June 26, 1962 P. G. SAGE 3,041,223

COMPOSITE WALL STRUCTURE

Filed May 25, 1959

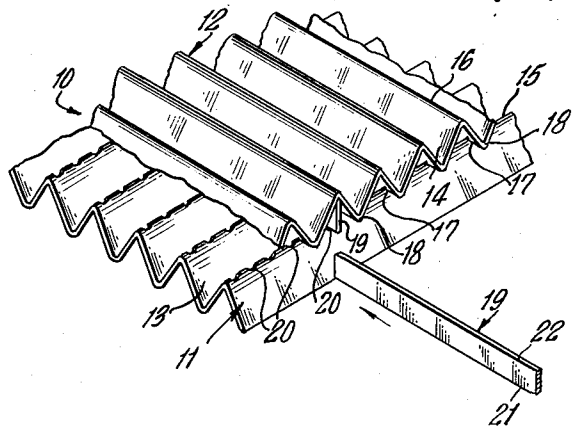

FIG. 1

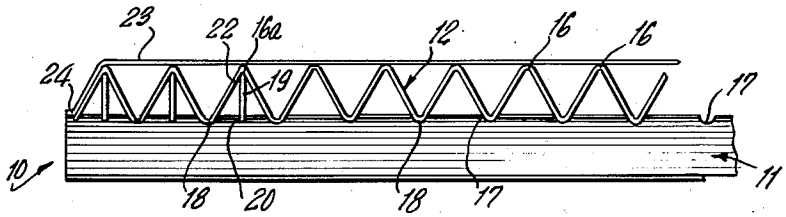

FIG. 2

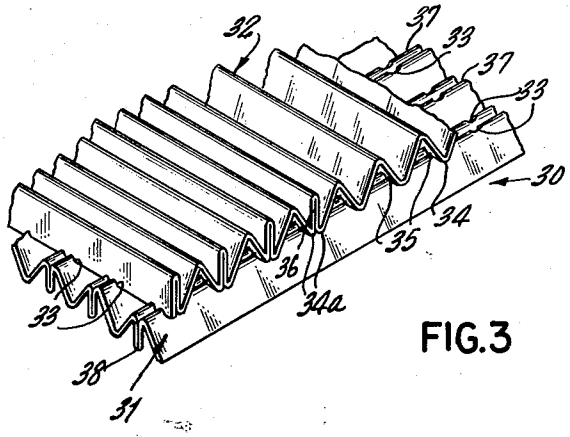

FIG. 3

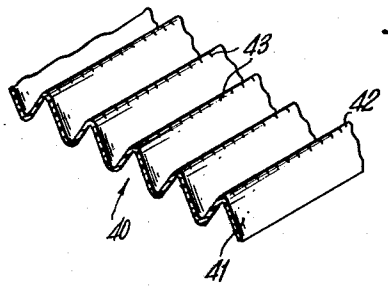

FIG. 4

INVENTOR.
PHILIP G. SAGE
BY Leon M. Strauss
ATT.

United States Patent Office 3,041,223 Patented June 26, 1962

3,041,223

COMPOSITE WALL STRUCTURE

Philip G. Sage, 130 W. 34th St., New York, N.Y.

Filed May 25, 1959, Ser. No. 815,461
7 Claims. (Cl. 154—55)

This invention relates generally to cardboard structures and more specifically to corrugated wall structures for cartons, containers and similar packaging materials.

It is one of the primary objects of the invention to provide means facilitating interconnection of at least two layers of corrugated or groove-shaped boards, preferably consisting of cardboard, pasteboard, plastic, plastic composition and like material, to thereby obtain an extremely strong wall structure, which will withstand high pressures and bending stresses, may take up relatively heavy loads and can be manufactured at a relatively low cost.

It is another object of the invention to provide means conducive to an efficacious wall structure of the aforesaid type, which may be readily reinforced at the central as well as at the end or edge parts of the wall structure, and is useful for the employment in the manufacture of cartons, shipping containers and the like, for which up to now plywood and similar materials were required.

Still another object of the present invention is to provide means rendering the possibility of obtaining strong and durable corrugated wall structures for containers of the aforesaid type, which can be readily produced on heretofore existing machines and do not require any changes in their outer appearance.

Yet another object of the present invention is to provide means envisioning a reinforced corrugated wall structure of cardboard and similar composite material which is very rigid, despite the fact that it is provided with recesses or cutouts, but which will not contribute to any reduction in strength of the final product, which is highly resistant to stresses exerted in various directions.

