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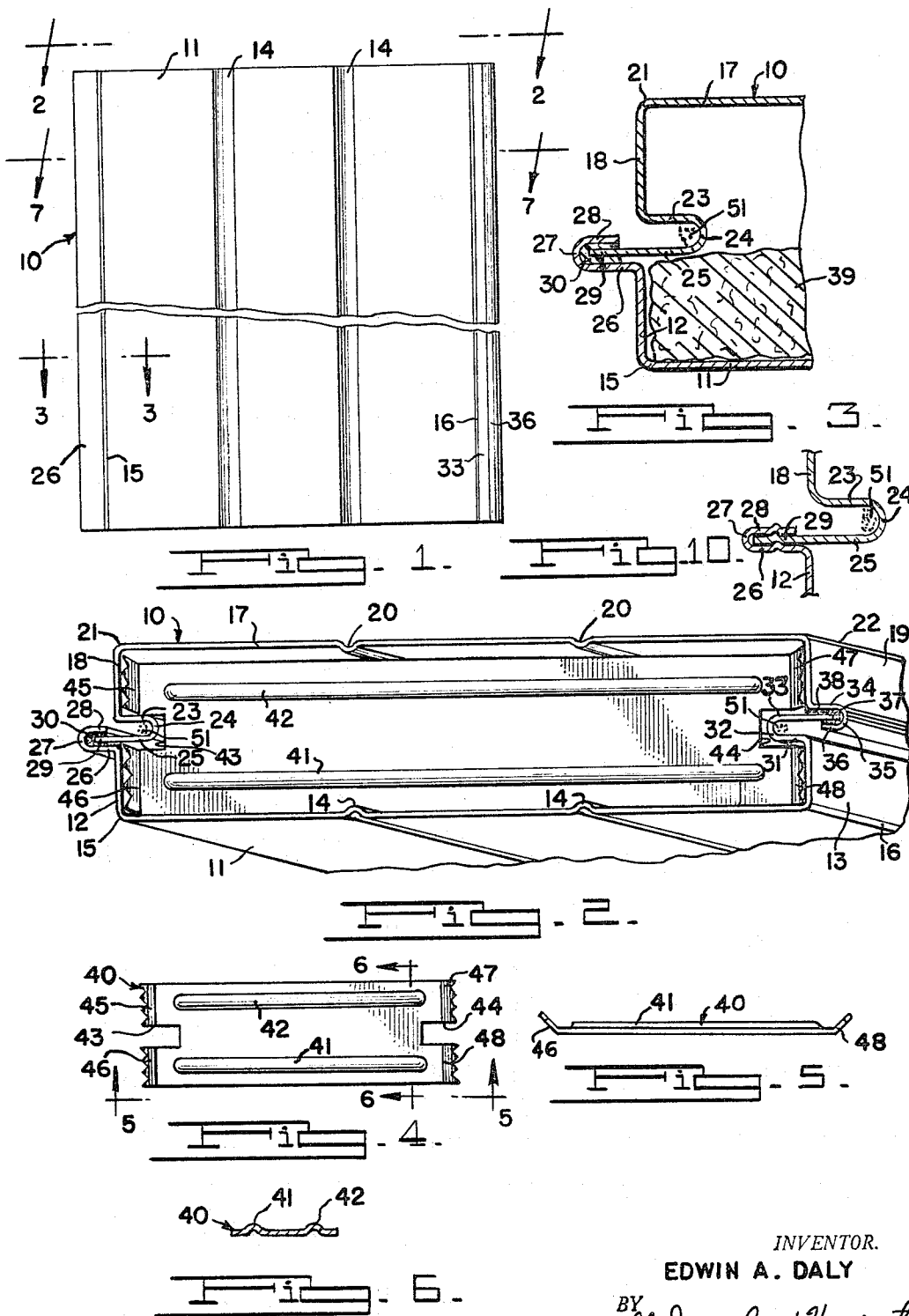
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COMPOSITE PANEL WITH INSULATING INSERT

