

June 22, 1937.

W. H. MEYER ET AL.

2,084,859

RAILWAY CAR UNDERFRAME

Filed Aug. 27, 1934

5 Sheets-Sheet 1

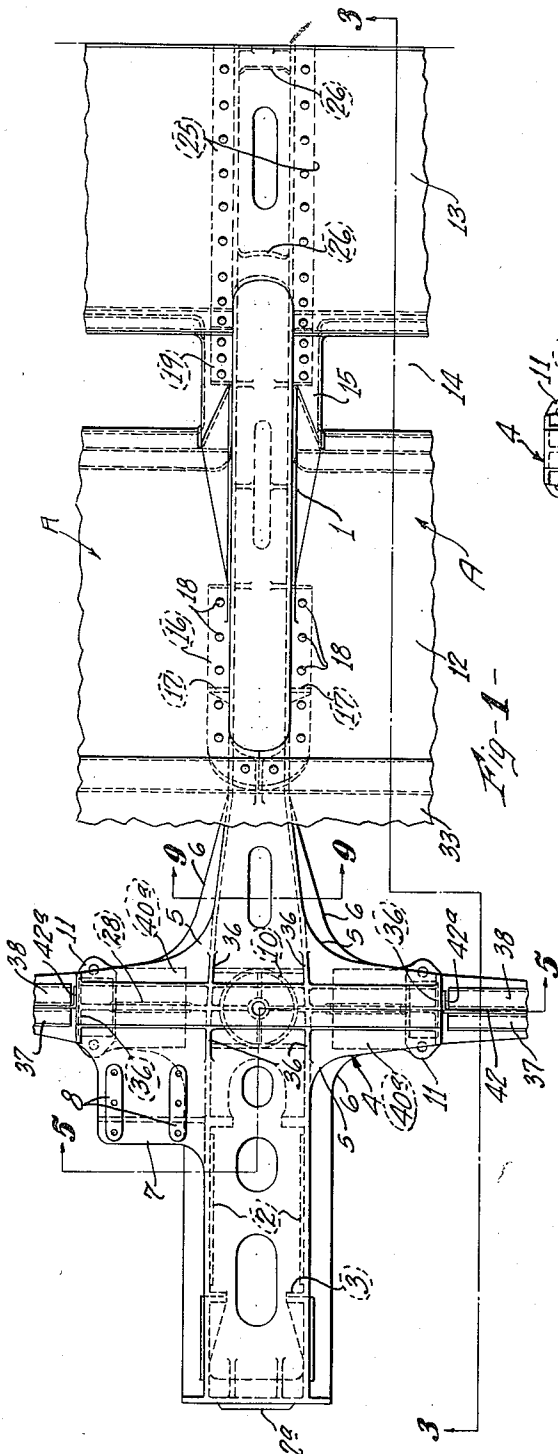


Fig-1-

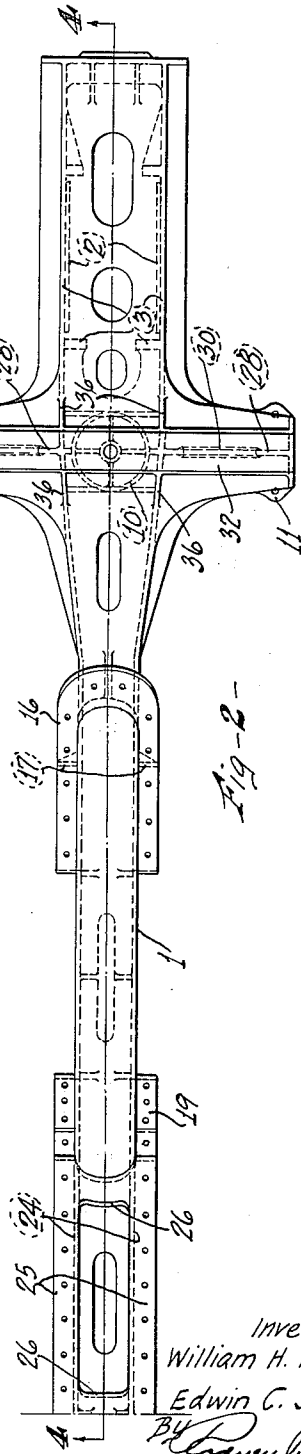


Fig-2-

