July 29, 1941. E. R. SCHROEDER 2,250,555

DROP BOTTOM MINE CAR

Filed Jan. 4, 1939 3 Sheets-Sheet 1

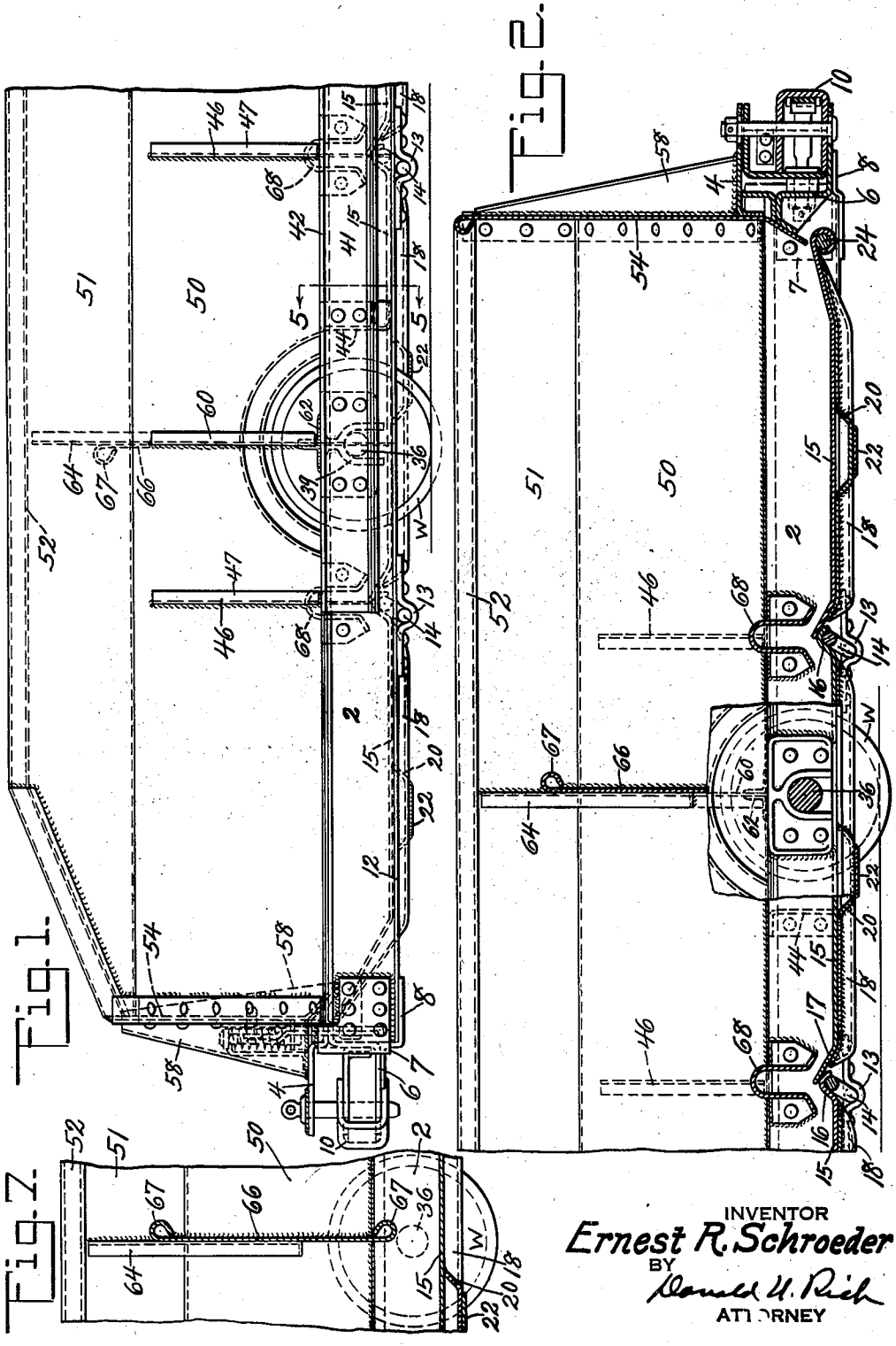


Fig. 1.

Fig. 2.

