Sept. 6, 1932. C. F. FREDE ET AL 1,875,584

RAILWAY CAR UNDERFRAME

Filed Jan. 24, 1931 2 Sheets-Sheet 1

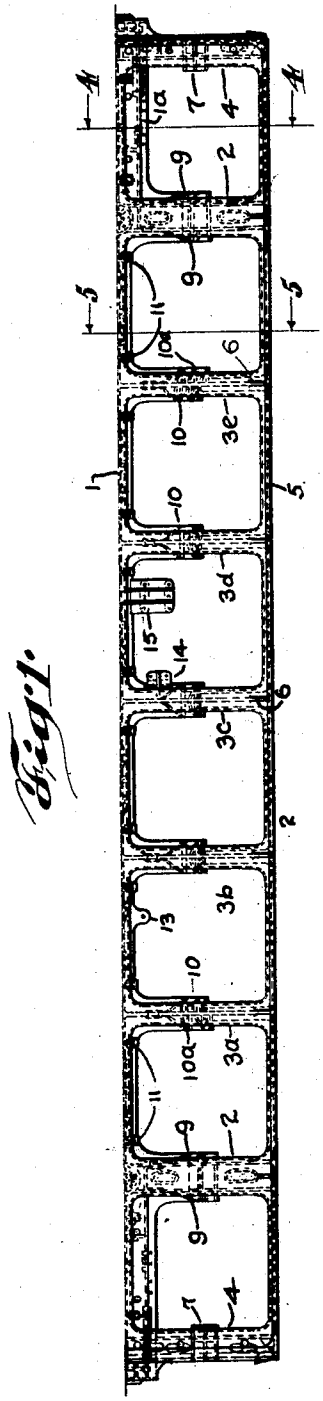


Fig. 1.

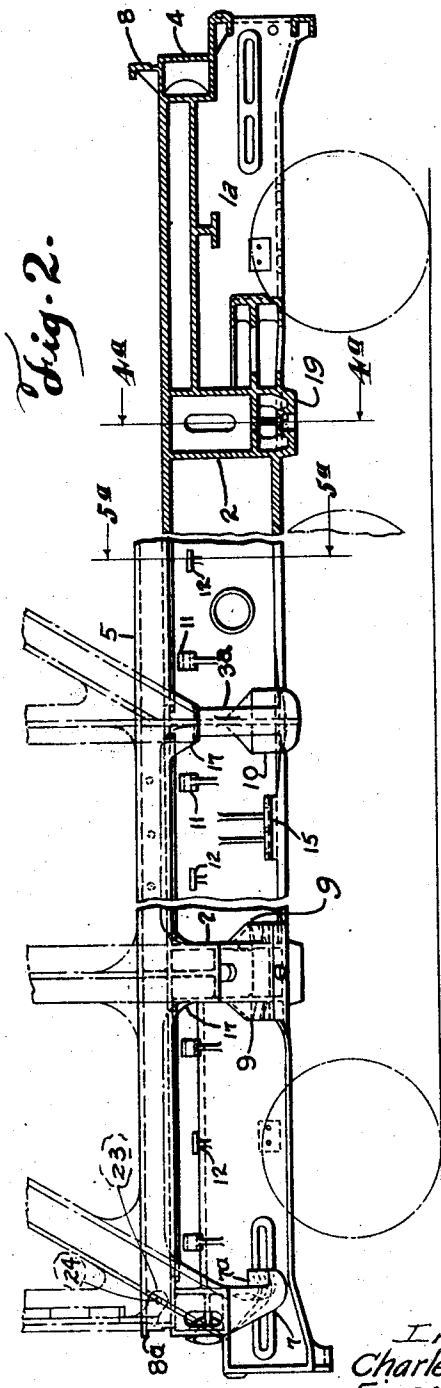


Fig. 2.

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Fig. 3.

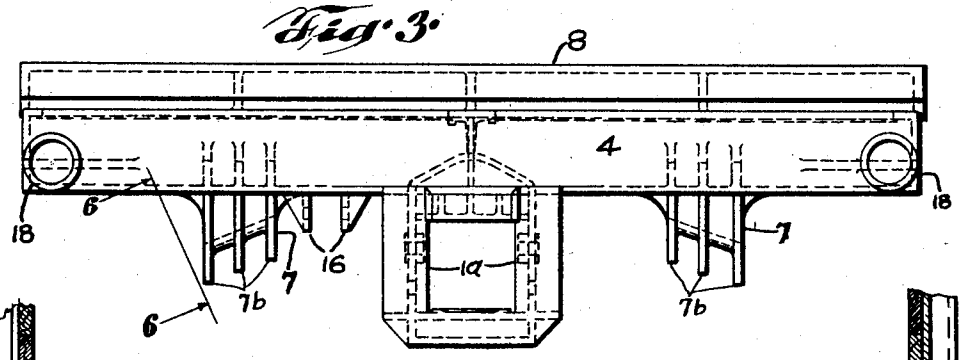


Fig. 4.

