Jan. 9, 1940. J. P. KAVANAUGH 2,186,111

CONTAINER

Filed March 9, 1937 2 Sheets-Sheet 1

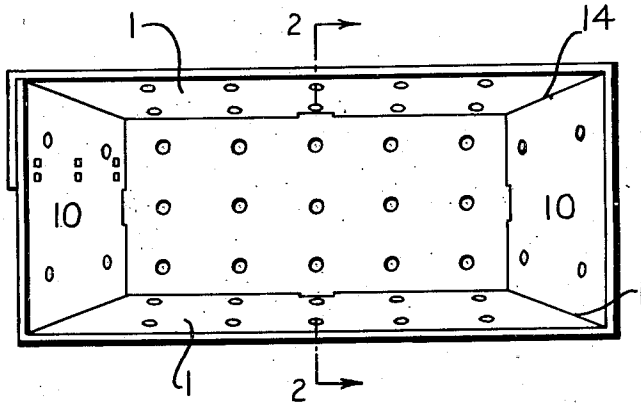
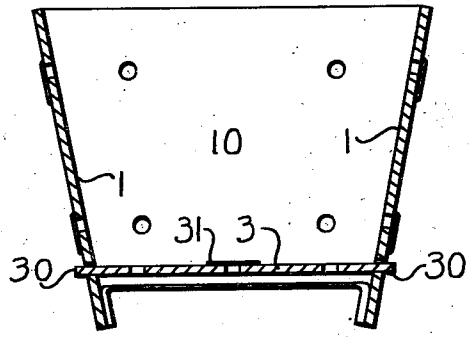
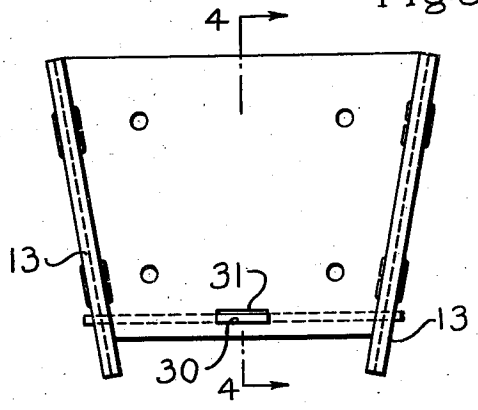


Fig. 1

Fig. 2

Fig. 3





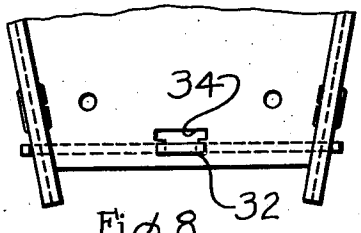


Fig. 8

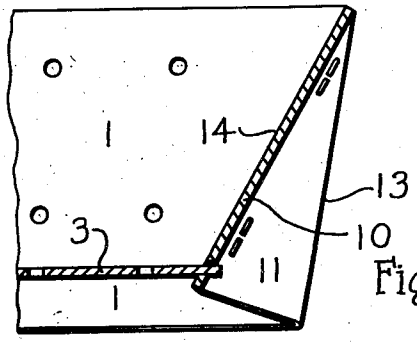


Fig. 4

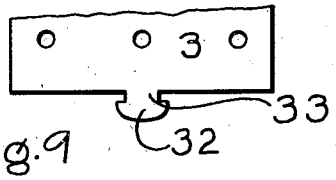


Fig. 9

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Jan. 9, 1940. J. P. KAVANAUGH 2,186,111

