March 23, 1971 K. P. COOVER ET AL 3,572,252

COVERED RAILWAY HOPPER CAR

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FIG. 1

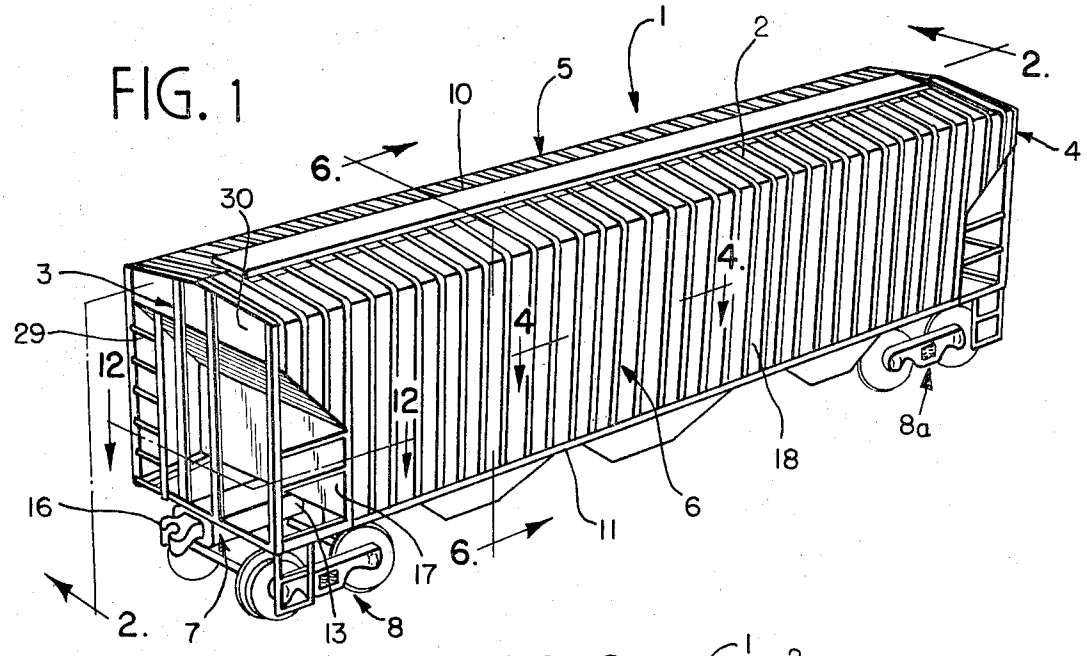


FIG. 2

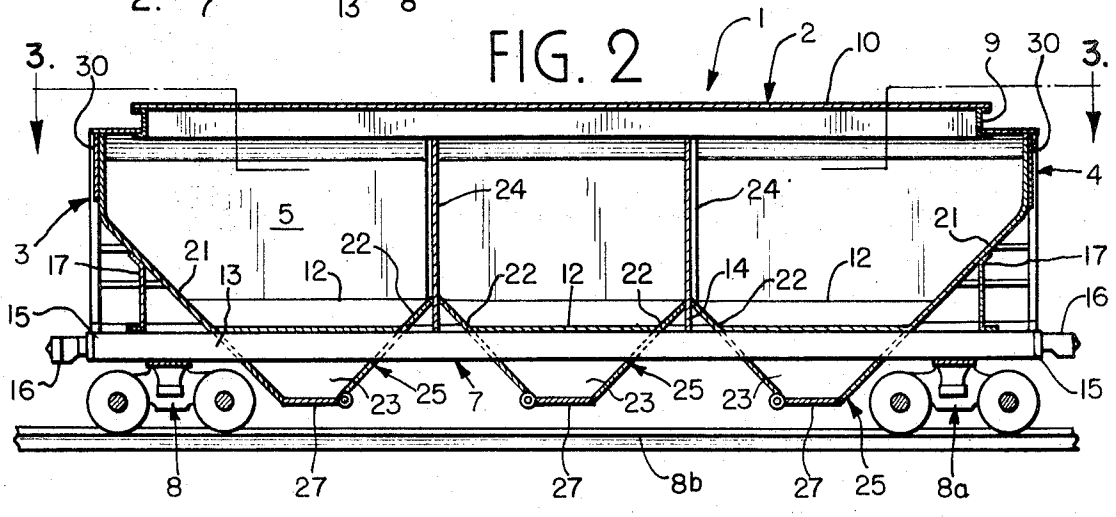
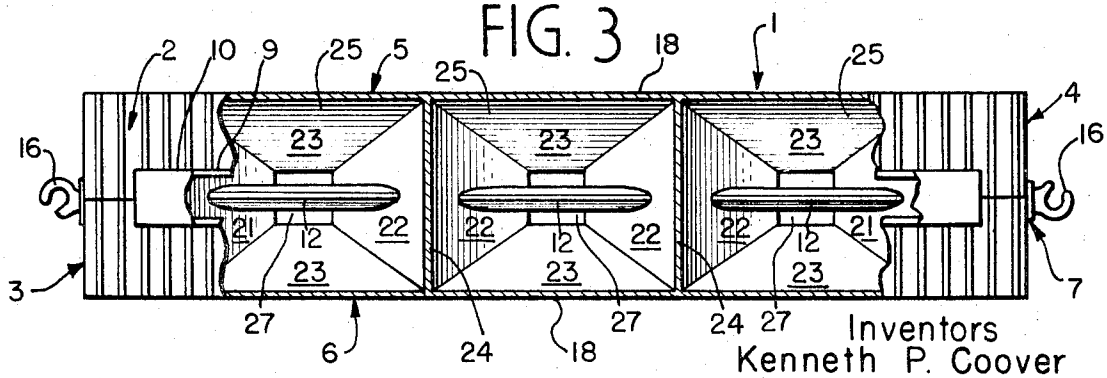


