March 8, 1938. I. H. WEBER 2,110,782

CONTAINER AND METHOD OF MAKING SAME

Filed April 12, 1937 2 Sheets-Sheet 1

Fig. 1.

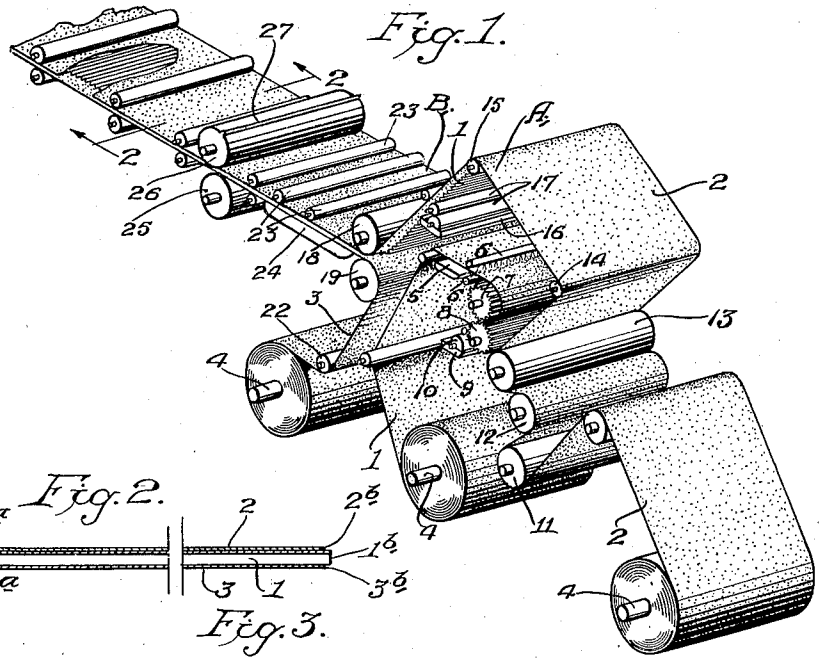


Fig. 2.

Fig. 3.

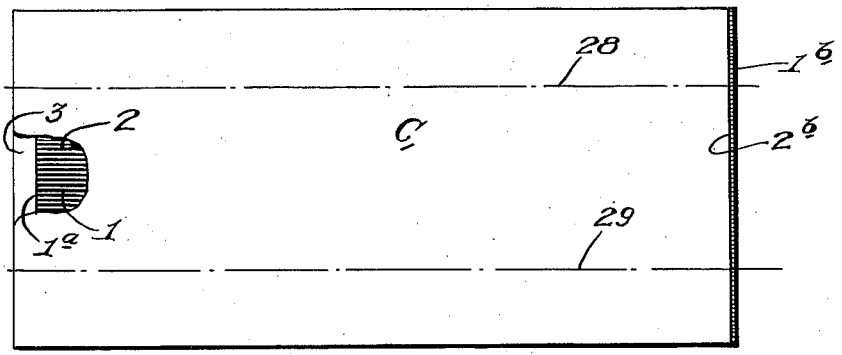
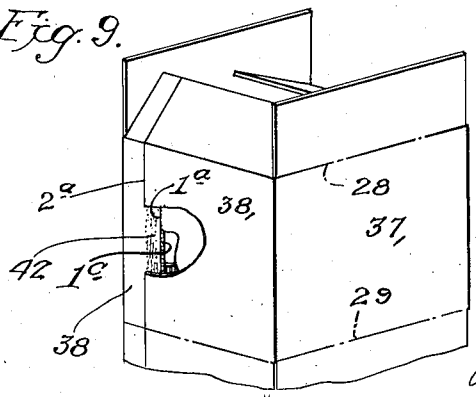


Fig. 9.



Inventor:—
Isadore H. Weber
by his Attorneys
Howson & Howson

March 8, 1938. I. H. WEBER 2,110,782

CONTAINER AND METHOD OF MAKING SAME

Filed April 12, 1937 2 Sheets-Sheet 2

Fig. 4.

