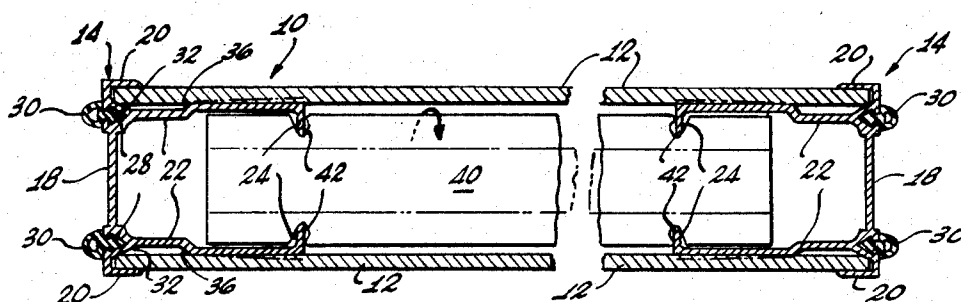




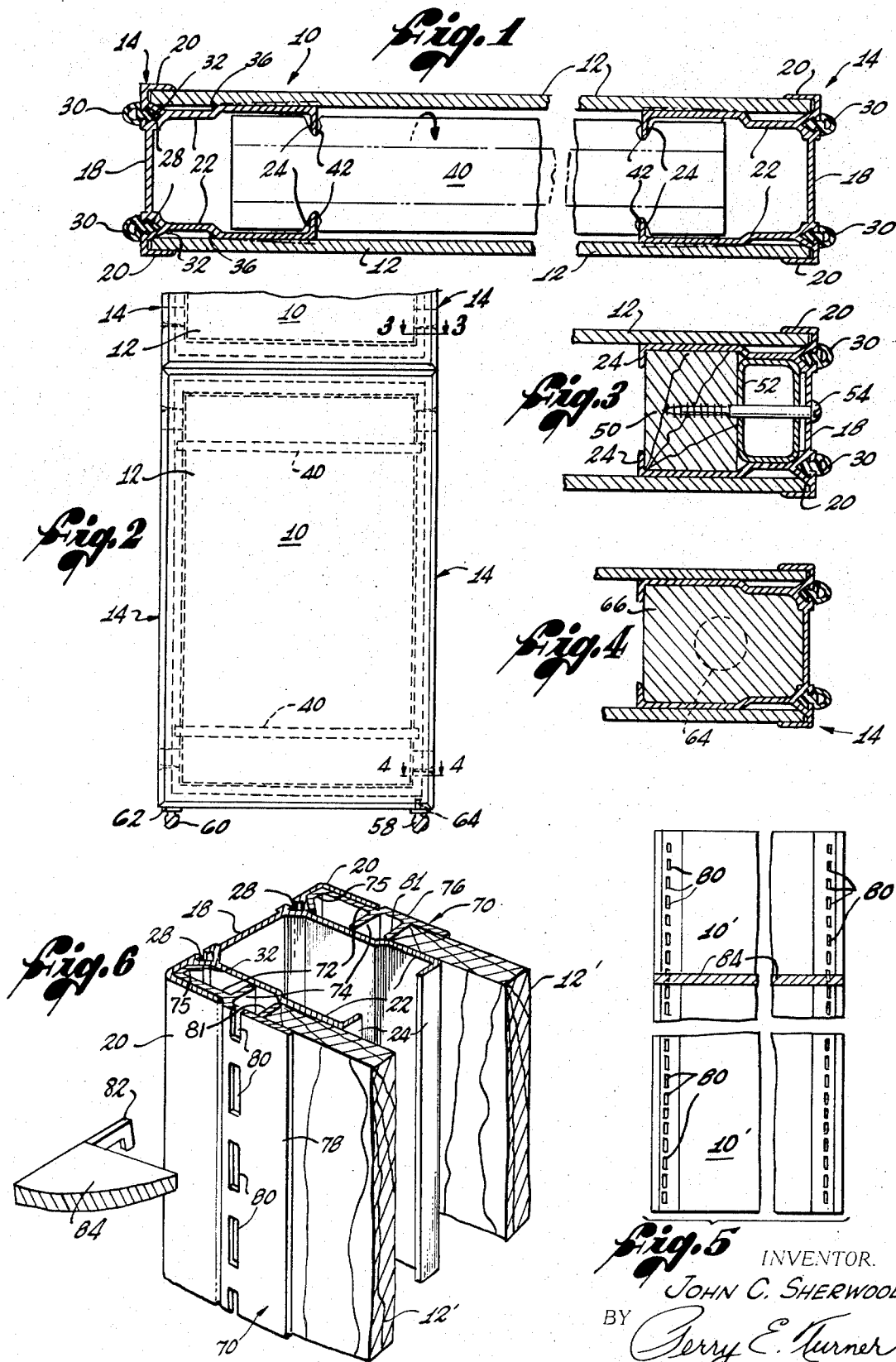
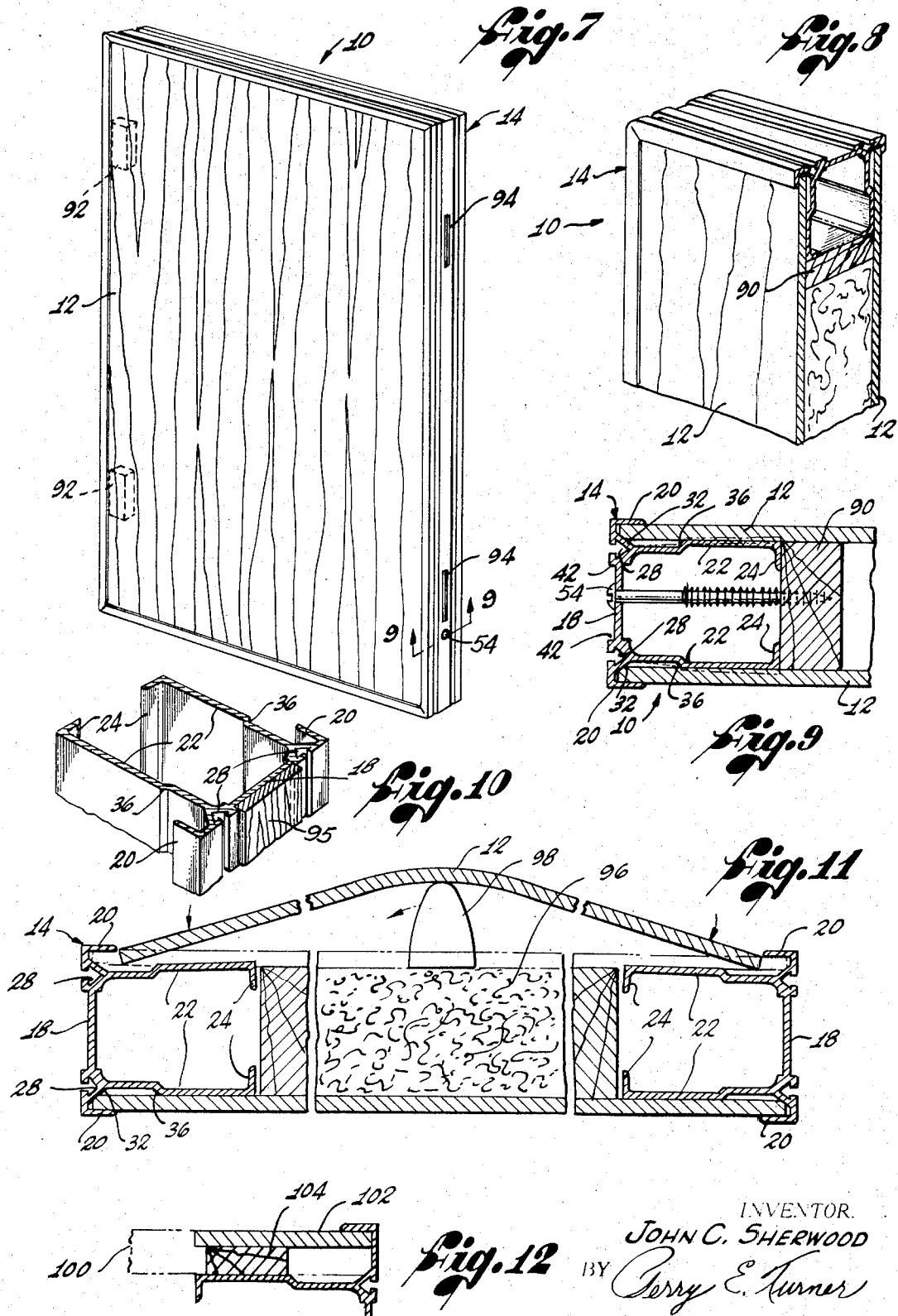


Fig. 5 INVENTOR.
JOHN C. SHERWOOD
BY *Gerry E. Turner*
ATTORNEY



INVENTOR.
 JOHN C. SHERWOOD
 BY *Cory E. Turner*
 ATTORNEY

PANEL AND STILE CONSTRUCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to hollow core panels and hardware therefor.

