April 21, 1936. H. W. SANFORD 2,037,929

FRAME CONSTRUCTION FOR MINE CARS AND OTHER VEHICLES

Filed July 12, 1934

Fig. 1

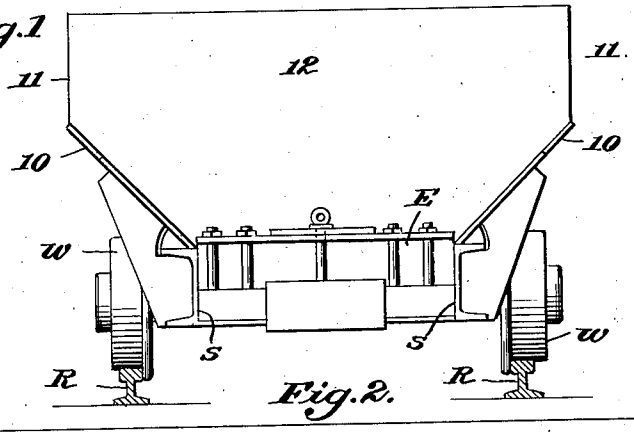


Fig. 2.

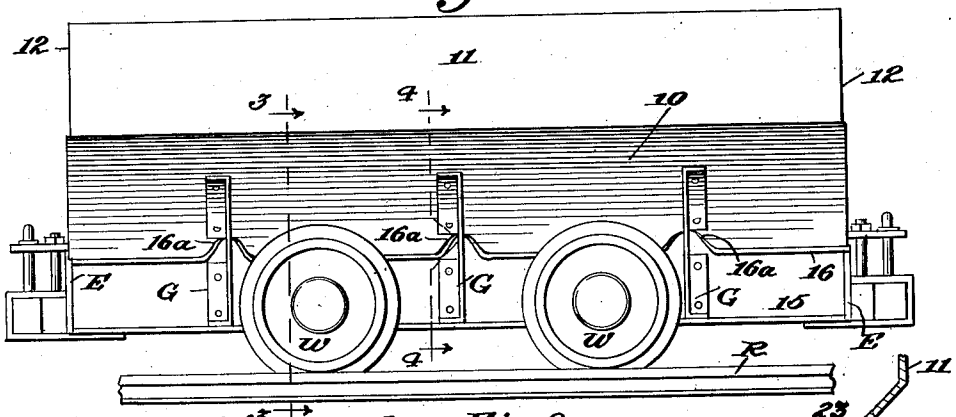


Fig. 3.

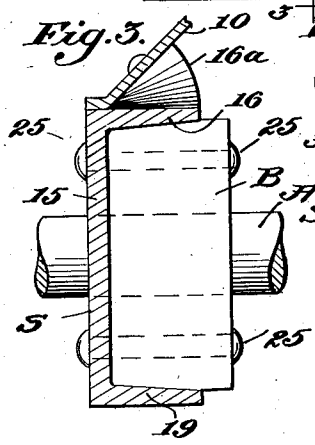


Fig. 5.

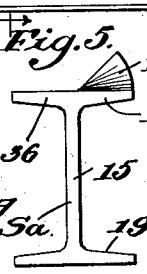


Fig. 6.

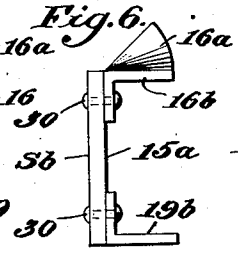
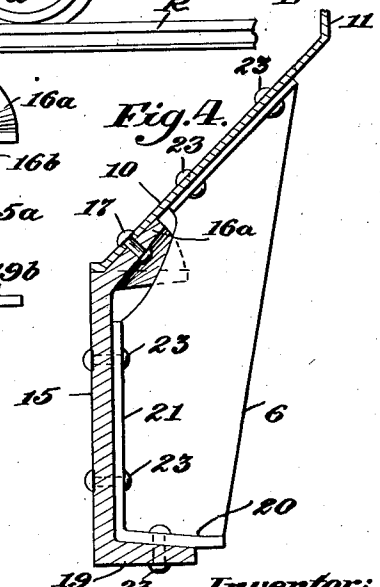


Fig. 4.



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FRAME CONSTRUCTION FOR MINE CARS AND OTHER VEHICLES

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15 Claims. (Cl. 105—364)

This invention relates to improvements in the construction of mine cars and similar industrial vehicles which have flare walls for supporting the lading, and relates particularly to a strong and stiff assemblage of parts for such vehicles.

