United States Patent [19]

Vjecsner

[11] **3,908,889**

[45] **Sept. 30, 1975**

[54] **CORNER LOCK FOR PAPERBOARD CONTAINERS**

[76] Inventor: **Paul Vjecsner**, 350 W. 51 St., New York, N.Y. 10019

[22] Filed: **May 23, 1973**

[21] Appl. No.: **363,096**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 154,286, June 18, 1971, abandoned.

[52] **U.S. Cl.** **229/35**

[51] **Int. Cl.**[2] **B65D 5/30**

[58] **Field of Search** 229/35

[56] **References Cited**

UNITED STATES PATENTS

567,897	9/1896	Girard	229/35
2,171,051	8/1939	Stonecypher	229/35
2,218,509	10/1940	Goodyear	229/35 X

FOREIGN PATENTS OR APPLICATIONS

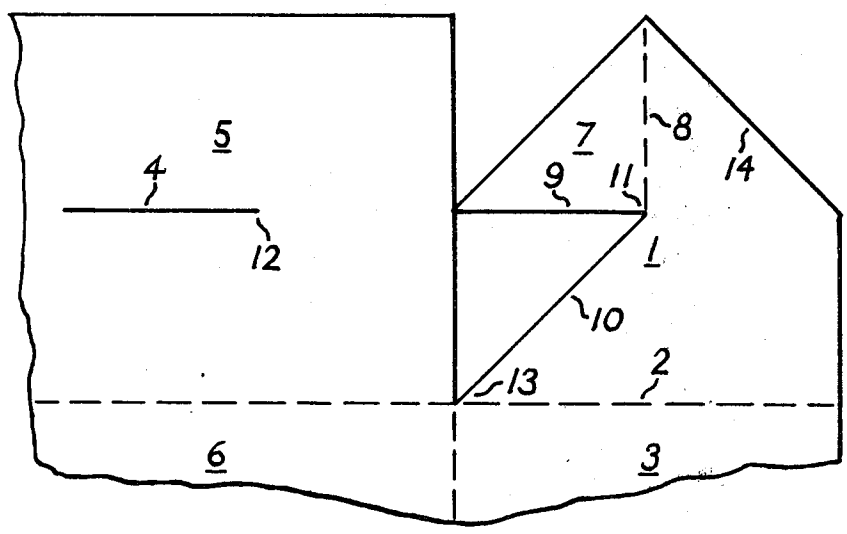
318,860	6/1934	Italy	229/35

Primary Examiner—Leonard Summer
Attorney, Agent, or Firm—Hubbell, Cohen and Stiefel

[57] **ABSTRACT**

A corner lock in a tray-type container, with a flap, attached to one wall, inserted downward into a slit in the other wall, the flap locking by means of an acutely angled locking edge which is enterable in the slit by bending of the flap to deflect this edge from this acute angle which is reformed after entry into the slot to lock the flap in the slit. The downward turned flap provides easy assembly and unobstructed use of the container permitting similarly secured container to also be utilized as a slip-over cover.

