# United States Patent [19]

**Ewing**

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[54] **PANEL FOR USE IN A MODULAR CONCRETE FORM**


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[52] **U.S. Cl.** ..... **249/189,** 249/157, 249/196, 249/219 W

[51] **Int. Cl.** ..... **E04g 9/00**

[58] **Field of Search** ..... 249/189, 192, 194, 196, 249/219 W, 187, 188, 157, 159, 155, 48, 49



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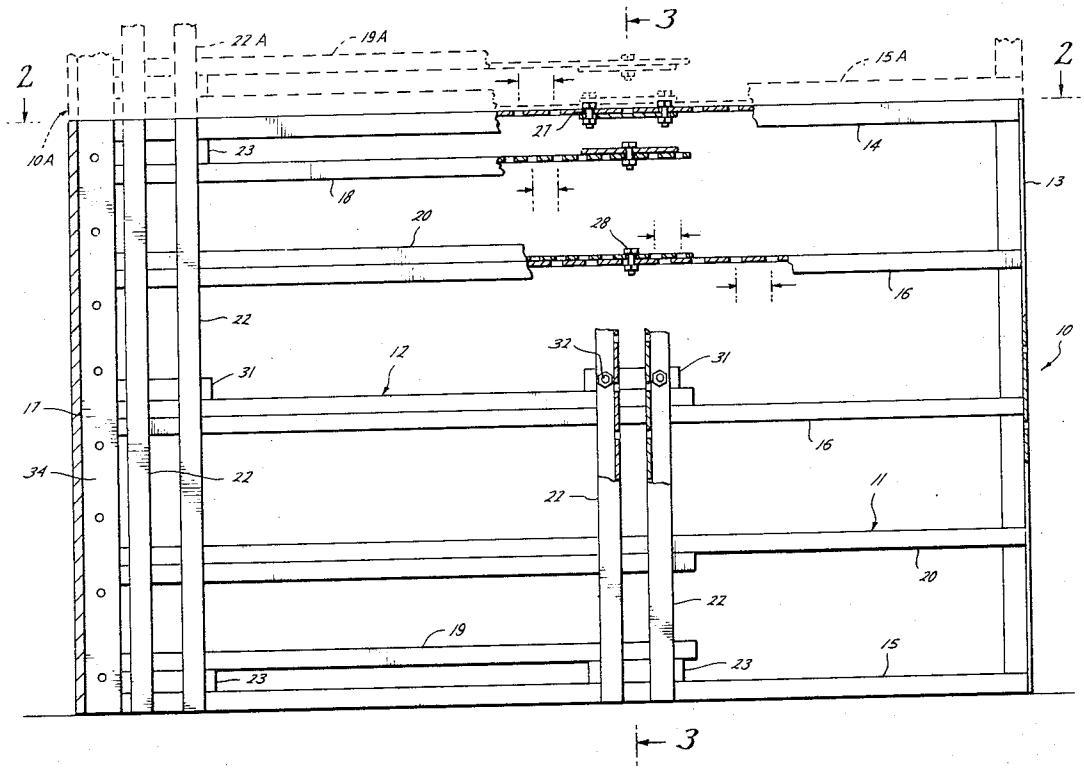
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[57] **ABSTRACT**

A modular concrete form panel made up of laterally adjustable and interfitting sections.


