United States Patent [19]

Allen

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[54] **REINFORCED FIBERGLASS PLASTIC ROOF FOR BOX CARS**

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[73] Assignee: **Stanray Corporation,** Chicago, Ill.

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[52] **U.S. Cl.** **52/53,** 52/309, 52/459, 52/630

[51] **Int. Cl.** **B61d 17/12,** E04d 3/34

[58] **Field of Search** 52/45, 53, 56, 17, 630, 52/309, 584, 459

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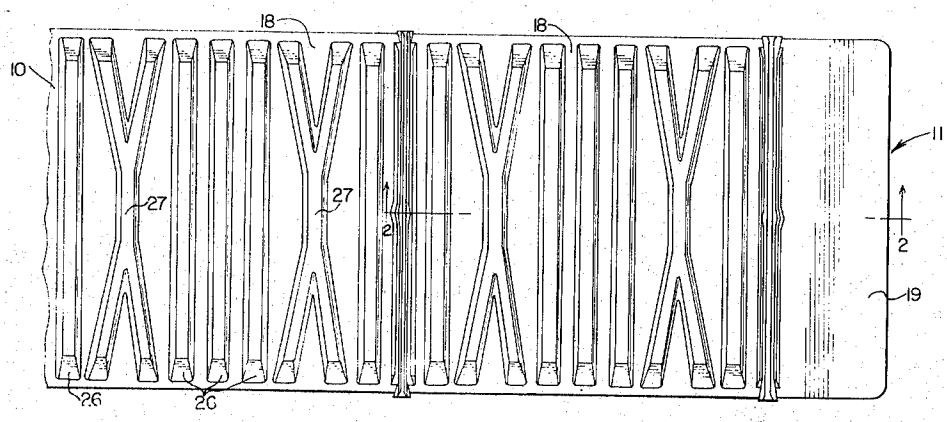
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[57] **ABSTRACT**

A railway vehicle roof including a plurality of sections made from molded reinforced fiber glass plastic sheets. The molded plastic sheets include a pair of transversely extending and lengthwise spaced ribs, a pair of spaced X-shaped ribs disposed between the transversely extending ribs, and a plurality of ribs extending between the X-shaped ribs. Upstanding flanges are formed along the transverse edges of the panel. A seam cap fits over adjacent ones of the upstanding flanges.