It is a still further object of the present invention to provide means devising a reinforced corrugated wall structure of the aforesaid type, which may be arranged with its corrugations in such a manner as to fulfill all practical requirements at locations thereof where the greatest pressure or stress occurs.

These and other objects of the invention will become further apparent from the following detailed description, reference being made to the accompanying drawing showing a preferred embodiment of the invention.

In the drawing:

FIG. 1 is a fragmentary perspective view of a corrugated wall structure with a reinforcing element thereof in the process of being inserted into said structure embodying the invention;

FIG. 2 is an end elevational view of the corrugated structure of FIG. 1 in assembled condition; and

FIG. 3 is a view similar to that of FIG. 1, but showing the invention in somewhat modified form and with the reinforcing element forming an integral part of the structure.

FIG. 4 is a perspective view, partly shown in section of modified corrugated wall employable in the invention.

Referring now more particularly to the drawing, there is shown a wall structure **10** consisting of a lower corrugated member **11** and an upper corrugated member **12**, both made of cardboard or similar composite material. Each member **11**, **12** is fluted at **13** and **14** respectively and has a crest **15** and **16**.

As can be more clearly seen in FIGS. 1 and 2, the lower corrugated member **11** is provided with a series of cut outs **17** into which substantially snugly fit the lowermost crests or bottom edges **18** of corrugated member **12**, whereby the cut outs **17** are substantially completely filled by said lowermost crests or bottom edges **18**. It will be

observed that the normal distance between the uppermost crests **16** of member **12** and the uppermost crests **15** of member **11** when in superposed position is only inappreciably or slightly changed, when the lowermost crests **18** engage the cutouts **17** of member **11**, as apparent from FIG. 2.

Toward the ends of corrugated member **11** and in particular at locations thereof where great stress or pressure is exerted, there are provided adjacent recesses or perforations **20** which are spaced from each other at a lesser distance than the cut outs **17**.

While the successive lowermost edges **18** of the corrugated member **12** fit into respective cut outs **17** in substantially equal spaced apart relation, the recesses **20** are used for inserting slab-like elements or reinforcing strips **19**, which on the one hand at their bottom edges **21** are held and retained in the respective recesses **20** and on the other hand abut at their upper edges **22** against the inner upper surface edges **16***a* of the corrugations of member **12**.

Above the crests **16** of corrugated member **12** and in abutment with the crests **16** there extends a flat paper or cover sheet **23** to hold down corrugated member **12** onto lower corrugated member **11**, as it may be well understood.

The outermost ends **24** of this sheet **23** are bonded to the lowermost corrugated member **11** as at **24**, whereby a sturdy corrugated composite wall structure **10** is obtained, which prevents any shifting of the corrugated members **11**, **12** with respect to each other.

The aforesaid structure includes further the provision of means, such as elements **19** to reinforce the corrugated wall structure **10** at any location or locations thereof, as desired.

FIG. 3 shows a further embodiment of the invention in the form of a composite corrugated wall structure **30** having the lower corrugated member **31** and the upper corrugated member **32**.

In this particular instance the lower corrugated member **31** is provided with cut outs **33** for adjusting and nesting therein the lower crests or edges **34** of the corrugated top member **32**.

As can be seen from FIG. 3, the regularly spaced apart corrugation sections **35** may be changed in their formations as seen at **36**, whereby two successive corrugations **35** are placed directly adjacent each other as indicated at **34***a*, which together fit into respective recesses **33** extending across the crests **37** of the lower corrugated member **31**.

The lower corrugated member **31** may be also transformed, preferably at their respective lateral ends as at **38** to correspond in shape and dimensions to the reinforcements indicated at **36** of the upper corrugated member **32**. In contradistinction to the wall structure seen in FIGS. 1 and 2, the separate reinforcement elements or slabs **19** of FIG. 1 are thus replaced by integral reinforcements **34***a*, **38**.

It is well understood that the reinforcing slabs or struts whether integral with the corrugated wall or walls or not may be arranged in any desired angle to each other and do not have to extend necessarily normal to the corresponding crests of the corrugated wall or walls or parallel to each other.

Referring now more particularly to FIG. 4, there is disclosed a corrugated base wall structure **40** having corrugations **41** the crests **42** thereof being provided with slits **43** arranged in predetermined spaced relation to each other. These slits or scored lines may penetrate to a certain extent in a downward direction the corresponding crests of the corrugations **41** and greatly simplify the product without weakening the structure when an upper corrugated member, such as **12** or **32** is to be assembled in a manner as hereinabove set forth.

