Sept. 30, 1952 C. A. BOYD 2,612,119

MINE CAR

Filed May 5, 1950 3 Sheets-Sheet 1

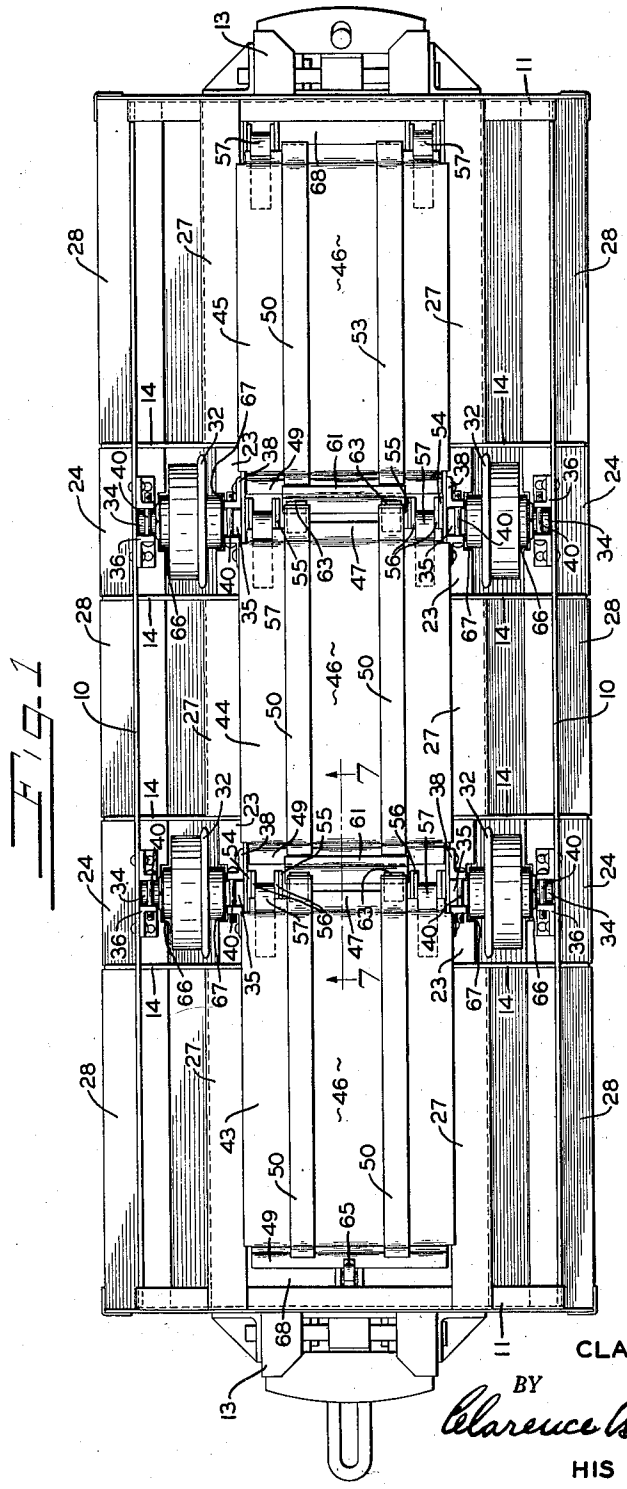


FIG. 1

INVENTOR.
CLARENCE A. BOYD
BY
Clarence B. Desjardins
HIS ATTORNEY

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MINE CAR

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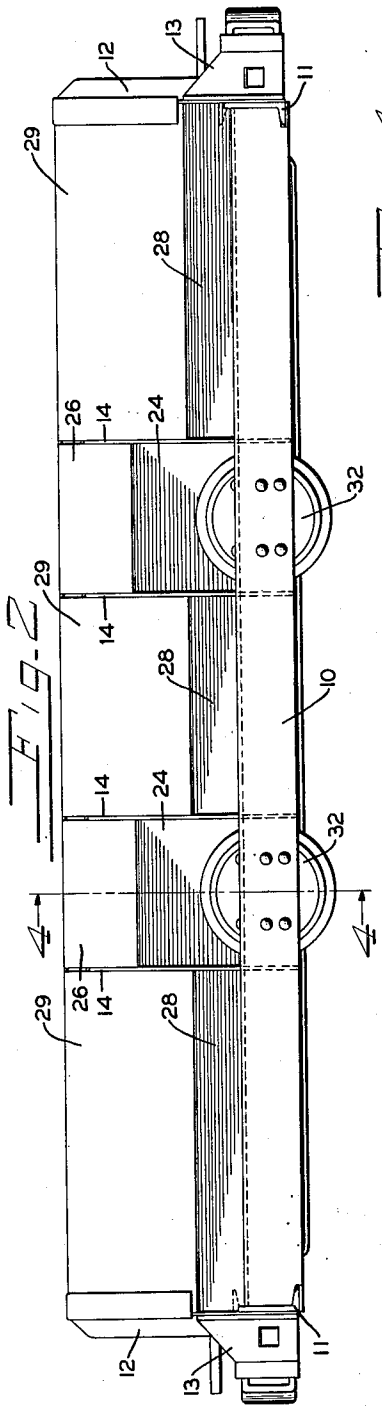


