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LOCKING MEANS FOR BOXES

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FIG. 1

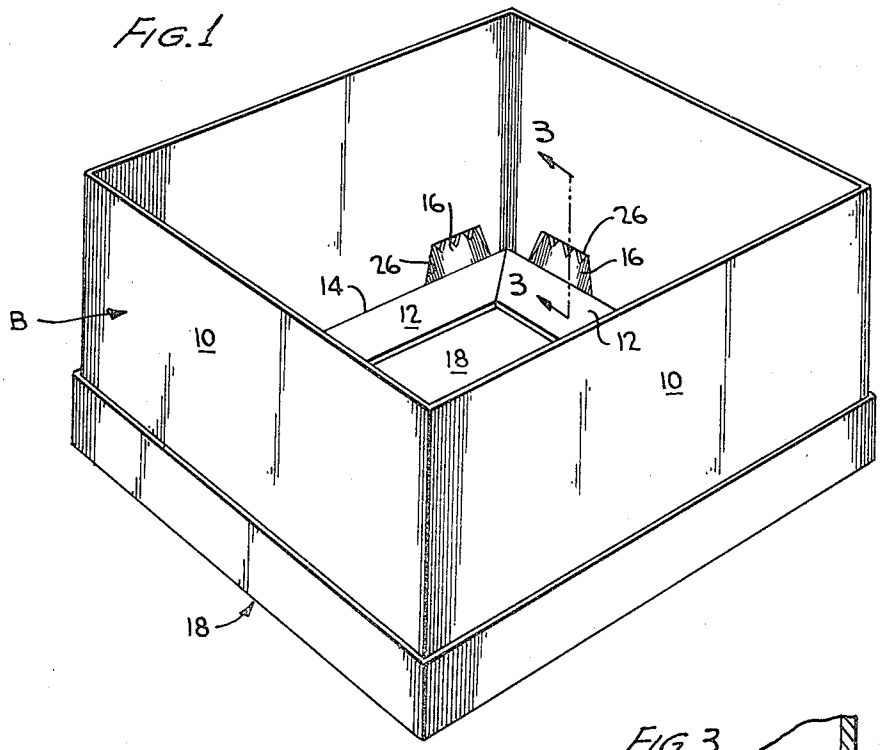


FIG. 2

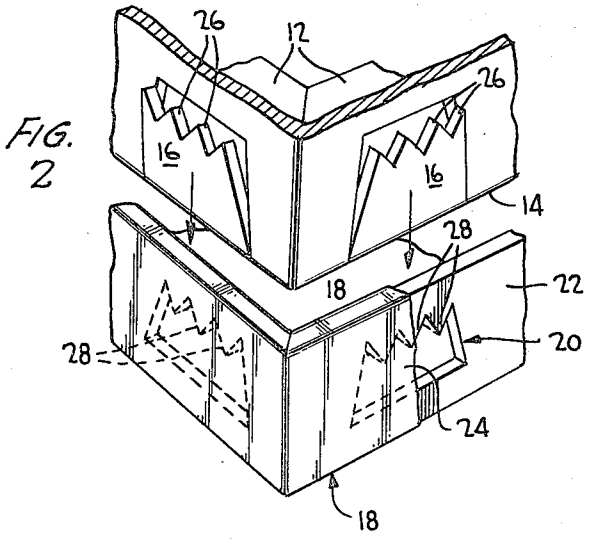
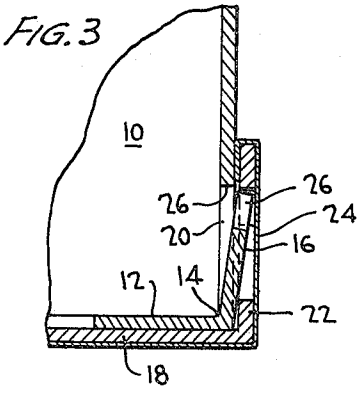


FIG. 3



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LOCKING MEANS FOR BOXES

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ABSTRACT OF THE DISCLOSURE

A cardboard box construction in which locking tongues are struck out from the side panels of the box body, for locking reception in recesses formed in the encircling wall of an end closure applied to the body. The free end edges of the tongues are serrated for mating intermeshing engagement with similarly serrated edges of the recesses; to thus increase the area of contact between the respective locking edges, to resist outward swinging of the tongues and outward deflection of the closure side walls away from the box body.

BACKGROUND OF THE INVENTION

This invention relates to improvements in locking means for securing together different parts or sections of sheet material boxes, and more specifically, constitutes an improvement of the locking means of the type shown by way of exemplification in the United States Patent of Louise James, No. 2,577,248, granted Dec. 4, 1951.

