

June 16, 1931.

C. F. FREDE ET AL
RAILWAY VEHICLE UNDERFRAME

1,810,558

Filed Oct. 20, 1930

2 Sheets-Sheet 1

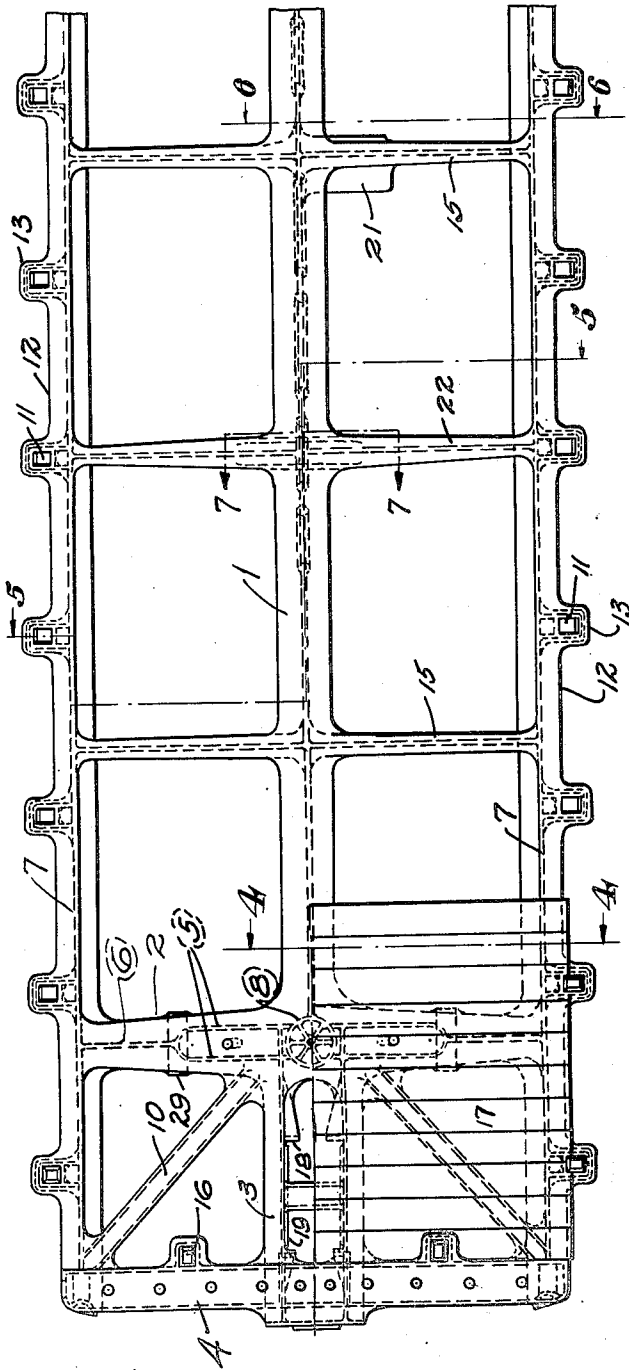


Fig. 1.