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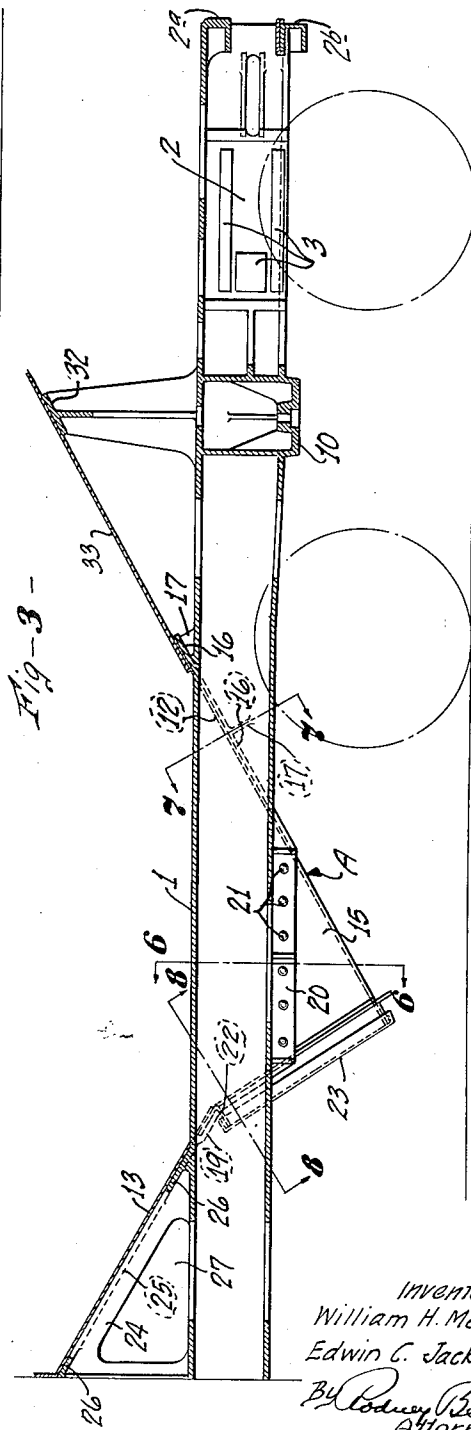
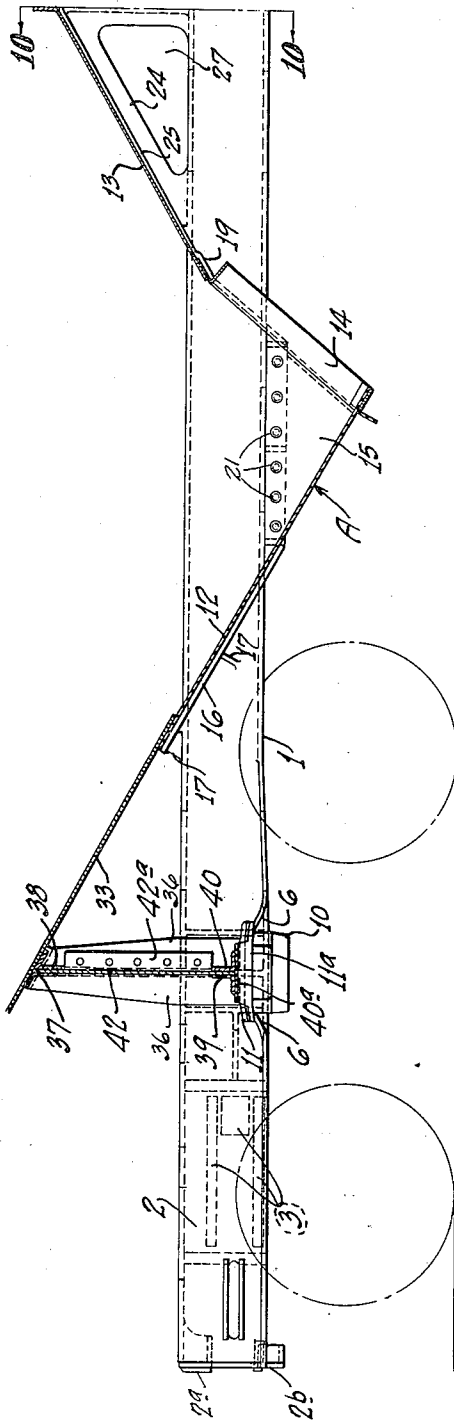
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5 Sheets-Sheet 2



