Oct. 25, 1932. H. M. PFLAGER ET AL 1,884,846

RAILWAY CAR STRUCTURE

Filed Sept. 15, 1930 3 Sheets-Sheet 1

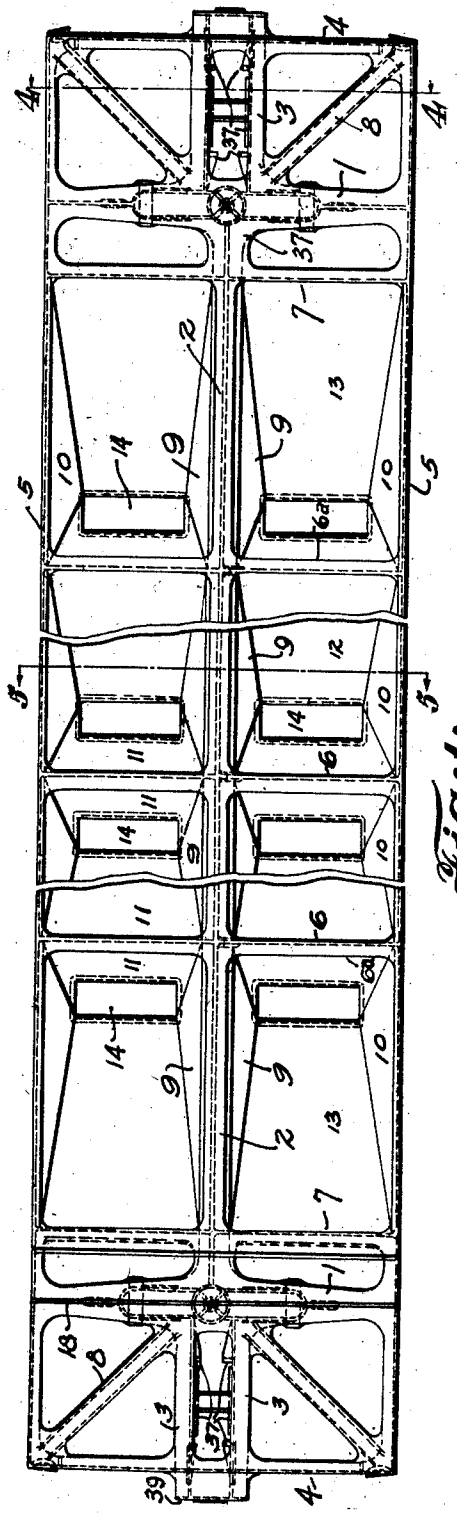

Fig. 1.