Filed Sept. 3, 1963

2 Sheets-Sheet 1



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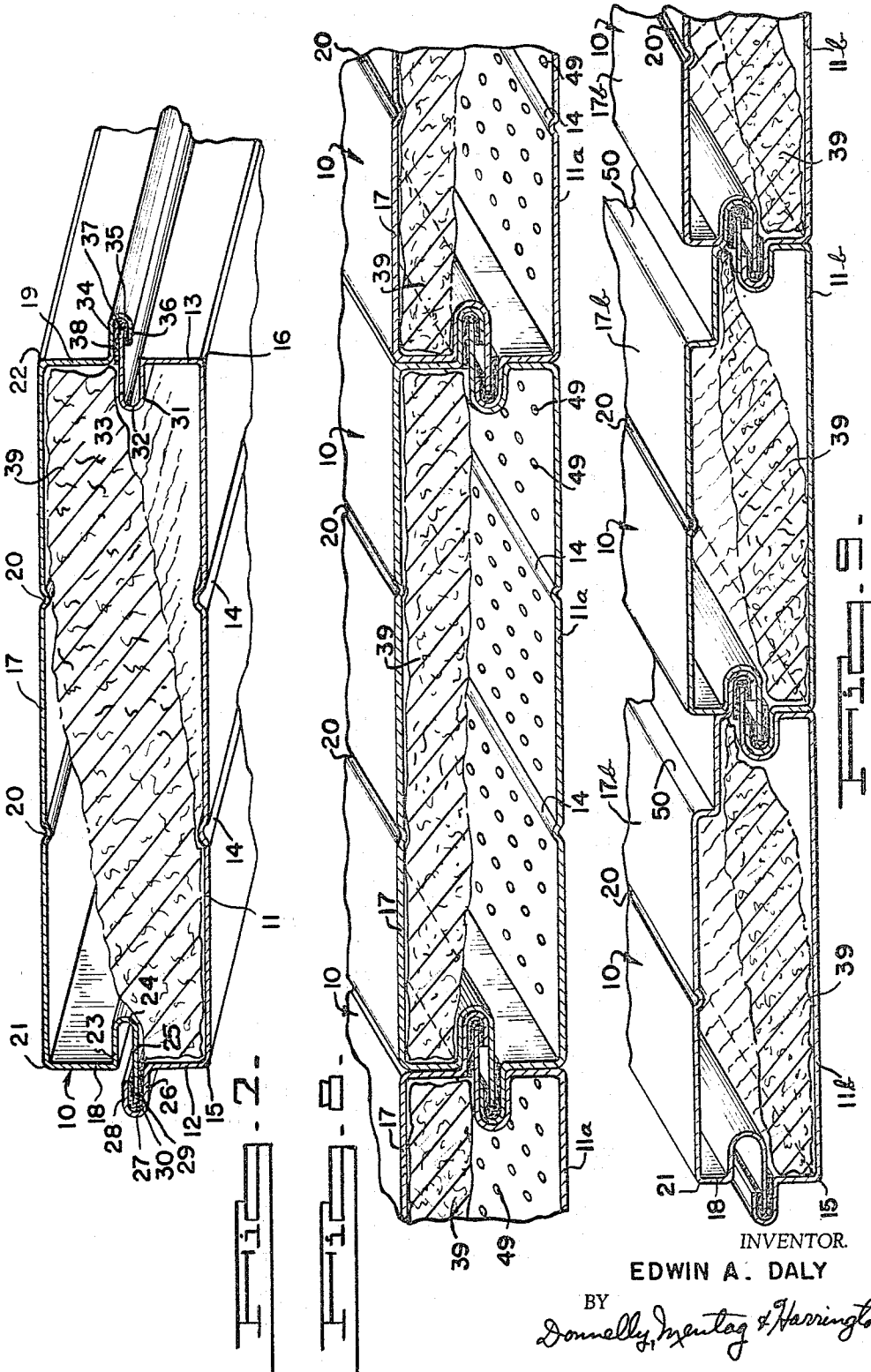
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COMPOSITE PANEL WITH INSULATING INSERT
Edwin A. Daly, Detroit, Mich., assignor to Walcon Corporation, Ecorse, Mich., a corporation of Michigan
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 7 Claims. (Cl. 52—145)

This invention relates to a metal building construction panel, and more particularly, to a novel and improved metal building panel formed from two substantially identical roll formed sections.

