July 31, 1956 MacM. CLEMENTS 2,756,464

BUILDING CONSTRUCTION, INCLUDING BUILDING PANELS FORMING PART THEREOF

Filed Nov. 4, 1952 2 Sheets-Sheet 1

Fig 1.

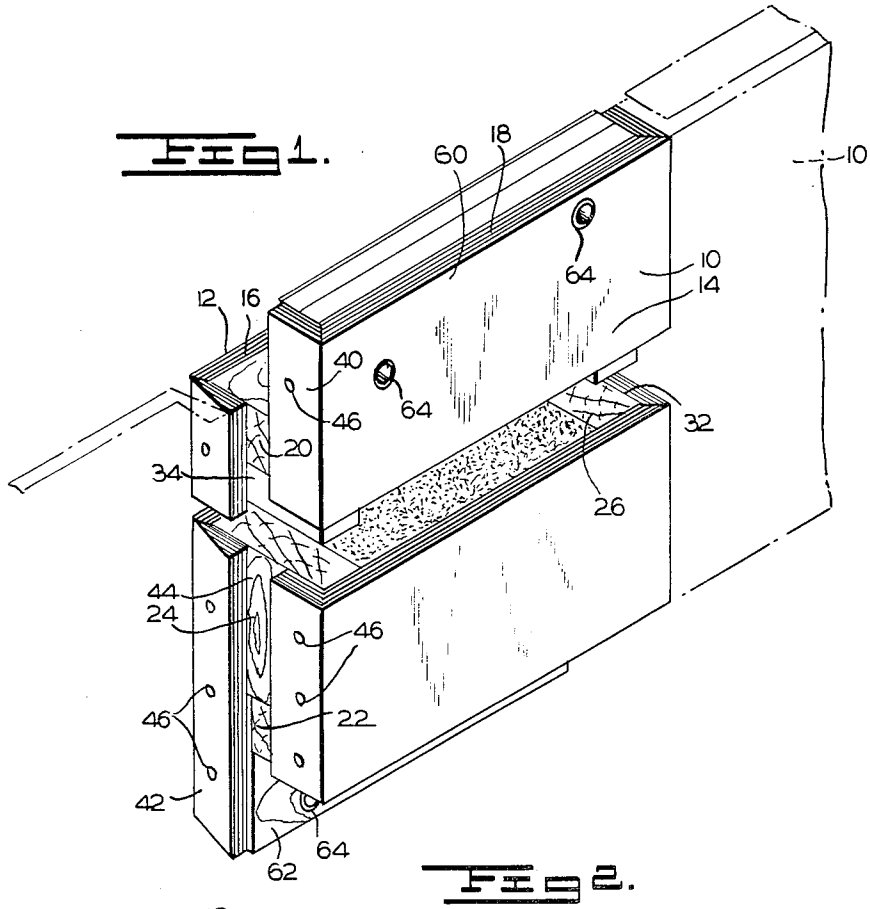


Fig 2.

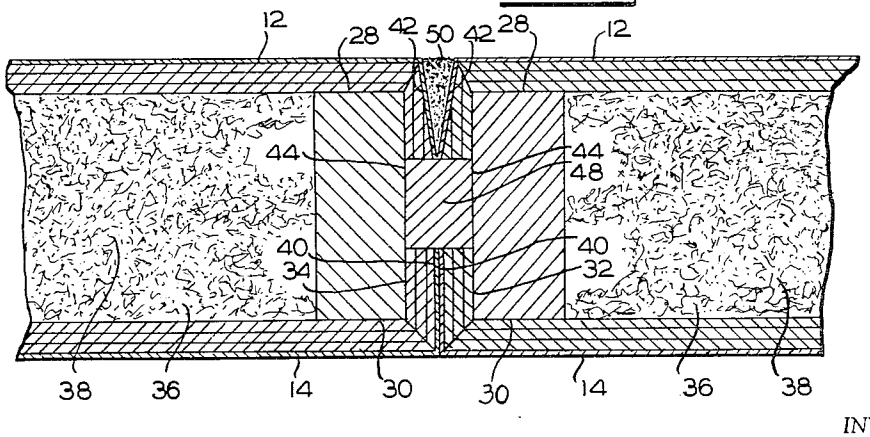
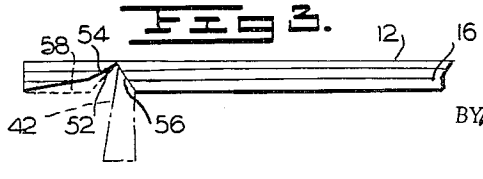


Fig 3.