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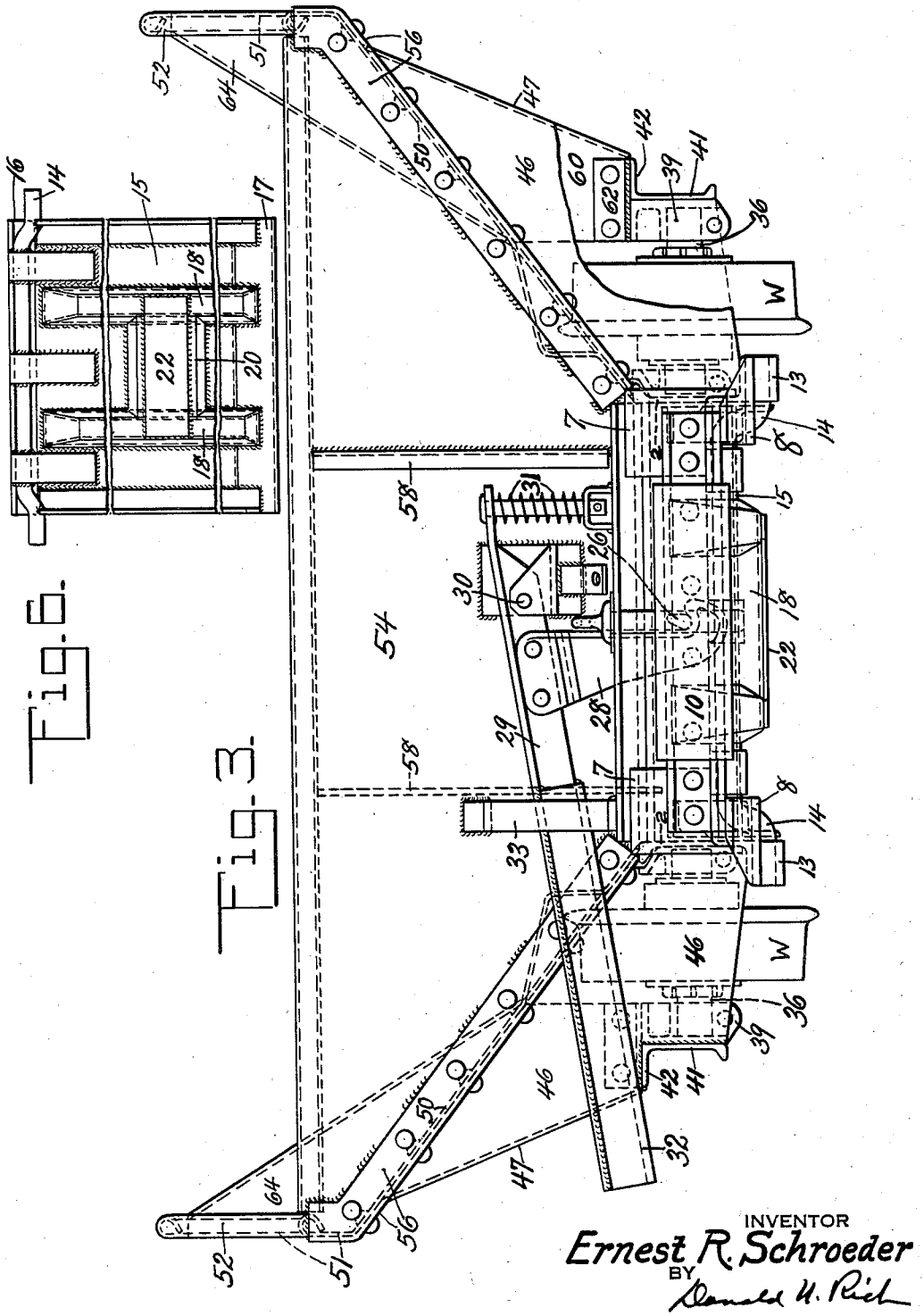


Fig. 6.

Fig. 3.

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Fig. 4.

