Oct. 17, 1961 R. W. McCORMICK 3,004,696

PARTITIONED CONTAINER

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FIG. 1

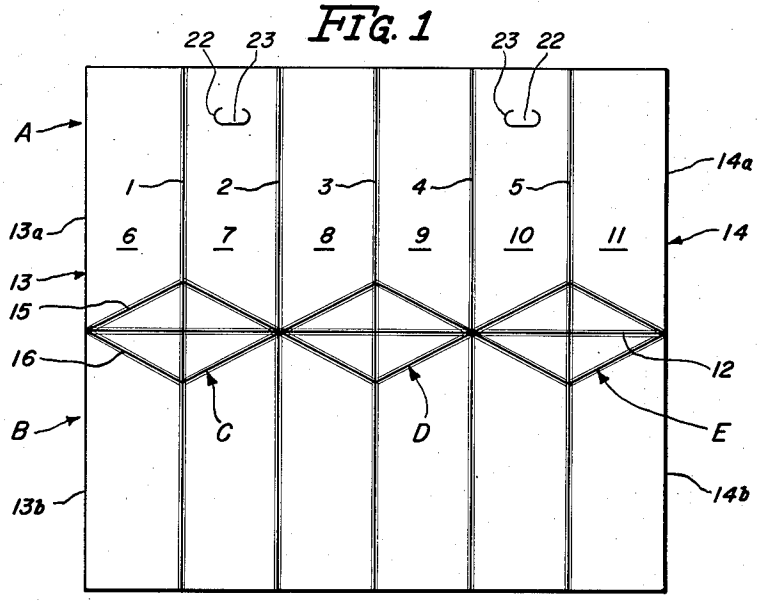


FIG. 2

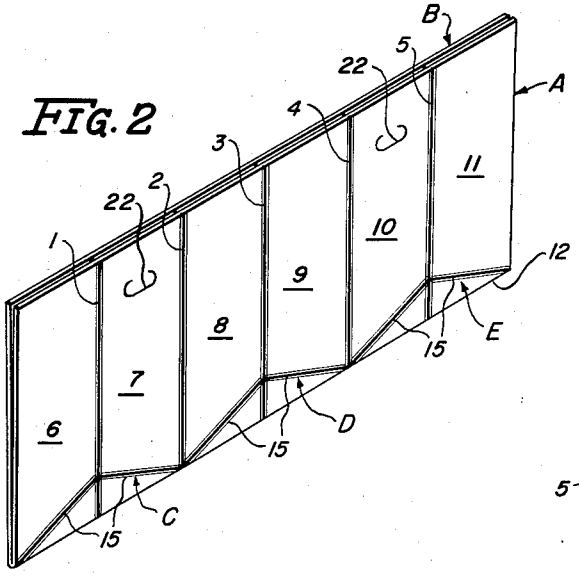


FIG. 3

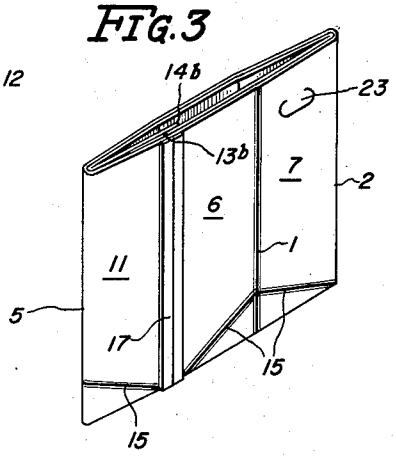
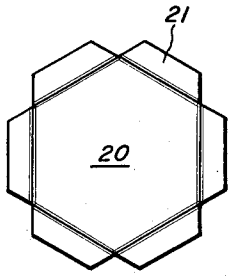


