Nov. 23, 1965 M. E. NEREM 3,219,383

SHELTER CONSTRUCTION AND FASTENERS THEREFOR

Filed Nov. 15, 1963 4 Sheets-Sheet 1

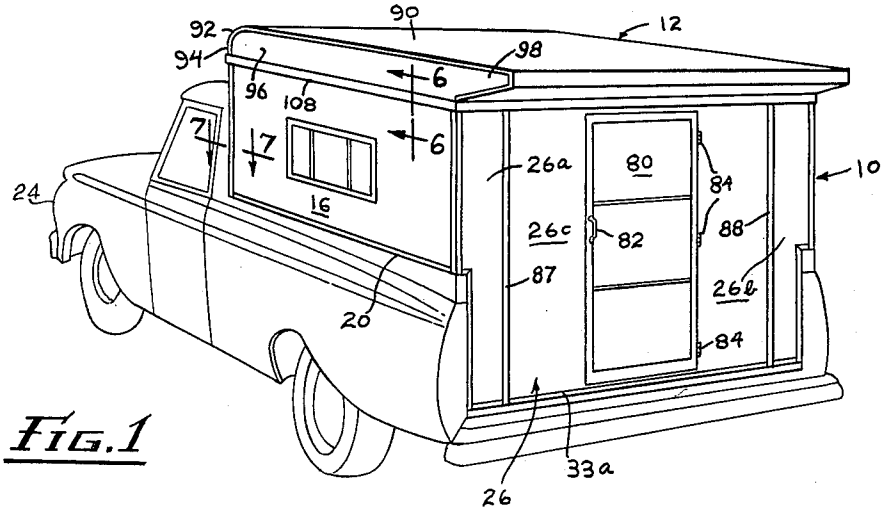


FIG. 1

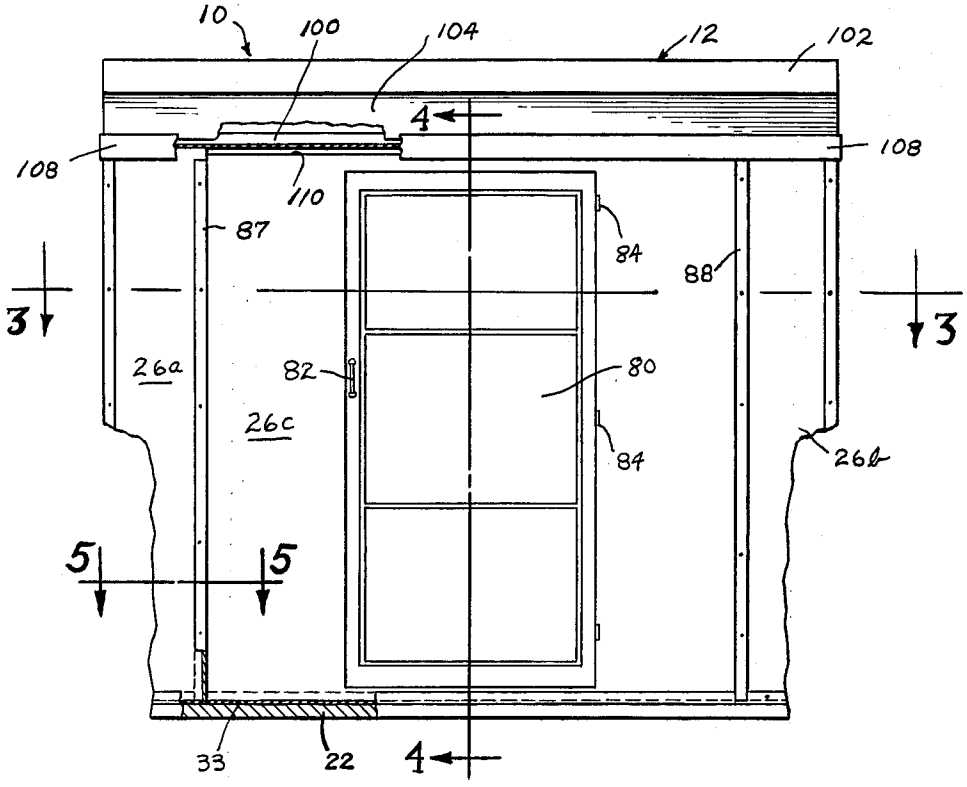