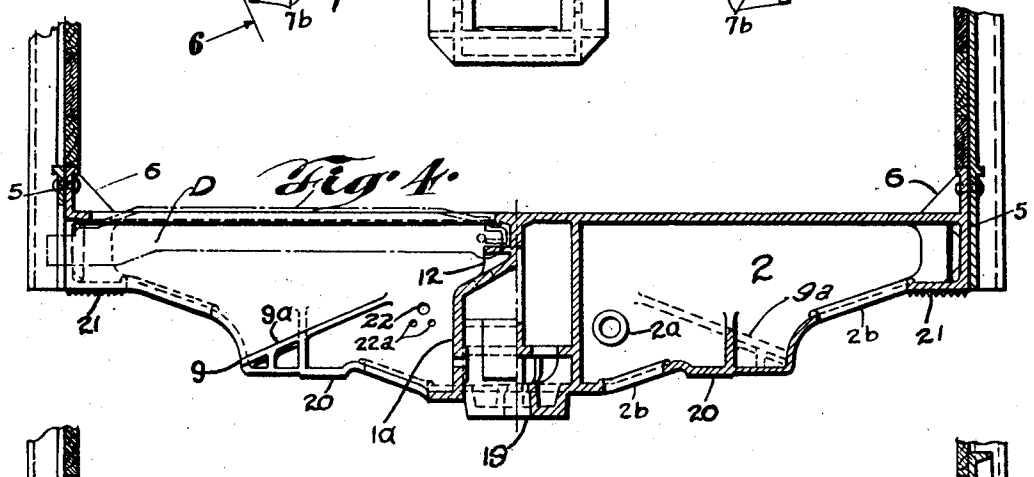
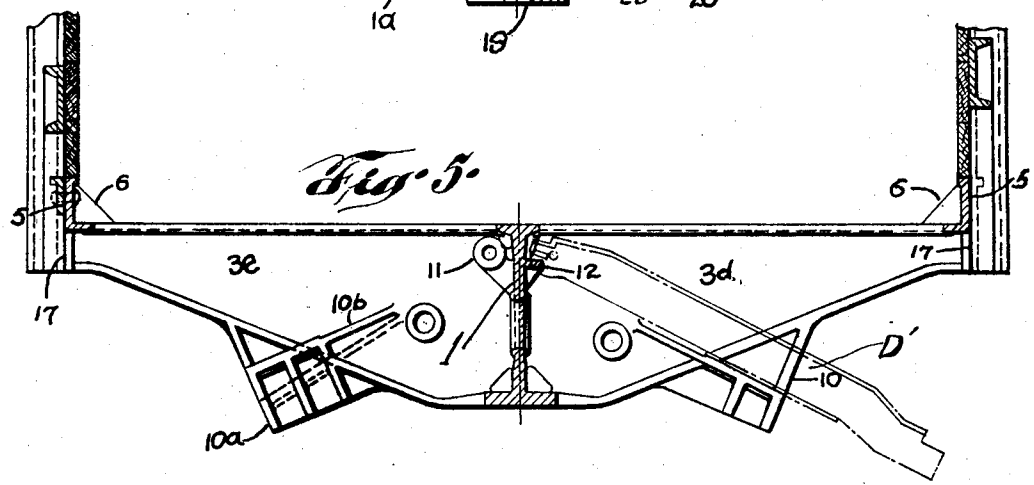


Fig. 5.



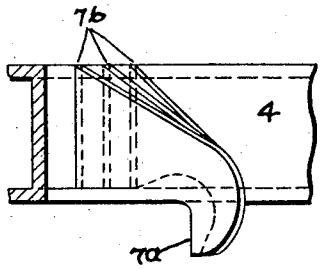


Fig. 6.

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UNITED STATES PATENT OFFICE

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RAILWAY CAR UNDERFRAME

Application filed January 24, 1931. Serial No. 511,062.

Our invention relates to railway rolling stock and consists in a novel underframe for drop bottom cars.