CONTAINER

Filed March 9, 1937 2 Sheets-Sheet 2

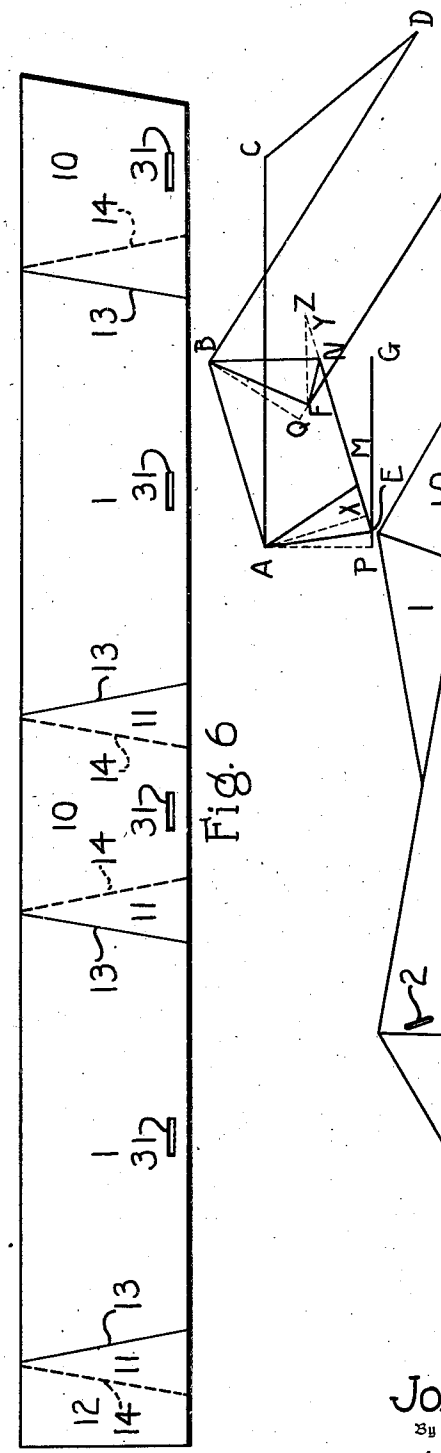


Fig. 6

Fig. 7

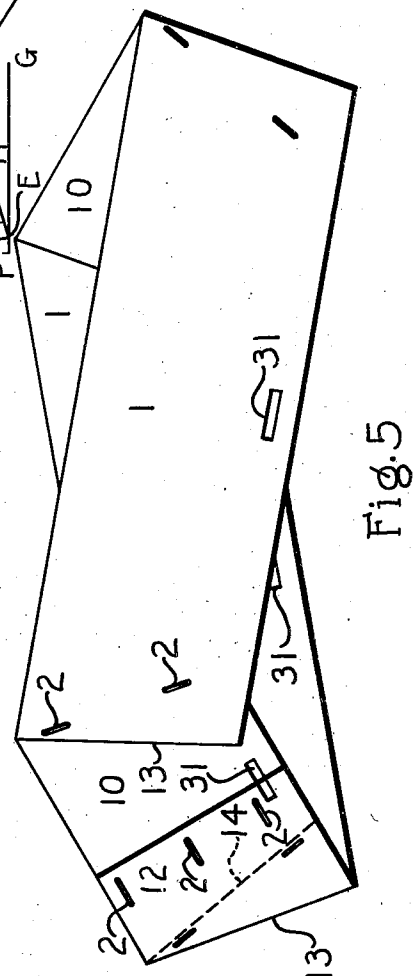


Fig. 5

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UNITED STATES PATENT OFFICE

2,186,111

CONTAINER

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Application March 9, 1937, Serial No. 129,831

6 Claims. (Cl. 229—23)

This invention relates to a container, and more specifically to a basket or box especially suitable for grapes or berries of various kinds. Such a container may, if desired, be provided with a cover and suitable handles, but these may be of any conventional construction and are not part of my invention.

The principles of construction which I employ are best adapted to a container having two sides and two ends, the ends of which, at least, are flared upward, and flared sides are also preferable. A principal object of my invention is to produce such a container which may be completely fabricated at a factory, and yet may be shipped in a collapsed condition as a flat package. The user will have no nailing, stitching or gluing operation to perform, but may merely expand the collapsed wall structure and fix the bottom in place without the employment of tools and by the performance of a few simple manipulations.

Another object of my invention is to construct a container having reenforced corners, preferably in the form of buttresses disposed in prolongation of the side walls of the container. A stiff and rigid structure is thereby produced, though the material may itself be of flimsy character.

A further object of my invention is, in a container for the purpose mentioned, to provide a construction which will permit access of air to and air circulation through the contents of the container, and in particular the lower layer thereof.

Still another object of my invention is to construct a container having the aforementioned advantages which may be constructed with a minimum of expense, since inexpensive, scrap material may be used and the operations performed thereon are few. Such material may be fiber board, and strips left over from the manufacture of other containers may be utilized in this container.

Other advantages of my specific box construction will be described hereafter.

My invention particularly contemplates the novel features of construction employed in the fabrication of my container as illustrated in the drawings and described in the following specification, which will enable the container to be collapsed, and which in expanded form contribute to its rigidity and utility, the particular unique characteristics of which are specifically defined in the claims.