It is the primary object of the present invention to provide a novel and improved metal building construction panel which is preferably made from steel or aluminum sheet metal and which may be used in the construction of either load bearing or non-load bearing walls or roofs.

It is another object of the present invention to provide a novel and improved metal building construction panel which is simple and compact in construction, economical of manufacture, and which may be quickly and easily assembled in plural numbers to form panel assemblies for constructing building walls and roofs. The panels are adapted to be secured to a building by any suitable means, as by being welded, bolted or screw fastened to the structural steel girders or other supports in the building. The panels may be insulated and perforated for acoustical purposes.

It is a further object of the present invention to provide a novel and improved metal building construction panel which is formed from a pair of substantially identical roll formed sections provided with similar interengagable joint means on each end thereof for quick and easy locking connection with complementary joint means on adjacently disposed panels.

It is still another object of the present invention to provide a novel and improved metal building construction panel which in a preferred form may comprise a part termed an outer section, and another part termed an inner section which is formed substantially identical to said outer section but reversed in position relative to the same. Said outer and inner sections each having end walls, and the end walls on one section being aligned with the corresponding end walls on the other section and being connected together to form a male joint member and a female joint member on each end of the panel, and said joint members being formed for mating engagement with complementary joint members on adjacently disposed panels in a panel assembly incorporating a plurality of panels.

Other objects, features and advantages of this invention will be apparent from the following detailed description, appended claims, and the accompanying drawings.

In the drawings:

FIG. 1 is a broken elevational view of an insulated metal wall panel made in accordance with the principles of the present invention;

FIG. 2 is a fragmentary end perspective view of the structure illustrated in FIG. 1, taken substantially along the line 2—2 thereof, and looking in the direction of the arrows;

FIG. 3 is a fragmentary, enlarged horizontal sectional view of the structure illustrated in FIG. 1, taken along the line 3—3 thereof and looking in the direction of the arrows;

FIG. 4 is a plan view of a panel end enclosure plate for enclosing the ends of the panels of the present invention;

FIG. 5 is a side elevational view of the structure illustrated in FIG. 4, taken along the line 5—5 thereof and looking in the direction of the arrows;

FIG. 6 is a transverse sectional view of the structure

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illustrated in FIG. 4, taken along the line 6—6 thereof and looking in the direction of the arrows;

FIG. 7 is a transverse sectional view of the structure illustrated in FIG. 1, taken substantially along the lines 7—7 thereof and looking in the direction of the arrows;

FIG. 8 is a sectional view, similar to FIG. 7, and showing an assembly of a plurality of slightly modified panels made in accordance with the principles of the present invention;

FIG. 9 is a view similar to FIG. 8, and showing a further modified panel construction made in accordance with the principles of the present invention; and,

FIG. 10 shows a modified panel joint structure.

Referring now to the drawings and in particular, to FIGS. 1 through 6, the numeral 10 generally designates an insulated metal wall panel made in accordance with the principles of the present invention. The panel 10 is formed from two identical roll-formed sections as more fully described hereinafter.

As shown in FIGS. 1, 2 and 7, the panel 10 comprises the bottom roll formed section having the bottom wall 11 and the integral end walls 12 and 13. The panel bottom wall 11 is provided with a flat exterior face or surface in which is formed a plurality of laterally spaced apart, longitudinally extended U-shaped inwardly extended stiffening beads indicated by the numerals 14. The end walls 12 and 13 extend perpendicularly or normally, upwardly from the bottom wall 11 and are integrally joined to the bottom wall 11 at the lower ends thereof by the bevelled corners 15 and 16.

The panel 10 further includes the top roll formed section having the top wall 17 and the integral end walls 18 and 19. The panel top wall 17 is provided with a flat exterior face or surface in which is formed a plurality of laterally spaced apart, longitudinally extended, U-shaped, inwardly extended stiffening beads indicated by the numerals 20. The end walls 18 and 19 extend downwardly perpendicularly or normally from the top wall 17 and are joined to the top wall 17 at the upper ends thereof by means of the bevelled corners 21 and 22.