FIG. 3



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FIG. 4

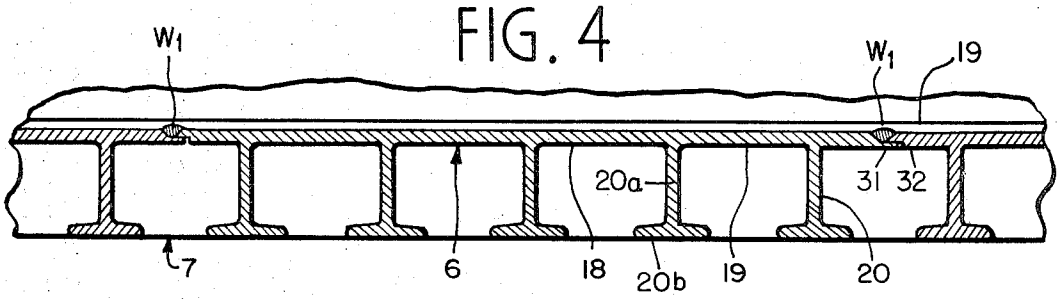


FIG. 6

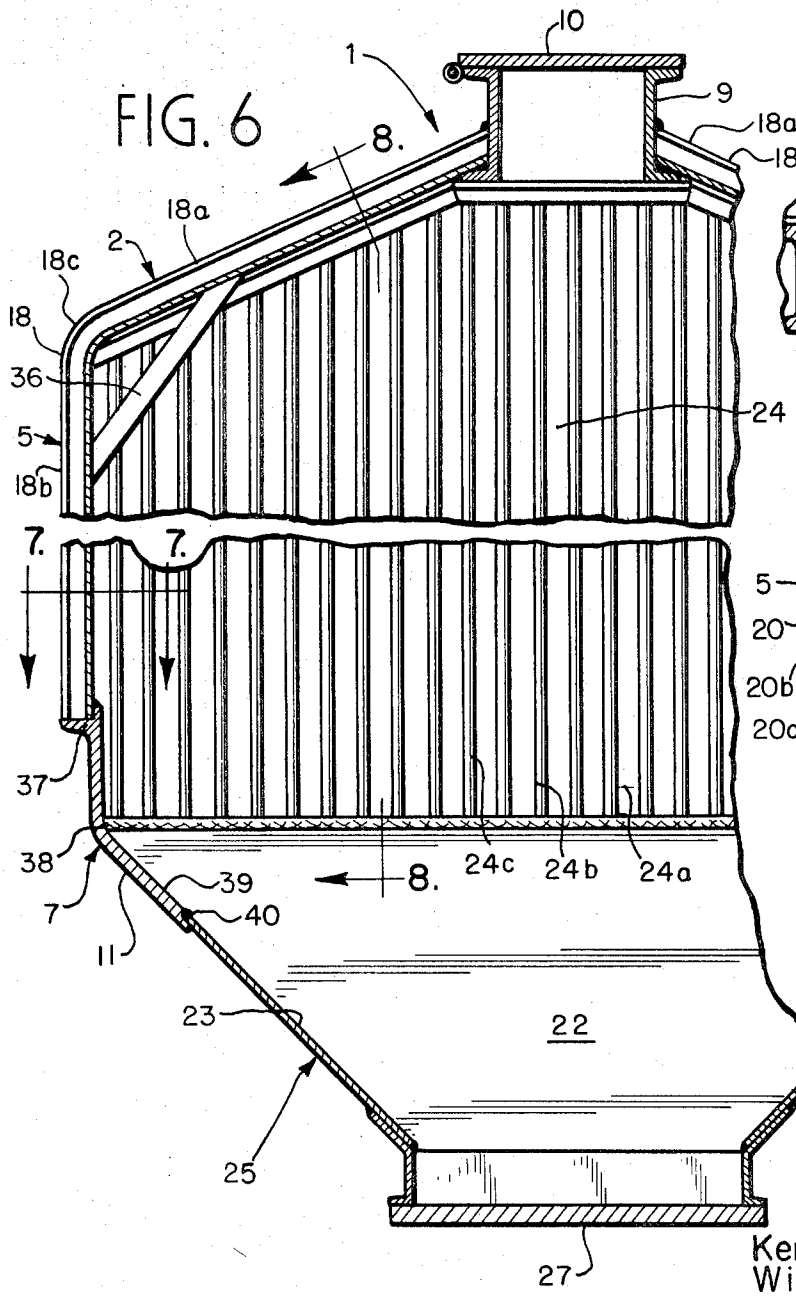


FIG. 5

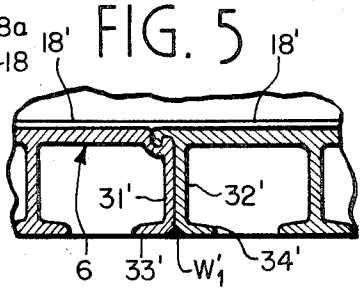
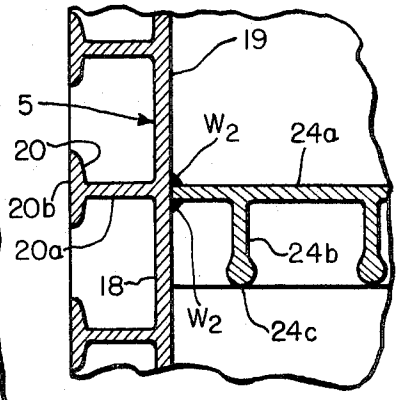