I have shown in the drawings a preferred form of container in which both the ends and the sides are flared upwardly, and in which the end of each side forms with the upper edge of such side an acute angle. It is to be understood, however, that while the end walls will always be flared upwardly and outwardly, the side walls, under certain conditions, may be vertical, or the sides may have square cut ends. Also I have shown the bottom of the container constructed separately from the wall structure, but such bottom may be formed integral with a side or an end, or secured along an edge thereto, if desired. These and other changes may occur to one skilled in the art without departing from the spirit of my invention as defined in the appended claims.

Figure 1 is a plan view of the container.

Figure 2 is a transverse section of the container, taken along the line 2—2 of Figure 1, while Figure 3 is an end elevation view.

Figure 4 is a partial section of the container taken along the line 4—4 of Figure 3, to illustrate in particular the corner construction.

Figure 5 shows the wall structure in collapsed position, while Figure 6 shows the strip from which the wall structure is made scored along the proper lines for folding, preparatory to fabrication of the wall structure.

Figure 7 is a diagram showing the method of calculating and laying out the score lines, according to the desired dimensions of the container.

Figures 8 and 9 are fragmentary end elevation and plan views, respectively, of a slightly modified form of mechanism for locking the bottom to the wall structure.

As will be evident from Figures 1, 2 and 3, my container preferably has upwardly flared side and end walls, and a flat bottom. It is intended primarily for use as a grape basket, and since fermentation of fresh grapes usually starts at the bottom of a basket, where ventilation is poor, I have taken special precautions to insure a circulation of air through this portion of my container. To that end I employ a perforated bottom, and in addition preferably perforate the sides. An apertured bottom is ordinarily of little value since the bottom of a grape basket usually consists of a band which seats about its entire circumference quite tightly upon a table or other basket supporting the grape basket. In my container, however, I space the lower edges of the end walls above the lower edges of the side walls, the container being supported by the latter, so that air may enter freely beneath the perforated bottom and penetrate therethrough to the fruit. While a section of the end may be cut out for this purpose, I prefer to construct the container by fold-

ing the corners in such a manner that the lower edges of the ends will necessarily be raised.

A container of the type which I have illustrated is preferably made of fiber board or similar material. In order to employ successfully the lighter weights of such material I provide specially reinforced corners. To reduce further the cost of these containers my preferred construction is also adapted to utilize scrap strips by allowing the wall structure, including the sides and ends, to be made of one strip of material, and the bottom section to be made separately from another strip of scrap. Construction of the bottom integral with one of the sides is not quite so economical for scrap material cannot so easily be utilized. The cost of fabricating the container is also kept to a minimum by forming the wall structure merely by scoring and folding, so that no cuts are required between the ends of the strip, and the folds are held where desired by suitable clips or staples, or by gluing or stitching.

In Figure 6 is shown a strip scored preparatory to being folded to form the wall structure. It includes two side portions 1 and two end portions 10, with triangular portions 11 disposed between and joined to adjacent sides and ends. A flap 12 is also provided for stapling to the end section 10 at the opposite end of the strip. Two classes of score lines are employed, one type 13 forming an acute angle with the upper edges of the side walls, defining the end slope of each slide, and the other type 14 formed on the other side of the strip and disposed at an acute angle with the upper edges of the ends.

In forming the container from the strip of Figure 6 each corner is broken oppositely along the score lines 13 and 14 to form a pleat. Each triangular section 11, having upright sides 13 and 14, is deflected through 180 degrees about a line 13 to lie flat against the side 1. These triangular sections are permanently secured in such position by suitable means, such as staples 2, which may be disposed along the lines 14. The triangular sections 11 are then disposed at an angle of 90 degrees to the end sections 10 about the lines 14. This will bring the flap 12 into a position overlapping the end section 10 at the opposite end of the strip, and this flap is then permanently secured to the end, such as by staples, to form of the strip a continuous wall structure including sides 1, ends 10, and intermediate joining sections 11, disposed in relation to each other as shown in Figures 1 to 4 inclusive.

It will be evident that the disposition of the lines 13 at an acute angle to the upper edges of the sides 1 is not necessary in order to form a container having upwardly and outwardly flared walls, for the inclination of the lines 14 will accomplish this effect. Disposition of the line 13 at an acute angle will, however, as clearly shown in Figure 4, cause the lower edge of the joining section 11 to be directed upwardly so that the lower edge of the end 10 joined to the section 11 will be spaced above the lower edge of the side 1 when the strip is folded as described, without the necessity of cutting a portion out of the end's lower edge. A space for inflow of air to the perforated bottom for ventilation purposes will thereby be afforded without the necessity of an additional cutting operation.