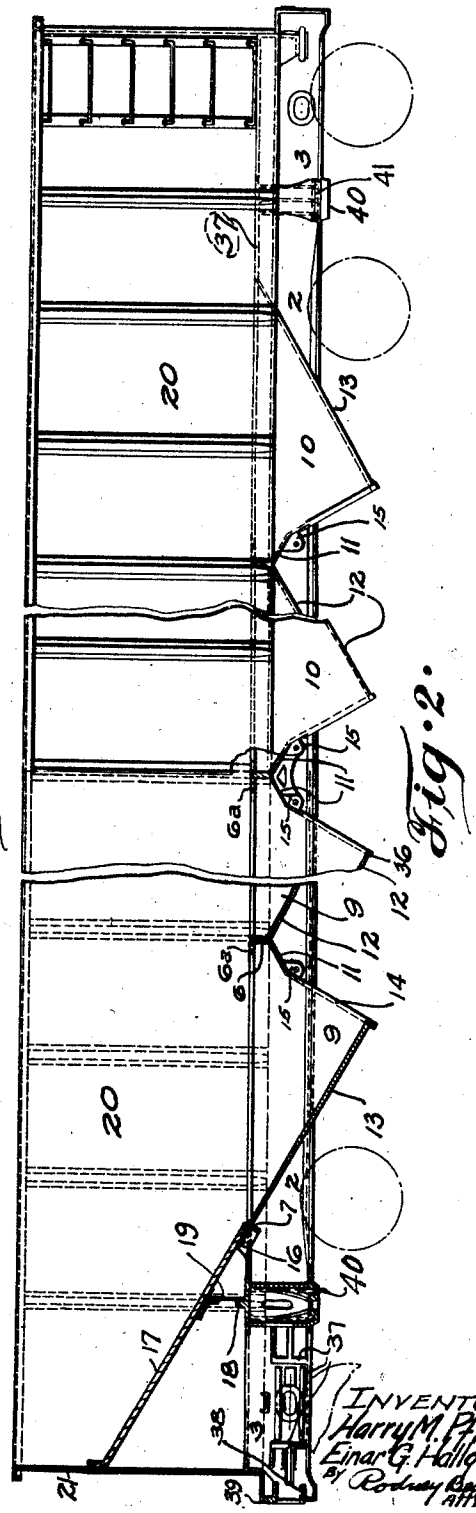

Fig. 2.

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RAILWAY CAR STRUCTURE

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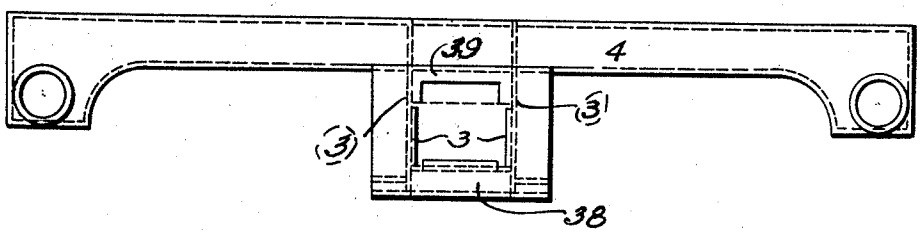

Fig. 3.

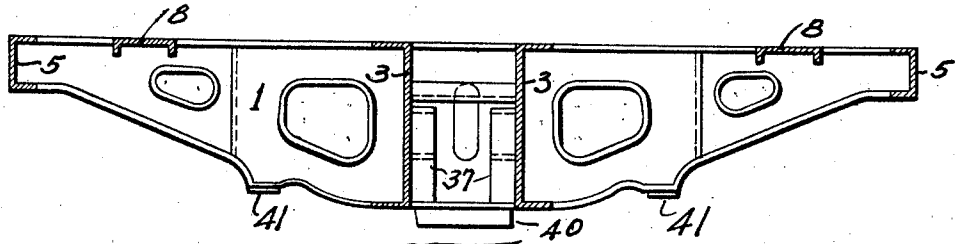

Fig. 4.

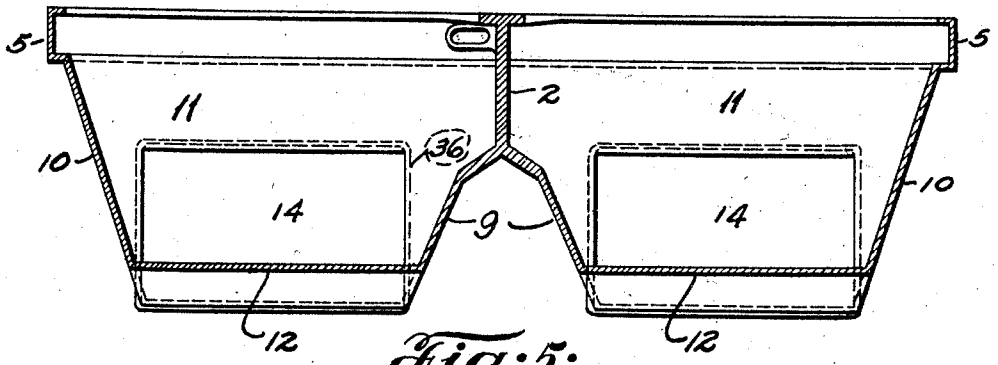

Fig. 5.

