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POLYGONAL PAPERBOARD BOXES

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1 Claim. (Cl. 229—41)

This invention relates to polygonal paperboard boxes, and more particularly, to octagonal boxes of the type used in packaging coiled material.

A convenient way of handling electrical cable involves the use of an octagonal box shaped to conform about an otherwise loose coil. The box not only protects the coil during shipment but serves as a convenient dispenser, a hole being cut in the center of the top panel through which the wire is withdrawn as needed while the unused portion remains coiled within the box.

Briefly, a conventional box comprises a blank having top and bottom panels of octagonal outline. Each panel has four side-forming members spaced apart, and each of these side-forming members has lateral extensions. Four additional side-forming members are then hinged to the bottom panel, and each of these oblique side walls has a tuck-in end flap, which is provided with laterally projecting ears. In assembly, the various side members and lateral extensions on the top and bottom panels overlie one another, and the oblique side-forming members are swung upwardly to overlie the extensions. The oblique sides are then secured by tuckling the associated end flaps between the top panel and the upper edges of the lateral extensions, the end flaps being locked in place by their laterally-projecting ears.

Although such a box is satisfactory, the lateral overhang of the end flaps is necessarily limited or may cause difficulties in tucking the end flaps beneath the top panel. Accordingly, it is an object of the present invention to provide a carton of the character referred to, but in which the end flaps of the oblique side walls are formed to facilitate there being tucked beneath the top panel.

Briefly, this objective is achieved by using a blank of the type described heretofore. In this instance, however, the oblique side wall sections are creased to buckle outwardly, preferably along lines which converge from the bottom panel toward the end flap. The end flap is of a length somewhat greater than that heretofore and is split along a line intersecting the hinged connection of the end flap with the side wall at the junction of or between the aforementioned converging scores. In assembly, the outer portion of each oblique side section is compressed so as to buckle outwardly, with the result that the two portions of the attached end flap swing inwardly in partially overlapping relationship with one another. As the end flap sections are swung inwardly, the overhanging ears thereof are brought together so that they may more readily pass through the opening defined beneath the top panel by adjacent side walls. Pressure is then applied to the upper center portion of the oblique side wall, with the result that it straightens and the attached end flap sections return to their original coplanar relationship, the meeting edges abutting together to lock the box in its assembled condition. Indeed, the box is in such locked condition that it cannot be opened except by removing a part of the top or bottom panels.

Other features of the invention will be in part apparent from and in part pointed out in the following de-

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tail description taken in connection with the accompanying drawings, in which:

Fig. 1 is an oblique view of a paperboard container embodying features of this invention;

Fig. 2 is a plan view of the blank from which the container of Fig. 1 is made;

Fig. 3 is an oblique view illustrating the blank in partially erected condition;

Fig. 4 is a view similar to that of Fig. 3 showing how the end flaps are manipulated to facilitate their tuck-in operation;

Fig. 5 is a detail view similar to that of Fig. 4, but showing how the end flap sections are caused to swing apart and interlock the other side-forming members; and

Fig. 6 is a detail top plan of the finished carton with parts broken away to show the corner lock.

The container herein described preferably is made from paperboard, either corrugated or solid fiber, which is die cut and scored to form the blank illustrated in Fig. 2. The blank has a pair of octagonal panels, one of which is designated 1 and will be referred to as the bottom panel, and the other of which is designated 3 and will be referred to as the top panel, a relationship which obviously could be reversed. The octagonal panels are shown interconnected along fold lines 7 and 9 by a section 5 forming one of four right angular side walls of the finished container. For purposes of terminology, the other four sides will be referred to as one of the oblique side walls. A second one 11 of the right angular side walls is hinged at 13 to the panel 3. The side wall 11, in turn, has rectangular extensions 15 laterally hinged at 17 to project a distance corresponding approximately to half the width of the adjacent oblique sides, which are defined by cuts 19.

Between the side members 5 and 11, and spaced therefrom, are two additional side-forming members 21, which are similar to the above-mentioned member 11 and form the other two right angular sides. As indicated, the members 21 are hinged along scores 23 and rectangular extensions 25 are laterally hinged thereto at 27. It may be noted that the rectangular extensions 15 and 25 are cut with their inner edges 29 offset outwardly a slight distance from the corresponding hinge lines 13 and 23.

