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(19) **United States**(12) **Patent Application Publication**  
**Gibson**(10) **Pub. No.: US 2016/0178329 A1**(43) **Pub. Date: Jun. 23, 2016**(54) **PORTABLE BALLISTIC DIVIDER WALL**(52) **U.S. Cl.**(71) Applicant: **MGM HOLDINGS, LLC**, Cheyenne,  
WY (US)CPC ..... **F41H 5/12** (2013.01)(72) Inventor: **Michael H. Gibson**, Boise, ID (US)(57) **ABSTRACT**(73) Assignee: **MGM HOLDINGS, LLC**, Cheyenne,  
WY (US)(21) Appl. No.: **14/590,251**(22) Filed: **Jan. 6, 2015****Related U.S. Application Data**(60) Provisional application No. 61/925,759, filed on Jan.  
10, 2014.**Publication Classification**(51) **Int. Cl.**  
**F41H 5/12** (2006.01)

Portable ballistic divider walls have a plurality of wall panels each having a body portion with opposed body edges and a face panel with opposed face edges, the face panel being formed of a ballistic-resistant material, the wall panels having fastener facilities operable to connect a body edge of each body portion with a respective adjacent body edge of an adjacent body portion, the face panel having a flange portion extending beyond the body edge, and the flange portion being operable to cover a seam between abutting body edges. The fastener facilities may be operable to secure adjacent wall panels in an angled relationship, while the flange covers the entirety of a seam between the adjacent body portions. The body portions have a body thickness, and the flanges may have a width at least 57% of the body thickness. There may be a brace assembly attached to the body portion.

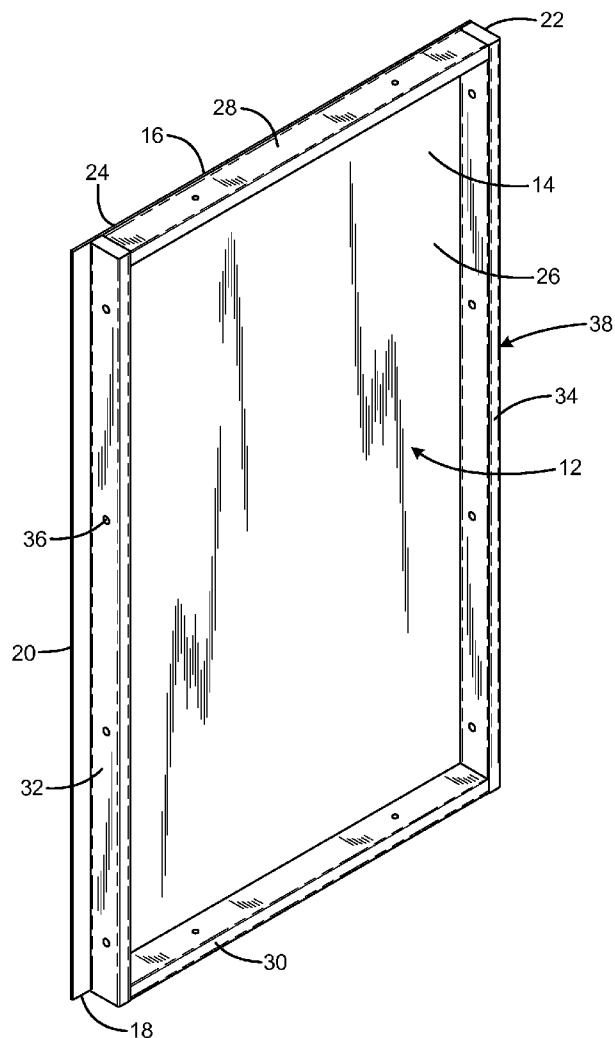
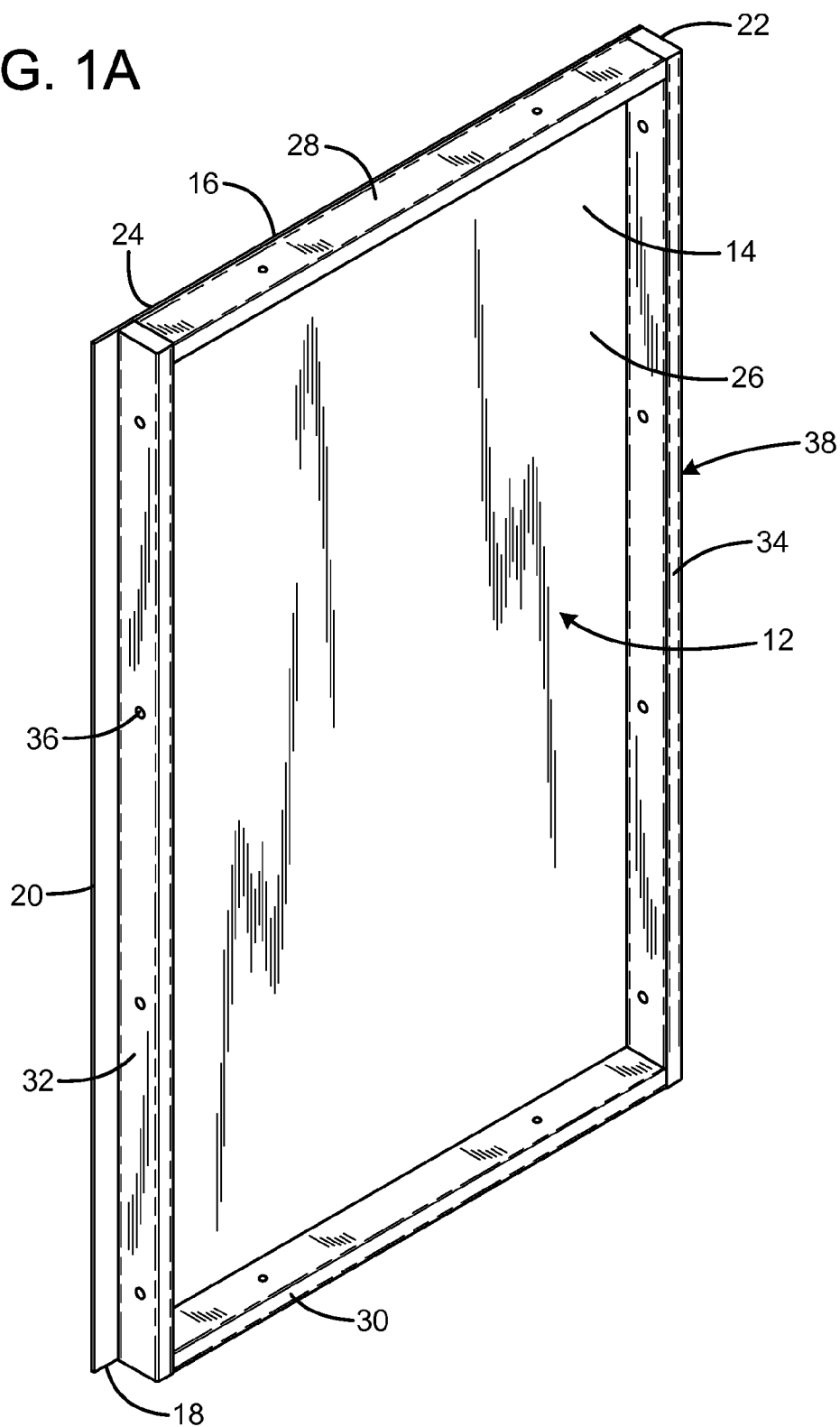


