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LIGHT WEIGHT PANEL CONSTRUCTION

Filed Aug. 17, 1970

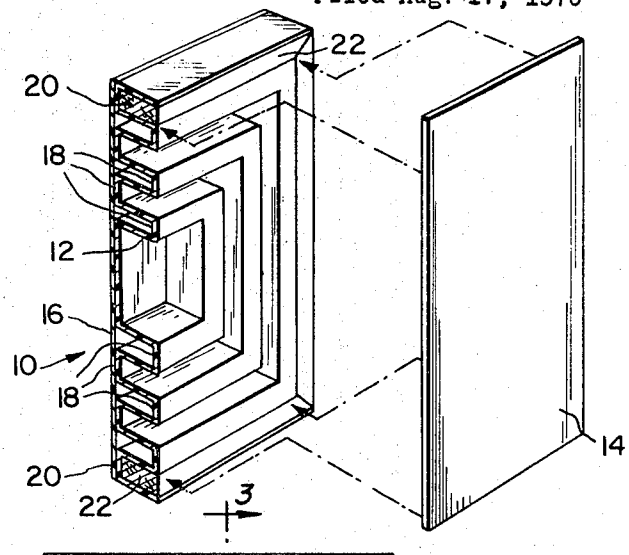


FIG. 1

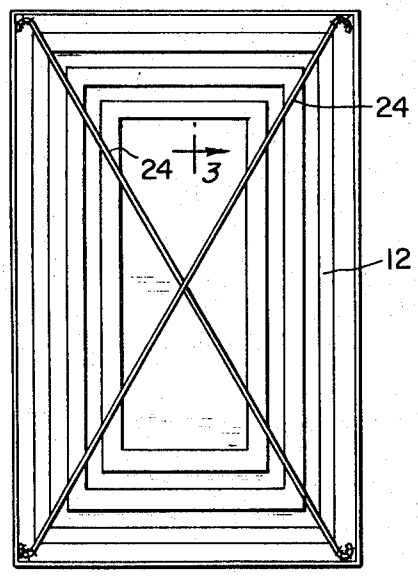


FIG. 2

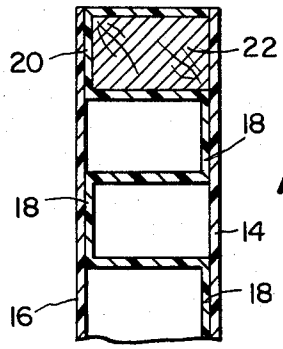
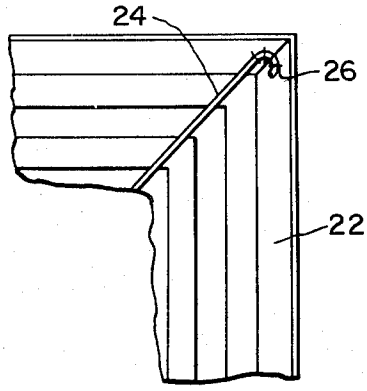


FIG. 3

FIG. 4



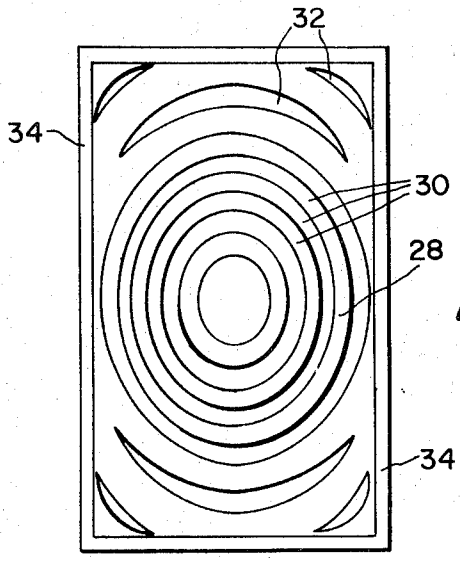


FIG. 5

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LIGHT WEIGHT PANEL CONSTRUCTION

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U.S. Cl. 52—618 8 Claims

ABSTRACT OF THE DISCLOSURE

A light weight rigid panel construction including a plastic core member having a plurality of concentric corrugations, rigid frame means positioned in the outermost of the corrugations, tensioning means connecting diagonally opposite corners of the core member, and cover means on each face of the core member.

