May 28, 1957 C. J. PAPADOPOULOS 2,793,801

FOLDING BOX CONSTRUCTION

Filed July 20, 1954

Fig. 1.

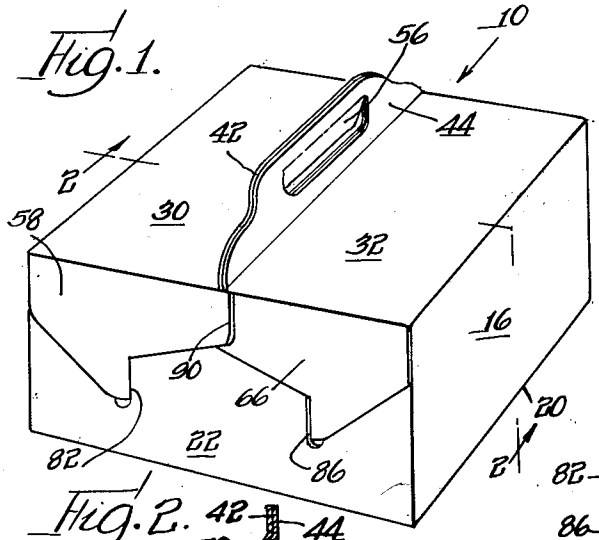


Fig. 2.

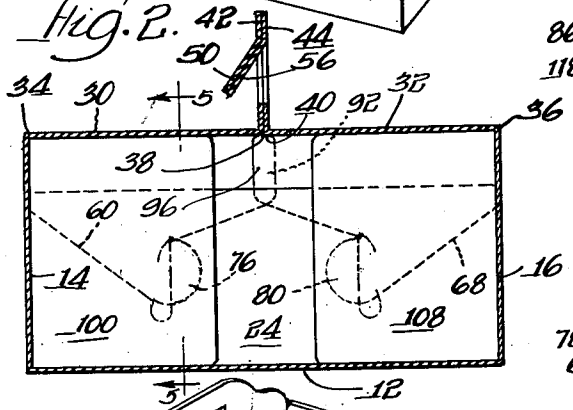


Fig. 3.

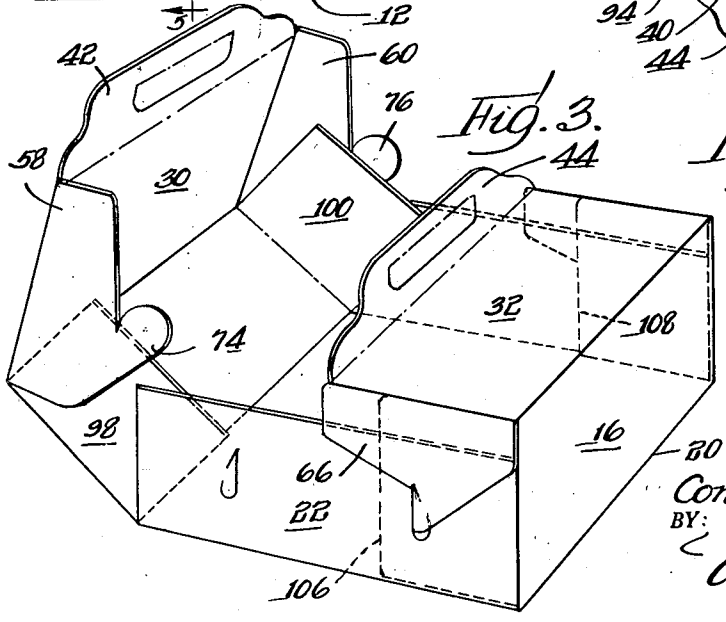


Fig. 4.