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Fig 4.

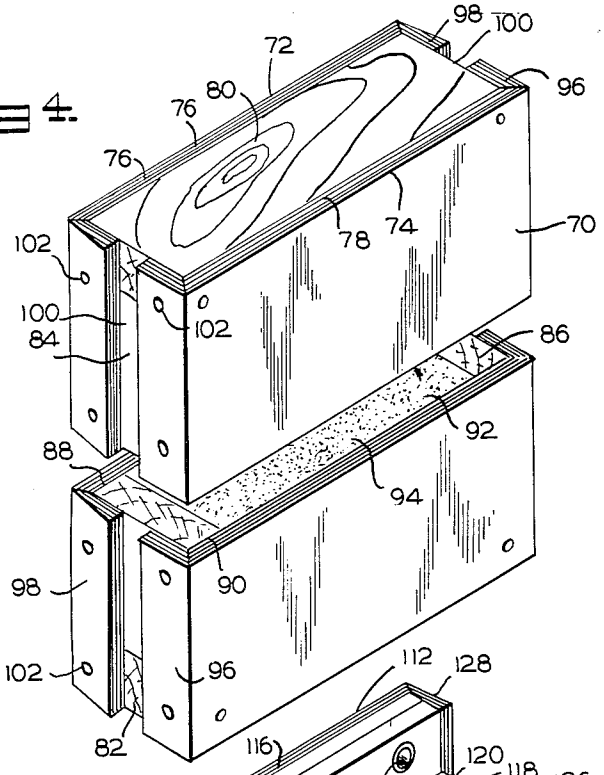
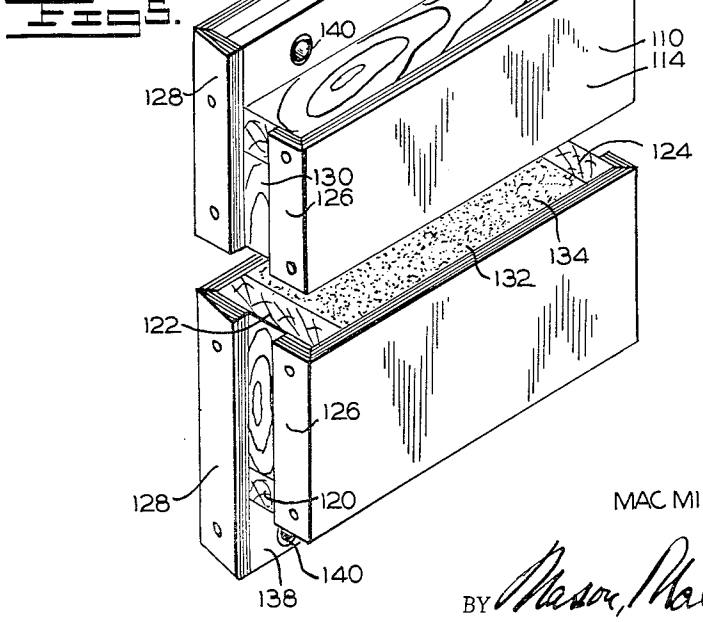


Fig 5.



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BUILDING CONSTRUCTION, INCLUDING BUILDING PANELS FORMING PART THEREOF

MacMillan Clements, Bethel, Conn.

Application November 4, 1952, Serial No. 318,657

5 Claims. (Cl. 20—15)

The invention relates to a structural panel for use in constructing buildings of various kinds, refrigerators particularly of the "walk-in" type, refrigerated cars of railway rolling stock, refrigerated trucks, and for all uses where building elements must have high structural strength, a high co-efficient of thermal insulation and inside and outside appearance.

This application is a continuation-in-part of my co-pending application Serial No. 175,607, filed July 24, 1950, for Structural Panel, now Patent No. 2,629,140, granted February 24, 1953.

A principal object of the invention, therefore, is to provide a structural panel for walls, floors, ceilings, or roofs and for any of the above-named or kindred uses, which possesses a high resistance to heat or cold and to humidity travel either inward or outward of the walls, floor, ceilings, or roofs of which said panel forms a part.

Another important object is to provide a novel and improved groove means or joint on one or both of the side edges of the panel of the type described, and which does not require to be painted.

A further important object is to provide for sealing the adjacent edges of panels to each other, and also to permit a certain amount of adjustment of one panel to the next adjacent panel during the settling operation of the structure of which the panels form a part, and for other reasons hereinafter pointed out.