A particular feature of the present invention is the provision of such a vehicle, having sill-members and flare walls inclined upwardly and outwardly from such sill-members, with such an arrangement of the sill-members that they operate as reinforcements and supports for the flare walls by contacting with the surface therewith for a distance equivalent to the width of a top flange portion of a sill-member, and yet having the essential rigidity and resistance in a horizontal plane.

Another feature of the present invention is the provision of such a vehicle with side sill-members, upwardly and outwardly inclined walls extending from the sill-members, and reinforcing gusset plates joined to the flare walls and sill-members, the sill-members having upper flange portions which are locally conformed to the angle of the flare walls.

A further feature of the present invention is the provision of such a vehicle having side sill-members of structural steel and each including an upper flange member extending outwardly, with upwardly and outwardly inclined flare walls, the upper flanges being bent upwardly at isolated points to engage the flare walls and being substantially horizontal between said points for stiffening the side members against distortion in a horizontal plane.

Still another feature of the present invention is the provision of such a vehicle with sill-members having upper flange portions and flare walls extending obliquely upwardly and outwardly from the sill-members, the flanges being bent upwardly at isolated points to engage the flare walls and being substantially horizontal above the axles for engagement with the axle boxes.

With these and other features as objects in view, as will appear in the course of the following specification and claims, illustrative forms of practicing the invention are set forth on the accompanying drawing in which:

Fig. 1 is an end view of a mine car according to the present invention.

Fig. 2 is a side view of the same.

Fig. 3 is a detailed view, on a larger scale, in sections substantially on line 3—3 of Fig. 2.

Fig. 4 is a similar sectional view substantially on line 4—4 of Fig. 2.

Figs. 5 and 6 are views showing modified forms of sill-members.

In the drawing, the illustrative mine car has wheels W for travel upon rails R. The wheels are mounted on axles A which pass through axle boxes B.

The side sill-members S are illustrated in Figs. 1 to 4 as being formed of structural metal of channel shape, extending from one end member E to another and connected to provide therewith a stiff and strong traction truck frame. The flanges are directed outwardly away from the longitudinal center line of the vehicle. Inclined obliquely upwardly and outwardly from these sill-members are the lading-supporting flare plates or walls 10 which are illustrated as curved to provide upright wall portions 11 at the sides of the car. End walls 12 of desired height and form join the flare walls at opposite sides of the car and stiffen the same.

In the illustrative form, the major portion of the length of the upper flange 16 of each side sill-member is substantially horizontal, but it is bent or kinked upwardly at isolated points (three being shown in Fig. 2) to provide portions 16a which conform to the angle and direction of the flare wall 10 and are joined thereto (Fig. 4) by rivets 17. It will be noted in Fig. 2 that two such kinked points are located between the wheels and the adjacent ends of the car, while the third point is located between the wheels. In the particular illustration, a gusset plate G is provided at each of these kinked portions, having a lower flange 20 which engages the bottom flange 19 of the sill-member S, a flange 21 which engages the upright web 15 of the sill-member S, and a flange 22 which engages the flare wall 10. Rivets 23 are employed to securely join these members together.

From Fig. 2, it will be seen that the upper flange portion 16 retains its substantially horizontal direction opposite the wheels W and their axles A. Thus the axle boxes B engage this upper flange with a substantially horizontal surface of contact, and hence the loads are transmitted from the lading walls to the sill-members and thence to the axle box B in a direction substantially normal to the surfaces of contact between the axle boxes and the sill-members. The rivets 25 pass through the boxes and webs 15 of the sill-members S to hold these parts rigidly together.

In Fig. 5, the sill-member Sa has an upright web 15 as before, but is illustrated as being of I-beam type and of structural or rolled metal. The outwardly extending upper flange portion 16

is provided locally as before with the upward bends or kinks 16a at isolated points. This type of structure is particularly advantageous with rotary dump cars, where the inward projection of a top flange 36 does not hinder the discharge of the lading.

In Fig. 6, the sill-member 5b is shown as being built up of a web 15a and upper and lower angle members 16b and 19b which are connected to the web 15a by rivets 30. Here, again, the upper flange portion 16b has the local bends or kinks 16a for conforming to the flare wall.