FIG. 1A



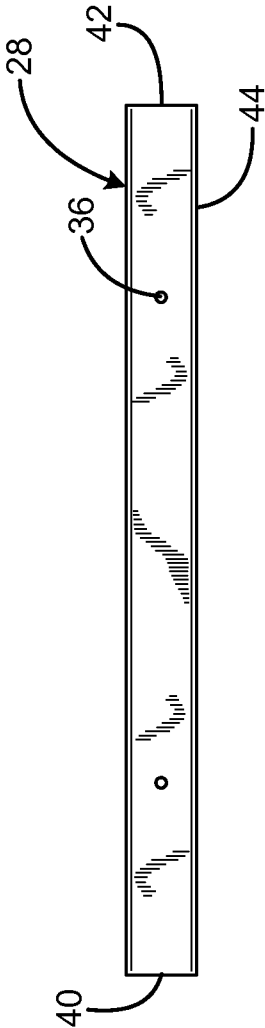


FIG. 1B

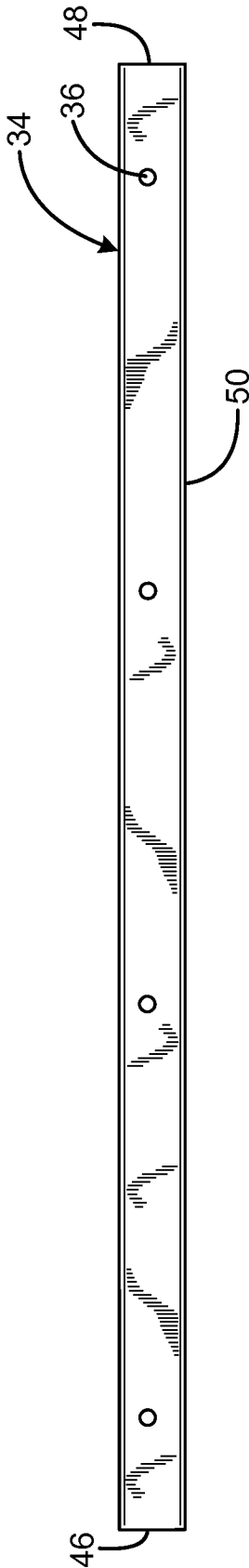
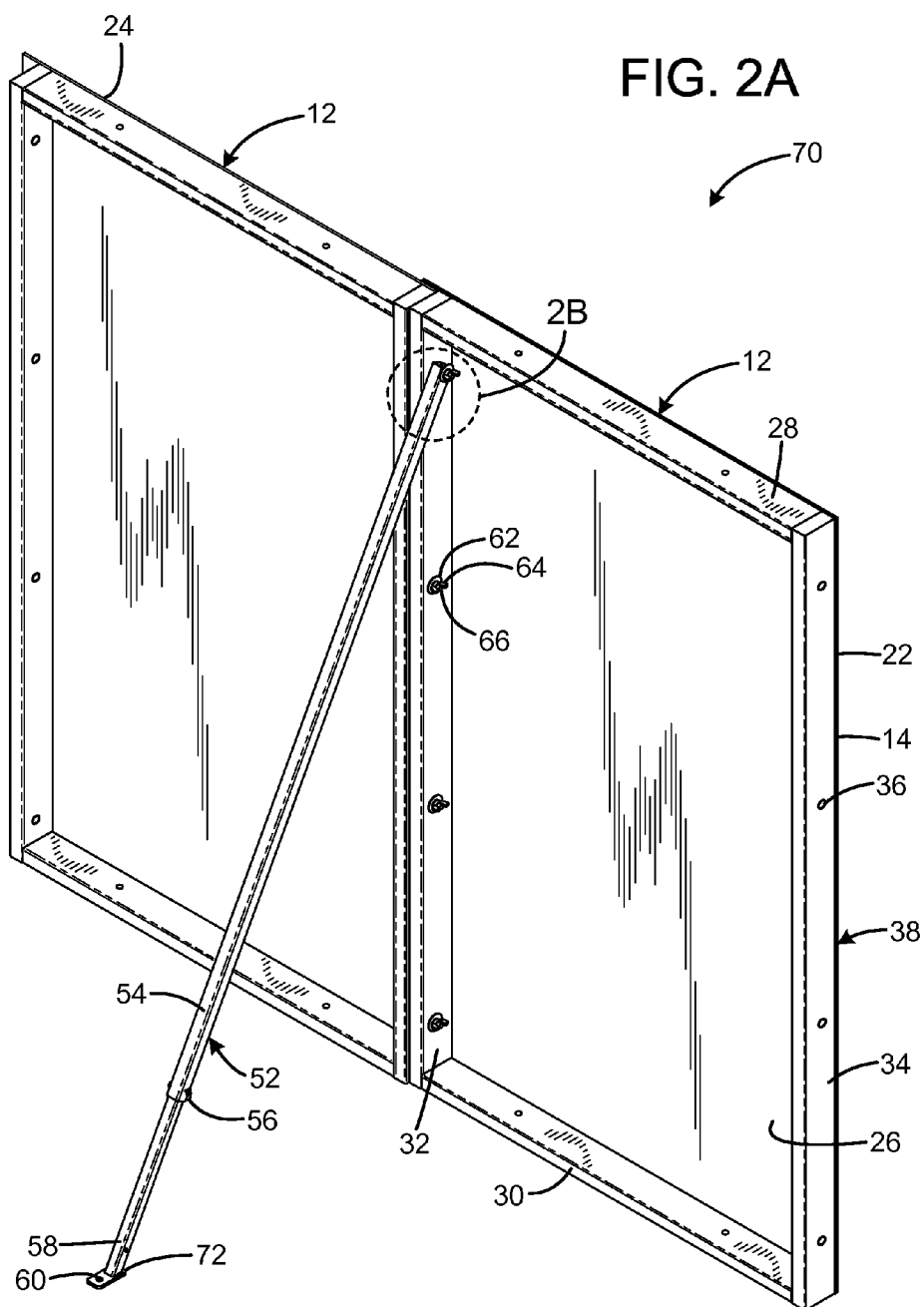


