July 5, 1960 J. V. FISHER 2,943,427

METHOD OF FORMING A CARTON

Filed Sept. 9, 1954 4 Sheets-Sheet 1

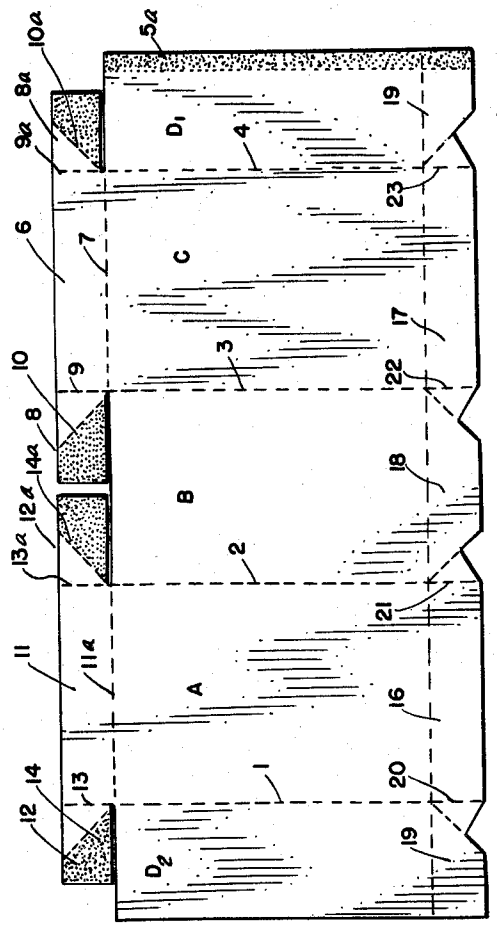


FIG. 1

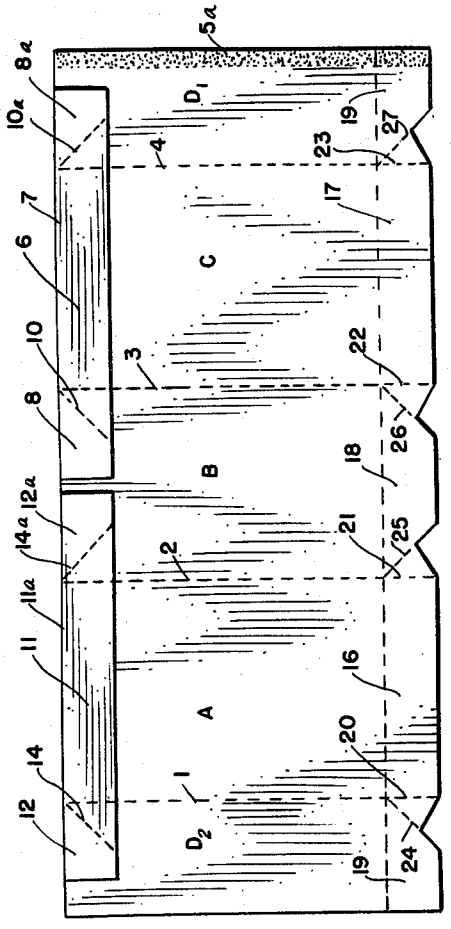


FIG. 2

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July 5, 1960 J. V. FISHER 2,943,427

