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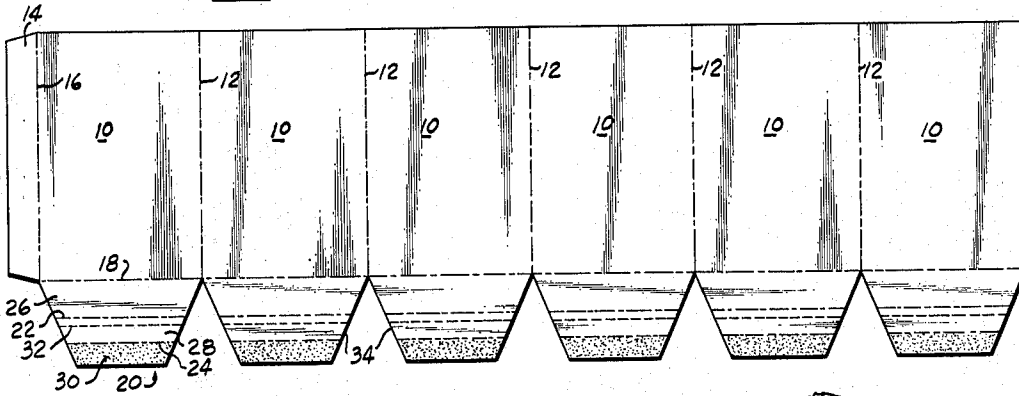
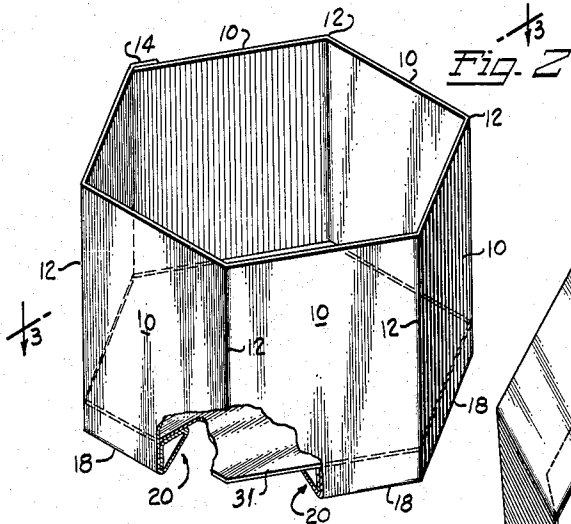
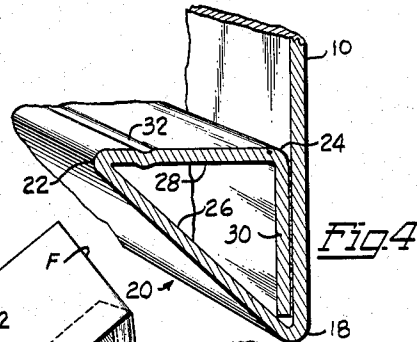
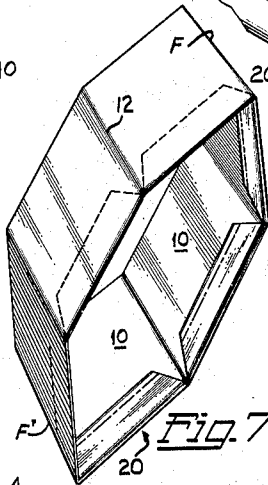
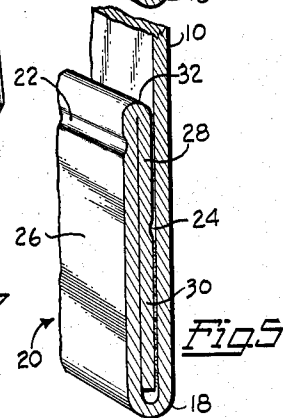
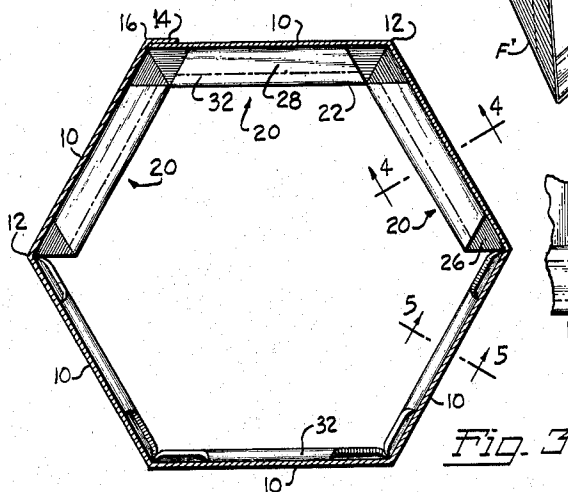
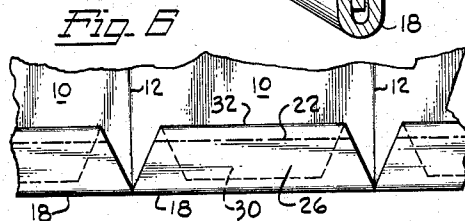
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2,733,852

