Aug. 27, 1963 A. S. IMIELINSKI 3,101,652

METHOD OF MAKING PARTITIONED BOXES

Filed Nov. 28, 1960 2 Sheets-Sheet 1

Fig. 1

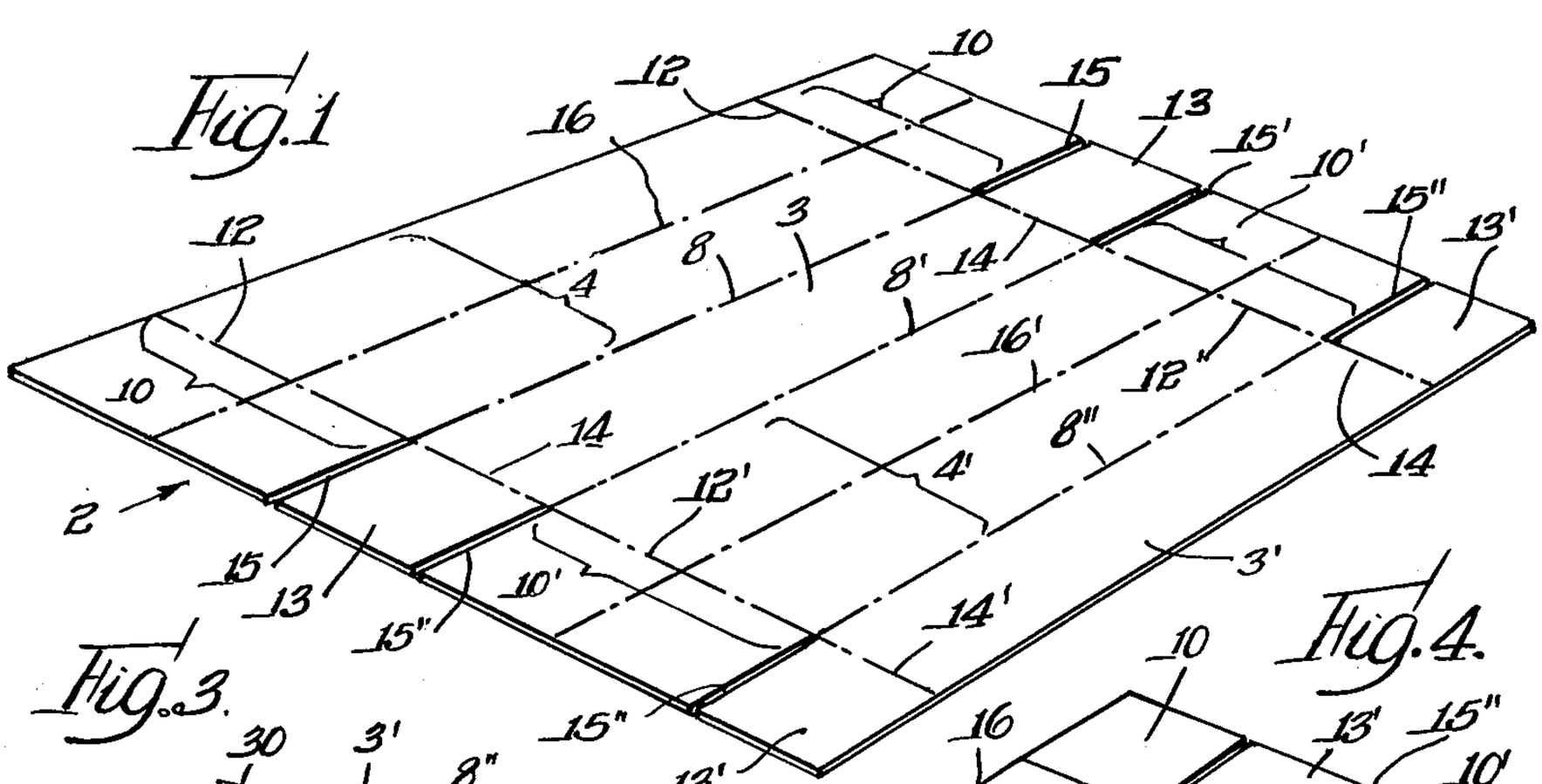


Fig. 3.

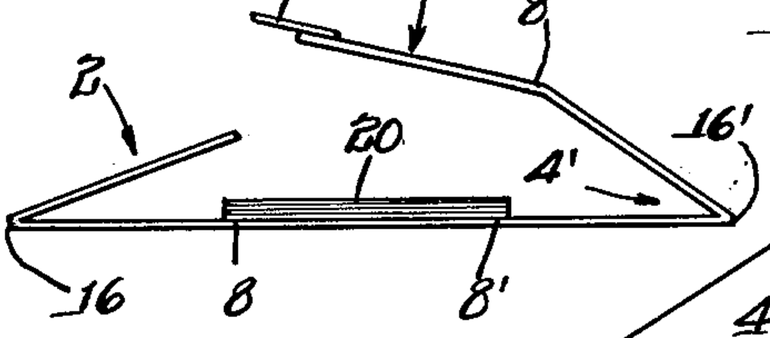


Fig. 4.