The other panel 1 differs somewhat from panel 3. Panel 1 also carries a second side-forming member 31 opposite the common side wall 5, the former being hingedly connected along a crease 33. Lateral extensions 35 are hinged at 37 to members 31 and 5, but they are of triangular outline and are cut with their outer edges 39 offset inwardly with respect to the outer edge 38 of the side member 31. Ideally, the edges 39 should coincide with the edges 29 in the assembled carton to form a gap beneath the top panel 3.

Otherwise, the triangular extensions 35 are bounded by die cuts 40, which also define the edges of adjacent members 41 for forming the oblique side walls of the box. There are four side members 41 hingedly connected to the bottom panel 1 along scores 43, and each carries an end tuck-in flap 45, which is hinged along a crease 47 to the associated side-forming member 41. These end flaps 45 are formed with ears 49, which project beyond and overhang the edges of the associated side members 41, one of which edges is designated 40. The other edge of each side-forming member 41 is defined by die cuts 50.

Between the cuts 50 lie a pair of side members 51, which are hingedly connected to the bottom panel 1 along fold lines 53. The members 51 are similar to the member 31 in that they carry triangular extensions 55, which are hinged along parallel lines 57 and which have outer edges 59 inwardly offset from edges 58. As will be apparent, the extensions 55 are otherwise defined by the cuts

50. In assembly, the side-forming members 31 and 51 on the bottom panel overlie the corresponding members 11 and 21 of the top panel. For that reason, the creases 7, 33 and 53 may be slightly closer than creases 9, 13 and 23. Also, the oblique side-forming members 41 overlie the various lateral extensions 15, 25, 35 and 55, hence the creases 43 may be widely spaced in comparison to fold lines 7, 9, 13, 23, 33 and 53.

The entire one-piece blank is of a length corresponding to twice the diameter of the box plus three times the height; and the blank is of a width corresponding to the diameter of the box plus twice the height. Waste resulting from the die-cutting operation is held to a minimum, and the blanks may be shipped and stored, until read for use, in a compact flat condition. As described up to this point, the carton is similar to that disclosed in the aforesaid patent application.

The invention for which protection is now sought relates to the oblique side-forming members 41 and the associated end flaps 45. In the previous application, the end flaps were continuous from ear to ear. For this reason, difficulties might be encountered in tucking the end flaps in the openings defined between edges 19 of the panel and the adjacent edges 29, 39 and 59 of the several lateral extensions, it being necessary that each end flap be of a width somewhat greater than that of the corresponding slot in order for the flap to have an adequate interlocking action.

Conversely, if the overhang were such as to facilitate the tuck-in operation, the interlocking action tends to be inadequate, and the resulting box may inadvertently open as it is knocked about in handling. It will be understood that the side walls of this box should remain closed. Indeed, it is desirable to have an arrangement which precludes opening of the box by withdrawal of the end flaps or side walls, especially when used as a container for coiled wire, the wire being withdrawn from an opening in one of the panels 1 or 3, as needed, so that the unused portion remains within the box.

Referring now more particularly to Figs. 2, 4, 5 and 6, the end flaps 45 are of substantial length. In fact, the outer edge is in part formed by converging lines 61, which are coextensive with the edges 38 and 58 and with fold 9, thereby making more efficient use of the paperboard and simplifying die-cutting operations. The edges 61 do not meet, but what would have been the vertex is cut away to define lines 63 to a center slit 65. Cut 65 extends at right angles to the fold 47, so that each end flap is divided into two sections, each section having a laterally overhanging ear portion 49. The inner edge 67 of each ear may be somewhat longer than that heretofore, so that a better interlocking action is obtained.

Since the overhang of each ear is somewhat greater, the invention also contemplates that the oblique side-forming members 41 will be scored along converging lines 69, which extend generally from the extremities of fold 43 to meet the inner end of the cut 65 at the fold line 47.

