

[54] **FOLDING BOX**
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2,327,709 8/1943 Himes 229/39 R
 3,439,861 4/1969 Olson 229/39 R X
 3,647,076 3/1972 Heimann 211/88

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Assistant Examiner—Bruce H. Bernstein

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 211/88

[57] **ABSTRACT**

Box formed from a folded blank, in particular for document filing. The box has a bottom, two side walls and at least one end side wall and has means for keeping the box erected, i.e. maintain the general shape of the box when folded for use and prevent its collapse. The box may have a bottom with, on the interior side, a pair of slotted flaps adapted to engage, within the box, a separator with a pair of lugs adapted to be engaged by a pair of slots. The box may have also an inwardly folded tab having laterally directed tongues retained between foldlines of the sidewalls and end side wall. The tab can be used for gripping below supporting rails.

[56] **References Cited**
UNITED STATES PATENTS

889,109	5/1908	Davidson	229/39 R
1,566,196	12/1925	Garcia	229/39 R
1,808,772	6/1931	Ethridge	229/39 R
1,997,669	4/1935	Woerner, Jr.	229/39 R
2,308,128	1/1943	Tanner	229/39 R

3 Claims, 20 Drawing Figures

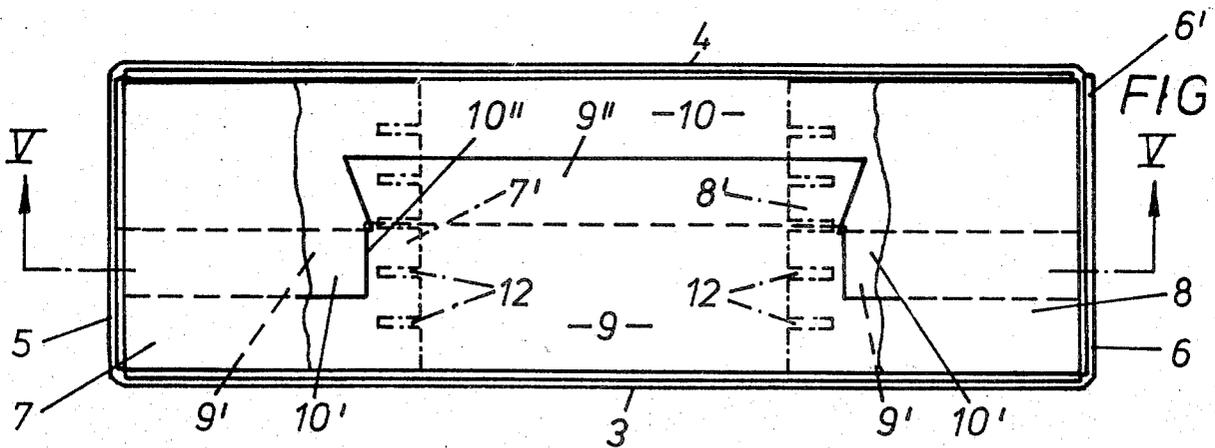
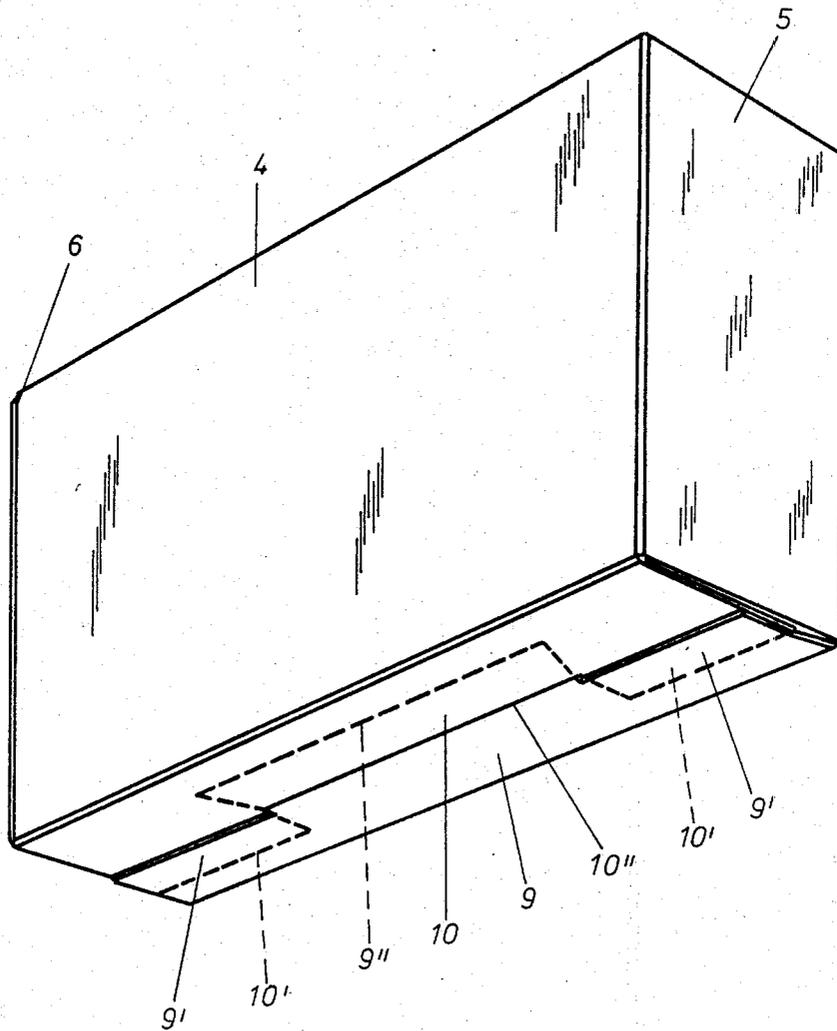
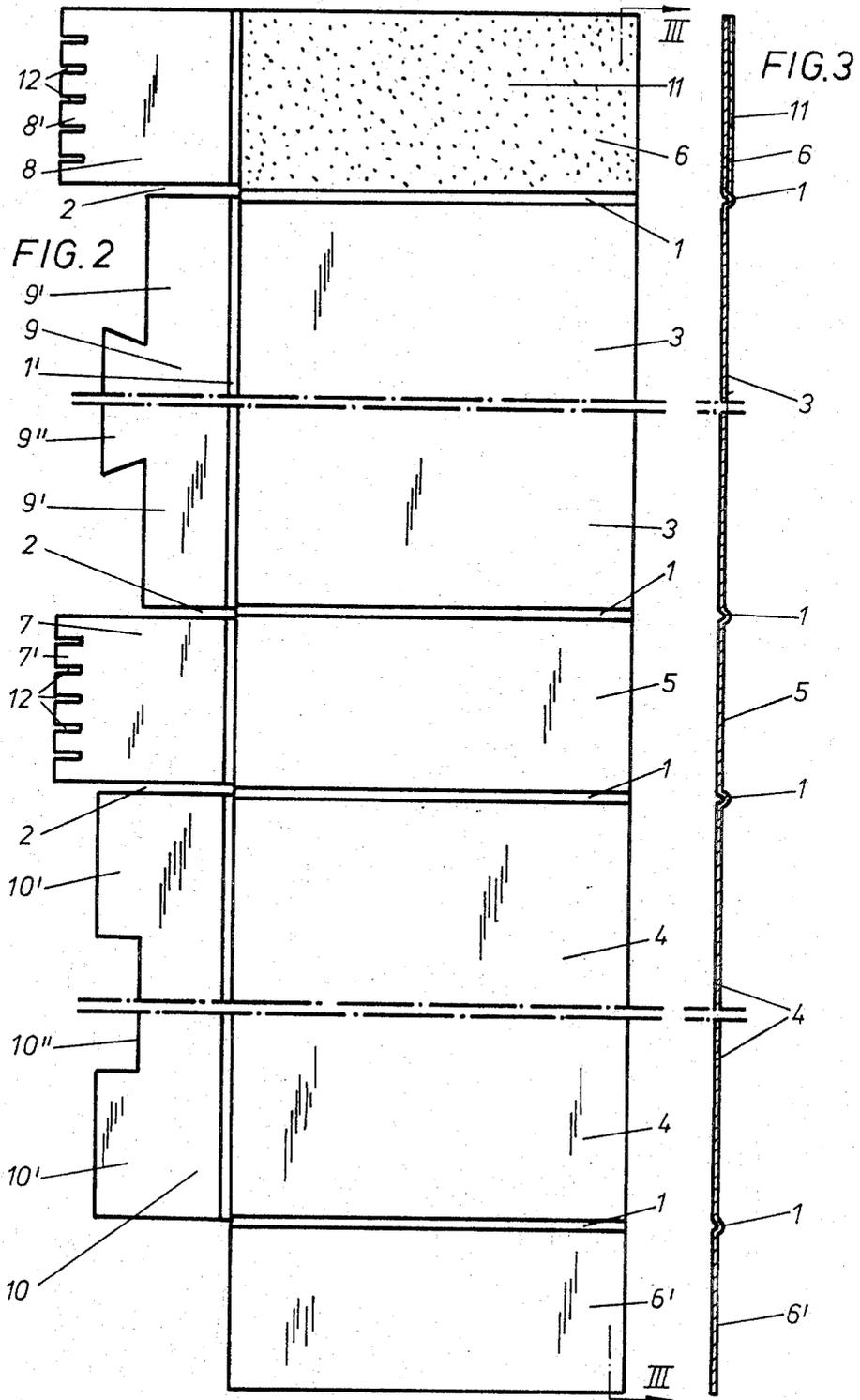


