Sept. 15, 1942. F. J. ULLRICH 2,296,126

AUTOMATIC SETUP BOX OR CARTON

Filed Nov. 9, 1939

Fig. 1

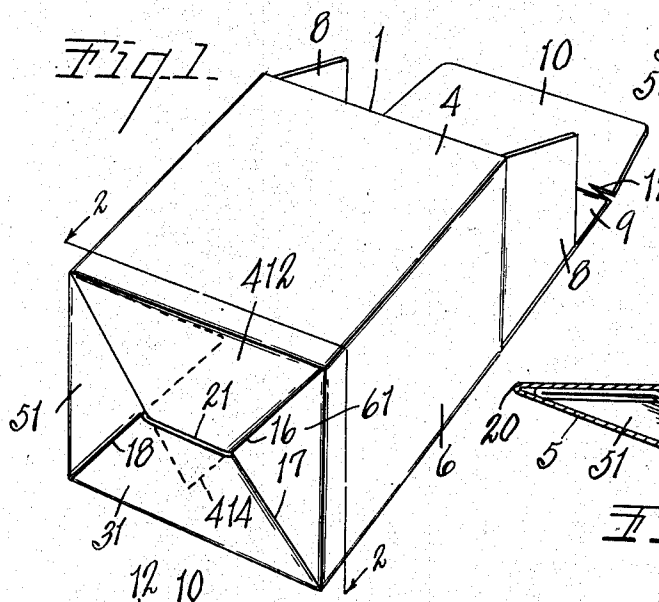


Fig. 2

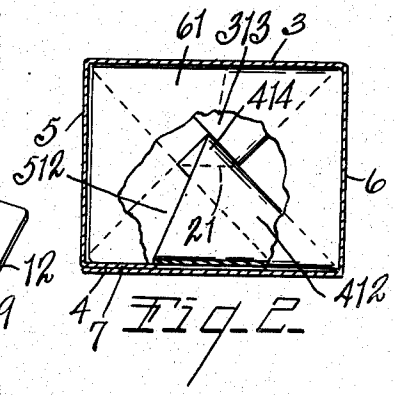
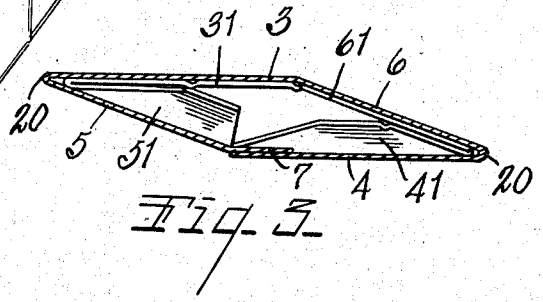