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RAILWAY CAR STRUCTURE

Filed Sept. 15, 1930 3 Sheets-Sheet 3

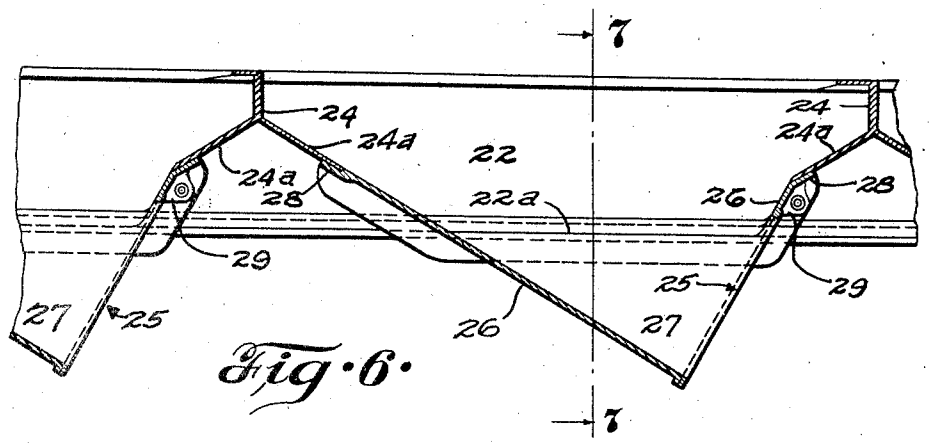

Fig. 6.

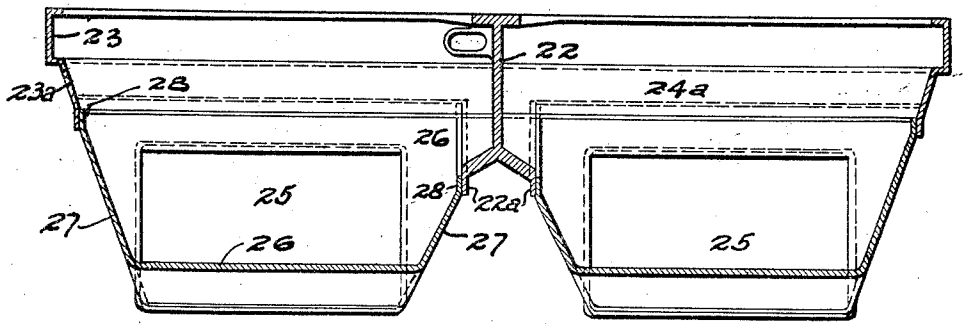

Fig. 7.

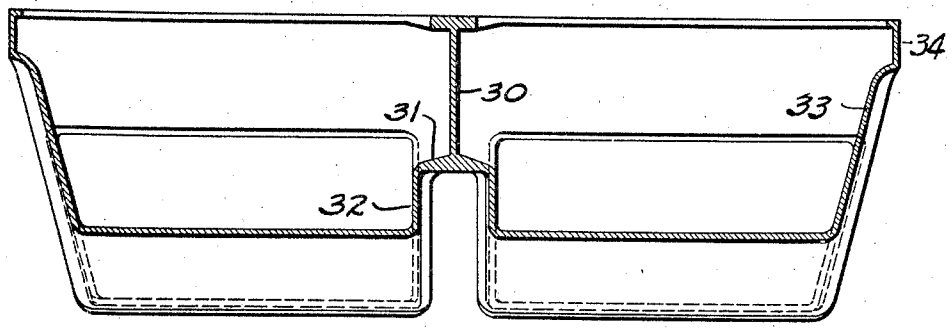

Fig. 8.

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UNITED STATES PATENT OFFICE

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RAILWAY CAR STRUCTURE

Application filed September 15, 1930. Serial No. 482,035.

Our invention relates to railway rolling stock and particularly to the construction of the underframe for a railway hopper car.