In such prior art arrangements, the locking means are employed for positively interconnecting the different and normally separable sections of a sheet material box, as, for instance, the box body and bottom, in a manner to positively and strongly resist their separation. The box body is customarily formed of a plurality of flat sheet material panels interconnected to each other to define a tubular body of polygonal configuration. At one end of the body the respective panels are provided with inwardly turned flaps which are integrally connected to the respective panels along fold-lines. Locking tongues struck out from the respective panels are carried by the flaps on the opposite sides of the fold line therefrom, so as to be resiliently projected outwardly as a result of the inward folding of the flaps. The box bottom or end section is of similar configuration in plan to the cross section of the box body and is provided with a marginal wall, the various sections of which overly and are parallel to the respective body panels. Certain of these wall sections are provided with locking recesses in registry with the respective locking tongues for the reception of the same and are provided with rectilinear locking edges for abutting locking engagement with the similarly rectilinear locking edges at the free ends of the locking tongues.

Thus, each locking tongue presses outwardly against the marginal wall of the box end closure to urge the wall away from the box body.

Any appreciable spacing thus caused between the box body and the surrounding wall of the end closure member, will not only detract from the appearance of the box, but will permit the locking tongues to assume angular positions with respect to the box panels and closure walls, and thereby will detract appreciably from the locking strength or holding power of the locking means.

With this in mind, the objects of the present invention are to provide an improved locking means in which the strength thereof is increased by: Forming the co-acting locking edges of each recess and its associated locking tongue for co-action in a manner to avoid the definition of a transverse axis of relative angular movement between them, forming the said interlocking edges for interlocking engagement in a manner to positively resist such relative angular movement; and forming the said edges for interengagement over a considerably greater length than heretofore, without necessarily increasing the dimensions of the co-acting tongues and recesses.

To attain these objects, the respective locking edges of each locking tongue and its cooperating recess in the box end closure, are of multi-fingered or serrated formation, arranged in relatively off-set manner so that the fingers or serrations thereof are in mating or interdigital relation to resist outward swinging of the locking tongues away from the box body.

Where the edges are serrated as in the preferred embodiment, the sloping slides of the respective serrations of the cooperating locking edges are thus in frictional wedging engagement with each other, so that the apex and the adjoining portion of any given serration of one locking edge is gripped between the base portions of a pair of serrations of the other locking edge.

The interlocking serrations are thus retained in substantially a common plane by frictional engagement and abutment of their edges, to positively resist relative outward movement of the box closure marginal walls away from the associated side-wall panels of the box body.

Moreover, it will be readily apparent that the abutting engagement between the two interlocking edges is of considerably greater length than where the said edges are of rectilinear configuration.

The foregoing objects and advantage are obtained by the preferred embodiments of the invention shown by way of illustration in the accompanying drawing in which:

FIGURE 1 is a perspective view of a sheet material box structure having our invention incorporated therein.

FIGURE 2 is an enlarged "exploded" fragmentary perspective view of one corner of the box structure; and

FIGURE 3 is an enlarged detail cross-section on the line 3—3 of FIGURE 1.

The preferred mode of carrying out the invention is illustrated in the accompanying drawings in which the invention is applied to a generally conventional cardboard or sheet material box structure comprising a tubular box body B which, in the present instance, is of rectangular configuration, made up of a series of flat sheet material sidewall panels **10** interconnected in usual manner at the corners of the box body. Integrally secured to the respective panels **10** along their lower edges are flaps **12** which are folded inwardly perpendicularly to the respective panels along fold lines **14** which coincide with the lower edges of the respective panels. One or more locking tongues **16** is struck out from each panel **10** and is connected to the box body solely by way of the flap **12**, being connected to the flap along the fold line **14**. It will be seen that the various locking tongues **16** are located on the opposite side of the fold lines **14** from their associated flaps **12** and project outwardly from the respective side walls **10** of the box body, being resiliently urged outwardly about the fold lines **14** by the tendency of the sheet material constituting each locking tongue **16** to assume a position substantially in the same plane with its associated flap **12**.

It will be understood that the opposite ends of the box body B will normally be closed by suitable end closure members, of which only the lower end or bottom closure is herein illustrated, it being understood that the upper end closure or cover may be of similar construction to the bottom, though the locking recesses or means **20** of the bottom will normally be omitted to facilitate ready removal and replacement of the cover.

The bottom **18** is similarly of a suitable cardboard or other stiffly resilient sheet material construction and of a polygonal (in the present case rectangular) shape and

dimension, corresponding to the cross-section of the box body. The closure member **18** is provided in customary manner with outwardly turned side wall sections or flanges **22** interconnected to each other at the corners and disposed substantially parallel to and externally of the respective side wall panels **10** of the box body.

These marginal side wall sections **22** of the bottom **18** are provided with locking recesses **20**, positioned for reception of the respective locking tongues **16** of the box body.

In order to prevent the resilient unfolding action of the respective tongues from swinging them entirely through the recesses **20**, the outer surface of the box bottom and, more particularly, its side wall sections **22**, is covered with a suitable thickness of sheet material which normally will constitute a decorative paper **24**. The paper packing **24** thus serves to limit the outward swinging of each tongue beyond a position in which its free end edge is in a common plane with its associated side wall section of the bottom **18**.