FIG. 1C



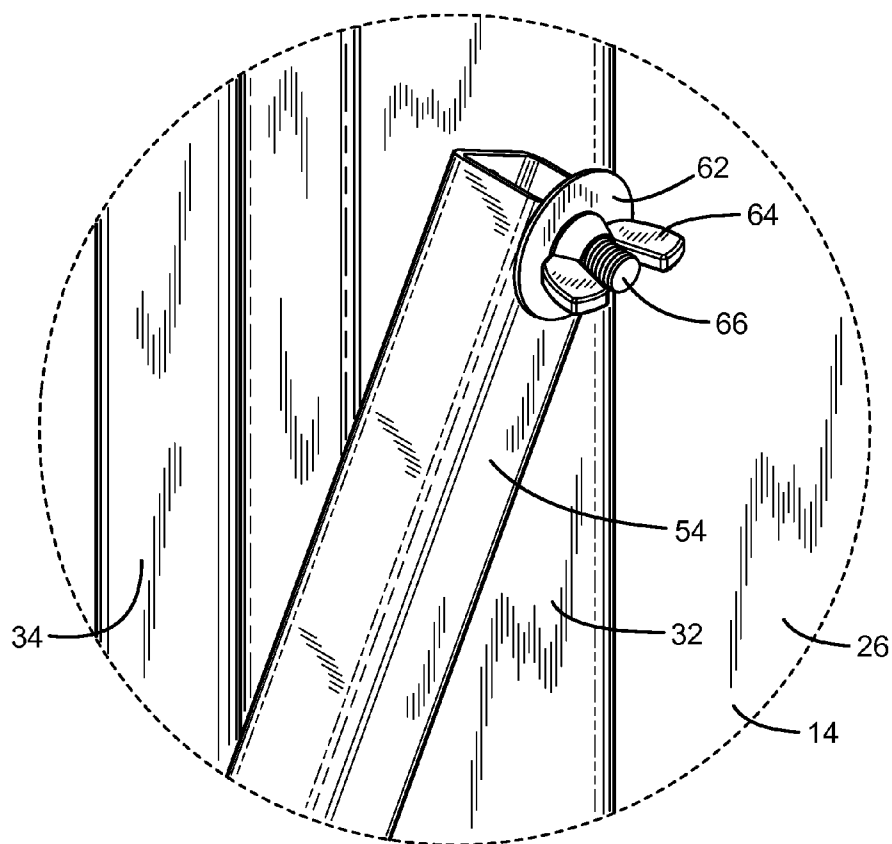
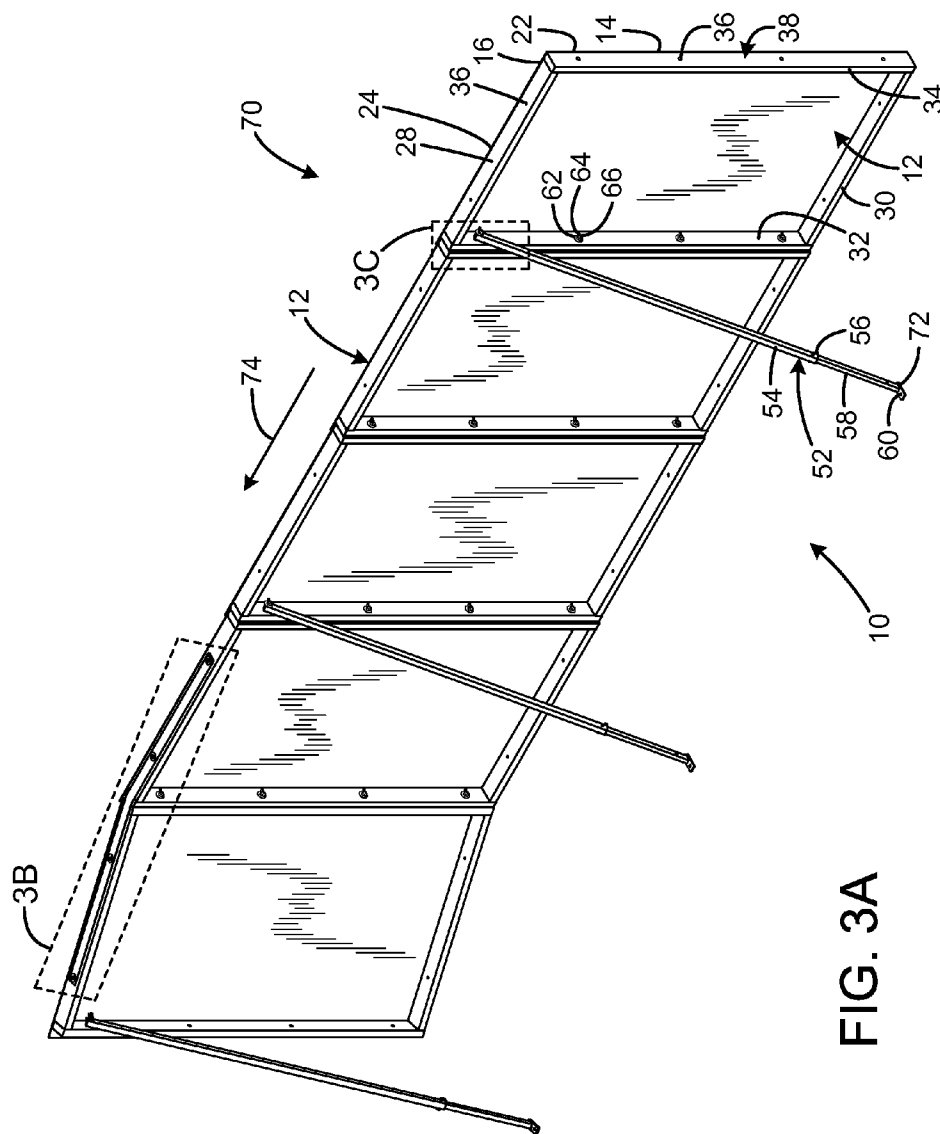