BACKGROUND OF THE INVENTION

This invention relates to a panel construction, and more particularly to a light weight, rigid panel construction.

Although panels are known which include a core member and facing panels or covers over the core member, many of the prior art constructions of this type have been seriously disadvantaged in that they are frequently either too weak or too heavy to be of use in the construction industry. Although these core-type panels represent a substantial weight saving over solid panels such as wood, making the core of a material such as a honeycomb material or a cellular material has usually not provided sufficiently rigidity to the panel to be useful for large sizes.

Another problem arises with prior art types of cellular core panels, particularly when these panels are utilized for doors. Inasmuch as the door requires some type of hardware such as hinges, doorknobs, locks, and the like, the use of this type hardware with cellular doors has been difficult if not impossible with many of the prior art constructions due to the nature of the panel being hollow very near to its edges.

Accordingly, the primary object of this invention is to provide a rigid, light weight panel construction of the core type.

A further object of this invention is to provide a panel construction which combines the advantages of a cellular core and a solid core panel.

Another object of this invention is to provide a panel of simple construction.

Still a further object of this invention is to provide a panel construction which is rigid and has strength to resist forces in all directions.

Yet, another object of this invention is to provide a light weight panel construction which combines a plastic member with a wood member to form the core of the panel.

Still a further object of this invention is to provide a panel construction having a core including a plurality of concentric corrugations.

Yet a further object of this invention is to provide a panel construction which includes tensioning means for pre-stressing and thusly strengthening the panel.

Still another object of this invention is to provide a panel construction which may be readily filled with insulating material.

These and other objects and advantages for this invention will become apparent when considered in light of the following description and claims when taken together with the drawings in which:

FIG. 1 is an exploded fragmentary perspective view of the panel of this invention;

FIG. 2 is a front elevation of the panel of this invention with the cover removed;

FIG. 3 is a view along lines 3—3 of FIG. 2 and viewed in the direction of the arrows;

FIG. 4 is an enlarged fragmentary view of a portion of the core of this invention; and

FIG. 5 is a front elevational view of an alternate embodiment of a panel formed according to this invention with the cover removed.

DESCRIPTION OF THE PRIMARY EMBODIMENT

Referring now to FIG. 1, a panel generally designated **10** is shown and consists of a core portion **12**, a front panel **14** and a rear panel **16**. The core **12** is formed as to have a plurality of corrugations **18**. The corrugations **18** are formed in such a manner as to have a generally rectangular cross-sectional configuration, and are uniform throughout the core member **12**, and are concentrically arranged. This concentric arrangement of the corrugations **18** provides increased rigidity to the core member **12** in such a manner that the core **12** resists bending in all directions. Furthermore, the fact that the corrugations are of generally rectangular cross-sectional configuration provides structural rigidity against forces applied to the core **12** perpendicularly to the core **12**.

To add even further structural rigidity to the core member **12**, the outermost corrugation **20** has a rigid filler **22** disposed therein. This filler is preferably made of wood, however, other suitable materials could be utilized such as particle board, synthetic resins, or the like. One advantage of using wood as the rigid filler **22** is that it permits use of hardware such as hinges, doorknobs, and the like in the conventional manner that does not require special equipment or hardware.

The corrugated core **12** is preferably formed by a vacuum forming process in which a plastic sheet is drawn into a mold to produce the desired configuration. Any type of plastic which may be formed in this manner can be used, provided it is of sufficient thickness as to impart the desired rigidity of the finished core.