METHOD OF FORMING A CARTON

Filed Sept. 9, 1954 4 Sheets-Sheet 2

FIG. 3

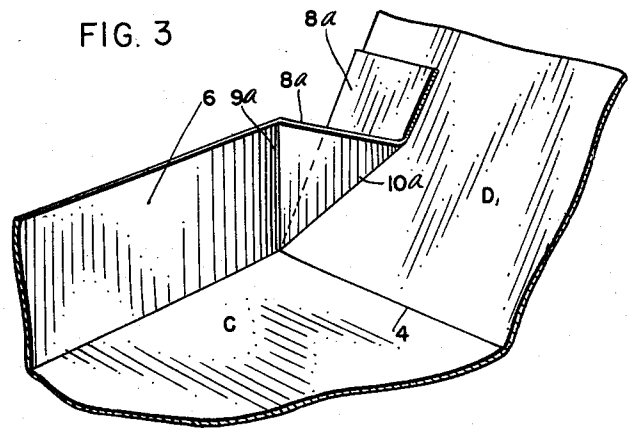


FIG. 4

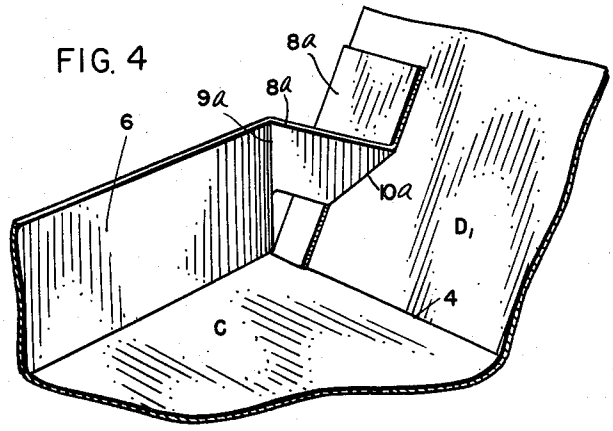
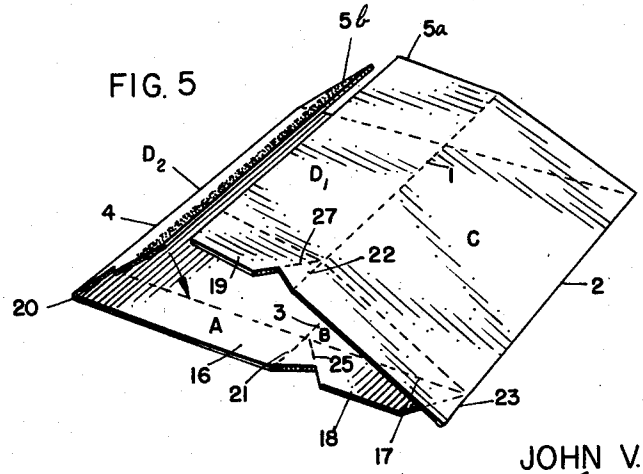


FIG. 5



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July 5, 1960 J. V. FISHER 2,943,427

METHOD OF FORMING A CARTON

Filed Sept. 9, 1954 4 Sheets-Sheet 3

FIG. 6

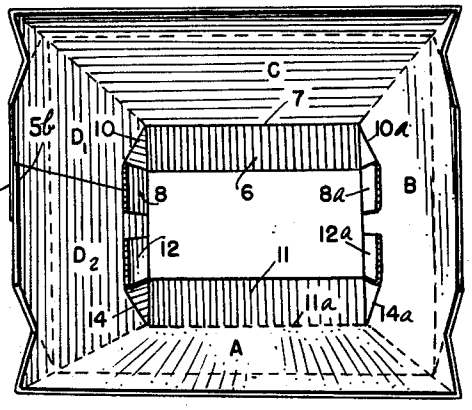


FIG. 7

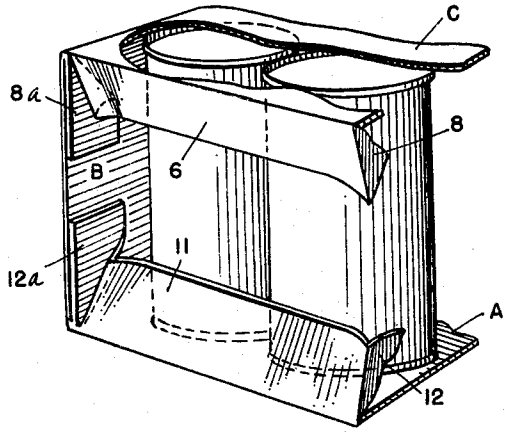
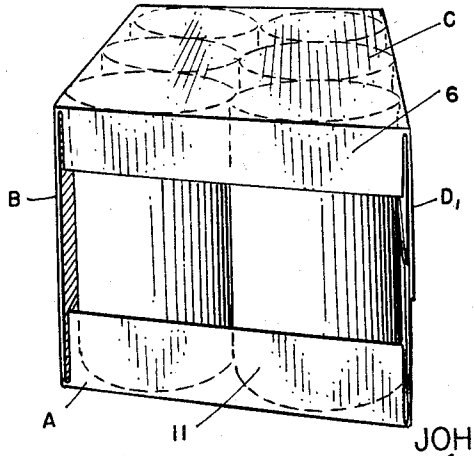