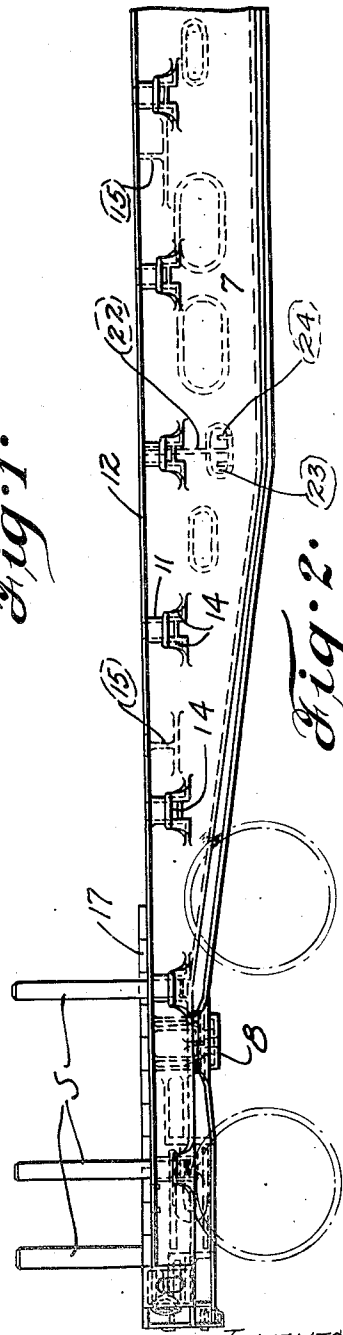


Fig. 2.

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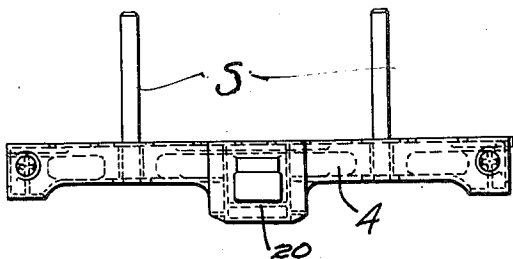


Fig. 3.

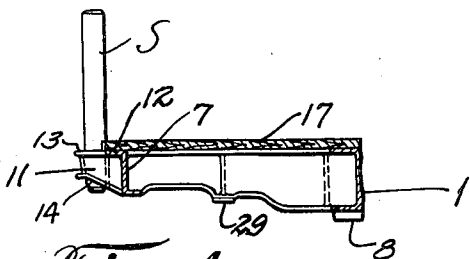


Fig. 4.

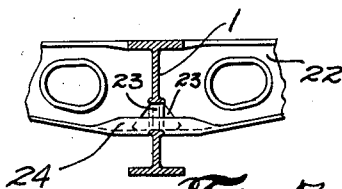


Fig. 7.

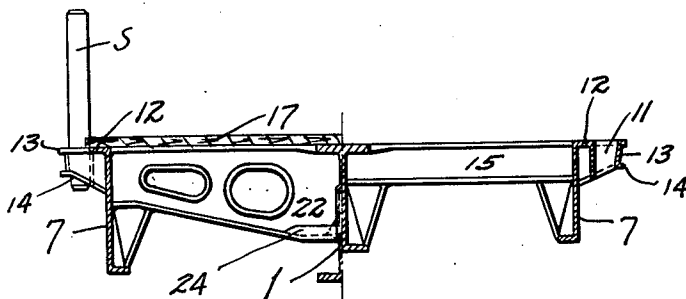


Fig. 5.

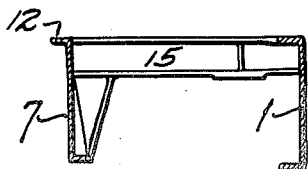


Fig. 6.

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UNITED STATES PATENT OFFICE

CHARLES F. FREDE, OF ST. LOUIS, MISSOURI, AND EINAR G. HALLQUIST, OF EDWARDSVILLE, ILLINOIS, ASSIGNORS TO GENERAL STEEL CASTINGS CORPORATION, OF GRANITE CITY, ILLINOIS, A CORPORATION OF DELAWARE

RAILWAY VEHICLE UNDERFRAME

Application filed October 20, 1930. Serial No. 490,026.

Our invention relates to railway rolling stock and consists in a novel underframe structure particularly adapted for flat bottom freight cars.

5 The main object of our invention is to provide an economical, strong underframe and preferably one which can be formed in a single casting which will eliminate a substantial amount of time and labor involved in finishing and assembling separately formed units
10 and which will be free from the deteriorating tendencies of built-up structures, due to loosening of bolted or riveted joints, corrosion, etc.

15 Another object of our invention is to simplify the construction by utilizing a single center sill between the bolsters in combination with spaced draft sills between the bolsters and end sills. This construction can be
20 effected very advantageously by means of a cast underframe without sacrificing any strength or rigidity at the bolster.

