This invention relates to a collapsible and re-usable container or shipping carton, and is more particularly concerned with such a container or shipping carton made of corrugated board or other suitable fiber-board material.

Containers extensively used as shipping cartons, are generally constructed of a single piece of corrugated board cut and scored to form side and end walls having top and bottom flaps connected thereto. Containers of this type are generally shipped from the point of fabrication to the point of use in the form of a flat tube made by folding the blank of which the container is constructed, along a transversely extending score constituting the hinged connection between one of the side walls and an end wall of the container, the opposite end edges of the blank being connected to one another by a tab formed on one of the end edges and fastened by gluing, stapling, or taping the same to the opposite end edge of the blank to constitute a so-called manufacturer's joint. At the point of use, the flat, tubular form of the container is erected and assembled into box-like shape by means of suitable equipment designed to unfold the container from its flat, tubular form into box-like form, to fold the bottom flaps inwardly, and to connect these flaps to one another, as by means of adhesive tape, staples or other suitable fastening means. When thus erected, the container may be filled with the desired contents, following which the top flaps may be folded by suitable equipment to form the closure for the container.

Containers formed as above described cannot, after being erected and assembled into box-like form, be subsequently collapsed into flat form without removing or destroying the fastening means by which the bottom flaps are secured to each other. Hence, when once erected for use, they cannot economically be collapsed into a flat form for shipment of the empty container back to a shipper of goods for re-use of the container.

The principal object of the invention, accordingly, is to provide a collapsible container so constructed that after being initially employed for the shipment of goods therefrom, may be collapsed into substantially flat form for return to the same or a different shipper, for re-use, a number of times.

Another object of the invention is to provide a collapsible and re-usable container as aforesaid, made from a single piece or blank of cut and scored material.

Still another object of the invention is to provide a container of the character above-set forth, so fabricated at the point of manufacture that it may readily be set up or erected from the flat collapsed form, in which it is shipped to the user, to open, box-like form, without requiring the use either of any tools or equipment or any fastening devices, and so that, likewise, it may also be re-collapsed, without tools and without damaging the container, for return of the container to a shipper or packer, for re-use.

As illustrative of instances in which containers possessing the aforesaid characteristics are of particular advantage, there may be mentioned the packing of produce in the field, such as in the case of lettuce, and the packing of eggs.

Briefly stated, the container or carton of the invention is fabricated from a single piece blank of sheet material, such as corrugated board, cut and scored to provide side and end walls, closure flaps hinged to the upper end of each of these walls, and bottom flaps hinged to the lower end thereof, these bottom flaps being so formed and scored, and the end walls and their respective closure flaps being so scored, as to permit the end walls and their respective closure flaps to be folded inwardly while at the same time the bottom of the container is folded outwardly.

The invention, and the above-mentioned advantages as well as others, accruing therefrom, will be more evident from the detailed description and claims below, and from the accompanying drawings, in which:

FIG. 1, is a view, in plan, of a blank cut and scored for forming the carton according to the invention;

FIG. 2 is a view, in perspective, with parts broken away, showing the carton as erected into box-like form from the blank of FIG. 1;

FIG. 3 is a view thereof in horizontal cross-section, taken along line 3—3 of FIG. 2;

FIG. 4 is a view, in perspective, showing the carton partially collapsed;

FIG. 5 is a view thereof in vertical cross-section, taken along 5—5 of FIG. 4;

FIG. 6 is a view thereof, in horizontal cross-section, taken along line 6—6 of FIG. 4.

Referring now in more detail to the drawing, the one-piece blank from which the container of the invention is formed, is indicated generally by the reference numeral 10. As shown in FIG. 1, the blank is formed along its longitudinal mid-portion with a pair of spaced, parallel scores 12, 13, extending lengthwise of the blank from one of the transverse edges 14 to the opposite transverse end edge 15 thereof. The blank is also formed with scores 16, 17 and 18, parallel to one another and extending transversely of the blank between the longitudinal scores 12, 13. One of the end edges of the blank may be formed with an outwardly extending tab 19 whose inner end is defined by a transversely extending score 20, parallel to the scores 16, 17, 18.