FIG. 8



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July 5, 1960 J. V. FISHER 2,943,427

METHOD OF FORMING A CARTON

Filed Sept. 9, 1954 4 Sheets-Sheet 4

FIG. 9

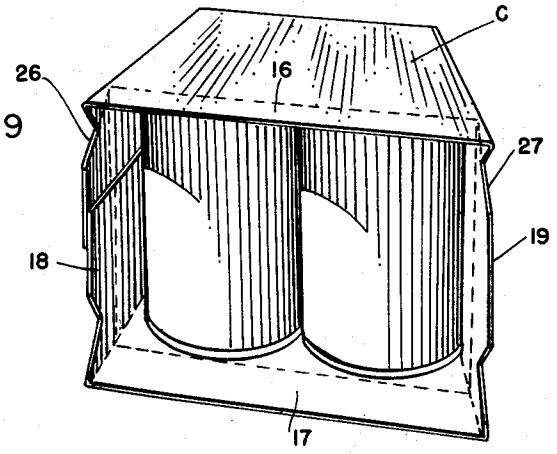


FIG. 10

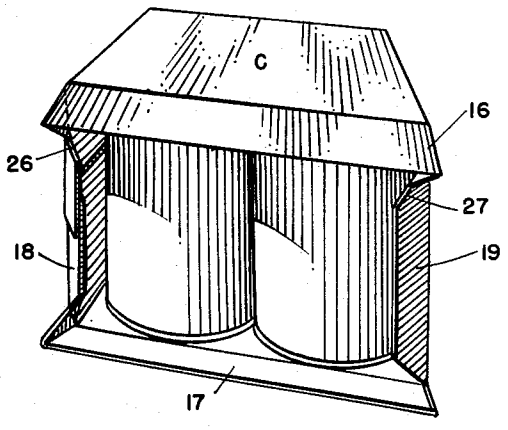
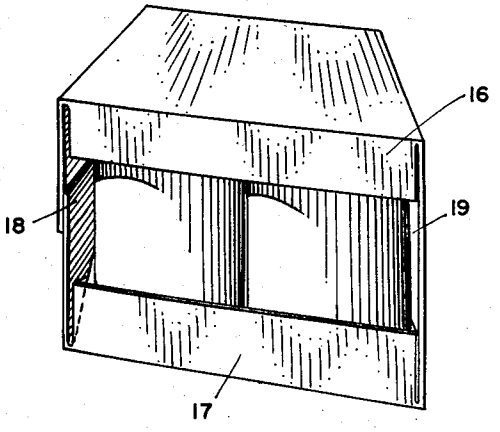


FIG. 11



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United States Patent Office 2,943,427 Patented July 5, 1960

2,943,427

METHOD OF FORMING A CARTON

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Filed Sept. 9, 1954, Ser. No. 454,975

2 Claims. (Cl. 53—29)

This invention relates generally to a carton for the packaging of merchandise. Although the invention is not necessarily limited to a carton of any specific size or capacity, and may be used in the packaging of merchandise in bulk or in containers of any configuration, it is particularly adaptable for use in a carton of the so-called "six-pack" type designed to hold and display cylindrical cannisters such as are commonly employed for dog food or beverages.

The invention involves not only a carton which may be constructed with less material without sacrifice of strength and durability, but also, and even more important, a carton blank which is constructed and so arranged that it can lie flat on a stack of similar blanks and then be opened to automatically form a carton in which all but the filling end is formed and anchored.