Fig. 1





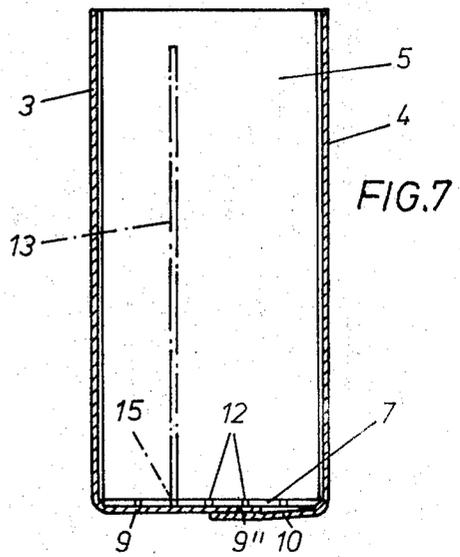
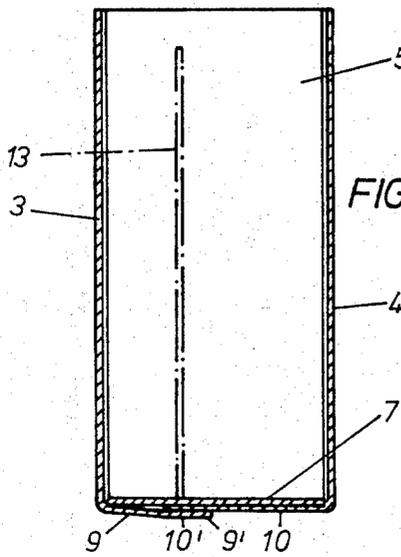
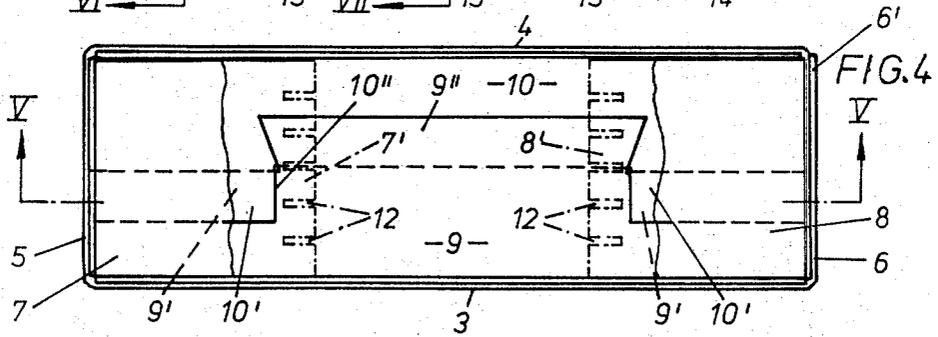
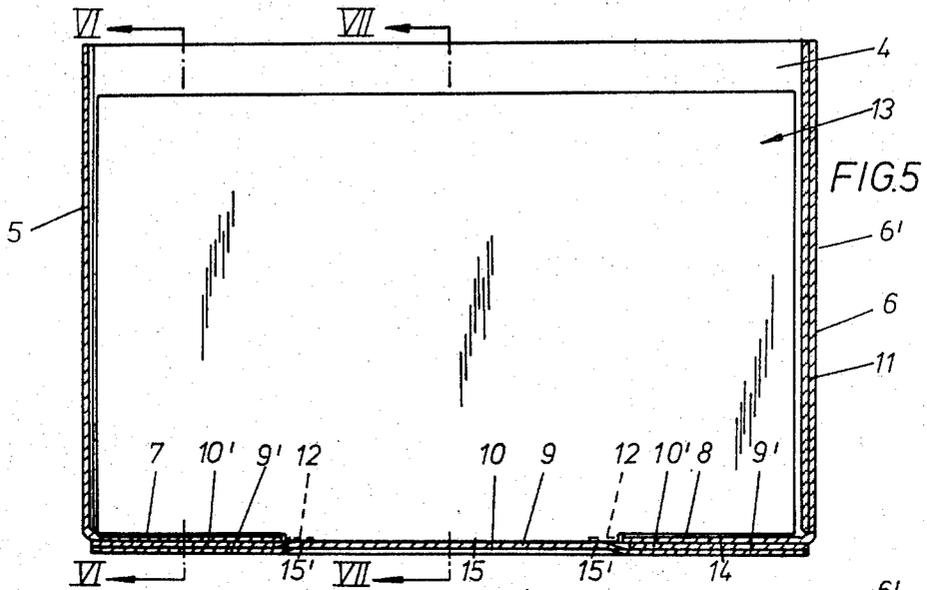