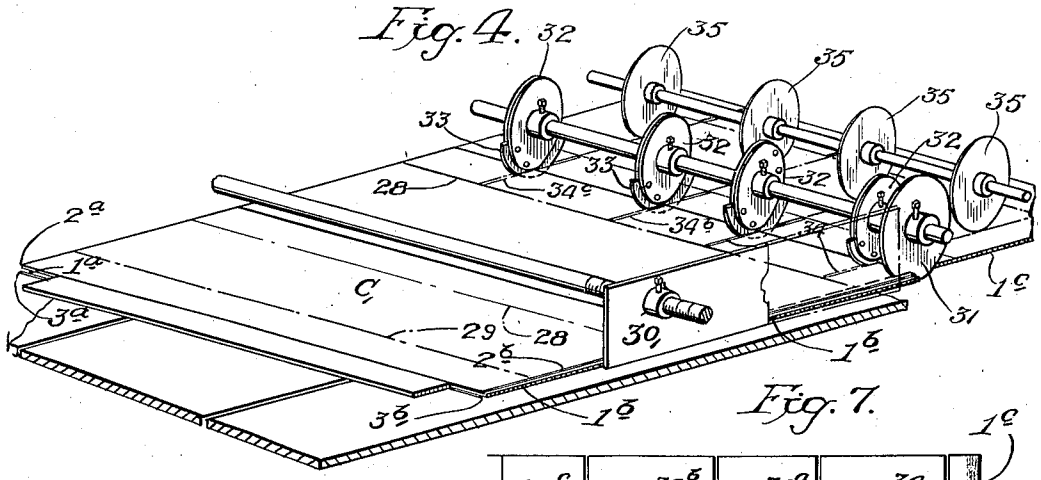


Fig. 7.

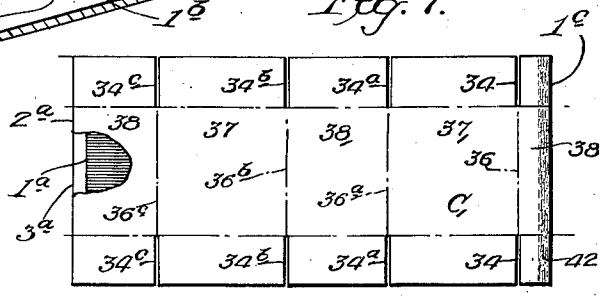


Fig. 5.

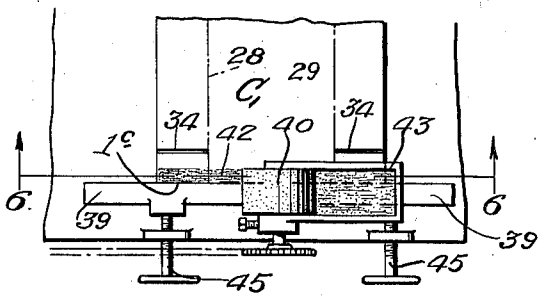


Fig. 8.

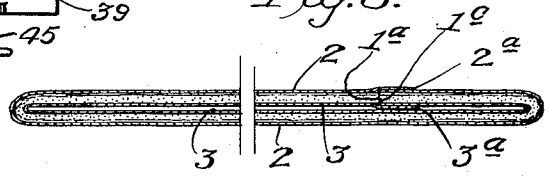
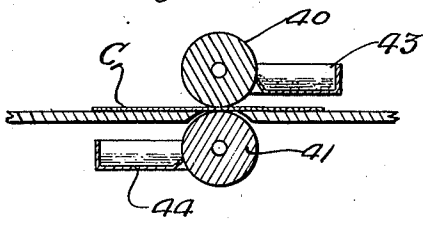


Fig. 6.