It will also be evident that folding of the strip in the manner described will result in the container having buttressed corners disposed in prolongation of the sides 1. This construction makes for great strength, but if it should be considered unsightly, a reenforced corner would still be provided if the buttress were folded about the line 14 and again secured face to face against the end wall 10. On the other hand, a further fold might be made in the side 1 along the line of contact of the end 10 therewith, and the section joined along the line 13 might be deflected through 180° to form a reentrant pocket extending into the interior of the container, which might be secured to the side 1 in such inwardly projecting position.

In the particularly construction described the ends and the sides will both ordinarily be flared upward, the ends being flared to a greater extent than the sides. By properly selecting the length of sides and ends and the angles of the score lines, however, it is possible to have a structure in which only the end walls are flared upwardly, while the side walls will be disposed precisely vertically. On the other hand, if the lines 13 are made perpendicular to the top edges of the sides, instead of being disposed at an acute angle as shown, then the side and end walls will be flared upwardly to the same degree, instead of the end walls being flared to a greater extent than the side walls, as in the construction shown.

It will be seen that a wall structure of the type described, though made of comparatively light material, will be rugged and stiff. It is further desirable, however, that the corners be folded in the manner described and stapled, and that the ends of the strip be permanently secured together prior to shipment. Such containers, provided with the preferred buttressed corners illustrated, cannot be easily nested and even if they could be considerable room would still be required. I have therefore devised a way of folding the wall structure into a flat package, wherein one side and one end, disposed substantially in a common plane, will lie flat against the other side and end, also disposed substantially in a common plane, in the manner shown in Figure 5.

In designing a wall structure which will fold into a flat package of the type described, the length of the upper edges of the sides and ends may be selected arbitrarily. So also may be arbitrarily selected the angle at which the lines 13 are disposed to the upper edges of the sides. Having selected these three factors, however, only one slope of line 14 corresponding to these factors selected will enable the wall structure to be folded. In order to score the lines 14 at the proper angle this line may be plotted in the manner illustrated in the diagram of Figure 7. A length of side upper edge A—C is selected, and the length of end upper edge A—B is chosen. These lines are disposed at an angle equal to twice the angle of departure of the line 13 from a perpendicular to the upper edge of the wall structure. This angle B—A—C is equal to the angle between the lower edge of the triangular section 11, as shown in Figure 4, and the lower edge of the side 1. With radius A—B and center C an arc is drawn. With radius A—C and center B a second arc is drawn, intersecting the first arc at D. The figure A—B—D—C will now represent the diagram assumed by the upper edge of the wall structure in the folded position of Figure 5. The angle P—A—E is then drawn, being the angle between line 13 and a perpendicular to the upper edge of the wall structure. A—E will then be cut off according to the height of the side selected and represented by the line A—P.

Now it is evident that if no cuts are to be made

in the strip the sum of the upper edges of one side and one end must be equal to the sum of the lower edges of one side and one end plus the length of the lower edges of two triangular sections 11. Also it is evident that the length of the lower edge of an end plus the length of the lower edges of two triangular sections 11 must be equal to the length of the upper edge of the end plus the amount by which the two adjacent ends of the sides' lower edges are shortened, the shortening of one side being represented in Figure 7 by the distance P—E. Translating this last statement into the distances represented in Figure 7, having made X—E and Y—Z equal to P—E, and X—Y equal to A—B, we find that the total length E—Z is equal to X—Y, the length of the upper edge of the end, plus X—E and Y—Z, each equal to the length cut from one end of one side.

Next we find that in folded position, because of the disposition of the diagram A—B—D—C, the adjacent ends of the sides must be disposed at A—E and B—F. To the line E—Z, therefore, it is only necessary to draw a line F—N at an angle to the line F—H equal to the angle B—A—C, or twice the angle P—A—E, which is the angle of turn up G—E—M, previously mentioned as being shown in Figure 4. It will then be found that the length F—N equals the length N—Z, and by striking off an equal length E—M the lines A—M and B—N can be plotted. The length M—N will be the length of the lower edge of the end 10, and the lines E—M and N—F will each be equal to the length of a lower edge of a triangular section 11. The angles M—A—B and N—B—A will be equal, and will be the angles which the lines 14 must make with the upper edge of the wall structure in order to obtain foldability thereof.