In assembly, the article, such as a coil of loose wire (not shown), is placed upon the panel 1. This coil should be formed with its periphery such as to be closely confined in the container. The side members 31 and 51 of the bottom panel are then folded upwardly, as illustrated in Fig. 3, and their triangular extensions 35 and 55 are turned inwardly to lie over the crease lines 43. The other side member 5 is folded upwardly (its extensions 35 being turned inwardly), and the top octagonal panel 3 is brought down to overlie the bottom panel in spaced parallel relationship. As this is done, the side members 11 and 21 depending from the top panel are brought into underlying relationship with the three upstanding side members 31 and 51 on the bottom panel. Also, the rectangular extensions 15 and 25 are turned inwardly into underlying relationship with the triangular extensions 35 and 55 respectively.

The intervening oblique sides, which are only in part closed by the lateral extensions, are then completed by folding up the four side members 41. The entire box becomes locked upon tucking the end flaps 45 between the edges 19 of the top panel and the edges 29, 39 and 59 of the several lateral extensions, there being a gap provided for this purpose, as explained previously.

This tuck-in operation is facilitated by first gripping the outer upper portions of each oblique side-forming member 41 between its edges 50 and 40 so that the member buckles outwardly along scores 69, these scores being impressed in the inner surface of each side member to facilitate such outward bending. The outward buckle of the side member along scores 69 causes the two sections of the end flap 45 to swing inwardly relative to one another, as indicated in Figs. 4 and 5. This temporary condition is sufficient to bring the overhanging ears 49 inwardly a distance sufficient to clear the side walls 5, 11, 21, 31 and 51, as the end flaps are tucked inwardly. Pressure is then applied to the outer surface of each oblique side wall 41, so that the side wall straightens after its end flap has entered the box. As the oblique side wall straightens, the two sections of end flaps swing apart. Since the end flap has an upward bias against the top wall resulting from the resilience of the board, the inner edges at 65 return to substantial abutting relationship and the ear portions 49 lock behind the adjacent side walls. As such, the oblique side walls are securely locked in place and the box cannot readily be opened without destruction of a portion thereof.

From the foregoing description, it is apparent that those skilled in the art will understand the structure, function and mode of operation of the invention herein disclosed, and appreciate the advantages thereof. Although one embodiment has been disclosed in detail, it is to be understood that the invention is not limited thereto, but the drawings and description thereof are to be understood as being merely illustrative.

For example, the container could be made from two pieces, one of which would be like that portion of the Fig. 2 blank shown below the line 9 and the other of which pieces would be similar to that shown above the line 7. Furthermore, some of the extensions or side members might be eliminated and the container might be of a different shape, without departing from the principle of this invention. It is to be recognized that various modifications will present themselves to those skilled in the art.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

In a paperboard box of the character referred to having top and bottom panels and a plurality of integrally hinged side walls; the improvement that comprises said side walls being hinged alternately to the top and bottom panels, the side walls lying at a similar obtuse angle to each other, tuck-in flaps hinged along fold lines to the upper portions of side walls associated with the bottom panel, said tuck-in flaps being of a width greater than that of the associated side walls and the outer edges of said flaps defining an obtuse angle with said fold line, which angle is similar to said first-mentioned obtuse angle, thereby to engage behind the adjacent side walls which are hinged to the top panel, openings formed opposite said flaps for insertion thereof, said openings being of a width substantially equal to that of the aforesaid fold lines, said tuck-in flaps being split along a line transverse to said fold line and terminating at said fold line, and said associate side walls being scored over the inner faces thereof to buckle outwardly when pressure is applied to their side edges, said side walls being scored along a pair of lines converging at the intersection of said fold line and split and which diverge toward the hinge connection of the side walls with the bottom panel.

5**References Cited in the file of this patent****UNITED STATES PATENTS**

640,766	Hibson -----	Jan. 9, 1900	
2,320,665	Sheater -----	June 1, 1943	5
2,707,586	Buttery -----	May 3, 1955	
2,819,833	Sauer -----	Jan. 14, 1958	

26,460
117,701
796,698

6**FOREIGN PATENTS**

Australia -----	May 7, 1930
Austria -----	May 30, 1930
France -----	Apr. 11, 1936