FIG. 2

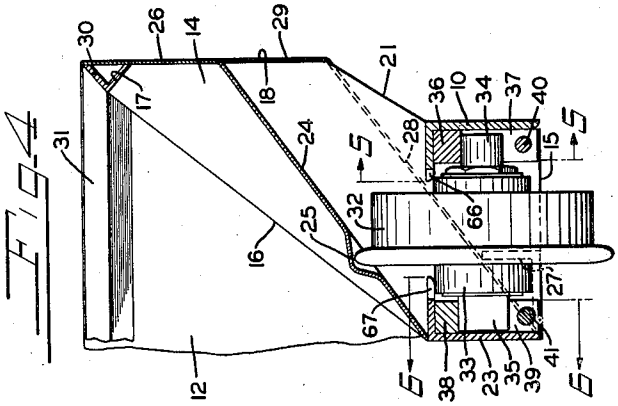


FIG. 4

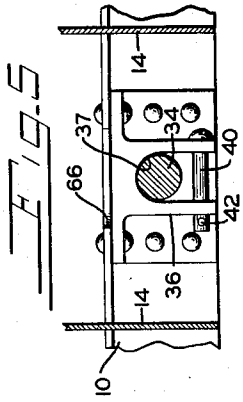


FIG. 5

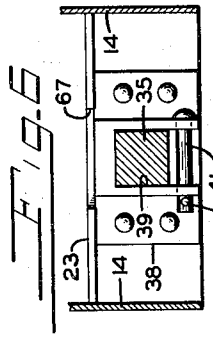


FIG. 6

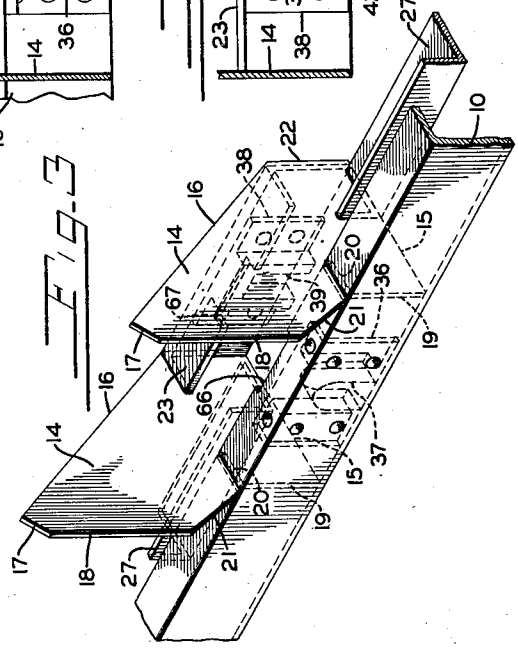


FIG. 3

INVENTOR.
CLARENCE A. BOYD

BY Clarence B. DeJardins

HIS ATTORNEY

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MINE CAR

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Fig. 7

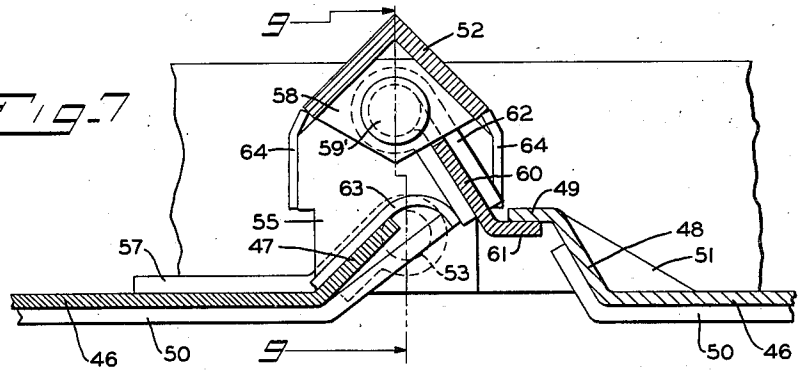


Fig. 8

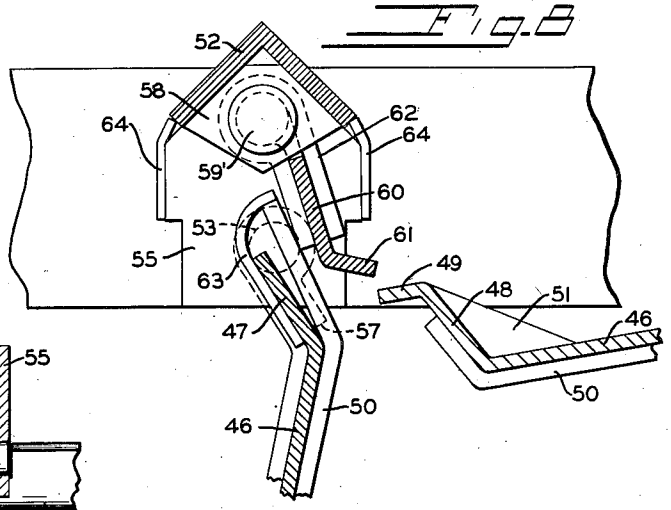


Fig. 10

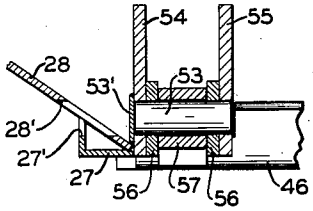
