, 1934
1,955,868	Wine	Apr. 24, 1934
2,188,815	Murphy	Jan. 30, 1940
2,189,795	Hartbauer	Feb. 13, 1940
2,237,059	Reid	Apr. 1, 1941