FIG. 2

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SHELTER CONSTRUCTION AND FASTENERS THEREFOR

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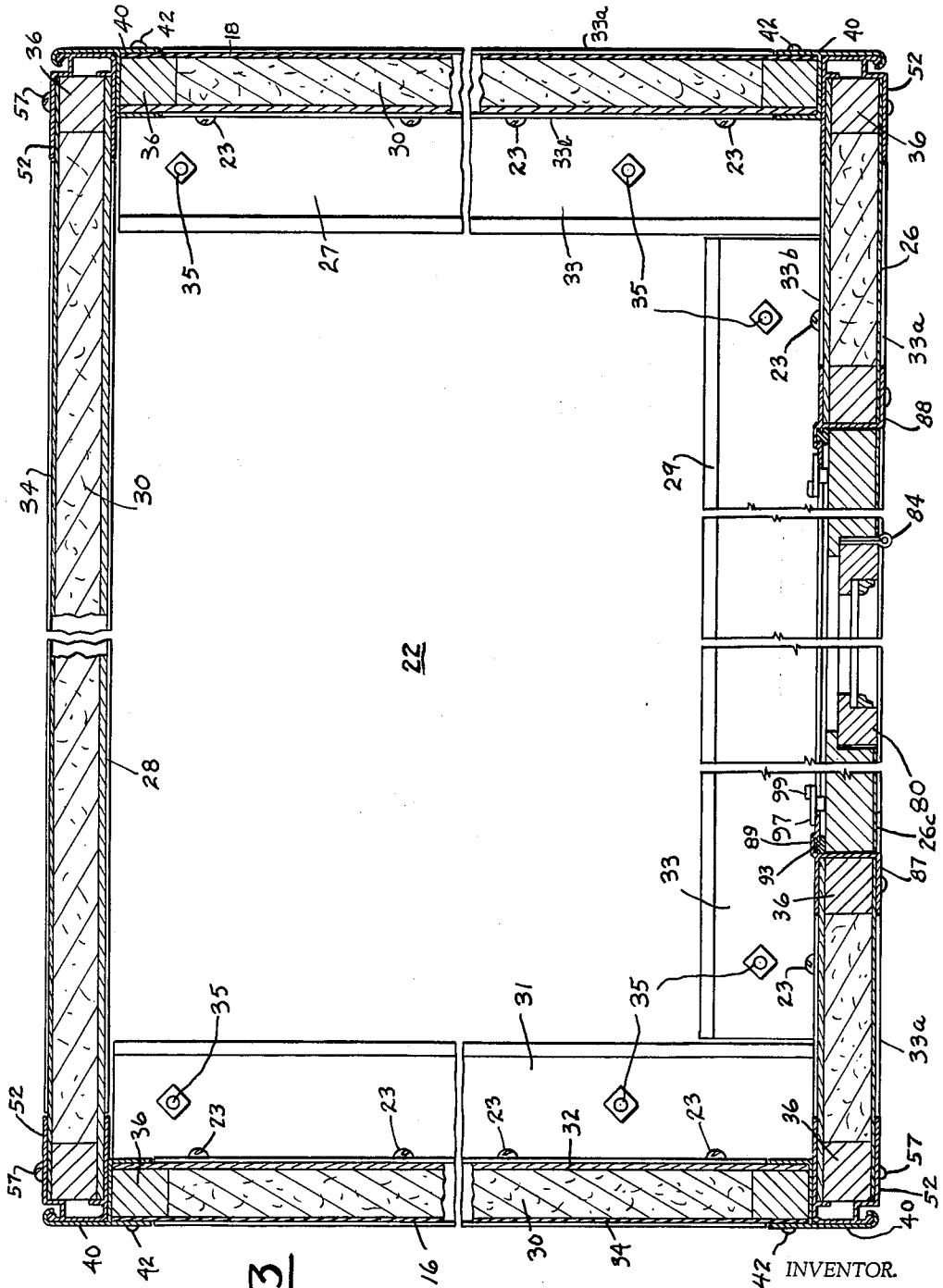