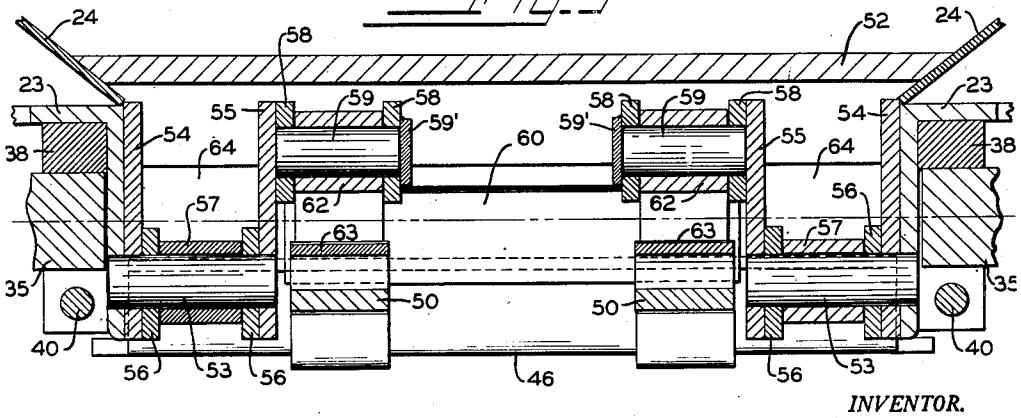


Fig. 9



INVENTOR.

CLARENCE A. BOYD

BY Clarence B. DeJardins

HIS ATTORNEY

Patented Sept. 30, 1952 2,612,119

UNITED STATES PATENT OFFICE

2,612,119

MINE CAR

Clarence A. Boyd, Barnesville, Ohio, assignor to The Watt Car & Wheel Company, Barnesville, Ohio, a corporation of Ohio

Application May 5, 1950, Serial No. 160,149

26 Claims. (Cl. 105—253)

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My invention relates to improvements in mine cars and has to do, more particularly, with drop bottom mine cars.