FIG. 4



INVENTOR
Robert W. McCormick
BY Robert D. Trickett
ATTORNEY

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FIG. 5

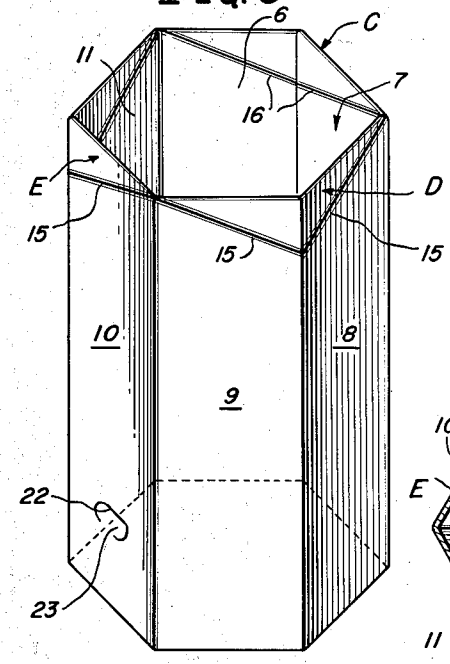
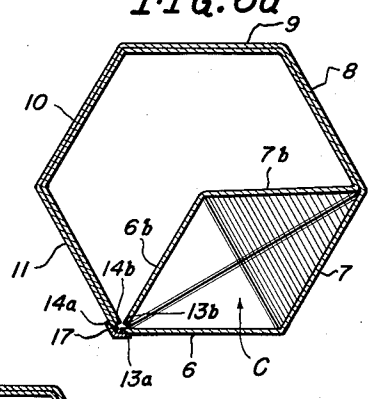


FIG. 6a



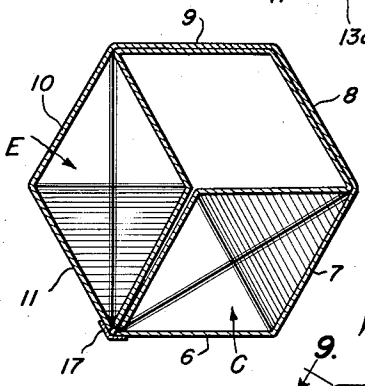
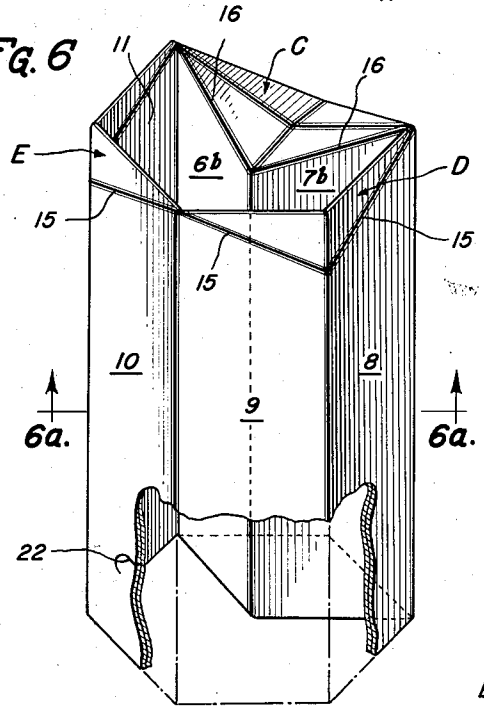


