July 2, 1963 N. E. CARLSON 3,095,831

CAR END WALL

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FIG. 2

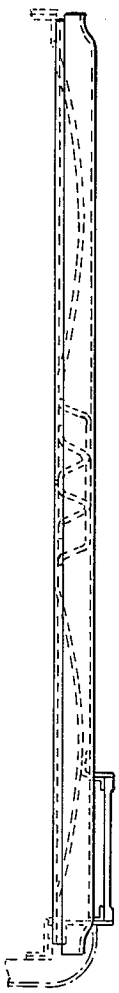


FIG. 1

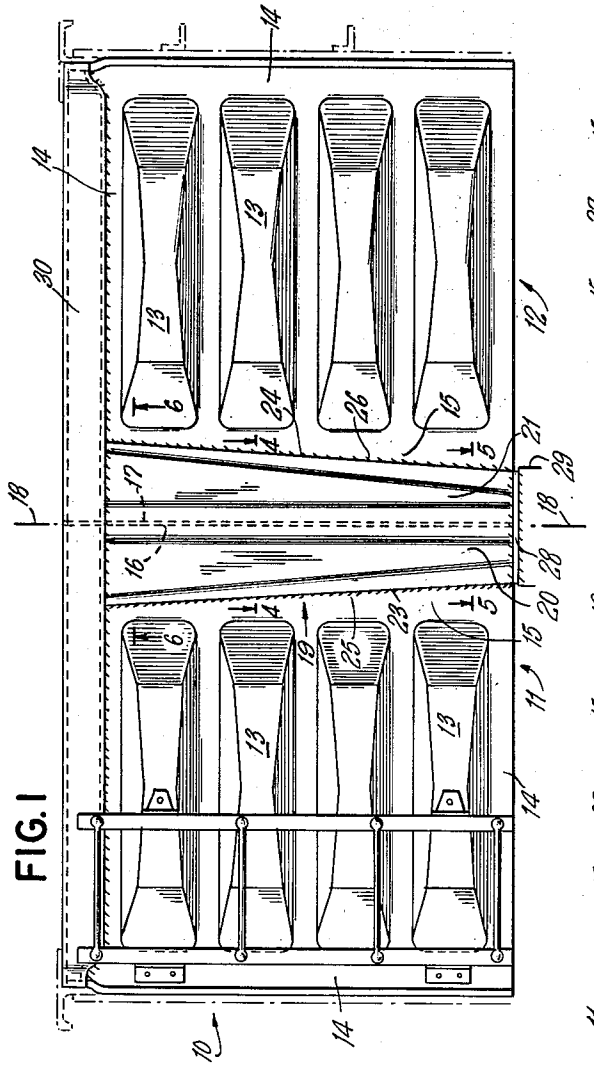


FIG. 5

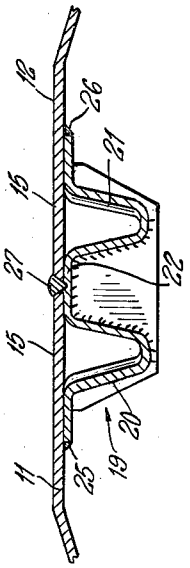


FIG. 4

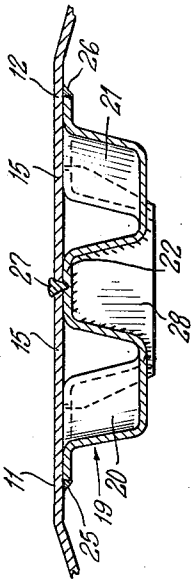
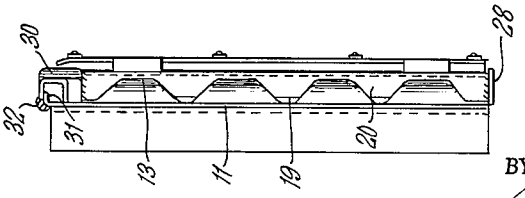


FIG. 3



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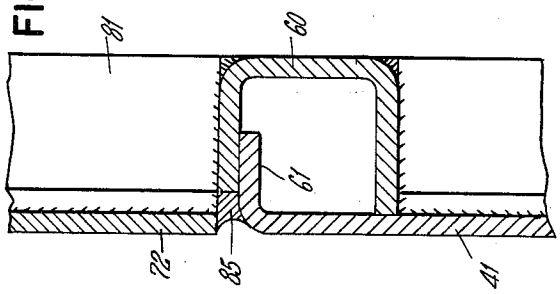
ATTORNEY