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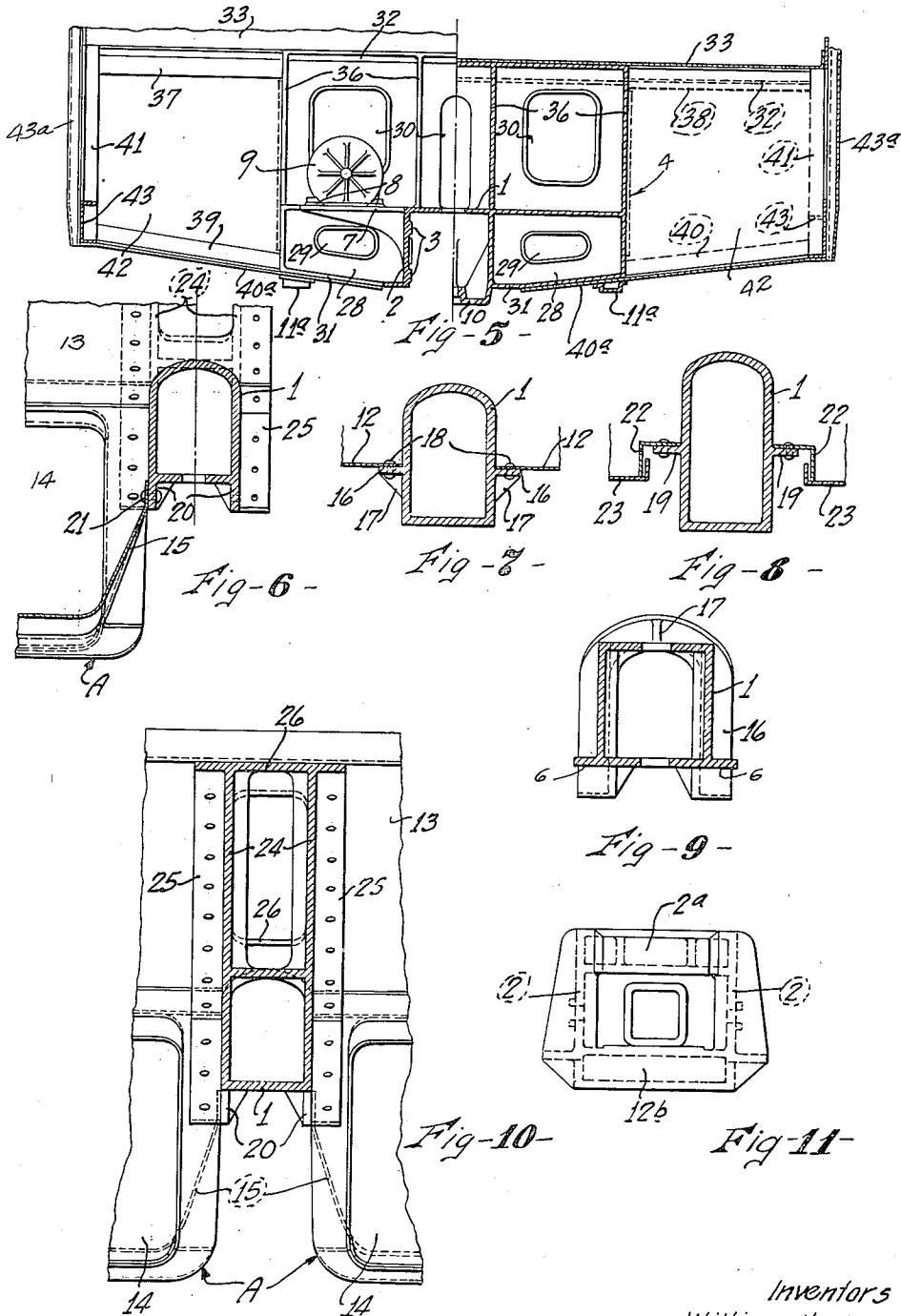
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RAILWAY CAR UNDERFRAME