2. Description of the Prior Art

It is known to provide hollow core panels with stiles which have spaced grooves to receive the edges of the face sheets of the panel. With such edge fittings, the panel must be provided with separate means to support the panel in a variety of ways, as where a panel is to be supported on casters or stands, or where two or more such panels are to be mounted on end to achieve greater height. Such fittings also do not serve as integral structural parts of the panel capable of coaction both to keep the stiles and panels interlocked and in mutual supporting relation.

SUMMARY OF THE INVENTION

This invention embraces a hollow core panel having an edge stile construction having edge walls lapping the edges of face sheets and inner spring walls of substantial width which are self-biased against the inner surfaces of the face sheets. Also embraced by this invention are such panels with elongated elements lockingly engaging the inner ends of the inner walls, and rods and splines shaped to be matingly received within spring walls. Further, this invention embraces such a panel wherein the stile is substantially continuous around the panel. Also embraced is the structure and method wherein the face sheets and spring walls are bonded together.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional view of a panel and stile construction of the invention, and showing interlocking means in the form of an elongated plate;

FIG. 2 is a front elevation view of a pair of panels on end;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2, showing a cooperative stile and spline arrangement of the invention for supporting panels end to end;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 2, showing a cooperative stile and insert for supporting a panel on casters or stands;

FIG. 5 is a fragmentary front elevation view of a panel with slotted members for shelving;

FIG. 6 is a fragmentary perspective view of the panel of FIG. 5, partly in section, illustrating the cooperative structural relation of the stile, slotted members and panels;

FIG. 7 is a perspective view of a panel wherein the top and vertical edges of the face sheets are fitted with a stile of the invention that is formed as a single element;

FIG. 8 is a fragmentary perspective view, partly in section, of a corner portion of the panel of FIG. 7;

FIG. 9 is a sectional view taken along the line 9—9 of FIG. 7;

FIG. 10 is a fragmentary perspective view, partly in section, of a stile of the invention wherein a decorative face strip is bonded to the web of the stile;

FIG. 11 is a sectional view of a hollow core panel of the invention in assembly, to aid in explaining the

method and construction whereby the face sheets are bonded to the stile; and

FIG. 12 is a fragmentary sectional view of a panel of the invention wherein a stile shaped to receive a relatively thick face sheet is adapted to accommodate a substantially thinner face sheet.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Referring to FIG. 1, a panel 10 is shown which has decorative face sheets 12, e.g., laminated plywood with a hardwood veneer on one surface, and stiles 14 which cap the vertical edges of the sheets 12. The panel 10 preferably is of the hollow core type, wherein the space between the face sheets includes lightweight material, e.g., expanded cardboard honeycomb.

The stiles 14 are extruded members (e.g., aluminum) of unique construction. Such construction has the appearance of a shallow channel within which is a relatively deep channel. The stile has a rigid web 18 which terminates in narrow rigid walls 20 at right angles thereto, and relatively wide walls 22 with spring action that are spaced inwardly of the walls 20, such wider walls terminating in lips 24 bent inwardly at right angles thereto. The portions of the web from which the spring walls 22 extend are of enlarged cross section, and are provided with grooves 28 in their outer surfaces which are suitably shaped to matingly receive and interlock with sealing strips 30. Such enlarged portions are formed with chamfers 32 which form the transitions between the walls 22 and the portions of the web from which the walls 20 extend.

As shown, the outer portions of the spring walls 22 are slightly offset relative to the inner portions thereof, and preferably the transitions 36 between such offset portions form obtuse angles therewith. The spring walls 22 normally flare outwardly, as indicated by the dotted line positions thereof. Accordingly, the walls 22 are adapted to be forced inwardly to parallel relation in assembling the panel, and thereafter such walls exert a constant outward bias against the face sheets 12.