Other objects will appear hereinafter throughout the specification.

The invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

In the drawings:

Figure 1 is a perspective view of one form of building panel of this invention, with parts of adjacent panels shown in dotted lines;

Figure 2 is a horizontal section taken medially through a pair of adjacent panels and including the locking means and sealing means used to form a building structure;

Figure 3 is a top plan view of one of the laminated sheets and showing in dotted lines the end of said sheet in its final position;

Figure 4 is a perspective view of another form of the invention, and

Figure 5 is a perspective view of a third form of the invention.

It will be understood that the invention is not limited to the use of a metal "skin" on both sides of the panel; that only one key-receiving channel on one side only of a panel may be provided and that each of the sheets of backing material which may underlie the metal "skin" may be of plywood, although another backing sheet can be substituted therefor, all as hereinafter described.

It will be further understood that any one of the three types of panels shown in Figures 1, 4, and 5 may be employed as determined by the type of construction including the framework with which they may be employed.

Referring now to the drawing, and more particularly to Figure 1, the numeral **10** indicates the panel as a whole. Such panels are arranged side-by-side with key means as shown in Figure 2, connecting the adjacent or abutting sides of each pair of panels.

As shown, the panel **10** is provided with exterior and interior metal "skins" or layers **12** and **14**, respectively, although in some instances, the interior "skin" **14** may be dispensed with. Lying beneath at least one "skin" is a non-metallic layer **16** or **18**. These layers each may consist of low-tensile strength material, such as plywood, the individual layers of which are bonded to each other and the outside layer of which is bonded to the metallic "skin" to form with the "skin" a laminated sheet on one or both sides of the panel. Other materials than plywood may be used, such as beaverboard, stiplex, etc., but plywood is preferred because of its freedom from warping and cracking under varied climate conditions which include temperature and humidity variables. The thickness of a plywood sheet lends itself to the forming of a groove now to be described. A suitable rectangular or other shaped framework is provided, and this consists of the upper and lower frame pieces **20** and **22**, and side frame pieces **24** and **26**, all preferably composed of lumber.

Referring to Figures 1 and 2, it will be noted that the frame pieces **24** and **26** have a first pair of opposite faces **28** and **30** over which the laminated sheets extend, and a second pair of opposite faces **32** and **34**, each forming one wall of one of the key-receiving channels now to be described.

The several frame pieces form an enclosed space **36** which is preferably filled with suitable insulating material **38**, such as Fiberglas.

In the structure shown, and referring particularly to Figure 2 which is a horizontal section through the medial portion of any one of the forms shown in Figures 1, 4, and 5, each panel has a right angle flange **40** and a flange **42** which is at a substantially greater angle than 90° to the plane of its sheet, the right angle flanges and the acute angle flanges of adjacent panels being in juxtaposed position, as shown in Figure 2, and each layer of metal and the non-metallic layer forming both right angle and the obtuse angle flanges are bonded to each other. Preferably, each flange forms part of the laminated sheet on the opposite sides of the framework. Each laminated sheet is scored or cut, as shown at the corners of Figures 2 and 3 of the present application to allow for forming each right angle flange **40** and each acute angle flange **42**. The thickness formed by the several layers or flanges **40** and **42** is such that a key-receiving channel **44** of substantial thickness is formed. Each laminated sheet is of greater area than that defined by the framework consisting of upper and lower and side frame pieces.

The flanges **40** and **42** are held to the frame pieces by suitable means as by the nails **46**. When a pair of panels are in the position shown in Figure 2, the key-ways provide a space in which the key **48** is located to form a tight joint between the side edges of adjacent panels.

As will be noted with particular reference to Figure 2, when the panels are in this position, there is a space provided which extends along the longitudinal edges of the adjacent panels which is generally wedge-shaped in cross section, for the reception of mastic or other sealing means **50**.

Each flange **42** is made by providing a special notch **52** having sides **54** and **56** preferably. These sides form acute angles of different degrees with the plain face of the panel. The side **54** may be in the neighborhood of 20

to 30° with regard to the face of the panel and the side **56** approximately 40 to 50° to the face of said panel. In addition, the portion of the flange indicated by dotted lines **58** has been removed, so as to permit adjacent flanges to assume the angles shown in Figure 2 whereby to provide a wedge-shaped space for the reception of mastic **50**. The mastic or other sealing means **50** preferably forms an effective seal against the entrance of moisture from the outside, and said seal faces outwardly, although the invention is not limited to this construction, as the seal may face inwardly; i. e., it may form a portion of the inside wall of the structure instead of the outside wall of the same.