FIG. 6b

FIG. 6



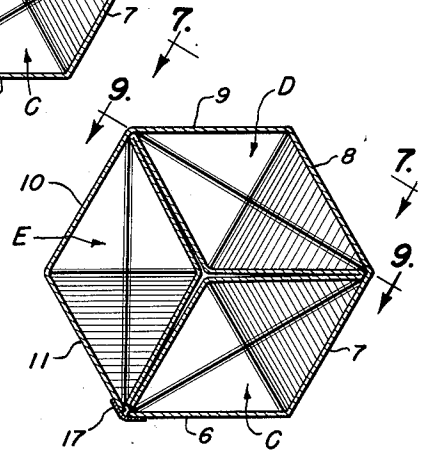


FIG. 6c

INVENTOR
Robert W. McCormick
BY Robert D. Seichert
ATTORNEY

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FIG. 7

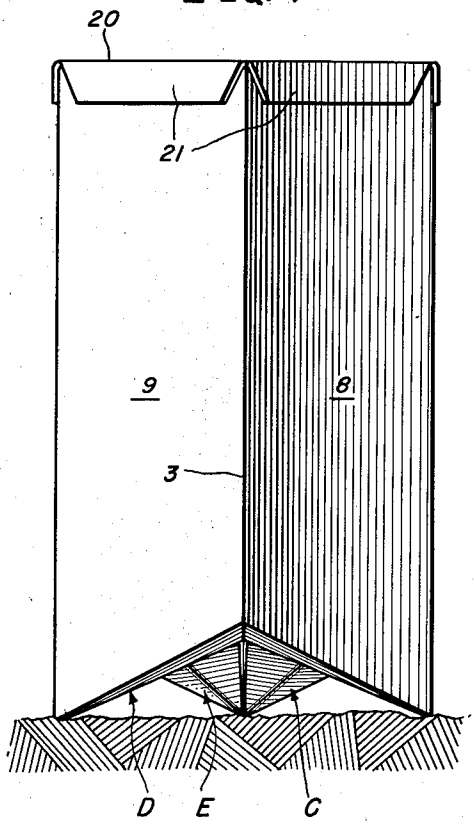


FIG. 9

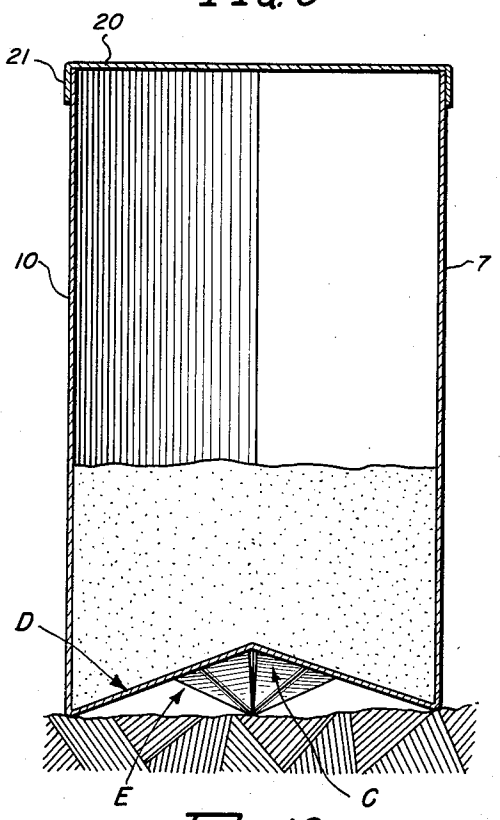


FIG. 8

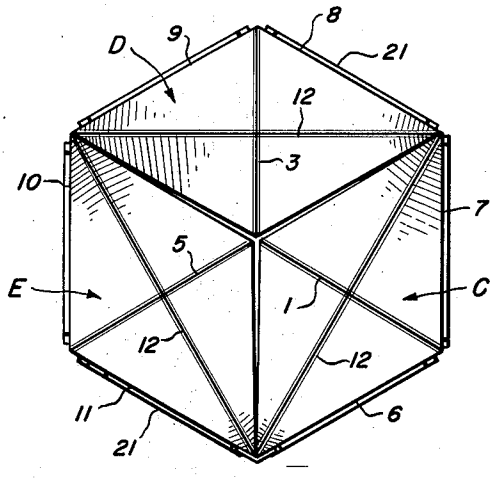
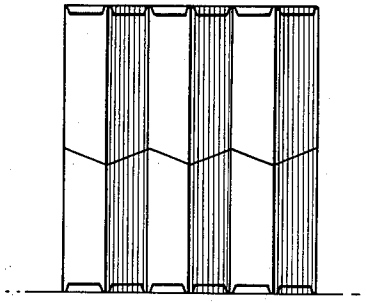


FIG. 10



INVENTOR
Robert W. McCormick
BY Robert W. Leichert
ATTORNEY

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3,004,696

PARTITIONED CONTAINER

Robert W. McCormick, Cleveland, Ohio, assignor to Container Corporation of America, Chicago, Ill., a corporation of Delaware

Filed Apr. 13, 1959, Ser. No. 805,879
5 Claims. (Cl. 229—27)

The present invention relates to containers and more particularly to containers formed with partitions to provide a plurality of compartments.

