Aug. 28, 1956 M. WATTER 2,760,446

CONNECTION BETWEEN ROOF AND SIDE WALL UNITS OF RAILWAY CARS

Filed May 27, 1949

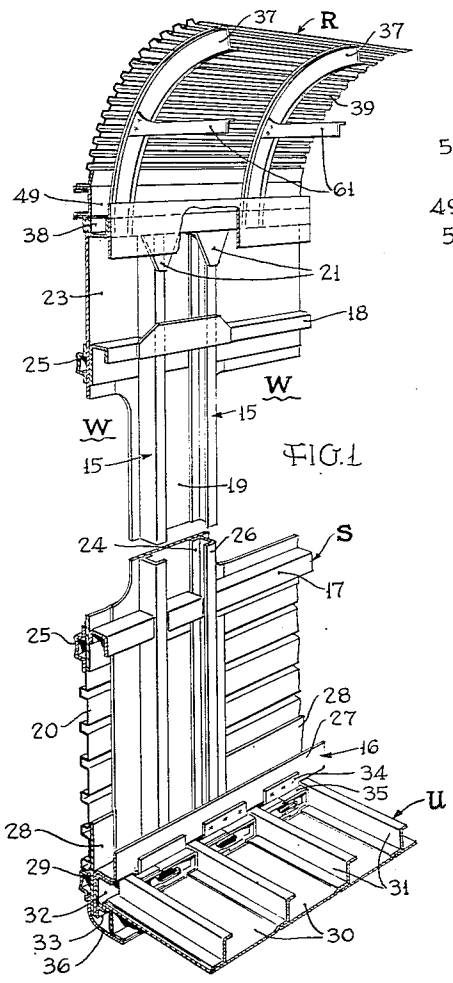


FIG. 1

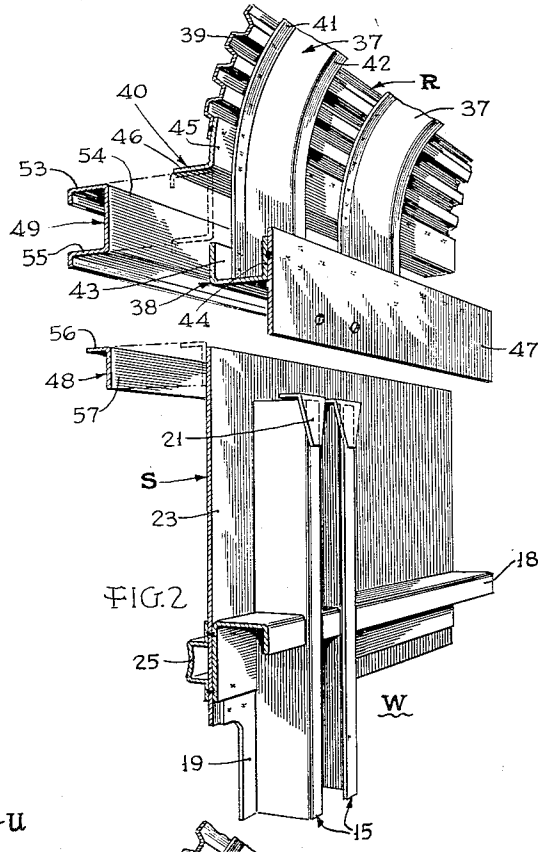


FIG. 2

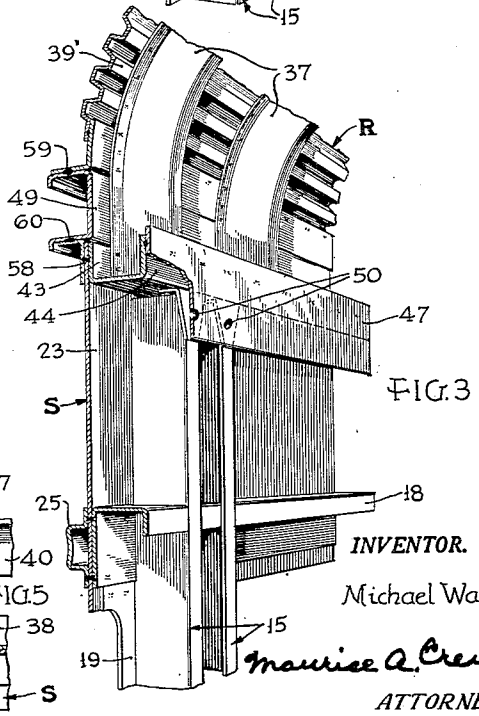


FIG. 3

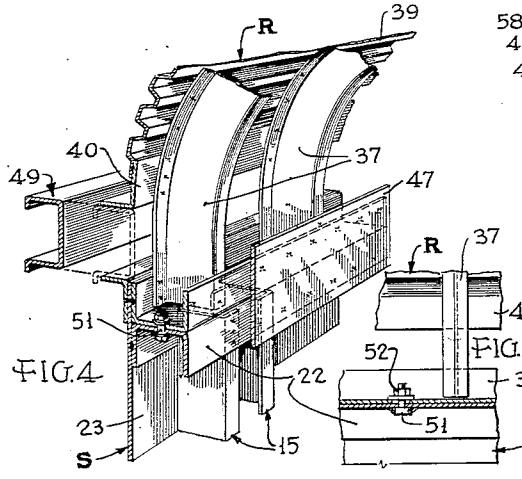


FIG. 4

FIG. 5

INVENTOR.

Michael Watter

Maurice A. Crews

ATTORNEY

United States Patent Office 2,760,446 Patented Aug. 28, 1956

2,760,446

CONNECTION BETWEEN ROOF AND SIDE WALL UNITS OF RAILWAY CARS

Michael Watter, Philadelphia, Pa., assignor to The Budd Company, Philadelphia, Pa., a corporation of Pennsylvania

Application May 27, 1949, Serial No. 95,625

5 Claims. (Cl. 105—397)

The invention deals with a final connection between a preassembled roof unit and preassembled side wall units of railway car and similar vehicle bodies of elongated prismatic shape. The invention is specifically designed for bodies made of sheet metal having their parts mostly connected by electric spot welding.

One object of the invention is a connection between the roof and side units of the indicated type of bodies which is rigid and facilitates maintenance of close dimensional tolerances so as to lessen the labor involved in the use of prefabricated and preassembled interior trim, equipment, etc.

Another object of the invention is a final assembly joint between roof and sides which permits preassembling of the units with insulation, inner trim, baggage racks, etc., at least to a large extent, before connecting the units to each other, thereby alleviating crowding and congestion in the interior of the body during its final assembly and the beginning of the interior finishing work.