As shown in FIGS. 2, 3 and 7, the panel end walls 12 and 18 are vertically aligned and are joined together at the inner ends thereof so as to form a male joint member and a female joint member for interlocking engagement with complementary joint members on an adjacently disposed panel in a panel assembly. The inner end of the end wall 18 is first turned sidewardly inwardly of the panel to form the first wall portion 23 of the female joint member. The inner end of the end wall 18 is then folded over and extended outwardly of the panel to form the U-shaped inner end or second wall portion 24 of the female joint member. The inner end of the end wall 18 is then extended outwardly of the end walls 12 and 18 to form the third wall portion 25 of the female joint member. As best seen in FIG. 3, the female joint member is substantially centrally located in the panel with the female joint walls 23 and 24 being parallel to each other. The female joint member formed by the aforementioned structure extends longitudinally of the panel.

The inner end of the end wall 12 is turned sidewardly outwardly of the panel and formed in a manner similar to the inner end of the end wall 18, but in an oppositely disposed direction. As best seen in FIG. 3, the inner end of the end wall 12 is first turned sidewardly outwardly to form the first wall portion 26 of the male joint member. The inner end of the wall 12 is then folded over on itself to form the U-shaped second wall portion 27, and thence it is turned inwardly parallel to the first wall portion 26 to form the male joint member third wall portion 28. It will be seen that the folded over wall portions 26, 27 and 28 are adapted to receive the outer end 29 of the female joint member wall portion 25. A

suitable insulation material, as insulating tape 30, is disposed between the male joint wall portions 26, 27 and 28, and 29 for insulation purposes to prevent direct metal-to-metal contact between the top and bottom panel sections. It will be seen that the male joint member is extended outwardly sidewardly of the panel, and that it extends longitudinally thereof and in a position spaced laterally downwardly from the female joint member.

As shown in FIGS. 2 and 7, the other side of the panel is provided with a similar set of male and female joint members for interlocking engagement with complementary joint members on an adjacently disposed panel in a panel assembly. However, it will be seen that the positions of the male joint members are reversed on the right side of the panel, as viewed in FIG. 7, as compared to the positions of these joint members on the left end of the panel. As viewed in FIG. 7, the male joint member is disposed in a position offset downwardly from the female joint member while on the right side of the panel the male joint member is disposed in a position offset upwardly from the female joint member.

As shown in FIGS. 2, 3 and 7, the panel end walls 13 and 19 are vertically aligned and are joined together at the inner ends thereof to form a male joint member and a female joint member. The inner end of the end wall 13 is turned sidewardly inwardly of the panel to form the first wall portion 31 of a female joint member. The inner end of the end wall 13 is then folded over and extended outwardly of the panel to a point outwardly of the end walls 13 and 19 so as to form the U-shaped second wall portion 32 of the female joint member and the third wall portion 33 of the female joint member. The female joint member formed by the last mentioned structure is substantially centrally located between the section walls 11 and 17 of the panel. The female joint member formed by the last mentioned structure extends longitudinally of the panel and in a substantially co-planar, horizontally aligned position with the first described female joint member. The amount of offset between the female joint members depends on the thickness of the sheet material used. For example, in a panel twelve inches long and three inches thick and made from sheet metal .138 thick the center-lines of the female joint members were offset from each other about .202 inch.

The inner end of the end wall 19 is turned sidewardly outwardly of the panel and formed in a manner similar to the outer end of the end wall 13, but in an oppositely disposed direction. The inner end of the end wall 19 is first turned sidewardly outwardly to form the first wall portion 34 of the male joint member. The inner end of the wall 19 is then folded over on itself to form the U-shaped second wall portion 35 and thence it is turned inwardly parallel to the first wall portion 34 to form the male joint member third wall portion 36. It will be seen that the male joint member formed by the folded over end of the wall 19 is adapted to receive the outer end 37 of the last mentioned female joint member wall 33. A suitable insulation material, as insulating tape 38, is disposed between the male joint portions 33, 35, and 36, and 37 for insulation purposes to prevent direct metal-to-metal contact between the two sections of the panel. It will be seen that the last mentioned male joint member is extended outwardly sidewardly of the panel and that it extends longitudinally thereof in a position laterally spaced upwardly from the female joint member. It will also be seen that the male joint member on the right end of the panel is disposed upwardly in vertically offset, parallel disposition, relative to the male joint member on the left end of the panel.