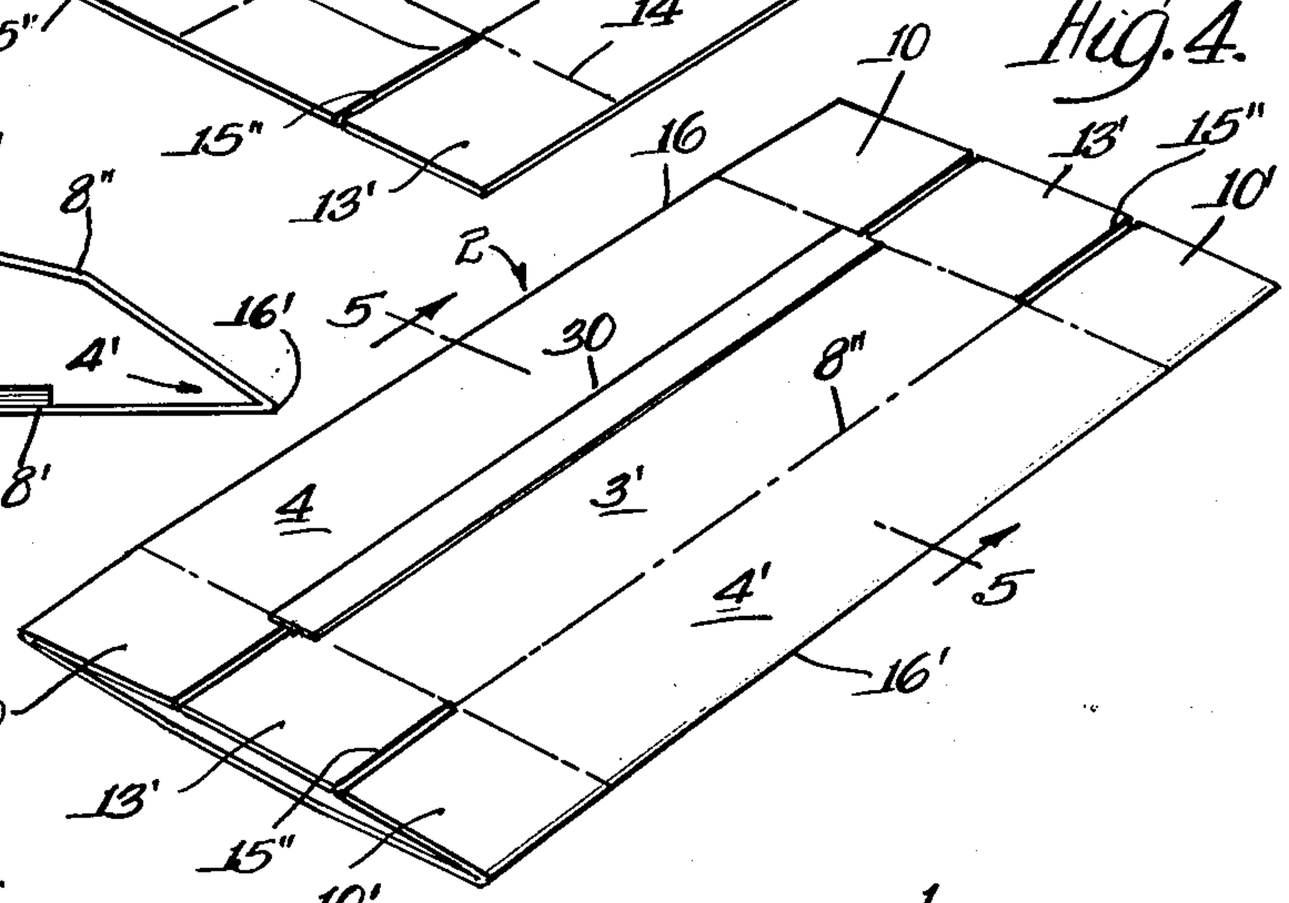


Fig. 5.