The invention may be used under any type of car construction, but it is particularly intended to be used in conjunction with truss-like side frames in which the side sill of the underframe forms the bottom chord for a side frame girder which carries most of the load, thus permitting the underframe center sill to be made smaller than would be necessary if it carried the entire load. This construction is particularly advantageous in drop bottom cars where the center sill should be of comparatively narrow cross section in order to avoid interference with material being dumped and to provide for doors of maximum width.

Heretofore, underframes for cars with drop bottoms have usually been designed either with two spaced center sills extending the entire length of the car, or with a single center sill of box or inverted U section. In both of these forms the top of the underframe includes wide level surfaces which retain material being dumped and reduce the size of the door openings.

The main objects of my invention are to provide a simple and light but rigid gondola car underframe having a single center sill member and having side sills which may form the bottom chords of the side frame girders; and to reduce the number of bolted and riveted connections between the underframe members by casting various parts in an integral structure.

We attain these objects and others in the construction illustrated in the accompanying drawings in which—

Figure 1 is a top view of a longitudinal half of an underframe embodying our invention.

Figure 2 is an enlarged view of the same structure shown partly in section on the longitudinal center line and partly in side elevation and showing part of the side frame truss.

Figure 3 is an end view of the underframe.

Figure 4 is a vertical transverse section, the left side being taken on the line 4—4 of Figure 1 and the right side being taken on the line 4*a*—4*a* of Figure 2 and showing part of the side frame truss.

Figure 5 is a similar view, the left side being taken on the line 5—5 of Figure 1 and the right side being taken on the line 5*a*—5*a* of Figure 2.

Figure 6 is a detail section and elevation taken on the line 6—6 of Figure 3.

The underframe includes a center sill 1, bolsters 2, transoms 3*a*, 3*b*, 3*c*, 3*d*, and 3*e*, end sills 4, and side sills 5, all formed integrally. The transoms and main part of the center sill are of I beam section having their top flanges imperforate, these flanges being adapted, therefore, to form part of the floor of the car. The lower portion of the center sill between each end sill and the adjoining bolster is bifurcated as indicated at 1*a* in Figure 4 to form spaced draft sills for mounting the usual draft rigging.

The bolsters 2 are preferably of box section with top and side members substantially imperforate and with cored openings 2*b* in the bottom webs to support the inside cores and provide access to the interior for removing the core sand after molding. A bolster of this shape is well adapted to transmit the load carried by the side frames and most efficiently meets the requirements of strength, weight, cost, and clearance conditions in this type of car. Each bolster is provided with the usual center plate 19, side bearing plates 20, and corrugated jacking plates 21. Holes 22 and 22*a* are drilled through the vertical walls of one of the bolsters on one side of the center sill, the hole 22 permitting the passage of the brake cylinder pressure retaining valve pipe and the holes 22*a* are bolt holes for a clamp to hold the pipe in position. The hole 2*a* in the vertical walls of the bolster permits passage therethrough of the train line pipe. This construction eliminates the possibility of material falling through the bolster or piling up between the vertical walls of the bolster.

The channel side sills 5 are adapted to form the bottom chords of the side girder or

main load carrying members of the car. Side sills 5 are located above the level of the transverse members, and ribs 6 are provided at the intersection of each transverse member with the side sill to strengthen the joint between these parts. Gussets 17 are also provided at the intersections of the transverse members and the side sills in vertical alignment with the vertical web of the side sill, and these gussets, the vertical web, and end flanges on the transverse members merge in a comparatively large flat surface adapted to mount and brace the vertical and diagonal struts of the side framing which converge at these points.

The transverse members 8 above the end sills 4 preferably have upper flanges turned inwardly, as are the flanges on side sills 5, but these may project outwardly as shown at 8*a* in Figure 2. The transverse member which has the outwardly extending flange 8*a* provides for an end wall, the lower portion of which engages the inner face of the transverse member and is provided with brackets 23 having trunnions 24 about which the wall may be swung inwardly and downwardly to accommodate long articles of lading which must be carried in two cars.

The top flanges of the transverse members 8 merge with the top flanges of the side sills 5 to form a continuous flange around the underframe. The end of the underframe with the transverse member which has an inwardly turned flange at the top provides for a permanent end wall fixed to the ends of the side walls. The outer face of member 8 serves as a seat for end wall uprights.