Conditions within the mines and at the tipples limit the overall dimensions of mine cars and, therefore, any increase in the loading capacity of such cars must be obtained by changes in the internal construction. The principal object of my invention is to provide a novel mine car construction having drop bottom doors through which the lading may be dumped, and which will have maximum capacity for the standard overall dimensions.

A further object of my invention is to provide a mine car so constructed as to have improved strength to resist strains and stresses exerted longitudinally of the car.

A further object of my invention is to provide a mine car having an improved side wall structure, which provides adequate support for the lading and is strong and sturdy, particularly with respect to forces exerted lengthwise of the car.

A further object of my invention is to provide a drop bottom mine car in which the wheels are mounted on stub axles, and the lading capacity is increased by the elimination of axles extending transversely of the discharge opening in the bottom of the car, and to provide efficient and effective means for mounting the stub axles in the side wall structure.

A further object of my invention is to provide improved latching means, for releasably holding in closed position the swinging doors closing the discharge opening, such latching means being of such a nature that the movement of a door to open position causes the release of the door next in rear thereof, and to provide improved door latching means of this character which will occupy a minimum amount of the loading space.

Further objects, and objects relating to details of construction and economies of operation, will definitely appear from the detailed description to follow. In one instance, I have accomplished the objects of my invention by the devices and means set forth in the following specification. My invention is clearly defined and pointed out in the appended claims. A structure constituting a preferred embodiment of my invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a bottom plan view of a mine car embodying my invention.

Fig. 2 is a view of the mine car in side elevation.

Fig. 3 is a fragmentary, perspective view of a part of the side wall structure at a wheel location, the stub axle and wheel being omitted.

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Fig. 4 is a fragmentary, vertical, sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary, detail, sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is a detail, sectional view taken on the line 6—6 of Fig. 4.

Fig. 7 is an enlarged, fragmentary, vertical, sectional view taken on the line 7—7 of Fig. 1, showing adjoining doors latched in closed position.

Fig. 8 is a similar view but showing the forward door in open position and the door in the rear thereof released and moving to open position.

Fig. 9 is a transverse sectional view taken on the line 9—9 of Fig. 7, and

Fig. 10 is a transverse, sectional view of the hinge for the rear door.

In the drawings, the same reference numerals refer to the same parts throughout the several views and the sectional views are taken looking in the direction of the arrows at the ends of the section lines.

Referring to the numbered parts of the drawings, the frame of my improved mine car comprises a pair of longitudinally extending side sills 10, which are connected at their ends by end sills 11. End wall structures 12 are rigidly secured in any desired manner to the end sills 11 and to the ends of the side wall structures hereinafter to be described. A bumper and draft rigging, indicated generally at 13, of any desired construction, is supported by and secured to each of the end sills 11.

Each side sill 10 is in the form of an angle member having an upper horizontal flange extending inwardly of the car. A plurality of plates 14 are mounted on each side sill 10 edgewise thereof and rigidly secured thereto. These plates 14 are arranged in pairs, there being one pair at each wheel location, one plate of the pair being in advance of the wheel and the other in the rear thereof. Each plate 14 has a horizontal lower edge 15, approximately in line with the bottoms of the side sills 10, a vertical inner edge 22 and an inclined inner edge 16 sloping upwardly and outwardly therefrom from the horizontal plane of the tops of the side sills to a point near the top of the car, where it meets a downwardly and outwardly sloping upper edge 17. Each plate 14 has an outer vertical edge 18 extending from the outer end of edge 17 to the upper end of an inwardly inclined edge 21 which extends to the vertical edge 19 extending therefrom to the outer end of bottom edge 15. Each plate 14 is provided with a notch 20, between edge 21 and edge 19, which receives the upper horizontal flange of the side sill 10.