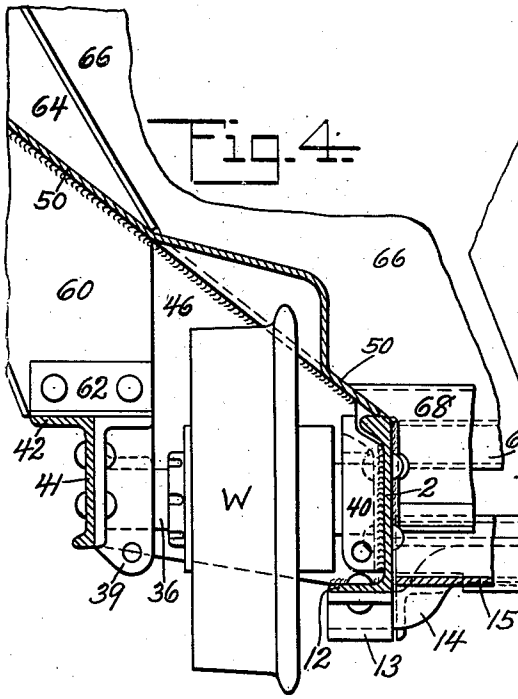


Fig. 8.

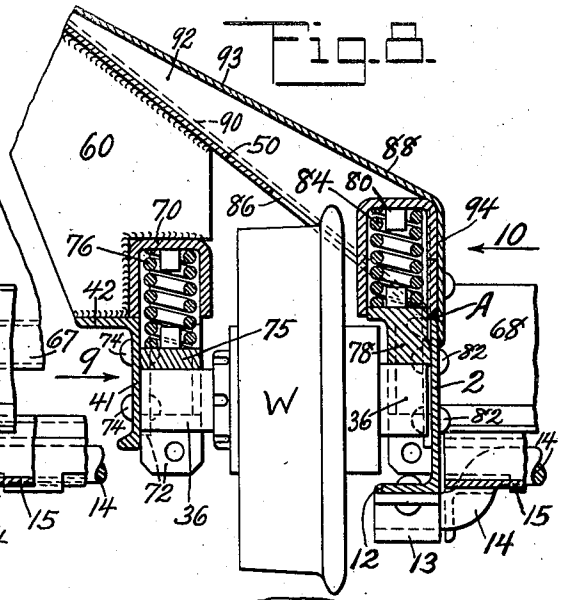


Fig. 9.

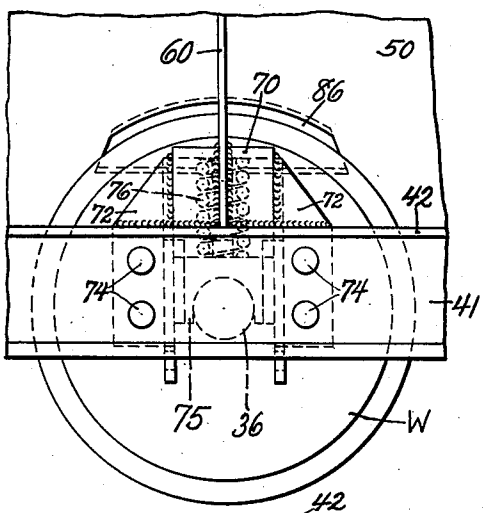


Fig. 10.

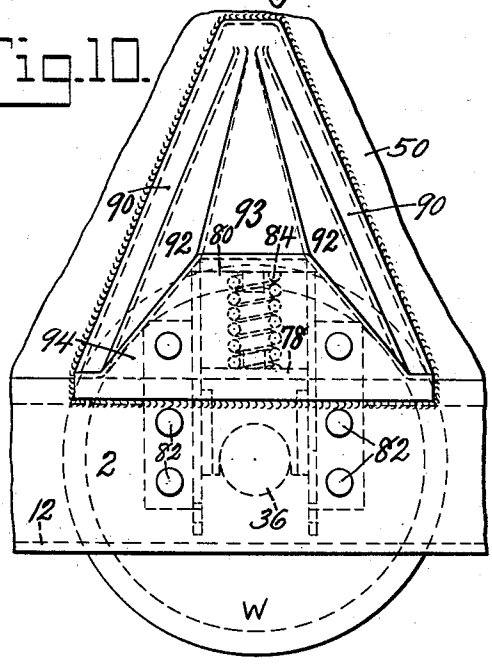
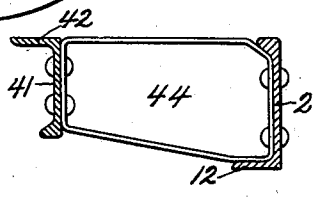


Fig. 5.