FIG. 7



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FIG. 8

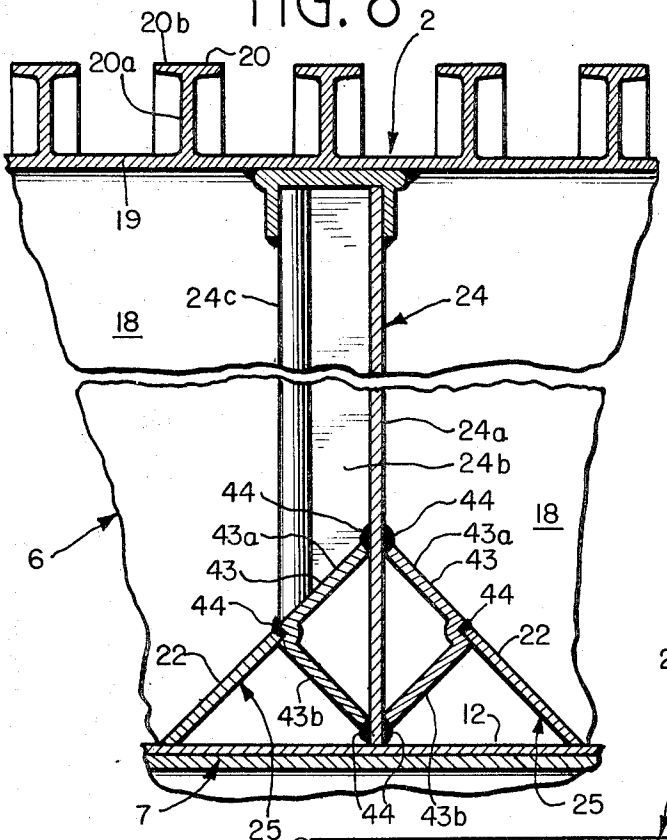


FIG. 10

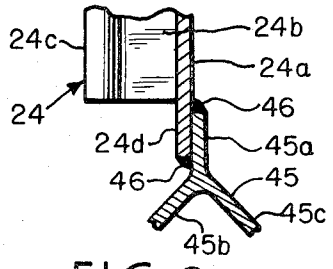


FIG. 9

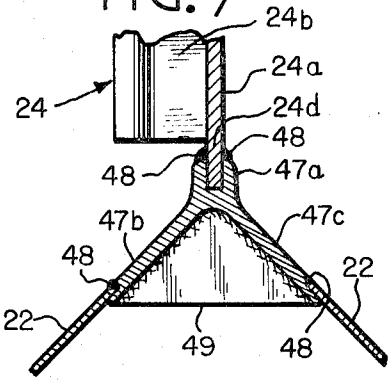
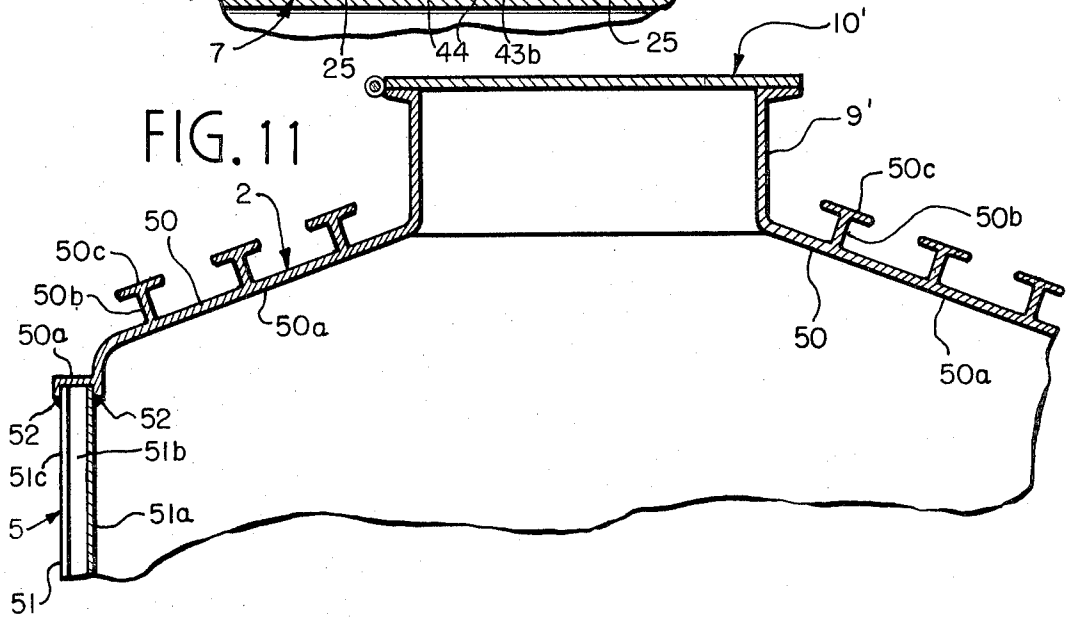