FIG. 3

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SHELTER CONSTRUCTION AND FASTENERS THEREFOR

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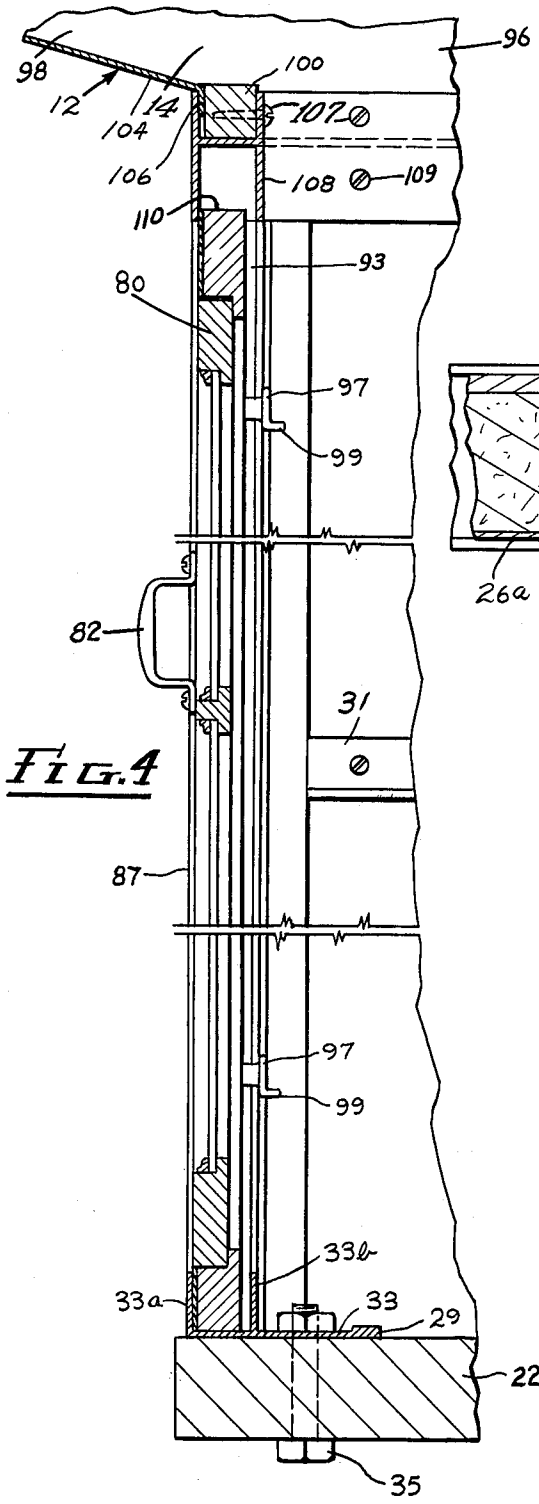


FIG. 4

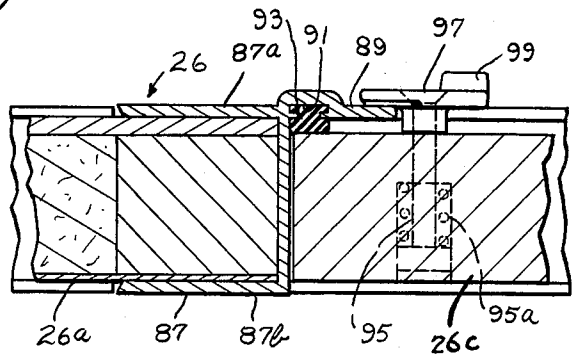


FIG. 5

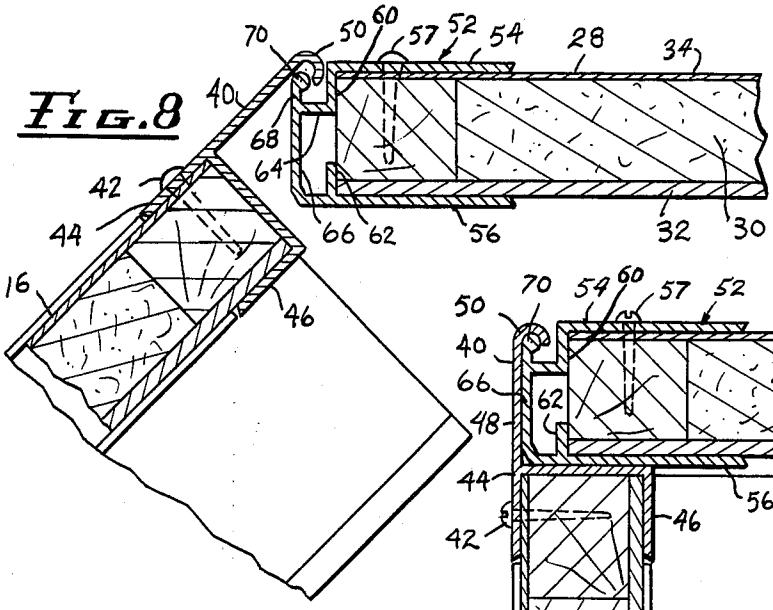
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SHELTER CONSTRUCTION AND FASTENERS THEREFOR