This new method of constructing a carton blank and making a carton therefore effects a considerable saving in both time and other expense in large scale packaging operations. Packaging machines now being used require a duplicate set of folding and anchoring mechanisms for the reason that they are performing identical or almost identical function simultaneously on both ends of the carton.

The principal object of the invention is to provide a method of forming a carton whereby the forming and filling thereof and the anchoring of the various parts in place (whether by glueing, stapling or otherwise) is accomplished by manipulative actions which are largely restricted to one end only of the carton.

Another object is to provide a carton blank which can be partially glued or otherwise secured together by the box-maker yet which will still be flat so that it may be stacked with other flat blanks, similarly constructed, until the carton is ready to be filled.

A further object is to provide a carton having an end panel portion which automatically opens when the carton is assembled and filled.

These and other objects will more fully appear from the following description and with reference to the accompanying drawings wherein:

Fig. 1 is a plan view of a carton blank embodying the present invention;

Fig. 2 is a view of the carton blank with the end retaining strips folded and glued to the body of the blank;

Fig. 3 is an enlarged detail perspective illustrating the hinging action which occurs when the blank is folded to form the carton;

Fig. 4 is a detail perspective as shown in Fig. 5 with a modified form of hinge;

Fig. 5 is a perspective view of the carton preliminarily folded and glued together at its ends to provide a flat, continuous strip;

Fig. 6 is a perspective view taken through the filling end of the carton as the blank is being opened to form the carton;

Fig. 7 is a perspective view of the carton with parts

cut away, to show the cans as they mutually engage the automatic end panels;

Fig. 8 is a perspective view showing the carton filled with cans but the filling end of the carton still open;

Fig. 9 is a perspective view featuring the filling end of the carton before it is closed;

Fig. 10 is a similar perspective view showing the filling end of the carton partially closed;

Fig. 11 is a similar perspective view showing the filling end of the carton closed and locked.

As embodied in the so-called six-pack type carton the invention comprises essentially a pair of closing panels which are folded over onto the body of the blank and there anchored in such manner that when the blank is opened and filled with the six cans the closing panels will automatically extend across the end of the carton opposite the filling end to be engaged by the first two cans as they reach their fill position in the carton. It will be seen therefore, that there is no necessity for providing mechanism for closing and anchoring the end of the carton across which the retaining flaps extend. The panels, which may be narrow or broad as desired, serve to close that end.

In the following detailed description it will be helpful to bear in mind that although with precision folding and scoring the panels can be made to open automatically to their final positions, it is not necessary that they do so. It is sufficient if the panels are engaged by the edges of the cans and then pushed by the cans into the final position as the cans are fed into the carton. Normally, the closing panels, if properly constructed, will open to a sufficient degree when the blank is unfolded, to provide an ample surface to be engaged by the cans. A very slight pressure will put the panels firmly into the final position.

Referring to the plan view of the carton blank shown in Fig. 1, reference characters **1**, **2**, **3**, and **4** indicate four parallel fold lines which define the four sides A, B, C, and (D_1—D_2) of the carton when the ends of the blank are overlapped and glued together along the strips indicated by reference characters **5***a* and **5***b* (Fig. 5).

Reference character **6** designates a closing panel which is hinged along fold line **7** between and at right angles to the fold lines **3** and **4**. The closing panel **6** is formed at each end with an anchor tab **8**—**8***a*, which is hinged thereto along fold lines **9** and **9***a*, respectively, which, in the blank, are extensions of fold lines **3** and **4** respectively.

Each anchor tab **8**—**8***a*, is formed with an oblique fold line **10**—**10***a*, which extends upwardly and outwardly along the tab at an angle of approximately 45° from the hinge line **9**—**9***a*. This angle may be varied a few degrees one way or the other, as desired. It will be noted that when the carton blank is opened and flat the oblique fold lines bisect the angle between the anchor tab and the edge of the adjacent side of the carton.

For a purpose to be presently described, each anchor tab is covered with adhesive material except for the area between the tab hinge line and the oblique fold line.