FIG. 11



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FIG. 12

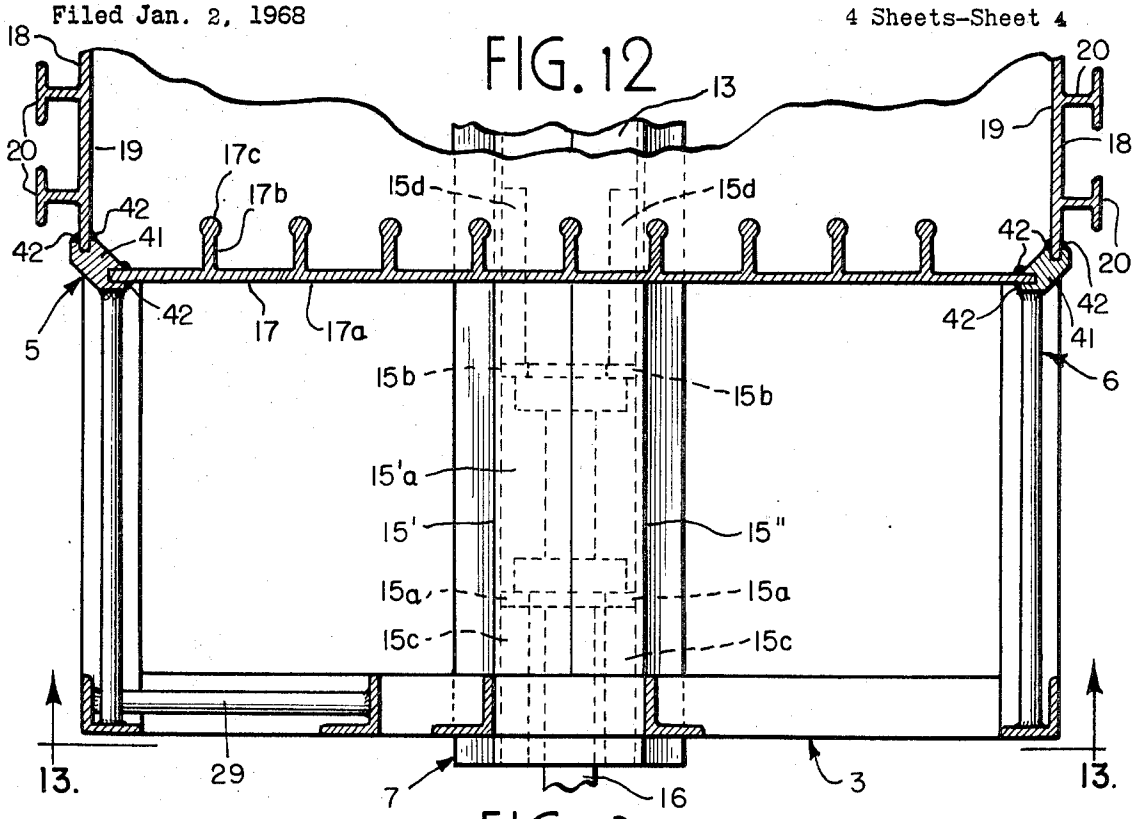


FIG. 13

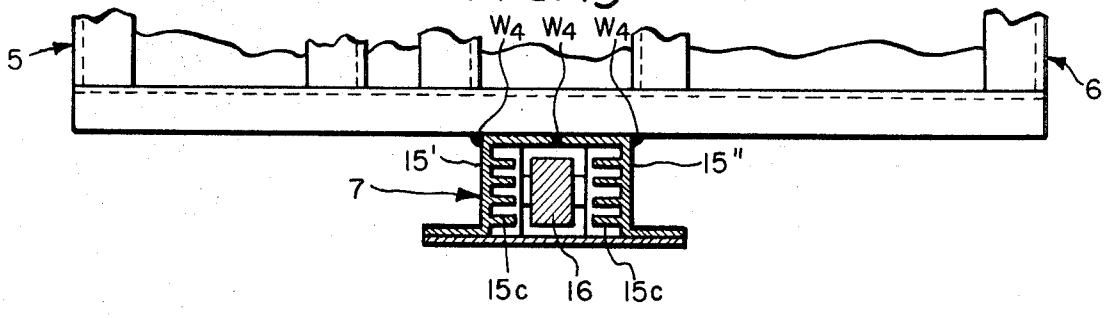
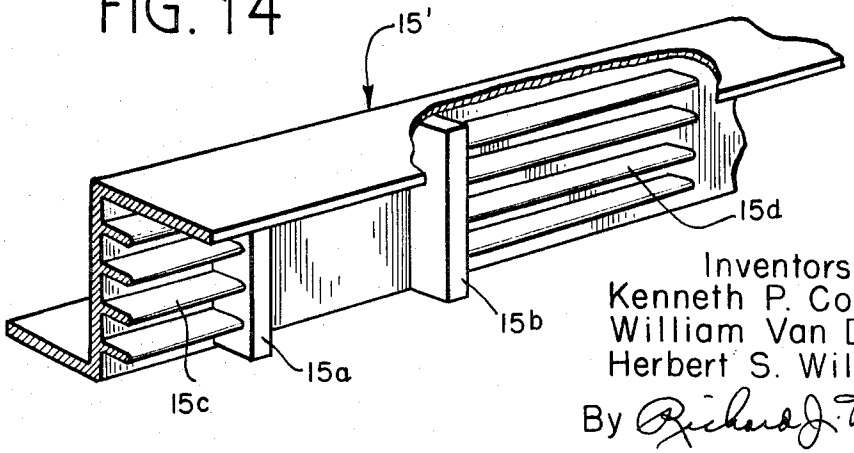


FIG. 14



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3,572,252

COVERED RAILWAY HOPPER CAR

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Int. Cl. B61d 17/08, 17/16, 7/02
U.S. Cl. 105—248 23 Claims

ABSTRACT OF THE DISCLOSURE

A railroad hopper car comprising integral roof and side structures of extruded aluminum welded to compartment structures of extruded aluminum to define a plurality of hatch-type hopper areas, each of the structures being a unit sheet with perpendicularly projected stiffeners to define the side sheeting and sideposts, the structures being held together by weldments and wherein there is also provided extruded bolster structure and draft sill construction at the ends of the car center sill.