Fig. 10

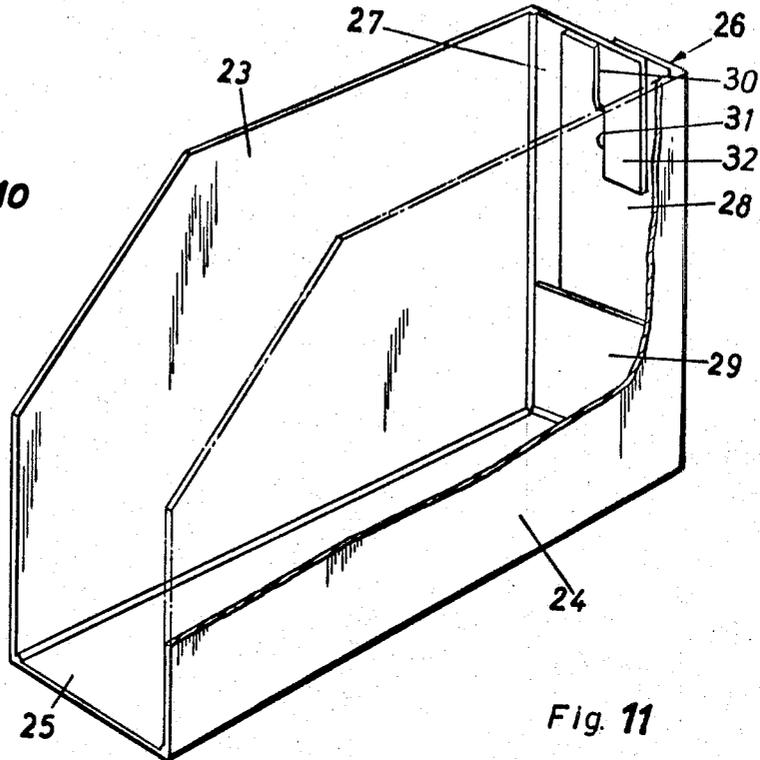
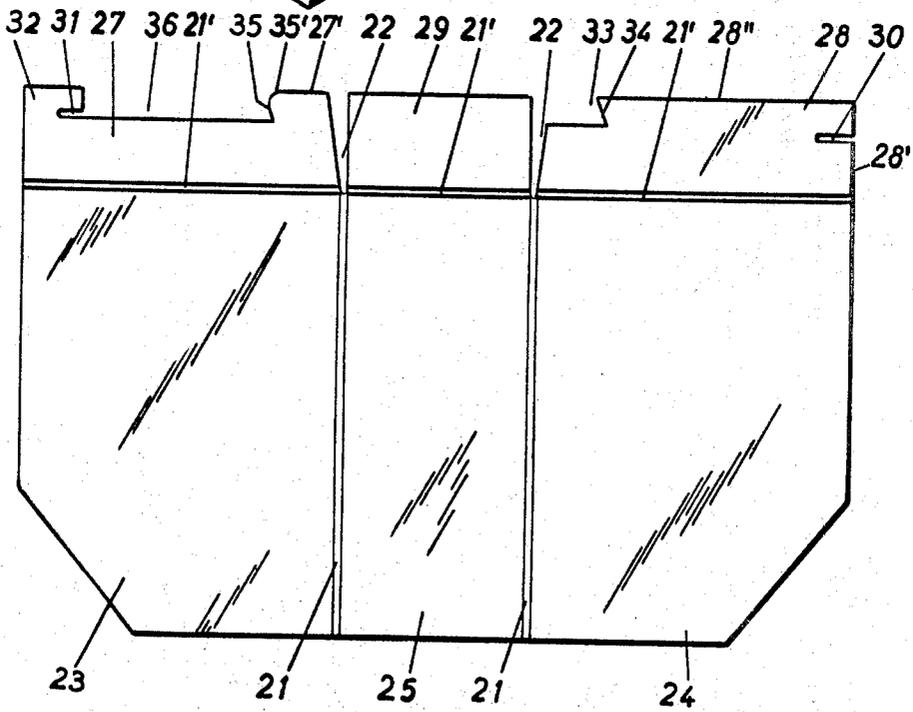
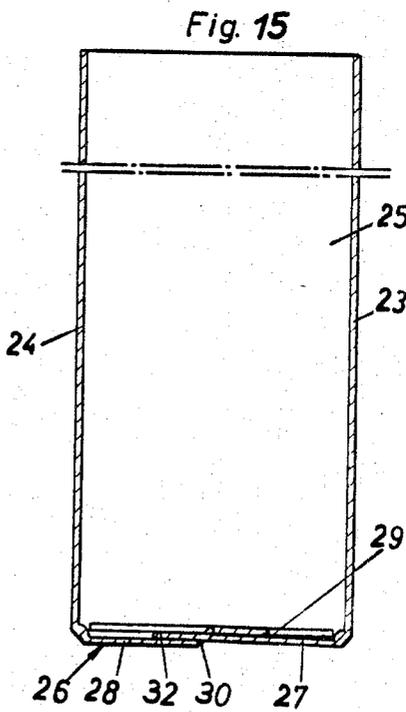
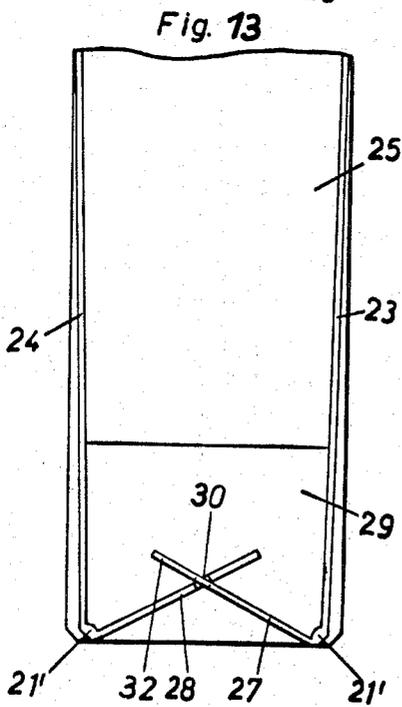
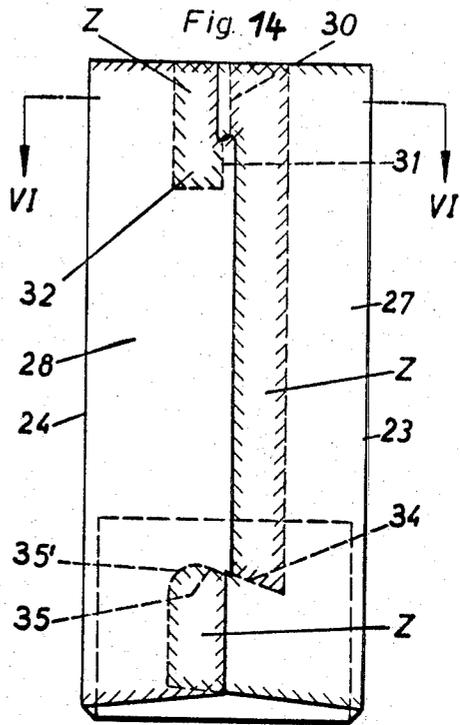
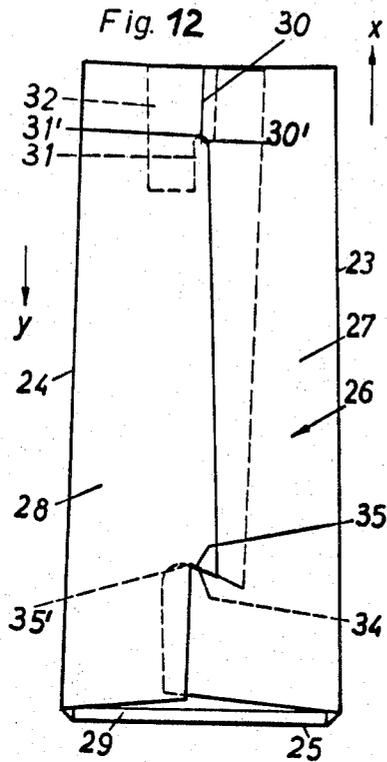