3 Claims, 12 Drawing Figures



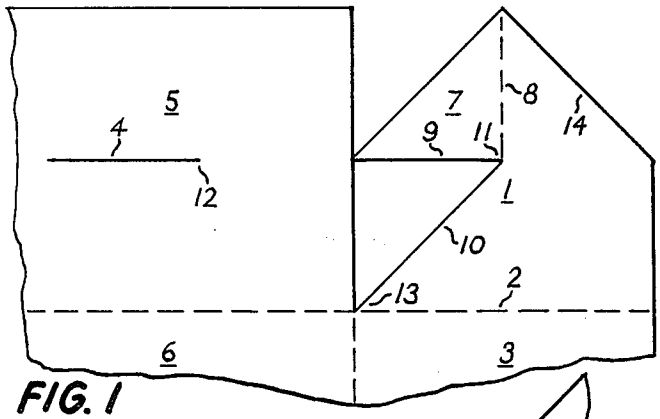


FIG. 1

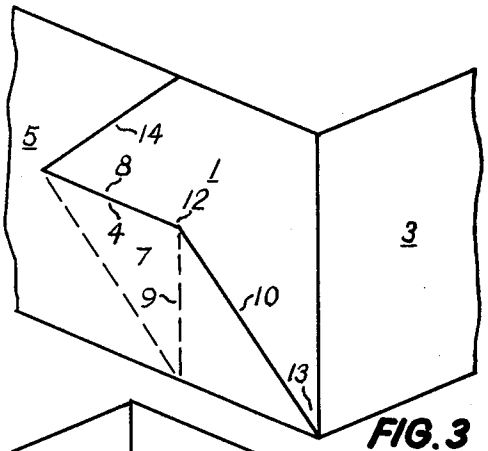


FIG. 3

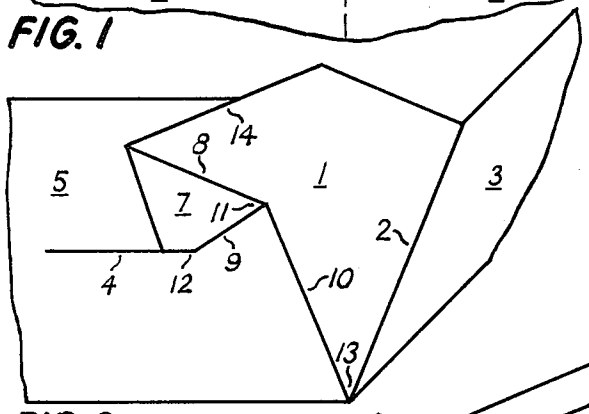


FIG. 2

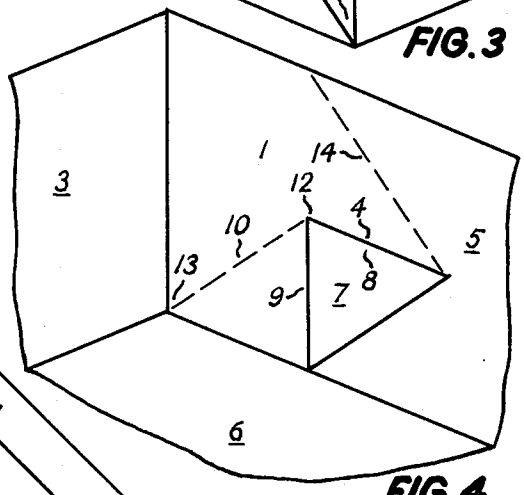


FIG. 4

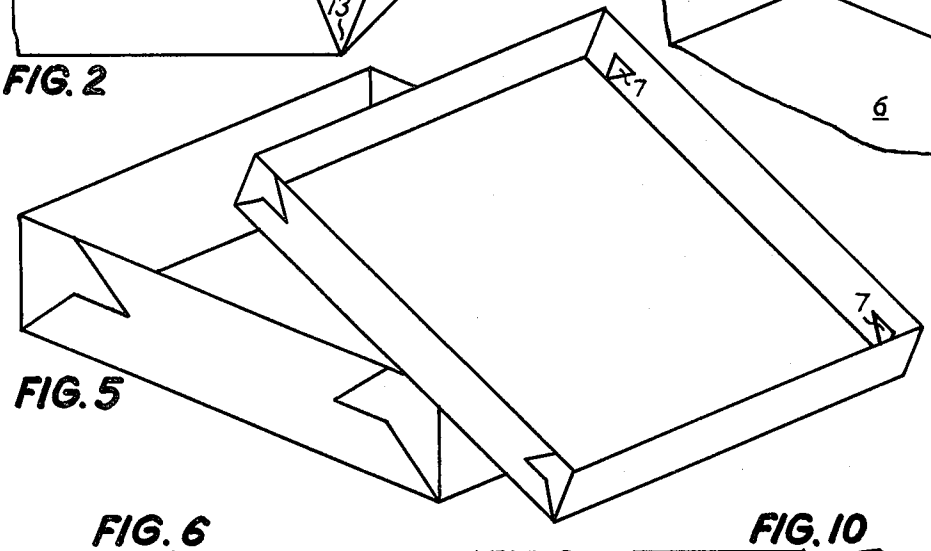
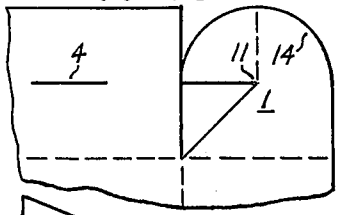