Fig. 3



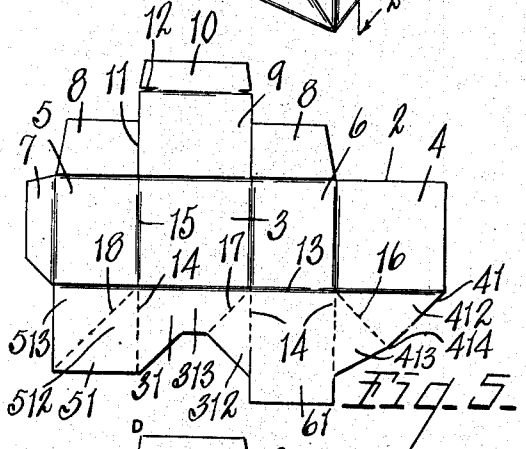


Fig. 5

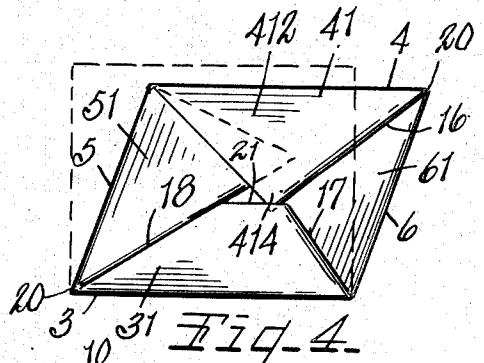


Fig. 4

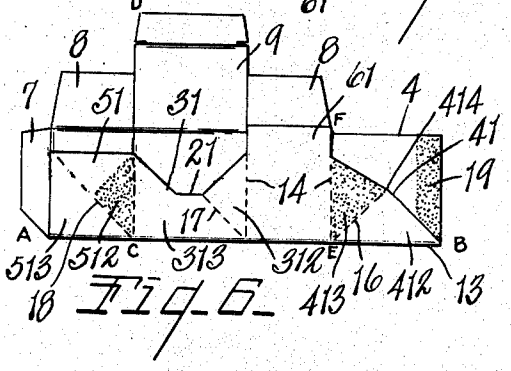


Fig. 6

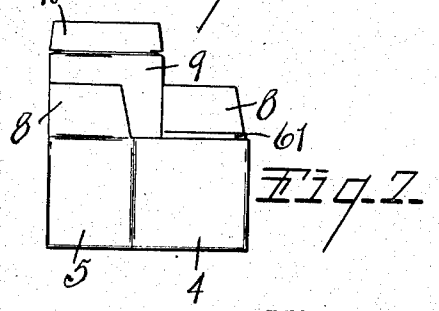


Fig. 7

INVENTOR.
Fred J. Ullrich
BY Earl F. Chappell
ATTORNEYS

Patented Sept. 15, 1942

2,296,126

UNITED STATES PATENT OFFICE

2,296,126

AUTOMATIC SETUP BOX OR CARTON

Fred J. Ullrich, Kalamazoo, Mich., assignor of one-half to Leo A. Fordon, Detroit, Mich.

Application November 9, 1939, Serial No. 303,593

2 Claims. (Cl. 229—41)

This invention relates to improvements in automatic setup boxes or cartons.

The main objects of my invention are:

First, to provide a novel automatic setup box or carton.

Second, to provide a carton of the type described which is adapted to be originally assembled in flat or knockdown form and to be quickly and conveniently set up by a simple manipulation, the resultant carton in setup form having a very strong and rigid bottom which is highly resistant to inadvertent displacement and reinforces the carton as a whole.

Third, to provide a box having an automatic setup bottom of the type described, including overlapping and interlocking elements automatically engageable when the box is set up and further elements to hold the first named elements in place and reinforce and brace the box after the same is set up or erected.

Fourth, to provide an automatic setup box of the type described which may be produced and assembled by relatively few operations and without appreciable waste of material.

Further objects relating to details and economies of my invention will definitely appear from the description to follow. The invention is defined in the claims.

A structure embodying the features of my invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a bottom perspective view of a box or carton embodying my invention and in particular showing the improved automatic quick setup bottom thereof in erected condition.

Fig. 2 is a horizontal section on a line corresponding to line 2—2 of Fig. 1 with a portion of the innermost bottom flap broken away to illustrate in greater detail the relation of the bottom forming parts.

Fig. 3 is a view in section generally similar to Fig. 2, illustrating the disposition of the parts of the bottom at an early stage of the setting up operation.

Fig. 4 is a bottom plan view of the box at a further stage in the erection or setting up thereof and while the parts of the box are being shifted from the solid line position to final position illustrated in dotted lines.

Fig. 5 is a view illustrating the blank of the embodiment of my invention illustrated.

Fig. 6 is a view illustrating the blank following certain preliminary folding and adhesive applying operations thereon.

Fig. 7 is an elevational view illustrating a box or carton embodying the details of my invention and also illustrating the construction of the side walls and top closure thereof.

My present invention relates to a box or carton such as is generally formed of a relatively stiff grade of container stock or cardboard. In particular, the invention relates to a novel bottom for a box whereby the same may be assembled and supplied in flat collapsed or knockdown condition and quickly and easily set up when the occasion therefor arises with a minimum of manual manipulation. The primary object of my invention is to produce a box having such advantages which, moreover, is very strong, rigid, and resistant to displacement. Further, it is highly desirable that such a box or carton be capable of being made with a minimum of material and material wastage and by relatively simple steps. The box or carton to be hereinafter described satisfies all of these requirements and lends itself for use in the packaging of many different types of commodities wherein a strong and economical container is desired.

Referring to the drawing, the reference numeral 1 in general indicates a box of my invention which is formed from the blank illustrated in Fig. 5 and designated by the reference numeral 2. This blank is cut from a suitable grade of container stock or cardboard stock and is shaped, scored, and perforated or otherwise rendered bendable or hinged, as illustrated in Fig. 5 to provide side walls 3, 4, end walls 5, 6 adjacent and connected to the respective side walls, and a securing tab 7 formed as a lateral extension of one of the end walls 5 and which is adapted to be adhered to the remote side wall 4 in a manner to be described to complete a tubular body for the box.