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FIG. 8



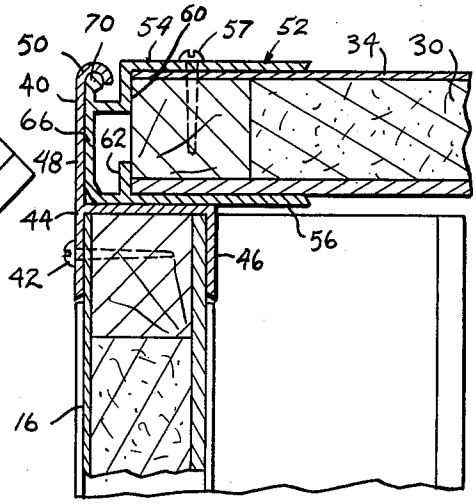


FIG. 7

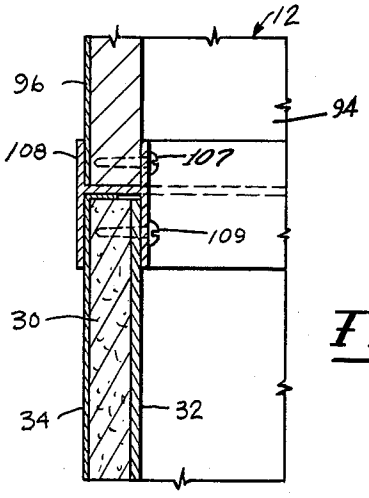


FIG. 6

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United States Patent Office 3,219,383 Patented Nov. 23, 1965

3,219,383

SHELTER CONSTRUCTION AND FASTENERS THEREFOR

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Filed Nov. 15, 1963, Ser. No. 324,056
16 Claims. (Cl. 296—23)

The present invention relates to collapsible shelters and to an improved connecting or fastening assembly for securing the walls of the shelter together. While the invention is particularly useful as a collapsible and removable body for a vehicle such as a truck, it is also useful in other applications as portable tool houses or fish houses or the like. One important shortcoming of prior devices is that it has been difficult to provide a weatherproof joint at the intersection of the walls while at the same time allowing the panels to be quickly connected or disconnected.

Still another disadvantage of most if not all prior devices used with automotive vehicles is that the wall panels were thought to be necessarily permanently secured together to provide the required rigidity, and assembled they occupy a considerable amount of space thereby causing high storage and shipping costs.

Accordingly, it is the principal object of this invention to provide an improved collapsible shelter.

It is another object of the present invention to provide a collapsible shelter construction including a plurality of panels and an improved fastener for retaining the panels in connected relationship.

Another object of the present invention is the provision of an improved shelter construction adapted for use as a truck bed cover.

A still further object of the present invention is the provision of an improved collapsible shelter having a plurality of panel members adapted to be connected along their edges and one of the panel members being larger in size than the remaining members and including side walls thereon whereby the other panels after being disassembled can be packed therein.

A further object of the present invention is the provision of an improved shelter including fasteners connected between a plurality of panels for reliably locking the panels together when positioned at right angles to one another but allowing them to separate when pivoted to a predetermined oblique angle.

A further object of the present invention is the provision of an improved shelter for vehicles including a removable panel extending almost entirely across the rear of the shelter whereby relatively large objects can be placed within the shelter.

Other objects of the invention will become apparent as the description proceeds.

To the accomplishment of the foregoing and related ends, this invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principles of the invention may be employed.

The invention is illustrated by the accompanying drawings in which the same numerals refer to corresponding parts and in which:

FIGURE 1 is a rear perspective view of a truck having a shelter thereon embodying the present invention;

FIGURE 2 is an enlarged rear elevational view of the shelter according to FIGURE 1 partially broken away;

FIGURE 3 is a horizontal sectional view partially broken away taken on line 3—3 but drawn to a larger scale than FIGURE 2;

FIGURE 4 is a partial vertical sectional view taken on line 4—4 of FIGURE 2 and drawn to the scale of FIGURE 3;

FIGURE 5 is a partial horizontal sectional view taken on line 5—5 of FIGURE 2 and drawn to a scale larger than FIGURES 3 and 4;

FIGURE 6 is a partial vertical sectional view taken on line 6—6 of FIGURE 1 and drawn to the scale of FIGURE 3;

FIGURE 7 is a partial horizontal sectional view taken on line 7—7 of FIGURE 1 drawn to a scale between that of FIGURE 3 and FIGURE 5; and

FIGURE 8 is a view similar to FIGURE 7 and drawn to the same scale showing the position of the panels as they appear after being disconnected from one another.