Formed integrally with each end sill is a door stop 7 comprising an inclined plate 7*a* supported by three transverse ribs 7*b* (Figures 3 and 6). Door stops 9 on each side of the bolsters 2 (Figure 4) comprise similarly supported inclined plates 9*a* merging with the side walls of the bolster and extending outwardly and downwardly. A door in closed position is illustrated in dot and dash lines at D and another door in open position is shown at D′. The lower ends of the plates 9*a* merge with the bottom flanges of the bolsters. Stops 10*a* formed on the outer sides of the transoms 3*a* and 3*e* correspond with the stops 9*a* formed on the bolsters and have three supporting ribs. The other stops 10 on the intermediate transoms are made smaller and placed lower than the stops 9 and 10*a* and have only two supporting ribs. The top plate portions of all the stops on the bolsters and transoms merge with the adjacent vertical webs, as at 10*b* in Figure 5. The stops 10 on the transoms 3*a*, 3*b*, 3*c*, 3*d*, and 3*e* are located at a lower level than the stops 7, 9, and 10*a* on the bolsters, end sills, and transoms because the corresponding doors may drop farther than the doors over the trucks, the downward movement of which is limited by the trucks.

On some previous designs of drop bottom cars, three hinges have been provided to withstand the forces applied during the dumping operation. But since it is difficult to line up three hinge bolt holes on a large casting, we prefer to substitute a door support 12 for the center hinge and form the hinge elements 11 and supports 12 integrally with the vertical web of the center sill. A brake rigging lug 13 merges with the bottom flange of the center sill and air brake reservoir and cylinder brackets 14 and 15 project from the middle transom and an adjacent portion of the center sill, respectively. Hand brake brackets 16 and push pole pockets 18 are formed integrally with each end sill 4.

While we have illustrated a complete underframe formed in a single casting, it is within the spirit of our invention to unite two or more parts into an integral whole by welding, or to embody some features of the invention in a smaller unit. Obviously, our invention is not limited to the details of the preferred structure herein illustrated and described, but includes these and various modifications. We contemplate the exclusive use of all such variations as come within the scope of our claims.

We claim

1. In a car underframe, spaced bolster members, a single center sill member between said bolster members, and support members arranged to carry the inner ends of drop doors, all of said members forming an integral structure.

2. In a car underframe, spaced bolster members, a single center sill member of I beam section between said bolster members, and members on said center sill member arranged to support the inner ends of drop doors, all of said members forming an integral structure.

3. In a car underframe, spaced bolsters, a single center sill between said bolsters, said center sill being arranged to support the inner ends of drop doors, and channel shaped side sills, all of said parts forming an integral structure.

4. In a railway car underframe, end sills, spaced bolsters, intermediate transoms, and channel shaped side sills extending above the level of the tops of said end sills, bolsters, and transoms, and having top and bottom flanges extending inwardly, all of said parts forming an integral structure.

5. In a railway vehicle underframe, end sills, spaced bolsters, and intermediate cross transoms, all having top flanges, and channel shaped side sills extending above the level of the tops of said bolsters, end sills, and transoms, said side sills having top and bottom flanges extending inwardly, the bottom flanges thereof merging with the top flanges

of said end sills, bolsters, and transoms, and all of said parts forming an integral structure.

6. In a railway vehicle underframe, spaced bolsters, a center sill between said bolsters, intermediate cross transoms between said bolsters, and side sills located above the level of the tops of said bolsters, center sill, and transoms and having bottom flanges merging with said tops, all of said parts forming an integral structure.

7. In a railway vehicle underframe, spaced bolsters, a center sill between said bolsters, intermediate cross transoms between said bolsters, end sills, a draft sill between each bolster and the adjacent end sill and forming an extension on said center sill, and side sills extending above the level of the tops of said bolsters, center sill, transoms, draft sills, and end sills, all of said parts forming an integral structure.

8. In a railway vehicle underframe, spaced bolsters and a side sill, said side sill being located above the level of said bolsters and being arranged to form the bottom chord of a side frame girder from bolster to bolster, and said bolsters and sill forming an integral structure.

9. In a railway vehicle underframe, spaced bolsters having top flanges, a center sill between said bolsters having a top flange, transoms intermediate said bolsters having top flanges, a channel shaped side sill having its top flanges spaced above said bolsters, center sill, and transoms and having its bottom flange on the same level as the top flanges of said bolsters, center sill, and transoms and forming portions thereof, and all of said parts forming an intergral structure.

10. In a railway vehicle underframe, spaced bolsters, end sills, side sills extending above said bolsters and end sills, and a transverse member having a vertical web extnding above said end sill and at the same level as said side sills.