**7 Claims, 5 Drawing Figures**



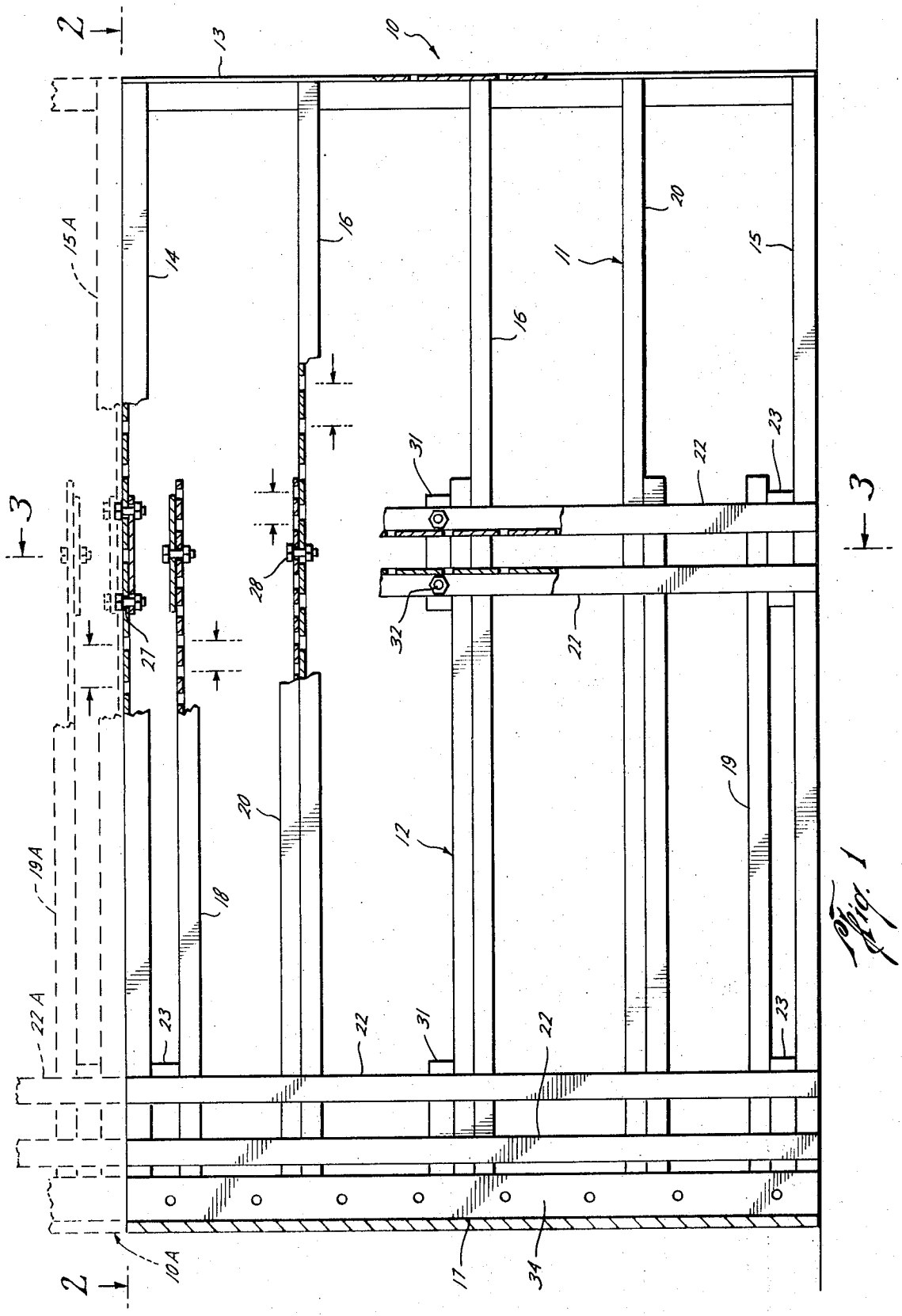

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Fig. 1

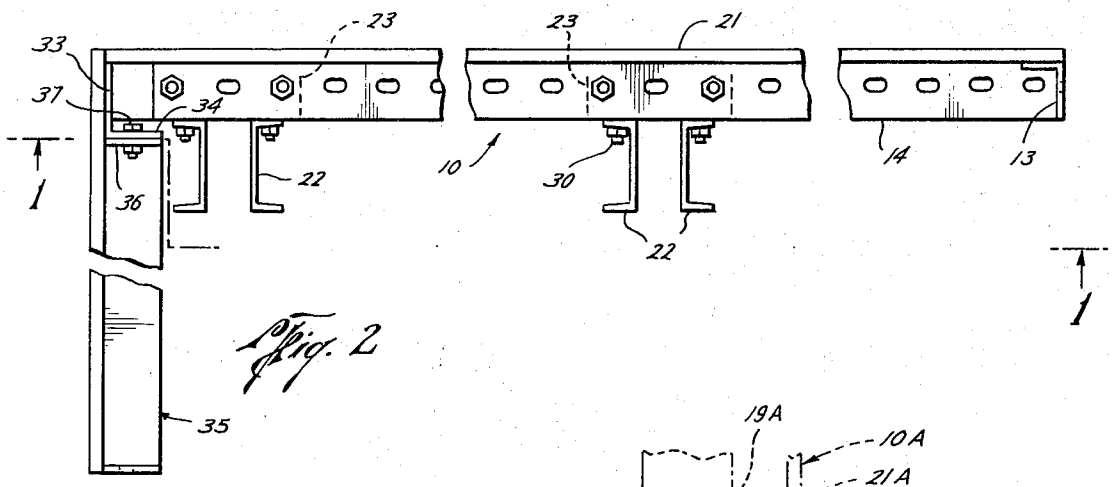



Fig. 2

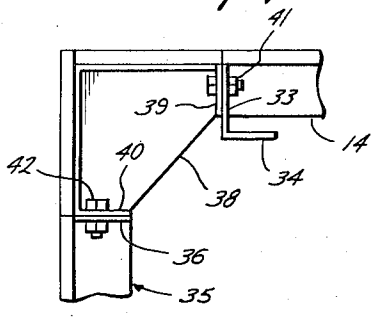



Fig. 2A

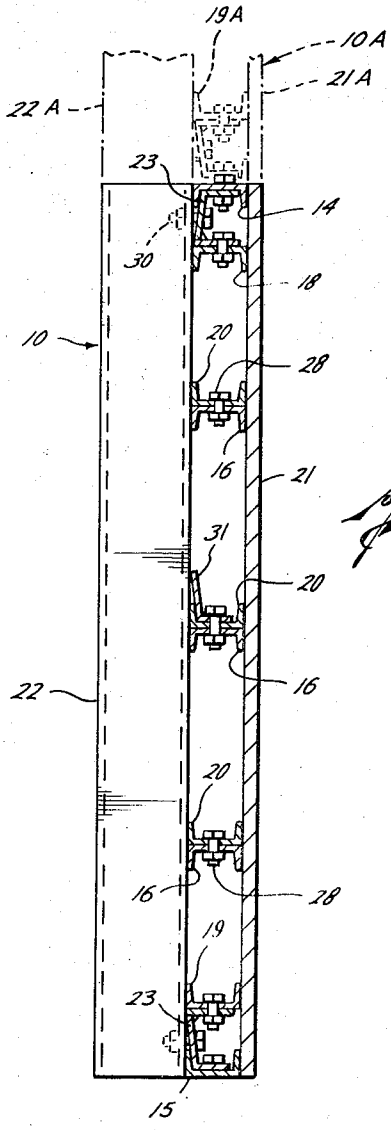



Fig. 3

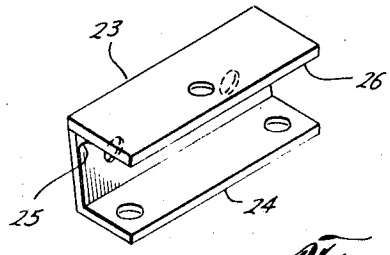



Fig. 4

# PANEL FOR USE IN A MODULAR CONCRETE FORM

This invention relates to modular concrete forms of lightweight construction. More particularly, it relates to improvements in panels for use in such forms.

Prefabricated panels of this type are connected end-to-end and one above the other, as required to make up the inner and outer forms. Each panel comprises upright side members and transverse members extending laterally between the side members. A skin of wood or other suitable material is secured to the face of the panel on which the concrete is to be retained, and one or more upright reinforcing members known as "wales" are secured to the opposite face of the panel.

The principal advantage of forms of this type is that the panels may be disconnected for reuse at other jobs. Also, of course, it's not necessary to build each form in its entirety at the job site, as is required in the case of more conventional forms. Obviously, however, it's impractical to stock the panels in all conceivable sizes, and consequently each job normally requires panels of special sizes at one end of each wall.

It is therefore an object of this invention to provide panels which eliminate the need for these special sizes; and, more particularly, to provide panels for a system of this type which are adjustable to different lengths.