FIG. 5

FIG. 6



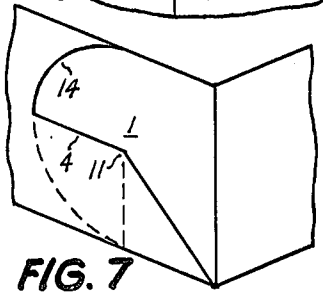
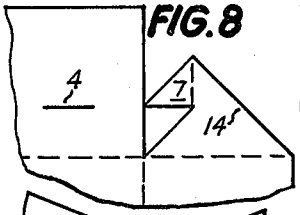


FIG. 7

FIG. 8



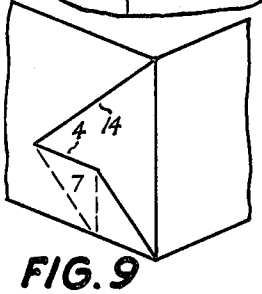
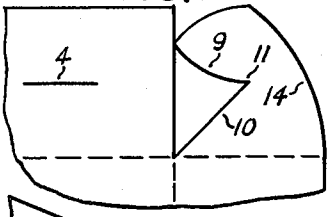


FIG. 9

FIG. 10



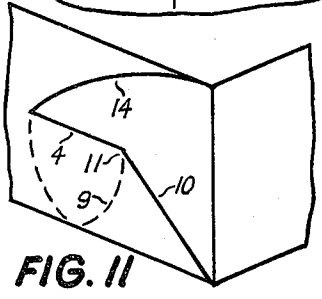


FIG. 11

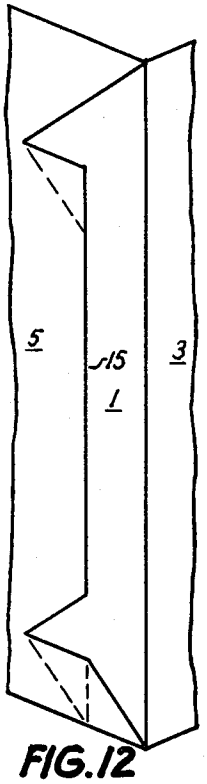


FIG. 12

CORNER LOCK FOR PAPERBOARD CONTAINERS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of my co-pending U.S. patent application Ser. No. 154,286, filed June 18, 1971, also entitled "Corner Lock for Cardboard Container", now abandoned. This invention relates to a corner lock in tray-type cardboard containers, designed to replace glue or other external fasteners, for the purpose of economy in material and time.

Beside this general purpose, the main object of the invention is to substantially improve on similar locks now in use, eliminating their great disadvantages. Specifically, these objects are a stable and secure lock which will not open inadvertantly; a quick single-movement assembly, suitable for the simplest machine operation or hand assembly; no additional blank material being necessary; no required parts smaller than half the height of the container wall, enabling its use in the most shallow trays such as lids; and, above all, the absence of obstruction in the use of the container, especially the container with a telescopic cover, offering no obstacles in either the cover or the bottom box portion during closure and opening. Thus, the primary object is to make the economic advantages of fastener-free cardboard locks available in containers where previous such locks were unusable, as in all containers with slip-over covers, while offering for any other tray-type container a more practical and stronger fastener-free lock than those previously used.

In the drawings,

FIG. 1 is a plan view of the corner lock;

FIG. 2 is an exterior perspective view of the corner lock shown in FIG. 1 during the assembly of a locked corner of a container in accordance with the present invention;

FIG. 3 is an exterior perspective view of the assembled locked corner illustrated in FIGS. 1 and 2;

FIG. 4 is an interior perspective view similar of FIG. 3 of the locked corner illustrated in FIG. 3;

FIG. 5 is a perspective view showing the use of the corner lock illustrated in FIGS. 1–4 in a box with its telescopic cover;

FIGS. 6 and 7 are views similar to FIGS. 1 and 3, respectively, illustrating an alternative embodiment of the lock illustrated in FIGS. 1 and 3;

FIGS. FIGS. 8 and 9 are views similar to FIGS. 1 and 3, respectively, illustrating a different alternative embodiment of the corner lock illustrated in FIGS. 1 and 3;

FIGS. 10 and 11 are views similar to FIGS. 1 and 3, respectively, of a still different alternative embodiment of the corner lock illustrated in FIGS. 1 and 3, and

FIG. 12 is a fragmentary perspective view illustrating the multiple use of the corner lock illustrated in FIGS. 1 and 3 on a high container wall.