CONTAINERS

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Fig. 1



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2,733,852

CONTAINERS

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5 Claims. (Cl. 229—41)

This invention relates to collapsible containers made of flexible material such as paperboard, which can be shipped flat and erected simply and rapidly at their destination, and it relates more particularly to containers of the kind comprising a tubular body having an end-closure member supported by hollow ledge sections formed by the ends of the side walls of the tubular body.

Heretofore, containers of the type here under consideration have required a substantial degree of manipulation by the consumer in order to erect them, since it was not known prior to this invention, how to ship such containers in flat condition and yet substantially complete insofar as assembly is concerned. Moreover, in order to provide a stronger and more practical support for the end-closure member, it is essential that the hollow ledge sections be glued or otherwise securely fastened to the side walls of the container. Prior containers of this type have not been entirely satisfactory because the ledge sections did not provide enough support or because they were difficult to assemble, or else the container could not be manufactured by machine in bulk quantities ready for quick assembly upon delivery to the customer. An example of the prior art over which the present invention constitutes a marked improvement appears in the patent to Strauss, No. 2,603,401, dated July 15, 1952.

In the patent to Strauss, the container is provided with tubular ledge-forming members adjacent the edges of the container at its ends. These ledge-forming members provide means for supporting a flat end-closure disk, which is shaped to conform with the interior of the container. The present invention relates to an improved container which is generally similar to that disclosed by Strauss but wherein the container is provided with commercially practical means, for securing, as by gluing, the hollow ledge sections to the inside of the container so as to form a sturdier and more practical construction. More particularly, the present invention contemplates providing means for collapsing the hollow ledge sections so that the various panels, of which these sections consist, will lie flat against their side walls in order that they may be glued properly in production type box making machines and so that the container can be shipped flat after it has been glued.

It is an object of this invention, therefore, to provide a container of the above-mentioned type which can be manufactured and almost entirely assembled by machine, thereby readily lending itself to mass production.

It is a further object to provide a container which can be shipped to the customer in a flat condition and which requires a minimum amount of time and effort for it to be set up for use.

Another specific object of the invention is to provide a container of the type above described in which the tubular ledge sections are permanently glued to the side walls of the container but may be collapsed so that the whole container will lie flat.

Accordingly, my invention provides a collapsible con-

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tainer comprising a body having a plurality of side walls connected together to define a polygonal tube, a plurality of the side walls each having an edge terminating in a flap for forming a tubular ledge of triangular cross section. The flaps contain fold lines which define an inner marginal panel extending at an acute angle to its side wall, an intermediate panel on which the end-closure of the container rests, and an outer marginal panel secured in substantially coplanar relationship with its side wall. Each flap contains a collapsing fold line parallel to the edge and spaced therefrom so as to permit said hollow ledge section to collapse and to lie flat against its side wall. Whereas the triangle may be of any type, a right triangle is best suited for most constructions. The edges of each hollow ledge-forming flap, or at least portions thereof, most desirably converge towards the outer marginal panel. Moreover, it is desirable for appearance's sake, although by no means indispensable, that adjacent portions of the inner marginal panels be contiguous when the container is completely assembled.

A more complete understanding of the invention will become apparent from the following description of the accompanying drawings wherein:

Fig. 1 shows a blank for a hexagonal container embodying the invention;

Fig. 2 is a perspective view partially broken away of a container assembled from the blank of Fig. 1;

Fig. 3 is a section taken on line 3—3 of Fig. 2 of a partially erected container;

Fig. 4 is an enlarged perspective view of a section of Fig. 3 taken at line 4—4;

Fig. 5 is a similar view taken at line 5—5 of Fig. 3;

Fig. 6 is a side elevation of a portion of the lower edge of the container as seen from within and showing the ledge sections collapsed; and

Fig. 7 is a perspective view of the body of the container in partially collapsed condition.

The blank depicted in Fig. 1 is preferably formed from paperboard or the like and since the invention is being illustrated by, though not confined to, a container of hexagonal cross section, the blank provides six side walls 10 separated by fold lines 12, one of the terminal side walls having a securing or glue flap 14 connected thereto at a fold line 16. Since Fig. 1 shows the outside of the side walls face up, the walls 10 are folded back along fold lines 12 to form the hexagonal tubular container shown in Figs. 2 and 3, wherein flap 14 is secured to the opposite terminal side wall in the manner indicated.