The angle of slope of the side and end walls may also be ascertained easily from the diagram of Figure 7. The slope of each end in expanded position will be, of course, the line A—M or the angle P—A—M from the vertical. The slope of the side from the vertical will be the angle X—A—M, which is the departure of the line A—M joined to the side from the perpendicular A—X. Thus by the diagram of Figure 7 the slope of the sides and the slope of the ends may be ascertained, and the angles of the lines 13 and 14 may be plotted. In varying the proportions of the box it will be found that the angle X—A—M will be increased, and hence the end slope will become more shallow by *a* decreasing the length of the side, *b* increasing the length of the end, or *c* by increasing the angle P—A—E. Also by completing the diagram of Figure 7 the shape that the wall structure will assume in collapsed position, as shown in Figure 5, may be drawn without the necessity of actually constructing and folding the wall structure.

After the wall has been expanded into container-forming position the container is completed by the addition of a bottom 3, supported between the container walls. I prefer that the bottom be formed separately from the wall structure, and be provided with tabs 30 disposed about its margins. In the wall structure I provide slots 31, all disposed in a plane near the bottom, into which the tabs 30 may be projected. The wall structure is thereby maintained in an expanded position, and the completed container is ready for use. As pointed out previously, the bottom might, if desired, be formed with one of its edges integral with a side 1, for example. In folded position of the wall structure this bottom could be folded flat against the side 1 and project thereabove, between it and the other side. In expanded position tabs on the other three sides of the bottom might be inserted into slots 31 in the manner shown.

As an alternative form of locking device for securing the bottom to the wall structure, and supporting it therefrom, I may provide a tab, shown in Figure 9, having an enlarged head portion 32 and a narrow neck portion 33. Such a tab may be inserted into a T-shaped slot 34, as shown in Figure 8. The neck 33 will be of a width and a length to drop down into the upright portion of the T-slot, and pressure on the bottom of the container cannot pull the tab end 32 through it. The bottom is thereby securely locked to the wall structure.

What I claim as my invention is:

1. A container comprising a continuous wall strip having its ends joined to form, as integral components, two end sections flared upwardly and two side sections having their lower edges extending below the lower edges of the end sections, to leave a space between the lower edges of the end sections and an object supporting the container, and a bottom supported between the side sections and the flared end sections, above the level of the lower edges of the side sections, to complete the container.

2. A container comprising a strip having its ends joined to form a wall structure including integral sides and ends, said strip having at each corner a section folded back upon a side along a line disposed at an acute angle to the upper edge of the side, and permanently secured to such side, and each such section being joined to an adjoining end to support the lower edge of such end above the lower edge of the adjacent side, and a perforated bottom supported between the sides and ends to complete the container.

3. A container comprising a strip having its ends joined to form a wall structure including integral sides and ends, and external buttress extensions disposed coplanar with the sides, and outwardly of the ends, said strip having at each corner a section folded back upon the buttress extension and permanently secured thereto to form a buttress, and a bottom supported between the sides and ends to complete the container.

4. A container comprising a strip having its ends joined to form a wall structure including integral, upwardly flared sides and ends, and external buttress corners disposed in prolongation of the sides, said strip having at each corner a section folded back upon a side along a line disposed at an acute angle to the upper wall edge, and permanently secured to such side to form a buttress, each such section being joined to an adjoining end to support the lower edge of such end above the lower edges of the sides, and a bottom supported between the flared sides and ends to complete the container.

5. A collapsible container comprising a strip having its ends joined to form a wall structure including integral, upwardly flared sides and ends, and external buttress corners disposed in prolongation of the sides, said strip having at each corner a section folded back upon a side along a line disposed at an acute angle to the upper wall edge, and permanently secured to such side to form a buttress, each such section being joined to an adjoining end to support the lower edge of such end above the lower edges of the sides, and the junction angle between such

section and the end being such that said wall structure may be moved from expanded position into collapsed position, wherein one side and one end disposed substantially in line lie flat against the other side and end also disposed substantially in line, and a perforated bottom separate from the wall structure and having tabs projecting outward from its edge, said wall structure having a plurality of horizontal slots near the lower edge thereof corresponding in position to said tabs and of a size to receive them for interconnection of said bottom with the wall structure.

6. A container wall structure formed of a continuous strip of material adapted to have its ends joined, and having upper and lower edges which are straight throughout, and having corner fold lines disposed angularly with respect to such edges to define a rectangular container wall structure having two opposite ends which are upwardly and outwardly flared, and shorter than the two other sides, the angles of the fold lines and the lengths of the sides and ends being so chosen and arranged relatively as to form buttress extensions of the sides beyond the ends, and to fold a side and an end along the corner fold lines into a common plane, and to fold flat against the other side and end, likewise folded along the corner fold lines into a common plane.

JOSEPH P. KAVANAUGH.