In FIG. 1 flap 1 is attached at its base 2 to the side edge of wall panel 3, the slit 4 is located horizontally in wall panel 5, with wall panels 3 and 5 attached at their bottom edges to floor panel 6 which panels form a corner of a box when raised and locked together as illustrated in FIGS. 2 and 3. Flap 1 has a portion 7 to be inserted in slit 4, and a fold-line or pivot axis 8 substantially coincidental with slit 4 after insertion. Portion 7 has a locking edge 9 which forms an acute angle with edge 10 of flap 1, with end 11 of edge 9 abutting against one end 12 of slot 4 in the locked position illustrated in FIGS. 3 and 4. In each embodiment the fold line or pivot axis 8 forms an angle of less than 180° with edge 10 or the equivalent straight line between end 11 and pivot point 13 which is at the juncture of the bottom edges of the wall panels 3 and 5. The angle formed by edges 9 and 10 at end 11 preferably does not exceed 45°.

In FIG. 2 wall panels 3 and 5 are raised by folding along their bottom edges, and flap 1 is folded or bent toward the interior along its base 2 and fold-line or pivot axis 8, widening the angle between edges 9 and 10 to 90° or more. Portion 7 is then inserted into slit 4.

The insertion, and subsequent locking of the wall panels as seen in FIGS. 3 and 4, is achieved by means of a combination of structural features with directional movements. Edge 9 of portion 7 locks the flap because its acute angle reduces its distance from pivot point 13, to prevent its return through end 12 of slit 4. The insertion is made possible by appropriately distancing edge 9 from pivot point 13 through the bending of portion 7 at foldline or pivot axis 8. The adequate bending of portion 7 at axis 8 increases the distance between edge 9 and pivot point 13 both in height and in depth, for a comfortable access to slit 4. Because of its bending, portion 7 enters slit 4 partly frontally, an equally frontal movement being required for the flap to exit, which can only be achieved by direct pulling apart of the overlying surfaces of flap 1 and wall panel 5. Since such pulling apaprt does not occur inadvertently, the lock is secure against the normal pulling forces exerted on the container or box while it may be disassembled and reassembled at will by direct pulling apart of overlying surfaces as described above, as for flat shipping and storage, without appreciably affecting its performance.

FIG. 5 shows the practicality of the described lock in the containers with telescopic covers. The foremost feature is the absence of obstruction in the use of the cover as well as the bottom unit. The downward turned portion 7 of the lock, inside the structures, provides unimpeded sliding of the cover on and off the box and packaging of merchandise inside the box. The failure to provide this advantage, combined with the lack of firmness in locks presently in use, is the principal reason for the absence of fastener-free locks where economically desirable, an area comprising a large portion of the cardboard container market. Beside meeting these requirements in the use of the container, the lock herein described meets all the demands of economy in its manufacture. Its simple features are adaptable to the smallest dimensions in boxes, and its assembly, made in a continuous movement without the customary forward push and pullback, is accomplished without intricacy and with speed, whether manually or by machine, in which instance a simple die and plunger method is applicable, without machinery changes.

In FIGS. 6 and 7 a circular edge on flap 1 gives maximum distance from locking point 11, for maximum strength, facilitating in its bulk particularly hand use, frequent in retail, as on containers for garments or bakery goods. In all FIGS. other than FIGS. 6 and 7 flap edge 14 meets slit 4 diagonally. This aids drawer-type use of assembled boxes arranged in shelves, as is the case in shoe stores, by eliminating possible resistance of vertical edges.

FIGS. 8 and 9 display such a diagonal edge 14 fully extended, appropriate for relatively high and narrow

walls, and where inserted portion 7 is desired in low position.

In FIGS. 10 and 11 locking edge 9 is curved, enabling easier access to slit 4, with lesser bending of the material and without the need for a fold-line, the portion containing edge 9 being bent about the equivalent pivot axis. The angle formed at locking point 11 by edges 9 and 10 is acute, as in the previously described locks. This lock is preferable for a one-time assembly, with the flap remaining largely unbroken throughout. Low lying curved edge 14 pictured has the advantages of a diagonal at slit 4 and of a continuous line, while retaining strength.