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UNITED STATES PATENT OFFICE

2,250,555

DROP BOTTOM MINE CAR

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Application January 4, 1939, Serial No. 249,229

17 Claims. (Cl. 105—364)

This invention relates to mine cars in general and in particular to mine cars of the automatic drop bottom door type. In the past all drop bottom mine cars have been built with an exceedingly heavy sill member which constituted the main load carrying element of the car. The sills were supported on through axles which usually had the wheels mounted thereon outside the sills. The sills directly supported the drop bottom doors as well as the side wings of the car which were usually braced to the sills, thus the load carried by the wings tended to rotate said wings outwardly and downwardly with the result that there was a tendency for the bearings to bind and place a relatively heavy bending strain on the axles. Such binding and rotating tendency of the side portions was, of course, reduced by having the doors carried by the sills but was not sufficient to wholly overcome the binding tendency, since the lever arm through which the door worked was of such short length compared with the leverage through which the side wings worked. Further, the sills had to be sufficiently large to carry the entire load to which the car would be subjected; in other words, it was a sill carrying car. It is an object, therefore, of the present invention to provide a car in which the side or wing portions of the car act as the main load carrying element; in other words, to provide a side carrying car.

A further object of the invention is the provision of a car having parts so arranged as to prevent any binding tendency in the bearings.

A still further object of the invention is the provision of an automatic drop bottom mine car carried on stub axles.

Yet another object of the invention is the provision of a drop bottom mine car mounted on independent stub axles either directly or through the medium of springs.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawings, in which:

Figure 1 is an elevational view of substantially one-half the car;

Fig. 2 is a sectional view of substantially the other half of the car;

Fig. 3 is an end view of the car looking toward the latch end thereof;

Fig. 4 is a sectional view of the side wall taken substantially at the wheel housing;

Fig. 5 is a sectional view taken on line 5—5 of Fig. 1 and adjacent the wheel housing;

Fig. 6 is a bottom view of the improved door used on the car;

Fig. 7 is a sectional view taken substantially on the center line of the car and disclosing the cross tie construction;

Fig. 8 is a sectional view similar to Fig. 4 but showing a modification thereof;

Fig. 9 is an outside view of the modification looking in the direction of arrow 9 of Fig. 8, and

Fig. 10 is an inside view of the modification looking in the direction of arrow 10 of Fig. 8.

Referring now to the drawings in detail, it will be seen that the car is formed by bulb angle center sills having the webs 2 disposed vertically and connected together at the ends of the car by an end construction formed of upper and lower substantially Z-shaped plates 4 and 6 respectively. These Z-shaped end plates are connected together to form roughly a channel shaped end sill reinforced on its rear surface and suitably connected to the center sills by corner connections 7 and 8. Mounted within the channel like end members are spring mounted combined bumping and draft elements 10 preferably of the type shown in Willoughby application 151,508, filed July 1, 1937 now Patent 2,164,558 granted July 4, 1939. The flanges 12 of the bulb angle center sills are directed outwardly and have attached thereto clips 13 forming bearings for offset pivot rods 14 to which the door plate 15 is securely welded or otherwise attached. The door plate is substantially flat throughout the major portion of its surface, but has the forward edge deflected upwardly as at 16 and bent partially around the pivot rod, while the rear edge is deflected upwardly as at 17 and is adapted to rest upon the forward edge 16 of the next adjacent rearward door; all as clearly shown in Figures 1 and 2. The lower surface of the door plate is suitably reinforced by a plurality of upwardly directed channels 18 having their flange portions welded securely to the door plate. Additional stiffening and wear means is provided by connecting the intermediate reinforcing channels together by short channel member 20 and flat wear plate 22 (Figs. 2 and 6). The forward edge of the forwardmost door is hinged on a straight rod 24; while the rear edge of the rearmost door is provided with a projection 26 adapted to be engaged by hook 28 connected to unlatching bar 29 pivoted to the car end wall at 30 and held in latching position by spring 31. The unlatching arm is formed by one full length angle member to which is welded a short angle member 32, thus providing a box section unlatching arm in the

area subjected to the greatest strain and wear and guided by strap or similar means 33 carried by the end wall and end sill.