For the panel shown in FIGS. 1-4, the stile dimensions and face sheet thicknesses are such that the outer faces of the offset portions of the walls 22 are in surface-to-surface contact with the inner surfaces of the face sheets 12. Also, the inner surfaces of the narrow walls 20 are in surface-to-surface contact with the outer surfaces of the face sheets adjacent their edges. The offset portions of the spring walls 22 are forced to parallel relation when the stiles are mounted on the edges of the face sheets as shown. In such assembly, the portions of the face sheets extending between the chamfers 32 and transitions 36 are spaced from the confronting portions of the walls 22. Forcing the stiles into place causes the inner corners of the face sheets to ride against the chamfers 32 and be forced outwardly to force the outer surfaces of the face sheets against the inner surfaces of the narrow walls 20. Also, the spring action of the walls 22 aid in maintaining such surface-to-surface contact with the walls 20.

In the embodiment shown in FIGS. 1-4, the face sheets and stiles are interlocked by bars 40. As shown in FIG. 1, the ends of the bar 40 extend into the spaces between the offset portions of the walls 22. In the vicinity of the lips 24 of the stiles, the thickness of the

bar is less than the distance between the lips, and the width of the bar is greater than the distance between the lips. At each end, the bar is provided with opposed notches 42.

For locking purposes, after the side stiles are in place and before the ends are capped, the bar is moved to the desired position and turned so that its notches 42 straddle the lips 24. The notches 42 preferably are shaped and spaced so that their walls engage the lips and exert forces thereon tending to force the stiles inwardly. The frictional fit is sufficient to insure that the bars 40 remain in place when they are turned to the locking position. As indicated in FIG. 2, two such bars 40 spaced below the top and above the bottom of the panel are ample to maintain the desired interlocking relationship. Turning such a bar can be effected by hand where the space between the sheets 12 is wide enough. Otherwise, it can be turned by a suitable tool inserted through an opening in a web and adapted to engage the end of the bar to turn it.

The two panels in FIG. 2 are splined together via the aligned stiles at their abutting ends. Referring to FIGS. 2 and 3, each spline in one arrangement takes the form of coextensive blocks of wood 50 and tubing 52 between the walls 22, and screw members 54 which extend through the web 18 and tubing 52 and are threaded into the block 50. To assemble the panels end to end, one-half of the lengths of the block 50 and tubing 52 are inserted in the lower end of the upper panel and secured by screw members 54 in the manner shown in FIG. 3. Then the panels are aligned and moved together with the other half of the blocks 50 and tubing 52 inserted into the stiles of the lower panel, where they are secured in place by screw members 54.

Again referring to FIG. 2, the lower end of the bottom panel 10 is shown provided with casters 58, 60. Preferably the caster 60 is one of two identical casters spaced along and extending from a plate 62. Such casters 60 together with such single caster 58 make it possible to easily move the panel to any desired position, while at the same time providing a three-point support to prevent the panel from tipping.

Referring to FIGS. 2 and 4, the caster 58 is mounted on the lower end of a support rod 64 which extends into the panel 10. As best seen in FIG. 4, the rod 64 slidably extends into a block 66 which is pressed into the lower end of the stile 14. The block 66 for this purpose is shown as a solid element, the lower end of which is provided with a bore to slidably receive the rod 64. It will be understood that the plate 62 which supports the two casters 60 is provided with a central rod that is similarly disposed in the lower end of a block mounted in the lower end of the stile at the left side of the panel.

The splines and caster support blocks above described are illustrative of hardware of the invention. It will be understood that this invention embraces any of a variety of elements cooperatively arranged with the stiles for desired purposes. For example, an arrangement similar to the block 50 and tubing 52 shown in FIG. 3 may be employed for supporting the casters. In such arrangement, a threaded nut may be welded into the lower end of the tubing 52, and the caster support rod may be threaded into the nut. Similarly, a solid block may be used in lieu of the block 50 and tubing 52 shown in FIG. 3 for the spline. Further, stile inserts at

the bottom of the panel may be provided for stands and like supports.

FIGS. 5 and 6 illustrate additional hardware cooperatively functioning with the stile for adapting a panel to support shelving. As best seen in FIG. 6, an extruded tubular member 70 has a portion that fits between the narrow wall 20 of the stile and the confronting portion of the spring wall 22, and in this example includes a wall 72 against the inner surface of the wall 20, a lateral wall 74 having its edge abutting the spring wall 22, and a lateral wall 75 that extends to the chamfer 32.

