May 10, 1949. J. F. CONWAY 2,469,497

FOLDING BOX

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FIG. 1

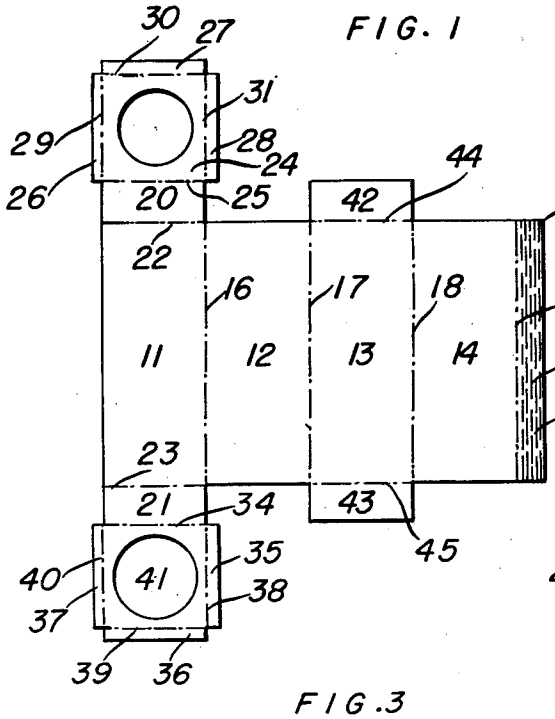


FIG. 2

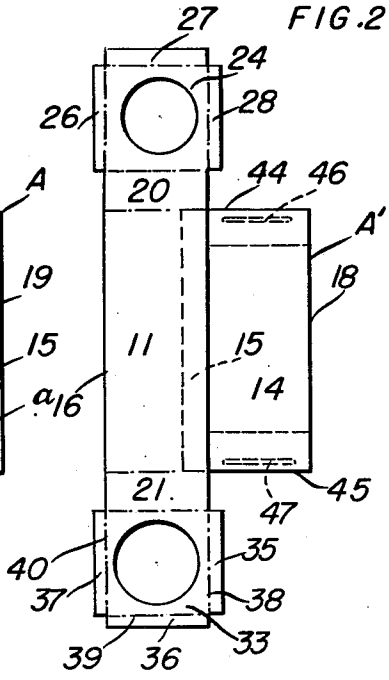


FIG. 3

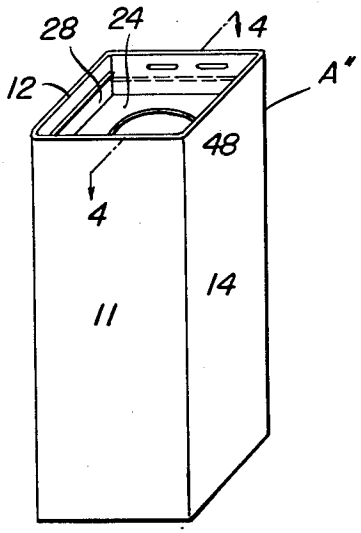
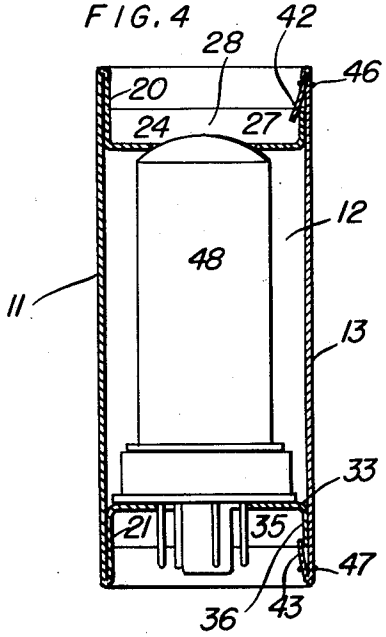