The structure shown, and particularly the provision of the mastic filled space allows for tolerances that may be necessary when the right angle flanges **34** do not form true right angles with the surface of the "skin" **14**, or where for some other reason, the panels are not in true alignment with each other. This may sometimes occur during the settling of the building, refrigerator, or other structure of which the panels form a part. Moreover, the mastic **50** provides a tight seal between the juxtaposed edges of adjacent panels.

Each of the opposite sides of the panel are provided with extension means **60** and **62**, respectively, which has been fully described in my Patent No. 2,629,140 of which this application is a continuation-in-part, and in my application filed concurrently herewith, the description of which will not be repeated herein. Each extension means is provided with apertures **64** for the reception of lag screws, bolts, or other attaching means whereby each panel may be detachably attached to the framework of a building, refrigerator, or other structure.

The structures of Figures 4 and 5 are similar to the structures shown in Figures 1, 2, and 3, except that in Figure 4, no extension means is provided, and in Figure 5 each extension means is provided on the same side of the panel.

Referring to Figure 4, the panel is indicated at **70**. The panel is provided with metal "skins" **72** and **74**, and non-metallic layers **76** and **78**, and with upper and lower frame pieces **80**, **82**, and side frame pieces **84** and **86**.

The side frame pieces have opposite faces **88** and **90**. The four frame pieces form an enclosed space **92** for the reception of insulating material **94**. The right angle flange is indicated at **96** and the flange which is at an angle that is substantially greater than a 90° angle with the plane of its sheet as indicated at **98**. These flanges provide a key-receiving channel **100**. The flanges are held in position by securing means such as nails **102**.

It will be understood that each non-metallic layer may be of plywood and all surfaces of the outer sheet of which are bonded to the metallic sheet including both the right angle and the acute angle flanges.

In the construction shown in Figure 5, the panel as a whole is indicated by **110**, and such panel is provided with metallic "skins" **112** and **114**, non-metallic layers **116** and **118**, upper and lower frame pieces **120** and side pieces **122** and **124**.

The right angle flanges are indicated at **126** and the acute angle flanges at **128**. Each right angle flange and the flange which extends at an angle to the plane of its sheet which is substantially greater than a 90° angle. This flange, with the right-angled flange, forms a key-receiving channel **130**, and the four frame pieces form a space **132** for the reception of insulating material **134**.

As shown, the panel **110** includes extension means **136** and **138**, both formed on the same side of the panel. These extension means are the same as the extension means noted in my patent above referred to, and in my application filed concurrently herewith. Each extension means is provided with apertures **140** extending therethrough for the reception of lag screws or bolts whereby panels may be detachably attached to the frame members of a building, or forming part of a refrigerating structure.

The above description and drawings disclose several embodiments of the invention, as specific language has been employed in describing the several figures. It will, nevertheless, be understood that no limitations of the scope of the invention are thereby contemplated, and that various alterations and modifications may be made such as would occur to one skilled in the art to which the invention relates.

Having thus described the invention, what is claimed as new and what is desired to be secured for Letters Patent is:

I claim:

1. A panel for use in building construction and refrigerators comprising in combination, a frame having a first pair and a second pair of opposite faces, two sheets of material, at least one of said sheets being laminated, said sheets of material extending across said first pair of opposite faces of said frame so as to form with said frame, an enclosed space, each of said sheets of material being of larger area than the area defined by said frame over which they extend with the ends of said sheets extending beyond the opposite side edges of at least one face of the frame forming flanges, the outer face of at least one of which extends at an angle which is substantially greater than 90° and the inner face of which extends at substantially a right angle to the plane of the sheet, attaching means for attaching each sheet to said frame, the pair of adjacent flanges on the same side of said frame forming a key-receiving channel, said channel extending along one of said second pair of opposite faces of said frame, said laminated sheet and its flange comprising an outer metallic layer and an inner non-metallic layer of material, said metallic layer and non-metallic layer of material being bonded to each other to form said sheet of laminated material including at least one of said flanges.