Inventor:—
Isadore H. Weber
by his Attorneys
Howson & Howson

Patented Mar. 8, 1938 2,110,782

UNITED STATES PATENT OFFICE

2,110,782

CONTAINER AND METHOD OF MAKING SAME

Isadore H. Weber, Philadelphia, Pa., assignor to David Weber & Co., Philadelphia, Pa., a corporation of Pennsylvania

Application April 12, 1937, Serial No. 136,414

7 Claims. (Cl. 93—45)

This invention relates to new and useful improvements in methods of making containers and is a continuation in part of an application filed by me on December 9, 1935, bearing Serial No. 53,666.

The principal object of the invention is to provide a method of making containers of the character set forth wherein a novel connection or joint is provided between opposite abutting edges in a container body which has a finished appearance and is substantially flush with the surfaces of said container.

Another object of the invention is to provide a method of the stated character which is relatively inexpensive and may be carried out in commercial practice with very little additional machinery over that customarily employed.

Other objects of the invention and the features and details of the construction thereof are set forth hereinafter and disclosed in the accompanying drawings, in which:

Fig. 1 is a fragmentary view in perspective diagrammatically illustrating certain steps in the process embodying this invention.

Fig. 2 is an enlarged fragmentary view in section on line 2—2, Fig. 1.

Fig. 3 is an enlarged view in plan of a section or blank as cut from the run formed in Fig. 1 after said section has been transversely scored.

Fig. 4 is a view in perspective illustrating certain other steps in the process contemplated by this invention.

Fig. 5 is a view in plan illustrating the application of adhesive to the blank or section prior to assembly.

Fig. 6 is a view in section on line 6—6, Fig. 5.

Fig. 7 is a view in plan of a completed container section or blank.

Fig. 8 is a view in section through a blank which has been partially assembled, and

Fig. 9 is a view in perspective of one form of completed container made in accordance with this invention.

Referring now to the drawings, the invention in general contemplates the formation of a continuous run of double-faced corrugated board, wherein the intermediate corrugated filler sheet 1 is of less width than the liners or facing sheets 2 and 3 which are secured to opposite faces of said corrugated filler sheet 1 in such manner that they project a substantially equal distance beyond only one side edge 1*a* thereof as indicated by reference numerals 2*a* and 3*a* in Fig. 2 of the drawings.

Due to the necessity of steaming the filler 1 with live steam which is injected into said filler just prior to being corrugated for the purpose of softening the fibres therein to enable the corrugation thereof without cracking or breaking of said fibres in the surface thereof and also the necessity for contact of the filler 1 and facings or liners 2 and 3 with heating plates, steam heated corrugating and preheating rolls respectively hereinafter described, as well as the passage of all of these sheets over the usual drying elements, said sheets 1, 2 and 3 and each of them are subjected to a sudden substantial rise in temperature which causes them, and particularly the filler sheet 1, to shrink transversely thereof due to the longitudinal tension and the lack of any tension or pull transversely or crosswise of said sheets. The amount or degree of shrinkage in the width of these sheets depends upon the moisture content thereof, the kind and quality of the paper employed, as well as upon the weather conditions on the particular day the sheets are being used and hence is substantially incapable of accurate predetermination or control by compensating or allowing therefor so as to enable the production of a finished run having the exact transverse filler width axially of the corrugations therein that is both desired and required in each blank or section cut from such run.

The amount of shrinkage occurring in the dimensions of the filler 1 axially of its corrugations and in the liners or facings 2 and 3 is generally less than one-half an inch but in order to produce container blanks having a filler dimension, axially of its corrugations, which is, exactly equal to the specified perimeter of the container to be formed, said filler sheet 1 must be initially fed into the corrugated board making machinery in widths sufficiently in excess of the ultimate dimensions desired in the finished board to allow for an indeterminate amount of shrinkage and ultimate trimming of the blanks to the exact filler dimension desired.

