June 24, 1969 R. W. BEICHLER ET AL 3,451,610

SHIPPING AND STORAGE CONTAINER

Filed Oct. 31, 1967 Sheet 1 of 2

Fig. 1

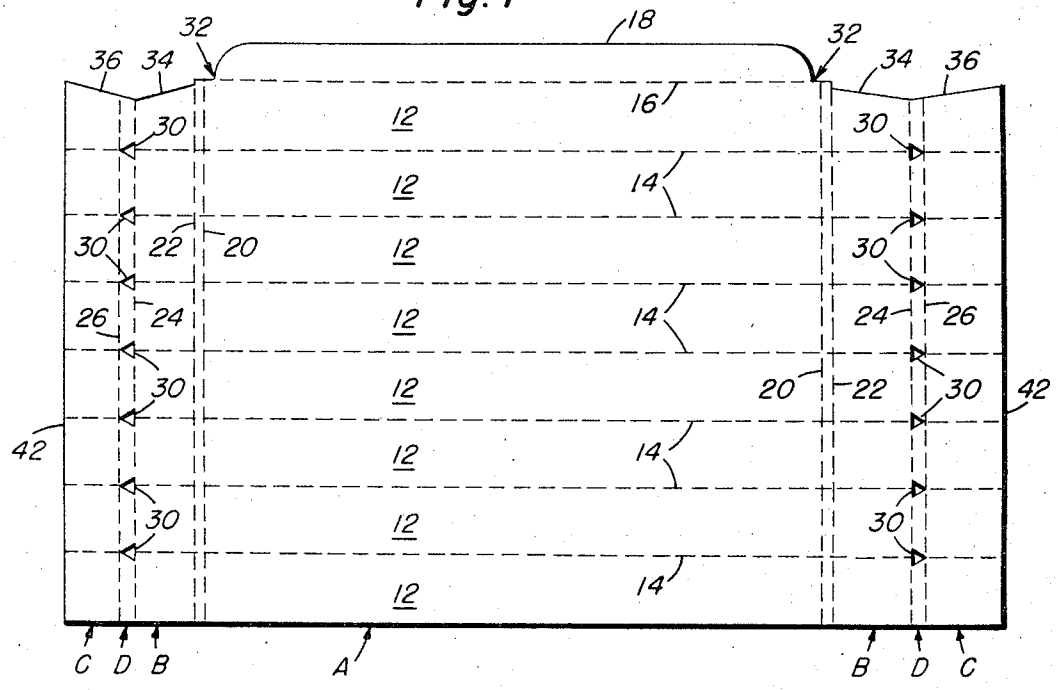


Fig. 2

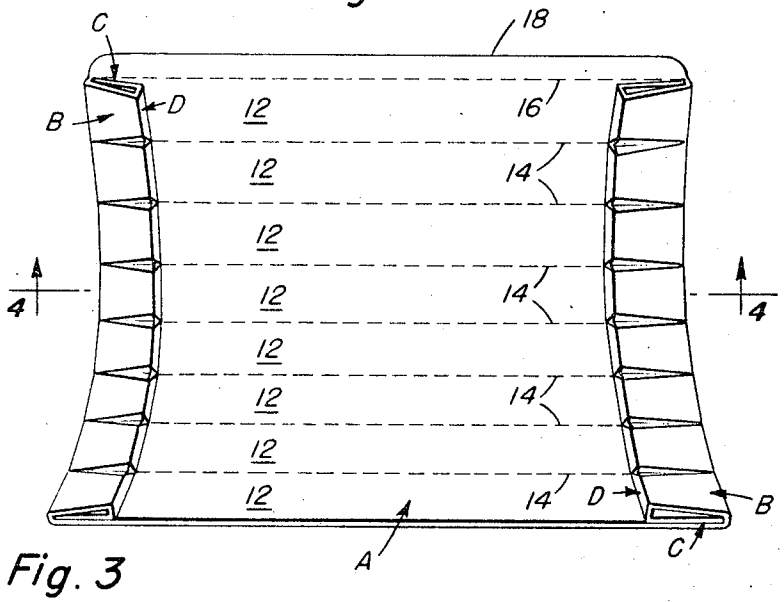
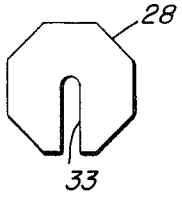