The car is supported upon four wheels W through the medium of stub axles 36 projecting on either side of the wheel into engagement with outer bearings 39 and inner bearings 40, the latter being securely attached to the web of the bulb angle center sills, while the former is attached to the vertical web 41 of the outer or auxiliary sills. These outer or auxiliary sills are also of bulb angle form but inverted with the bulbs placed downwardly and the flanges 42 upwardly and directed outwardly away from the wheels. The auxiliary sills are of a length sufficient to connect the outer bearing boxes and extend beyond the wheels an amount sufficient for their termination substantially in the transverse plane of the end door supports as clearly shown in Fig. 1. Adjacent each wheel and intermediate the wheels on each side of the car, pan-shaped gusset braces 44 are provided which rigidly connect the center and auxiliary sills as clearly shown in Figs. 1, 2 and 5. The center sills and side sills are additionally connected together by gussets 46 located at the end of the auxiliary sills and at the center thereof. These gussets are so cut as to overlap the webs of the center and auxiliary sills to which they are welded as clearly shown in Fig. 4; also they are so cut as to overlap the outward directed flange 42 of the auxiliary sills and are provided with an upwardly and outwardly directed extension adapted to assist in transferring loads from the side wall sheet to the center and auxiliary sills. The outer edge of these gussets is provided with a flange 47 to increase their stiffness as well as the area of welding between the gusset and flange of the auxiliary sill. Stationary side floors 50 are welded at their lower edges to the bulb of the center sills and are inclined upwardly and outwardly at an angle sufficient to insure discharge of lading from the car and terminate in a vertically directed portion 51 reinforced at its upper edge by roll 52. These stationary side floors or side wings are connected to the end walls 54 through the medium of angles or similar members 56, each of the end walls being braced against bulging and end shocks by gusset members 58 placed on the outside of the end wall with the exception of the one gusset which would interfere with the unlatching bar, this gusset being placed on the inside of the end wall as clearly shown in Figs. 1 and 3. In order to additionally brace the auxiliary sill and assist in transmitting loads from the side floor to the sill and axle, gussets 60 are provided directly above each axle and connect the auxiliary sills and side floor portions, being welded to the side floor and connected to the auxiliary sills and outer boxes by means of short angles 62 (Figs. 1 and 4). The gussets 60 are in effect carried inside the car by welding interior gussets 64 to the sloping side floor portion and vertical side wall portion 51 directly above the gussets 60. In large capacity cars the gussets 64 will be connected together by means of tie plates 66 having reinforcing rolls 67 at their upper and lower edges (Fig. 7) and which plates are welded to the interior gussets and to the sloping side floor portions as well as the center sills. The customary center sill ties 68 are provided joining the center sills at each door support point and protecting the hinge axes of the doors from injury by heavy lumps of lading.

Due to the provision of the auxiliary sills, gussets 46, 60 and 64 and their interrelation with respect to the side floor a construction is formed, the members of which cooperate to support the car load. Thus it may be said that the car is properly a side carrying car with the load imposed on the doors being distributed by the center sills, part to the axles and part to the side wall structure for distribution through the gussets to the auxiliary sill and outer boxes which of necessity must carry half of each wheel load. The load carried directly above the side floor portions is directly distributed to the auxiliary and center sills through the gussets. Any rotative tendency of the wings downwardly and outwardly can not cause binding in the bearings, since each wheel and axle assembly could rotate about the rail head. Any rotative tendency of the side wing portions is counteracted, at least in part, by the weight of the lading carried upon the central doors and any part not so counteracted will be resisted by the end walls, intermediate gussets and particularly by cross ties 66. It should be noted that the gussets 46 tying the side floors, center sills and auxiliary sills together are located substantially in alignment with the door hinges, namely, the points at which the loads carried by the central doors are imposed upon the center sills for distribution to the auxiliary sills and side wall structure. Also it should be noted that the gussets 60 and 64 and cross ties 66 (when necessary) are located substantially in the planes of the axles for direct transmission of the loads to the axles.

Under certain mine conditions it is desirable to have the axles movable relative to the body in order to decrease the possibility of derailment and to this end the axles may be spring mounted as shown in Figs. 8, 9 and 10 which disclose one manner in which this may be accomplished. Since the construction shown in Figs. 8, 9 and 10 is merely a modification of that previously described, the same reference characters have been applied wherever possible. In this case, however, the gussets 60 have portions thereof removed in order to accommodate outer spring cups 70 securely welded to the gussets as shown in Fig. 8. Each cup is formed by a downwardly directed U-shaped member, the ends of which are closed by angles 72 having the flanges directed outwardly away from each other to provide additional securing area by means of which the spring cup assembly may be secured to the auxiliary sills as by rivets 74. The legs of the angle which close the spring cups also provide guides for axle bearing 75 which rests upon the axle and supports the carload through the medium of outer coil spring 76 (Figs. 8 and 9). The inner axle bearing 78 instead of being connected to the center sill is guided in an inner spring cup assembly 80 similar to outer spring cup assembly and attached to the center sill by welding as at A and by rivets 82. The load is transmitted from the inner spring cup assembly through spring 84 to the inner axle bearing, thus it will be seen that the load of the car is resiliently mounted on the stub axles without materially modifying the design or function of the car.