Referring now particularly to Fig. 1 of the drawings, reference numerals 4 indicate supporting shafts on which are carried supply rolls of paper 2 and 3 and straw, kraft, chestnut or the like 1, respectively constituting facings or liner sheets and a filler sheet. In accordance with the invention, the runs of liner or facing 2 and 3 are of greater width than the filler 1 and each of said sheets is of sufficiently greater width than that desired for each such sheets in the completed blank to allow for maximum shrinkage and trimming thereof as above mentioned. As shown, the filler 1 is fed over an idler roll, a heat-

ing plate 5 and between steamers 6 just prior to passage of said filler between the steam heated corrugating rolls 7 and 8 where it is transversely corrugated, the amount of live steam injected into the filler 1 by the steamers 6 depending upon the kind of paper or filler medium employed as well as the linear speed of travel of said filler between said corrugating rolls. A paste box 9 is provided adjacent the corrugating rolls 7 and 8 and equipped with feeding rolls 10 to apply adhesive to the ridges of the corrugations thus formed in the filler 1 which face toward the liner sheet 2. The liner or facing sheet 2 passes around preheating rolls 11 and 12 and a steam heated pressure roll 13 by means of which said sheet is pressed into contact with the adjacent ridges of the corrugations formed in the filler sheet 1 as the latter passes around the previously mentioned corrugating roll 8 and is secured thereto to form a continuous single-faced corrugated run A.

As previously stated, the liners or facing sheets must be secured to opposite faces of the filler sheet 1 so that corresponding edge portions project beyond only one side edge 1*a* of said filler sheet and due to a constant tendency for the several supply rolls and runs of paper to weave slightly transversely relative to one another during formation of the board because of the extreme distance through which the several runs are drawn before being secured to one another as well as variations in the tension and braking forces applied respectively to the several runs and supply rolls thereof, it is impossible to accurately align the other edges of said facings or liners with the opposite edge 1*b* of the corrugated filler sheet 1. Accordingly, and in order that the edge 2*b* of the facing sheet 2 will not project beyond the edge 1*b* of the filler sheet, it is necessary that said facing sheet 2 be fed into contact with and secured to said filler sheet 1 so that said edge 2*b* of the former is offset slightly inward from the edge 1*b* of the filler sheet a distance sufficient to compensate for maximum relative transverse weaving of the sheets as shown in Fig. 2 of the drawings.

As the sheet A emerges from between the rolls 8 and 13, the same passes over a series of idler rolls 14 and 15, and an adhesive box 16 having rollers 17 associated therewith to apply adhesive to the now exposed ridges of the corrugations of the continuous single-faced run A, said sheet A subsequently passing between opposed rolls 18 and 19, after which the run of liner or facing sheet 3 is fed about a preheating roll 22 and the previously mentioned roll 19 into parallel contact with the exposed ridges of the corrugations of the continuous run of single-faced corrugated board A in the manner described in connection with feeding of the liner or facing sheet 2, that is, offset slightly inward from the edge 1*b* of the filler, so that the edge 3*b* of said liner or facing 3 will not at any time project beyond said edge 1*b* of the filler 1 of said single-faced run A as also shown in Fig. 2 of the drawings. Thus the side edge 1*b* of the filler will be entirely free from any projecting portions of either facing or liner sheet and it is pointed out that the fact that said edge 1*b* of the filler be and remain at all times projection free is essential to the success of this invention as will hereinafter appear. The liner 3 is secured to the run A by virtue of the adhesive previously applied to the exposed ridges of the corrugations in the filler 1 from the paste box 16 by rolls 17 and forms a composite double-faced run of single-wall transversely corrugated board B which then passes intermediate a series of rolls 23 and hot plates or like heating elements 24 for drying and then passes between a pair of opposed rolls 25 and 26 respectively, one of which is provided with an adjustable cut-off 27 operable to sever said continuous run of double-faced single-wall corrugated board B into sections at predetermined intervals transversely thereof, to form sections C or multiples thereof.