Fig. 3



INVENTORS

Robert W. Beichler

William E. Hubbard

BY Larry C. Hall ATTORNEY

June 24, 1969 R. W. BEICHLER ET AL 3,451,610

SHIPPING AND STORAGE CONTAINER

Filed Oct. 31, 1967 Sheet 2 of 2

Fig. 4

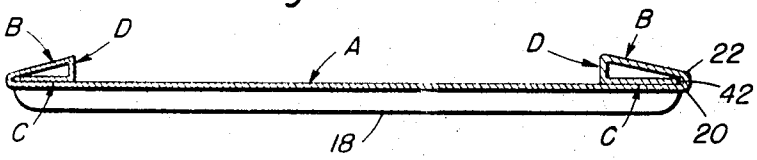


Fig. 5

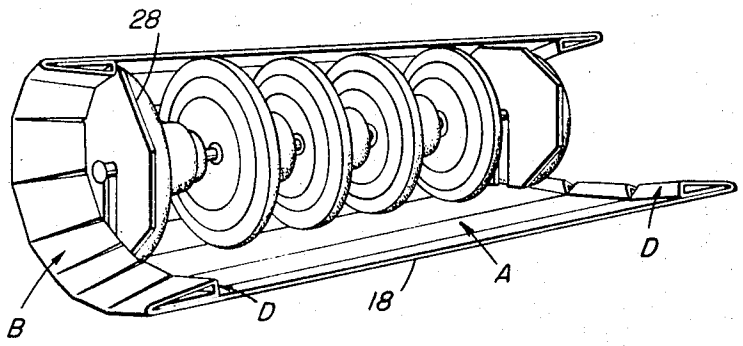
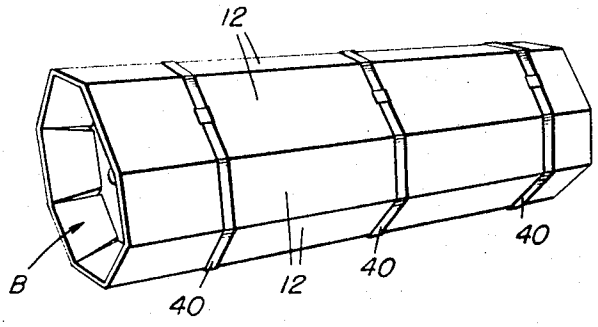


Fig. 6



INVENTORS
Robert W. Beichler
William E. Hubbard

BY Harry C. Hall
ATTORNEY

United States Patent Office 3,451,610 Patented June 24, 1969

3,451,610

SHIPPING AND STORAGE CONTAINER

Robert W. Beichler and William E. Hubbard, Baltimore, Md., assignors to Westvaco Corporation, New York, N.Y., a corporation of Delaware

Filed Oct. 31, 1967, Ser. No. 679,368
Int. Cl. B65d 3/04, 5/04
U.S. Cl. 229—23 5 Claims

ABSTRACT OF THE DISCLOSURE

A one-piece shipping and storage container is presented which is scored and cut to form a tubular polygonal structure having a novel end panel feature for housing and retaining the product therein.

Brief summary of invention

This invention relates to a package for use as both a shipping and storage container. In particular, the package is designed for shipping fragile objects, or, objects which must be protected against damage that might result from rough or improper handling.

The invention was developed specifically for housing porcelain suspension insulator strings. However, any frangible product, shaped like a string of insulators could be successfully shipped and stored in our container. The invention is described herein for use with string insulators as an example.

A porcelain suspension insulator unit comprises a circular central piece of electrical grade porcelain which has cemented at its opposite ends metal hardware fittings. One fitting is a socket or clevis cap, referred to as the top end, and, the other fitting is a complementary shaped ball or clevis pin at the bottom. A suspension insulator string consists of a plurality of suspension insulator units strung together by fitting the bottom pin into the top cap of adjacent units. Such strings are used for insulating and supporting a transmission line conductor from a tower crossarm. The length of the string, and, hence the number of units it contains is generally proportional to the voltage to ground of the line conductor.