FIG. 2B



**FIG. 3A**

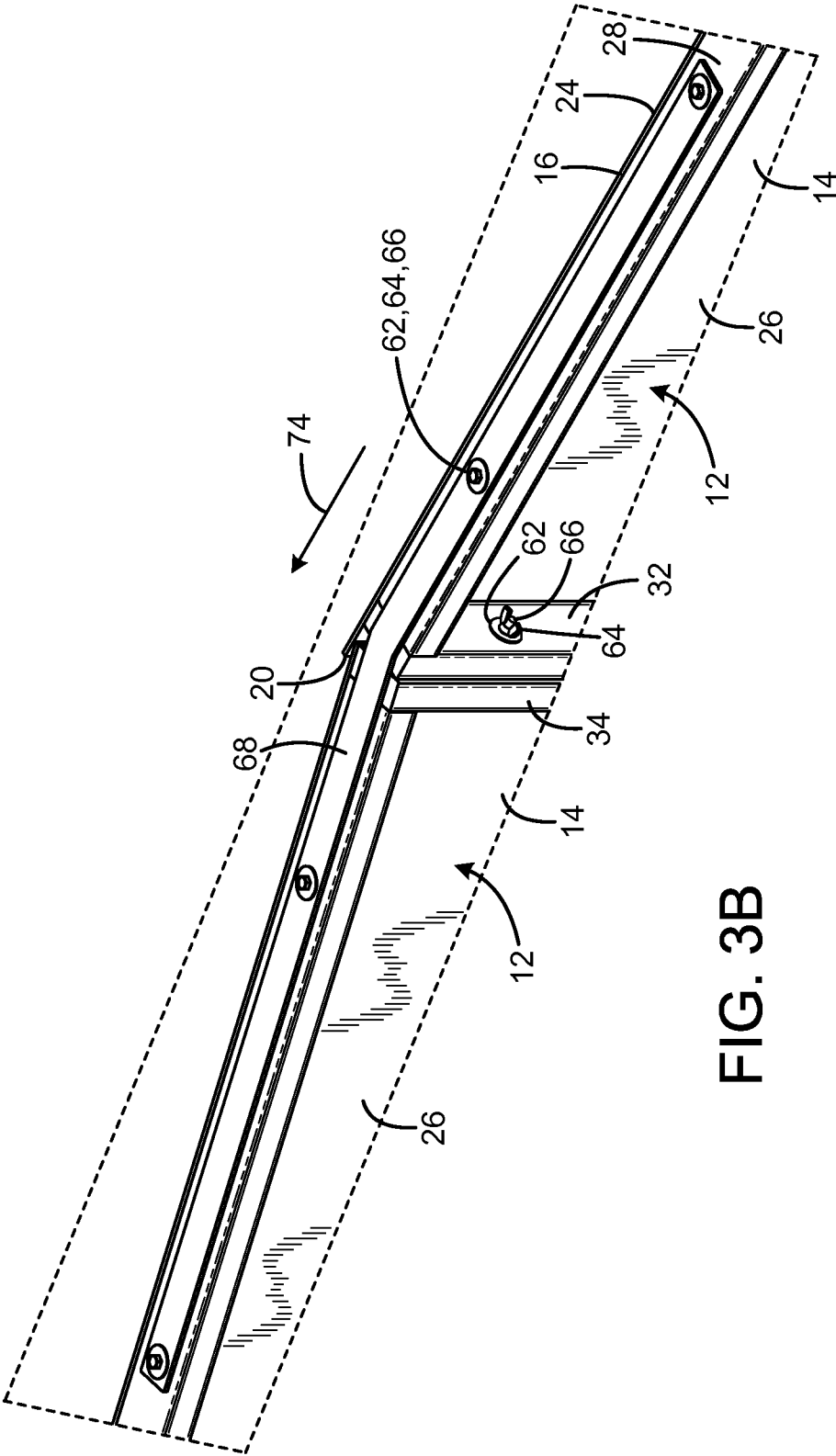
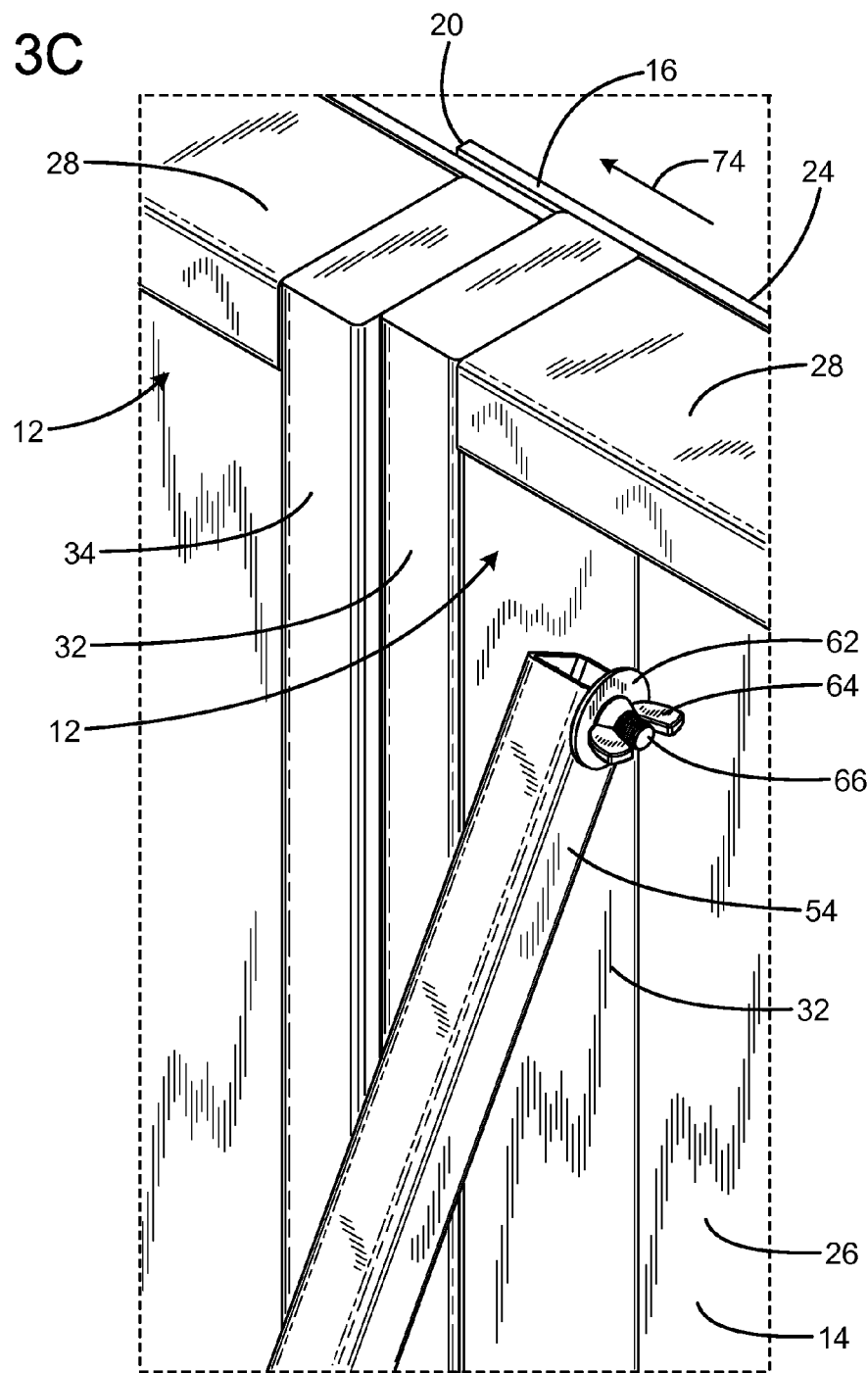


FIG. 3B

FIG. 3C





## PORTABLE BALLISTIC DIVIDER WALL

### CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 61/925,759 filed on Jan. 10, 2014, entitled “PORTABLE BALLISTIC DIVIDER WALLS,” which is hereby incorporated by reference in its entirety for all that is taught and disclosed therein.