The aforescribed panel is generally rectangular in shape and is preferably made from light-gauge steel or aluminum sheet material although it will be understood that other suitable materials may be used. The aforescribed panel may be made to any suitable size as for example, in one embodiment, the panel was twelve

inches in width, from end wall to end wall, and three inches thick. Since the panels are formed from two identically shaped but reversed in position roll formed sections, the length of the finished panels may be made to any desired dimension. The panels may be assembled in a horizontally disposed panel assembly to form a roof deck construction, or they may be disposed vertically in panel assemblies for use as either a load bearing wall or a non-load bearing wall. The material selected for use in the panels would be selected according to whether or not they are going to be used for load bearing or non-load bearing uses.

As shown in FIG. 7, a batt of suitable insulation material 39, as for example, a one inch thick layer of glass fiber material, may be inserted in a diagonal position in the panel for insulation or acoustical purposes. The ends of the panel may be closed by a suitable end closure plate generally indicated by the numeral 40 in FIGS. 2, 4, 5 and 6. The end closure plate 40 is substantially rectangular in over-all plan configuration and is provided with the spaced apart longitudinally extended stiffening beads 41 and 42. The closure plate 40 is provided on each end thereof with a centrally disposed, inwardly extended recess or cut-out portion, as 43 and 44, for reception of the inwardly extended female joint members. The opposite end portions of the closure plate 40 are turned upwardly as shown in FIGS. 4 and 5, and as indicated by the numerals 45, 46, 47 and 48. The closure plate turned-up portions 45, 46, 47 and 48 are provided with teeth on the outer edges thereof, as shown in FIGS. 2 and 4. An end closure plate 40 as described is adapted to be press-fitted into each end of the panel and the aforementioned teeth will grip the end walls of the panel sections and retain the closure plate in place.

FIG. 8 shows a fragmentary, end perspective view of a portion of a panel assembly made with a plurality of the aforescribed panels in a slightly modified form. The bottom walls 11a of the panels shown in FIG. 8 have been provided with perforations indicated by the numerals 49 for acoustical purposes. FIG. 8 illustrates how the centrally disposed female joint members in each particular panel receive the male joint members on the two adjacent panels. It will be seen that the middle panel in FIG. 8 has its male joint members disposed in the female joint members in the left and right panels. It will be seen that the panel top walls and the panel bottom walls of the adjacently disposed and interlocked panels are disposed parallel with each other. In this acoustical panel assembly, the insulation material 39 has been mounted in the top panel section.

FIG. 9 is a fragmentary, end perspective view of a portion of a panel assembly formed from a plurality of modified panels. The only difference in the panels employed in the assembly of FIG. 9 is that the outer walls 17b have each been provided with a longitudinally extended flute or recess 50 along one corner for decorative purposes and the inner walls 11b are not provided with stiffener beads. It will be seen that variations in the outer and inner walls may be made as illustrated in FIG. 9, but that the male and female joint members on each side of the panels are formed in the same manner as in the embodiment of FIGS. 1 through 7.

FIG. 10 illustrates a slight variation in the structure of the male joint members. FIG. 10 illustrates a fragmentary sectional view of a male joint member, on the left side of a panel, in which the insulating tape 30 has been deleted. In this modification, the various portions of the male joint member are squeezed and clinched tightly together in metal-to-metal contact. The male joint member on the right side of the panel would also be provided with the same structure. A panel constructed in this manner may be used without insulation therein to construct a strong and light roof deck.