The main object of our invention is to provide a hopper car of maximum capacity for its length and height and also to provide an economical, rigid, strong underframe and hopper structure adapted to resist the usual corrosive actions which tend to rapidly deteriorate the ordinary built up car structure in which the joints between overlapping plates, shapes and rivets afford numerous crevices for the entrance of water and dirt which greatly facilitates corroding. This construction also provides hopper walls free from rivets which obstruct the passage of material.

Another object of our invention is to simplify the construction of the car when first built, and to avoid the necessity of frequent inspection and repair of assembled parts thus giving the car maximum life and minimum maintenance expense.

We attain these objects by constructing all or a substantial part of the underframe as an integral unit and, preferably in the form of a one piece casting, including the bolsters and longitudinal sills and hopper wall elements which latter brace and reinforce the sills so that they need not be as heavy as in the usual construction in which the underframe is complete and carries the hoppers without deriving any very substantial reinforcement therefrom.

Figure 1 is a top view of a hopper car underframe embodying our invention.

Figure 2 is in part a longitudinal vertical section through the hoppers, and in part a side elevation of a hopper car equipped with our novel underframe.

Figure 3 is an end view of the underframe.

Figures 4 and 5 are vertical transverse sections on lines 4—4 and 5—5 of Figure 1.

Figure 6 is a longitudinal section through the hopper structure of a modified form of our invention.

Figure 7 is a vertical transverse section taken on line 7—7 of Figure 6.

Figure 8 is a similar section illustrating another modification of our invention.

In the structure shown in Figures 1 to 5 inclusive, the entire underframe comprises a one piece casting having bolsters 1, a single I-beam center sill 2 between the bolsters, spaced channel draft sills 3 between the bolsters and end sills 4, and side sills 5 of channel cross section. Diagonal corner braces 8 extend from the intersection of the bolsters and draft sills to the intersection of the side sills and end sills.

The car is of the type having a plurality of hoppers on each side of the center sill, and the upper portions of the hopper end walls 11, 12 and 13 extend from side sill to side sill throughout the depth of the center and side sills and merge with vertical webs of the sills and form the main transverse members of the underframe. The lower portions of the hopper end walls project below the level of the bottom of the sills. The vertical webs of the sills 2 and 5 form the upper portions of the hopper side walls. Preferably the lower flanges of the center sill are inclined as shown in Figure 5 and have extensions 9 forming the lower portions of the inner side walls of the hoppers and the lower flanges of the side sills have inclined extensions 10 forming the lower portions of the outer side walls of the hoppers. Extensions 9 and 10 are integral with the downwardly projecting portions of the hopper end walls 11, 12 and 13 and with them form substantially rectangular hopper discharge chutes.

The hopper end walls 11, one for each hopper, are each provided with a rectangular door opening 14 and door hinge lugs 15 are formed integral with one side of the door opening. Suitable reinforcing ribs 36 extend around the door openings. The upper portions of walls 11 and 12 merge into vertical ribs 6 to which the superstructure braces may be secured and these ribs terminate in stiffening flanges 6a. The adjacent portions of the walls 11 and 12 diverge widely and more nearly approach the horizontal to form a more rigid cross brace for the underframe and to provide more room for mounting the hopper door.

The upper end of the left hand hopper end wall 13 is shown with a projection 16 ex-

tending above the top of the sills for mounting the lower end of the superstructure slope sheet 17. The adjacent bolster 1 has an integral upward projection 18 for mounting a slope sheet support plate 19 spaced from projection 16.

At the opposite end of Figures 1 and 2 we illustrate a general service construction in which the end wall of the end hopper terminates at the top of the sills and the car is provided with a flat floor 37 extending from the upper edge of the hopper to the end of the car. This structure will omit the upwardly projecting elements for mounting the end slope sheet.

The car side walls 20 may be riveted or welded to the car side sills 5 and the car end walls 21 may be similarly secured to the underframe end sills 4.