A further object of the invention is a final assembly joint or connection which can be made by tools located exclusively on the outside or the inside of the body but not requiring reaching with the tools from the exterior to the interior, so as to do away with long-throated welding, riveting or the like tools and with the necessity of leaving openings in the body walls for the crossing of the tools.

The invention may be employed preferably in combination with a final assembly joint between the side wall units and an underframe unit which is designed with the same or analogous purposes in view. Such joint is disclosed in applicant's copending application Serial No. 53,018, "Joint Especially for Railway Car and Similar Vehicle Bodies," now Patent No. 2,565,709, filed October 6, 1948.

The above outlined and further objects and advantages as well as the features of the invention are fully disclosed by the embodiments illustrated in the attached drawing and the following detailed description.

In the drawing:

Figure 1 is a diagrammatic fragmentary perspective inside view of and a cross section through one side of a railway car, showing one of the side wall units and adjoining portions of the roof and underframe units;

Figure 2 is a fragmentary exploded perspective view, on a larger scale, of the roof unit, the upper part of the side wall unit and of the supplemental connecting members shown in Figure 1;

Figure 3 is a perspective view on the scale of and showing the parts of Figure 2 after final asssembly;

Figure 4 is a fragmentary perspective, partly exploded view similar to Figures 2 and 3 of a modified final assembly connection; and

Figure 5 is a fragmentary inside view and longitudinal vertical section along the middle line of the side wall header as shown in Figure 4 but on a smaller scale.