An important object of the invention is to provide a container that may be employed advantageously for fruits and vegetables and equally well for relatively dense and heavy powdered or comminuted materials, the container being formed with a plurality of partitions which provide compartments and at the same time reinforce the container internally to resist the tendency of the outer walls to become distorted due to rough handling during transportation.

Another object of the invention is to provide an efficient form of compartmented container which may be manufactured in a flat, collapsed condition and which may be quickly and easily set up by unskilled persons, as in the use of the container in the harvesting of fruits and vegetables, entirely by hand.

A further object of the invention is to provide a container having three downwardly extending pointed or prismatic portions enabling the container to be positioned in a stable manner on relatively rough or uneven ground surfaces.

A further object of the invention is to provide a compartmented container which may be formed from a single blank of foldable paperboard and which is substantially sift proof, making it highly advantageous for powdered materials.

A still further object of the invention is to provide a form of container having a bottom construction including a plurality of prismatic portions which may nest or interlock with the prismatic portions of an identical container when the two bottom portions are placed one against the other.

Additional and more specific objects and advantages of the present invention will become apparent as the description proceeds.

In the drawings:

FIG. 1 is a plan view of a paperboard blank from which the container of the present invention may be formed;

FIG. 2 is a perspective view showing the blank folded to bring the partition forming sections flat against the portion comprising the container outer walls;

FIG. 3 is a perspective view showing the folded blank of FIG. 2 folded again to bring the ends substantially into edgewise relation such ends being secured as by means of gummed tape;

FIG. 4 is a plan view of a blank from which a closure for the container may be constructed;

FIG. 5 is a perspective view of the container as it appears after it has been expanded but before expansion of any of the compartments;

FIG. 6 is a perspective view with parts broken away showing the container inverted and with one of its compartments brought to expanded condition;

FIG. 6*a* is a horizontal cross-sectional view taken along lines 6*a*—6*a* looking upward in the direction of the arrows;

FIGS. 6*b* and 6*c* are views similar to FIG. 6*a* showing respectively the second compartment and the third compartment brought to expanded position;

FIG. 7 is an elevational view showing the expanded container resting upon a relatively rough surface, and

being supported by the apexes at the lower ends of adjoining pairs of side walls;

FIG. 8 is a plan view showing the lower end of the container in expanded form as it appears when viewed from below;

FIG. 9 is an elevational view, partly in section to show the interior of one of the compartments free of joints throughout its lower portion and therefore effective against sifting of the contents; and

FIG. 10 is a small scale elevational view showing a stacked group of expanded containers, the containers in the lower group being inverted and the containers in the upper group having their bottom surfaces placed upon the upturned bottom surfaces of the containers of the lower group whereby an interlocking nesting of the containers is achieved.

The present invention provides essentially a compartmented container having its outer walls and inner partitions formed from a single blank of foldable paperboard, such as corrugated or solid fibre board. The blank, as herein illustrated, is rectangular and has a plurality of elongated panels formed by a series of parallel crease or score lines extending across the blank. Each elongated panel comprises a side wall portion, a bottom portion and a partition portion. The blank is scored centrally at right angles to the elongated panels to form two half sections. One half section contains the outer wall panels and the other contains the inner partition panels. Along the central score line are formed endwise aligned, diamond shape areas or panels provided by two sets of score lines impressed at acute angles to the central score line. The diamond shaped areas are located symmetrically along the central score line and the short or lateral axes of the diamond shaped areas coincide with alternate score lines defining the elongated panels. The apexes of the diamond shaped areas along their longitudinal axes coincide with the other alternate score lines between the elongated panels and with the edges of the blank.

The blank is first folded along the central score line to bring the two half sections together. Next the folded blank is again folded at right angles to the central fold line, forming a flat, collapsed tubular construction and the lateral opposed edges of the blank are brought together. The edges of the outer half section are then hingedly secured to each other. The outside panels thus comprise the walls of the container and the inside panels comprise the inner partitions. By inverting the collapsed container and pressing down upon the central part of the folded diamond shaped areas, these areas can be caused, first to flatten and expand, after which the central part may be depressed below the apexes on the longitudinal axis of each area. This causes a simultaneous outward expansion of the outer wall panels and inward expansion of the partition panels. The three pairs of partition panels may thus be expanded inward into substantial contact with each other and the body portion of the container is complete. The container is then ready to be filled, and may be closed with a suitable panel cover.