The end walls 5, 6 each have a top closure flap 8 integral therewith and the side wall 3 likewise has a top closure 9 terminating in a tucking tongue 10, the closure 9 being adapted to be disposed over the flaps 8 with the tongue inserted in the box to complete a top closure in an obvious manner. The position of the top flap 9 is not limited to the wall 3, but can be an integral part of wall 4, which eliminates any objection to having the sealing tab 7 disposed on the front of the box to interfere with the insertion of the tongue 10. In the illustrated embodiment, the flaps 8 and 9 are separated by slits 11, although it will be apparent that other top closure provisions may be employed, such, for example, as

are illustrated in my copending application, Serial No. 287,568, filed July 31, 1939. Notches 12 formed between the tongue 10 and the flap 9 serve to increase the resistance of the top closure to outward displacement and in general rigidify the top when it is closed.

It is with the bottom construction that the present invention is primarily concerned. This construction consists in its entirety of a one-piece bottom member or extension 13 integral with and laterally coextensive with the walls 3, 4, 5, 6, being integrally united thereto by the scored line A—B. This extension is separated into individual bottom or end members 31, 41, 51, 61 corresponding to the walls 3, 4, 5, 6, respectively, by the perforated lines 14 which are in fact extensions of the score lines 15 by which the walls 3, 4, 5, 6 are outlined. Further angularly disposed perforated lines 16, 17, 18 subdivide the end members 41, 31, 51 respectively. Thus, the side wall end member 41 is subdivided by line 16 into relatively bendable sections 412, 413. The side wall end member 31 is subdivided by line 17 into relatively bendable sections 312, 313. The end member 51 is subdivided by the line 18 into relatively bendable sections 512 and 513. The end member 61 is unscored since in final erected form it lies flat across the entire bottom of the carton constituting an inner end member covering the other end members interiorly of the carton, as will be described.

It will be observed that in the embodiment under consideration the side walls 3, 4 and end walls 5, 6, though all rectangular, have different dimensions, with the result that the bottom or end of the box will be rectangular but not equilateral or square. My invention finds its preferred application in the production of a box having a rectangular bottom which is other than square for it provides a sliding overlap of certain of the opposed walls during setting up of the box, which is advantageous. However, I desire it to be understood that my invention is not limited particularly in this respect and is well employed in the production of boxes having square walls and bottoms.

In assembling a knockdown box or carton from the blank 2 cut, scored, and perforated or otherwise rendered bendable as described above, the same is first folded on the line A—B to bring the one-piece bottom member or extension 13 upwardly onto the body or wall portion of the blank as illustrated in Fig. 6. Preferably adhesive or cement is then applied to the exposed faces of the end member sections 413 and 512 and to an area 19 along the exposed edge of the side wall 4 for coaction with the sealing tab 7 in the manner to be described. However, it will be apparent that the sequence of the folding and initial adhesive applying operations may be altered, the adhesive being applied to the blank when the latter is still in the flat form of Fig. 5.

With the blank folded and supplied with adhesive, as illustrated in Fig. 6, the same is then folded along the line C—D to superpose end wall 5, the end member 51, and the sealing tab 7 on the side wall 6 and end member 31, simultaneously causing the adhesive bearing end member section 512 to adhere to a corresponding undesignated area on the end member 31. The side wall 4 and end member 41 are then folded upwardly and inwardly to superpose the same on end member 61, thereby causing the cemented area 19 to engage the tab 7 and secure the blank in flat tubular carton form, and simultaneously causing the adhesive bearing area 413 on end member 41 to engage and adhere to a correspondingly shaped undesignated area on the end member 61. The end member 31, it will be noted, is shaped so that a straight edge 21 is left between the section 312 and the part of section 313 to which end member 51 is adhered, whereby in erecting the carton the corner of end member 41 will be received without interference behind this edge, being in erected form substantially overlapped thereby (see Fig. 1). Pressure is applied until the cemented coacting areas are firmly united and as a result will move simultaneously in setting up the box in the manner to be described. The aforesaid series of operations are well adapted to be performed on existing carton making machines.