Referring now to the FIGURE 1, there is shown a shelter in accordance with the present invention indicated at **10**. The shelter **10** includes a top panel **12** which is provided with a rearward extension or pocket **14** to be described more fully hereinbelow. The shelter **10** is also provided with a plurality of vertical walls including side walls **16** and **18**, the lower edges of which are adapted to rest at **20** (FIGURE 1) upon the upward edges of the bed **22** of a pickup truck **24**. Connected between the side walls is a rear wall **26** and a front wall **28** seen in FIGURE 3. The side walls **16** and **18** are each substantially shorter than the rear wall **26** which extends downwardly to the floor **22** of the truck bed.

Referring to FIGURE 3, each of the walls **16, 18, 26** and **28** is composed of a vertically disposed wall panel including a center section **30** which can be formed from a variety of substances but preferably is composed of an insulating material such as a rigid plastic foam. One suitable material is a foamed polystyrene plastic.

Bonded to the inner and outer surfaces of the center section **30** are sheets of a rigid protective material such as a sheet of thermosetting plastic **32** on the inward surface and a sheet of aluminum or the like **34** on the outward surface. Extending around the edges of the foamed plastic core **30** is a rectangular framework composed of wooden beams **36**. As can be seen in FIGURE 3, the edges of both of sheets **34** and **32** overlap the beams **36**.

The lower edges of the panels **16, 18, 26** and **28** are supported against lateral displacement in any suitable manner as by identical retainers **27, 29** and **31**. The retainers **27, 29** and **31** are themselves supported by horizontally disposed flanges **33** which are secured to the sides of the truck bed in the case of retainers **27** and **31** and to the base of the truck bed in the case of retainer **29** by suitable means such as bolts **35**, for example. The retainers also each include a pair of vertically disposed horizontally spaced and parallel flanges **33*a*** and **33*b***. As clearly shown in FIGURES 1, 2 and 4, the lower edges of the vertical panels rest between the flanges **33*a*** and **33*b***. Any suitable means such as screws **23** may be used to secure the panels between the flanges.

In FIGURES 3, 7 and 8 the details of the panel connecting members are illustrated and reference is now had to those figures. Rigidly connected to the front and rear edges of the side walls **16** and **18** are vertically disposed fasteners or connecting members **40**. The fasteners **40** can be secured to the panels in any suitable manner as by screws **42**. Each fastener includes a generally U-shaped channel portion having parallel side walls **44** and **46** positioned adjacent the sheets **34** and **32** respectively and a forwardly extending retainer flange **48** including a channel or recess at the free end thereof having the form of the letter J as seen in transverse section, called a J-shaped hook **50**.

The side edges of the front and rear walls **28** and **26** respectively each include connecting members or fas-

teners **52** that cooperate with the fastener connecting member **40** to form joints. Fasteners **52** have parallel side walls **54** and **56** forming a channel that embraces the edges of the panels. These channels are secured to the panels by any suitable fastening means such as screws **57**. As best seen in FIGURES 7 and 8, the fasteners **52** are provided with shoulders **60** and centrally extending flanges **62** to define a false bottom against which the side edges of the front and rear panels abut. Engagement of the panel edges with the false bottom correctly locates the fastener **52** with respect to the panel. Extending normal to the inward end of the shoulder **60** is a wall **64**. Between the wall **64** and the wall **56** is another wall **66** and extending outwardly a short distance from wall **64** is still another wall **68** which terminates at its outward end in a bead-like rail **70** which is offset with respect to the side wall **54**. As shown in FIGURES 3 and 7, the rails **70** fit precisely within the J-shaped hooks **50**, the walls **56** abutting the forward and rearward edges of the side panels.

While the invention has been illustrated with J-shaped hooks **50** on the side panels and fasteners **52** on the end panels, the positions of these members may be reversed, it being necessary only that a cooperating pair be used at any given corner.

It should be noted that as long as the front, rear and side panels have their respective connecting members engaged and are placed as shown in FIGURES 3 and 7, i.e., at right angles to one another, the panels will be rigidly connected in two planes. Lateral movement is prevented by the interaction between rails **70** and J-shaped hooks **50** while longitudinal movement of the side panels is prevented by abutment between the connectors of the side panels and the adjacent portions of the front and rear panel connectors respectively.

The panels of the shelter **10** can be separated from one another by swinging the rear edges of the side panels forwardly and outwardly, but they can also be separated by sliding any of the panels vertically relative to the remaining panels. Thus when space is limited laterally of the shelter, the side panel **16**, for example, can be removed by sliding it upwardly until its lower edge clears the upward edge of the front and rear panels.