In these structures, it will be understood that the substantially horizontal positioning and direction of the flanges of the sill-members serves to stiffen them against distortion in a horizontal plane, and also to provide a strong assembly with the axle boxes. The local kinks or bends constitute no essential weakening of the structure, with respect to distortion in a horizontal plane, owing to the greater reinforcing thus effected by connecting these kinks or bends rigidly with the flare walls at points spaced from the inner and lower edges of these flare walls. In the particular illustration, furthermore, the gusset plates themselves operate further as stiffening means against distortion in a horizontal plane, as well as stiffening means against yielding of the flare walls in vertical planes. It is thus possible to have the interior of the car substantially free of reinforcing members from end to end and from side to side, and a maximum capacity is afforded within the space available.

While such sill members may be made of various materials, a particular advantage exists, also, in the present arrangement in that the sill-members may be made of relatively cheap and strong structural or rolled metal. Such rolled metal is stiffer at the junction of or fillet between upright and horizontal flanges than flanged metal formed by bending sheets, and likewise such members are cheaper when they are of standard forms. At this point, it may be brought out that a non-standard form of rolled metal is extremely expensive, owing to the necessity of having complete sets of forming rolls at the rolling mill, while the angle of flare walls varies greatly in different specifications by purchasers. With the present invention, the simple standard structural metal form is employed, and deformed or kinked locally at isolated points to any desired angle for the purposes stated.

It is obvious that the invention is not limited to the constructions employed as illustrations, but that it may be employed in many ways within the scope of the appended claims.

I claim:

1. In a mine car or similar vehicle having lading-supporting flare walls extending obliquely upwardly and outwardly, longitudinal load-supporting side sill-members of structural steel having substantially upright webs and substantially horizontal flanges extending outwardly from the tops of said webs, the said substantially horizontal flanges being bent upwardly at isolated points of the sill-members to engage the flare walls and being substantially horizontal and having their outer edges spaced from the flare walls between said points for stiffening the sill-members against distortion in a horizontal plane.

2. In a mine car or similar vehicle having lading-supporting flare walls extending obliquely upwardly and outwardly, wheels and axles, longitudinal load-supporting side sill-members of structural steel having substantially upright webs and having substantially horizontal flanges extending outwardly from the tops of said webs, said side sill-members being located between the wheels and supported by said axles, the said substantially horizontal flanges being bent upwardly at isolated points of the sill-members to engage the flare walls and being substantially horizontal and having their outer edges spaced from the flare walls between said points for stiffening the sill-members against distortion in a horizontal plane.

3. In a mine car or similar vehicle having lading-supporting flare walls extending obliquely upwardly and outwardly, longitudinal load-supporting side sill-members of structural steel having substantially upright webs and substantially horizontal flanges extending outwardly from the tops of said webs, the said substantially horizontal flanges being bent upwardly at isolated points of the sill-members to engage the flare walls and being substantially horizontal and having their outer edges spaced from the flare walls between said points for stiffening the sill-members against distortion in a horizontal plane, and a stiffening member connected to said side sill-member at one of said isolated points.

4. In a mine car or similar vehicle, longitudinal load-supporting side sill-members with at least the upper portion thereof formed of structural steel having a substantially upright web and an outwardly directed flange, lading supporting flare walls extending obliquely upwardly and outwardly from a point of the horizontal flange spaced inwardly from the outer edge thereof, the flange of each said side sill-member at isolated points along its length conforming to the outer and lower surfaces of the corresponding flare wall and being secured thereto, each said sill-member having its flange substantially horizontal and having their outer edges spaced from the flare walls between said isolated points for stiffening the vehicle against yielding in a horizontal plane.

5. In a mine car or similar vehicle having a lading-supporting flare wall extending obliquely upwardly and outwardly, wheels and axles, and outside stiffener members connected to the flare wall, the combination therewith of a channel side sill with the web substantially vertical, the legs of the channel having portions extending horizontally outward above and below the axles, axle boxings for the axles and secured to the side sill and located between said horizontal portions, the upper leg of the channel at isolated points of the length spaced from the axle boxings being bent upward to engage the flare wall, each said stiffener member having secured portions engaging said web, an upwardly bent part of the upper leg, and the flare wall, the lower leg of the channel extending at a right angle from the web throughout its length.

6. A channel side sill assembly for a mine car or similar vehicle having a lading-supporting flare wall which extends upwardly and outwardly obliquely from the side sill, said side sill having a vertical web for supporting the vehicle against end drooping, a lower leg at a right angle to said web for supporting the web against bending in a horizontal plane, and an upper leg having portions spaced along its length which are locally kinked to conform to and engage the flare wall and also having other portions at a right angle to the web, said web having axle-receiving apertures beneath two of said other portions, and axle boxings rigidly connected to said side sill at said apertures and bearing against said web and legs.