The construction and arrangement as thus far broadly described, is substantially similar to that disclosed in the prior mentioned James Patent No. 2,577,248, of Dec. 4, 1951.

In accordance with the present invention, each locking tongue **16** is formed at its free end with a locking edge comprising a plurality of projections, preferably in the form of a uniform series of serrations **26**, and the relatively opposing locking edge of each recess **20** is formed with a similar series of projections, preferably in the form of a plurality of uniform serrations **28**.

Each cooperating pair of such serrated edges **26** and **28** is formed with the serrations thereof relatively off-set and in intermeshing relationship so as to frictionally interlock with each other when in their abutting and interdigitated relationship.

In the preferred arrangement, utilizing serrated locking edges **26** and **28** as illustrated in the preferred embodiment, the serrations are all of uniform size and shape, preferably being of saw toothed or wedge-like configuration, each defined by opposite sloping side edges converging to a point. It will be apparent that in the interlocking relationship of the locking edges, the apex portion of each serration **26** or **28** will be frictionally engaged by and between the base portions of adjoining serrations **26** or **28** and the several interdigitated serrations will thus be frictionally retained in a common plane. The serrated formation of each of the locking edges, and the interlocking relationship of the serrations, will firmly resist any tendency of each locking tongue **16** to swing or be deflected out of the plane of its associated side wall section **22** of the end closure **18**.

Thus, in the operation of the invention, in order to apply the end closure **18** to the box body **10**, the lower end flaps **12** of the box body are folded at least partially inwardly by manual pressure, whereupon application of the end closure **18** over the end of the box body folds the flaps further inwardly to substantially normal position relative to the box side wall panels.

The inward folding of the flaps **12** will tend to project their respective associated locking tongues **16** outwardly so that the locking tongues will be resiliently pressed into the respective locking recesses **24** to have their serrated locking edges **26** respectively projected beneath the locking edges **28** of the respective locking recesses as the bottom or lower end closure **18** is pressed firmly onto the box. When the manual applying pressure is removed, the box bottom **18** will tend to be urged off of the box body by the pressure of the flaps **12** so that the interlocking edges **16** and **26** of the respective locking tongues and recesses will be caused to firmly abut against each other in frictional abutting engagement along the entire extent of each.

Manifestly, the length of each serrated locking edge **16** and **26** will be substantially greater, and the edges will thus have substantially greater bearing length over which any disassembling forces may be distributed, than would be the case were these edges of simply rectilinear configuration. Moreover, the interdigitated relationship of the serrations **16** and **26** will tend to hold the free ends of the tongues **16** in a common plane with the respective marginal side wall sections **22** of the box end closure **18**, thus causing these side wall sections to remain in substantially contiguous snug relation to the box side panels. Such closely contiguous relationship not only improves the overall appearance of the box, but in addition, affords greater strength to the interlock thus secured, so that same may resist a greater withdrawal force on the box end closure than would otherwise be the case.

At the same time, the overall box structure still remains simple and economical to produce, and the locking means in no way detracts from the esthetic appearance of the boxes.

Having thus described our invention, we claim:

1. In a box construction comprising a tubular box body of polygonal cross-section having a plurality of interconnected sheet material panels, certain of said panels including flaps at one end of said body attached thereto along fold lines and extending inwardly normally to the respective panels, locking tongues attached to the respective flaps along said fold lines and projecting outwardly from the respective said panels, a sheet material closure member secured over said one end of the body, said closure member including marginal side walls, substantially parallel to and externally of the respective wall panel, said side walls respectively being formed with locking recesses for reception of the respective tongues, each said tongue being formed at its free end with a locking edge comprising a plurality of serrations, and each said side wall being formed with a plurality of serrations along an edge of each said locking recess opposed to said locking edge of the tongue, said serrations of the tongue and recess respectively being arranged in relatively off-set and intermeshing relationship.

2. The invention defined in claim **1** in which each serration of a locking tongue has an edge parallel to and in abutting engagement with an opposing edge of a serration of said side wall.

3. The invention defined in claim **2**, in which all of said serrations are defined by rectilinear edges, said edges of the locking tongues being parallel to the relatively opposed edges of the said recesses.

4. The invention defined in claim **3**, in which the serrations of all of said tongues and said wall sections are of uniform size and shape.

5. The invention defined in claim **1**, in which opposing pairs of said serrated edges are in abutting engagement with each other substantially throughout their respective lengths.

6. The invention of claim **1**, in which said locking edges of each and said interlocking pair are relatively complementary in shape, each including a plurality of projections for reception between and in contiguous engagement with the projections of the other.

References Cited

UNITED STATES PATENTS

1,683,192	9/1928	Huye	229—45 X
2,025,589	12/1935	Huye	229—45 X
2,577,248	12/1951	James	229—45
2,899,120	8/1959	James	229—23

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U.S. Cl. X.R.

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