The construction described forms a hopper car underframe with a center sill comprising a single vertical web running from bolster to bolster and a plurality of hopper structures on each side of the center sill integral with the center sill and side sill and contributing largely to the rigidity of the underframe structure. As a result, the center sill and side sills sectional areas may be reduced substantially from that usually required in built up structures in which the center sill is large enough to carry substantially the entire load. The usual wide structural box girder center sill, formed of spaced channels with their flanges facing outwardly and provided with top and bottom web plates, limits the width of the hopper openings and results in a broad central platform on which the material loaded into the car would accumulate and have to be shoveled off when the car is emptied. In our construction the entire underframe structure, comprising a relatively narrow center sill with integral hopper elements and side sills, forms a unit strong enough to transmit the buffing and pulling forces and to carry the load. At the same time, the hoppers may be widened and the horizontal surfaces tending to interfere with the discharge of the load may be reduced.

The smooth inner surfaces of the hoppers, free from crevices, overlapping flanges and riveted heads further increase the discharge area and facilitate the movement of the material over the hopper walls.

The inclination of the hopper side walls 9 and 10 permits the underframe to weave between its ends without setting up undue stresses in the hopper structures or distorting the door openings.

We prefer to include as integral parts of the underframe structure the draft gear pocket forming elements 37, the coupler carrier 38, the striking plate 39, the center plate 40, and the side bearings 41.

The above advantageous features may be attained in structures differing substantially in detail from that described above and illustrated in Figures 1 to 5 inclusive.

In the modification illustrated in Figures 6 and 7, we show the longitudinal sills 22 and 23, with flanges 22*a* and 23*a*, and the transverse webs 24, with flanges 24*a*, forming the upper parts of the hopper side and end walls and essential elements of the underframe. The lower portion of each hopper consists of a separate casting having end and side walls 26 and 27 respectively and provided with flanges 28 whereby the hoppers may be welded or riveted to the depending elements on the sills and transoms.

This structure will retain many desirable features of our preferred structure but it will be easier to cast the underframe since it is not so large or complicated and if one or more hoppers are injured in a wreck or otherwise they can be removed and replaced more readily than a hopper of our preferred structure. Each hopper structure is provided with a door opening 25 and includes integral door hinge elements 29.

In the structure shown in Figure 8 we illustrate a center sill 30 having the usual horizontal flanges 31 with the hopper wall forming elements 32 depending vertically therefrom. The other side walls 33 of the hoppers incline inwardly and downwardly from the side sills 34 similarly to the arrangement shown in Figure 5 although the walls merge with the sills in the form of an arc instead of an angular connection as shown in the preferred structure.

While we prefer to form the entire underframe in a single casting, our invention may be embodied in a structure having sills, transverse members and hopper elements welded into an integral whole rather than cast in a single piece. Similar integral structure may be formed also by forging operations. Certain features of the invention may be embodied in substantially different detail structure and reference is made here to our copending application Serial No. 482,034, filed of even date herewith, and also to application Serial No. 353,494, filed April 8, 1929, by G. G. Gilpin and A. E. Small. Structures of both of these copending applications may embody numerous features of the present invention.

Various other modifications in the details of the structure may be made without departing from the spirit of our invention and we contemplate the exclusive use of all such structures coming within the scope of our claims.

We claim:

1. In a railway car underframe, a center sill having a single vertical web, and hopper side wall elements depending from the lower portions of said center sill proper and reinforcing the same.

2. In a railway car underframe, a center sill having a single vertical web, and hopper end wall elements integral with said center sill and extending transversely thereof and constituting underframe cross ties.

3. In a railway car underframe, a center sill of I-beam cross section, and hopper side wall elements integral with and depending from and extending along the outer edges of the lower flanges of said center sill.

4. A railway car underframe, center sill of I-beam cross section, the lower flanges of said sill being inclined downwardly and outwardly and provided with extensions whereby hopper side wall elements are formed integral with the sill and extending below the same.