7. A side sill for a mine car or similar vehicle having a lading-supporting flare wall which extends upwardly and outwardly obliquely from the side sill, said side sill having a vertical web for supporting the vehicle structure against end drooping, a lower leg at right angles to said web for supporting the web against bending in a horizontal plane, and an upper leg having spaced along its length portions locally kinked to conform to and engage the flare wall and also having other portions at right angles to the web and extending outwardly away from and having its outer edge spaced from the flare wall.

8. In a mine car or similar vehicle having an oblique flare wall and axles, the combination therewith of a side sill of channel form with a vertical web for supporting the vehicle against end drooping and a lower leg extending at a right angle from the web to stiffen the same against bending in a horizontal plane, and also having an upper leg with portions extending at an angle to the flare wall and substantially at a right angle to the web for supporting the same against bending in a horizontal plane and further portions kinked upwardly to conform to and engage the flare wall, and additional stiffener members connected with the flare wall and side sill and located at said kinked portions for strengthening the same against bending in a horizontal plane.

9. In a mine car or similar vehicle having an oblique flare wall and axles, the combination therewith of a channel side sill with a vertical web for supporting the vehicle against end drooping, a lower leg extending at a right angle from said web, an upper leg having portions at a right angle to the web and further portions kinked upwardly to conform to and engage the flare wall, said right angle portions being effective to supporting the web against bending in a horizontal plane, said kinked portions being located remote from the axles, and additional stiffener members conforming to and connected with the flare wall and side sill at the kinked portions of the latter for supporting the flare wall and providing additional strength against bending of the web in a horizontal plane.

10. A side sill assembly for a mine car or similar vehicle having a lading-supporting flare wall which extends upwardly and outwardly obliquely from the side sill, said side sill having a vertical web for supporting the vehicle against end drooping and an upper leg having portions spaced along its length which are locally kinked to conform to and engage the flare wall and also having other portions at an acute angle to the flare wall and substantially at a right angle to the web, said web having axle-receiving apertures beneath two of said other portions, and axle boxings rigidly connected to said side sill at said apertures and bearing against said web and leg.

11. In a mine car or similar vehicle, longitudinal load-supporting side sill-members each having a substantially upright web and an outwardly directed flange, lading supporting flare walls extending obliquely upwardly and outwardly, the flange of each said side sill-member at isolated points along its length conforming to the outer and lower surfaces of the corresponding flare wall and being secured thereto, each said sill-member having its flange extending at an angle to the associated flare wall and being substantially horizontal between said isolated points for stiffening the car or vehicle against yielding in a horizontal plane.

12. A side sill for a mine car or a similar vehicle having a lading-supporting flare wall which extends upwardly and outwardly obliquely from the side sill, said sill having a vertical web for supporting the car or vehicle structure against end drooping and an upper flange having spaced along its length portions locally kinked to conform to and engage the flare wall and also having other portions extending outwardly at an angle to the flare wall and substantially at right angles to the web for supporting the said side sill against bending in a horizontal plane.

13. A side sill for a mine car or similar vehicle wherein a sloping side wall of the vehicle body engages the side sill in a substantially sealing relationship, comprising a vertical web portion, and a flange portion extending lengthwise of the web portion and joined thereto and angularly directed with respect thereto, said flange portion having spaced along its length restricted portions locally kinked to conform to the angle of the sloping side wall for supporting the same and also having other portions of greater longitudinal dimensions along its length, each directed substantially at a right angle to said web portion for strengthening said web portion against sidewise bending.

14. In a mine car or similar vehicle having lading-supporting flare walls extending obliquely upwardly and outwardly, longitudinal load-supporting side sill-members located at the lower ends of said flare walls and having substantially upright webs and flanges extending outwardly from the tops of the webs beneath the flare walls, the major portion of each said flange being horizontal for stiffening the sill-member against distortion in a horizontal plane, and restricted minor portions of each said flange located at isolated points along the length thereof being kinked upwardly to engage the corresponding flare wall and being secured thereto.

15. A side sill for a mine car or a similar vehicle having a lading-supporting flare wall which extends upwardly and outwardly obliquely from the side sill, said sill having a vertical web for supporting the car or vehicle structure against end drooping and an upper flange having spaced along its length restricted portions of relatively short length locally kinked to conform to and engage the flare wall and also having the major portion of its length extending outwardly at an angle to the flare wall and substantially at right angles to the web for supporting the said side sill against bending in a horizontal plane.

HUGH W. SANFORD.