FIG. 4



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FIG. 5

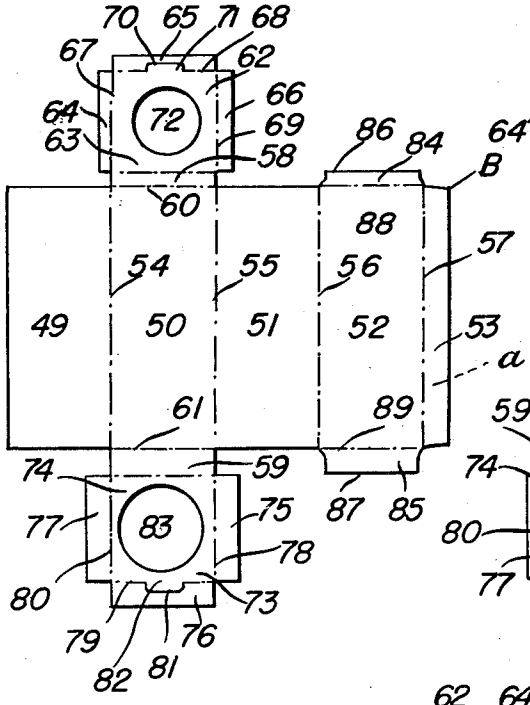


FIG. 6

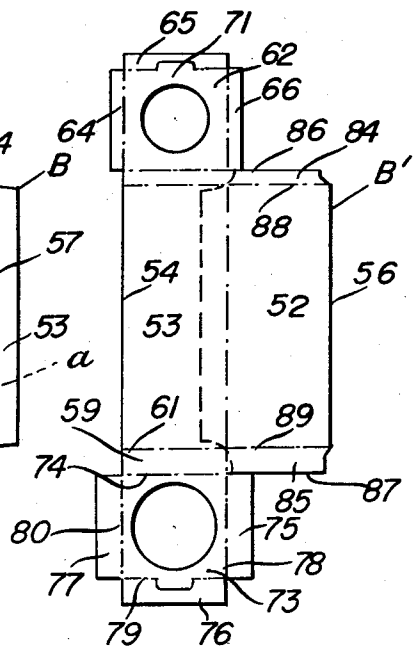
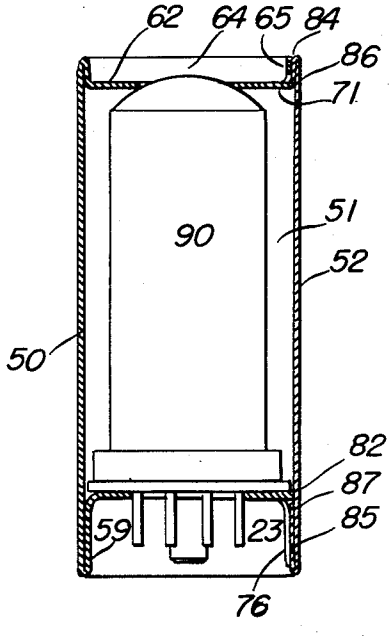


FIG. 7



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FOLDING BOX

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Application August 25, 1945, Serial No. 612,597

1 Claim. (Cl. 229—6)

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This invention relates to folding boxes and provides an improved carton for radio tubes, light bulbs and similar articles.

The improved carton according to this invention may be made from a single piece of paperboard, cardboard or other foldable sheet material, requires a minimum of stock, may be prefabricated in the form of a flat collapsed tubular structure and may be easily expanded into hollow carton form when needed. One of the principal features of the improved carton is its convenient, quick locking end structure which will lock in carton closed position without additional securing operations such as gluing or stapling or riveting.

The various objects, features and advantages of this invention will appear more fully from the detailed description that follows accompanied by drawings showing for the purpose of illustration preferred embodiments of this invention. The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the characteristic features of this invention which are believed to be novel will be particularly pointed out in the claim appended hereto, the invention itself, its objects and advantages and the manner in which it may be carried out may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof in which,

Fig. 1 is a plan view of a blank from which an improved radio tube carton embodying features of this invention may be formed, the inside surface of the blank facing the observer;

Fig. 2 shows the blank of Fig. 1 after initial folding and gluing operations resulting in the formation of a collapsed flat tubular structure;

Fig. 3 is a perspective view of an expanded filled and closed carton set up from the blank shown in Fig. 2;

Fig. 4 is a vertical cross section through the carton shown in Fig. 3, a section being taken on line 4—4 of Fig. 3;

Fig. 5 is a plan view of a flat blank from which a radio carton of modified form may be made, the inside surface of the blank facing the observer;

Fig. 6 is a plan view of a collapsed flat tubular structure made from the blank shown in Fig. 5; and

Fig. 7 is a vertical cross section through a filled and closed carton set up from a blank shown in Fig. 6.

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In the following description and in the claims, various details will be identified by specific names for convenience. The names, however, are intended to be as generic in their application as the art will permit. Like reference characters refer to like parts in the several figures of the drawings.