The extrusion 70 has an exterior wall 78 which is flush with the wall 20 of the stile, and which has spaced slots 80 adjacent the edge of the wall 20. The slotted wall 78 terminates in an intumed lip 81 which abuts the edges of the face sheets 12'. This construction provides an opening behind the slots 80 so that hooks 82 of shelf elements 84 can enter the slots and latch to the back of the slotted wall 78. In this arrangement, the face sheets 12' abut the outer portions of the spring walls 22 in the manner previously described in connection with FIG. 1.

Referring again to FIGS. 1-4, it should be noted that the seal strips 30 provide effective means whereby panels 10 can be placed side by side to form a temporary dividing wall for physically and acoustically separating two portions of a room from each other. When two panels are placed side by side in edge abutment, seal strips in one of the stiles are sufficient for this purpose.

Referring to FIGS. 7-9, a panel is shown with a wraparound stile of the invention. In this embodiment, interiorly of the panel is a rigid rectangular frame 90 to which the face sheets 12 are attached. By way of example, the panel may be assembled by placing one face sheet on a flat support and spraying glue on its inner surface. The frame 16 is placed on the glued surface and expanded cardboard honeycomb is set on the glued surface within the frame. Then the inner surface of the other face sheet is sprayed with glue and that sheet is placed on the frame. Weights are then placed on the top face sheet until the glue dries and effects a firm bond between the face sheets and the portions of the frame and the honeycomb contacted thereby. Then the stile is secured in place around the edges of the face sheets.

The stile is effectively wedged into the position shown in FIGS. 8 and 9, and this may be done by manually compressing the walls 22 at one end to insert them between the face sheets, and thereafter striking the web at points along its length, as with a rubber mallet, to force the walls inwardly. To facilitate the desired wrapping, the walls 20, 22 are notched adjacent the web where it is desired to bend the web so as to place the adjacent portions of the stile at right angles. Thus, the walls at the upper corners of the panel have miter joints.

After the stile is secured in place as above described, it is staked to the frame 16. Thus, as shown in FIG. 9, a screw 54 is passed through the center of the web and screwed into the frame. It will be recognized that a similar attachment is made at the opposite edge of the frame. And in order that the panel may be adapted to have casters or stands with rods inserted into the lower ends of the stile, the screw connections 54 preferably

are located, as indicated in FIG. 7, far enough above the lower end of the panel to permit such hardware to be fitted in to the lower ends of the stile.

FIG. 7 also illustrates locking mechanisms 92 mounted in the stile at one edge of the panel. Such mechanisms have latch elements (not shown) that are adapted to extend into slots in an adjacent panel for locking the panels together. The panel in FIG. 7 is shown with slots 94 opposite the locks 92 and in position to be latched by similar locks in another panel.

In the panel shown in FIG. 7, the continuous web of the stile enhances the aesthetic appearance of the panel. The panel is thus ideally suited to be used in a position where its edges are exposed to view. Further in this connection, two or more such panels may be locked together and used as a decorative partition, e.g., to form a backdrop or alcove for a receptionist's desk in a large room. In such case, the sealing strips above described may only be used between the abutting edges of adjacent panels.

The stile of this invention is also adapted to support a decorative face strip on its web 18. Referring to FIG. 10, the portions of the enlarged cross section in which the grooves 28 are formed are raised above the center portion of the web, whereby shoulders are provided at the edges of such center portion. In FIG. 10, a decorative face strip 95 is placed between the shoulders and bonded to the web. Thus, for a panel formed with such face strips and face sheets 12 as above described, the only exposed metal parts are the walls 20 and the edges of the web from which these walls extend.

FIG. 11 illustrates another novel panel structure and method of assembly of this invention. In this example, one face sheet is placed with its decorative face on a flat support, and its unfinished surface is sprayed with an adhesive. Then the stiles 14 are manipulated to place their lower walls around the edges of the sprayed sheet and to bring the outer faces of the offset portions of the walls 22 against the sheet, and in such a manner that the wet adhesive is not removed in the area contacted by such offset wall portions. This is done by cocking the stiles outwardly to place the edges of the sheet in the space behind the walls, and then rocking the stiles inwardly to bring the faces of the offset wall portions against the face sheet.