It is the custom of the trade for the manufacturer of suspension insulator units to preassemble them into strings to meet the customers requirements and ship such preassembled strings rather than for the customer to assemble the strings from individually packaged and shipped units. As such strings are flexible, the porcelain frangible, and, subject to decrease in insulating strength from surface contamination unless stored in a clean place, it is desirable to protect them for as long as possible with a strong container which will also have a good space factor for storage purposes.

A close fitting tubular container offers good support to the insulator string, and, provides excellent resistance to damage, but is difficult to handle and store because of its tendency to roll. Increasing the number of sides of a tubular or cylindrical container of regular polygonal cross section still provides good impact strength and overcomes the handling and storage problems of a cylindrical container.

For our purposes, we have found the optimum shape to be a regular octagonal cross section, for obtaining a good storage space factor, low porcelain breakage, and ease of handling and control.

Our novel container comprises a unitary blank of moisture resistant corrugated paperboard which is treated with a polyethylene coating so as to be strong and weather resistant. The weatherproof treatment is required because quite often the packages are stored out of doors under

varying conditions and for varying lengths of time. In the preferred embodiment, the blank is divided into eight equal sized panels with a tuck-in flap located along one of the upper or lower edges. At each side of the container the blank is cut and scored to form the product retaining ends. If desired, an octagonally shaped end member may be inserted at each end of the package as it is folded around the product. The entire package is then bound snugly together with a suitable strap material, the straps being strategically located around the perimeter of different insulator units.

Description of the drawing

FIGURE 1 shows the cut and scored blank from which our novel container is formed;

FIGURE 2 shows the blank with the end flaps and retaining panels folded ready to receive the product;

FIGURE 3 shows an example of the end closure members which may be used at each end of the container;

FIGURE 4 shows a side view of the container blank in section taken along lines **4**—**4** in FIGURE 2;

FIGURE 5 shows in perspective the container blank partially wound around a five insulator unit string; and

FIGURE 6 shows the completely enclosed container package strapped for shipment or storage.

Detailed description

Referring to the drawing, and in particular FIGURE 1, these is illustrated a one piece blank of material from which the novel shipping and storage container may be constructed. The blank has as its major components, a primary or main portion A, a pair of fold over panels B, a pair of retaining panels D and a pair of end flaps C. The container is preferably constructed from single wall corrugated paperboard which has been treated with a curtain coated polyethylene composition so as to be strong and weather resistant. For our purposes we use a paraffined corrugated medium with the outer facings curtained coated, and, a weather resistant adhesive. After the blanks are formed, the board is printed and then die-cut and coated, or, coated and then die-cut. The blank is scored and cut in such a manner that when the container is assembled, it will resemble a tubular polygonal like structure.

As a preferred embodiment, the blank contains a plurality of primary panels **12** which are defined by equally spaced parallel score lines **14** extending from one side of the blank to the other. The scored lines **14** in the blank are all formed on the inner surface of the container and extend parallel to the flutes of the corrugated layer to permit easy folding. At the top of the blank along the edge of one of the primary panels **12**, is attached a panel or flap **18** separated from the main portion A of the blank by a scored fold line **16**. Flap **18** is preferably slightly shorter than the primary panel **12** it is attached to so that a small area **32** is left at each end of the flap **18** which permits it to be later tucked inside the opposite or lower side of the blank. Primary panels **12** of the blank main portion A form the central body portion of the container, and may assume any desired length or width depending on the length and circumferential dimensions of the product which is to be packaged. Further, the blank may be scored to form as many panels as desired, although we have found by experimentation that an octagonal shape is the most desirable for the reasons set out hereinbefore.

The two side portions of the blank of FIGURE 1 are each cut and scored to form the unique product retaining end closures for our container. The construction includes at each side, a fold over panel B, a retaining panel D and an end flap C.. The end flaps C are, of course, located at the extreme sides of the blank and the fold over panels B are located between the main portion A

of the blank and the intermediate or retaining panels D. Fold over panels B are defined on one side thereof by a pair of parallel scored lines **20**, **22** and on the other side by a scored line **24**. Each of these scored lines are perpendicular to the primary panel score lines **14** and are necessary to allow flaps C and fold over panels B to be folded adjacent each other, and subsequently adjacent the main portion A of the blank when the container is assembled.