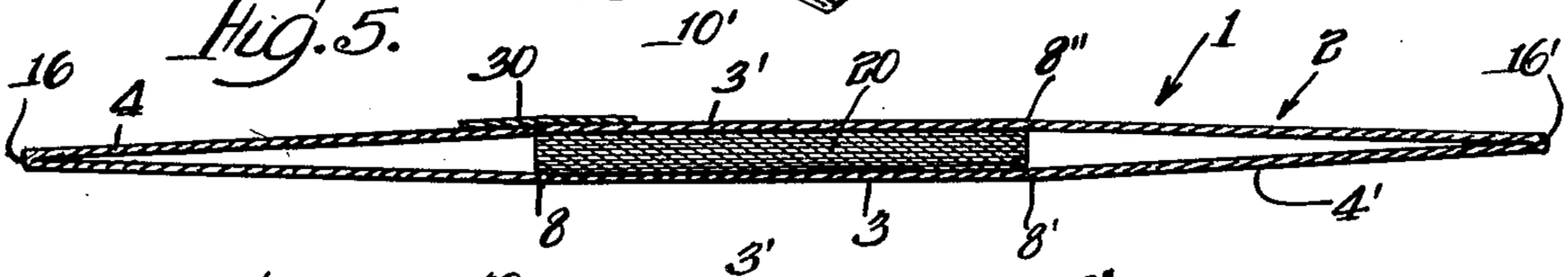
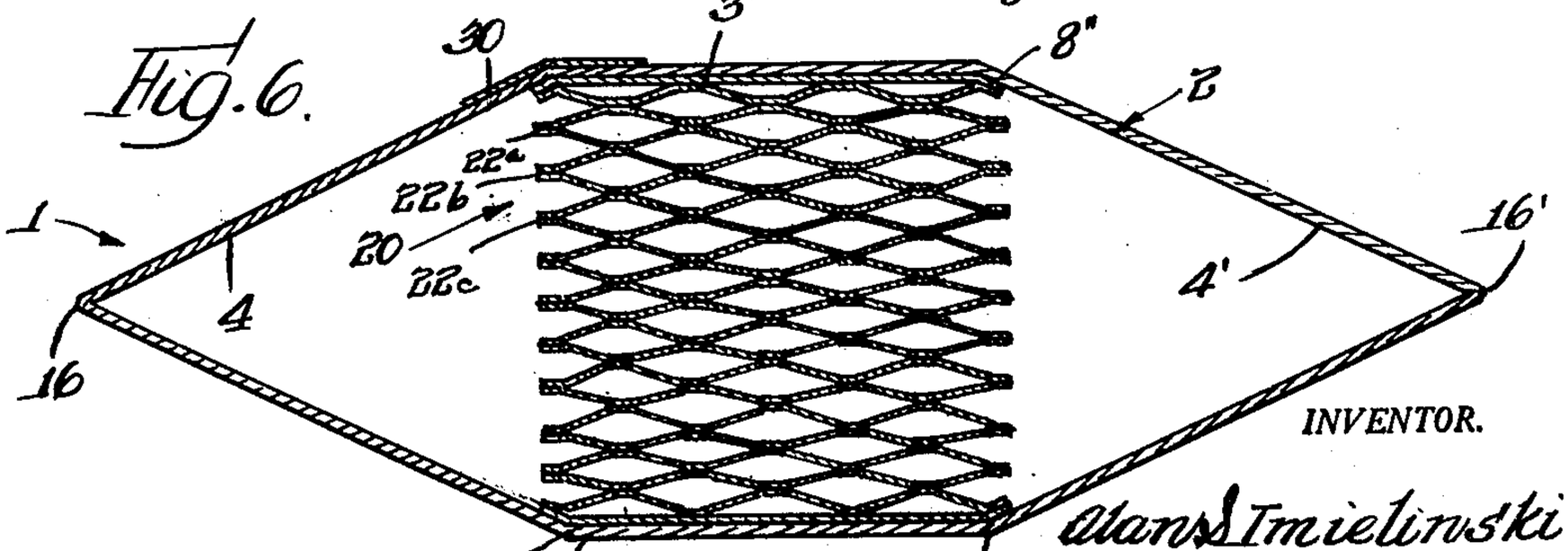


Fig. 6.



INVENTOR.

Alan S. Imielinski

By Vollenstein, Spangenberg & Hattis Attys.

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Fig. 7.