The lower edge 18 of each side wall is coincident with a fold line connecting a flap 20 containing fold lines 22 and 24 which are parallel to edge 18 and divide flap 20 into an inner marginal panel 26, an intermediate panel 28 and an outer marginal panel 30. Flap 20 forms an inwardly extending ledge section of triangular cross section with panel 30 glued to side wall 10 as shown in Fig. 4. Although in the embodiment shown herein the outer marginal panel 30 forms one side of the triangle, it will be understood of course that panel 30 need not extend the full length of the side of the triangle adjacent the side wall 10, since the side wall can itself provide this side of the triangle. Moreover, while it is far more desirable to fold the panel 30 downwardly (i. e. inwardly of the hollow ledge) as shown, because with this arrangement panel 30 provides a stronger support for the end-closure member 31 (Fig. 2) and also does not interfere with the seating of the end-closure against the ledge sections, it is also possible to fold panel 30 upwardly so that it lies outside the hollow ledge section. Each flap also contains within the intermediate panel 28 a collapsing fold line 32, parallel to the lower edge 18 of its side wall for permitting the ledge sections to fold up flat against the side walls as shown in Figs. 5 to 7.

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Although the angular relationship between the convergent edges 34 of the flaps 20 is not critical in this construction, it is desirable, in the construction shown, that the edges of at least the inner marginal panels 26 converge enough so that they will not overlap when the tubular ledge sections are formed. For appearance sake, it is also desirable to make the edges of the inner marginal panels 26 contiguous (see Fig. 3) when the ledge sections are extended. Therefore, to accomplish this, the correct angular relationship between the convergent edges of at least the panels 26 of the flaps 20 must be chosen. This is determined by the angles within the triangular ledge sections and the number of sides of the particular container. In the case of a hexagonal container as depicted in the embodiment of the invention here illustrated, the angle included between convergent edges of adjacent flaps is approximately 47°.

As indicated by stippling in Figs. 1, 4 and 5, the outer marginal panel of each flap 20 may be coated with glue during the gluing operation in the box folding machine for securing it to the side wall 10. Of if desired, the glue may be applied to side walls 10 adjacent the lower edges 18 thereof rather than to panels 30.

A partial assembly of the body of the container from the blank of Fig. 1 has been depicted in Fig. 3, the flap 14 having been adhesively or otherwise suitably secured to the opposite terminal side wall 10. The outer marginal panels 30 have likewise been adhesively secured in substantially coplanar relationship with their respective side walls 10, as described above. The three upper ledge-forming sections in Fig. 3 are shown extended, adjacent edges of panels 26 being shown contiguous with each other in this particular case. The three lower ledge-forming sections as viewed in Fig. 3 are shown folded up flat against the side walls 10, in the manner more clearly illustrated in Figs. 5 and 6.

In setting up the container thus formed, it is only necessary to open up the body from its flat condition as it comes out of the box folding and gluing machine, and to place the end-closure member 31 into the upper end of the container. The disk forming end-closure 31 is of course hexagonal in plan for a hexagonal container as illustrated herein and fits snugly within the side walls 10. When the disk 31 is pressed down within the container against the upper edges 32 of the collapsed ledge-forming sections, these sections will be extended inwardly simultaneously from the side walls until they assume the position shown in Fig. 4. In this fully extended condition of each ledge section, the collapsing fold line 32 and the fold lines 22 and 24 have yielded under pressure, as the disk 31 is pressed downwardly, and have, consequently, permitted the intermediate panel 28 to flatten out to its full width instead of being folded upon itself at collapsing fold line 32 as shown in Fig. 5. The ledge sections thus extended provide a strong, sturdy support for the end-closure 31, since panels 30, being secured firmly to the side walls 10, can not pull away under the load of the contents of the container and since panels 26, which remain rigid, will provide additional support. In order that panels 26 will be as strong as possible so that they will not buckle under the load of the contents of the container, the grain of the paperboard of which the container is made should be arranged perpendicularly to the fold lines within flap 20. The presence of collapse line 32 does not in any way weaken the support provided by the ledge section, because panel 28 is not under compression.

It is of course readily apparent that the container can be quickly collapsed by simply removing end-closure 31 and collapsing the ledge sections so that the body of the container can again be folded flat.

The collapse fold 32 must be properly located with respect to the other fold lines of the end flaps 20 in order for the ledge sections to be collapsed completely against the side walls of the container. This is readily

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determined from the length of the perimeter of the triangle formed by the cross section of a ledge section as shown in Fig. 4. The collapse line 32 is located by measuring, along the perimeter of the triangle in either direction from the fold line at 18, a distance equal to one-half the perimeter of the triangle.