In some instances it appears to be preferable that the lower corrugated member **40** be made of sufficient elastic material to facilitate easy assembly of the composite corrugated wall structure. It is well understood that slits 43 readily open up and provide the necessary grooves or recesses for the upper corrugated member, whose corrugations will fixedly engage with the respective opened slits of the lower corrugated member without materially reducing the strength of the then assembled corrugated wall structure.

It is further to be stressed that the lower corrugated member **40** (FIG. 4) may be made of a different material than that of the upper corrugated member and may have greater elasticity than the latter. In the particular instance shown in FIG. 4 corrugated member **40** may be made from a rubberized or plastic material, whose slits may be readily spread or opened up for frictionally engaging corresponding corrugations of an upper corrugated member (not shown).

It can thus be seen that there has been provided in accordance with the present invention a composite corrugated wall comprising a plurality of corrugated elements arranged in superposed position and extending in crosswise directions to each other, one of said elements located below an adjacent upper element being provided with a plurality of cut outs having a predetermined distance from each other and positioned in the crests of the corrugations of said one element, whereby the corrugations of said upper element may be seated in said cut outs and fixedly engaged with said one element, said one element being provided with perforations provided only in some of the crests of its corrugations, said perforations being located approximately midway between two adjacent cut outs, and means disposed between said upper corrugated element and said one corrugated element and extending from said perforations of said one element for contact with the underfaces of the crests of the corrugations of said upper element.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

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

1. A composite wall structure for use in connection with the manufacture of containers comprising at least two corrugated walls arranged in superposed relation to each other, the upper crests of one of said corrugated walls extending in transverse direction to the upper crests of the other of said corrugated walls, the lower corrugated wall being provided with shallow cut outs located a predetermined distance from each other in the upper crests of the corrugations of said lower wall, so that the upper corrugated wall nested with its corresponding lower corrugations in said cut outs, said lower corrugated wall being further provided with recesses located between adjacent cut outs, reinforcing means extending from said upper corrugated wall to said lower corrugated wall and in engagement with said recesses, to thereby prop predetermined corrugations of said upper corrugated wall relative to said lower corrugated wall, and means overlying said corrugated walls in said superposed relation and in contact with crests of the uppermost corrugated wall and bonded to the lowermost corrugated wall.

2. A composite wall structure according to claim 1, said reinforcing means forming separate struts extending from said recesses to the corresponding underfaces of said upper crests of said upper corrugated wall.

3. A composite wall structure according to claim 1, said reinforcing means being formed by two adjacent corrugations of and integral with said upper corrugated wall and by two adjacent corrugations of and integral with said lower corrugated wall.

4. A composite wall structure according to claim 1, said overlying means forming cover sheet means extending over and bonded to the crests of said upper corrugated wall and fastened to a crest of said lower corrugated wall.

5. A composite corrugated wall comprising at least two corrugated elements in superposed position and extending in crosswise directions to each other, the lower corrugated element being provided with a plurality of cut outs having a predetermined distance from each other and positioned in at least some of the crests of the corrugations of the lower element, so that the upper element is seated with its corresponding corrugations in said cut outs and is fixedly engaged with said lower element, said lower element being provided with perforations in the crests of its corrugations, said perforations being located approximately midway between two adjacent cut outs, and prop means disposed between said upper corrugated element and said lower corrugated element and extending from said perforations of said lower element to the underfaces of the crests of the corrugations of said upper element.

6. A composite corrugated wall comprising a plurality of corrugated elements arranged in superposed position and extending in crosswise directions to each other, one of said elements located below an adjacent upper element being provided with a plurality of cut outs having a predetermined distance from each other and positioned in the crests of the corrugations of said one element, so that the corrugations of said upper element are seated in said cut outs and fixedly engaged with said one element, said one element being provided with perforations provided only in some of the crests of its corrugations, said perforations being located approximately midway between two adjacent cut outs, means disposed between said upper corrugated element and said one corrugated element and extending from said perforations of one element for contact with the underfaces of the crests of the corrugations of said upper element, and means extending from said upper element to said one element and bonded to the latter, the normal distance between the uppermost crests of said upper element and the uppermost crests of said one element being slightly reduced, when said upper element is engaged in the cut outs of said one element.

7. A wall according to claim 6, said one element being made of a material relatively yieldable with respect to the material of said upper element.

References Cited in the file of this patent

UNITED STATES PATENTS

1,875,188	Williams	Aug. 30, 1932
1,996,490	Romanoff	Apr. 2, 1935
2,224,810	Cumfer	Dec. 10, 1940
2,746,892	Elfving	May 22, 1956
2,833,682	De Laszlo	May 6, 1958