Referring more particularly to the drawings, there is shown in FIG. 1 a suitable blank, preferably of corrugated paperboard, cut in rectangular form and having impressed therein a plurality of crease or score lines **1**, **2**, **3**, **4** and **5** to define an even number of elongated panels **6**, **7**, **8**, **9**, **10** and **11**. In the preferred form of the invention five score lines are impressed in the blank to provide six elongated panels.

The blank is formed with a central score line **12** extending at right angles to the parallel score lines **1** to **5** and terminating at the lateral edges of the blank indicated at **13** and **14**. The blank is thus divided by the central score line into two half sections indicated at A and B. In the present instance the half section A forms

the outer walls of the container and the half section B forms the inner, compartmented portion of the container.

In order to form the bottom portions of the compartments of the container, the blank is preferably scored along lines **15** and **16**, forming acute angles with the central score line **12**, to provide three aligned, diamond shaped areas or panels C, D and E.

The container is preferably made up ready for use as a flat collapsed tube to conserve storage space. First, the blank is folded along the central score line **12** to bring the half sections A and B flat against each other. See FIG. 2. Next, the folded blank is again folded at right angles to the central score line **12**, as shown in FIG. 3, to bring the lateral edges of the half section A, indicated at **13***a* and **14***a*, into edge to edge relation. These edges are then hingedly secured together, as by means of a strip of gummed tape **17**.

The edges **13***b* and **14***b* of the partition portions of panels **6** and **11** are preferably left unsecured. In the flat collapsed form of the container, as shown in FIG. 3, it is to be noted that the edges **13***b* and **14***b* tend to overlap each other, this being due to the edgewise crowding of the partition panels when enclosed within the flattened tube formed by the outer walls of the container.

When it is desired to set up the container, the flat collapsed tube as shown in FIG. 3 is placed with the top edges down and the tube is brought to expanded condition as shown in FIG. 8. Then, by downward manual pressure upon the central portion of one of the folded diamond shaped areas, one of the compartments may be formed as shown in FIGS. 6 and 6*a*. In these figures the parts of panels **6** and **7** indicated at **6***b* and **7***b* have been expanded inward as the diamond shaped area or panel C has been opened up during down folding and further moved to a somewhat shallow concave condition. By depressing the diamond shaped areas or panels D and E in a similar manner the other two sets of partition panels may be moved inward to complete the container. The folds between the partitions will be disposed along the tubular axis of the container and the three sets of partitions will be brought into face to face relation. These steps are indicated in FIGS. 6*b* and 6*c*. The container may then be placed in upright position and filled with the desired contents.

It is to be noted that the bottom of the completed or expanded container presents three tapered or pointed portions, having what may be termed a prismatic shape, the points coinciding with the lower corners of the side walls where such corners are formed by the downwardly convergent edges. The central part of the bottom of the container is located above the points of the prismatic portions and is in line with the trough of the concave parts between the prismatic portions. The inwardly directed surfaces of these prismatic portions, being formed by two adjacent halves of the diamond shaped panels, tend to assume an approximation of a uniplanar form with the plane defined as passing through the two downwardly convergent edges of adjacent side walls.

For the purpose of closing the container a closure blank such as illustrated in FIG. 4 may be employed. This closure preferably comprises a panel **20** of hexagonal shape, having a flap on each of its six sides as indicated at **21**, **21**. These flaps may be secured to the container side walls by folding them down into contact with the walls and retaining them by adhesive or by gummed tape.

For ease in handling the filled containers finger openings **22**, **22** are preferably cut in two opposite side walls. The cuts are preferably made without displacing the material enclosed by the cuts. The tabs **23**, **23** thus formed may be left in place until it is desired to lift the container by hand. At such time the tabs **23** may be forced inward and upward. This will provide a double thickness of material at the top of the finger opening where the fingers of a person must contact in carrying the container in this manner. If desired, the finger openings may be omitted.