BACKGROUND OF THE INVENTION

(1) Field of invention

The field of the art to which the invention pertains is the construction of railroad freight cars from extruded metal components and finds particular use in hopper cars utilizing lightweight extruded components. The subject matter of the invention is directed in particular to this novel fabrication of the hopper car.

(2) Description of the prior art

It has been heretofore known to use extruded components in the manufacture, fabrication and assembly of freight cars. Larger freight cars are being built today to accommodate greater lading loads and consequently it is desirable to reduce the weight of the car whenever possible. Also it is desirable to reduce the cost of fabrication and to improve on the method of manufacture. The invention provides for increased freight car size while endeavoring to maintain the weight of the car fixed and yet to provide for a car that is easily and simply fabricated or built.

SUMMARY

The invention has for its advantage, purpose and object the construction of an improved freight car provided with extruded metal siding and compartment and bolster construction and in particular provides for extrusion of sheeting of light-weight material such as aluminum wherein the sheet metal has a plurality of perpendicular reinforcement elements that stiffen or strengthen each sheet. Further, the invention is adapted to provide for welding of the various wall portions to provide for an easily constructed and simply fabricated freight car structure such as an extruded aluminum hopper car. Specifically, the side wall sheets are of extruded aluminum to define flat areas with separate extruded T-shaped elements projecting perpendicularly from the flat portion. The combination of side sheet and stiffener extruded structures is used for the side walls, the roof, and the compartment walls and the bolster of the hopper car wherein the various extruded components or walls are held together by novel weldment means. A novel extruded draft sill construction is also provided. These and other objects will become apparent from reference to the following description, appended claims and attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the novel inventive hopper car;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is an enlarged partial sectional view taken along line 4—4 of FIG. 1;

FIG. 5 is an enlarged partial view illustrating interlocking of sections together;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 1;

FIG. 7 is a sectional view taken along line 7—7 of FIG. 6;

FIG. 8 is a sectional view taken along line 8—8 of FIG. 6;

FIG. 9 is a modified form of connecting hopper portions with the compartment sheet portion of FIG. 8;

FIG. 10 is a partial view of a modified form of attachment of the compartment sheet and hopper portion;

FIG. 11 is a modification of the roof and side wall construction shown in FIG. 6;

FIG. 12 is a sectional view taken along line 12—12 of FIG. 1;

FIG. 13 is a sectional view taken along line 13—13 of FIG. 12; and

FIG. 14 is an enlarged partial perspective view of the draft sill arrangement as shown in FIG. 13.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference now to the drawings and in particular to FIGS. 1 through 3, there is shown a covered hopper railroad car **1** having a roof **2**, car ends **3** and **4**, and car sides **5** and **6**. The car **1** is provided with a hopper underframe **7** carried on trucks **8**, **8***a* movable over rail structure **8***b*. The roof of the car is provided with a longitudinally extending trough hatch **9** having a cover **10** thereover. Each side **5** or **6** is provided with a side sill structure **11** (as best seen in FIG. 6). The car **1** is provided with three hoppers each designated as **25**. The underframe **7** comprises a center sill **13** which extends through each hopper **25** and is covered within each hopper **25** by a hood **12**. Each end of the center sill **13** is provided a draft sill structure **15** carrying a coupler **16** and being disposed generally over each truck over which is disposed a bolster structure **17**. Where two hoppers **25**, **25** meet one another there is provided a partition support **14** which extends to and is supported by the center sill **13**. The hopper car is provided with end slope floor sheets **21**, **21** defining the outer end portions of each end hopper **25**. Each of the hoppers **25** is further defined by a pair of hopper side sloping floor sheets **23**. Each of the hoppers is provided with cross ridge slope sheets **22**. The three hoppers are also defined by compartment partitions **24**, **24** and each hopper is provided with an outlet or discharge gate **27** and each end of the car is provided with an end ladder **29** and an end sheet **30**.

Each side **5** or **6** of the car **1** is defined by a plurality of integrated or welded-together side sheet structures **18** each having a side sheet portion **19** and a stiffener portion **20**. As shown by FIG. 4 the enlarged end portions **31** and **32** of two adjacent side sheets **19**, **19** are welded together and held thereby by weld W_1. FIG. 5 shows a modified weldment form of sheet **18'** where the ends **33'**, **34'** of end flanges **31'**, **32'** of the sheets are welded together by weld W'_1 and dovetailed to one another by overlapping portions **35'** and **36'** of the flanges **31'** and **32'**. Each side sheet construction **18** comprises a roof portion **18***a*, a side portion **18***b*, and a bend portion **18***c*, as seen in FIG. 6. A side plate reinforcement member **36** may span to and between portions **18***a* and **18***b* to rigidify and add strength to the side wall construction of the car. Each stiffener **20** of the side sheet con-