### FIELD OF THE INVENTION

[0002] The present invention relates to shooting ranges, and more particularly to a portable ballistic divider wall that can be easily moved to create novel training scenarios, while simultaneously protecting all involved in the training exercise from live pistol and rifle fire.

### BACKGROUND OF THE INVENTION

[0003] A shoot house is a type of indoor firing range modified to resemble a residential or commercial environment, with the walls and floor being fortified to safely absorb or deflect rounds fired from close range. It is used to train military and law enforcement personnel for various urban combat scenarios while permitting them to use their full power service weapons. Because the structures need to absorb or deflect gunfire away from the personnel being trained, traditionally strong, heavy materials for the walls and floors are needed such as concrete and steel. Use of materials that cannot deflect and/or contain live gun fire may lead to injuries or death as bullets penetrate completely through the material.

[0004] Even facilities that provide trainers with some flexibility to change the floor plan rely on portable ballistic divider walls that include steel wall plates. Conventionally constructed shoot houses can be difficult and time-consuming to alter given that the steel plates are heavy, requiring use of a lifting device to move them, and are frequently welded or bolted into place. Rolling ballistic doors have been used with some success, but these are limited to being able to only block off a hallway rather than completely changing the layout of a shoot house.

[0005] Therefore, a need exists for a new and improved portable ballistic divider wall that provide adequate protection from gun fire while still being easily moved without panel lifting equipment. In this regard, the various embodiments of the present invention substantially fulfill at least some of these needs. In this respect, the portable ballistic divider wall according to the present invention substantially departs from the conventional concepts and designs of the prior art, and in doing so provides an apparatus primarily developed for the purpose of providing adequate protection from gunfire while still being easily moved without panel lifting equipment.

### SUMMARY OF THE INVENTION

[0006] The present invention provides an improved portable ballistic divider wall, and overcomes the above-mentioned disadvantages and drawbacks of the prior art. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide an improved portable ballistic divider wall that has all the advantages of the prior art mentioned above.

[0007] To attain this, the preferred embodiment of the present invention essentially comprises a plurality of wall

panels each having a body portion with opposed body edges and a face panel with opposed face edges, the face panel being formed of a ballistic-resistant material, the wall panels having fastener facilities operable to connect a body edge of each body portion with a respective adjacent body edge of an adjacent body portion, the face panel having a flange portion extending beyond the body edge, and the flange portion being operable to cover a seam between abutting body edges. The fastener facilities may be operable to secure adjacent wall panels in an angled relationship, while the flange covers the entirety of a seam between the adjacent body portions. The body portions have a body thickness, and the flanges may have a width at least 57% of the body thickness. There may be a brace assembly attached to the body portion. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject matter of the claims attached.

[0008] There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof that follows may be better understood and in order that the present contribution to the art may be better appreciated.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1A is a top isometric view of the current embodiment of a portable ballistic divider wall panel constructed in accordance with the principles of the present invention.

[0010] FIG. 1B is a top view of the current embodiment of a top member constructed in accordance with the principles of the present invention.

[0011] FIG. 1C is a top view of the current embodiment of a left member constructed in accordance with the principles of the present invention.

[0012] FIG. 2A is a top isometric view of the current embodiment of two of the portable ballistic wall panels of FIG. 1 configured as a wall section with a telescoping wall brace.

[0013] FIG. 2B is an enlarged view of a portion of FIG. 2A denoted by the circled portion 2A.

[0014] FIG. 3A is a top isometric view of five of the portable ballistic wall panels of FIG. 1 configured as a portable ballistic divider wall with telescoping wall braces.

[0015] FIG. 3B is an enlarged view of a portion of FIG. 3A denoted by the rectangular portion 3B.

[0016] FIG. 3C is an enlarged view of a portion of FIG. 3A denoted by the rectangular portion 3C.

[0017] The same reference numerals refer to the same parts throughout the various figures.

### DESCRIPTION OF THE CURRENT EMBODIMENT

[0018] An embodiment of a portable ballistic divider wall formed by the portable ballistic divider wall panels of the present invention is shown and generally designated by the reference numeral 10.

[0019] FIG. 1A illustrates an improved portable ballistic divider wall panel 12 of the present invention.

[0020] More particularly, the portable ballistic divider wall panel 12 has a bullet resistant panel 14 having a top 16, bottom 18, left side 20, right side 22, a front face 24, and a rear face 26. In the current embodiment, the bullet resistant panel is a Level I ¼ inch thick multi-ply laminated ballistic fiber-

glass material manufactured by Waco Composites of Waco, Tex., United States Bullet Proofing of Upper Marlboro, Md., as well as other companies. The bullet resistant panel conforms to U.L. 752 and N.I.J. 0108.01 standards. The Level I bullet resistant panel is rated to not be penetrated by the NATO 9 mm round, but testing has shown it to resist penetration by 0.40 S&W, and 0.45 ACP rounds also. In alternative embodiments, the bullet resistant panel could be any ballistic protection level up to level eight, which would be a panel 1 $\frac{3}{8}$  inch thick. In the current embodiment, the bullet resistant panel has bullet resistant capabilities up to and including 7.62×51 NATO rounds, and is 78 inches high and 48 inches wide, but it could also be up to 120 inches high and 72 inches wide.