The container, when expanded to condition it to receive its contents, provides three compartments, each of which is formed of strips of paperboard comprising a continuous, unbroken paperboard surface from the top of the outer walls down across the diamond shaped areas or panels and up to the tops of the partitions. When the container is used for powdered or comminuted material having fluent characteristics the outward pressure of the contents upon the side walls tends to hold the pairs of walls **6** and **7**, **8** and **9**, **10** and **11** in their full 120° positions. This pulls the hinge lines of the pairs of walls **7** and **8**, **9** and **10**, **6** and **11** inward into firm contacting relation with the double thickness edges of the partition walls presented along the inside of these hinge lines. The container thus tends to assume a symmetrical hexagonal condition.

As shown in FIGS. 7 and 8, the container when expanded may rest upon three relatively narrow points at the lower ends of the hinge or score lines **2** and **4** and at the lower end of the juncture of walls **6** and **11**, hingedly secured to each other as by means of the strip of gummed tape illustrated herein. The expanded and filled containers, when placed on relatively uneven surfaces, will rest solidly and will be free from rocking tendencies as would be likely with containers having a plane surface bottom portion when placed upon certain uneven surfaces.

Compartmented containers having the bottom construction herein illustrated may be advantageously stacked in nested or interlocking arrangement as illustrated in FIG. 10. A row of several filled containers is placed in inverted position and upon these containers will be placed filled containers in upright position. While the bottom surfaces of the containers are not in full surface contact with each other a sufficient peripheral surface area of the upper container is in contact with the one below so that the superposed container is adequately supported. When two layers of containers as herein shown are transported, for example, by truck or railway car the upper layer of containers tends to remain firmly in place and are not subject to shifting as is the case where the two layers of containers have flat surfaces.

In order to obtain a desirable degree of flexibility in the score line areas a so called reverse type of score is impressed in the blank both for the score lines that define the wall and partition panels and for the central score that separates the blank into two half sections. This type of score involves applying two separated, parallel male scoring rules on one surface and applying one male scoring rule on the opposite surface and between the lines made by the first scoring rule. In place of scoring rules the score lines may be made by running the blank in between suitable scoring wheels. By having relatively wide score lines it is feasible to make all the panel scores generally parallel and still enable the fold lines to accommodate themselves to a certain amount of crowding that must necessarily occur in the use of corrugated board when the blank, after being folded with the two half sections in contact, is again folded to bring it into collapsed, tubular form. The result of the crowding of the partition panels in the collapsed tubular condition has been pointed out above and is shown in FIG. 3. While the outer wall panel portions **6** and **11** are held in substantial edgewise abutting relation by the strip of gummed tape, the partition portions of the same panels both extend past the first mentioned abutting edges. When the container is brought to its expanded, compartmented condition the free edges just referred to move into substantial registering relation and are received symmetrically into the angle formed by the free edges of the outer wall portions of panels **6** and **11** joined by the strip of gummed tape. See FIG. 6*b*.

The reverse type of score line is also advantageous in providing flexibility to enable the diamond shaped areas

readily to be brought to expanded form by thumb pressure of the operator.

In the use of the container for the packing produce, such as apples, the partitions not only assure maximum resistance against distortion of the outer walls of the container, but also keeps the fruit separated into smaller groups and thereby minimizes the pressure of the pieces against each other with consequent reduction in spoilage.