The filler **22** in the outermost corrugation **20** is fixed at the corners as by a suitable joint such as the miter joint shown, a tenon joint, a dovetail joint or the like.

As seen in FIGS. 2 and 4, tensioning members **24** are diagonally arranged on the core member **12**. These tensioning members **24** are preferably steel straps or cables. The members **24** are secured to the filler **22** by any suitable means, and in FIG. 4 the use of staples **26** for securing the tensioning members **24** to the filler **22** is shown.

After the core **12** has been formed, and the filler **22** and tensioning members **24** positioned on the core **12**, the front panel **14** and the rear panel **16** may be secured to the core **12** by any suitable means. It has been found convenient to adhesively secure the panels **14** and **16** to the core **12** by a suitable adhesive.

DESCRIPTION OF AN ALTERNATE EMBODIMENT

FIG. 5 illustrates an alternate embodiment of this invention wherein a core **28** is formed in a manner similar to core **12** of FIG. 1. However, in this embodiment, the corrugations **30** are generally oval, elliptical or circular. As in the primary embodiment, however, the corrugations **30** have a generally rectangular cross-sectional configuration, and are concentrically arranged.

To add rigidity in the corners of the core **28**, portions **32** are formed similarly to corrugations **30**, however, portions **32** are not continuous. Around the periphery of core **28** is a generally rectangular corrugation **34** which serves to receive filler member which would be similar to the filler member **22** in the primary embodiment. Similarly, tensioning members would be secured to the filler mem-

bers and front and rear panels (not shown) would be secured to the core member **28** to produce the finished panel.

In either of the foregoing embodiments, any of the corrugations of the core but the outermost corrugation may be filled with a sound, heat or fire insulating material such as asbestos fiber, glass fiber, mineral wool, or the like. Furthermore, the plastic material used to form the core and, the face panels may include a fire retardant composition of the type known in the art such as halogenated hydrocarbons, ammonium compounds or the like.

Furthermore, in addition to the rectangular embodiments illustrated, the panel may be formed in other shapes as required, particularly round, oval, or the like.

While this invention has been described, it will be understod that it is capable of further modification, and this application is intended to cover any variations, used and/or adaptations of the invention following in general, the principle of the invention and including such departtures from the present disclosure as come within known or customary practice in the art to which the invention pertains, and as may be applied to the essential features hereinbefore set forth, as fall within the scope of the invention or the limits of the appended claims.

What I claim is:

1. A rigid panel construction including:

(a) a sheet material core member having front and rear faces and a plurality of concentric corrugations having alternating peaks and valleys,

(b) said alternating peaks and valleys having substantially planar surfaces,

(c) rigid frame means positioned in the outermost only of said corrugations for imparting rigidity to said panel and substantially filling the outermost of said valleys,

(d) tensioning means connecting diagonally opposite corners of said core member,

(e) panel members secured to said peaks of said corrugations on said front and rear faces of said core member, and said panel members being substantially coextensive with said core member.

2. A rigid panel construction as in claim **1** and wherein:

(a) said core member comprises light weight plastic, and

(b) said rigid frame means includes a wooden frame member.

3. A rigid panel construction as in claim **2** and wherein:

(a) said tensioning means comprises tensioning bands fastened to said wooden frame member.

4. A rigid panel construction as in claim **3** and wherein:

(a) each of said corrugations are substantially rectangular.

5. A rigid panel construction as in claim **3** and wherein:

(a) the outermost of said concentric corrugations is rectangular, and

(b) each of the remainder of said corrugations is substantially arcuate.

6. A rigid panel construction as in claim **5** and wherein:

(a) the outer periphery of said panel construction is plastic.

7. A rigid panel construction as in claim **6** and including:

(a) insulating means disposed in each of the remainder of said concentric corrugations.

8. A rigid panel construction as in claim **5** and wherein:

(a) at least some of said arcuate concentric corrugations are discontinuous.

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