Referring now to FIGURES 1, 2, 3, 4 and 5 which illustrate the rear panel of the shelter **10**, the rear panel **26** is composed of a pair of relatively narrow vertically disposed side portions **26***a* and **26***b* and a removable center section **26***c* which extends almost the entire width of the rear panel **26**. The panel **26***c* has in its center a door **80** of any convenient and well-known construction including a handle **82** and supported upon the panel **26***c* by vertically disposed hinges **84**.

In most applications, the panel **26***c* will be retained in place as shown in the figures. When, on the other hand, a relatively large object is to be transported in the vehicle, the panel **26***c* is removed as will be described hereinbelow.

Referring now to FIGURES 1, 2, 4, 5 and 6 it will be seen that the top panel **12** is composed of a horizontally disposed section **90** which bends downwardly at its forward end **92** to provide a generally vertically disposed front wall **94** and the front wall of pocket **14**. Rigidly secured to section **90** are a pair of vertically disposed side walls **96** which extend rearwardly at **98** somewhat beyond the rear panel **26** to form the sides of pocket **14**.

Extending between the lower edges of extension **98** is a transversely disposed frame member such as a wooden beam **100**. The top panel **90** extends forwardly and downwardly at **104** and is secured at **106** to the rearward edge of the beam **100** to define the rear wall of pocket **14**. This pocket **14** in top panel **12** is longer than the other panels and hence allows them to be stored inside top **12** when the shelter is disassembled.

Rigidly secured around the lower edge of the top panel **12** is a retainer such as a metal extrusion having an H-shaped cross-section called channel **108**. The upwardly extending flanges of the channel **108** can be secured on either side of the lower edges of the roof **12** by means of any suitable fasteners such as screws **107**. The downwardly extending flanges of channel **108** are adapted to fit telescopically over the upward edges of the side panels **16** and **18**, the front panel **28** and the rear panel **26**. The upward edges of the vertically disposed panels are releasably secured to the channel **108** by means of any suitable fasteners such as screws **109**. Other types of fasteners can be employed in place of screws **109**, should it be desired. The channel **108**, and fasteners **40**, **52** and **87**, are preferably formed as aluminum extrusions.

As clearly shown in FIGURE 2, only the side portions **26***a* and **26***b* of the rear panel **26** extend upwardly into the channel **108** and abut against the horizontal web thereof. The center panel **26***c*, on the other hand, has an upward edge **110** which is spaced a slight distance below the horizontal web of the channel **108**. Panel **26***c* can be raised a distance equal to the clearance between edge **110** and the web of channel **108**. Since the depth of the channel formed by flanges **33***a* and **33***b* is less than the distance from edge **110** to the web of retainer **108**, the distance panel **26***c* can be raised, the bottom of the panel when raised clears the flanges **33***a* and **33***b* and may be swung clear if the catches **97**, described below, have been released.

Positioned vertically along the inward edges of the panels **26***a* and **26***b* (FIGURES 3 and 5) are a pair of channels **87** and **88** each including horizontally spaced and parallel flanges such as the ones **87***a* and **87***b*. Extending inwardly from the inside edge of the channel **87** is a vertically disposed flange **89** having a vertically disposed recess **91** therein within which is mounted sealing means such as an I-shaped resilient gasket **93**. Similar flange, recess and gasket is provided for channel **88**. Mounted for rotational movement about a horizontally disposed pin **95** is a fastener **97** including a handle **99** by which the fastener **97** can be pivoted to a position in which one end thereof wall overlap the inner edge of the flange **89** so as to lock the edges of the panel **26***c* in sealing engagement with the gasket **93**. The pin **95** can, if desired, be resiliently mounted by the provision of a spring **95***a*. Several of these fasteners **97** are provided along each of the channels **87** and **88**.

The shelter of the present invention is assembled by the following steps. First, connecting members **40** of the side panels **16** and **18** are hooked onto the rails **70** of panel **28** as shown in FIGURE 8. Both side panels **16** and **18** are then pivoted rearwardly about an axis extending through the center of the rails **70** of panel **28** until they have reached the position of FIGURE 3 at which time they are secured to panel **28**. This assembly is then lifted onto the truck bed and retainers **27**, **29** and **31** secured to the truck bed. The rear panel **26** is then placed in position by sliding the same downwardly within the hooks at the rearward edges of the panels **16** and **18** and the retainer **29** is secured to truck bed **22**. The panel **26***c* can then be placed in the position shown in FIGURE 4 and locked securely in place within the opening between the panels **26***a* and **26***b* by means of the latches **97**, if panel **26***c* was not assembled to panel **26** previously. Top panel **12** is then placed in position with the horizontal web of the channel **108** abutting the upward edges of the front, side and rear panel portions **26***a* and **26***b*. The fasteners **109** are then placed in position so as to retain the top panel **12** in position. Disassembly is by the reverse process.