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FIG. 8



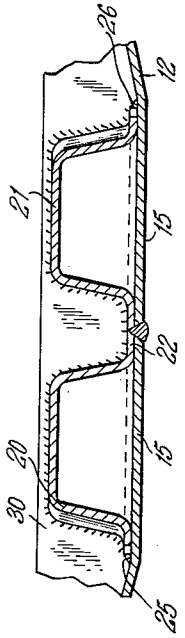


FIG. 6

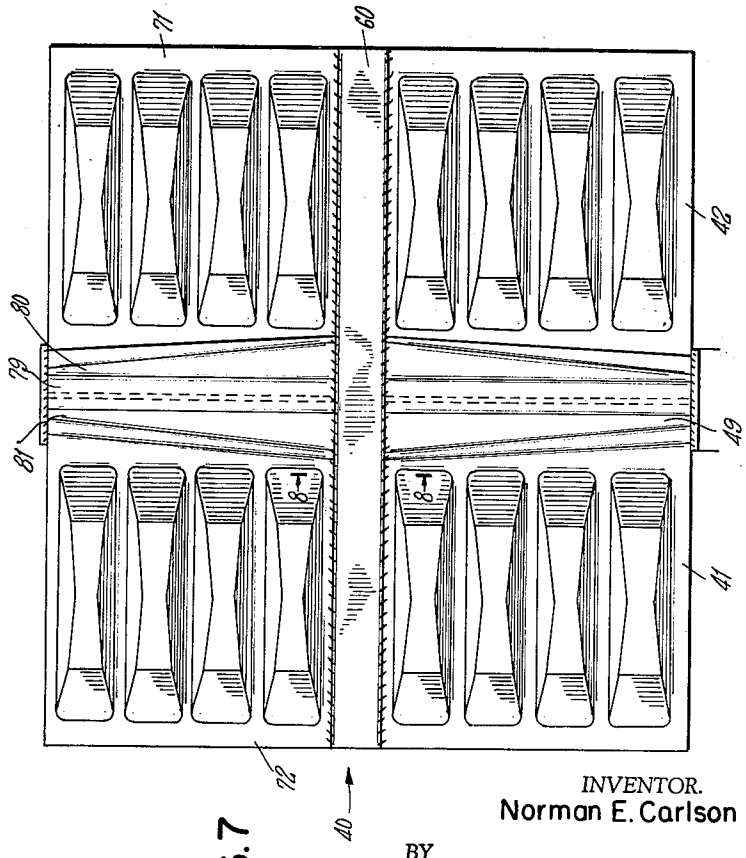


FIG. 7

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CAR END WALL

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8 Claims. (Cl. 105—410)

The present invention relates to end wall structures for freight cars and refers more particularly to novel reenforcing means for the same.

It is known that substantially vertical end walls of freight cars are subjected to forces which tend to bulge the wall outwardly. Principal among the causes of such is that buff shocks accelerate the car suddenly and the freight fails to accelerate along with the car, the end wall thus pushing so forcefully against the freight as to be deformed outwardly. The maximum deformation takes place near the center of a box car end wall and about at top center of a gondola car end wall.

An object of the present invention is to provide reenforcement means for end walls of freight cars.

A further object is the provision of a structure which may be fabricated from smaller components without loss of strength, compared to a wall made from a single metal plate or sheet.

In accomplishing the objects of the present invention, the wall of a gondola car is built up of two major components, the same being identical panels constituting half portions in side by side relation and having their adjacent boundaries abutting along a central vertical line. The panels may have horizontal corrugations extending over most of their area, and have flat margins of substantial area adjacent their abutting boundaries. A third approximately rectangular panel extends substantially from the top to the bottom of the first two, being welded to both panels along its own longitudinal boundaries. A single weld line further joins the abutted boundaries of the two main panels, the same weld also joining the two side panels to the overlying third panel.

The third panel has two channel shaped vertical corrugations extending throughout its height and providing a double box girder type of reenforcement of the wall. These corrugations are of uniform depth and of tapering width, being wider at top where greater reenforcement is needed.

In a gondola car, the top central portion of the end wall will bulge the most because it is the most distant from points or lines of attachment to the side walls and to the floor. A top chord member is therefore extended from side to side of the wall at the top thereof, being welded to the two main panels throughout its length. The third panel abuts the top chord member and is welded thereto throughout the line of abutment which includes the contour of the two vertical corrugations. The basic wall structure is thereby augmented by reenforcing members which in elevational view have the form of a T of which the top forms the top of the wall and the body extends from top to bottom thereof, the entire reenforcement being welded to the wall and rendering the same much stiffer, the amount of reenforcing material being greatest at the location which was formerly most subject to deformation, and the entire structure being unitary and enjoying the advantage of double box girder resistance to deformation. In addition the largest components are the identical panels each occupying a half of the width of the wall, permitting the use of smaller presses for forming the panels and facilitating the handling of the panels prior to assembly. Due to the welded construction, and in particular to the uniting of the three panels by the central vertical weld, the wall is as strong as if it had been constructed of a single panel extending across its entire width.