The drawing illustrates a part of a railway car body manufactured of sheet metal, e. g., stainless steel, parts.

The body comprises a side wall unit S with window openings W, a transversely arched roof unit R and an underframe or floor unit U. There is, of course, a side wall unit on each side. All units extend over the entire or at least a major part of the length of the body, and the roof and floor units extend from one side wall to the other. The fragmentarily illustrated parts will, however, suffice for a complete disclosure of the invention.

Each side wall unit S comprises a plurality of longitudinally spaced vertical posts **15** interconnected by a bottom sill or chord **16**, a window sill or chord **17**, a window header or chord **18**, dead light panels **19** between and extending downwardly beyond the window openings W, and a shear panel **20** between bottom sill **16** and window sill **17**. The upper ends of the posts **15** prior to their connection with the roof project beyond the window header **18** and are in Figures 1 to 3 provided on the inside with gusset plates **21** and in Figures 4 and 5 interconnected by an inverted U-section rail **22**. A letterboard panel **23** covers the upper ends of the posts on the outside.

The posts **15** are of channel section and arranged in pairs so that their open sides face each other. The outer walls **24** of the posts and the outsides of the window sill and header structures **17**, **18** are secured by spot welding to the dead light panels **19**, shear panel **20**, letterboard **23** and belt and header moldings **25**. Letterboard **23** constitutes a shear panel or girder sheet. The aforesaid gussets **21** are secured to the inner walls **26** (Figures 1 to 3) and the U-section rail **22** is secured to the outer and inner walls **24**, **26** (Figures 4 and 5) of the posts, such as by spot welding. Panels **19**, **20** and **23** extend beyond the frame members **15**, **17** and **18** toward the middle of each window opening W to form the margins thereof. The bottom chord **16** comprises a Z-section rail **27** and a gusset plate **28** arranged on and secured to the outside of the posts. Rub rail **29** is attached preferably after final assembly.

The illustrated and described construction of the side wall unit, in regard to the construction and arrangement of the posts, the dead light panels and the chord structures and the formation along the margins of the window openings, is similar to the construction forming the subject matter of the simultaneously filed application, Serial No. 95,644, "Vertically Extended Dead Light Panels of Passenger Railway Cars," now Patent No. 2,646,008, of Rupen Eksergian and applicant.

The underframe unit U has a floor panel **30** reinforced by transverse webs **31** and a side sill **32**. The lower margins of Z-section **27** and plate **28** of the side units S are in final assembly overlappingly secured to the outer depending arm of angle section **33** preassembled with the underframe unit U. Individual gusset plates **34** are secured to the inner surface of sill member **27** of the side unit S and to brackets **35** secured to successive webs **31** of the underframe unit U. A skirt or apron molding **36** may be attached singly or together with rub rail **29** after final assembly of the side wall and floor units.

The construction of the side and floor units along their meeting margins and the manner of making the connection between them are more fully disclosed and form the subject matter of applicant's above specified application, Serial No. 53,018.

The roof unit has longitudinally spaced Z-section carlines **37**, a longitudinal U-section sleeper **38** on each side, a longitudinally corrugated roof sheathing or skin **39** and an angle-section rail **40** along each side margin of the latter. The carlines **37** have longitudinally extending outer and inner arms **41**, **42** secured to the inside of the outer and inner walls **43** and **44**, respectively, of sleeper **38**. The roof sheathing **39** and the upwardly projecting arm **45** of each rail **40** are secured to the outer arm **41** of the

carlines. Rail 40 is arranged so that an open space is left between its horizontal arm 46 and the outer sleeper wall 43. Arm 46 may be provided along its outer margin with a downwardly or upwardly projecting reinforcing flange (not shown). A narrow upright web 47 is secured to the inner wall 44 of sleeper 38 and projects downwardly therebeyond.