While it would be possible to construct an underframe comprising a single structural
25 steel center sill between the bolsters, and spaced structural steel draft sills between the bolsters and the end sills, this construction would require a specially constructed member between the adjacent ends of the center sill
30 and the draft sills, to which the sills must be riveted or welded. This member would necessarily be constructed with riveting flanges of comparatively large areas to provide the necessary number of rivets to take
35 care of the pulling and buffing forces, and it can readily be seen that such a construction would not be as desirable on a built-up structure as one with the center sills and draft sills formed of continuous structural members.

40 Since on a one piece cast structure all rivets and riveting flanges can be eliminated, it is a much simpler construction to provide a single center sill between the bolsters, and spaced draft sills between the bolsters and
45 the ends of the car. This can be done without decreasing the strength or increasing the weight of the underframe. Where the center sill of a freight car underframe is of the I beam fish belly type to carry vertical loads
50 and also the pulling and buffing forces, it

weighs less than the construction provided with spaced I beam center sills having the same strength.

In a single sill construction, the pattern work is simplified and also the molding operation because all of the cores between the
55 spaced sills and the work of placing these cores in the mold can be eliminated. This results in a structure which can be made more quickly and with less expense.

Another object of our invention is to utilize
60 Z-shaped side sills with their upper flanges projecting outwardly and enlarged at intervals to extend around a stake or post and to form a reinforcement for stake pocket
65 walls formed integrally with the web of the sill. This provides for greater road clearances at the lower portion of the side sill while at the same time providing for a maximum
70 width of car at top of side sill.

Reference is made to copending application filed by Charles F. Frede, March 29, 1929, Serial No. 350,850, which has some features
75 in common with the construction described below. The use of a single center sill in the present structure instead of the spaced sills in the application referred to eliminates the members of the cross transoms between the center sills and greatly simplifies the pattern
80 work and facilitates the molding operation.

In the accompanying drawings which illustrate a selected embodiment of our invention—

Figure 1 is a top view of approximately
85 one-half of a car underframe.

Figure 2 is a side elevation of the same.

Figure 3 is an end view of the same.

Figures 4, 5 and 6 are vertical transverse sections taken on the corresponding section
90 lines of Figure 1.

Figure 7 is a vertical transverse section taken on the corresponding section line of
95 Figure 1.

The underframe has a continuous member for transferring longitudinal forces and carrying a substantial portion of the car load. This member constitutes an I shaped center
100 sill 1, extending between the bolsters 2, and spaced channel-shaped draft sills 3 extending between the bolsters and the end sills 4.

The bolsters have spaced webs 5 extending throughout the intermediate portion of the bolster and merging into single webs 6 extending outwardly to the Z shaped side sills 7.

The vertical webs of the channel draft sills extend through the bolster to the rear web 5 and form transverse reinforcing elements of the bolster adjacent to the center plate 8.

Diagonal struts 10 form corner braces for the draft sills, bolster, end sill and side sills.

The center sill and side sills are of fish belly type between the bolsters and formed integrally with the side sills are relatively shallow vertical walls 11 forming pockets for stakes S. The upper flange 12 of each Z bar side sill has portions 13 extending outwardly around the pocket openings and reinforcing the same whereby a pocket is provided extending through the upper flange without weakening the sill. The lower portions of the pocket walls are further reinforced by means of flanges 14.

Transverse transoms 15 and 22, preferably of I shaped section, extend from side sill to side sill with their webs merging with the vertical webs of these sills and with their upper flanges flush with and merging with the upper flanges of the center and side sills. These transoms are of different depths but all are shallower than the sills and their lower flanges merge with the vertical webs of the center and side sills above the level of the lower flanges on the latter. The lower flanges of each of the deeper transoms 22 form a U shape section 24 at their intermediate portion and openings 23 are provided in the sill and transom webs adjacent to the intersection of the portions 24 and the sill web.