In the drawings accompanying and forming part of, the specification, certain specific disclosure of the invention is made for the purpose of explanation but it is understood that the details may be modified in various respects without departure from the broad aspects of the invention.

Referring to the drawings, the blank A shown in Fig. 1 may be cut and scored in multiple from rolls or sheets of cardboard, paperboard or other suitable foldable sheet material on automatic cutting and scoring machines. Only one side of the blank need be imprinted or otherwise decoratively finished since only one side of the carton blank appears as the outside of the finished carton.

Side walls 11, 12, 13 and 14 and a terminal glue flap 15 are hingedly connected along fold lines 16, 17, 18 and 19. A pair of connecting panels 20 and 21 is hingedly connected to the side wall 11 along fold lines 22 and 23. An end panel 24 is hingedly connected to the connecting panel 20 along the fold line 25. The end panel 24 has flaps or tabs 26, 27 and 28 connected to it along fold lines 29, 30 and 31. An aperture 32 may be provided in the end panel to accommodate the top of a radio tube to be housed therein.

A similar end panel 33 is hingedly connected to the connecting panel 21 along a fold line 34. Flaps or tabs 35, 36 and 37 are hingedly connected to the side edges of the end panel 33 along fold lines 38, 39 and 40. An aperture 41 is provided in the end panel 33 to permit the prongs at the base of a radio tube to project through the bottom of the finished carton.

A pair of turned-in flaps 42 and 43 are hingedly connected to the side wall panel 13 along fold lines 44 and 45 and similar flaps may be provided at the ends of the remaining side walls 12 and 14, but are dispensable, and are not shown for that reason.

The blank A may be formed into a flat collapsed tubular structure by a few simple folding and securing operations. In the preforming of the tubular structure the turned-in flaps 42 and 43 are infolded about the fold lines 44 and 45 to overlie the inside surface of the side wall 13. The flaps 42 and 43 may be secured in the inturned

position by staples 46 and 47 affixed closely adjacent the fold lines 44 and 45 respectively or by a narrow strip of adhesive. Adhesive is then applied to the outside surface of the terminal glue flap 15 at *a* and the blank is folded about the fold lines 18 and 16 to bring the inside surface of the side wall 14 over the inside surface of the side wall 13 and to bring the side wall 11 into adhesive engagement with the glue flap 15 to which it adheres.

The resulting structure A' is shown in Fig. 2. In its collapsed state the blank A' requires little space and may be stored and shipped to the ultimate users in collapsed condition. It is available for immediate use or filling and may be completed into hollow carton form and filled by a few simple operations which will now be described.

Pressure applied against the fold lines 16 and 18 squares the blank A' into hollow container form which is reinforced by infolding of one end panel, for example the bottom panel 33. In inserting the bottom panel 33 into the space formed by the four side walls 11, 12, 13 and 14, the hinged flaps 35, 36 and 37 are folded about their respective fold lines 38, 39 and 40. In inserting the panel 33 the flap 36 moves past the outer edge of the turned-in flap 43 and interlocks therewith, thereby maintaining and locking the panel 33 in position. The remaining flaps 35 and 37 reinforce the bottom panel 33 and prevent buckling of the panel.

A tube 48 may then be inserted into the carton and the top of the carton may then be closed in a similar manner. In the closing of the carton top the hinged flaps 26, 27, and 28 are folded about their respective fold lines 29, 30 and 31 and the end panel 24 is then inserted into the space between the side walls 11, 12, 13 and 14. The carton top panel 24 is locked in carton closed position by the flap 27 which interlocks with the turned in flap 42 and is reinforced by the upturned side flaps 26 and 28. The complete filled and closed carton A'' is shown in Figs. 3 and 4. It is rigid and sturdy and affords equally good protection for radio tubes as cartons of more complicated and far more expensive construction. It offers the added feature that it may be quickly closed and locked without need of sealing, stapling or riveting operations conventionally employed after filling and closing of conventional cartons.

A modified form of blank is shown in Fig. 5. The blank B comprises side walls 49, 50, 51, 52 and a terminal glue flap 53 hingedly connected along fold lines 54, 55, 56 and 57.