Whereas crease lines are provided in most instances in the blank so that the latter can be folded and glued by machine prior to shipment to the customer, certain of the fold lines such as 22 and collapse line 32 are more desirably provided with skip cuts, which are alternated short cuts and creases, for the purpose of making these fold lines sufficiently flexible, so that the container may be quickly and easily set up as hereinbefore described. Moreover, if the nature of the material and the particular purpose, for which the fold line is intended, warrant it, the fold lines may be scored instead of creased.

Containers embodying the present invention are especially well suited for manufacture in the box making and folding machines used for the manufacture of many other types of containers. Thus the blank is an extremely simple one to make and is easily folded and glued by machine. After the blank is died out on the usual cutting and creasing machines, it is fed to the folding and gluing machine where the fold lines in the flaps 20 are, if desired, first pre-broken, and then glue is applied to the outside of panels 30 or on side walls 10, whichever is found to be more suitable. Next, flaps 20 are folded by machine on collapse lines 32 and then folded again at 18 against side walls 10 as best illustrated in Fig. 5. Since, at this point, the flaps 20 are flat against the side walls 10, suitable pressure can be applied to make the glued panels 30 adhere securely to the side walls. The body of the container is then folded on lines 12 and glued by machine in the usual manner, without interference with the ledge sections which lie flat against their respective side walls.

By reference to Fig. 7, it is apparent that when the container is collapsed, the material at the fold lines F and F' is placed under considerable strain because the side walls which are connected at these two fold lines become completely folded back upon each other. Since the edges of flaps 20 are tapered or cut back away from the fold lines 12, overlapping of the collapsed ledge sections adjacent the fold lines at F, F' is virtually eliminated, thereby avoiding unduly increasing the strain on the material and the tendency for it to burst at these points. This is important, especially where the containers are intended to be mass-produced, because when they are in the folding and gluing machine or stored in large stacks one on top of the other, considerable pressure tending to burst the folds is exerted on them while they are folded flat.

It is of course obvious that, without special provision, an even number of side walls 10 must be provided so that the container can be made to lie flat while forming the glue seams and for shipping the container in this condition. However, since the ledge sections made in accordance with this invention provide an unusually strong support for the end-closure, it is not necessary in all cases to provide a ledge section on each side wall. This is especially true where six or more side walls may be contemplated, in which case only every other side wall might have a ledge section. In a container where it is thus feasible to omit the ledge sections from one or more of the side walls, it then becomes more practical, by providing a vertical collapse line in one of the side walls, to make a container having an odd number of side walls.

Since, as pointed out above, it is not essential that the ledge sections form a continuous supporting ledge completely around the inside periphery of the container, it becomes unnecessary, where ledge sections are provided only on every other side wall, to make the edges of flaps 20 convergent. Furthermore, if the edges of flaps 20 are spaced far enough from the vertical edges 12 of the side

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walls 10, they do not have to converge, even where all the side walls are provided with ledge sections. Thus, the construction illustrated in the drawings could be modified by making flaps 20 of uniform width equal to the length of fold line 22, in which case edges 34 would be parallel to each other and perpendicular to the line 18. Various other changes and modifications of the embodiment described herein can be made without departing from the scope of the invention.

What is claimed is:

1. A collapsible container comprising a body having a plurality of side walls connected together to form a polygonal tube, a plurality of said side walls each having an edge terminating in a flap folded inwardly of said tube to form a hollow ledge for supporting an end-closure member, said hollow ledge together with the section of the side wall adjacent thereto being triangular in cross section, said flap containing fold lines defining an inner marginal panel, an intermediate panel against which the end-closure member is adapted to rest, and an outer marginal panel, each outer marginal panel being rigidly secured to its side wall in substantially coplanar relationship therewith, said flap also containing a collapsing fold line extending parallel to and spaced from said edge of its side wall and adapted to permit said hollow ledge to

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collapse so that the latter may lie flat against its side wall.

2. A collapsible container as set forth in claim 1 wherein said collapsing fold line is located at a distance equal to one-half the perimeter of the triangular cross section of said hollow ledge measured along its perimeter from said edge of the side wall.

3. A collapsible container as set forth in claim 1 wherein said intermediate panel of said hollow ledge is perpendicular to the side walls of the container.

4. A collapsible container as set forth in claim 1 wherein said outer marginal panel is glued to the side wall of said container inwardly of said hollow ledge.

5. A collapsible container as set forth in claim 1 wherein said container is made of paperboard, the grain in said paperboard being arranged perpendicular to said fold lines.

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