This transom arrangement provides flexibility in the underframe which will enable it to accommodate distortion of the center sill and transoms due to the weaving of the underframe when the car is loaded and running over uneven track. At the same time there is no sacrifice of needed strength. Also when the frame is cast the arrangement described will enable the metal to shrink in cooling without setting up as many strains as would result if the lower flanges of the sills and transoms merged with each other.

Each end sill has end stake pockets 16 formed integrally on its inner wall and the top of this sill is shown as slightly higher than the tops of the other sills, bolster, transoms and diagonal struts, all of which are substantially flush for mounting a floor such as one composed of the wooden planking 17.

The draft sills 3 have integral lugs 18 and guides 19 to accommodate the draft gear (not shown). Preferably, the bolsters include integral side bearing elements 29 and the end sill has an integral draw bar carrier 20 and

one of the transoms 15 includes an integral bracket 21 for mounting the air brake cylinder.

Obviously, many features of the invention may be retained without duplicating the structure illustrated, for instance the side sill need not be of Z section necessarily, and various other details of the described structure may be modified without departing from the spirit of our invention and we contemplate the exclusive use of such modified structures as come within the scope of our claims.

We claim:

1. A railway vehicle integral underframe including side sills, a pair of bolsters, a single center sill between said bolsters, and transoms connecting said sills intermediate said bolsters, all of said members having upper flanges in substantially the same plane for carrying a floor.

2. In a railway vehicle underframe, spaced bolsters, end sills, spaced draft sills between said bolsters and end sills, and a single center sill between said bolsters, diagonal struts from the ends of said end sills to the middle of the bolster, all of said parts forming an integral structure and having upper flanges in substantially the same horizontal plane.

3. In a railway vehicle underframe, spaced bolsters, a single I beam center sill and Z bar side sills between said bolsters, all of said parts forming an integral structure and having substantially flush top flanges for carrying a floor.

4. In a railway vehicle underframe, spaced bolsters, end sills, spaced channel-shaped sills between said bolsters and end sills and including elements for mounting a draft gear, a single center sill between said bolsters, and Z bar side sills united with said bolsters and end sills, all of said parts forming an integral structure.

5. In a railway vehicle underframe, spaced bolsters, end sills, spaced channel-shaped sills between said bolsters and end sills and including elements for mounting a draft gear, transverse transoms intermediate said bolsters, Z bar side sills united with said bolsters, end sills and transoms, all of said parts forming an integral structure and having substantially flush upper flanges for mounting a floor.

6. In a railway vehicle underframe, spaced bolsters, a single I beam center sill and Z bar side sills extending between said bolsters, transverse transoms intermediate said bolsters, and connecting said sills, all of said parts forming an integral structure and having substantially flush top flanges for carrying a floor.

7. In a railway vehicle underframe, bolsters, end sills and spaced draft sills between said bolsters and end sills, said draft sills being arranged to accommodate draft gear elements between them and having draft lugs thereon, and a single center sill between said

bolsters, all of said parts forming an integral structure and having upper flanges in substantially the same horizontal plane.

8. In a railway vehicle underframe, bolsters, the intermediate portions of said bolsters having two spaced vertical webs and the end portions of said bolsters having a single vertical web extending lengthwise of said bolsters, and spaced draft sills between said bolsters and the end of said underframe, said draft sills having vertical webs extending through said bolsters to the inner vertical webs of said intermediate portions of said bolsters and a single center sill between said bolsters, all of said parts forming an integral structure.

9. In a railway vehicle underframe, a single center sill, a bolster, the intermediate portion of said bolster having spaced vertical webs extending lengthwise of said bolster, and a pair of spaced draft sills extending outwardly from said bolster, each of said draft sills having a vertical web extending through said bolster to the inner vertical web of said bolster, said center sill having a vertical web extending inwardly from the inner vertical wall of said bolster from a point intermediate the vertical webs of said draft sills, all of said parts forming an integral structure.