After the sections C have been severed from the run B the same are scored and trimmed along their edges lying parallel to the corrugations of the filler at predetermined spaced intervals as indicated in Fig. 3 of the drawings by reference numerals 28 and 29 in accordance with the required depth and flap dimensions of the container to be produced, and the dimension of said filler sheet axially of the corrugations therein is then measured to determine the extent or amount that the sheet 1 shrank during formation of the composite faced run B. This shrinkage will be substantially uniform throughout a given run or lot of sections fabricated from any one roll of corrugating material and said sections are then fed successively through a trimming machine with the projection free edges 1*b* of their corrugated filler sheets firmly abutting an adjustable gauge 30 which has been first set with respect to a cutting tool 31 so that as said sections C pass through said machine, the tool 31 will cut the sections C along a predetermined line inwardly adjacent the edge 1*b* of said filler sheet as indicated in dotted lines in Fig. 4 and trim said sections down to the exact transverse filler width desired. This trimming of the sections C will, as shown in Fig. 4, remove a sufficient portion of each section so that the edges of the facings 2 and 3 exactly register with the edge of the filler sheet 1 at the cut edge 1*c* produced by said trimming operation.

The necessity for assembling the faced corrugated board B so that in the resulting sections C the filler edge 1*b* is entirely and always free from projecting edge portions of the facings or liners 2 and 3 will be clear from the above description for were said facings or either of them allowed to project even the slightest distance beyond said filler edge 1*b* accurate gauging of the trimming operation effected by the cutter 31 by cooperation of the edge 1*b* with the gauge 30 would be wholly impossible. During this trimming of the sections C by the cutter 31 as above mentioned, said sections are also engaged by members 32 having segmental slotting elements 33 secured peripherally thereof, and operable to slot said sections transversely of the corrugation in the filler thereof as indicated at 34, 34*a*, 34*b* and 34*c*. The elements 33 are of such arcuate length and arranged circumferentially of the members 32 so that slotting of each section C is completed in one revolution of said members 32 which operate in timed relation with the cutting tool 31. In addition the sections C are also engaged by rollers or like members 35 which function to score said sections transversely of the corrugations therein as indicated at 36, 36*a*, 36*b* and 36*c* respectively. These scoring members 35 are respectively aligned with a corresponding slotting member 32 and said sets of aligned slotters and scorers 32 and 33 are relatively spaced with respect to one another and said tool 31 so as to slot and score said sections in accordance with the dimensional requirements of the containers to be formed and also in such manner that the seam or joint will reside in a wall portion of each container and

not in or at a corner edge thereof, thus providing maximum strength and durability to said containers. The longitudinal scores **28** and **29** previously mentioned define between themselves the depth of the containers to be formed while the portions of the sections or blanks bounded by the said scores **28** and **29** and the scores **36**, **36***a*, **36***b* and **36***c* and said scores **36** and **36***c* and the adjacent edges of the sections constitute the side and end wall portions of the containers and are indicated respectively by reference numerals **37** and **38**. The trimming, slotting and scoring machine or apparatus illustrated in Fig. 4 may be and preferably is also provided with one or more sets of printing rollers (not shown) so that printing of advertising and other matter on the sections C may be accomplished during travel of said sections through said machine or apparatus.

After the sections C have been trimmed to the desired filler dimension and slotted and scored in the manner set forth above, said sections C are successively fed through an adhesive applying mechanism with their trimmed edges *1c* firmly abutting against a gauge **39** and between relatively opposed adhesive applying rolls **40** and **41** which contact said sections inwardly adjacent the edge thereof to deposit strips of adhesive **42** from paste boxes **43** and **44** along the adjacent edge portions of the facing sheets or liners **2** and **3** at opposite sides of said sections as shown in Figs. 5, 6 and 7 of the drawings. The gauge **39** may be adjusted relative to the opposed paste or adhesive applying rolls **43** and **44** by means of hand wheel **45** so that the relative width of the strip of adhesive **42** applied by said rolls to opposite edge portions of the sections may be varied at will.