6 Claims, 7 Drawing Figures



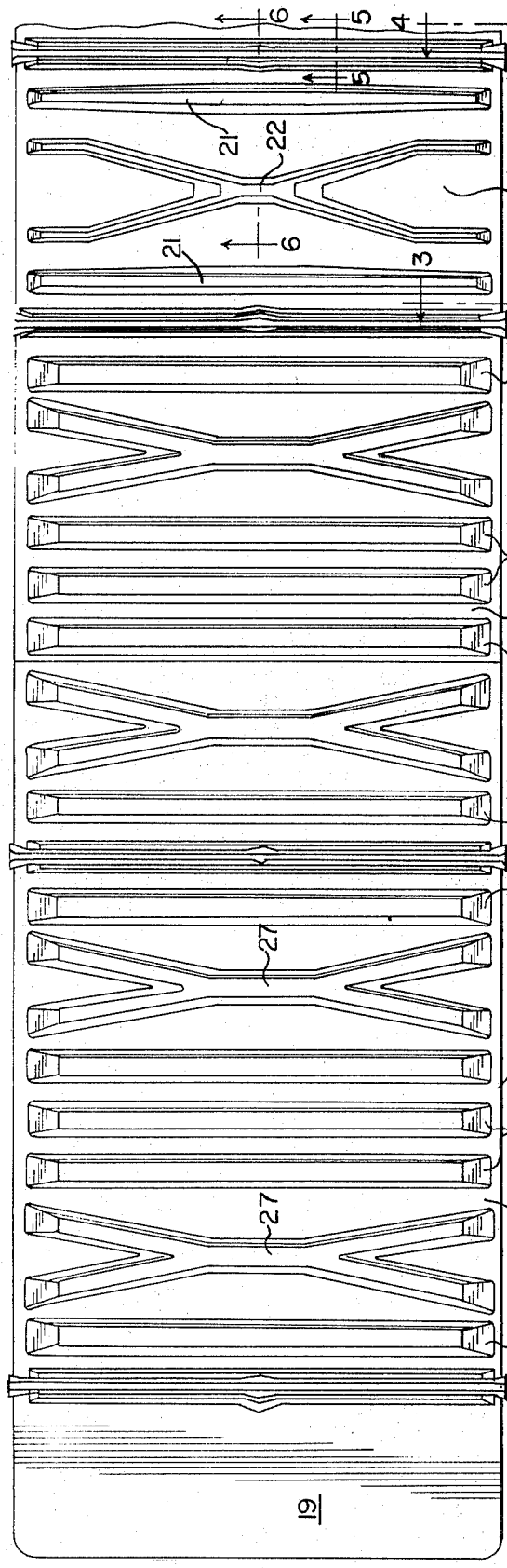

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FIG-1-

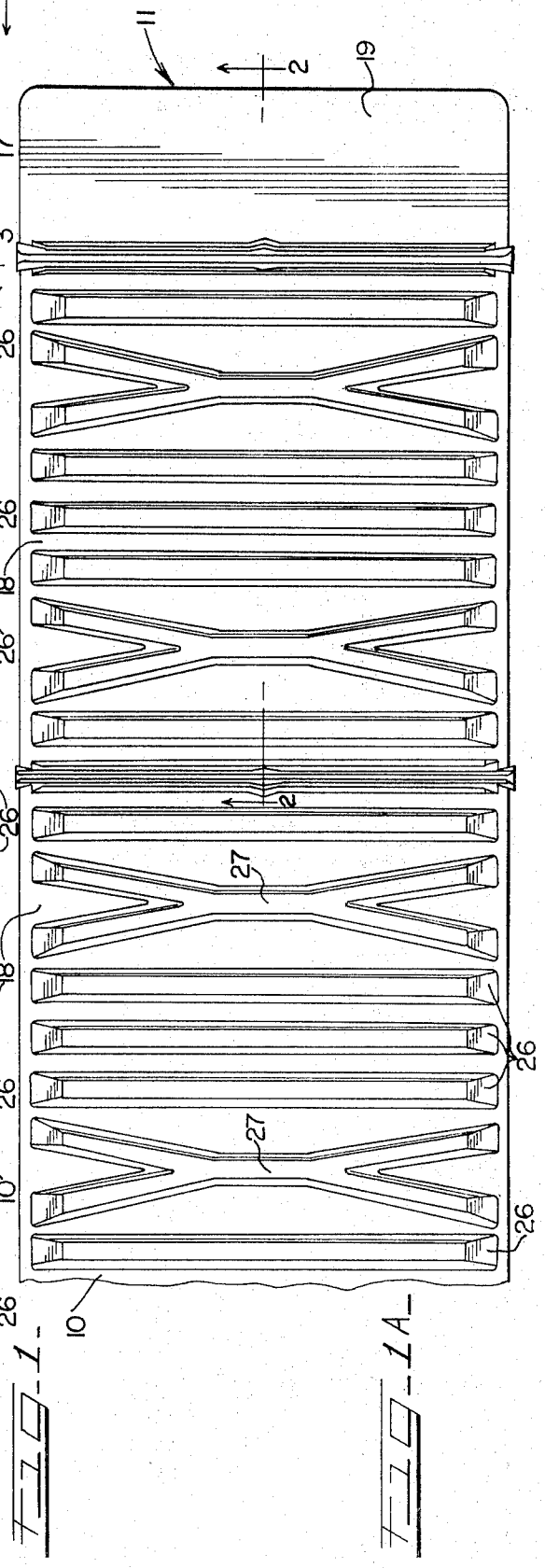

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FIG-1A-

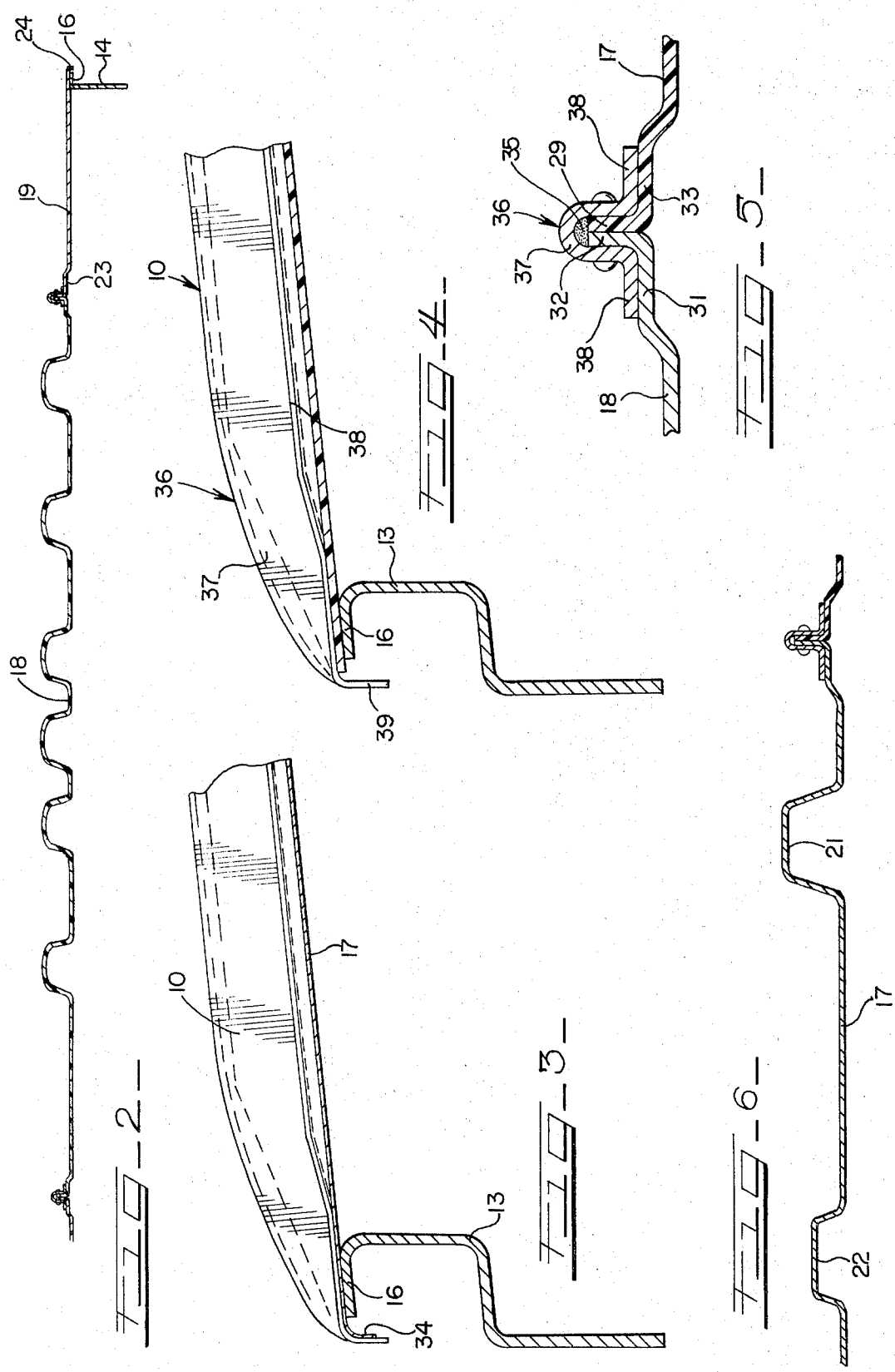


FIG-2

FIG-4

FIG-5

FIG-3

FIG-6

REINFORCED FIBERGLASS PLASTIC ROOF FOR BOX CARS

BACKGROUND

The present invention relates to a lightweight roof structure for a railway box car and more particularly to a railway roof structure including a plurality of roof sections made from fiber glass reinforced plastic.

Conventional railway box car roofs comprise a plurality of roof sections made from galvanized sheet steel or the like. The sheet steel sections are joined along the mating transverse edges thereof by seam caps after the longitudinal edges have been fixed to the side plates by suitable fastening means such as rivets or nuts and bolts.

By the present invention it is proposed to provide an improved lightweight roof structure including a plurality of molded fiber glass reinforced plastic sheets of which each has at least two spaced X ribs in each of the sheets. The space between the X ribs includes a plurality of transversely extending ribs. The roof may include a central roof section made from sheet steel and located substantially midway between the end of the car. Further end sections also made from galvanized sheet steel may be located at each of the ends of the roof.