In the case where springs are provided it will be necessary to form a modified wheel housing in order to permit the relative vertical movements between the wheel and body and maintain the clearances the same as when no springs are used. In the present instance the floor sheet is cut out

as at 86 and a relatively large wheel hood 88 provided which is adapted to be securely welded to the floor sheet and center sill. Each of these hoods has a floor securing flange 90 and two substantially triangular converging portions 92 joining the floor securing flange to a third substantially triangular portion 93, the base of which is a horizontal line substantially parallel to the center sills. These triangular portions and floor securing flanges converge toward a point at one end and are joined at the base by means of an end 94 of substantially truncated triangular form, thus permitting the end and triangular portion 93 to overlap the inner spring cup assembly.

It will be obvious that the use of the spring mounting does not in any way effect the manner in which the loads are carried by the side wall structure for distribution to the gussets and center and auxiliary sills, the sole purpose of the spring mounting being to assist in preventing derailments and to lighten the shocks to which the car body would be subjected during loading and passage over rough tracks.

While the constructions have been described more or less in detail, it is obvious that various modifications and rearrangements of parts may be made by persons skilled in the art from a study of the preceding description and drawings and all such modifications and rearrangements of parts are contemplated as fall within the scope of the following claims.

What is claimed is:

1. In a drop bottom mine or similar rail car the combination of spaced apart inverted bulb angle auxiliary sills, spaced upright bulb angle center sills located intermediate said auxiliary sills and having the flanges thereof directed toward the side of the car to provide an unobstructed space between the center sill webs, side floors carried by said sills and having the inner edges thereof secured to the bulb portions of said center sills, a plurality of drop bottom doors filling the space between the center sill webs and hingedly carried by the lower flanges thereof on axes extending transversely of the car, spaced bearing members secured to adjacent web portions of said auxiliary sills and center sills, a plurality of wheels intermediate said bearings, and stub axles supported by said wheels and in turn supporting said bearing members.

2. In a drop bottom mine or similar rail car the combination of spaced apart auxiliary sills, spaced center sills located intermediate said auxiliary sills, side floors carried by said sills, a plurality of drop bottom doors hingedly carried by said center sills on axes extending transversely of the car, spaced spring cups secured to adjacent portions of said auxiliary sills and center sills, bearing members slidable relative to said cups, stub axle wheel assemblies supporting said bearing members, and spring means located above said axles and interposed between said cups and bearing members and resiliently supporting said car, said spring cups projecting upwardly above the respective sills whereby the axles may be positioned in the horizontal plane of said sills.

3. In a drop bottom mine or similar rail car the combination of spaced apart auxiliary sills, spaced center sills located intermediate said auxiliary sills, side floors carried by said sills, a plurality of drop bottom doors hingedly carried by said center sills on axes extending transversely of the car, spaced supporting means secured to and extending above the adjacent portions of said sills with at least some of said supporting means projecting above the plane of the side floor portions, stub axle wheel assemblies supporting said car, and resilient means interposed between said supporting means and located above the axles of the stub axle wheel assemblies to resiliently support the car.

4. In a drop bottom mine or similar rail car the combination of a center sill and an auxiliary sill adjacent each side of the car, stub axle and wheel assemblies located on either side of the car and supporting said sills, side floor portions directly supported by said center sills and indirectly by said auxiliary sills, a plurality of drop bottom doors hingedly carried by said center sills on axes extending transversely of said car, and brace means extending across the car and connecting said side floor portions, said brace means being located substantially in a transverse plane through the car at the stub axle and wheel assemblies.