Score lines **20** define the ends of the primary panels **12** and are located slightly outboard of the ends of flap **18** in the inner surface of the blank. Adjacent to and outboard of score lines **20** are located the score lines **22**. The pairs of scored lines **20**, **22** at each side of the blank are separated from one another by a space which is approximately equal to the thickness of the material from which the container is made. This space is necessary so that the end flaps C may be folded in when the container is assembled. The width of panels B and flaps C are approximately equal and each is divided into eight portions by the score lines **14** which divide the main portion A into primary panels **12**. One end of each of the panels B and flaps C must be cut opposite to one another as shown in FIGURE 1 at **34**, **36**. The particular shape is necessary for hte reason that, on each side of the blank, after flap C is folded adjacent panel B, and, then both are folded adjacent main portion A the product retaining ends thus formed constitute a great deal of bulk. Because of this increased thickness at each end of the container, the free edges of the retaining ends abut one another when the panels are folded around the product, and prevent flap **18** from effecting a temporary closure of the container. The cut away portions **34**, **36** of panel B and flap C thus provide a space which allows flap **18** to be inserted inside the container when it is closed to form a snug fit. The upper portion of each of the flaps C and panels B have been shown cut as a matter of convenience. The lower portion could have been cut to accomplish the same purpose.

Fold over panels B at their outboard ends where they are connected to retaining panels D, are defined by the scored lines **24**. The intermediate or retaining panel D located at each side of the blank between flap C and panel B is characterized by its triangular cut-out areas **30**, located along each extended fold line **14**, and is defined by scored lines **24** and **26**. The width of retaining panel D is somewhat less than the width of one of the panels B or flaps C and is chosen to offer a substantial face to retain the product in the container, yet, not be so wide as to completely close the end of the container. The cut-outs **30** are die-cut in the blank in order that the container may be wrapped around the product and further to insure that the retaining panel D will remain normal to the blank main portion A when the container is closed. As noted in FIGURE 6, the assembled shipping container is completely closed with perpheral straps **40** which are applied under tension to the container to snugly engage the circumference of the packaged product. The combination of tab **18** frictionally tucked into the opposite side of the container and the straps **40** provides an integrated package which contributes to its strength and is responsible for the excellent record our container has made in experimental testing. Straps **40** may be made from any material which is strong enough to securely hold the shipping container together under the adverse shipping and storage conditions which are encountered. Materials such as synthetic plastics and metal would be useful, however, the preferred strap material has been found to be a synthetic material registered under the trademark Dymax. Because the shipping containers are stored out of doors, and, under variable weather and temperature conditions, it is important that the straps be formed from a material having a low modulus of elasticity and a low thermal expansion/contraction ratio. If metal straps are used, they must be treated to prevent rust, hence, the Dymax material which requires no treatment has proven most satisfactory. The position of the straps **40** on the package when string insulators are shipped is critical, because if they are not put around the perimeter of an insulator unit, the straps tend to cut into the corrugated board.

The end closure members **28** illustrated in FIGURE 3 are provided only to keep dust and other foreign matter from getting into the shipping container during transit and storage. The end closures **28** when added, fit between the product and the retaining panel D as shown in FIGURE 5 when the product is placed in the package. When a string of insulators is to be shipped, each end closure **28** is provided with a slot **33** to allow the unattached clevis pin and clevis cap, respectively, of the insulator string to be exposed. This expedient allows the insulator string to be fitted on the transmission tower crossarm without removing it from the container. It is obvious that, should some other product be shipped in our container which has no protruding parts, the slots **33** would be rendered unnecessary. The end closure members **28** are not a necessary structural part of the shipping container for the reason that retaining panel D serves as a bumper by engaging the peripheral end faces of the product to keep the product in the container. When string insulators are packaged, the large size insulators generally are approximately ten inches in diameter and one string may contain as many as six insulators. A string of insulators as described above weighs about ninety pounds, hence, the corrugated container, to be effective against breakage must be quite strong. A blank for packaging a string of insulators as described would be between 4½ and 5 feet in length, and when formed would be in excess of 10 inches in diameter. In order to securely and safely retain such a string of insulators in the shipping container, the panels B and flaps C must be about 5 inches wide, and, the retaining panel D approximately 1 inch wide.