In the blank as thus scored along the longitudinal mid-portion thereof, there are thus formed a pair of side wall panels 24, 26, defined by the scores 12, 13, 16, 20 and 12, 13, 17, 18, respectively; and a pair of end wall panels 25, 27, alternating with the side wall panels 24, 26, and respectively defined by the scores 12, 13, 16, 17 and 18. Between the longitudinal score 12 and its adjacent longitudinal edge 28, the blank is formed with cut-outs 29 substantially in alignment with scores 16, 17 and 18, to provide flaps 30, 31 extending laterally outwardly from the side wall panels 24, 26, and substantially rectangular flaps 32, 33 extending similarly from the end wall panels 25, 27. Thus, the flaps 30, 32, 31 and 33, hingedly connected to the panels 24, 25, 26 and 27, respectively, form the top closure for the container when these flaps are folded inwardly with respect to the side and end wall of the carton erected from the blank.

Along the longitudinal margin of the blank opposite that along which the flaps 30, 31, 32 and 33 extend, the blank is formed with a spaced pair of substantially rectangular flaps 35, 36, one of these flaps being hingedly connected to each of the side wall panels 24, 26 by the longitudinal score 13. This longitudinal margin of the blank, in accordance with the invention, is also formed with a spaced pair of substantially triangular shaped flaps 37, 38, alternating with the flaps 35, 36, the flaps 37, 38 each being hingedly connected to one of the end wall panels 25, 27, by the portion of the longitudinal score 13 extending intermediate the scores 16, 17 and the score 18 and end edge 15 of the blank.

Further, in accordance with the invention, the blank is formed with transverse scores 40, 41, substantially parallel to each other and extending, respectively, from the apices of the triangular flaps 37, 38, to the opposite
3 longitudinal edge 28 of the blank. Diagonally adjacent each outer corner of the flaps 35, 36, these flaps are formed with diagonal scores 43, 44 and 45, 46, respectively, these scores extending from each of the inner corners of the respective flaps 35, 36, to the longitudinal edges 48 thereof. As will be seen, particularly from FIG. 1, each of the diagonal scores 43, 44, 45 and 46 extends along a line forming one side of a substantially isosceles triangle whose other side is formed by a side edge 49 of one of the triangular-shaped flaps 37, 38.

In accordance with the invention, also, the transversely extending scores 40, 41 extend cross-sectionally into the blank from one surface thereof; whereas, the longitudinal scores 12, 13, transverse scores 16, 17, 18, 20, as well as the diagonal scores 43, 44, 45, 46 each extends cross-sectionally into the blank from the opposite surface thereof.

In fabricating the carton from the blank 10 formed, cut and scored as above-described, the triangular-shaped flaps 37, 38 and the rectangular-shaped flaps 35, 36 are folded inwardly toward each other along the score line 13 until disposed in a plane substantially at right angles to the planes of the side walls 24, 26 and end walls 25, 27, the flaps 37, 38 being disposed preferably with the bottom surface thereof overlying the upper surface of the flaps 35, 36, as shown in FIG. 2, the flaps 37, 38 as thus disposed being secured, as by gluing the same, to the underlying corner portions of the flaps 35, 36. As thus disposed, it will be seen from the foregoing description that each side edge of each of the flaps 37, 38 will substantially coincide with one of the diagonal scores 43, 44, 45, 46. In the carton as thus fabricated from the blank, as more clearly shown in FIGS. 2 and 3, the tab 19 is secured, as by means of staples, to the inner surface of the adjoining end wall 27, along the vertical margin thereof adjacent the end edge 15.

It is an important feature and advantage of the present invention that the container as thus fabricated may readily be collapsed into a substantially flat form merely by the application of rather light hand pressure along the center of the edges formed at the bottom of the end walls 25, 27 by the score 13. The application of such pressure in that manner will be sufficient to cause infolding of the end walls 25, 27 and their associated top flaps 32, 33 and bottom flaps 37, 38 along the transverse scores 40, 41 and, simultaneously, out folding of the carton along the diagonal scores 34, 44, 45, 46, each bisected portion of the infolded flaps 37, 38 carrying with it the corner portion of the flaps 35, 36, overlaid thereby. FIGS. 4, 5 and 6 depict the appearance of the container with its end walls partially infolded and its bottom wall partially outfolded when the container is in partially collapsed state, the closure flaps 30, 31 at the top of the side walls 24, 26, being shown in FIGS. 4 and 5 bent outwardly and downwardly, for the sake of greater clarity.

With the container brought to its fully collapsed state at the place where it is fabricated, it may be readily shipped in that substantially flat form to the place of its use, such as for the field packing of produce or for the packing of eggs. At the point of use, the container may be "set up" from its substantially flat, collapsed state into box-like form, simply by applying relatively light hand pressure along the top and bottom edges of the collapsed container, whereby it snaps into an open or box-like form. Thus, the user of the container fabricated according to the invention does not need to maintain any tools or equipment or utilize any fastening devices in order to "set up" the container from the flattened form in which it is delivered by the fabricator.