A closing panel **11**, identical to the closing panel **6** is hinged along fold line 11_2 between and at right angles to the fold lines **1** and **2**. The closing panel **11** is likewise formed at each end with anchor tabs **12**, **12***a*, hinged thereto along fold lines **13**, **13***a* and formed with oblique fold lines **14**—**14***a* and to which tabs is applied adhesive material except for the area between the tab hinge line and the oblique fold line.

As shown in Fig. 2, the first step after the blank is formed is to fold both closing panels **6** and **11**, through 180° along their respective fold lines **7** and **11***a* and then to anchor them in that position by means of the anchor tabs **8**, **8***a*, **12** and **12***a*. If desired for mechanical application of the adhesive, the distance between the anchor

tabs may be reduced until they are abutting, or they even be unitary.

As previously stated, the anchor tabs are provided on the side which contacts the blank, with adhesive except for the area on the inside of the oblique fold lines **10**, **10***a*, **14** and **14***a*. It will be seen that the closing panels **6** and **11**, not being directly anchored to the rest of the blank, will have a natural tendency to pull away from the rest of the blank and return to their original flat position as shown in Fig. 1. They will be restrained against such natural tendency only by the anchored portions of the anchor tabs **8**, **8***a*, **12**, and **12***a*.

Referring now to Fig. 3 it will be seen that as the side D_1, and the side C are brought into right angle relationship by folding along fold line **4**, the aforementioned natural tendency of closing panel **6** is to open away from the side C will be furthered as the unanchored portion of the tab **8***a* doubles back along the oblique line **9***a* until, as the side D_1 reaches a 90° angle to the side C, it rests against the anchored portion of the tab. In that position the closing panel **6** will be at a 90° angle to the side C.

This automatic opening of the closing panels as the blank is formed into the carton may not always be complete, depending upon the precision with which the fold lines are made and also upon the characteristics of the particular board employed. However, as above mentioned, this is not a matter of any particular concern. If a closing panel fails to open fully when the carton blank is opened to form the carton the cannisters themselves, as will hereinafter be shown, will readily push the closing panels into its proper position.

The tendency of the material to bind or buckle at or near the juncture of the tab fold line **9***a* and the oblique fold line **10***a* may be lessened, if desired, by the modification illustrated in Fig. 4. In this modiled form the oblique fold line **10***a* on the anchor tab **8***a* (and also the corresponding oblique lines of the other anchor tabs) does not run all the way to said juncture, but turns off about midway and runs directly to the fold line **4** thereby eliminating the diagonal fold at such juncture. The resulting increased area of the anchoring portion of the tab is, with this modification, also anchored by the adhesive, or otherwise, to its adjacent panel.

Referring now to Fig. 5, it will be seen that the carton blank, after having been preliminarily folded as shown in Fig. 2, is folded inwardly along fold line **3** and inwardly along fold line **1**, overlapped at **5***a* and **5***b* and there glued or otherwise secured together to provide a continuous strip.

These two operations, namely, (1) folding over and anchoring the closing panels **6** and **11** as shown in Fig. 2, and (2) folding and anchoring to provide a continuous strip, as shown in Fig. 5, may be performed by the boxmaker, if desired, because the resulting folded strip remains flat and can be stacked with similarly arranged blanks until it is to be filled. In commercial operations this advantage not only saves considerable time but also cuts down the machinery requirements at the point of packaging.

The blank as thus formed may be used in connection with various of the automatic packaging machines without any substantial change because the forming and filling of the carton is extremely simple and involves a minimum of operations. The carton blank, folded as shown in Fig. 5, is folded along fold lines **1**, **2**, **3** and **4** until each side of the carton is in right angle relationship to the two adjacent sides of the carton. This action, as previously described, at least partially opens the closing panels **6** and **11** across the end of the carton, as shown in Fig. 6. The cans are then fed into the carton in any suitable manner, the two cans first fed into the carton being pushed against the closing panels, as shown in Fig. 7 and into final filling position as shown in Fig. 8.

When the carton is filled, the filling end may be closed by stapling, glueing, or in any suitable manner. If it is desired to eliminate all glueing during the filling operation the closing can be effected with the blank herein disclosed by the following described wedging and locking action without the use of glue, staples or similar anchoring means, which is more fully described and claimed in my copending application, Serial No. 454,938, filed September 9, 1954, now U.S. Patent No. 2,889,040.