FIG. 1 and FIG. 1A are a composite plan view of a freight vehicle having a roof embodying the structure of the present invention.

FIG. 2 is a cross sectional view taken generally along the line 2—2 of FIG. 1.

FIG. 3 is a cross sectional view taken generally along the line 3—3 of FIG. 1.

FIG. 4 is a cross sectional view taken generally along the line 4—4 of FIG. 1.

FIG. 5 is a cross sectional view taken generally along the line 5—5 of FIG. 1 and showing the typical connection along the transverse edges of the sheets.

FIG. 6 is a cross sectional view taken generally along the line 6—6 of FIG. 1.

Referring now to the drawings, the roof **10** embodying the structure of the present invention is shown applied to a railway box car **11.** The railway box car **11** includes side plates **13** and end plates **14.** Each side plate **13** and each end plate **14** includes a horizontal upper flange **16** for supporting the roof **10.**

The roof **10** comprises a center panel **17** which is located substantially centrally of the length of the box car **11** and is secured to the flanges **16** of the side plates **13** by suitable rivets not shown. After locating the center panel **17,** a plurality of intermediate panel sections **18,** made from fiber glass reinforced plastic, are located between the central panel **17** and end panels **19,** at each end of the roof **10.** The intermediate panel sections **18** and the end panels **19** are secured to the side plates **13** and the end panels **19** by huck bolts and rivets, respectively.