The outer angle-section rail 40 together with a longitudinally extending angle-section rail 48 and the laterally outwardly facing U- or C-section rail 49 constitute parts of the final assembly means between the roof unit R and the side wall unit S on each side of the body. The manner in which this final assembly is made will now be described.

Roof unit R is placed on the side wall units S and held in the desired position thereon, such as by more or less conventional assembly jigs. In this position, the outer sleeper wall 43 is overlapped by the marginal portion of letterboard 23 projecting upwardly beyond the posts; in the embodiment per Figure 3, sleeper 38 rests on the inwardly flanged tops of post brackets 21 and overlaps the insides of these brackets by its web 47; and in the embodiment per Figures 4 and 5, sleeper 38 rests on top rail 22 and has the inside of the latter overlapped by its web 47.

The two units now may be permanently secured to each other on the inside by plug welds 50 or other connecting means between web 47 and brackets 21 (Figure 3) or by spot welds between inner wall of top rail 22 and web 47 (Figure 4), and on the outside by a number of tack welds between outer top rail wall 43 and letterboard 23. In the embodiment per Figures 4 and 5, the superimposed bottom walls of top rail 22 and sleeper 38 are, furthermore, interconnected by bolts 51 welded to top rail 22 and extending through an oversize hole in sleeper 38 and by nuts and washers 52 insertable from the outside through the space below angle-section rail 40.

The upper wall 53 of U-section 49 is now clamped on each side of the roof unit R to the outwardly projecting arm 46 of section 40 so that the bottom wall 54 of section 49 rests against the outer arms 41 of the carlines 37 and the lower wall 55 of section 49 projects outwardly just above the upper edges of letterboard 23 and outer sleeper wall 43. Then, the one arm 56 of angle section 48 is clamped along its length to the lower wall 55 of section 49 so that the other, downwardly extending arm 57 of angle section 48 rests throughout its length firmly against the outer surface of the upper margin of letterboard 23. Angle section 48 is temporarily secured in this position, such as by clamps or the like of the assembly jig, whereupon U-section 49 is released from sections 40 and 48 and taken off.

This again opens the space between roof section 40 and letterboard 23, and arm 56 of angle section 48, upper margin of letterboard 23 and outer wall 43 of roof sleeper 38 are permanently and structurally connected with each other throughout their length, as by spot welds 58, in reaching with pincer-type welding tools into the interior of sleeper 38. Upon completion of this connection, clamps or the like holding section 48 may be removed, section 49 is reinserted and the outwardly projecting arms 46, 53 and 55, 56 of sections 40 and 49 and 49, 48 are permanently and structually connected throughout, such as by spot welds 59, 60, the connecting points being freely accessible from the outside to pincer-type short-throated tools.

The described assembly procedure is susceptible to modifications, of which several are outlined in the following.

The structural connection between letterboard 23 and outer wall 43 of sleeper 38 may be made prior to the placing and securing of sections 48 and 49. The gusset webs 47 may be separately attached as a final assembly operation to both units before or after the final assembly joint by sections 40, 48, 49 on the outside, or they may form part of the side wall unit.

For locating angle section 48, gauge blocks or other gauging means may be employed instead of temporarily inserting section 49. Section 48 also may be preassembled with side wall unit S and the positioning of this section as well as the positioning of roof section 44 may be maintained so accurately by the use of preassembling and final assembling fixtures that the distance between the outwardly projecting arms 46, 56 of both sections 40, 48 is so accurately maintained as to permit subsequent insertion and securement of a correspondingly accurate section 49 without encountering dimensional difficulties.