It will be understood that the panels may be provided in any desired length depending upon the vertical extent

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of the structure to be formed therewith. It will also be understood that the inner and outer surfaces of the panels may be decorated in any desired manner as by painting, papering, veneering, and etc. The joints between the panels in the panel assembly may also be provided with suitable caulking 51 to form effective weathertight seals therebetween. Experience has shown that a roof or wall may be quickly and easily formed from a plurality of panels made in accordance with the principles of the present invention.

It is to be noted that the terms "top section" and "bottom section" are used interchangeably in this application with the terms "outer section" and "inner section," respectively. The terms "top wall" and "bottom wall" are also used interchangeably in this application with the terms "inner wall" and "outer wall," respectively.

The novel joint structure of the panel of the present invention resists the entrance of water and other weather elements between the panels of a panel assembly. The panel sections are rigidly secured together by the interconnected novel joint construction on each end of the panel without the need for such connectors as staples and the like which are used in the prior art panels. It will be seen that the female joint members also function as shelves for supporting sound barrier materials between the panel sections.

While it will be apparent that the preferred embodiments of the invention herein disclosed are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What I claim is:

1. A building construction panel comprising: an inner section and an outer section spaced from said inner section; said sections being formed from sheet-like material; a longitudinally extended joint means formed on each side of the panel and extending longitudinally thereof and adapted to interfit with a complementary joint means on a similar panel when assembled with other panels in side-to-side cooperative relationship; each of said joint means having a female member extended inwardly into the panel and a male member disposed parallel with said female member and laterally offset therefrom and extended sidewardly outwardly from the panel; said inner section including an inner wall and a pair of integral inwardly extended end walls; said outer section including an outer wall and a pair of integral inwardly extended end walls; the end walls on each of the panel sections being extended perpendicularly inward with the adjacently disposed end walls on each end of the panel being aligned with each other; the female member of the joint means on one end of the panel being U-shaped and including a first wall portion integral with the end wall on the outer panel and a second wall portion parallel to the first wall portion and spaced apart therefrom and having the end thereof extended sidewardly outward from the panel beyond the adjacent end walls of the panel; the male member of the joint means on said one end of the panel being U-shaped and including a first

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wall portion integral with the adjacent end wall on the inner panel and a second wall portion parallel to the first wall portion and spaced apart therefrom and having the end thereof extended towards said last mentioned end wall but stopping short thereof; the U-shaped female member being offset from the U-shaped male member; the open ends of said U-shaped members facing each other; the outwardly extended end of the female U-shaped member second wall portion being extended into the U-shaped member of the male member of the joint means; the female member of the joint means on the other end of the panel being formed identical to said last named female member but being integral with the inner panel; and, the male member of the joint means on the other end of the panel being identical to the last named male member but being integral with the outer panel; said panel including a closure plate on each end of said panel, said closure plate having friction gripping means at each end thereof to hold the closure plate in said panel, and opposed inwardly disposed recesses at each end of said closure plate receiving the U-shaped portion of said female joint means.

2. A building construction panel as defined in claim 1, wherein: the inner section is provided with a perforated inner wall for acoustical purposes; and, a sound absorbent material is mounted between the inner and outer sections.

3. A building construction panel as defined in claim 1, wherein: said inner and outer sections are provided with insulation means therebetween to eliminate direct contact between the sections.

4. A building construction panel as defined in claim 1, wherein: the female joint members on the opposite ends of the panel are disposed in offset, parallel alignment with each other, and said male joint members are disposed in offset parallel alignment with each other.

5. A building construction panel as defined in claim 1, wherein: said inner and outer walls have similarly shaped cross sections and are in a plane parallel with each other.

6. A building construction panel as defined in claim 1, wherein: said inner and outer walls are provided with differently formed profiles.

7. A building construction panel as defined in claim 1, wherein: the male member of each of the joint means includes insulation material between said outwardly extended end of the female U-shaped member second wall portion and the U-shaped member of the male member.

References Cited by the Examiner

UNITED STATES PATENTS

2,589,633	3/1952	Shepard	52-620
2,899,028	8/1959	Walker	52-579
3,048,244	8/1962	Callahan et al.	52-408
3,080,022	3/1963	Mote	52-407

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