Tests have shown that a shipping container of the size described above, for packaging a 90 pound string of insulators, will adequately retain the string of insulators in the container when dropped on its end. With the package securely strapped together, the retaining panel D holds the insulators in the container while the flaps C and panels B absorb the energy created. In the tests the package is dropped a height of 12 inches.

To show the effectiveness of the moisture resistant coating applied to the container blank, one sample was assembled and submerged in water for 3 days. When taken from the water, the container still retained its integrity and the contents remained in the package.

Since our shipping container may be assembled either by hand or with folding machinery, its utility is thereby increased. The sequence involved in folding and wrapping the blank to package the product, requires that end flaps C be folded first inwardly 90 degrees along scored lines **26**; next, the product retaining panels D are formed by folding each panel D inwardly 90 degrees along scored lines **24**. At this point, the end flaps C will lie adjacent to but at a slight angle with fold over panels B. Fold over panels B are next folded 90 degrees inward along scored lines **22**, and the end portions of the blank are then folded another **90** degrees inwardly along scored lines **20**. When these folds are made, either by hand or on a machine, the outer edges **42** of end flaps C will lie tucked under fold over panels B and opposite the fold lines **20**, **22** as shown in FIGURE 4. The space on the blank main portion A between the retaining panels D defines the length between which the product must lie.

Once the blank is folded to assume a configuration as shown in FIGURE 2, the product is then placed in the center of the blank and the primary panels **12** are folded around the product along scored lines **14** to encompass the product. If end closure members **28** are used, they

must be added before the primary panels are folded around the product as illustrated in FIGURE 5. Flap **18** is next tucked inside the container between the blank main portion A and the end flaps C to frictionally hold the package together before it is taken to the strapping machine. As pointed out hereinbefore, the folding steps performed to this point may be done either by hand or on folding machinery. The strapping step, because it must be performed under a great deal of tension, requires a strapping machine to obtain an effective closure.

Having completely described our shipping and storage container, the manner in which it is formed, and the manner in which it is used, we declare as our invention the subject matter of the following claims. Changes in the specific form of our invention, as herein disclosed, may be made without departing from the spirit of our invention.

We claim:

1. A shipping and storage container formed from a foldable material comprising:

(a) a unitary blank divided into a plurality of hingedly attached panels joined along first parallel scored lines, said blank including;

(1) a centrally located main portion;

(2) a fold over panel hingedly attached at each side of said main portion along spaced score lines transverse to said first parallel scored lines, said spaced score lines being separated from one another by a distance approximately equal to the thickness of the material from which the blank is made;

(3) a retaining panel hingedly attached at the outer edge of each fold over panel, and having

a plurality of cut-outs coincident with said first parallel scored lines;

(4) an end flap hingedly attached at the outer edge of each retaining panel wherein one end of each end flap and the adjacent fold over panel are divergently cut with respect to one another; and,

(5) a tuck in flap hingedly attached at one edge of said main portion.

2. The container blank recited in claim **1** wherein said blank is formed from moisture resistant corrugated paperboard.

3. The container blank recited in claim **2** wherein all scored lines are made on the inside of the blank with the first parallel scored lines located parallel to the flutes of the corrugated layer.

4. The container of claim **3** further comprising body encompassing straps which are strategically positioned around the assembled container.

5. The container of claim **4** which includes a pair of slotted end closure members, located at each end of the product, and adjacent the retaining panels.

References Cited

UNITED STATES PATENTS

2,624,989	1/1953	White	229—90 X
2,726,803	12/1955	Ketler	229—23
2,733,852	2/1956	Williamson	229—23
3,384,222	5/1968	Franco.	

DAVID M. BOCKENEK, *Primary Examiner.*

U.S. Cl. X.R.

206—46; 229—21, 40