Fig. 11





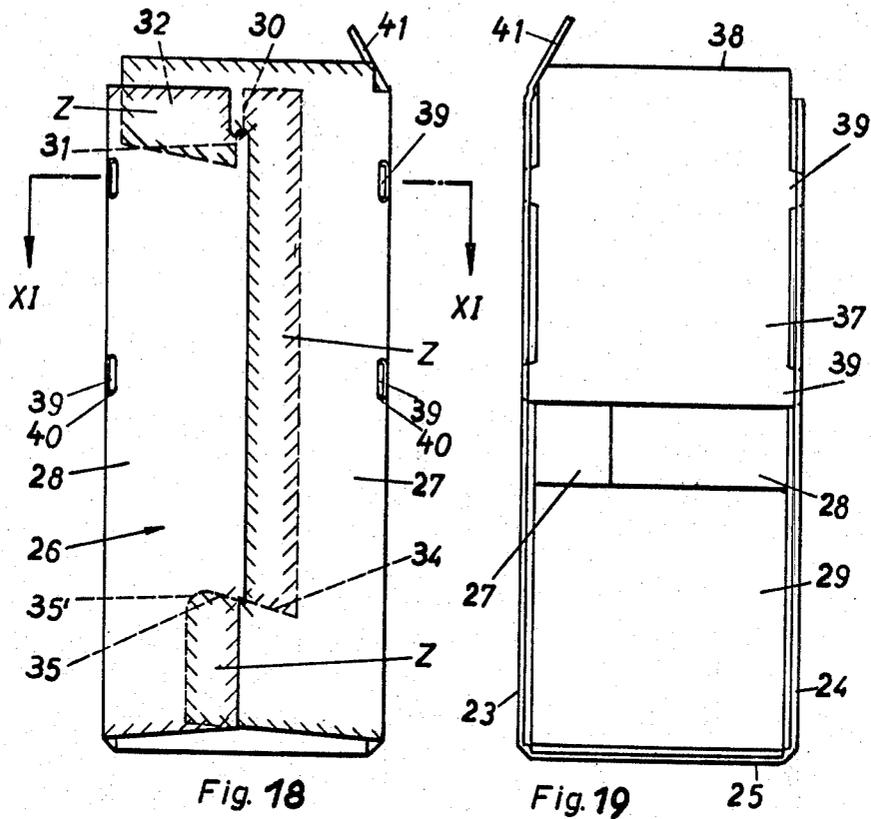


Fig. 18

Fig. 19

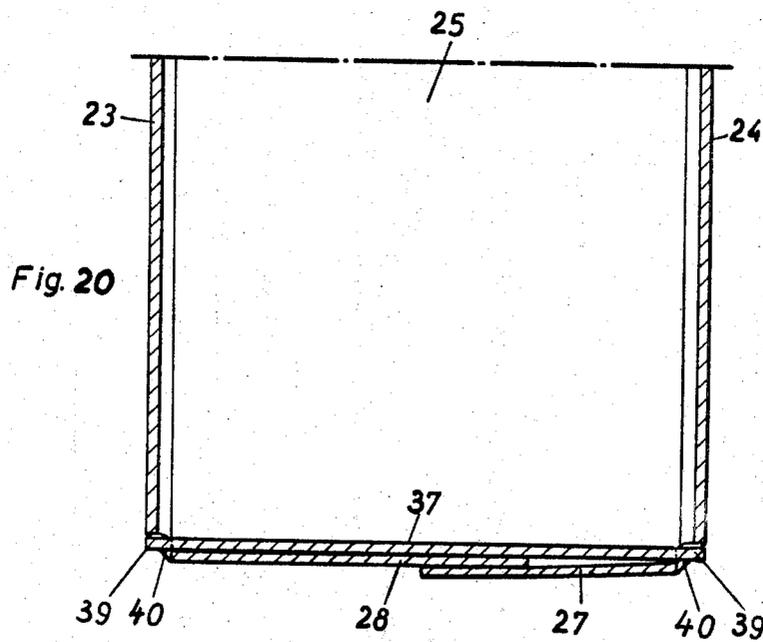


Fig. 20

FOLDING BOX

SUMMARY OF THE INVENTION

The invention relates to a box from a folded blank, in particular for document filing, the box having a bottom wall, two side walls and at least one end side wall, and having means for keeping the box erected, i.e., maintaining the general shape of the box when folded for use and preventing its collapse.

It is a main object of this invention to provide a box having said means comprising two wall flaps which are joined to the side walls, i.e. are extensions of the side walls, form the bottom wall at least in part, and are mutually engaged with each other.

For convenience, the box is referred to herein as though its said bottom wall were lowermost, and corresponding terms, i.e. bottom wall, side wall and end wall, are used to describe the walls of the box. However, the invention extends to the box in other orientations, even if say the bottom wall having means for keeping the box erected is intended to be an end wall.

The box may have a bottom formed by turning in a plurality of flaps on the foldable blank and consisting of two transverse flaps starting from the narrow side walls and open towards the interior of the box, and two longitudinal flaps starting from the broad side walls of the box and exposed towards the underside thereof, the longitudinal flaps being engaged into each other in dovetail fashion.

Boxes are already known in which the bottom is obtained after folded over the longitudinal flap which has a dovetail opening, then folding over the transverse flaps and subsequently interengaging the longitudinal flap which has the dovetail tongue into the longitudinal flap which was first turned in.

However, the transverse flaps interengaging the longitudinal flaps are forming edges facing towards the interior of the box which cause that documentary records are maintained on an unequal level. An equal level, however, is necessary to refer to the index-tabs of the records. Nor is such a construction, by itself, adapted for the insertion of laterally non-displaceable filing separators to divide the box into compartments, to make it more suitable for filing, e.g. documentary records. If these boxes, not intended to have separators, were nevertheless fitted with them, it would materially increase the cost. In particular, the stability of the box bottom and the resistance to lateral motion of the separators would not be adequate.