It should be noted that with the top **12** locked in position as shown in FIGURES 1, 2 and 4, the vertically disposed panels will be securely locked in place. Moreover, as a result of the tortious path between the rails **70** and the adjacent hook members, a highly satisfactory weatherproof seal is formed between the panels. The panels can nevertheless be easily and quickly disassembled without

the use of special tools. When disassembled, the side, front and rear panels can all be placed within the top panel **12** for convenient storage and shipment.

It is apparent that many modifications and variations of this invention as hereinbefore set forth may be made without departing from the spirit and scope thereof. The specific embodiments described are given by way of example only and the invention is limited only by the terms of the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A collapsible shelter comprising in combination a plurality of wall members and a roof, one of said wall members comprising a rear wall, said rear wall having a removable panel therein extended across almost the entire width of said rear panel, said removable panel slidably mounted within said rear wall for sliding movement vertically therein and wherein an upward extension is provided upon the lower edge of the rear panel for preventing movement of the lower end of the removable panel along an axis extending normal to the surface thereof until the removable panel has been lifted a distance sufficient to clear the upper edge of said extension.

2. A weather-tight demountable panel joint comprising: a channel member having side walls and adjoining back wall with a flange extending past the back wall on the opposite side to the opening in said channel, terminating in a J-like in section hook formation, a false bottom channel member having a bead-like rail offset with respect to one of the false bottom channel member sides and of a size to fit the inside of said J in section hook-like formation on said first channel member flange end; the distance from the inside radius of said J in section hook formation to said adjoining back wall on said first channel member being equal to the greatest distance from the radius of said bead-like rail on said false bottom channel member to the side thereof most distant from said rail-like formation, said channel member being of a size to embrace panels of which said panel joint is intended for use whereby when one edge of a panel is equipped with said channel member and a second channel member edge is equipped with said false bottom channel member, said panel edges may be secured together by engaging said rail in said J in section hook formation at the end of said flange and pivoting said false bottom channel member until it engages said adjoining back wall of said channel member.

3. A demountable weatherproof enclosure comprising a front panel, back panel, side panels and a roof member, hook-like J in section flanges secured to opposed edges of some panels and complementary rail members secured to adjacent edges of adjacent panels whereby said J in section flanges may partially embrace said rails and secure adjacent panel edges together in weatherproof relationship while held at a predetermined angle to each other, said roof member having downwardly projecting channel members secured to its lower portions that embrace the tops of both said side panels and said front and back panels to hold said panels at said predetermined angle relative to each other whereby said J in section flanges and rails remain engaged as a weatherproof joint.

4. The apparatus according to claim **3** wherein said roof member includes a projecting portion thereof extending beyond its panel embracing channels, whereby said roof member has a longer interior dimension in one direction than any of said panels joined with it.

5. The structure of claim **3** in which said rear panel is formed in three portions comprising two rear edge panels joined to the respective adjacent side panel edges and a central rear panel releasably secured to said edge rear panels forming a complete rear panel, said central rear panel having an entrance door mounted therein; whereby access through said rear panel and to the interior of said closure is provided and said closure may

be opened wider for the receipt of articles having greater dimensions than those of said entrance door by removing said center panel and without the necessity for disassembling said closure.

6. The combination of a pickup truck having a truck bed and a retainer means thereon positioned along the side and rear edges of said truck bed and a collapsible and removable body formed from a pair of flat vertically disposed side walls including vertically disposed bead means at the front and rear edges thereof, a front and rear wall each including a vertically disposed hook means on the edges thereof, said hook means constructed to releasably engage with the bead means provided on the front and rear edges of the side walls and a top member releasably mounted upon the upward edges of said front, side and rear panels.

7. The apparatus according to claim **6** wherein said top member comprises a relatively flat panel having side, front and rear walls which extend downwardly a short distance therefrom to define a compartment and wherein each of the side, front and rear panels is enough smaller than the compartment to be placed therein for shipment.