The assembling of the carton is now complete and I contemplate that the thus assembled cartons will be supplied to the trade in this flat or knockdown form. In setting up the carton when occasion demands, it is only necessary to grasp the same in flat form and apply compressive force to the opposite extremities designated 20 in Figs. 3 and 4 to cause the side walls 3, 4 to move in opposite directions, erecting the carton toward the final dotted line position illustrated in Fig. 4. This results in simultaneous downward and inward swinging of all the bottom members. The end members 31, 51 swing inwardly and downwardly together, since they are united at the cemented section 512 of the latter. During such swinging, end member 51 bends along its score line 18 so that the section 313 on member 31 which is adhesively secured to the cemented section 512 collapses downwardly with said cemented section onto the uncemented section 513 of member 51, reaching this position when the walls are finally erected to rectangular form. Meanwhile, the end member 61, being secured to member 41 by the cemented section 413 on the latter swings downwardly and inwardly with member 41. During this movement, the stock of the members 31, 61, 41 bends along perforated lines 16, 17, and 14 whereby when the parts reach final setup position, section 312 of member 31 bendably overlaps and lies on section 313, between section 313 and member 61. The member 61 and the cemented section 413 of member 41 to which it is secured lie over the uncemented section 412 of member 41, thus constituting an inner bottom member or layer of the full cross sectional area of the carton and entirely covering and concealing the lines of overlap of the other end members 31, 41, 51. The corner 414 of member 41 is received without interference by the relieved edge 21 on member 31.

As the end members swing downward in pairs as described, the member 61, being of full width throughout and engaging and being retarded by wall 4 on one of its sides, follows the other members. These also approach the final plane of the bottom in succession, moving laterally relative to one another and overlapping in the manner of a camera shutter during their downward and inward swinging. In final form, they come to rest in laterally overlapped position as clearly shown in Figs. 1, 2, and 4, with member 61 superposed thereover to provide a one-piece innermost layer of the full bottom area of the carton. The corner of the double thickness folded member 41 readily enters behind the exposed edge 21 of member 31, which is the bottommost of the four. The uncemented portion 513 of end member 51 swings

all the way laterally beneath the uncemented section 412 of member 41; whereby to fully seal the bottom at this point without undue thickness. As stated, the full size member 61 is the last flap in the movement of the flaps toward erected or set-up position and when the contents of the carton are inserted therein, this full length member is forced or jammed downwardly on top of the other members to finally urge the same to locked position, at the same time frictionally engaging the side walls of the carton to rigidify and strengthen the bottom, whereby the latter effectively resists crushing displacement as well as any tendency of the end members to return to inoperative position.

It will be noted that the bottom thus formed is gusseted by the cemented or integral bendable end members at three of its four corners, i. e., all except the corner between members 41, 51. These two members are well overlapped in final form (see Fig. 1) so that it is evident that the carton is practically leakproof at its bottom.

The aforesaid carton is primarily characterized by its strength and sturdiness, although it will be appreciated that the practically seamless and fully sealed bottom made possible by the one-piece, integrally connected bottom extension member 13 is also a highly advantageous feature. Erection of the carton is instantaneous and with the commodity inserted therein the walls and bottom are effectively braced against return to original form.

I have illustrated and described my improvements in an embodiment which is very practical. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A box or carton formed of an integral blank comprising alined side wall members, the ends of the blank being joined to provide a tubular side wall unit, the side wall members being hingedly connected for collapsing, each side wall member being provided with an end member extension hingedly connected thereto, the end members being hingedly connected to each other, one end member being of substantially the full transverse dimensions of the erected box and constituting an inner end member, other non-adjacent end members of the blank having diagonally disposed hinging portions disposed in angular relation to each other, the remaining end member of the blank having a diagonally disposed hinging portion disposed in parallel relation to the hinging portion of the adjacent end member, the said end members having the parallel hinging portions being collapsible on each other when in the form of the unit and having portions thereof adjacent their mutual hinging portion adhesively secured together, the said inner end member and the other end member having the diagonal hinging portion being collapsible on each other and having portions thereof adjacent their mutual hinging portion adhesively secured together whereby the box with the parts thereof so secured may be collapsed and may be erected by pressure upon the side edges of the collapsed structure and the end members automatically swung to erected position.

2. A box or carton formed of an integral blank comprising alined side wall members, the ends of the blank being joined to provide a tubular side wall unit, the side wall members being hingedly connected for collapsing, each side wall member being provided with an end member extension hingedly connected thereto, the end members being hingedly connected to each other, one end member constituting an inner end member, other non-adjacent end members of the blank having diagonally disposed hinging portions disposed in angular relation to each other, the remaining end member of the blank having a diagonally disposed hinging portion parallel to that of the adjacent end member, the said end members having the parallel hinging portions being collapsible on each other when in the form of the unit and having portions thereof adjacent their mutual hinging portion secured together, the said inner end member and the other end member having the diagonal hinging portion being collapsible on each other and having portions thereof adjacent their mutual hinging portion secured together whereby the box with the parts thereof so secured may be collapsed and may be erected by pressure upon the side edges of the collapsed structure and the end members automatically swung to erected position.

FRED J. ULLRICH.