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5 Sheets-Sheet 3



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5 Sheets-Sheet 5

Fig-18-

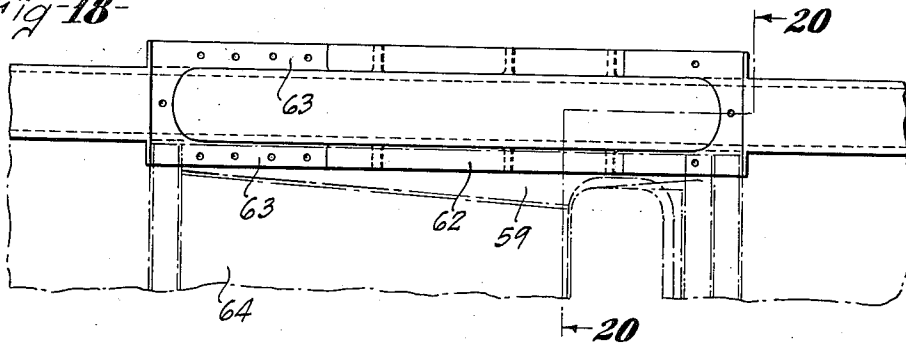


Fig-19-

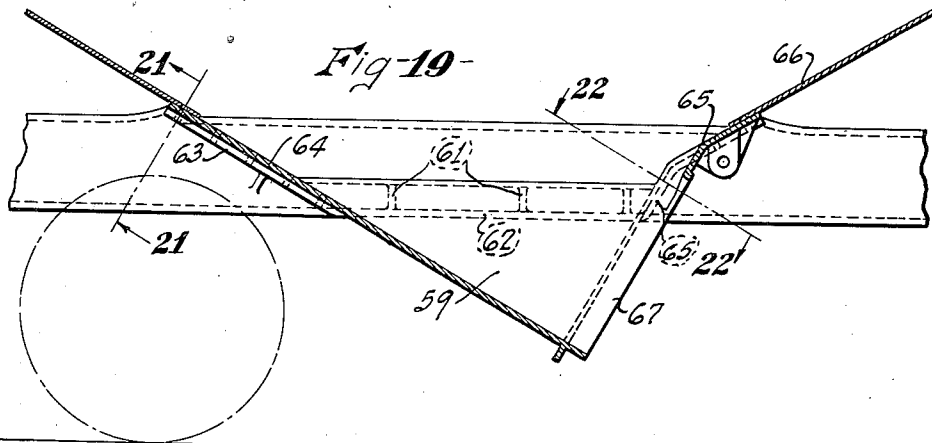


Fig-20

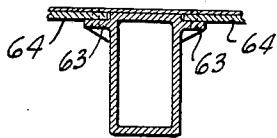
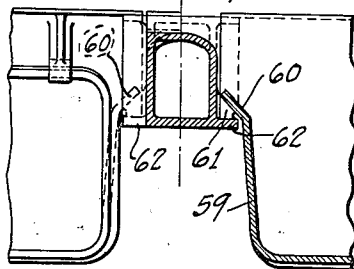


Fig-21-

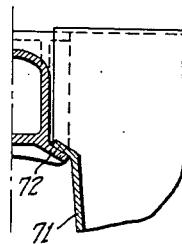


Fig-24-

Fig-22-

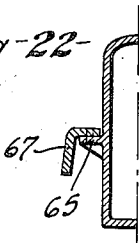
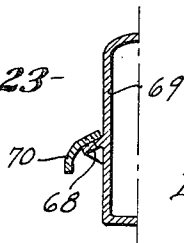


Fig-23-



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# UNITED STATES PATENT OFFICE

2,084,859

## RAILWAY CAR UNDERFRAME

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Application August 27, 1934, Serial No. 741,534

5 Claims. (Cl. 105—415)

This invention relates to railway rolling stock and consists particularly in novel underframe structure for hopper cars.

An object of the invention is to provide novel means for attaching the hopper walls to and supporting the same from the center sill.

Another object is to provide improved bolster structure adapted for supporting the adjacent hopper slope sheet.

Another object is to reinforce the center sill and particularly the portions between the bolster which support the hoppers and lading carried therein.

Another object is to strengthen and simplify the construction of hopper car underframes by forming various parts so as to accomplish the functions of members ordinarily formed separately and secured thereto.

These objects and other more detailed objects hereafter appearing are attained by the structures illustrated in the accompanying drawings in which—

Figure 1 is a top view showing a portion of the left longitudinal half of a hopper car, portions of the hopper walls or flooring being broken away.

Figure 2 is a top view showing the right longitudinal half of the underframe, the hoppers being omitted.

Figure 3 is a vertical longitudinal section taken on the line 3—3 of Figure 1.

Figure 4 is a similar section taken on the line 4—4 of Figure 2.

Figure 5 is a vertical transverse section taken on the broken line 5—5 of Figure 1.

Figure 6 is a similar section taken on the line 6—6 of Figure 4.

Figures 7 and 8 are detailed sectional views taken on the inclined lines 7—7 and 8—8, respectively, of Figure 4.