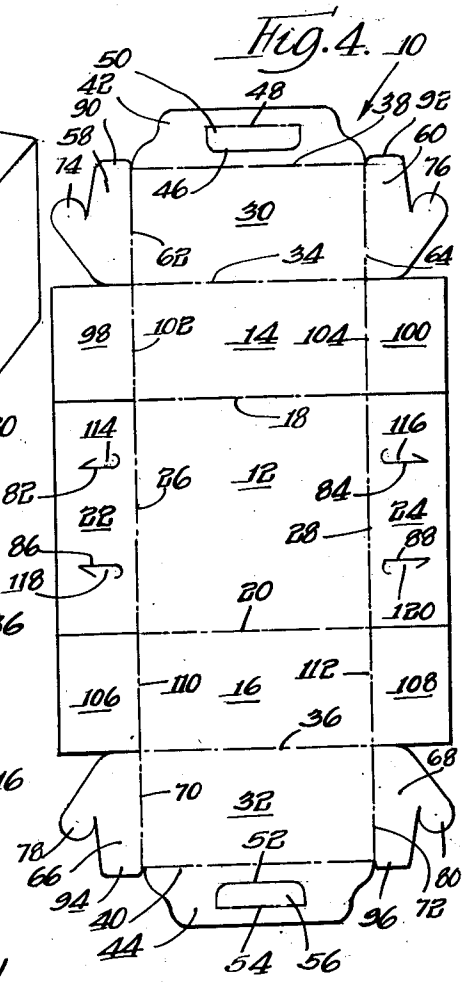
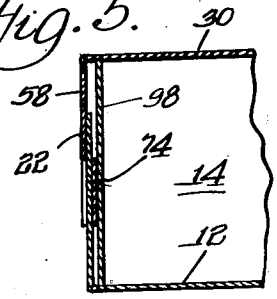


Fig. 5.



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United States Patent Office 2,793,801 Patented May 28, 1957

2,793,801

FOLDING BOX CONSTRUCTION

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Application July 20, 1954, Serial No. 444,471

3 Claims. (Cl. 229—33)

The present invention relates to novel folding or knock down box structures and more particularly to novel folding or knock down box structures which may be utilized for carrying various bakery goods, dry goods, or other merchandise.

An important object of the present invention is to provide a novel folding or knock down box structure which may be easily carried and which may be economically manufactured and then readily assembled by the user.

Another important object of the present invention is to provide a novel folding or knock down box structure having integral handle means for easy carrying, which box structure requires a reduced amount of stock material to promote economical manufacture and at the same time is strong and rugged and highly resistant to tearing.

A further object of the present invention is to provide a novel knock down box structure of the type described above which is formed substantially so as to preclude the entry of dirt or dust therein.

Still another object of the present invention is to provide a novel folding box structure of the above described type which is constructed so as to reduce any possibility of tearing of the handle means and to restrain tilting of the box structure when the box structure is supported by the handle means.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings wherein:

Fig. 1 is a perspective view of a novel box structure embodying the principles of this invention;

Fig. 2 is a cross sectional view taken along line 2—2 in Fig. 1;

Fig. 3 is a perspective view showing the box structure in a partially assembled condition;

Fig. 4 is a plan view of the novel box structure blank; and

Fig. 5 is a fragmentary cross sectional view taken along line 5—5 in Fig. 2.

Referring now more specifically to the drawings wherein like parts are designated by the same numerals throughout the various figures, a box structure **10** embodying the principles of this invention is shown in a completely assembled condition in Fig. 1 and in a completely flattened condition in Fig. 4. The box structure **10** includes a rectangular bottom panel **12** and side panels **14** and **16** articulated to opposite edges of the bottom panel along bend lines **18** and **20** respectively. Other side or end panels **22** and **24** are articulated to the other opposite edges of the bottom panel along bend lines **26** and **28** respectively. As will be understood the box structure may be made from heavy paper, paperboard, any suitable fibrous material, or any other desired material, and the bend lines just described as well as bend lines to be described below may be scored or partially slit in a known manner.

Articulated to upper edges of the side panels **14** and **16** respectively are complementary top panels **30** and **32**. The junctions between the outer edges of the top panels

and their respective side panels are provided by scored bend lines **34** and **36** and, as shown best in Fig. 2, the inner edges **38** and **40** of the top panels **30** and **32** respectively are disposed substantially in abutting relationship and over the middle of the bottom panel when the top panels are in their fully closed positions. Handle members **42** and **44** are respectively articulated to the inner edges **38** and **40** of the top panels so that when the top panels are closed the handle members will be disposed in upstanding juxtaposed relationship. The handle member **42** is slit along the line **46** and scored along the line **48** to provide a tab **50** and the handle member **44** is similarly slit along line **52** and scored along line **54** to provide a tab **56**. When the box is assembled these tabs may be folded as shown in Fig. 2 so as to provide the handle members with finger openings. By leaving the tabs articulated to the handle members, the tabs serve to reinforce the handle members and this structure also promotes economical manufacture of the box since if the tabs were completely severed from the handle members it would be necessary to provide an operator or a special mechanism for removing the tabs from the finger openings.