5. In a drop bottom mine or similar rail car the combination of a center sill and an auxiliary sill adjacent each side of the car, stub axle and wheel assemblies located on either side of the car and supporting said sills, side floor portions connected to said center sills and sloping upwardly and outwardly therefrom in spaced relation to said auxiliary sills, a plurality of drop bottom doors hingedly carried by said center sills on axes extending transversely of said car, brace means extending across the car and connecting said side floor portions, said brace means being located substantially in a transverse plane through the car at the stub axle and wheel assemblies, and additional brace means connecting said auxiliary sills and side floor portions substantially in the plane of said brace means.

6. In a drop bottom mine or similar rail car the combination of a center sill and an auxiliary sill adjacent each side of the car, stub axle and wheel assemblies located on either side of the car and supporting said sills, side floor portions supported by said sills, a plurality of drop bottom doors hingedly carried by said center sills on axes extending transversely of said car, brace means connecting said side floor portions together and to said auxiliary sills, said brace means being located substantially in a transverse plane through the car at the stub axle and wheel assemblies, and additional brace means at each side of the car connecting said auxiliary sills, center sills and side floor portions.

7. In a drop bottom mine or similar rail car the combination of a center sill and an auxiliary sill adjacent each side of the car, stub axle and wheel assemblies located on either side of the car and supporting said sills, side floor portions supported by said sills, a plurality of drop bottom doors hingedly carried by said center sills on axes extending transversely of said car, brace means connecting said side floor portions together and to said auxiliary sills, said brace means being located substantially in a transverse plane through the car at the stub axle and wheel assemblies, and additional brace means at each side of the car connecting said auxiliary sills, center sills and side floor portions, said additional brace means being located substantially in alignment with said door hinge axes.

8. In a drop bottom mine or similar rail car the combination of a center sill and an auxiliary sill adjacent each side of the car, stub axle and wheel assemblies located on either side of the

car and supporting said sills, side floor portions supported by said sills, a plurality of drop bottom doors hingedly carried by said center sills on axes extending transversely of said car, brace means connecting said side floor portions together and to said auxiliary sills, said brace means being located substantially in transverse planes through the car at the stub axle and wheel assemblies, cross ties connecting said center sills substantially at said hinge axes, and additional bracing means located at each side of the car and connecting said center sills, auxiliary sills and side floor portions together, said additional bracing means being located substantially in the transverse planes through the car at said cross ties.

9. In a mine or similar rail car the combination of center sills, auxiliary sills spaced outwardly of said center sills, wheel and axle assemblies supporting said sills, side floor portions sloping upwardly and outwardly from said center sills and overlying said auxiliary sills, central floor portions carried by said center sills and having at least the major portion thereof located below a horizontal plane through said axles, brace means located beneath said side floor portions at each side of the car and connecting said side floor portions and adjacent center and auxiliary sills together, and cross ties joining said center sills together, said cross ties being located substantially in the plane of said brace means and forming extensions thereof within the car to prevent distortion of the sills and sloping side floor portions.

10. In a mine or similar rail car the combination of center sills, auxiliary sills spaced outwardly of said center sills, wheel and axle assemblies supporting said sills, side floor portions sloping upwardly and outwardly from said center sills and overlying said auxiliary sills, central floor portions carried by said center sills and having at least the major portion thereof located below a horizontal plane through said axles, brace means located beneath said side floor portions at each side of the car and connecting said side floor portions and adjacent center and auxiliary sills together, cross ties joining said center sills together substantially in the plane of said brace means and forming extensions thereof within the car to prevent distortion of the sills and sloping side floor portions, and additional brace means located beneath said side floor portions at each side of the car and connecting said side floor portions and auxiliary sills together substantially in transverse planes through said car at the axles whereby the loads on said side floor portions are transferred more directly to said axles.

11. In a mine or similar rail car the combination of center sills, auxiliary sills spaced outwardly of said center sills, wheel and axle assemblies supporting said sills, side floor portions sloping upwardly and outwardly from said center sills and overlying said auxiliary sills, central floor portions carried by said center sills and having at least the major portion thereof located below a horizontal plane through said axles, brace means located beneath said side floor portions at each side of the car and connecting said side floor portions and adjacent center and auxiliary sills together, cross ties joining said center sills together substantially in the plane of said brace means and forming extensions thereof within the car to prevent distortion of the sills and sloping side floor portions, additional brace means located beneath said side floor portions at each side of the car and connecting said auxiliary sills and side floor portions, and interior brace means located above said side floor portions and connected thereto for strengthening the same, said interior brace means being located substantially in the plane of said additional brace means whereby deep braces are obtained within clearance limits and with a minimum of obstruction in the lading space of the car.