Gusset plate or web 47 may be dispensed with in the structure per Figures 3 and 4 as well as in other cases in which the inner connection between roof and side units is made by reaching from the outside into the space between outer and inner surface of side wall or roof. In such cases, one or both preassembled types of units R, S may be completely wired, equipped with windows and all or most of the other accessories, trimmed, painted, etc., up to the meeting lines and a mere trim strip (not shown) may be applied for covering on the inside the meeting margins of the units.

In all cases, the roof and side wall units constructed in accordance with the invention may be nearly completely insulated, equipped, trimmed, painted, etc., except for a narrow region adjoining the connection of the units with each other. In both illustrated embodiments, the insulation of the roof between sleeper 38 and angle 40 has to be left out until the connection between sleeper 38, letterboard 23 and section 48 is completed and in the construction per Figures 4 and 5 until, in addition, the nut and bolt connections 51, 52 are completed. In both illustrated cases, when gusset web 47 is employed, a longitudinal, narrow region has to be left free to permit the attachment of this web in final assembly to one or both units.

However, in the construction illustrated in Figures 4 and 5, the gusset plate or web 47 may be dispensed with, the same being true in other cases in which the inner connection between roof and side units can be made by reaching from the outside into the space between outer and inner surface of side wall or roof. In all such cases, the inner surfaces of one or both preassembled units may be trimmed right up to the meeting line between the two units and a mere trim strip (not shown) may be applied after final assembly for covering on the inside the meeting margins of the trims of both units.

The situation regarding equipment, trimming, etc., is similar with respect to the underframe U and its connection with the side walls S as outlined in applicant's cited prior application Serial No. 53,018.

The installation of prefabricated partition walls, equipment, etc., depends largely upon adherence to very close tolerances of the interior dimensions of the body, including maintaining verticality of the side walls to the floor. Dimensional tolerance and verticality depend in part on the connection between underframe and side wall but also on the correct and constant spacing between the opposite side margins of the roof unit and on the rigidity of the latter. Dimensional variations of the roof unit may be minimized and the rigidity of the roof may be increased by straight horizontal structural cross braces 61 spanning the arch of the carlines 37, Figure 1. Variations of shape and dimensions are further minimized by making the inside of the car the reference region, rather than the outside, as hitherto.

The invention is not restricted to the illustrated and described embodiments but is susceptible to modifications and has, of course, to be adapted to requirements of different body constructions. A number of examples for modifications which will occur to those skilled in the art without departing from the spirit of the invention, are outlined above.

What is claimed is:

1. Final assembly joint between a preassembled roof

unit and a preassembled side wall unit of an elongated prismatic body for vehicles such as passenger railway cars; said roof unit comprising longitudinally spaced transversely arched carlines, an upwardly facing channel-section sleeper telescoped over and secured to the ends of the carlines, and a longitudinally extending angle section secured by one of its arms to the carlines so that its other arm extends outwardly, said angle section being arranged above and leaving space between it and the outer wall of the sleeper, and a roof sheathing secured to said carlines above said angle section; said side wall unit comprising longitudinally spaced vertical posts and a girder sheet interconnecting the posts on the outside in the upper region of the side wall and projecting upwardly beyond the posts a distance about equal to the height of the outer side wall of said roof sleeper; a longitudinally extending angle section secured in final assembly of said units by one of its arms to the upwardly extended portion of said girder sheet and said outer wall of the sleeper so that its other arm projects outwardly at a distance below said outwardly extending arm on said roof unit, and an outwardly facing longitudinally extending channel unit fitted with its side walls between said outwardly extending arms of said roof unit and said side wall unit and secured to them by means applicable from the outside of the body.