11. In a railway vehicle underframe, an integral structure comprising end sills, channel side sills having their horizontal flanges extending inwardly, and transverse members, each having an upright wall and a top flange at the same level as the top flanges of said side sills, said members being positioned above said end sills.

12. In a railway vehicle underframe, spaced bolsters, an end sill having a vertical web, side sills above said bolsters and end sill, and a transverse member above said end sill and having a vertical web substantially in alignment with the vertical web of said end sill, and all of said parts forming an integral structure.

13. A railway vehicle underframe integral bolster structure having an imperforate top member with imperforate flanges extending outwardly from said bolster in line with said top member, and elements on said underframe for mounting drop doors, said flanges being adapted to overlie said drop doors.

14. In a railway vehicle underframe, end sill members, spaced bolster members, and intermediate transom members between said bolster members, all of said members forming an integral structure and having imperforate top flanges adapted to form part of the car bottom, and said side sills including elements for mounting separate flooring material.

15. In a railway car underframe, a side sill having a vertical web, a transverse member formed integrally therewith, and a vertical gusset formed on said side sill and at the end of said member in alignment with said vertical web and adapted to mount vertical and diagonal struts of a side frame truss.

16. In a railway car underframe, a cross member having an end flange, and a side sill above said cross member having a vertical web and a top flange, said end flange being in vertical alignment with said vertical web and integral therewith to form a surface adapted to mount a vertical post and a diagonal strut of a side frame truss.

17. In a railway car underframe, a center sill, door hinge elements on said center sill, and a door end supporting element intermediate said hinge elements, and both of said elements and said center sill forming an integral structure.

18. In a railway car underframe, a center sill having a vertical web and a top flange, a pair of spaced hinge butt elements on said vertical web, a door supporting element intermediate said butt elements and on said vertical web, said elements being spaced below said center sill top flange, and all of said parts forming an integral structure.

19. In a railway car underframe, a cross member having a vertical web and a drop door stop formed integrally therewith, said stop comprising a plate projecting from said vertical web in a plane perpendicular to said web and inclined downwardly and outwardly, and a plurality of transverse ribs supporting said plate and merging with said web.

20. In a railway car underframe, a transverse member, and drop door stops on opposite sides of said member and integral therewith, said stops being at different levels.

21. In a railway car underframe, a transverse member, door stops formed on opposite sides thereof and at different levels, and a transverse rib extending across said transverse member and supporting both of said stops.

22. In a railway car underframe, a transverse member having a vertical web and a top flange, and drop door stops on opposite sides of said member, each of said stops comprising a flange spaced below the top flange of said transverse member and merging with

the adjacent vertical web in a V shaped portion, and reinforcing ribs below said top flanges extending across said vertical web.

23. In a railway car underframe, a bolster, a side bearing, and a drop door stop, all formed integrally.

24. In a railway car, spaced bolsters, a center sill between said bolsters said sill having a single vertical web and a draft sill forming an extension on said center sill beyond one of said bolsters, said draft sill comprising a top flange and a vertical web beneath said flange, and said web being bifurcated in its lower portion to form spaced legs.

25. In a railway car, an end sill element, a bolster element, a draft member between said elements, said draft member comprising a top flange, a vertical web below said flange, spaced draft sills below said web, a plate connecting the tops of said draft sills with the bottom of said web, spaced hinge butts on said web between said top flange and said top plate, and a door support on said web intermediate said hinge butts, all of said parts forming an integral structure.

26. In a railway vehicle underframe, spaced bolsters, intermediate transoms between said bolsters, side sills and end members above the level of said bolsters and transoms, end sills beneath said end members, door stops on said bolsters, transoms, and end sills, a single center sill having a vertical web and top flange, draft sills forming extensions on said center sill beyond said bolsters, pairs of spaced hinge butts on said center sill and draft sills, and door end supports intermediate said hinge butts, all of said parts forming an integral structure.

27. In combination in a railway car, a side frame truss and an underframe, said underframe including integral transverse elements and a side sill positioned entirely above said elements and adapted to form the bottom chord of said side frame truss.

28. In a railway vehicle underframe, spaced bolsters, intermediate cross transoms between said bolsters, end sills, a single center sill having a vertical web and a top flange, side sills, and door hinge butts on said center sill, all of said parts forming an integral structure.

In testimony whereof we hereunto affix our signatures this 20th day of January, 1931.

CHARLES F. FREDE.
EINAR G. HALLQUIST.