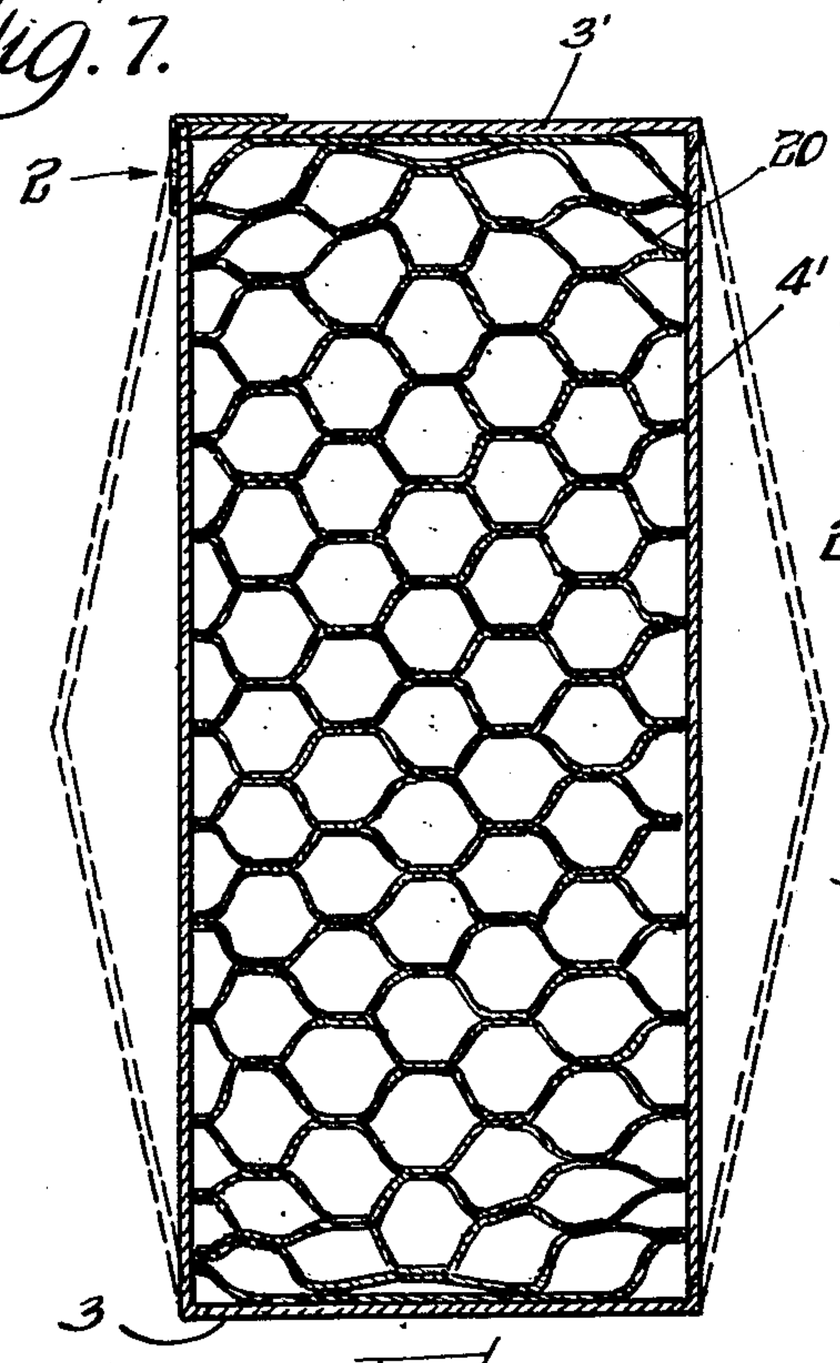


Fig. 8.