The central panel **17** as explained above is made from sheet metal such as galvanized sheet steel. The central panel **17** includes a plurality of ribs **21** and **22** of generally channel shaped cross section. The ribs **21** and **22** taper out into the flat roof adjacent the longitudinal edges thereof. The ribs **21** extend transversely of the roof **10** adjacent the transverse edges of the central panel **17.** The rib **22** is generally X-shaped and is of lesser depth than the ribs **21** and is disposed substantially midway between the transversely extending ribs **21,**

with the intersection of the "X" lying substantially along the center line of the car **10.**

The end sheets **19** are each made from sheet metal such as galvanized sheet steel and is formed along its inside edges with a transversely extending shallow rib **23.** The remainder of the sheet is substantially flat and the marginal edge portions along the side plates are bent to form downwardly depending flanges **24.**

The intermediate panels **18** are each molded from a plastic such as a translucent or gray opaque polyester resin reinforced with fiber glass. Preferably the glass fiber content is 30 to 35 percent by weight of the panel. The plastic panel is made so as to have a minimum flexure strength of about 28,000 p. s. i. and a minimum tensile strength of about 15,000 p. s. i.

The fiber glass reinforced plastic sheets **18** are formed by molding and include a plurality of transversely extending ribs **26** and a pair of X-shaped ribs **27.** The ribs **26** and **27** are formed of channel shaped cross section similar to the ribs **21** and **22** in the central panel **17.** Two of the transversely extending ribs **26** are located adjacent the respective transverse edges of the panel **18** and three ribs **26** are located in spaced side-by-side relationship between two length-wise spaced X-ribs **27.** The marginal transverse edge portions are each provided with a plurality of openings **28** adapted to receive fastening means such as huck bolts or the like for fastening to the horizontal flanges **16** of the side plates **13.**

As shown each of the transverse edges of the fiber glass reinforced plastic sections are provided with upstanding flanges **29.** The flanges **29** project from relatively shallow ribs **33** extending along the transverse edges of the section.

A similar upstanding flange **32** is formed along shallow ribs **31** provided along the transverse edges of the center panel **17.** The center panel **17** is also formed with a downwardly depending flange **34** which projects downwardly over the side plate **13.**

Initially the center panel **17** is positioned on the side plates **13** and fastened thereon by huck bolts. The fiber glass reinforced plastic or intermediate panels **18** are similarly fastened by huck bolts. Prior to positioning the intermediate panels **18** on the horizontal flanges **16** of the side plates **13,** the mating surfaces may be coated with a sealant such as butyl rubber or a polyurethane base sealant.

The end sections are fastened to the side plates and the end plate by means of rivets. When the central panel **17,** intermediate panels **18,** and the end panels **19** are attached, the upstanding flanges along the transverse edges are in substantial abutting relationship as shown in FIG. **5** for example of a typical connection of the central panel **17** to an intermediate panel **18.** The intermediate panels **18** are connected to each other at their upstanding meeting flanges, and the upstanding flange **29** on the central panel **17** is similarly fastened to the upstanding flange **32** of the adjacent intermediate panel **18.**

The connection between the flanges is made by a seam cap **36.** The seam cap **36** includes a U-shaped section **37** which clamps the flanges between the legs thereof. The interior of the U-section **37** may be filled with a sealant **35** such as butyl rubber or a polyurethane base sealant. Extending from the ends of the legs of the U are horizontal webs **38** which are adapted to lie along the major portion of the length of the raised

or shallow ribs extending along the transverse edges. The ends of the webs **38** also overlie the portions of the panel adjacent the longitudinal edges and having a downwardly depending portion **39.** The ends of the webs **38** are fixed to the associated roof sections by either rivets or huck bolts.

From the foregoing and the accompanying drawings, it is believed the invention may be readily understood by those versed in the art sufficiently to enable them to make and use the same.

I claim:

1. In a railway box car having a pair of side plate structures extending longitudinally thereof, a roof structure secured to the side plates, said roof structure comprising a panel at each end made of steel and a central panel made of steel, a plurality of reinforced fiber glass plastic roof sections disposed between the respective end panels and said central panel, said plastic roof sections each including a pair of X-shaped ribs molded therein, said X-shaped ribs being separated by a plurality of transversely extending ribs, a transversely extending rib located on opposite sides of each of said X-shaped ribs, and shallow ribs along each of the transverse edges of said sections, a flange projecting upwardly from each of said transverse edges and being in abutting relationship with an upstanding flange on an adjacent panel, and a seam cap overlying said flanges and fastening said panels together along said transverse edges.

2. The invention as defined in claim **1** wherein said seam cap includes a sealant for sealing said upstanding flanges.

3. The invention as defined in claim **1** wherein said plastic sections include a fiber glass content of about 30 to 35 percent by weight.

4. The invention as defined in claim **1** wherein said plastic is a polyester resin.

5. The invention as defined in claim **1** wherein said plastic is a translucent plastic.

6. The invention as defined in claim **1** wherein said plastic is a gray opaque plastic.

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