Expanded honeycomb 96, e.g., of cardboard is then placed on the sprayed surface between the stiles, and a rod 98 is set on the honeycomb 96. The top face sheet has its unfinished surface sprayed with an adhesive and placed against the rod 98, whereupon the edges of the sheet are forced down and tucked under the edges of the upper walls 20 of the stiles. Suitable means (not shown) are employed to prevent the curved face sheet from forcing the stiles from parallel relation. The rod 98 is preferably shaped so as not to damage the face sheet when its edges are forced down.

Once the top face sheet is positioned as shown, the rod is turned or otherwise manipulated to remove it from beneath the face sheet. The face sheet thereupon flattens, thereby forcing the walls 22 of the stiles to parallel relation and causing the sheet to be bonded to the upper walls 22 and the upper edges of the honeycomb 96.

The stile structure facilitates the movement of the curved face sheet into position. As the sheet flattens its

inner corner edges ride along the surfaces of inner portions of the walls 22. As the flattening proceeds, the inner surface of the sheet adjacent its edges ride on the outer portions of the transitions 36. When the sheet reaches its flat position, it comes to rest in surface-to-surface confrontation with the offset wall portions. Accordingly, none of the bonding material in this region is scraped away, whereby all confronting surface portions are securely bonded together.

In a modification of the above-described method, the outer surfaces of the offset wall portions and the edges of the honeycomb are initially coated with adhesive which is allowed to dry. This is the type of adhesive that is sprayed on the unfinished surfaces of the face sheets. Bonding is immediate upon the dry adhesive contacting the wet adhesive on the face sheets.

FIG. 12 illustrates how a stile of this invention accommodates face sheets of different thicknesses. The face sheet shown in phantom at 100 is assembled like those previously described in FIGS. 1-4, i.e., the unfinished surface of the face sheet 100 abuts the outer surface of the offset portion of the wall 22 of the stile. To adapt the stile to support a thinner face sheet 102, a strip 104 is bonded to the outer surface of the offset wall portion. The strip 104 is of a thickness that is the difference between the face sheets 100, 102. Accordingly, the thin face sheet 102 abuts the outer face of the strip 104 and is thus outwardly biased by the wall 22 in the same manner as the thicker sheet 100.

I claim:

1. A panel comprising: a pair of spaced parallel sheets;

extruded stiles at opposite edges of said sheets, each tile being shaped as a channel having a rigid web and side walls, a pair of spring walls fixed to each web between said side walls, said spring walls having inner portions contiguous to said webs and outer portions remate from said webs, both portions being substantially wider than said side walls, the space between each side wall and the inner portion of the spring wall adjacent thereto being wider than the thickness of the sheets, the outer portions of said spring walls being outwardly offset from the inner portions thereof, said spring walls being normally divergent but being held in generally parallel relation by said sheets, the outer surfaces of said offset portions being flat and in face-to-face contact with said sheets, whereby said spring walls exert outward bias distributed over the surface areas thereof in contact with said sheets to prevent distortion of said sheets, and means between said parallel sheets and between said stiles clamping said stiles and sheets together in assembled relation interlocking said stiles and sheets.

2. The panel of claim 1, wherein said interlocking means includes an elongated bar having its ends located between the spring arms of said stiles, the edges of the spring arms of each stile terminating in inturned lips, and said bars at each end having spaced notches in which the opposed lips are captured.

3. The panel of claim 1, wherein the remate edges of the offset portions of the spring walls have inturned lips, a block between the offset stile portions said block

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being engaged by the lips and being captured between such offset stile portions; and means securing the block to the adjacent web.

4. The panel of claim 3, wherein the blocks are spline members having portions extending out of the stiles at one end of said panel;

the portions of said spline members projecting outwardly of said stiles being adapted to extend between the offset portions of the spring walls of the stiles at one end of a similar panel;

and means securing said spline members to the portions of the stiles in which they are located, whereby two panels may be secured together.

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5. The panel of claim 1, including, at one face of the panel adjacent each edge thereof, a rigid extruded member located in the space between confronting portions of the rigid wall and spring wall,

each extruded member having a wall outwardly of the edge of the rigid wall which has an edge abutting the spring wall and abutted by the edge of the face sheet,

and said extruded members having spaced slots adjacent the edges of the rigid walls for receiving hooks on shelves to be releasably attached to the panel.

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