FIG. 12 shows the use of more than one lock in high container walls. The locks are connected by a vertical edge 15, for a continuous flap 1.

The principle of operation of all of the above described corner locks illustrated in FIGS. 1-12 is essentially the same, and this principle of operation is summarized in the following geometric explanation. The flap 1 is rotated about pivot point 13 towards the slot 4 in an arc having at locking end 11 a radius equal to the distance between slit end 12 and pivot point 13, direct insertion being prevented by the acute angle of the locking edge 9 with edge 10 representing the previously referred to radius of this arc of movement of the flap 1. In order to enable insertion of the flap 1 within the slit 4, this acute angle must be changed to a right angle so that the locking edge 9 will be tangent, and therefore exterior, to this arc of movement to gain approach to slit end 12. This change in angle is accomplished by bending along the pivot axis 8, however, this can only be done if the pivot axis 8 itself is at an angle of less than 180° to the previously mentioned straight line 10 on the side containing the locking edge 9. The reasons are the following. The locking edge 9 by rotating around the pivot axis 8 does not alter its angle to it; consequently if the axis 8 is at an angle other than 180° to another line, in this case the referred to straight line 10, the locking edge 9 in rotating will alter its angle to the straight line 10 by the difference between the axis/-straight line angle on the initial side and on the side reached by the rotating edge 9. Therefore, if the axis/-straight-line angle is 180°, i.e., the same on all sides, there will be no change from rotation, while, if the angle is over 180°, rotation of the locking edge 9 will for these reasons decrease its angle to the straight line 10; neither of these cases providing the necessary increase in width.

After insertion of the portion 7 through the slit 4, locking edge 9 resumes the acute angle thus preventing removal of the flap 1 by mere rotation back along the arc of movement, as the locking edge 9 is no longer tangent to the arc of movement.

The items described above and depicted in the drawings do not constitute the only possible forms of the invention. Other forms of the invention may be used, while retaining its spirit as claimed.

What is claimed is:

1. In a container structure of cardboard or similar material, said structure comprising an integral floor panel and a plurality of wall panels, with at least a pair of said wall panels being disposable substantially normal to said floor panel and to each other to form a corner for each container, said wall panels each having a side edge and a bottom edge, said bottom edges being adjacent said floor panel periphery, the improvement comprising an integral locking means for locking said disposed pair of wall panels to each other to form said corner, one of said pair of wall panels having a substantially horizontal slit extending therethrough, said slit having an end adjacent said corner, said other wall panel of said pair having a flap extending from said side edge of said other wall panel, said flap having a portion only being insertable in an entry position thereof into said wall panel slit into a locking position therein for locking said disposed pair of wall panels to each other to form said corner and having a pivot-axis in substantial coincidence with said slit when in said locking position, said flap portion thereof extending substantially downward after being inserted in said slit and having a base and a locking edge substantially facing the base of said flap, said locking edge substantially facing said corner in said locking position and extending at one end to one extremity of said pivot-axis and forming at said locking edge one end an acute angle with a straight line drawn from said locking edge one end to the juncture of the bottom edges of said pair of wall panels, said flap having an outer edge portion spaced from said locking edge at one extremity and substantially intersecting said locking edge to form a point at another extremity, said point being initially insertable through said slit during said flap insertion, said lock edge one end substantially abutting said slit end when in said locking position, said flap being bendable about said pivot-axis in a direction toward said slit for deflecting said locking edge from said acute angle toward at least substantially a right angle with respect to said straight line to widen said acute angle in the direction toward said slit for providing said entry position and in an opposite direction to substantially reform said acute angle from said widened angle for providing said locking position substantially after completion of insertion of said flap through said slit, said pivot-axis being at an angle of less than 180° with respect to said straight line on the side of said locking edge to cause said acute angle widening for enabling provision of said entry position and for enabling provision of said locking position upon said acute angle substantial reformation, said flap only being removable after said completion of insertion upon a reforming of said widened angle, whereby said completion of said insertion of said flap through said slit locks said flap in said locking position for forming said corner from said locked wall panel pair.

2. An integral locking means in accordance with claim 1 wherein said outer edge portion is curved in a direction which is substantially convex with respect to said flap base.

3. An integral locking means in accordance with claim 2 wherein both said outer edge portion and said locking edge are defined by a pair of intersecting straight lines.

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