In applying the invention to box car end walls, additional panels corresponding to the first, second and third panels are assembled and then welded to the top chord of the gondola car construction, the additional panels however being inverted bodily after assembly so that the corrugations taper outwardly in width from top to bottom.

It is also within the scope of the present invention to construct a box car end wall with its lower half comprising the three panels as described, with or without a member corresponding to the top chord of the gondola end wall, and the top half of the box car end wall being of any preferred construction.

These and other objects of the invention will be apparent to those skilled in the art from a study of the following description taken with the accompanying drawings in which:

FIGURE 1 is a front elevation of the improved car end wall embodied in a gondola car.

FIGURE 2 is a top plan view thereof.

FIGURE 3 is a side elevation thereof.

FIGURE 4 is a section on the line 4—4 of FIGURE 1.

FIGURE 5 is a section on the line 5—5 of FIGURE 1.

FIGURE 6 is a section on the line 6—6 of FIGURE 1.

FIGURE 7 is a front elevation of the improved car end wall embodied in a box car.

FIGURE 8 is a section on the line 8—8 of FIGURE 7.

Referring now in detail to the drawings, the invention as embodied in a gondola car is illustrated as the car end wall 10 comprising the left metal panel 11 and the right metal panel 12, panels 11 and 12 being identical and preferably being pressed products provided with the horizontal corrugations 13. Uncorrugated margins 14 extend around corrugations 13 on the top, bottom and outer sides thereof, as viewed in FIGURE 1, and wider uncorrugated margins 15 of the two panels 11, 12 are juxtaposed. Panels 11, 12 extend in a common plane and their adjacent boundaries 16, 17 are abutted along the central vertical line 18 of the wall 10.

A third and approximately rectangular panel 19 has two channel shaped vertical corrugations 20, 21 extending from top to bottom thereof, the corrugation 20 being on the left of the central web 22 and corrugation 21 being on the right thereof in the drawings. The longitudinal axis of panel 19 is coincident with the vertical line 18, the panel 19 thus symmetrically overlying the panels 11, 12 and in particular the margins 15 thereof, and each corrugation 20, 21 overlying a single margin 15. The longitudinal boundaries 23, 24 of panel 19 are welded throughout their length to the respective underlying margins 15, and the boundaries 16, 17 are welded throughout their length to each other and to the overlying web 22 of panel 19, the three panels thus being rendered unitary by the welds 25, 26, 27 uniting the just described portions of the panels.

The corrugations 20, 21 are of uniform depth throughout their length, and are widest at the top, diminishing uniformly in width toward the bottom. The flat plate 28 is welded to the center sill 29 of the car and panel 19 is welded to plate 28, the bottom end of panel 19 is being abutted against plate 28 and welded thereto along the line of abutment.

The top chord member 30 extends from side to side of wall 10. Member 30 is of channel shaped cross section, and is reduced both in depth and width at each end in order that a corner piece may be fit thereover and over the adjacent corner of the side wall as seen in FIGURE 2.

The top end of panel 19 is abutted against chord member 30 as clearly seen in FIGURES 3 and 6, and is welded thereto throughout the line of abutment as shown in FIG-

URE 6. Chord member 30 is further welded to the respective adjacent panels 11, 12, being thus throughout its length welded to and rendered unitary with wall 10. The panels 11, 12 have integral right angle flanges, such as 31 of panel 11, which extend inside member 30, and a weld 32 extending the length of member 30 at the top thereof further and again unites member 30 to the panels 11, 12. Wall 10 is thus reenforced by added structure having the elevational shape of a T as shown in FIGURE 1, the body of the T further being of double box girder construction, and the entire reenforcing structure being integral with wall 10 by reason of welding.

The wall 10 is thus greatly stiffened. The greatest weight of reenforcing material in relation to wall area is located at the top center, which as previously noted is the part of a gondola car end wall which bulges the most. The reenforcing means further extend from this area both sideswise and downward to points of connection with the side wall and center sill of the car, thereby producing maximum stiffness and strength for the weight of material used in the end wall.