Angle members 23 are rigidly secured at their ends to the pair of plates 14 at a wheel location. Each angle member 23 lies parallel to, but inwardly of, the corresponding side sill 10 and has a vertical leg approximately in line with the edges 22 of plate 14. A wheel section side wall member is rigidly secured to the angle member 23 and to the plates 14, at each wheel location, and each side wall member comprises an upwardly and outwardly sloping section 24 extending from the upper edge of the vertical leg of angle member 23, at the horizontal plane of the tops of the side sills 10, to the vertical plane of the car side, where said side wall member is extended upwardly to the top of the car in the vertical portion 26. A shallow recess 25 is pressed upwardly from the sloping portion 24 to clear the top of the wheel. There is an angle member 23 and a wheel section side wall member, such as described above, secured to the pair of plates 14 at each of the four wheel locations in the mine car shown.

There are three main side wall sections on each side of the car, that is to say, a forward section, an intermediate section and a rear section. Each includes an angle member 27, having a horizontal leg extending outwardly, in the horizontal plane of the bottoms of the side sills 10, from the vertical plane of the inner sides of angle members 23, and a vertical leg extending upwardly from the outer edge of the horizontal leg substantially in the vertical plane of the wheel flange. In the intermediate side wall sections, opposite ends of angles 27 are secured to plates 14, one in rear of a forward wheel and the other in front of a rear wheel. In the forward section, the rear end of angle 27 is secured to the forward plate 14 and the forward end of said angle member is secured to the front end sill 11. In the rear section, the front end of angle member 27 is rigidly secured to the rearmost plate 14, while the rear end of the angle member is rigidly secured to the rear end sill 11. Each main side wall section includes a main side wall member having a sloping portion 28 extending upwardly and outwardly, from the junction of the horizontal plane of the bottoms of the side sills 10 and the vertical plane of the inner sides of angle members 23, to the vertical plane of the car side where it is extended upwardly in the vertical portion 29 to the top of the car. Each sloping portion 28 extends above the angle member 27 and each main side wall member is rigidly secured to the angle member 27 and to plate 14 and, in the case of the front and rear sections, to the end wall structures 12.

The top of the side wall structure is strengthened by a belt rail formed from an angle member 30 applied against the upper portions 26 and 29 of the side wall members, and having one leg resting against the edges 17 of plates 14. All of the parts heretofore described are rigidly secured together, as by welding. The ends of the car may be similarly reinforced by transversely extending angles 31 welded to the upper portions of the end walls 12, thus extending the belt rail completely around the upper portion of the car.

The mine car is supported by four wheels 32, two wheels on each side of the car, each wheel having a hub 33 journaled, by means of suitable bearings, on a stub axle. The outer end of each stub axle is preferably cylindrical, as indicated at 34 (Fig. 4), while the inner end of the stub axle is preferably of square cross section, as indicated at 35. Each stub axle extends horizontally transversely of side sills 10, the outer end 34 of the axle being mounted on the side sill 10, while the inner end 35 thereof is mounted in the corresponding angle member 23. An axle-engaging member 36 fits against the inside of the side sill 10 and is rigidly secured thereto, as by rivets. Each of these axle-engaging members has a downwardly-opening recess 37, the upper end of which is curved. An axle-engaging member 38 is secured to the outer side of angle member 23, as by means of rivets, and is provided with a downwardly-opening recess 39 of rectangular outline corresponding to the squared end 35 of the axle. The outer end 34 of each stub axle is received in the recess 37 of a member 36 and the inner end 35 of the axle is received in the recess 39 of axle-engaging member 38. Thus, the weight of the car and its contents is transmitted to the ground through the engagement of the axle-engaging members 36 and 38 with the ends of the axles on which the wheels 32 are mounted, and the wheels revolve about horizontal axes between the side sills 10 and the corresponding angle members 23, and also between plates 14 secured to opposite ends of angle member 23. Notches 66 are cut in the horizontal flanges of side sills 10 and notches 67 in the horizontal flanges of angle members 23, to give clearance for wheel hubs 33. It will be seen that the mine car may be removed from the wheels and axles by lifting it upwardly therefrom, but, to prevent the separation of the wheels and axles in case the car should be derailed or overturned, bolts 40 and 41 are provided, spanning the lower ends of recesses 37 and 39, respectively, and held against inadvertent removal by cotter pins 42.