8. The combination of a pickup truck and a shelter comprising a pair of vertically disposed side walls, a front and rear wall releasably connected to the forward and rearward edges of the side walls respectively, and a pair of fastener members at each intersection between the front, side and rear panels, each pair of fasteners comprising a first fastener member formed from an extrusion including a pair of parallel flanges adapted to extend on opposite surfaces of the edge of one of the panels and an extension including a rail-like bead extending parallel with the adjacent edge of the connected panel and wherein the other of said fasteners of said pair comprises an elongated extrusion including a pair of parallel walls adapted to be positioned on opposite sides of the edge of the panel secured thereto and an elongated extension projecting outwardly from the parallel walls and including a channel having a J-shaped cross-sectional configuration constructed to extend over and enclose said bead-like rail to retain adjacent panels together when the shelter is assembled.

9. The structure of claim **8** wherein the top panel includes a retainer extending around the entire lower edge thereof, said retainer comprising a generally H-shaped member including a horizontally disposed web one surface of which abuts the lower edge of the top panel, a pair of downwardly extending, parallel flanges engaging opposite sides of the upward edge of the side, front and rear panels, and fastener means connecting said downwardly extending flanges to the upward edges of the side, front and rear panels.

10. A combination of a motor vehicle having a truck bed thereon and a collapsible and removable shelter mounted upon said truck bed comprising in combination a plurality of substantially flat side, front and rear walls releasably connected together along their abutting edges, a top wall removably mounted along the upward edge of said side, front and rear walls, said rear wall including a pair of lateral panel members and a central panel member extended substantially the width of said rear wall and removably mounted therein between said lateral panel members, said center panel member being mounted for vertical sliding movement and upon being moved upwardly the lower end thereof may be moved along an axis normal to the surface of the truck bed thereby enabling the lower end of the center panel member to be swung rearwardly whereby said center panel member may be removed so as to enable relatively large objects to be placed within said shelter.

11. A weather-tight demountable panel joint comprising a first channel member having side walls and adjoining back wall with a flange extended past the back wall on the opposite side of the opening of said channel, said flange terminating in a hook, a second channel member

having a bead-like rail adjacent one edge thereof of a size to fit the inside of the hook of the first channel member, the distance from the inside of said hook to said adjoining back wall of the first channel member being equal to the greatest distance from said bead-like rail to the opposite edge of said second channel member, whereby said first and second channel members are secured together by engaging said bead-like rail in said hook and pivoting said first channel member until the adjoining back wall engages said second channel member.

12. A demountable weather-proof enclosure comprising a front panel, back panel, side panels and a roof member, hook-like flanges secured to opposed edges of some panels and complementary rail members secured to adjacent edges of adjacent panels whereby said hook-like flanges may partially embrace said rails and secure adjacent panel edges together in weatherproof relationship while held at a predetermined angle to each other, said roof member having at least one downwardly projected member secured to its lower portions, said member engaged with said side panels and said front and back panels to hold said panels at said predetermined angle relative to each other whereby said flanges and rails remain engaged as a weatherproof joint.

13. The combination of a truck body and a shelter mounted thereon, said shelter including a rear wall and a top roof panel, the improvement comprising a removable panel extended substantially the entire width of said rear wall, and coacting means on said top roof panel and truck body cooperating with said removable panel to releasably hold said removable panel in engagement with the remainder of said rear wall whereby upon removal of said removable panel relatively large objects may be placed within the shelter through the opening in the rear wall.

14. The structure of claim 13 wherein said coacting means on said top roof panel and truck body comprise a horizontal top channel member secured to the roof panel and a horizontal bottom channel secured to the truck body, said channel members having flanges cooperating with said removable panel to releasably hold the removable panel in engagement with the remainder of the rear wall.

15. A collapsible shelter for use on vehicles comprising in combination: a plurality of vertical walls; a top wall, said top wall including a shoulder extending about the periphery thereof and a flange projecting downwardly adjacent said shoulder whereby said top wall fits telescopically over said vertical walls with said shoulder resting upon the upward edges of said vertical walls; an elongated connecting member positioned in vertically disposed relationship along the vertical edge of each of the vertical walls; a recess in half of said connecting members; and, an extension upon the other half of said connecting members, said extensions projecting into said recesses for releasably locking together adjacent walls at adjacent edges.

16. The combination of a pick-up truck and a shelter mounted thereon, said shelter including a rear wall and a roof, the improvement comprising: a removable center panel extended substantially the entire width of said rear wall, first means for releasably attaching the center panel to said rear wall and roof and second means secured to the truck cooperating with the first means to releasably hold the center panel in engagement with said rear wall, said removable center panel having a door, the door being adapted to allow personnel to leave and enter said shelter and removal of said removable center panel allowing relatively large objects to be placed within the shelter through said rear wall.

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