struction **18** comprises a flat sheet or web portion **20***a* and an elongated flange **20***b* perpendicular to the web portion **20***a* to define a T-shaped stiffener **20** to add strength to the roof and car side structure, as seen in FIG. 4. The side sheet portion **19** takes place of the siding or sheet of the side wall construction of the car and the stiffener portion **20** takes the place of the post construction or strengthening member. Each side sheet construction **18** is provided with a plurality of such sheet and stiffener portions that extend up the side and over onto the roof in a continuous fashion. The side **5** or **6** of the car further comprises a side sill top **37** of the side sill structure **11**, a side sill curved portion **38** of the side sill structure **11** and a side sill lower end portion **39** of the side sill structure **11** which is held by weld **40** to the hopper side sheet **23**, the partitions **24** being welded to the side sheets **18** by weldments W_2 (see FIGS. 6 and 7). Each partition is composed of a flat sheet portion **24***a* and a perpendicular flange portion **24***b* having bulbous end portion **24***c*, as seen in FIG. 7.

FIG. 8 shows welding of the partition support **14** of partition **24** to the slope sheets **22** of each hopper **25**, by means of a pair of angle plate reinforcement structures **43**, **43** each plate **43** having plate portions **43***a* and **43***b* held by welds **44** to the slope sheet **22**, the partition sheet **24***a* and support **14** as seen in FIG. 8.

FIG. 9 illustrates a modified form of the partition attachment to the slope sheets **22**, **22**; whereby Y-shaped member **47** is held to end **24***d* of partition **24** by welds **48**, the arms **47***a* and **47***b* of the structure **47** being attached by welds **48** to slope sheets **22**, **22**, the Y-shaped member **47** being held by triangularly shaped reinforcing underside member of plate **49**. FIG. 10 shows a further modification of attachment of the partition **24** to the slope sheets wherein the end portion **24***d* of the partition **24** is held by welds **46**, **46** to end portion **45***a* of Y-shaped member **45** having also portions **45***b* and **45***c* being connected by welds to respective slope sheets **22** (not shown) as in FIG. 8.

FIG. 11 shows a modified form of the side and roof sheet construction, as shown in FIG. 6, wherein the stiffeners are reduced in number and the hatch is widened. Further, it is noticed that the roof structure is a separate piece from the side structure and in particular there is shown a roof sheet structure **50** and a side sheet structure **51**. The roof sheet structure is provided with sheet portion **50***a*, flange portion **50***b* with perpendicular T-flange portion **50***c* and has a U-shaped cap or end portion **50***d* welded to the side wall structure **51** by welds **52**. The side sheet structure **51** is similarly privided with flat sheet portion **51***a*, web portion **51***b* and T portion **51***c*. The widened upright trough portion **9'** is provided with a cover **10'**.

FIG. 12 illustrates welding of the bolster **17** to the side sheets **18**. It is noted that the bolster plate construction is similar to the partition compartment structure **24** and is provided with a flat sheet portion **17***a* and a flange portion **17***b* having a bulbous end portion **17***c*. Corner post structures **41**, **41** attach the side sheet structure **18**, **18** to the bolster structure **17** as by welds **42**.

The draft sill construction, as best seen in FIGS. 12, 13 and 14, is an extension of the center sill structure **13** at the ends thereof and each draft sill structure comprises draft gear structure **15'** a coupling with coupler structure **16** and held within the draft sill structure **15** which is held between draft sill stops **15***a* and **15***b* provided with reinforcing rub structures **15***c* and **15***d*. The draft sill structure **15** comprises two Z-shaped extruded draft sill sections **15'** and **15''** held together and to the end of the car by welds W_4, each draft sill section **15'** or **15''** being extruded to provide aforementioned parts **15***a*, **15***b*, **15***c* and **15***d*, best seen in FIG. 14.

Thus, what is provided is a simply constructed, easily fabricated aluminum extruded hopper car wherein the side wall and roof construction is a continuous extruded

sheet and reinforcing stiffener arrangement welded with similarly constructed partitions and bolsters.

The foregoing description and drawings are given merely to explain and illustrate the invention, and the invention is not to be limited thereto, except insofar as the appended claims are so limited, since those skilled in the art who have the disclosure before them will be able to make modifications and variations therein without departing from the scope of the invention.