12. In a mine or similar rail car the combination of center sills, auxiliary sills spaced outwardly of said center sills, wheel and axle assemblies supporting said sills, side floor portions sloping upwardly and outwardly from said center sills and overlying said auxiliary sills, central floor portions carried by said center sills and having at least the major portion thereof located below a horizontal plane through said axles, brace means located beneath said side floor portions at each side of the car and connecting said side floor portions and adjacent center and auxiliary sills together, cross ties joining said center sills together substantially in the plane of said brace means and forming extensions thereof within the car to prevent distortion of the sills and sloping side floor portions, additional brace means located beneath said side floor portions at each side of the car and connecting said auxiliary sills and side floor portions, and interior brace means located above said side floor portions and connected thereto for strengthening the same, said additional brace means and interior brace means being positioned substantially in transverse planes through the car at the axles whereby the loads on said side floor portions are transferred more directly to said axles.

13. In a mine or similar rail car the combination of center sills, auxiliary sills spaced outwardly of said center sills, wheel and axle assemblies supporting said sills, side floor portions sloping upwardly and outwardly from said center sills and overlying said auxiliary sills, central floor portions carried by said center sills and having at least the major portion thereof located below a horizontal plane through said axles, brace means located beneath said side floor portions at each side of the car and connecting said side floor portions and adjacent center and auxiliary sills together, cross ties joining said center sills together substantially in the plane of said brace means and forming extensions thereof within the car to prevent distortion of the sills and sloping side floor portions, additional brace means located beneath said side floor portions at each side of the car and connecting said auxiliary sills and side floor portions, interior brace means located above said side floor portions and connected thereto for strengthening the same, said additional brace means and interior brace means being positioned substantially in transverse planes through the car at the axles whereby the loads carried by said side floor portions are transferred directly to the adjacent axle, and additional cross ties joining said side floor portions and interior brace means together to prevent spreading of the car sides.

14. In a mine or similar rail car the combination of spaced sill members adjacent each side of the car, wheel and axle assemblies supporting said sill members. side floor portions sloping upwardly and outwardly past said sill members, brace means tying said side floor portions together and to the adjacent sill members to form

girder walls at each side of the car directly supported by the adjacent wheel and axle assemblies, end walls connecting said girder walls together, and plate metal tie means connecting said girder walls together intermediate said end walls thereby preventing spreading of the girder side walls.

15. In a mine or similar rail car the combination of spaced sill members adjacent each side of the car, wheel and axle assemblies supporting said sill members, side floor portions sloping upwardly and outwardly past said sill members, brace means tying said side floor portions together and to the adjacent sill members to form girder wals at each side of the car directly supported by the adjacent wheel and axle assemblies, end walls connecting said girder walls together, and plate metal tie means connecting said girder walls together intermediate said end walls, said plate metal tie means and certain of said brace means being positioned substantially in transverse planes through said car at the axles whereby the loads carried by said side walls will be transferred directly to the adjacent axles.

16. In a mine or similar rail car the combination of spaced sill members adjacent each side of the car, independent wheel and axle assemblies for supporting said sill members, resilient means projecting above said sill members and supporting said sill members on said wheel and axle assemblies, central floor portions located between said wheels and having the major portion thereof below a substantially horizontal plane through said axles, side floor portions sloping upwardly and outwardly from said central floor portions past said sill members and cutting said resilient means and wheels below the top edges thereof, openings in said side floor portions to receive said wheels, and wheel hoods closing said openings and covering said wheels and projecting resilient means.

17. In a mine or similar rail car the combination of spaced sill members adjacent each side of the car, independent wheel and axle assemblies for supporting said sill members, resilient means projecting above said sill members and supporting said sill members on said wheel and axle assemblies, central floor portions located between said wheels and having the major portion thereof below a substantially horizontal plane through said axles, side floor portions sloping upwardly and outwardly from said central floor portions past said sill members and cutting said resilient means and whels below the top edges thereof, openings in said side floor portions to receive said wheels, and wheel hoods closing said openings and covering said wheels and projecting resilient means, said wheel hoods being each formed of a plurality of triangular shaped portions having their apices joined and their bases merging into an end wall plate.

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