[0021] A frame 38 is attached to the rear face 26 of the bullet resistant panel 14. The frame has a top member 28, bottom member 30, left member 32, and right member 34. In the current embodiment, the frame is 78 inches high and 46 inches wide. As a result, the left edge 20 of the bullet resistant panel acts as a flange and overhangs the left member of the frame by 2 inches. The frame members are all 3 $\frac{1}{2}$  inches wide. Therefore, the 2 inch flange overhang has a width that is 57% of the frame's thickness of 3 $\frac{1}{2}$  inches. Preferably, the flange has a width at least half the thickness of the frame to provide an adequate angle between panels without a gap between the panel surfaces. An angle of 30° between panels can then be safely tolerated, which permits a wide range of structural shapes of the assembled ballistic divider wall 10. In the current embodiment, the members are manufactured from 2×4 lumber. The members are preassembled into the wooden frame using fixtures to ensure the members remain square. Four screw holes 36 are drilled in each of the left and right members, and two screw holes 36 are drilled in each of the top and bottom members. In the current embodiment, the screw holes are  $\frac{3}{4}$  inch through holes. To attach the frame to the bullet resistant panel, countersunk holes (not shown) are drilled in the bullet resistant panel at 16 inch intervals, and  $\frac{3}{16}$ ×2 screws (not shown) are used to threadedly connect the bullet resistant panel to the frame. Subsequently, the entire assembled wall panel 12 is encapsulated with a sprayed waterproof, UV resistant coating such as polyurethane or epoxy (not shown). For indoor usage, the wall panel can be sprayed with white polyurethane to enhance lighting. In the current embodiment, the uncoated wall panel weighs 70 pounds, and the coated wall panel weighs 120 pounds. The wall panel is coated to extend the life of the ballistic panel and structure during training, handling, and storage. The coating also serves to protect the panel components from UV rays when used in exterior applications, and to increase the perceived lighting when used in interior applications.

[0022] FIG. 1B illustrates the top member 28, which is identical to the bottom member 30. The top and bottom members are 43 inches long, 3 $\frac{1}{2}$  inches wide, and 1 $\frac{1}{2}$  inches thick in the current embodiment. The screw holes 36 in the top and bottom members are positioned 9 $\frac{1}{2}$  inches from either end 40, 42 and 1 $\frac{3}{4}$  inches from the outer edge 44.

[0023] FIG. 1C illustrates the left member 34, which is substantially identical to the right member 32 except for placement of the screw holes 36. The left and right members are 78 inches long, 3 $\frac{1}{2}$  inches wide, and 1 $\frac{1}{2}$  inches thick. The screw holes in the left and right members begin 6 inches from either end 46, 48, and the screw holes are spaced apart from adjacent screw holes by 22 inches. The screw holes in the left member are positioned 1 $\frac{3}{4}$  inches from the outer edge 50, and

the screw holes in the right member are positioned 2 inches from the outer edge. The screw holes in the left member are offset from the screw holes in the right member so that the screw holes in the left member will be coaxial with the screw holes in the right member to allow for the offset resulting from the bullet resistant panel 14 overhang when two portable ballistic divider wall panels 14 are connected side-by-side.

[0024] FIGS. 2A-B illustrate a portable ballistic divider wall section 70 of the present invention. More particularly, the wall section 70 includes two wall panels 12 attached side-by-side and supported by a wall brace 52. The two wall panels are arranged such that the four screw holes 36 in the left member 32 of the rightmost panel are registered with the screw holes in the right member 34 of the leftmost panel, such that the left edge 20 of the rightmost bullet resistant panel 14 overlaps the right member 34 and bullet resistant panel of the leftmost wall panel. Four bolts 66 are inserted through the registered screw holes and are each secured by a flat washer 62 on each end of the bolt and a wingnut 64. The uppermost bolt also is inserted through a hole (not visible) at one end of a brace leg 54 to releasably secure the wall brace to the two wall panels. In the current embodiment, the brace leg is made of 1.25"×1.25"×0.095" tube steel. The bolts are  $\frac{3}{8}$ -16 UNC hex bolts, the wingnuts are  $\frac{3}{8}$ -16 UNC, and the flat washers are  $\frac{3}{8}$  inch.

[0025] The wall brace 52 has a telescoping brace leg base weldment 58 that is releasably secured to the brace leg 54 by a wire lock pin 56. The brace leg base weldment includes an angled plate 72 having a hole 60 that receives an anchor spike (not shown) to secure the brace leg to the floor or ground. In the current embodiment, the wall brace has a collapsed length of 68 $\frac{1}{2}$  inches and an extended length of 83 inches. When the wall section 70 is ready for use, the wall section is vertical and the wall brace is positioned at a 28° angle with respect to the wall section, and the brace leg base weldment is located 36 inches from the rearmost edge of the rightmost bottom member 30. In the current embodiment, the brace leg base weldment is made of 1"×1"×0.083" tube steel and is 27 $\frac{7}{8}$  inches long, and the plate is  $\frac{3}{16}$ " thick steel. The plate is attached at a 62° angle relative to vertical. The wire lock pin is  $\frac{1}{4}$  inch in diameter and 1 $\frac{3}{4}$  inches long. A suitable anchor spike for use with the current invention has a diameter of  $\frac{3}{8}$  and a length of 12". The wall brace includes the telescoping brace leg base weldment so that when the brace leg base weldment is fully inserted into the wall brace, the wall brace will fit within the depth of the frame 38 for storage and transportation.