2. In a wall, a plurality of panels arranged in edge-to-edge abutting relation, each of said panels consisting of a frame having a first pair and a second pair of opposite faces, two sheets of material, at least one of said sheets being laminated, said sheets of material extending across said first pair of opposite faces of said frame so as to form with said frame, an enclosed space, each of said sheets of material being of larger area than the area defined by said frame over which they extend with the ends of said sheets extending beyond the opposite side edges of at least one face of the frame forming flanges, the outer face of at least one of which extends at an angle which is greater than 90° and the inner face of which extends at substantially a right angle to the plane of the sheet, attaching means for attaching each sheet to said frame, the pair of adjacent flanges on the same side of each panel forming a key-receiving channel, said channel extending along one of said second pair of opposite faces of said frame, said laminated sheet and its flange comprising an outer metallic layer and an inner non-metallic layer of material, said metallic layer and non-metallic layer of material being bonded to each other to form said sheet of laminated material including at least one of said flanges, the juxtaposed faces of the acute angle flanges of adjacent panels forming a space, sealing material in said space, and a key in a pair of facing key-receiving channels of said panels.

3. A panel for use in building construction and refrigerators comprising in combination, a frame having a first pair and a second pair of opposite faces, two sheets of material, at least one of said sheets being laminated, said sheets of material extending across said first pair of opposite faces of said frame so as to form with said frame, an enclosed space, each of said sheets of material being of larger area than the area defined by said frame over which they extend with the ends of said sheets extending beyond the opposite side edges of at least one face of the frame forming flanges, the outer face of at least one of which extends at an angle which is substantially greater than 90° and the inner face of which

extends at substantially a right angle to the plane of the sheet, attaching means for attaching each sheet to said frame, the pair of adjacent flanges on the same side of said frame forming a key-receiving channel, said channel extending along one of said second pair of opposite faces of said frame, at least one of said sheets and its flange comprising an outer metallic layer and an inner non-metallic layer of material, said metallic layer and non-metallic layer of material being bonded to each other to form said sheet of laminated material including at least one of said flanges, said panel having extension means on the opposite sides thereof for attaching said panel to the framework of a building or other structure.

4. A panel for use in building construction and refrigerators comprising in combination, a frame having a first pair and a second pair of opposite faces, two sheets of material, at least one of said sheets being laminated, said sheets of material extending across said first pair of opposite faces of said frame so as to form with said frame, an enclosed space, each of said sheets of material being of larger area than the area defined by said frame over which they extend with the ends of said sheets extending beyond the opposite side edges of at least one side of the frame forming flanges, the outer face of one of said flanges forming an angle which is substantially greater than 90° and the inner face of which extends at substantially a right angle with the plane of its sheet and another of said flanges forming a substantial right angle with the plane of said sheet, attaching means for attaching each sheet to said frame, the pair of adjacent flanges on the same side of said frame forming a key-receiving channel, said channel extending along one of said second pair of opposite faces of said frame, at least one of said sheets and its flange comprising an outer metallic layer and an inner non-metallic layer of material, said metallic layer and non-metallic layer of material being bonded to each other to form said sheet of laminated material including at least one of said flanges, said panel having extension means on the same side thereof for attaching said panel to the framework of a building or other structure.

5. In a wall, a plurality of panels, each of said panels

consisting of a frame having a first pair and a second pair of opposite faces, two sheets of material, at least one of said sheets being laminated, said sheets of material extending across said first pair of opposite faces of said frame so as to form with said frame, an enclosed space, each of said sheets of material being of larger area than the area defined by said frame over which they extend with the ends of said sheets extending beyond the opposite side edges of at least one side of the frame forming flanges, the outer face of at least one of which extends at an angle which is greater than 90° and the inner face of which extends at substantially a right angle to the plane of the sheet, attaching means for attaching each sheet to said frame, the pair of adjacent flanges on the same side of said frame forming a key-receiving channel, said channel extending along one of said second pair of opposite faces of said frame, said laminated sheets and their flanges each comprising an outer metallic layer and an inner non-metallic layer of material, said metallic layer and non-metallic layers of material being bonded to each other to form each of said laminated sheets of material and including the flanges thereof, the juxtaposed faces of the acute angle flanges of adjacent panels forming a space, sealing material in said space, and a key in a pair of facing key-receiving channels of said panels, said panels having extension means on the same side thereof for attaching said panels to the framework of a building or other structure, said extension means comprising portions of one of said sheets extending in opposite directions from said frame.

References Cited in the file of this patent

UNITED STATES PATENTS

1,493,991	Knight	May 13, 1924
2,165,336	Brogden	July 11, 1939
2,247,836	Goldbeck	July 1, 1941
2,447,272	Parkes	Aug. 17, 1948
2,629,140	Clements	Feb. 24, 1953

OTHER REFERENCES

American Builder, December 1937, page 62.