10. In a railway vehicle underframe, bolsters, said bolsters having top and bottom flanges, the intermediate portions of said bolsters having spaced vertical webs between said flanges extending lengthwise of said bolsters, the end portions of said bolsters having a single vertical web between said flanges extending lengthwise of said bolsters, a single center sill between said bolsters having an I cross section, and spaced channel-shaped draft sills merging with said bolsters, all of said parts forming an integral structure.

11. In a railway vehicle underframe, bolsters, end sills, cross transoms intermediate said bolsters, side sills, a single fish belly center sill between said bolsters and spaced draft sills between said bolsters and end sills, all of said parts forming an integral structure and having substantially flush upper surfaces for carrying a floor.

12. In a railway vehicle underframe, bolsters, end sills, a single center sill between said bolsters, spaced draft sills between said bolsters and end sills and Z shaped side sills, the upper legs of said Z shaped side sills extending outwardly, all of said parts forming an integral structure.

13. In a railway vehicle underframe, bolsters, end sills, a single fish belly center sill between said bolsters, spaced draft sills between said bolsters and end sills, and fish belly Z shaped side sills, all of said parts forming an integral structure.

14. In a railway vehicle underframe, bolsters, a single center sill of I cross section between said bolsters, flanged side sills, a trans-

verse member extending between said side sills and connected to said center sill and having top and bottom flanges, the top flange of said transverse member being aligned with the top flanges of said sills, and the bottom flange of said transverse member being connected to the vertical webs of said sills at points spaced above the bottom flanges of said sills, all of said parts forming an integral structure.

15. In a railway vehicle underframe, bolsters, a single center sill between said bolsters having an I cross section, flanged side sills, a transverse member extending between said side sills and connected to said center sill and having top and bottom flanges, the top flange of said cross member being aligned with the top flange of said sills, and the bottom flange of said cross member being connected to the vertical webs of said sills at points spaced above the bottom flange of said sills, said bottom flange of said cross member having a U shaped section at its connection with the vertical web of said center sill, said center sill vertical web being open at the sides and above said U section, all of said parts forming an integral structure.

16. In a railway vehicle underframe, bolsters, a Z shaped side sill between said bolsters having its upper flange extending outwardly, and elements on said side sill forming a stake pocket spaced from the vertical web of said side sill and projecting outwardly from the outer edge of said upper flange, all of said parts forming an integral structure.

17. In a railway vehicle underframe, a Z shaped side sill having its upper flange extending outwardly of the underframe, and elements on said side sill forming a series of stake pockets spaced from the vertical web of said side sill, the upper flange of said side sill extending around the upper portion of said stake pockets, all of said parts forming an integral structure.

18. A railway vehicle side sill of Z shaped cross section having stake pocket walls formed integrally with its web, the upper flange of said sill extending around the pocket opening and reinforcing said walls.

19. In a railway vehicle underframe, bolsters, a single center sill of I cross section between said bolsters, flanged side sills, a transverse member extending between said side sills and connected to said center sill and having top and bottom flanges, the top flange of said transverse member being aligned with the top flanges of said sills, and the bottom flange of said transverse member being connected to the vertical web of said center sill at a point spaced above the bottom flanges of said center sill, all of said parts forming an integral structure.

20. In a railway vehicle underframe, bolsters, a single center sill between said bolsters having an I cross section, flanged side sills, a

transverse member extending between said side sills and connected to said center sill and having top and bottom flanges, the top flange of said cross member being aligned with the top flange of said sills, and the bottom flange of said cross member being connected to the vertical webs of said center sill at a point spaced above the bottom flange of said center sill, said bottom flange of said cross member having a U shaped section at its connection with the vertical web of said center sill, said center sill vertical web being open at the sides and above said U section, all of said parts forming an integral structure.

In testimony whereof we hereunto affix our signatures this 7th day of October, 1930.

CHARLES F. FREDE.
EINAR G. HALLQUIST.

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