Another object is to provide such a panel which is made up of basically the same lightweight parts as the standard length panels of conventional modular forms; and, more particularly, in which a major portion thereof may be made up from part of a standard length panel.

A further object is to provide a panel of the type above described which may be easily and quickly adjusted to the desired length, and which may be connected to and disconnected from adjacent panels with the same facility as standard length panels.

In the drawings, wherein like reference characters are used throughout to designate like parts:

FIG. 1 is a cross-sectional view of one corner of an inner form, as seen along broken line 1—1 of FIG. 2, and including a panel constructed in accordance with this invention and having a portion thereof broken away to show certain details of its construction;

FIG. 2 is a top plan view of the form of FIG. 1, as seen along broken line 2—2 of FIG. 1;

FIG. 2A is a top plan view of the corner of another form including one end of the panel of FIGS. 1 and 2 connected to a rigid corner piece;

FIG. 3 is a vertical sectional view of the panel, as seen along broken line 3—3 of FIG. 1; and

FIG. 4 is an enlarged perspective view of a clip used in connecting wales to the panel.

With reference now to the details of the above-described drawings, the panel which is shown in FIGS. 1 to 3, and indicated in its entirety by reference character 10, includes laterally adjustable and interfitting first and second sections 11 and 12, respectively. The first section 11 is made up of an upright side member 13 and upper, lower and intermediate members 14, 15 and 16, respectively, extending laterally therefrom. Similarly, the second section 12 is made up of an upright side member 17 and upper, lower and intermediate members 18, 19 and 20, respectively, extending laterally therefrom.