[0026] FIGS. 3A-C illustrate a portable ballistic divider wall 10 of the present invention. More particularly, the divider wall is assembled from multiple wall panels 12 attached side-by-side into one or more wall sections 70. The wall panels are attached such that the overhanging portion of each bullet resistant panel 14 points downrange of the expected direction of gunfire. Optionally, the wall panel positioned farthest from a shooter may be angled 17° away from the front face 24 of the adjacent bullet resistant panel. This is accomplished by attaching an angle bracket plate 68 to the top members 28 of the adjacent panels by inserting bolts 66 through holes (not shown) in the angle bracket plate that are axially registered with the holes 36 in the top members and securing the bolts using wingnuts 64 and flat washers 62.

[0027] When the portable ballistic divider wall 10 is assembled as described, a round fired by a shooter on the side of the front face 24 of the bullet resistant panel 14 that strikes the wall 10 will deflect and continue in its previous general direction semi-parallel to the wall as shown by the arrow 74.

For any rounds fired by a shooter on the side of the rear face 26 of the bullet resistant panel that strike the wall, the bullet will be sufficiently slowed and redirected by the wood frame 38 and the polyurethane or epoxy coating that it or any bullet fragments would not pose a threat to the shooter. The overhanging portions 20 of the bullet resistant panels prevent any bullets or bullet fragments from penetrating the wall at a joint. Bullet damage to the wall panels can effectively be repaired by gluing or screwing a 4"×4" patch of the bullet resistant panel material on the inside of the panel.

[0028] While a current embodiment of a portable ballistic divider wall has been described in detail, it should be apparent that modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention. With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

[0029] Therefore, the foregoing is considered as illustrative only of the principles of the invention.

[0030] Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

I claim:

1. A ballistic wall structure comprising;  
a plurality of wall panels each having a body portion with opposed body edges and a face panel with opposed face edges;  
the face panel being formed of a ballistic-resistant material;  
the wall panels having fastener facilities operable to connect a body edge of each body portion with a respective adjacent body edge of an adjacent body portion;  
the face panel having a flange portion extending beyond the body edge; and  
the flange portion being operable to cover a seam between abutting body edges.
2. The wall structure of claim 1 further comprising the fastener facilities being operable to secure adjacent wall panels in an angled relationship, while the flange covers the entirety of a seam between the adjacent body portions.
3. The wall structure of claim 1 wherein the body portions have a body thickness, and the flanges have a width at least 57% of the body thickness.
4. The wall structure of claim 1 further comprising a brace assembly attached to the body portion, the brace assembly being angled out from the wall structure to support the wall structure.
5. The wall structure of claim 1 wherein the fastener facilities are bolts, flat washers, and wing nuts.
6. The wall structure of claim 1 wherein the ballistic-resistant material is multi-ply laminated ballistic fiberglass.

7. The wall structure of claim 1 wherein the body portions and face panels are encapsulated in a material selected from the group consisting of polyurethane and epoxy.

8. The wall structure of claim 1 wherein the flange portion of the face panel is positioned such that the flange portion is downrange of a shooter when the wall structure is assembled.

9. The wall structure of claim 1 wherein the body portion is made of wood.

10. The wall structure of claim 1 further comprising the wall structure including an end most wall panel, the end most wall panel being connected at an obtuse angle relative to an adjacent wall panel.

11. The wall structure of claim 10 wherein the end most wall panel and its adjacent wall panel have apertures receiving fastener facilities to connect an angled bracket plate to the end most wall panel and the adjacent wall panel.

12. A portable ballistic divider wall structure for a shoot house in which live ammunition training exercises are conducted, the structure comprising;

a plurality of wall panels formed of a ballistic-resistant material having a width;

each wall panel having a frame having a width;

wherein the width of each frame is less than the width of the associated wall panels such that each wall panel has a side portion overhanging the associated frame;

each frame having apertures receiving fasteners to connect adjacent wall panels;

wherein the apertures are offset on the portion of the frame attached to the side portion overhanging the frame such that the apertures on two adjacent frames are axially registered when the overhanging side portion of one wall panel overhangs an adjacent wall panel.

13. The wall structure of claim 12 further comprising a brace assembly attached to at least one of the frames, the brace assembly being angled out from the wall to support the wall.

14. The wall structure of claim 12 wherein the fasteners are bolts, flat washers, and wing nuts.

15. The wall structure of claim 12 wherein the ballistic-resistant material is multi-ply laminated ballistic fiberglass.

16. The wall structure of claim 12 wherein the wall panels and frames are encapsulated in a material selected from the group consisting of polyurethane and epoxy.

17. The wall structure of claim 12 wherein the overhanging side portion of the wall panel is positioned such that the overhanging side portion is downrange of a shooter when the wall is assembled.

18. The wall structure of claim 12 wherein the frame is made of wood.

19. The wall structure of claim 12 further comprising the wall including an end most wall panel, the end most wall panel being connected at an obtuse angle relative to an adjacent wall panel.

20. The wall structure of claim 19 wherein the end most wall panel and its adjacent wall panel have apertures receiving fasteners to connect an angled bracket plate to the end most wall panel and the adjacent wall panel.

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