It is therefore another object of the present invention, to provide a box having a parallelogram-shaped bottom with, on the interior side of the bottom, a pair of slotted flaps extending from opposite sides of the bottom, the slots being parallel to each other and adapted to engage, within the box a separator with a pair of lugs adapted to be engaged by a pair of said slots, one on each slotted flap.

The slotted flaps may advantageously generally conform, at least for part of their length, to the inside width of the base.

Preferably, the exterior side of the bottom comprises a pair of flaps extending from the remaining opposite sides of the bottom and interengaging in dovetail-fashion, and preferably, the dovetail-fashion interengaging flaps cover substantially the whole area of the parallelogram.

Advantageously, the slotted flaps extend to the region of the dovetail interengagement.

The box may have a rectangular bottom.

The invention further provides a blank adapted to be folded into a box as set forth above.

The box or the blank may be provided with at least one separator with a pair of lugs adapted to be engaged by a pair of said slots, one on each said slotted flap.

The separators preferably extend over substantially the entire inside length of the base and so allow a satisfactory seating of the edges of the sheets of documents. According to the space required for these latter, so the separators may easily be detached from their engagement with the relevant slots and be fitted into other appropriately required slots in the transverse flaps. Nevertheless, although the transverse flaps are called upon to support the separators, a stable bottom is achieved by virtue of the advantageously shaped longitudinal flaps. This is achieved on the one hand by the dovetail engagement and on the other by the marginal edge portions of the longitudinal flaps which have the dovetail tongue, these engaging fully over the end faces of the opposite longitudinal flap. As has been found, the bottom area withstands the greatest strains which arise, for example during carrying of the box which is loaded with documents and separators. The box separators likewise remain in their position until they are rearranged intentionally. For easy insertion of the box separator, this latter has the strip projecting from the marginal edge, the ends of the strip engaging with the slots which are open towards the end of the transverse flap. Since the transverse flaps extend into the zone of dovetail engagement of the longitudinal flaps, a favourable weight distribution over the interengaged longitudinal flaps of the bottom area is created.

It is further a main object of the present invention to provide a box in which preferably one end wall has said means for keeping the box erected and comprises two end wall flaps being in hooked engagement with each other adjacent the upper edge of the end wall having been engaged by relative movement in a vertical direction and being interengaged adjacent the bottom edge of the end wall by a dovetailed engagement which secures the hooked engagement.

The term "dovetailed engagement" merely means the inter-engagement of two faces which are inclined to the direction of the forces tending to disengage the engagement. It is not necessary that each tab should have two edges which are inclined to said direction; in other words, it is not necessary that one tab should have a full dovetail.

The box of the invention can be formed with a stable final shape using a simple and easy erection procedure. The twisting facility of the only partially erected box may be utilized for the erection procedure, which may be performed without tools, namely in that the upper zone of the end wall flaps are hooked into engagement when the box is in a twisted position. There need only be one insertion aperture or slit extending from the upper edge of one flap and a corresponding slit in an upper part of the other flap, to provide the hooked engagement. The bottom parts of the end wall flaps are retained in engagement in the simplest possible manner by a dovetail engagement after the hooked engagement has been effected, and can be effected by relative movement of the flaps in a horizontal direction. In addition to its function of retaining the lower parts of the

flaps, the dovetail connection also performs a further function of co-operating with the hooked engagement to provide stability. The hooked engagement in the upper parts of the end wall provides a high degree of stability against spreading forces which occur particularly in full boxes. The invention can utilize the fact that, because the side walls have been folded up from a flat blank, they tend to spring apart, this tendency additionally maintaining the box in a form which is stable for operational use.

As may be seen from the preceding description, assembling the box comprises substantially two operations, one being the hooked engagement and the other being the dovetail engagement. The last-mentioned may be more readily achieved by radiusing or convex curving the edge of the dovetail on one flap; specifically, the flap can have an upwardly facing dovetail part formed by a substantially vertical edge which adjoins a downwardly inclined edge, the join being radiused or curved — the other flap will in general have a downwardly facing dovetail part formed by a substantially vertical edge which adjoins an upwardly inclined edge, and the join need not be radiused or curved.

An inwardly folded tab may be joined to, i.e., form an extension of, the upper edge of one of the flaps, the inwardly folded flap having laterally directed tongues which are retained adjacent fold lines between the flaps and the side walls. The tab can be used for gripping below supporting rails if the fold line between the tab and the flap to which it is joined projects above the tops of the side walls. The tongued retention of the inwardly folded tab dispenses with the need for separate retaining means such as adhesive layers, clips or rivets.

BRIEF DESCRIPTION OF DRAWINGS

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view from below of a box according to the invention "below" referring to the normal position of the box in use;

FIG. 2 shows a blank from which the box of FIG. 1 is made;

FIG. 3 is a section along the line III-III in FIG. 2; FIG. 4 is a view of the base of the assembled box; FIG. 5 is a section along the line V-V in FIG. 4; FIG. 6 is a section along the line VI-VI in FIG. 5;

FIG. 7 is a section along the line VII-VII in FIG. 5;

FIG. 8 shows on an enlarged scale a view of the box from below during assembly, more specifically, during interengagement of dovetails; and

FIG. 9 is a section along the line IX-IX in FIG. 8;

FIG. 10 is a perspective view of a box constituting a second embodiment;

FIG. 11 shows the unfolded blank for the box;

FIG. 12 is a view towards the end wall of the box with the end wall flaps in hooked engagement prior to the dovetail connection being made;

FIG. 13 is a plan view of the box as in FIG. 12;

FIG. 14 is a view of the end wall of the assembled box;

FIG. 15 is a section along the line VI-VI of FIG. 14;

FIG. 16 is a perspective view of a box constituting a third embodiment;

FIG. 17 shows the unfolded blank for the box of FIG. 16;

FIG. 18 is a rear view of the box of FIG. 16;

FIG. 19 is a front view of the box of FIG. 16; and

FIG. 20 is a section along the line XI-XI of FIG. 18.