Moreover, as above-indicated, when the container has been loaded with the desired contents to be shipped there-in, the container may, after removal of the contents at their destination, be readily re-collapsed into substantially flat form in the manner above-described, for return to the same or a different user thereof. Thus, the container of the invention may be reused a number of times, until the normal wear and tear in handling and shipping renders further re-use for its intended purpose undesirable or impractical.

As will be evident from the foregoing description, the re-usable container of the invention is more efficient and less costly than types presently in use, and eliminates the need not only for tools to be maintained and fastening devices to be utilized for the "set up" of the container by the user, but also, in the case of the field packing of produce, such as lettuce, the need for employing costly field crews for that purpose.

Desirably, and particularly in the case of cartons to be used for the shipment of fresh produce or the like, ventilation openings such as indicated at 50, may be formed in the side walls and/or end walls of the carton during the fabrication.

What I claim is:

1. A collapsible carton formed from a single-piece blank of sheet material and comprising a pair of side walls, an end wall hinged to opposite ends of each of said side walls, a closure flap hinged to the upper edge of each of said side walls and end walls and forming the top wall of the carton, a rectangular-shaped flap hinged to the lower edge of each of said side walls, a triangular-shaped flap hinged to the lower end of each of said end walls, forming, with said side walls and bottom flaps, the bottom wall of the carton, each of said end walls and its associated closure flap and bottom flap being inwardly scored transversely thereof, each of said side wall bottom flaps being outwardly scored diagonally adjacent the opposite ends thereof to permit in-folding of the end walls and their associated closure flaps and bottom flaps along said transverse scores and simultaneous outfolding of the carton along said diagonal scores.

2. A collapsible, re-usable shipping container formed from a one-piece blank of fiberboard material, said container comprising:
   (1) a pair of side walls; 
   (2) a pair of end walls; 
   (3) a closure flap hingedly connected to the upper end of each of said side and end walls; and
   (4) a bottom flap hingedly connected to the lower end of each of said side and end walls; 
   the bottom flaps of said side walls being of substantially rectangular shape, the bottom flaps of said end walls being of substantially triangular shape, with the apex of the triangle disposed substantially along the longitudinal median line of the container, each of said end walls and its associated closure flap and bottom flap being scored transversely along the median line thereof, and each of said rectangular-shaped bottom flaps being scored along a line extending diagonally from a corner of the container to said longitudinal median line of the container, each of said diagonal scores substantially coinciding with a side edge of one of said triangular-shaped flaps.

3. A one-piece blank of sheet material for forming a collapsible, re-usable carton, said blank being:
   (A) outwardly scored in the longitudinal mid-portion thereof along a pair of spaced parallel longitudinal lines and along a plurality of spaced parallel transverse lines to provide:
      (1) a pair of spaced side wall panels and
      (2) a pair of spaced end wall panels alternating with said side wall panels; 
   (B) formed with:
      (1) a substantially rectangular flap extending laterally outward from each of said side and end wall panels to one of the longitudinal edges of the blank and hingedly connected to said side and end wall panels by one of said longitudinal scores; 
      (2) a substantially rectangular flap extending laterally outward from each of said side wall
panels to the other longitudinal edge of the blank and hingedly connected to said side wall panels by the other of said longitudinal scores; and

(3) a substantially triangular flap extending laterally outward from each of said end wall panels and hingedly connected thereto by said other longitudinal score, the apex of each of said triangular flaps being disposed along said other longitudinal edge of the blank; and

(C) inwardly scored:

(1) along parallel lines extending transversely of the blank from the apex of each of said triangular flaps to said first-named longitudinal edge of the blank; and

(2) diagonally adjacent each outer corner of each of said last-named rectangular flaps along a line forming one side of a substantially isosceles triangle whose other side is formed by one side edge of the adjacent one of said triangular flaps.

References Cited in the file of this patent

UNITED STATES PATENTS

1,532,316 Kaufman ---------------- Apr. 7, 1925
2,331,582 Trost ----------------------- Oct. 12, 1943
2,761,609 Arkin ---------------------- Sept. 4, 1956
3,039,670 Hardon --------------------- June 19, 1962

FOREIGN PATENTS

197,482 Great Britain -------------- May 17, 1923
472,044 Italy ---------------------- June 4, 1952