A pair of connecting panels 58 and 59 is hingedly connected to the side wall 50 along fold lines 60 and 61. An end panel 62 is hingedly connected to the connecting panel 20 along a fold line 63. The end panel 62 has flaps 65, 65 and 66 connected to it along fold lines 67, 68 and 69. The fold line 68 is interrupted by a cut line 70 defining a lock tab 71 integral with the end panel 62 adapted to project beyond the fold line 68 when the flap 65 is folded. Similar cut lines may be provided along the fold lines 67 and 69 to provide additional lock tabs along the side edges of the panel 62. However, one lock tab is usually sufficient, and for reason of simplification of the drawing, additional lock tabs along the side edges of the end panel 62 are not shown.

An aperture 72 may be provided in the end panel 62 through which the top of a radio tube may project. A similar end panel 73 is hingedly connected to the connecting panel 59 along a fold line 74. Flaps 75, 76 and 77 are hingedly connected to the side edges of the end panel 73 along fold lines 78, 79 and 80. The fold line 79 is interrupted by a cut line 81 defining a lock tab 82 integral with the end panel 73 and adapted to project beyond the fold line 79 when the flap 76 is folded. It is understood that similar additional cut lines may be provided to interrupt the fold lines 78 and 80 to provide additional lateral lock tabs. The end panel 73 has an aperture 83 to permit the prongs at the base of the radio tube to project through the bottom panel of the finished carton.

A pair of lock flaps 84 and 85 having outer edges 86 and 87 are hingedly connected to the side wall panel 52 along fold lines 88 and 89, and additional similar flaps may be provided at the ends of the remaining side wall panels 49 and 51 in the event additional lateral lock tabs are provided on the end panels.

The blank B may be formed into a flat collapsed tubular structure by a few simple folding operations. In the preforming of the tubular structure adhesive *a* is first applied to the underside of the terminal glue flap 53 and the blank is then folded about the fold lines 56 and 54 to bring the inside surface of the side wall 52 over the inside surface of the side wall 51 and to bring the side wall 49 into adhesive engagement with the glue flap 53 to which it adheres.

The resulting structure is shown in Fig. 2. The blank B' requires little space and may be shipped and stored in collapsed condition. It is available for immediate use and may be completed into hollow carton form by a few simple operations which will now be described.

The blank B' may be squared by pressure applied against the fold lines 54 and 56. The bottom of the carton may then be formed in the following manner. The lock flap 85 is infolded first about the fold line 89 and the bottom panel 73 is then infolded by folding it and its connecting panel 59 about the fold lines 74 and 61, and by folding the flaps 75, 76 and 77 about their respective fold lines 78, 79 and 80. After insertion of the bottom panel 73 the flaps 75, 76 and 77 lie parallel with the side walls 51, 52 and 49 of the carton and the lock tab 82 engages and interlocks with the edge 87 of the lock flap 85. The flap 76 holds the lock flap 85 in folded position.

A tube 90 may then be inserted into the partially completed carton to rest with its base on the bottom panel 73.

The top of the carton may then be closed by inserting the top panel 62 in a similar manner. In its infolded position the top panel 62 rests against the top of the tube. Its lock tab 71 rests against the edge 86 of the lock flap 84 past which it moves during the closing operation. The flap 65 overlies the lock flap 84 and maintains it in infolded position. The lateral flaps 64 and 66 rest against the respective side walls 51 and 41 and reinforce the top panel 62 against buckling.

The carton is preferably so dimensioned that a small amount of force is required for closing the top and moving the lock tab 82 beyond the locking edge 86 of the lock flap 84. So dimensioned the tube urges the lock tabs 71 and 82 against the respective locking edges 86 and 87 of the lock flaps 84 and 85, whereby the carton is kept securely locked and the tube is prevented from rattling inside the carton.

Thus the invention provides a simple inexpensive and efficient carton for the packaging of radio tubes. The carton requires only a minimum of

stock, and the operations required for its forming and filling are extremely simple.

Obviously the present invention is not restricted to the particular embodiments or the details described and illustrated. Various changes, modifications, additions, omissions and substitutions may be made without departing from the essence of the invention.

What is claimed is:

A one piece radio carton comprising, enclosing side walls, and end structures for closing the ends of the carton, said end structures comprising, a connecting flap hingedly connected to one of the side walls; an end panel hingedly connected along one of its edges to said connecting flap; flaps hingedly connected along the other edges of said end panel; a lock tab integral with said end panel, said lock tab being cut out from at least one of said last named flaps; and a lock flap for each lock tab, said lock flap being connected to a side wall and foldable back upon the side wall to which it is hinged for engaging the respective lock tab in carton closed position and means for maintaining said lock flap in folded back position against said side wall of the end panel.

JAMES F. CONWAY.

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