2. Final assembly joint formation between a preassembled side wall unit and a preassembled roof unit of an elongated prismatic body for vehicles, such as passenger railway cars, said side wall unit having longitudinally spaced vertical posts having their upper ends telescopingly secured in a downwardly facing channel-section top rail, a shear panel being secured to the outside of the posts and the top rail and projecting a short distance beyond the latter; said roof unit comprising longitudinally spaced carlines having their ends telescopingly fitted and secured in an upwardly facing channel-section sleeper and having their outside secured to a roof sheathing, said roof sheathing ending a short distance above the outer wall of said channel-section sleeper; bolts being secured to and projecting upwardly beyond the bottom wall of the top rail of the side wall unit and in the final assembly through holes in the bottom wall of said roof sleeper and being accessible for the application of nuts from the outside through the space between the upper margin of the outer wall of the roof sleeper and the lower margin of the roof sheathing, and a C-section longitudinally coextensive with said roof and side wall units having its arms fitted between and secured from the outside to outwardly projecting arms which are provided on said side wall unit and said roof unit along the opposite margins of said panel and sheathing.

3. Final assembly joint formation between a preassembled side wall unit and a preassembled roof unit of an elongated prismatic body for vehicles, such as passenger railway cars; said side wall unit having longitudinally spaced vertical posts having their upper ends interconnected by a rail including a horizontal arm extending across the tops of the posts, a shear panel being secured to the outside of the posts and said rail, projecting a short distance beyond the latter and ending in an outwardly extending arm; said roof unit comprising longitudinally spaced carlines having their ends nested and secured in a sleeper rail provided with an outer upwardly directed arm and a lower arm extending inwardly across the bottoms of the carlines, and a roof sheathing secured to the outside of the carlines ending a short distance above the

outer arm of said sleeper rail in an outwardly projecting arm; final connecting means between said arms which extend across said posts and carlines being for their application accessible from the outside through the space between the upper margin of the outer wall of said sleeper rail and the roof sheathing and an elongated member longitudinally coextensive with said roof and bridging the space between and having its outwardly extending margins overlappingly secured to said outwardly projecting arms on said side wall unit and said roof unit.

4. In a method of building a generally prismatic body for vehicles, such as for passenger railway cars, the steps of preassembling a side wall including the structural securement of a longitudinally continuous panel to the outside of vertical posts in the region of the upper margin of the side wall; of preassembling a transversely arched roof unit including the securement of a roof sheathing to the outside of longitudinally spaced transverse carlines in arranging the roof sheathing so that its lower margin ends a short distance above the lower ends of the carlines; of providing one of said units with an outwardly directed arm longitudinally extending along that margin of its sheathing nearest to the other unit in final assembly; of bringing the two units together into the position of their final assembly; of removably securing one side wall of an outwardly facing channel section to said outwardly directed arm on one of said units; of removably securing one arm of an outwardly facing angle section to the other side wall of said channel section so that the second arm of said angle section rests against the outside of the other one of said units and of removably securing the angle section in this position independently of said channel section; of removing said channel section; of permanently connecting said units together and securing said second arm of said angle section by reaching from the outside through the space below the lower margin of said roof sheathing; and of reinserting the channel section and overlappingly securing its walls to the outwardly projecting arm on one of said units and said first arm of said angle section.

5. In a method of building a generally prismatic body for vehicles, such as for passenger railway cars, the steps of preassembling a side wall and a roof including the securement to each of a longitudinally continuous panel on the outsides of transverse frame members, i. e., vertical posts and transversely arched carlines, in arranging the panels so that in final assembly their adjacent margins are spaced from each other; of providing an outwardly directed arm along each of said adjacent margins in gauging the distance between said arms to be equal to the distance of a channel-section member; of connecting the two units with each other by reaching into the interior through the space between said margins; of inserting the channel section so that its side walls project outwardly and overlap said outwardly projecting arms; and of permanently securing said overlapping arms and walls from the outside.

References Cited in the file of this patent

UNITED STATES PATENTS

2,165,576	Ragsdale	July 11, 1939
2,172,571	Theriault	Sept. 12, 1939
2,294,357	Dean et al.	Aug. 25, 1942
2,314,978	Gunn	Mar. 30, 1943
2,405,793	Lohse	Aug. 13, 1946
2,489,670	Powell	Nov. 29, 1949