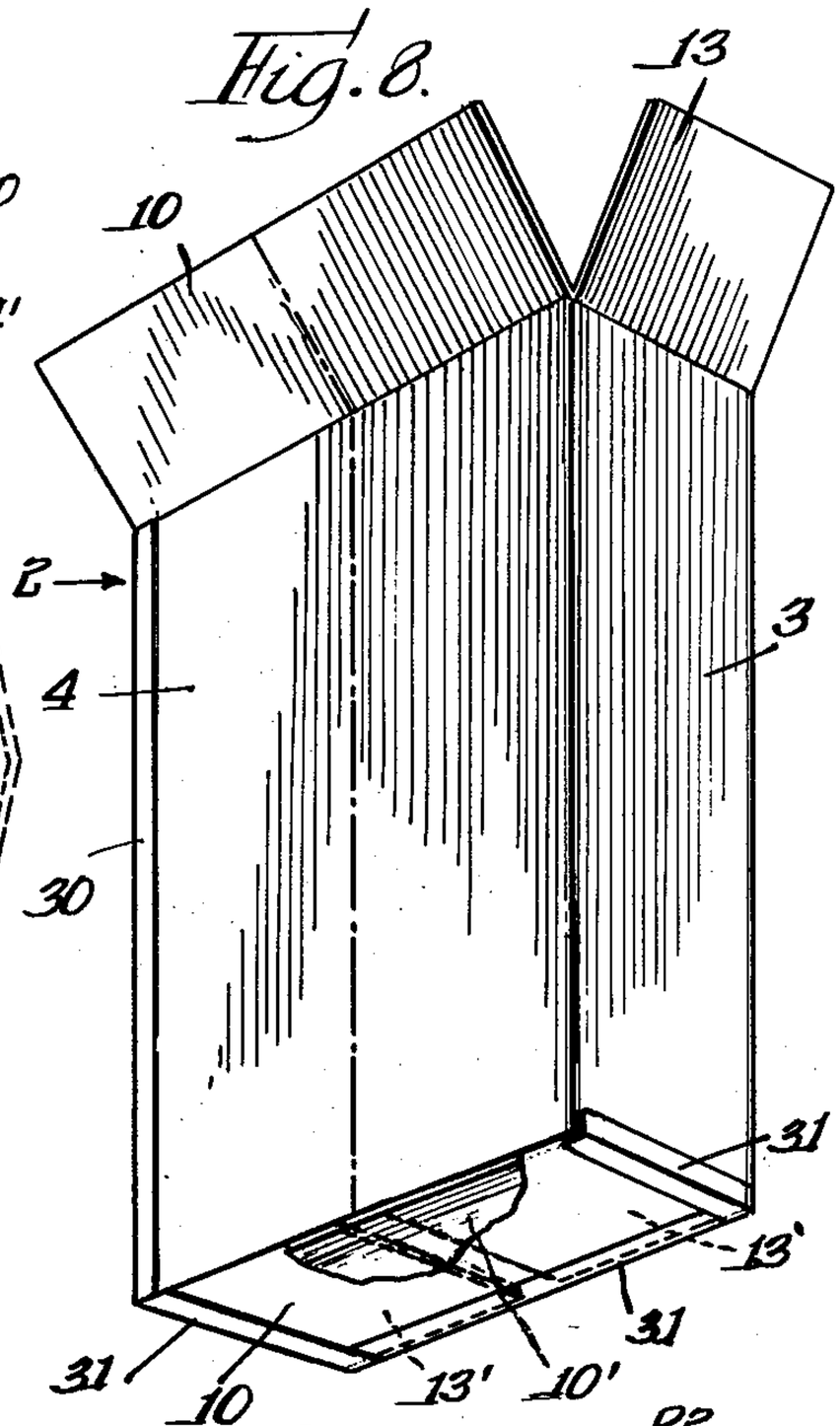


Fig. 2

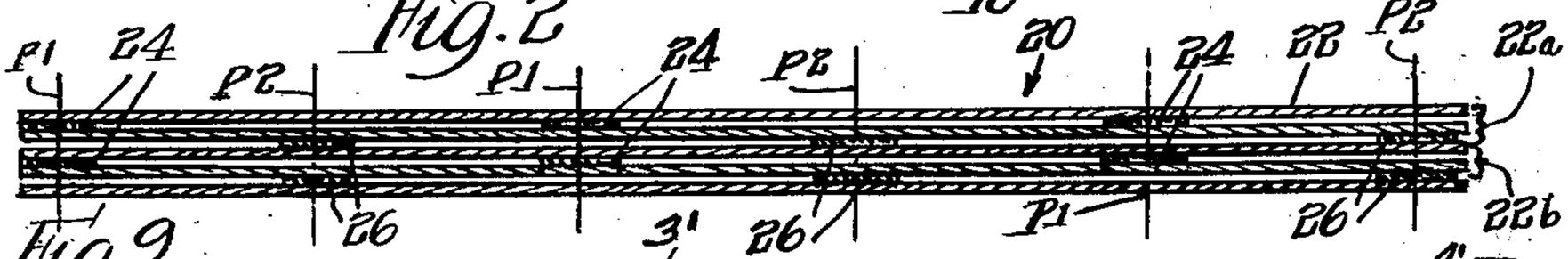
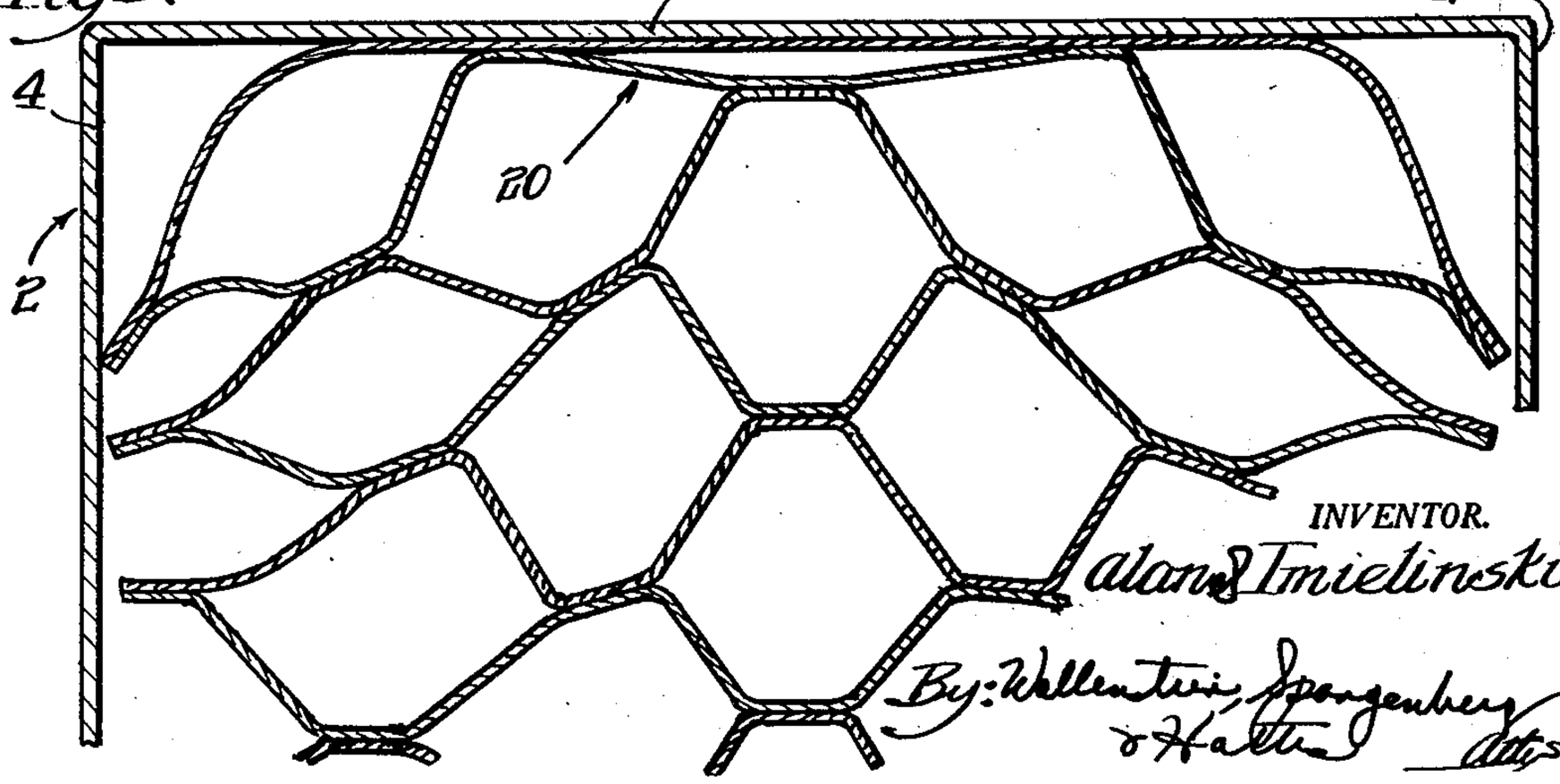