The opening in the bottom of the car for the discharge of the lading is defined by the angle members 23 and 27 and the end sills 11 and normally closed by three drop bottom doors, the front door being indicated at 43, the middle door at 44 and the rear door at 45. The body portion 46 of each door is flat and, when the door is closed, lies substantially in the horizontal plane defined by the bottoms of the side sills 10. At the rear end, each door is provided with a flange 47 extending upwardly and rearwardly at an angle of about 45° to the body portion 46. At the forward end, each door is provided with an upwardly and forwardly inclined flange 48 and with a forwardly extending lip 49, which extends substantially the full width of the door, flange 48 being braced by the lateral corner flanges 51. Each door is reinforced by a pair of parallel reinforcing strips 50 secured to the bottom surface thereof. At the forward end of the door, each strip 50 is bent upwardly against the lower face of flange 48, while, at the rear end of the door, each strip 50 is inclined upwardly and extends beyond the end of flange 47, for connection with an abutment member hereinafter to be described.

Each door is hinged on a pair of horizontal studs 53, at opposite sides of the car, each loosely mounted in the vertical leg of one of the angle members 23 and extending inwardly therefrom. A plate 54 is applied against the inner face of angle member 23 and has a hole therein in line with a hole in the vertical leg of said angle member, the two holes loosely receiving the outer end of stud 53. Plate 54 and angle member 23 are rigidly secured together, as by welding, and the end of axle 35 prevents outward movement of pin 53, inward movement of said pin being prevented by door flange 47. The mine car is reinforced by transverse angle members 52, extending from one side of the car to the other, at each wheel location. In the mine car shown, there are two pairs of wheels and, therefore, two of these

transverse members. The angle member 52 opens downwardly over the joint between the rear edge of one door and the front edge of the adjacent door and, not only serves to reinforce the car, but also sheds lading away from the joint between the doors, thus preventing its loss from the car. The ends of this transverse reinforcing angle 52 are rigidly secured, as by welding, to opposite angle members 23 and side wall members 24. The angles 52 also serve as supports for the hinge studs 53 and for the pins on which the locking plates are mounted to swing. Hanger plates 54 and 55 have their upper ends conformed to and rigidly secured to the angle member 52 and depend therefrom parallel to each other. Each stud 53 has its inner end received in a hole in the lower end of a hanger plate 55. Hinge straps 57 are fixed to the rear end of each door, extend between plates 54 and hanger plate 55 and embrace stud 53, spacers 56 being interposed between the hinge strap and the plates 54 and 55.

Hanger bars 58 are also fitted within each angle member 52 and rigidly secured thereto, two of these hanger bars being located in engagement with the inner sides of hanger plates 55, while the other two bars are spaced therefrom inwardly of the car. Each pair of hanger bars 58 loosely receives a horizontal pin 59 which is held against excessive endwise movement in one direction by pad 59' secured to one of the hanger bars and overlying the end of pin 59. These pins are for hinging a locking plate 60, which has on its lower end a flange 61 inclined at an angle thereto and adapted to engage under the lip 49 of the adjacent door. The locking plate 60 extends across the car from one hanger plate 55 to the opposite hanger plate. Hinge straps 62 are secured to the locking plate 60 and embrace the pins 59, whereby the locking plate is mounted to swing on a horizontal axis in a plane above that including the axis of the axles and wheels. Straps 63 are secured to the upper surface of the rear portion of the front and middle doors, in line with the reinforcing strips 50, and these straps 63 extend upwardly and are curved forwardly and downwardly to form a cam abutment in line with and adapted to engage the hinge straps 62 of the corresponding locking plate. Shields 64 are secured to the front and rear edges of the angle member 52 and extend downwardly therefrom, being also secured to hanger plates 55 and to angle members 23. Said shields help to prevent any of the lading from escaping through the space between the ends of the locking plate and the side wall structure of the car.

There is no transverse angle member 52 at the hinged end of the rear door 45 and, therefore, the studs 53, on which that door is hinged, are supported in any suitable way from end sill 11. Hanger plates 54 and 55, for the rear door, are rigidly secured to end sill 11 and slope plate 68 and have holes loosely receiving hinge studs 53 for the rear door (see Fig. 10). Endwise movement of stud 53, in one direction, is limited by pad 53' welded to plate 54 and overlying the outer end of pin 53, and in the other direction, is limited by door flange 47. A notch 27' in angle member 27 and a hole 28' in side wall 28 are provided to permit insertion of stud 53 in position, after which pad 53' is secured in place.