More particularly, the side members 13 and 17 are generally of the same height, and the side members as well as the laterally extending members are of generally the same thickness, from front to back, so that the front and back faces of the panel sections are generally coplanar. Consequently, and as will also be described hereinafter, a skin 21 of wood or the like may be secured to the front face of the panel to contain the concrete, and one or more wales 22 may be connected to the back faces of the sections, as will be described to follow, in order to lend rigidity and strength to the panel.

As shown in the drawings, the upper member 14 of first section 11 is spaced vertically above the upper member 18 of second section 12, the lower member 15 of first section 11 is spaced vertically below the lower member 19 of second section 12, and each of the intermediate members 16 of the first section 11 is slidable over an intermediate member 20 of the second section 12. The upper, lower and intermediate members of the first section are equal in length, with the upper, lower and intermediate members being vertically spaced apart generally equal distances, whereby the first section may be fabricated from a panel of conventional construction. Although adjacent upper, lower and intermediate members of the second section are not vertically spaced generally the same distances, they nevertheless are of the same length and otherwise similar in construction to the members of the first section, as will be described hereinafter, so that the second section may also be conveniently fabricated from parts of conventional forms of this type.

When interfitted with one another, the panel sections 11 and 12 are releasably connected together to form a panel having a length from one end to the other, which upon release of the connection, may be adjusted to provide a panel of another desired length. The considerable lateral extent of the upper, lower and intermediate members of the first section 11 insures considerable overlap with those of the second section, and thus a wide range of adjustability.

In the preferred form of the invention, the laterally extending members of both sections are formed of metal channels which, although lightweight, lend considerable structural strength to the panel when connected as shown and described. The channels forming the upper and lower members 14 and 15 of the first section 11 are arranged with their flanges facing inwardly toward one another and thus toward the panels forming the upper and lower members 18 and 19 of the second section 12. These latter channels are also preferably arranged with their channels facing inwardly toward one another, and thus away from the channels forming the upper and lower members 14 and 15. The channels 16 and 20 forming the intermediate members of the sections 11 and 12 are, on the other hand, arranged with their webs back-to-back and slidable laterally over one another.

As will be apparent from the broken away section of FIG. 1, bolt holes in the webs of the intermediate channels of each section are laterally spaced apart the same distance as bolt holes in the upper and lower channels thereof, thereby further facilitating fabrication of the panel. However, as will also be apparent from the broken away portion of FIG. 1, the bolt holes in the channels of first section 11 are spaced more widely apart than the bolt holes in the channels of second section

12. This provides a considerable range of adjustability in aligning the holes of slidable intermediate members 16 and 20 of the two sections preparatory to connecting them together. Thus, when the holes of the slidable pairs of intermediate channels are so aligned, bolts 28 may be extended therethrough and secured by nuts for holding the sections in adjusted position.

The upper members 14 and 18 and the lower members 15 and 19 of the first and second sections, respectively, are connected to one another by means of U-shaped clips 23. As best shown in FIG. 4, each such clip includes an angle having a horizontal leg 24 and an upright leg 25, and a bar 26 welded to the leg 25 and extending generally parallel to the horizontal leg 24. For purposes which will be apparent from the description to follow, there are bolt holes in each of the bar 26 and legs 24 and 25. As illustrated, there are laterally spaced pairs of bolt holes in the legs 24 and 25 and a single hole in bar 26, although obviously more holes may be provided in each.

As shown in FIGS. 1 and 2, a pair of clips are arranged in laterally spaced locations between the upper members and between the lower members, respectively, of the first and second sections, with the horizontal leg and bar adjacent the webs thereof and the upright leg 25 extending across the vertical space between the channels on the back sides of the sections. More particularly, the clips are arranged one above the other near the overlap of the sections 11 and 12 as well as near the left end of the panel. When so arranged, the clips are releasably connected to the upper and lower channels of the two sections by bolts 27 extendible through holes in the channels aligned with the above-mentioned holes in the clip, whereby nuts may be secured to the bolts for further holding the sections in adjusted positions.

As described to follow, wales 22 are connected to the upper and lower ends of the panel by bolting to the clips 23, and to a vertically intermediate portion of the panel by clips 31 each comprising an angle similar to the angle of the clip 23. A pair of laterally spaced clips 31 are arranged with their horizontal legs extending along the web of the central intermediate channel 20 and their vertical legs extending vertically above the flanges of such channels adjacent the back faces of the panel sections. More particularly, each clip 31 has a hole for connecting it to intermediate channel 20 in vertical alignment with the clips 23. The vertical leg of the clip 31 also has a pair of bolt holes therein which are vertically aligned with the pair of holes in leg 25 of clips 23, to permit connection of wales 22, as described below.