Fig. 9.



INVENTOR.
Alan S. Imielinski

By: Wallenstein, Spangenberg & Hattis Attys.

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3,101,652
METHOD OF MAKING PARTITIONED BOXES

Alan S. Imielinski, Chicago, Ill., assignor to Ivan Lippitz, doing business as Able Container Co., Chicago, Ill.

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2 Claims. (Cl. 93—37)

This invention relates to partitioned boxes, and more particularly to boxes provided with a very large number of article-receiving compartments or cells therein.

In recent years, aluminum foil Christmas trees and the like have been packaged in a compact folded condition in cardboard boxes having partition-forming inserts therein in the form of a honeycomb-like structure. The honeycomb partition-forming members were manufactured in a partially or substantially fully expanded condition and then shipped to the manufacturer of the articles to be packaged separate from the boxes. It was not practical to ship the honeycomb members in a completely flat, unexpanded condition because of the difficulty of manually expanding an unexpanded honeycomb member into the proper size for insertion into the boxes. The partially or substantially fully expanded honeycomb members were bulky and difficult to handle and store efficiently.

One of the objects of the present invention is to provide a partitioned box structure and a method of making the same where the honeycomb partition-forming member forming a part thereof may be manufactured and shipped in a self-supporting, flat, unexpanded condition, to facilitate handling and storage thereof, and wherein set up of a completed partitioned box using the honeycomb member can be accomplished in an efficient and simple manner.

In accordance with the most advantageous form of the present invention, the honeycomb partition-forming member and a folded box body are prefabricated as an integral fold box blank which can be shipped to the ultimate user thereof in a substantially self-supporting, flat, unexexpanded condition, and wherein the set up of the box requires merely the unfolding of the folded box blank and the securement of closure end flaps forming part of the box body. The process of unfolding the box blank automatically expands the partition-forming member to open the cells thereof with a minimum of effort.

The folded box blank of the invention preferably comprises a box body of cardboard or similar material having a first pair of identical, rectangular panels positioned in closely spaced confronting relation, and a second pair of identical, rectangular panels folded outwardly in half and bridging the opposite corresponding longitudinal margins of the first pair of panels. End closure flaps extend from at least one of the ends of the box body-forming panels. The box body is held in a substantially flat folded condition by the flat, unexpanded, honeycomb partition-forming member which is adhesively or otherwise secured between the first-mentioned pair of panels.

The honeycomb partition-forming member may be made in a self-supporting, flat, unexpanded condition by making the same from a stack of flat sheets of kraft paper or the like which are adhesively secured together along longitudinally spaced parallel lines in a manner which forms a honeycomb cell structure when the sheets making up the stack are expanded. The resulting stack of adhesively secured paper sheets are kept in an unexpanded state during the fabrication of the folded box blank in a manner to be described. The resiliency of the paper making up the partition-forming member resists expansion thereof. The flat honeycomb partition-forming member is expanded by pushing in the outwardly folded-in-half second pair of panels of the box body to bring

them into spaced parallel relationship. The resulting leverage action obtained by pressing in the outwardly folded panels enables the box to be expanded into a normal shape with a minimum of effort. The end closure flaps at one end of the box body are then secured together to hold the box in its expanded condition against the compressive force exerted by the partition-forming member.