While the present description sets forth a preferred embodiment of the invention, various changes may be made in the construction without departing from the spirit of the invention, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim:

1. A polygonal compartmented container formed from foldable paperboard comprising a plurality of elongated panels arranged in tubular form and hingedly connected in series at their longitudinal edges along generally parallel lines, a fold line extending at right angles, centrally across said panels, to divide the assembled panel group into two half sections, there being also two sets of fold lines each extending at acute angles to the central fold line and forming a plurality of adjoined, endwise aligned, diamond shaped areas, located symmetrically along the central fold line with their transverse axes respectively coinciding with alternate hinge lines of the panel group and with their apexes located respectively at the intersections of the central fold line with the remaining alternate hinge lines of the panel group, one of the half sections of the assembled panels, comprising inner partitions, being folded over along the central fold line and enclosed inside the other half section, comprising the container outer walls, the outer walls and the enclosed inner partitions being collapsible to flat tubular form, the diamond shaped areas, when the tubular construction is in expanded form, being collapsible inwardly and axially of the expanded tube, whereby to cause the pairs of partition panels adjoined to the inner sides of the respective diamond shaped areas to expand inwardly of the tube and form with the side wall panels on the other side of the respective diamond shaped areas similar compartments each having a symmetrical diamond shape in cross-section.

2. A hexagonal compartmented container comprising a body portion formed from a single, rectangular blank of foldable paperboard having six elongated panels of substantially equal width defined by generally parallel score lines impressed in the blank and extending from edge to edge thereof, the blank having impressed therein a central score line extending at right angles to the parallel, panel-defining score lines to divide the blank into two half sections, there being also two sets of score lines impressed in the blank, each set extending at acute angles to the central score line and forming three adjoined, endwise aligned, diamond shaped areas, located symmetrically along the central score line and arranged with their transverse axes respectively coinciding with the first, third and fifth parallel score lines and with their apexes located respectively at the intersections of the central score line with the lateral edges of the blank and at the intersections of the central score line with the second and fourth parallel score lines, the blank being folded along the central score line to bring both half sections into face to face relation, such half sections being thus readied to form an outer container wall section and an inner section providing partitions, the folded sections being additionally folded into the form of a flat, collapsed tube with the opposed edges of the outer wall section in edgewise contacting relation to each other, and means for hingedly joining such last mentioned edges, the three diamond shaped areas, after the collapsed tube is expanded, being collapsible inwardly and axially of the tubular construction, whereby to cause the pairs of partitions adjoined to the inner sides of the respective diamond shaped areas to expand inwardly of the tube and form with the side walls three similar compartments each having a symmetrical diamond shape in cross-section.

3. A collapsible polygonal tubular container formed from a single sheet of suitable material such as foldable paperboard, comprising: an even numbered plurality of elongated side panels hingedly attached to each other at their side edges along parallel hinge lines; a like number of elongated partition panels hingedly attached to each other at their side edges along hinge lines which are parallel to each other and aligned with the hinge lines between respective side panels; and an integral bottom wall comprising a plurality of pairs of triangular bottom wall panels, each pair of said bottom wall panels being hingedly attached to a side panel and a partition panel, respectively, along converging hinge lines and being hingedly attached to each other along a hinge line extending in a direction normal to said first and second mentioned hinge lines.

4. A collapsible polygonal vertically disposed tubular container formed from a single sheet of suitable material such as foldable paperboard, comprising: an even numbered plurality of elongated vertically extending side panels hingedly attached to each other at their side edges along parallel hinge lines; a like number of elongated vertically extending partition panels hingedly attached to each other at their side edges along hinge lines which are parallel to each other and aligned with the hinge lines between respective side panels; and an integral bottom wall comprising a plurality of pairs of transversely extending bottom wall panels, each pair of said bottom wall panels being hingedly attached to a side panel and a partition panel, respectively, and being hingedly attached to each other.

5. A collapsible polygonal vertically disposed tubular container formed from a single sheet of suitable material such as foldable paperboard, comprising: an even numbered plurality of elongated vertically extending side panels hingedly attached to each other at their side edges along parallel hinge lines; a like number of elongated vertically extending partition panels hingedly attached to each other at their side edges along hinge lines which are parallel to each other and aligned with the hinge lines between respective side panels; and an integral bottom wall comprising a plurality of transversely extending bottom wall panels hingedly attached to respective side and partition panels.

References Cited in the file of this patent

UNITED STATES PATENTS

483,902	Corey	Oct. 4, 1892
2,138,252	Link	Nov. 29, 1938
2,695,238	Ferguson	Nov. 23, 1954
2,715,509	Paige	Aug. 16, 1955
2,816,652	Clark	Dec. 17, 1957