The front door 43 is releasably held in closed position by a latch 65 engaging lip 49 and provided with operating mechanism of any desired character, for instance, one to be operated by a trip alongside the track.

Slope plates 68 are provided at the ends of the car to prevent loss of lading past the front end of door 43 and the rear end of door 45.

The arrangement of latching means for the middle door 44 and the rear door 45 is such that, when the front door 43 is released and dropped to open position, as shown in Fig. 8, the cam abutment 63 swings from the position shown in Fig. 7 to that shown in Fig. 8, thus permitting the locking plate 60 to swing forwardly so that lip 49 on the middle door 44 will clear flange 61 of the locking plate and permit the middle door to drop to open position. That releases the locking plate for the rear door 45 and permits that door to move to open position. The doors are restored to closed and latched position by moving the car, rear end foremost, over an abutment which first cams the rear door 45 to closed position and holds it there while the middle door 44 is being cammed to closed position, with the result that the locking plate 60 is swung so that flange 61 engages under the lip 49 of the rear door. Then, as the car moves rearwardly, the forward door 43 will be cammed to closed position, swinging its locking plate rearwardly to latch the middle door and latch 65 engages lip 49 on the front end of the front door 43 and retains it releasably in closed position. Of course, individually locking doors might be used instead of the interlocking type shown.

I am aware that the mine car construction disclosed herein is susceptible of considerable variation without departing from the spirit of my invention and, therefore, I claim my invention broadly as indicated by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent, is:

1. A mine car construction comprising the combination of a pair of side sills extending from end to end of the car, a pair of end sills connecting the side sills at each end of the car, axles extending transversely of said side sills, wheels mounted on said axles between the side sills, a plurality of vertical plates mounted edgewise on and rigidly secured to said side sills at spaced intervals, said plates being arranged in pairs adjacent fore and aft to the wheels, an angle member for each pair of plates, rigidly secured at its ends to the plates and extending parallel to a side sill on the opposite side of a wheel therefrom, wheel section side wall members, one for each pair of plates, each rigidly secured to the plates of said pair and to said angle member and sloping upwardly and outwardly from the inner edge of said angle member and the horizontal plane of the tops of said side sills to the vertical plane of the car side and extending thence vertically to the top of the car, and main side wall members rigidly secured to said plates and sloping upwardly and outwardly from the juncture of the vertical plane of the inner sides of said angle members and the horizontal plane of the bottoms of said side sills to the vertical plane of the car side and extending thence vertically to the top of the car.

2. The combination of claim 1 in which said plates extend upwardly from the horizontal plane of the bottoms of the side sills.

3. The combination of claim 2 in which each of said plates has an inner edge extending upwardly from the upper inner corner of the angle member and the horizontal plane of the tops of said side sills to a point adjacent the top of the car side.

4. The combination of claim 3 in which each of said plates has an outer edge in the vertical plane of the car side.

5. The combination of claim 1 including stiffening members rigidly secured to said plates and to the lower portions of said main side wall members and extending parallel to said side sills.

6. The combination of claim 5 in which said stiffening members are of angular formation each having a horizontal flange in line with the bottoms of the side sills and extending outwardly from the vertical plane of the inner sides of the wheel section angle members.

7. The combination of claim 1 in which the axles are stub axles, one for each wheel, one end of each stub axle being mounted in a side sill and the other end in one of said angle members, each wheel mounted to rotate in a vertical plane between the side sill and the corresponding angle member.

8. The combination of claim 7 including, for each stub axle, an axle-engaging member secured to a side sill and an axle-engaging member secured to an angle member, each axle-engaging member having a downwardly-opening recess to receive an end of an axle.

9. The combination of claim 1 in which the axles are stub axles, one for each wheel, one end of each stub axle being mounted in a side sill and the other end in one of said angle members, each wheel mounted to rotate between the side sill and the corresponding angle member, and including a plurality of doors closing the bottom of the car and hinged about horizontal axes lying in a plane below the horizontal plane including the axes of said axles, and latching means for said doors.

10. The combination of claim 9 in which said doors are hinged on studs carried by and extending horizontally from said angle members toward the center of the car.