In accordance with another aspect of the invention, the folded box blank above described is made in a manner which enables the honeycomb partition-forming member to remain unexpanded during the fabrication of the box blank. The box body is formed from a flat sheet of cardboard material or the like provided with suitable score lines to form fold lines at the various corners of the box body and additional score lines enabling the folding-in-half of the aforementioned second pair of panels defined by the first-mentioned score lines. Before the flat sheet of cardboard has been formed into a complete box body blank, the flat, unexpanded honeycomb partition-forming member is adhesively secured to one of the aforesaid first pair of panels. Next, the said second pair of panels are folded outwardly in-half to bring the other panel of the first pair of panels into confronting relation with the yet unsecured side of the honeycomb partition-forming member and the latter panel is secured to the latter side of the partition-forming member. The resulting contiguous ends of the folded box body blank are then connected together by suitable paper tape or other securing means.

Other objects, advantages and features of the invention will become apparent upon making reefrence to the specification to follow, the claims and the drawings wherein:

FIG. 1 is a perspective view of a flat sheet of cardboard prior to its being fabricated into a completed box body blank;

FIG. 2 is an enlarged section through a portion of the flat, unexpanded, honeycomb partition-forming member incorporated into the folded box blank of the present invention;

FIG. 3 illustrates the manner in which the sheet of cardboard in FIG. 1 and the flat, unexpanded, honeycomb partition-forming member of FIG. 2 are assembled to form the folded box blank of the present invention;

FIG. 4 is a perspective view showing the completed folded box blank of the present invention;

FIG. 5 is an enlarged transverse section through the completed folded box blank of FIG. 4, taken substantially along the line 5—5 thereof;

FIG. 6 is a transverse section corresponding to FIG. 5, as the blank is being unfolded to form a completed box structure;

FIG. 7 is a transverse section of the completed box structure;

FIG. 8 is a greatly enlarged fragmentary sectional view of a portion of the completed box structure shown in FIG. 7; and

FIG. 9 is a perspective view of the completed box structure.

The folded box blank of the present invention illustrated in the drawings is generally indicated by reference numeral 1 and includes a box body 2 made from a flat sheet of cardboard shown in FIG. 1. The cardboard sheet is divided by score lines into four main contiguous panels, namely, a first pair of substantially identical, spaced elongated rectangular panels 3 and 3′ which are adapted to form opposite side walls of a completed rectangular box, and a second pair of substantially identical wider elongated rectangular panels 4 and 4′ of the same length as the panels 3 and 3′ and positioned on opposite sides of the panel 3. The second pair of panels 4 and 4′

are adapted to form the other opposite side walls of a rectangular box. The panels 3 and 4 are separated by a score line 8, the panels 3 and 4′ are separated by a score line 8′, and the panels 3′ and 4′ are separated by a score line 8″.

The panel 4 has end flaps 10—10 defined by score lines 12—12. The other corresponding panel 4′ has end flaps 10′—10′ defined by score lines 12′—12′. The panel 3 has end flaps 13—13 defined by score lines 14—14. The end flaps 13—13 are physically separated from the adjacent end flaps 10 and 10′ by slits 15—15 and 15′—15′. The panel 3′ has end flaps 13′—13′ defined by score lines 14′—14′. The end flaps 13′—13′ are separated from the adjacent end flaps 10′—10′ by slits 15″—15″. The panels 4 and 4′ and their associated end flaps are bisected by longitudinal score lines 16—16′.

The honeycomb partition-forming member identified by reference numeral 20 comprises a stack of flat, elongated, rectangular sheets 22 made from kraft paper or the like. Successive pairs of the sheets are identified by reference numerals 22*a*, 22*b*, 22*c*, etc. The confronting inner surfaces of the respective pairs of sheets 22*a*, 22*b*, 22*c*, etc. are secured together by a strong adhesive material, such as a dextran glue, along spaced longitudinal lines or strips 24 located in spaced longitudinal planes P1 extending transversely to the planes of the sheets 22 and extending the full length of the sheets. The sheets 22 have a length corresponding to the length of the panels 3, 3′, etc. and a width somewhat greater than the width of the panels 3 and 3′. The confronting outer surfaces of the respective pairs of sheets 22*a*, 22*b*, etc. are secured together by a suitable adhesive material along spaced longitudinal lines or strips 26 located in spaced longitudinal planes P2 positioned midway between the planes P1. Prior to the initial forced expansion thereof, the flat stack of sheets forms a self-supporting flat body which resists expansion to a degree dependent upon, among other things, the thickness of the kraft paper sheets. In one exemplary embodiment of the invention, the kraft paper was a 90 lb. weight kraft paper providing 1⅜ inch cells when the cells are fully expanded.