The invention as applied to box cars is illustrated in the box car end wall 40, FIGURES 7 and 8. In wall 40 the panels 41, 42, 49 and chord member 60 correspond to panels 11, 12, 19 and chord member 30 and are similarly interconnected by welding. The further features of interrelation of elements described in wall 10 are also present as between the elements 41, 42, 49, 60 of wall 40, and a complete particular description of such features will not be repeated.

The panels 71, 72, 79 are substantially identical to panels 41, 42, and 49, being similarly shaped and interrelated with the exception that whereas panels 41, 42 have the upper marginal flanges, as 61, which extend inside chord member 60, the panels 71, 72 have no flanges extending inside chord member 60. The assembly of panels 71, 72, 79 is furthermore inverted before being connected to chord member 60, so that the corrugations 80, 81 have their wider, bottom ends abutting chord member 60 and diminish in width away from chord member 60. Panel 79 is welded to chord 60 continuously along the line of abutment and the chord 60 is further welded to the respective adjacent panels 71, 72.

Wall 40 therefore comprises the substantially identical panels 41, 42, 71, 72 extending in a common plane and welded to the chord 60 of channel shaped cross section, and the double box girder panels 49, 79 butted endwise against chord 60 and welded thereto, panels 49, 79 further being welded along their outer longitudinal margins to the respective underlying panels and the panels of the respective pairs 41, 42, 71, 72 being welded to each other and to the respective overlying panels 49, 79 by welds extending along the vertical center line of the wall. The horizontal weld 85 further joins panels 71, 42 to chord 60 and to each other and likewise joins panels 41, 72 together and to chord 60.

There is thus provided a reenforced box car end wall, comprising quarter sections having abutting margins and welded to each other along said margins, and further comprising box girder reenforcing means extending substantially along the horizontal and vertical central lines of the wall and welded to the quarter sections and to each other, whereby a unitary end wall is produced, reenforced from top to bottom and from side to side and with the strongest reenforcement located at the center thereof.

The invention may be modified in various respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

What is claimed is:

1. A unitary freight car end wall structure fabricated from a plurality of smaller components and comprising, in combination, two substantially identical metal panels each having at least one uncorrugated margin, said panels abutting each other along a vertical line and each panel constituting substantially a half portion of said end wall, said end wall further comprising an approximately rectangular third metal panel overlying said vertical line and with its longitudinal axis coincident therewith, said last mentioned panel extending substantially the entire height of said other two panels and being formed with a web of substantially constant width in substantially coextensive contact with said uncorrugated margins and with a tapered vertically extending corrugation on each side of said web and overlying said margin of the respective underlying panel, a weld extending along said vertical line and integrally connecting together said two panels and said web of said rectangular third panel, and a weld extending along each longitudinal boundary of said third panel and integrally connecting the latter to the respective panel lying thereunder.

2. A unitary freight car end wall structure fabricated from a plurality of smaller components and comprising, in combination, two substantially identical metal panels formed with horizontally extending corrugations and having each at least one uncorrugated margin, said panels abutting each other along a vertical line and each panel constituting substantially a half portion of said end wall, said end wall further comprising an approximately rectangular third metal planel overlying said vertical line and with its longitudinal axis coincident therewith, said last mentioned panel extending substantially the entire height of said other two panels and being formed with a web of substantially constant width in substantially coextensive contact with said uncorrugated margins and with a tapered vertically extending corrugation on each side of said web and overlying said margin of the respective underlying panel, a weld extending along said vertical line and integrally connecting together said two panels and said web of said rectangular third panel, and a weld extending along each longitudinal boundary of said third panel and integrally connecting the latter to the respective panel lying thereunder.

3. A unitary freight car end wall structure fabricated from a plurality of smaller components and comprising, in combination, two substantially identical metal panels each having at least one uncorrugated margin, said panels abutting each other along a vertical line bounding said margin and each panel constituting substantially a half portion of said end wall, said end wall further comprising an approximately rectangular third metal panel overlying said vertical line and with its longitudinal axis coincident therewith, said last mentioned panel extending substantially the entire height of said other two panels and being formed with a web of substantially constant width in substantially coextensive contact with said uncorrugated margins and with a vertically extending corrugation on each side of said web and overlying said margin of the respective underlying panel, a weld extending along said vertical line and integrally connecting together said two panels and said web of said rectangular third panel, and a weld extending along each longitudinal boundary of said third panel and integrally connecting the latter to the respective panel lying thereunder, said corrugations of said third panel being of substantially uniform depth throughout their length and tapering inwardly in width from top to bottom.