11. The combination of claim 10 including transverse reinforcing members, one for each pair of wheels, each rigidly secured at its ends to opposite wheel section side wall members, and in which said door hinging studs are loosely received in depending plates fixed to said transverse members.

12. The combination of claim 11 in which the latching means comprise depending locking plates each engageable with the hinged end of a door and having a lip engageable under the free end of an adjacent door, said locking plates being swingable about horizontal axes lying in a plane above the horizontal plane including the axes of said axles.

13. The combination of claim 12 including horizontal pins on which said locking plates swing and means for mounting said pins on said transverse members.

14. The combination of claim 13 in which the transverse members are downwardly-opening angle members positioned to shed lading away from the joint between doors and said horizontal pins are fixed in pairs of parallel hanger bars rigidly secured to said transverse members.

15. The combination of claim 14 in which the hanger bars are secured to the transverse members between said depending plates, whereby said pins for the locking plates are located inwardly of the car with respect to the door hinging studs.

16. The combination of claim 15 including hinge straps secured to the locking plates and embracing said pins and abutments fixed to the doors at the hinged end and engaging said locking plate hinge straps.

17. A mine car construction comprising the combination of a pair of longitudinally extending side sills, a pair of end sills connecting the ends of said side sills, side wall structures rigidly secured to said side sills, end walls rigidly secured to said end sills, stub axles mounted in and extending transversely of said side sills with their inner ends substantially in line with the lower inner portions of the side wall structures, wheels journaled on said axles, a plurality of swinging doors closing the bottom of said mine car, means for hinging said doors to swing about axes lying in a horizontal plane below the horizontal plane including the axes of said axles, and latching means for said doors, said latching means comprising a swinging locking plate suspended between the hinged end of a door and the free end of an adjacent door.

18. The combination of claim 17 in which the latching means comprise a plurality of locking plates each engaging the hinged end of a door and having a lip engageable under the free end of an adjacent door, and means for hinging said locking plates to swing about horizontal axes lying in a plane above the horizontal plane including the axes of said axles.

19. The combination of claim 18 including transverse reinforcing members extending across the car above the joints between adjacent doors and rigidly secured at their ends to said side wall structures, plates rigidly secured to said transverse members and horizontal pins supported by said plates and on which said locking plates are hinged.

20. The combination of claim 19 in which said transverse members are downwardly-opening angle members adapted to shield the joints between adjacent doors from the car lading, and including studs extending inwardly from the side wall structures, and said doors are hinged on said studs.

21. The combination of claim 20 including hanger plates rigidly secured to and depending from said transverse members and receiving the inner ends of said studs.

22. The combination of claim 21 including hanger bars located inwardly of the car with respect to said hanger plates and rigidly secured to said transverse members and in which said horizontal pins are received in said hanger bars.

23. The combination of claim 22 in which the lips on said doors extend across the bottom opening of the car from one side wall structure to the other and the locking plates extend transversely of the car from one hanger plate to the opposite one.

24. The combination of claim 23 including a pair of hinge straps secured to each locking plate, each of said straps embracing one of said horizontal pins, and a pair of cam abutments secured to the hinged end of a door in line with and engaging the hinge straps of the corresponding locking plate.

25. The combination of claim 24 including shield members, each secured to a side wall structure and a hanger plate and extending downwardly from an edge of a transverse member to prevent escape of lading between a side wall and the edge of a locking plate.

26. A mine car construction comprising the combination of a pair of longitudinally extending side sills, a pair of end sills connecting the ends of said side sills, side wall structures rigidly secured to said side sills, end walls rigidly secured to said end sills, stub axles mounted in and ex-

tending transversely of said side sills with their inner ends substantially in line with the lower inner portions of the side wall structures, wheels journaled on said axles, said stub axles being readily detachably connected to the sills through downwardly extending openings, fastening means for the downwardly extending openings, a plurality of swinging doors closing the bottom of said mine car, means for hinging said doors to swing about axes lying in a horizontal plane below the horizontal plane including the axes of said axles, latching means for said doors, and a reinforcing transverse member interposed between opposite wheel mountings and on which both the latching means and the door hinging means are supported.

CLARENCE A. BOYD.

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