The sections or blanks C are then folded or doubled along the scores **36** and **36***b* and the trimmed edges *1c* thereof together with the adhesive coated portions adjacent thereto are inserted and secured between the projecting portions of the liners or facings **2** and **3** at the opposite edge of the blank or section with the opposite edges *1a* of the corrugated filler sheet **1** in firmly abutting relation as shown in Fig. 8 of the drawings to form the seam or joint in a wall of the container. In accordance with the usual practice in the trade, the containers will be shipped in this substantially flat, otherwise unassembled, state to be set up or assembled by the user or customer in the usual manner into, for example, the form shown in Fig. 9 of the drawings.

The present invention provides a novel method of manufacturing corrugated containers which are of an extremely rugged, substantially indestructible nature, embodying certain novel structural features for securing the opposite side edges of the container blanks in abutting relation to provide a joint or seam in the container which is substantially flush with the adjacent surfaces thereof, and while certain specific embodiments and structural details of the invention have been illustrated and described herein, it is not intended that the same be precisely limited thereto but that changes and modifications may be incorporated within the scope of the annexed claims.

I claim:

1. The steps in the method of making containers consisting of feeding continuous runs of filler and facing sheets of predetermined transverse dimensions to a corrugated board making machine, said facing sheets being of greater transverse width than said filler sheet and at least said filler sheet having a transverse dimension sufficiently in excess of the ultimate dimension required to allow for maximum shrinkage of said sheet, transversely corrugating said filler sheet, securing said facing sheets to opposite faces of the filler sheet in such transverse relation with respect thereto that said facing sheets project a substantially equal distance beyond one and the same side edge of said filler and extend substantially to but not beyond the opposite side edge thereof, cutting sections from the resulting run of corrugated board at predetermined intervals transversely thereof, and feeding said sections to a scoring and slotting mechanism with the projection free filler edges of the sections cooperatively abutting a gauge predeterminedly set to control scoring and slotting of said sections with respect to said projection free edges thereof.

2. The steps in the method of making containers consisting of feeding continuous runs of filler and facing sheets of predetermined transverse dimensions to a corrugated board making machine, said facing sheets being of greater transverse width than said filler sheet and at least said filler sheet having a transverse dimension sufficiently in excess of the ultimate dimension required to allow for maximum shrinkage of said sheet, transversely corrugating said filler sheet, securing said facing sheets to opposite faces of the filler sheet in such transverse relation with respect thereto that said facing sheets project a substantially equal distance beyond one and the same side edge of said filler and extend substantially to but not beyond the opposite side edge thereof, cutting sections from the resulting run of corrugated board at predetermined intervals transversely thereof, feeding said sections to a scoring and slotting mechanism with the projection free filler edges of the sections cooperatively abutting a gauge predeterminedly set to control scoring and slotting of said sections with respect to said projection free edges thereof, depositing adhesive upon opposite faces of said sections adjacent the projection free edges thereof, and thereafter inserting and securing said projection free edges and adjacent adhesive coated portions between the projecting portions of the facing sheets at the opposite edge of the fillers.

3. The steps in the method of making containers consisting of feeding continuous runs of filler and facing sheets of predetermined transverse dimensions to a corrugated board making machine, said facing sheets being of greater transverse width than said filler sheet and at least said filler sheet having a transverse dimension sufficiently in excess of the ultimate dimension required to allow for maximum shrinkage of said sheet, transversely corrugating said filler sheet, securing said facing sheets to opposite faces of the filler sheet in such transverse relation with respect thereto that said facing sheets project a substantially equal distance beyond one and the same side edge of said filler and extend substantially to but not beyond the opposite side edge thereof, cutting sections from the resulting run of corrugated board at predetermined intervals transversely thereof, scoring said sections parallel to the filler corrugations while trimming the opposite edges of the sections lying parallel to said corrugations, and feeding said sections to a scoring and slotting mechanism with the projection free filler edges of the sections cooperatively abutting a gauge predeterminedly set to control scoring and slotting of

said sections with respect to said projection free edges thereof.