In order to retain the top panels in their closed positions, locking flaps **58** and **60** are articulated to side edges **62** and **64** of the top panel **30** and similar locking flaps **66** and **68** are articulated to side edges **70** and **72** of the top panel **32**. These locking flaps are provided with tongue portions **74**, **76**, **78** and **80** which are respectively adapted to be inserted into slits **82**, **84**, **86** and **88** formed in the side panels **22** and **24**. As shown best in Figs. 1, 2 and 3 the locking tongues project inwardly or away from the side panels **14** or **16** with which their associated top panels are connected so that when the box is supported by the handles the weight of the box causes the tongue portions to be urged more securely into their respective slits in the end panels. Furthermore, it should be noted that the upper ends of the slits in the end panels are disposed substantially in lines extending from the handle members to the bottom corners of the box. This arrangement of the upper slit ends which actually engage the tongue portions of the locking flaps serves to restrain tilting of the box when the box is held by the handles and also serves to promote distribution of the weight of the box equally through the locking flaps to the handle so as to reduce any possibility of overloading the handle structures at a localized area, which overloading might cause tearing of the handles.

An important feature of the invention is illustrated best in Figs. 2, 3 and 5. More specifically, it should be noted that the side panels **14** and **16** are substantially higher than the end panels **22** and **24** so that the panels **22** and **24** only partially close the ends of the box. With this arrangement it is seen that the box blank is substantially narrower than it would be in the event the end panels **22** and **24** were of the same height as the side panels. Thus the novel box structure of this invention requires considerably less stock material than many boxes now in general use, and it will be appreciated that this saving in stock material becomes quite substantial and important when a large number of the boxes are produced.

In order to completely close the ends of the box it should be noted that the locking flaps depending from the top panels are each provided with generally rectangular upper portions which depend to and overlap the end panels. The locking flaps **58** and **60** are provided with portions **90** and **92** which extend past the bend line **38** connecting the handle member **42** to the top panel **30** and the locking flaps **66** and **68** are provided with similar extending portions **94** and **96**. Thus, when the box is in its completely assembled position the extending portions

90 and 94 overlap each other and the extending portions 92 and 96 overlap each other to prevent dust or any other foreign material from entering the box between the locking flaps.

In order to close the corners of the box structure against the entry of dirt or any other foreign material and also to reinforce the end structures of the box, flaps 98 and 100 are articulated to opposite ends 102 and 104 of the side panel 14 and similar flaps 106 and 108 are articulated to opposite edges or ends 110 and 112 of the side panel 16. As shown best in Figs. 2, 3 and 5 these flaps are adapted to be folded so that they extend along the inner surfaces of the end panels 22 and 24 whereby the flaps serve to effectively close the corners of the box and reinforce the end panels.

In order to facilitate insertion of the tongue portions of the locking flaps through the slits in the end panels, the slits are extended as shown in the drawings so that they respectively define small tabs or flaps 114, 116, 118 and 120 which may be bent slightly inwardly to provide enlarged openings in the end panels. As will be understood the tongue portions of the locking flaps may be inserted through such enlarged openings much more readily than they could be inserted through narrow slits. In order to locate the uppermost point of the slits so as to insure engagement between the end or edge of the slit and the locking tongues at points substantially in the diagonal lines described above, it should be noted that the uppermost extensions of the slits are preferably in the form of substantially straight lines extending downwardly at an angle from the uppermost portions or ends of the slits. However, the lowermost extensions of the slits are preferably curved upwardly and away from the generally vertically disposed main portions of the slits so as to facilitate inward folding or bending of the small tabs or flaps 114 through 120. It should be noted that the flaps 98, 100, 106 and 108 extend behind and cover the various slits in the end panels so as to preclude the entry of dirt or foreign material through the slits.