Figure 9 is a vertical transverse section taken on the line 9—9 of Figure 1.

Figure 10 is a vertical transverse section taken on the line 10—10 of Figure 3.

Figure 11 is an end view of the center sill structure.

Figure 12 is a partial top view showing a modification.

Figure 13 is a view corresponding to Figure 3 but showing the form in Figure 12.

Figure 14 is a vertical transverse section taken on the line 14—14 of Figure 13.

Figures 15, 16 and 17 are sections taken on the inclined line 15—15, 16—16 and 17—17, respectively, of Figure 13.

Figure 18 is a view corresponding to Figure 12 but showing another modification.

Figure 19 is a sectional view corresponding to Figures 3 and 13 but showing the form in Figure 18.

Figure 20 is a vertical transverse section taken on the broken line 20—20 of Figure 18.

Figures 21 and 22 are sectional views taken on the inclined lines 21—21 and 22—22 of Figure 19.

Figure 23 is a view corresponding to Figure 22 but showing another modification.

Figure 24 is a half vertical transverse section corresponding to Figure 20 but showing still another modification.

In Figures 1 to 11 is illustrated a hopper car underframe including the center sill 1, draft sills 2 having integral striking plates 2a and drawbar carry iron 2b, and the usual draft lugs and guide ribs 3, and intersecting transverse arms, generally indicated at 4, braced from the center sill by gussets 5, 6 and 7, each gusset 7 having pads 8 for mounting the brake cylinder 9, shown in Figure 5. On the under-surface of each arm 4 at the middle is the center bearing element 10 and at the ends are the side bearing mountings 11.

The car illustrated is provided with four hoppers A, two on each side of the center sill, and each having an outer end wall 12, an inner end wall 13 having a hopper opening 14, and an inner side wall 15, the outer side portions of the hoppers being omitted. Projecting laterally from the side walls of the center sill near the arms 4 are the inclined flanges or ledges 16 braced by ribs 17. Each flange 16 extends the entire depth of the center sill, over the top thereof and beneath the same, and is perforated for riveting, as at 18, to the supported hopper end wall 12. Between the flanges 16 are the inclined flanges 19 likewise extending the full depth of the center sill and at their bottoms connected with the lower extremities of the flanges 16 by means of the vertical longitudinal flanges 20 depending beneath the lower outer corners of the sill and perforated for riveting to the inner side walls 15 of the hoppers, as at 21.

As shown in Figures 4 and 8, a portion of each inclined flange 19 is attached to the lower extremity of the supported wall 13 and the remainder thereof supports the angular element 22 which forms a part of the periphery of the hopper opening and is adapted for receiving the hopper cover 23.

Between the hoppers, the center sill side walls are extended upwardly to form approximately inverted V-shaped brackets 24. These brackets

along their upper edges have perforated flanges 25 forming continuations of the inclined flanges 19 extending along the center sill side walls. The flanges 25 on the center sill extensions 24 cooperate with flanges 19 to support the inner sloping end walls 13 of the hoppers. The extensions 24 are connected at their lower ends and at their tops by the transverse webs 26 and are perforated, as at 27, to facilitate casting and lighten the structure. These brackets also function as substantial reinforcements for the center sill between the hoppers, the flanges 16, 19 and 29 reinforcing the portions of the center sill inside the hoppers.

The integral bolster arms 4 extend only to the side bearing mountings 11 and each includes a vertical transverse web 28, perforated at 29 and 30, and extending upwardly substantially beyond the top wall of the center sill. The web 28 has an integral reinforcing flange 31 at the bottom and an inclined flange 32 at the top for mounting the slope sheet 33 forming an extension of the adjacent hopper end wall 12. The web 28 extends from end to end of arm 4 and is further reinforced by vertical ribs 36. Secured to the top and bottom flanges 32 and 31 on each arm 4 are the laterally extending angles 37, 38, 39 and 40 connected at their ends by structural members 41 and mounting the panel webs 42, having flanges 42a secured to the outer ribs 36, and forming lateral extensions of the web 28. Top angles 37 and 38 form extensions of the inclined top web 32 of the cast part of the bolster and the bottom angles 39 and 40 form continuations of the bottom web 31 thereof. As shown in Figures 3 and 5, the side bearings 11a are mounted beneath the plate 40a on the bottom of the bolster. The structural members 37, 38, 39, 40 and 41 and the webs 42 serve to extend the bolsters laterally to the side sills 43 and side plates 43a of the car.