What is claimed is:

1. A hopper vehicle comprising a pair of extruded side and roof sheet structures, said roof structure defining a longitudinally extending hatch trough, each structure comprising extruded sheet means having flat sheet portions and having extruded reinforcing stiffener means, said stiffener means comprising a plurality of elongated stiffener flange elements extending exteriorly of the vehicle generally perpendicularly outward from the sheet portions for reinforcement of the side and roof structures,

each stiffener flange element comprising a web portion outwardly extending from the sheet portions and having a load-reinforcing cross flange end portion to define a generally strengthened T-shaped flange element.

2. The invention according to claim **1**, and

said side and roof structures being extruded from aluminum material.

3. The invention according to claim **1**, and

each side and roof sheet means comprising a roof sheet part and a side sheet part that is integral and continuous with each roof sheet part and bent relative thereto, flange elements of each roof sheet and side sheet part extending upright and over the car, each flange element being spaced generally parallel and longitudinally of the other.

4. The invention according to claim **1**, and

generally upright transverse compartment structure defining a plurality of hopper areas, each compartment structure comprising an extruded sheet member, said sheet member having a flat portion and a plurality of flange stiffener portions each extending outward from said flat portion.

5. The invention according to claim **4**, and

each of said compartment flange portions comprising a generally vertically extending web means having a bulbous end part for strengthening of each compartment structure, each compartment flange portion being generally parallel to the other.

6. The invention according to claim **4**, and

each compartment structure being welded to a side sheet part.

7. The invention according to claim **1**, and

said hopper vehicle having hopper side slope sheet means and a side sill structure and a hopper bottom and gate structure, said sill structure being welded with the side sheet part and slope sheet means, and said slope sheet means being welded to said bottom and gate structure.

8. The invention according to claim **1**, and

each side and roof sheet means comprising a plurality of sheets each extending longitudinally of one another and having their flat portions welded to one another.

9. The invention according to claim **1**, and

each side and roof sheet means comprising a plurality of sheets each extending longitudinally of one another and having the ends of their flat portions in overlapping relation to one another and the ends of their flanged elements welded to one another.

10. The invention according to claim **1**, and

each side and roof sheet means comprising a side sheet part and a roof sheet part having a lower end portion attached to the side sheet part.

11. The invention according to claim **10**, and

said end portion of the roof sheet part being welded to the side sheet part.

12. The invention according to claim **10**, and

stiffener elements of the side sheet part being generally parallel to one another and extending longitudinally of the car.

13. The invention according to claim **10**, and

the stiffener elements of the roof sheet part extending generally vertically of one another and being spaced longitudinally of one another.

14. The invention according to claim **10**, and

stiffener elements of the side sheet part being generally parallel to one another and extending longitudinally of the car, and

the stiffener elements of the roof sheet part extending generally vertically of one another and being spaced longitudinally of one another.

15. The invention according to claim **1**, and

each side and roof sheet means comprising a roof sheet part and a side sheet part, a plurality of compartment structures being attached to said side sheet part and having sloping floor sheets attached to each side of each compartment structure to define a plurality of hoppers.

16. The invention according to claim **15**, and

attachment means for fixing each sloping floor sheet to its compartment structure comprising:

a pair of angle plate means each having their free ends welded to the lower opposite face of the respective compartment structure and their respective apex portions welded to the upepr end of a respective sloping floor sheet.

17. The invention according to claim **15**, and

said compartment structure and sloping floor sheets having re-inforcement means welded together.

18. The invention according to claim **15**, and

attachment means for fixing each sloping floor sheet to its compartment structure comprising:

a generally inverted Y-shaped structure having an upper leg attached to said compartment structure and each of two lower end legs attached to a respective sloping floor sheet.

19. The invention according to claim **18**, and

the upper leg being notched to receive a lower end of the compartment structure.

20. The invention according to claim **18**, and

generally triangular shaped re-inforcing plate means being attached in said Y-shaped structure and buttressing the lower legs for re-inforcement thereof.

21. The invention according to claim **18**, and

the upper leg overlapping the lower end of the compartment structure in abutting relation.

22. The invention accordig to claim **1**, and

bolster means being attached with the side part of roof and side sheet structure, said bolster means comprising extruded sheet means having flat sheet portions and having extruded re-inforcing stiffener means, said stiffener means comprising a plurality of elongated stiffener flange elements extending generally perpendicularly and vertically outward from the bolter sheet portions for re-inforcing the bolster.

23. The invention according to claim **22**, and

each bolster stiffener element having a bulbous re-inforcing end.

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U.S. Cl. X.R.

105—250, 377, 401, 406, 409, 420