The blank seen in FIG. 2 is particularly suitable for being folded to form the box of FIG. 1 and preferably consists of rigid cardboard. The foldable blank has a panel of appropriate wall thickness bounded by fold lines 1, 1' and the edge of the blank. Separation incisions 2 are provided from the opposite edge, terminating on the fold line 1'.

Thus are determined the shape and size what will become the side walls 3 and 4, the end walls 5, 6 and 6', the transverse flaps 7 and 8 and the longitudinal flaps 9 and 10 of the box, of which the transverse flaps and longitudinal flaps together form the bottom.

One end wall 6 is provided, for example, with a self adhesive coating 11 which, prior to assembly of the box, is covered with a protective paper, not shown.

The transverse flaps 7 and 8 which correspond more or less to the inside width of the bottom have a crenelated edge formed by slots 12.

One longitudinal flap 9 has, midway along the edge 9''' of its marginal edge portion 9' (which extend parallel with its fold line 1'), a projecting dovetail tongue 9''. The other longitudinal flap 10 has a rectangular recess or cut-out 10'', midway along the edge 10''' of its marginal edge portion 10'. The recess 10'' is so shaped and dimensioned as to receive and retain the dovetail tongue 9''.

The box to be formed from this foldable blank is assembled as follows: the side walls 3 and 4, and end walls 5, 6 and 6' are so folded along the fold lines 1 that they form a rectangle. The end wall 6 overlaps the end wall 6' and adheres to it by virtue of the self-adhesive coating 11.

It is also possible, however, to glue the end walls 6, 6' in some other suitable manner.

Then, the transverse flaps 7 and 8, extending from the end walls 5, 6 are folded inwards along the fold line 1'. Then the longitudinal flap 9 (which has the dovetail tongue 9'') is folded in, after which the longitudinal flap 10 (which has the cut-out 10'') is folded in. As FIGS. 8 and 9 show, the end edges 10''' of the marginal edge portion 10' of the longitudinal flap 10 will be moved into contact with marginal edge portions 9' of the longitudinal flap 9 and positively pivot the flap 9 inwardly about the fold line 1'. The dimension x of the end edge 10''' is somewhat smaller than the dimension y of the end edge 9''' of the marginal edge portion 9', so that after further pressure p in the direction indicated by the arrow in FIG. 9, the edge portion 10' of the longitudinal flap 10 moves in front of the marginal edge portions 9', while the dovetail tongue 9'' moves in front of the longitudinal flap 10 to be engaged by the recess 10''; see particularly FIG. 4.

The bottom of the finished box has to withstand stresses, especially when the laden box is being carried about. By virtue of the marginal edge portions 9' which engage fully over the edge portions 10' of the longitudinal flap 10 on either side of the dovetail tongue 9'', an extremely strong base to the box is realized; see FIG. 6.

Similarly, contributory factors are the transverse flaps 7, 8 which bear on the longitudinal flaps 9, 10 their end edges 7', 8' extending as far as the zone of dovetail engagement; see FIG. 4. The presence of an unfolding force about the fold line 1' — due to the inherent stiffness of the material of the blank, results in satisfactory bearing of the transverse flaps 7, 8 against the bottom surface formed by the longitudinal flaps 9, 10. This also helps to ensure good weight distribution (When the laden box is being carried) over the interengaged longitudinal flaps 9, 10 of the base.

Intra-box separators 13 can be inserted into boxes which have thus been assembled. Each separator 13 has, projecting from the bottom edge 14 (as seen in FIG. 5), a pair of lugs or projections which are preferably formed by the ends 15' of a rather short continuous strip 15 extending only over the middle portion of the bottom edge 14 of the separator 13.

This pair of ends 15', when the separator is inserted into the box, engages with the appropriate pair of slots 12 provided on the transverse flaps 7, 8, and so divides the box into compartments. According to the exact division of the space required, so the separator can be removed at will from its engaged position and moved a fresh position in which it can be engaged.

It will be appreciated that no additional means for locating the separators 13 needs to be provided, and that the slots form a convenient and easy means for locating them, and relocating them when different relative compartment size become necessary. The number of slots will normally be chosen to be adequate for the number of separators 13, and for the smallest likely-to-be-desired increment in compartment size, while not being so great as unduly to weaken the merlons separating the slots of the flaps 7, 8.

In another embodiment of the invention the unfolded blank (see FIG. 11) for forming the box of FIG. 10, is likewise constructed of hard card board. It is provided with creases 21, 21' and cuts 22. This defines the shape and size of side walls 23, 23', of a bottom 25, of flaps 27, 28 forming an end wall 26, and a tab or flap 29 placed on the inside in the front of the end wall.

One end wall flap 28 has an insertion slit 30, extending from the edge 28' parallel to the crease 21'. The insertion slit 30 is associated with an open insertion slit 31 in the other end wall flap 27, the insertion slit 31 extending parallel to the crease 21' and being cut into a projecting tab 32 of the flap 27. The insertion slit 30 and the insertion slit 31 are provided as retaining means for hooked engagement.

The end wall flaps 27, 28 also represent means for a dovetailed connection to this end, a corner cut 33 is provided in the flap 28 adjacent to the tab or flap 29, the dovetail edge 34 of the said corner cut 33 making an acute angle with the edge 28'' of the flap 28 which extends parallel to the crease 21'. The other dovetailed edge 35 of the flap 27 is formed by a cut-out 36 of the said flap. The dovetailed edge 35 also makes an acute angle with the edge 27' of the flap 27 but is radiused at its free end, the edge 35 merging into a convex curve 35' which curves the opposite way to the edge 35.