4. A unitary freight car end wall structure fabricated from a plurality of smaller components and comprising, in combination, two substantially identical metal panels each having at least one uncorrugated margin, said panels abutting each other along a vertical line bounding said margin and each panel constituting substantially a half portion of said end wall, said end wall further comprising an approximately rectangular third metal panel overlying said vertical line and with its longitudinal axis coincident therewith, said last mentioned panel extending substantially the entire height of said other two panels and being formed with a web of substantially constant width in substantially coextensive contact with said un-

corrugated margins and with a vertically extending corrugation on each side of said web and overlying said margin of the respective underlying panel, a weld extending along said vertical line and integrally connecting together said two panels and said web of said rectangular third panel, and a weld extending along each longitudinal boundary of said third panel and integrally connecting the latter to the respective panel lying thereunder, said corrugations of said third panel being of channel shape of substantially uniform depth throughout their length and tapering inwardly in width from top to bottom and constituting, together with the respective panels to which they are attached, box girders reenforcing said wall.

5. A unitary freight car end wall structure fabricated from a plurality of smaller components and comprising, in combination, two substantially identical metal panels each having at least one uncorrugated margin, said panels abutting each other along a vertical line bounding said margin and each panel constituting substantially a half portion of said end wall, said end wall further comprising an approximately rectangular third metal panel overlying said vertical line and with its longitudinal axis coincident therewith, said last mentioned panel extending substantially the entire height of said other two panels and being formed with a web of substantially constant width in substantially coextensive contact with said uncorrugated margins and with a tapered vertically extending corrugation on each side of said web and overlying said margin of the respective underlying panel, a weld extending along said vertical line and integrally connecting together said two panels and said web of said rectangular third panel, and a weld extending along each longitudinal boundary of said third panel and integrally connecting the latter to the respective panel lying thereunder, said wall further comprising a top chord member extending from side to side across the top thereof and rigidly connected to said first mentioned two panels throughout its length, the top end portion of said third panel abutting said top chord member and being welded thereto substantially throughout the line of abutment.

6. A unitary freight car end wall structure fabricated from a plurality of smaller components and comprising, in combination, two substantially identical metal panels each having at least one uncorrugated margin, said panels abutting each other along a vertical line bounding said margin and each panel constituting substantially a half portion of said end wall, said end wall further comprising an approximately rectangular third metal panel overlying said vertical line and with its longitudinal axis coincident therewith, said last mentioned panel extending substantially the entire height of said other two panels and being formed with a web of substantially constant width in substantially coextensive contact with said uncorrugated margins and with a vertically extending corrugation on each side of said web and overlying said margin of the respective underlying panel, a weld extending along said vertical line and integrally connecting together said two panels and said web of said rectangular third panel, and a weld extending along each longitudinal boundary of said third panel and integrally connecting the latter to the respective panel lying thereunder, said corrugations of said third panel being of channel shape

of substantially uniform depth throughout their length and tapering inwardly in width from top to bottom and constituting, together with the respective panels to which they are attached, box girders reenforcing said wall, said wall further comprising a top chord member extending from side to side across the top thereof and welded to said first mentioned two panels throughout its length, the top end portion of said third panel abutting said top chord member and being welded thereto substantially throughout the line of abutment, whereby said wall is reenforced with a substantially T shaped structure and the vertical portion of said structure being of double box girder construction and said structure being integral with said wall.

7. A substantially square unitary end wall structure for a box car or the like, said unitary end wall structure being fabricated from a plurality of smaller components and comprising four identical substantially square metal panels constituting substantially quarter portions thereof, each panel having at least one uncorrugated margin, said panels extending in a common plane and abutting each other in pairs along a substantially vertical line bounding said uncorrugated margins, a substantially rectangular metal panel in contact with both of said square panels of a pair and with its longitudinal axis substantially coincident with said line, said rectangular panels being former with a web of substantially constant width in substantially coextensive contact with said uncorrugated margins and with a tapered vertical corrugation on each side of said web overlying the respective uncorrugated margin of the panel lying thereunder, a weld extending along each said vertical line and uniting the web of each of said rectangular panels to its two underlying panels and further uniting said two underlying panels, a weld extending along each longitudinal boundary of each rectangular panel and uniting the same to the respective underlying panel, and a chord member of channel shaped cross section extending horizontally from side to side of said wall substantially at mid-height thereof, portions of said chord member throughout its length extending adjacent the plane of said four panels and being welded to the respective adjacent panels of said four panels, said corrugations of said rectangular panels extending throughout the length thereof and said rectangular panels having their ends in abutment with said chord member and welded thereto throughout the line of abutment.

8. A structure according to claim 7, said corrugations of said rectangular panels being of substantially uniform depth and being wider adjacent said chord member and diminishing in width away from said chord member.

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