4. The steps in the method of making containers consisting of feeding continuous runs of filler and facing sheets of predetermined transverse dimensions to a corrugated board making machine, said facing sheets being of greater transverse width than said filler sheet and at least said filler sheet having a transverse dimension sufficiently in excess of the ultimate dimension required to allow for maximum shrinkage and subsequent trimming of said sheet, transversely corrugating said filler sheet, securing said facing sheets to opposite faces of the filler sheet in such transverse relation with respect thereto that said facing sheets project a substantially equal distance beyond one and the same side edge of said filler and extend substantially to but not beyond the opposite side edge thereof, cutting sections from the resulting run of faced corrugated board at predetermined intervals transversely thereof, and trimming said sections to the exact filler dimension desired by cutting the same along a predetermined line inwardly adjacent the projection free side edge of said filler opposite that beyond which said facing sheets project.

5. The steps in the method of making containers consisting of feeding continuous runs of filler and facing sheets of predetermined transverse dimensions to a corrugated board making machine, said facing sheets being of greater transverse width than said filler sheet and at least said filler sheet having a transverse dimension sufficiently in excess of the ultimate dimension required to allow for maximum shrinkage and subsequent trimming of said sheet, transversely corrugating said filler sheet, securing said facing sheets to opposite faces of the filler sheet in such tranverse relation with respect thereto that said facing sheets project a substantially equal distance beyond one and the same side edge of said filler and extend substantially to but not beyond the opposite side edge thereof, cutting sections from the resulting run of faced corrugated board at predetermined intervals transversely thereof, and trimming said sections to the exact filler dimension desired by cutting the same along a predetermined line inwardly adjacent the projection free side edge of said filler opposite that beyond which said facing sheets project while said projection free filler edge cooperates with a gauge to predeterminedly control the trimming of the sections.

6. The steps in the method of making containers consisting of feeding continuous runs of filler and facing sheets of predetermined transverse dimensions to a corrugated board making machine, said facing sheets being of greater transverse width than said filler sheet and at least said filler sheet having a transverse dimension sufficiently in excess of the ultimate dimension required to allow for maximum shrinkage and subsequent trimming of said sheet, transversely corrugating said filler sheet, securing said facing sheets to opposite faces of the filler sheet in such transverse relation with respect thereto that said facing sheets project a substantially equal distance beyond one and the same side edge of said filler and extend substantially to but not beyond the opposite side edge thereof, cutting sections from the resulting run of faced corrugated board at predetermined intervals transversely thereof, trimming said sections to the exact filler dimension desired by cutting the same along a predetermined line inwardly adjacent the projection free side edge of said filler opposite that beyond which said facing sheets project, and at the same time scoring and slotting said sections parallel to said projection free filler edge thereof at predetermined spaced intervals with respect to the trimming cut.

7. The steps in the method of making containers consisting of feeding continuous runs of filler and facing sheets of predetermined transverse dimensions to a corrugated board making machine, said facing sheets being of greater transverse width than said filler sheet and at least said filler sheet having a transverse dimension sufficiently in excess of the ultimate dimension required to allow for maximum shrinkage and subsequent trimming of said sheet, transversely corrugating said filler sheet, securing said facing sheets to opposite faces of the filler sheet in such transverse relation with respect thereto that said facing sheets project a substantially equal distance beyond one and the same side edge of said filler and extend substantially to but not beyond the opposite side edge thereof, cutting sections from the resulting run of faced corrugated board at predetermined intervals transversely thereof, trimming said sections to the exact filler dimension desired by cutting the same along a predetermined line inwardly adjacent the projection free side edge of said filler opposite that beyond which said facing sheets project, and at the same time scoring and slotting said sections parallel to said projection free filler edge thereof at predetermined spaced intervals with respect to the trimming cut, depositing adhesive upon opposite faces of said sections adjacent the trimmed edge thereof, and thereafter inserting and securing said trimmed edge and adjacent adhesive coated portions between the projecting portions of the facing at the opposite edge of the filler so that said filler edges are in closely abutting relation.

ISADORE H. WEBER.