When assembling the box structure described above from its flattened condition shown in Fig. 4 to its fully assembled condition shown in Fig. 1 the end panels 22 and 24 are first folded to an upright position. Then one of the side panels, for example the side panel 16, is folded toward its upright position and during this folding action the flaps 106 and 108 are inserted within the end panels. During the folding of the side panels 16 the top panel 32 is also folded toward its closed position and the locking flaps 66 and 68 are pressed against the end panels so that their tongue portions slide through the openings in the end panels provided by the slits 86 and 88. The side panel 14 and the top panel 30 and their associated flaps are then assembled in a similar manner to complete the box. The box is then ready to be picked up and carried by the handle members since the locking tongues and slits are arranged so as to be urged into positive interengagement when the box is carried by the handles. Thus, the need for tying the box with string and the like in accordance with practices now followed for many boxes in general use is eliminated.

From the above description it is seen that the present invention has provided a novel box structure fully capable of satisfying the objects heretofore set forth. More specifically, it is seen that the present invention has provided a novel box structure requiring substantially less stock material thereby promoting economical production of the box. It is also seen that the novel box structure of this invention is relatively rugged and resistant to tearing so that it may be safely carried by its integral handle members without either coming apart or tearing. Furthermore it is seen that the present invention has provided a novel box structure having the advantages just mentioned and also being formed so as to preclude the entry of dust, dirt or any other foreign material into the interior thereof.

While the preferred embodiment of the present invention has been shown and described herein it is obvious that many structural details may be changed without departing from the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A one-piece knock down box comprising a bottom panel, a pair of opposed side panels articulated to opposite edges of said bottom panel and having a predetermined height, a pair of opposed end panels articulated to other opposite edges of said bottom panel and having a height substantially less than said predetermined height so as to close only partially the ends of the box, a pair of flaps articulated to opposite end edges of each of said side panels and having a height substantially similar to said predetermined height, said flaps extending long adjacent end panels for substantially completely closing corners of the box, a pair of complementary top panels each articulated to an upper edge of one of said side panels, a pair of juxtaposed upstanding handle members each articulated to an inner edge of one of said top panels, a pair of locking flaps articulated to opposite end edges of each of said top panels, said locking flaps having generally rectangular portions depending from said top panels and overlapping said end panels and substantially completing the closing of the ends of the box, each of said locking flaps having a tongue portion depending from its rectangular portion, said end panels having opening means therein through which said tongue portions extend for interlocking engagement with the end panels, and said first mentioned flaps extending along inner surfaces of said end panels and traversing said opening means for preventing entry of foreign material into the box through said opening means.

2. A one-piece knock down box, comprising a bottom panel, a pair of opposed side panels articulated to opposite edges of said bottom panel and having a predetermined height, a pair of opposed end panels articulated to other opposite edges of said bottom panel and having a height substantially less than said predetermined height so as to close only partially the ends of the box, a pair of complementary top panels each articulated to an upper edge of one of said side panels, a pair of juxtaposed upstanding handle members each articulated to an inner edge of one of said top panels, said inner edges being centrally located with respect to said bottom panel, a pair of locking flaps articulated to opposite end edges of each of said top panels, said locking flaps including generally rectangular portions depending from said top panels and overlapping said end panels and substantially completing the closing of the ends of the box, adjacent rectangular portions of adjacent locking flaps including overlapping extensions for preventing entry of foreign material between the adjacent locking flaps and into the box, each of said locking flaps having a tongue portion depending from its rectangular portions and located outwardly of the inner edge of its associated top panel and extending inwardly, said end panels having slit means therein through which said tongue portions extend for interlocking engagement with the end panels, each of said slit means having an uppermost end portion engageable with its associated tongue portion and disposed substantially on a diagonal line extending outwardly and downwardly from the inner edge of the top panel from which its associated tongue portion depends to an adjacent bottom panel corner so that when the box is supported by the handle members, the weight of the box is distributed evenly and tilting of the box is restrained, and flap members articulated to opposite end edges of each of said side panels, said flap members having a height substantially equal to said predetermined height and extending along inner surfaces of said end panels and traversing said slit means for closing the corners of the box, preventing entry

of foreign material through said slit means, and supporting said opposite end edges of said top panels.

3. A one-piece knock down box, as defined in claim 2, wherein each of said slit means includes an upright substantially straight section terminating at said uppermost portion, an upper extension extending substantially in a straight line and at an angle from said uppermost slit means portion, and a lower extension curved upwardly so that the entire slit means defines a tab portion in the end panel which may be easily pressed inwardly for facilitating insertion of the tongue portions.

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