In Figures 12 to 17, inclusive, the inner side walls 44 of the hoppers are formed as integral downward extensions of the side walls of the center sill 45, as most clearly shown in Figures 14 and 15. Extending along the side walls of the center sill are the inclined flanges 46 braced by ribs 47 and continued downwardly along the hopper walls 44 to approximately the lower extremities thereof, these flanges serving for mounting and supporting the hopper outer end walls 48. Spaced inwardly of the flanges 46 are short flanges or ledges 49 supporting the lower extremity of the hopper inner end wall 50. Each ledge 49 extends approximately halfway down the side of the center sill and, extending along the remainder of the sill wall as a continuation thereof and along the edge of the hopper wall 44, is an angular element 51 forming the inside part of the periphery of the hopper opening and adapted for receiving the hopper door 52.

As shown in Figure 13, the upper edge of the hopper opening is reinforced by an angle 53 secured to the lower edge of the hopper inner wall 50 and the lower edge of the opening is reinforced by an angle 54 secured to the lower edge of hopper wall 48. In this form the substantial upward extensions on the center sill between the hoppers are omitted, the inner walls 50 of the adjacent hoppers being secured together at their upper extremities and to the vertical transverse bracing and supporting web 55, as at 56. The flanges or ledges 46 and 49 extend continuously over the top of the center sill and the top wall

of the sill is inclined upwardly adjacent these flanges, as at 57 and 58, for reinforcing the same. By means of this structure, the ribs 47 are omitted at the top of the center sill and the flanges are adequately braced without excessive concentration of the metal, and the casting operation is facilitated.

In Figures 18 to 22, the hopper inside walls 59 are formed separately from the center sill and at the top are bent inwardly, as at 60, and have ribs or lugs 61 resting on the lateral flanges 62 projecting from the lower edges of the center sill. The flanges 62 constitute continuations of the inclined flanges or ledges 63 extending upwardly along the side walls of the center sill and over the top thereof for attachment and supporting of the hopper wall 64. Attached to the lower portion of the inclined flange 65 supporting the lower edge of the hopper inner end wall 66 is the angular element 67 forming a portion of the periphery of the hopper opening. The flanges 62, 63, and 65 are substantially continuous along the sides and lower edges of the center sill.

Figure 23 shows an inclined flange 68 corresponding to the flange 65 in Figure 22 and projecting laterally from the side wall of the center sill 69. Mounted on the inclined flange 68 is the approximately arcuate element 70 forming a portion of the periphery of the hopper opening.

In Figure 24, the hopper inside wall 71 is secured directly to the outwardly and downwardly inclined flange 72 projecting from the lower edge of the center sill.

In each of the forms, the construction of the underframe and attachment of the separately formed hoppers to the sill and bolsters are substantially simplified and also strengthened due to the formation of various parts integrally and the novel disposition of the various attaching and bracing flanges and ribs. The hopper car is also more durable than similar cars utilizing built-up underframes due to the absence of riveted and bolted seams which are corroded by certain types of lading material, such as coal, and become weakened after use for a limited period.

The invention is not limited to the exact details of the structures illustrated but may be modified in various respects as will occur to those skilled in the art and the exclusive use of all such modifications as come within the scope of the claims is contemplated.

We claim:

1. Hopper car underframe integral structure including a box-like center sill member, oppositely inclined ledges extending along a side wall thereof and below the bottom wall thereof for attachment to hopper end walls, and a flange connecting the lower extremities of said ledges and extending downwardly from the bottom of said sill member for supporting the hopper side wall.

2. A hopper car integral underframe structure comprising a center sill member for transmitting longitudinal forces applied to the underframe and a flange extending over the top thereof for attachment of a hopper wall, the top wall of said sill member being inclined upwardly to meet the upper portion of said flange and merging therewith so as to brace the same.

3. A hopper car box section center sill member having restricted portions of its side walls comprising inverted V-shaped open truss structure running lengthwise of the sill member and extending substantially above the remainder of the

member and forming support structure for converging hopper walls.

5 4. Structure as specified in claim 3 in which the upwardly projecting portions of said side walls are provided with flanges at their upper edges for attachment of hopper walls, said flanges being continued downwardly along the center sill member.

5. Structure as specified in claim 2 in which said flange extends over said center sill member at an angle to the vertical and the inclined portion of said center sill wall merges with the downwardly facing side of said flange.

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