5. In a railway car underframe, a side sill of channel cross section, the lower flange of said sill having a downwardly and inwardly inclined extension forming a hopper side wall element.

6. In a railway car underframe, a center sill with a single vertical web, side sills, and hopper end walls extending between said sills and forming underframe cross ties.

7. In a railway car underframe, a center sill with a single vertical web, side sills, and hopper side walls depending from said sills and forming sill reinforcing elements.

8. In a railway car underframe, a center sill with a single vertical web, side sills, and hopper structures below said sills and forming a substantial part of the underframe structure by cross bracing and otherwise reinforcing said sills.

9. An underframe as set forth in claim 6 in which the structure specified is formed in a single casting.

10. An underframe as set forth in claim 7 in which the structure specified is formed in a single casting.

11. An underframe as set forth in claim 8 in which the structure specified is formed in a single casting.

12. In a railway car integral underframe structure, longitudinal sills, a transverse member extending between and bracing said sills and inclined downwardly and inwardly towards the center of the car to form the end wall of a hopper below the top of said sills, said member projecting above the top of said sills for mounting a hopper end wall upper slope sheet.

13. In a railway car integral underframe structure, longitudinal sills, a bolster, a transverse element spaced from said bolster, said bolster including a rib extending above the level of the top of said sills for mounting a support plate for a hopper end sheet, and said plate including an upwardly and outwardly inclined element projecting above said level for directly supporting said slope sheet.

14. In a railway car underframe, a single center sill, a side sill, hopper side walls depending from the lower portions of said sills proper, and a hopper end wall extending between said side walls, there being a door opening formed in said end wall and extending substantially the full width thereof.

15. In a railway car underframe, side sills, a center sill, and a member extending from side sill to side sill and integral therewith and with said center sill and inclined from the vertical and forming a hopper end wall throughout the depth of said sills.

16. In a railway car underframe, side sills, a single center sill having a vertical web and outwardly extending flanges along its lower edge, and a hopper end wall inclined from the vertical and merging with said flanges to form a cross tie extending from side sill to side sill.

17. In a railway hopper car underframe, a center sill having a single vertical web, and a plurality of hoppers on each side of said sill and formed integrally therewith.

18. In a railway hopper car underframe integral structure including bolsters, a center sill comprising a single upright web between said bolsters, draft sills between said bolsters and the ends of the car, hopper side and end walls, draft gear pockets, striking plate, and coupler carrier.

19. A railway hopper car underframe integral structure including bolsters, a center sill comprising a single upright web between said bolsters, a center plate, draft sills between said bolsters and the ends of the car, hopper side and end walls, draft gear pockets, striking plate, and coupler carrier.

20. A railway hopper car underframe integral structure including bolsters, a center sill comprising a single upright web between said bolsters, a center plate, side bearings on said bolsters, draft sills between said bolsters and the ends of the car, hopper side and end walls, draft gear pockets, striking plate, and coupler carrier.

21. In a railway car underframe, side sills, a center sill, and a member extending from side sill to side sill and integral therewith and inclined from the vertical and forming a hopper end wall throughout the depth of said sills.

22. In a railway car underframe, longitudinal sills, transverse members, depending flanges on said sills and members, all of said parts being integral with each other, and a hopper unit structure with flanges at its upper end for attachment to said first mentioned flanges.

23. In combination, a cast underframe for a railway car, including the upper portion of a hopper, and a separately cast lower portion of said hopper attached to said underframe.

24. In combination, a cast underframe for a railway hopper car, including the upper portion of a hopper, and a separately cast rectangular structure forming the lower portion of said hopper including a door frame and arranged to be attached to said underframe.

25. In combination, a cast underframe for a railway hopper car, including the upper portion of a hopper, and a separately cast rectangular structure forming the lower portion of said hopper including a door frame provided with integral door hinge elements and arranged to be attached to said underframe.

In testimony whereof we hereunto affix our signatures this 11th day of September, 1930.

H. M. PFLAGER.
EINAR G. HALLQUIST.