To assembly the folded box blank of the invention, the honeycomb partition-forming member 20 in a still unexpanded condition is centered upon one of the panels 3 and 3′ of the still flat box body 2 so that the longitudinal axis of the cells thereof extend parallel to the longitudinal margins of the panels 3, 3′, etc. It is then secured over substantially its entire area to the latter panel using a dextran glue or other strong adhesive material. Since the honeycomb partition-forming member 20 is wider than the associated panel 3 or 3′, the side margins of member 20 extend beyond the longitudinal margins thereof. Next, the box body 2 is folded (as illustrated generally in FIG. 3) by folding the panels 4 and 4′ outwardly along the score lines 16 and 16′ to bring the other corresponding panel 3 or 3′ into confronting relation with the yet unsecured opposite flat side of the partition-forming member 20. The inside surface of the latter panel is then adhesively secured for substantially its entire extent over the latter flat side of the partition-forming member, utilizing dextran glue or other suitable adhesive material. The last step in the fabrication of the folded box blank is to secure together the resulting contiguous longitudinal margins of the box body, as by means of an adhesive paper strip 30 bridging the margins of the box body.

The resulting folded box blank is held in a completely flattened condition by the resiliency of the yet unexpanded, honeycomb partition-forming member 20. The box blank is, therefore, convenient to handle and store.

To set up the box of the present invention, it is merely necessary to press the opposite corners of the box defined by the fold lines 16 and 16′ inwardly as shown in FIGS. 6 and 7. The unfolding of the box blank automatically separates the panels 3 and 3′ to expand the honeycomb partition-forming member 20, to expose the cells which are to receive the articles to be packaged. The expansion of the partition-forming member reduces the overall width of the same so that the side margins thereof are adjacent the inner surfaces of the box body panels 4—4′, as shown in FIG. 7.

The box blank is locked into its expanded condition by folding and securing together with adhesive tape 31 (or other securing means), the end flaps 10—10′ and 13—13′ at one end of the box, as shown in FIG. 8. After the articles to be packaged are positioned in the various cells of the expanded honeycomb member 20, the flaps 10—10′ and 13—13′ at the then open end of the box are similarly folded to close the box structure.

The present invention has thus provided an extremely compact and easy to set up prefabricated folded box blank for making a honeycomb partitioned box. It should be understood that numerous modifications may be made of the preferred embodiment of the invention described above without deviating from the broader aspects of the invention.

What I claim as new and desire to protect by Letters Patent of the United States is:

1. A method of making collapsed expandable partitioned box from a flat unflolded blank having a series of parallel fold lines forming at least two alternate rectangular panels forming opposite sides of a rectangular box and additional non-contiguous panels which, when the ends of the blank are connected together and the contiguous panels are folded into transverse planes along said fold lines, form the remaining sides of the box, said method comprising the steps of: forming a flat, self-sustaining unexpanded partition-forming member which has a width at least in the neighborhood of the width of one of the additional panels and when once expanded stretches into a condition which requires a compresisve force to maintain the same in a flat condition, said partition-forming member providing longitudinally extending open ended cells in its expanded state, anchoring one of the flat sides of said partition-forming member upon said one additional panel with the cells thereof running longitudinally of the panel, folding the panels of said alternate pair of panels in half toward the center of the blank and over the partition-forming member, bringing another additional panel over the opposite flat side of said partition-forming member and anchoring the same thereto and securing any loose unconnected panels of the blank immovably with respect to the contiguous ends thereof to form a folded box structure which can be unfolded into a completed partitioned box by unfolding said folded in half panels to bring the same into spaced parallel relation.

2. A method of making a collapsed expandable partitioned box from a flat unfolded blank having a series of parallel fold lines forming at least two pairs of alternate rectangular panels forming the opposite sides of a rectangular box when the ends of the blank are brought together and the contiguous panels are folded into transverse planes along said fold lines, said method comprising the steps of: forming a flat, self-sustaining unexpanded, honeycomb partition-forming member having a length approximately equal to the length of one of said panels measured parallel to the associated fold lines a width slightly wider than the width of said one panel and when once expanded stretches into a condition which requires a compressive force to maintain the same in a flat condition, said partition-forming member providing longitudinally extending open ended cells in its expanded state, anchoring one of the flat sides of said partition-forming member upon said one panel with the cells thereof running longitudinally of the panel, folding the panels of the other pair of panels in half toward the center of the blank and over the partition-forming member, bringing the other panel paired with said one panel over the opposite flat side of said partition-forming member and anchoring the same thereto and securing any loose uncon-

nected panels of the blank immovably with respect to the contiguous ends thereof to form a folded box structure which can be unfolded into a completed partitioned box by unfolding said folded in half panels to bring the same into spaced parallel relation.

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