As shown in Figs. 1 and 2, the filling end is formed with closing panels **16**, **17** and anchoring flaps **18**, **19**. The closing panels and anchoring flaps are hinged together at fold lines **20**, **21**, **22** and **23**, and the anchoring flaps are further provided with diagonal fold lines **24**, **25**, **26** and **27**. If the blank is to be used with a packaging machine, the anchoring flaps are preferably cut away along a line extending from the outer end of the fold lines **20**, **21**, **22** and **23** to approximately the middle of the adjacent diagonal fold lines **24**, **25**, **26** and **27** in order to provide the automatic opening plows used on such machines with an entrance notch on one panel and an exit notch on the opposite panel, horizontally aligned with the entrance notch.

With the arrangement as described it will be seen that with the carton filled as shown in Fig. 9, the folding of the anchoring flaps inwardly through 90° will automatically, by virtue of the diagonal fold lines **24**, **25**, **26** and **27**, bring each closing panel **16** and **17** into approximately 90° relationship with the panel to which it is hinged, as shown in Fig. 10. Further pressure on the vertical flaps will force them past the two end cans whereby they are locked in place because the radius of each anchoring flap is greater than the distance between the hinge line of the closing flap and the nearest vertical edge of the can.

It will be obvious that the present invention, as hereinafter claimed, is not limited to the specific embodiment hereinabove described. It may be used with larger or smaller cartons. Although two horizontal retaining panels and two horizontal closing panels are usually preferable, a carton with only one each of those panels will serve adequately under certain circumstances. If the closing panels **6** and **11** are enlarged to completely enclose the end opposite the filling end the carton can be used to package bulk material, pulverulent or otherwise. Where glueing is shown, any other type of anchoring means may be employed without departing from the invention. Likewise the ends and sides may be interchanged and the various flaps and panels may be made wider or to opened or otherwise cut to suit individual circumstances. For convenience and clarity in the wording of the claim the panel A along which the containers are fed into the carton will be referred to as the "floor panel." It should also be understood that the term "pre-scored" includes equivalents of scoring, such as pre-folding, notching, perforating, or otherwise defining where the folds will come.

In brief, the scope of this invention is not limited to the specific embodiment hereinabove described, but is limited only by the scope of the following claims.

I claim:

1. In the method of high speed formation of cartons one-by-one from a pile of substantially flat blanks and filling each carton as formed with a plurality of substantially identical containers, the said blanks being prescored to define two side panels, a floor panel and a closing panel to extend across one end of the formed carton, the improvement which consists in forming the closing panel of each carton blank with an ear at each end projecting, in the unfolded blank, adjacent one end of a side panel, folding each said ear on to its said adjacent side panel and anchoring the ear thereto whereby when the carton is formed the closing panel will be automatically moved partially toward its final closing portion in the completed carton, and then feeding the containers into the carton from the opposite end whereby the foremost

containers engage the said closing panel and move it into its final closing position.

2. In the method of high speed formation of cartons and simultaneous filling of the same with substantially similar containers, said cartons being formed from blanks pre-scored to define two side panels, a floor panel and a substantially rectangular closing panel for one end, the base of which closing panel is unitary with one end of the floor panel, the improvement which consists in providing, with respect to each of said blanks, an ear on each end of the closing panel and a diagonal fold line on each ear running from the end of the base line of the closing panel outwardly along the ear at an angle of approximately 45 degrees, folding the closing panel, and its attached ear portions, along the base line of the closing panel and toward the floor and side panel areas of the blank, securing each ear to the side panel along the aforesaid diagonal fold line whereby, when the carton is formed from the blank, the closing panel will automatically move toward right angle relationship with the floor panel, forming cartons one at a time from said blanks and feeding containers in an upright position into each said carton as formed, said feeding operation being accomplished by sliding the containers along the aforesaid floor panel from the end of the carton opposite the closing panel end until the foremost containers move against and are held within the carton by said closing panel.

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