The box is assembled by first folding the tab or flap 29 inwardly about the crease 21' into an approximately 90° position relative to the bottom 25. The side walls 23, 24 are then brought parallel to each other by folding about the creases 21. The flap 27, 28 are then successively folded so that the flap 27 is disposed in front

of the flap 28 and both flaps are positioned approximately at right-angles to the side walls. To obtain hooked engagement, one side wall 23 is moved in the direction x (see FIG. 12) and the other side wall 24 is moved in the direction y , both these motions being made possible because of the twistability of the partly assembled box. The flap 32 of the flap 27 is inserted through the insertion slit 30 of the flap 28 until the insertion slit 30 and the insertion slit 31 are in alignment with each other. During the insertion motion, the flaps 27, 28 form an obtuse angle facing towards the interior of the box. During the subsequent and oppositely directed motion of the side walls 23, 24 or of the flaps, the end edges 30', 31' of the insertion slits 30, 31 move against each other to limit such motion, whereupon the edges of the flaps 27, 28 are disposed in one plane, once again being at 90° to the side walls and coterminating with the upper edge of the side walls 23, 24. The dovetailed connection may then be produced by depressing the flaps 27, 28 towards the interior of the box, the dovetailed edges 34, 35 being engaged with each other by virtue of the obtuse angle formed by the flaps 27, 28 which obtuse angle faces towards the interior of the box. The curve 35' of the dovetailed edges 35 of the flaps 27 moves against the upper part of the dovetailed edge 34 of the end wall flap 28, so that as a result of the restoring force exerted by the flaps 27, 28 and because of the orientation assumed by the dovetailed edges 34, 35, the flaps starting from the position illustrated in FIG. 13 are moved into the plane of the end wall 26 while completing the dovetailed engagement. The tab or flap 29 does not obstruct the previously-mentioned operation because it is resiliently deflected about the crease 21'. Protection against twisting of the box in one direction is obtained by the hooked engagement, as already mentioned, and in the other direction by the dovetailed connection.

The overlapping zones Z of the end wall flaps 27, 28 have hatched outlines in FIG. 14.

A relatively smooth outer end wall surface is obtained with a box which is produced in the manner described hereinabove. This is important if the box is eventually placed so that the end wall functions as a bottom.

The box illustrated in FIG. 16 to 20 is modified relative to the first embodiment in that the box has a folding flap 41 projecting from the side wall 23 and a tap 37 adjoining the end wall flap 27 and adapted to fold into the interior of the box.

The crease 38 between the flap 27 and the tap 37 of the assembled box is disposed above upper side wall edges 23', 24' and thus forms an overhanging flap which grips beneath supporting rails as they are described in the U.S. Pat. No. 3,647,076. Tapering tongues 39 are provided for retaining the tab 37 in the operative position, the tongues 39 projecting in pairs on each side of the tap 37 and being adapted to engage in correspondingly disposed apertures 40 in the zone of the creases 21'.

The flap 41 could alternatively project from the other side wall 24. Instead of being integral with the material of the blank, it is alternatively possible for the flap 41 to be stuck to one side wall 23 or 24. The box also be produced with the flap 41 stuck to the opposite wall or to a separate overlapping flap projecting from the opposite side wall 24 or 23. This would produce a tubular member whose end wall or bottom — depending on

utilization-could be formed in the corresponding manner by the user. In this case, it would be necessary for the flap 37 to be entirely omitted or to be previously folded in the folded blank if such a box is to be placed into a supporting rack. Since the flaps 27, 28 form an obtuse angle facing the interior of the box, when they are joined, it would be necessary for the flap 41 to terminate a corresponding amount short of the end wall.

What I claim is:

- 1. A folding box formed from an integral blank comprising in combination
 - a. a parallelogram-shaped base formed by turning in a plurality of flaps on the foldable blank and consisting of two transverse flaps starting from the end walls and facing towards the interior of the box,
 - b. and two longitudinal flaps starting from the side walls of the box and exposed towards the exterior side thereof,
 - c. the longitudinal flaps being engaged into each other in dovetail — fashion,
 - d. wherein the dovetail-fashion interengaging flaps cover substantially the whole area of the parallelogram,
 - e. and wherein the said transverse flaps starting from the end walls have a plurality of slots being parallel to each other, and adapted to engage, within the box,
 - f. a separator with a pair of lugs adapted to be engaged by a pair of slots, one on each slotted flap.
- 2. A box formed of a foldable integral blank, comprising

- a. a bottom wall, two side walls and at least one end wall being joined together by fold lines,
- b. and having means for keeping the box erected said means being provided adjacent the end wall and comprising two end wall flaps which are joined to the side walls by fold lines and form the end wall, at least in part, the flaps of which
- c. one flap having an insertion slit extending from the upper edge of said flap parallel to the corresponding fold line
- d. and the other flap having an insertion slit extending parallel to the corresponding fold line and being cut into a projecting tab of said flap, being in hooked engagement with each other adjacent the upper edge of the end wall having been engaged by relative movement in a vertical direction and being interengaged adjacent the bottom edge of the end wall by a dovetail engagement which secures the hooked engagement, said dovetail engagement having been engaged by a relative movement in a horizontal direction by depressing said flap towards the interior of the box.
- 3. A box as set forth in claim 2, which additionally includes
 - an inwardly folded tab that is joined to the upper edge of one of the flaps,
 - the inwardly folded tab having laterally directed tongues which are retained adjacent fold lines between the flaps and the side walls,
 - and wherein the fold line between the inwardly folded tab and the flap to which it is joined may project above the top of the side walls.

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