Each of the wales also comprises a metal channel, although of larger and heavier construction than the lightweight channels making up the laterally extending channels of the panel sections. Closely spaced pairs of the wales are arranged in vertical positions against the flanges of the channels of the laterally extending channels at the back faces of the panel sections 11 and 12 so as to align bolt holes in their flanges with bolt holes in the vertical legs of the clips 23 to receive bolts 30 and with bolt holes in the clips 31 to receive bolts 32. Nuts may be secured over the ends of these bolts to maintain the wale flanges tightly against the flanges of the laterally extending section members.

As shown in FIGS. 1 and 2, each side member 13 comprises a metal angle arranged with one leg perpendicular to the front and back faces of the panel sections. The ends of the upper, lower and intermediate members 14, 15 and 16 are welded to the angle in any suitable manner. The side members 17 of the section 12 includes a metal plate 33 extending perpendicularly to the front and back faces of the panel sections. The outer ends of the channels making up the upper, lower and intermediate members of the second section 12 are welded to the plate in any suitable manner. The plate 33 extends beyond the back faces of the panel sections, and a flange 34 secured to such outer end extends inwardly toward the side member 13 and spaced from the back faces.

More particularly, a series of vertically spaced-apart bolt holes are provided in the flange 34 to facilitate connection of the panel 10 to a panel 35 extending perpendicularly therefrom adjacent the corner of the form. Thus, as shown in FIG. 2, the panel 35 has a vertical end plate 36 which may be provided with similarly vertically spaced-apart bolt holes to receive bolts 37 for releasably connecting the flange 34 and end plates 36 to one another.

Alternatively, and as shown in FIG. 2A, the panel 10 may be connected to a rigid corner piece 38 of another form and having plates 39 and 40 extending from opposite corners thereof. For this purpose, the end plate 33 of the side member 17 may have a series of vertically spaced bolt holes to receive bolts 41 for extending through aligned holes in plate 39 of the corner piece. The plate 40 of the corner piece may also be provided with vertically spaced-apart holes for alignment with holes in the plate 36 of panel 35 to receive bolts 42 for connecting them together.

It will be understood, of course, that the panel 10 may be connected at its right-hand end to another panel, which may also be of adjustable construction, or which may instead be of conventional construction. Also, and as indicated in broken lines in FIGS. 1 and 3, another adjustable panel 10A similar to the panel 10 may be connected to the upper end thereof. In this event, the web of the lower channel member 15A of the section 11A of the panel 10A will lie over the web of the upper channel 14 of the section 11 of the panel 10. Also, and as indicated in FIG. 1, the bolts 27 for connecting the clip 23 to the upper member 14 of panel 10 may be of sufficient length to connect the member 15A of panel 10A to the member 14 and also clip 23A of panel 10A to the member 15A.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. A panel for use in a modular concrete form, comprising laterally adjustable and interfitting first and sec-

ond open framework sections each including an upright side member and upper, lower and intermediate members extending laterally from the side member, means releasably connecting the upper, lower and intermediate members of the first section in laterally overlapping relation to the upper, lower and intermediate members, respectively, of the second section, the faces of the upright, upper, lower and intermediate members providing a front side of the panel to which a flat skin will be secured, a wale, and means releasably connecting the wale to laterally overlapping portions of said upper, lower and intermediate members of said first and second sections for maintaining it tightly against the faces thereof on the back side of the panel.

**2.** A panel of the character defined in claim **1,** wherein the upper and lower members of said first section are channels having their flanges facing inwardly, and the clips are connected to the webs of said channels.

**3.** A panel of the character defined in claim **1,** wherein the first and second clips are connected to both of said upper and lower members, respectively.

**4.** A panel of the character defined in claim **3,** wherein the upper and lower members of said both sections are channels, with the flanges of the first section facing inwardly, and the clips are connected to the webs of said channels.

**5.** A panel of the character defined in claim **1,** wherein each section has at least one additional member extending laterally from the side member thereof, each of the intermediate members of one section being laterally slidable over an intermediate member of the other section, and means connecting each pair of slidable intermediate members to one another.

**6.** A panel of the character defined in claim **5,** including a third clip, means connecting the third clip to one of said intermediate members, and means releasably connecting the wale to the third clip vertically beyond said one intermediate member for maintaining its side edge tightly against the side edges of said intermediate members on the back faces of said sections.

**7.** A panel of the character defined in claim **5,** wherein the slidable intermediate members comprise channels having their flanges facing away from one another and their webs tightly engaged.

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