May 16, 1950 J. E. JUBIN 2,507,978

ANCHORING MEANS FOR SHEET MATERIAL MEMBERS

Filed Dec. 2, 1946 2 Sheets-Sheet 1

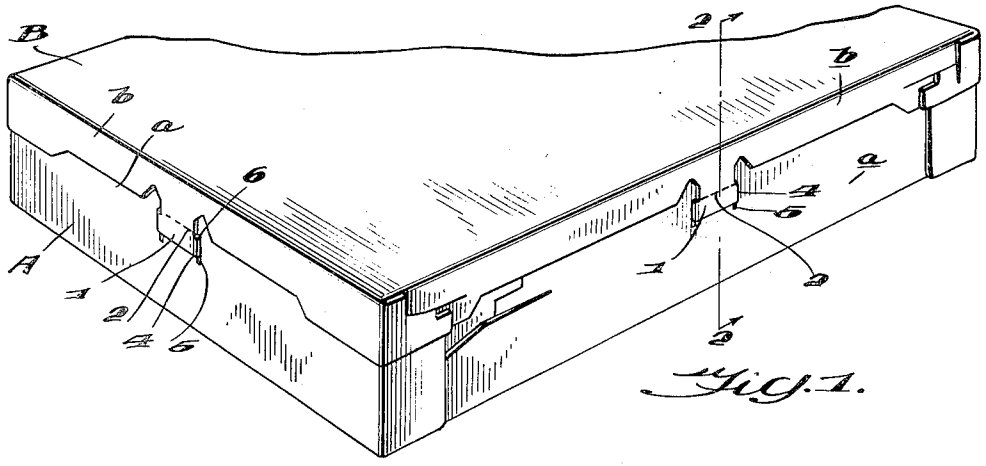


Fig. 1.

Fig. 2.

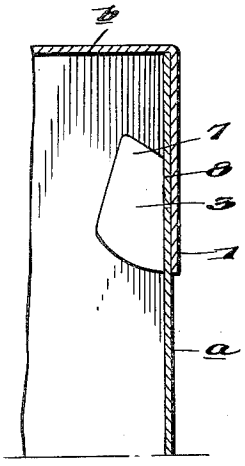


Fig. 3.

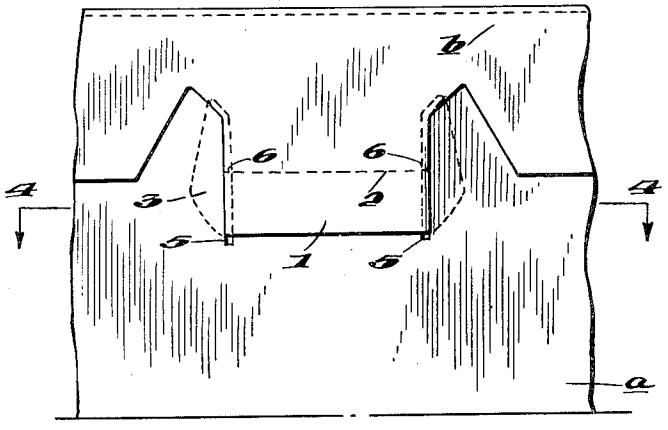
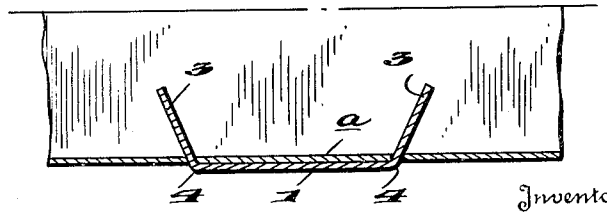


Fig. 4.



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ANCHORING MEANS FOR SHEET MATERIAL MEMBERS

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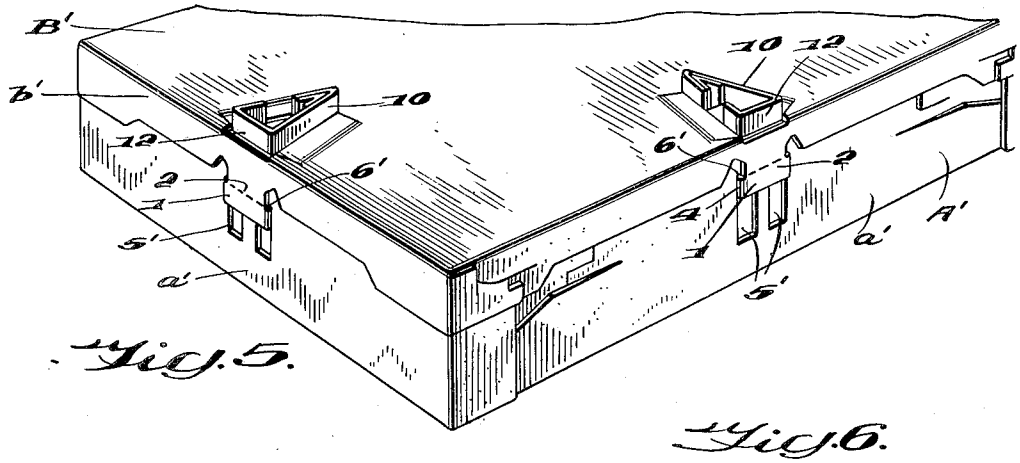


Fig. 5.

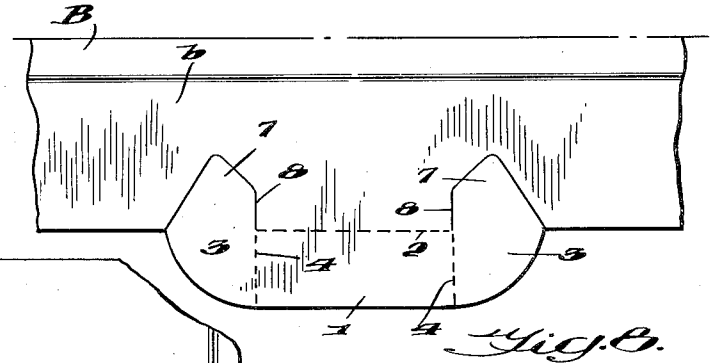


Fig. 6.

Fig. 7.

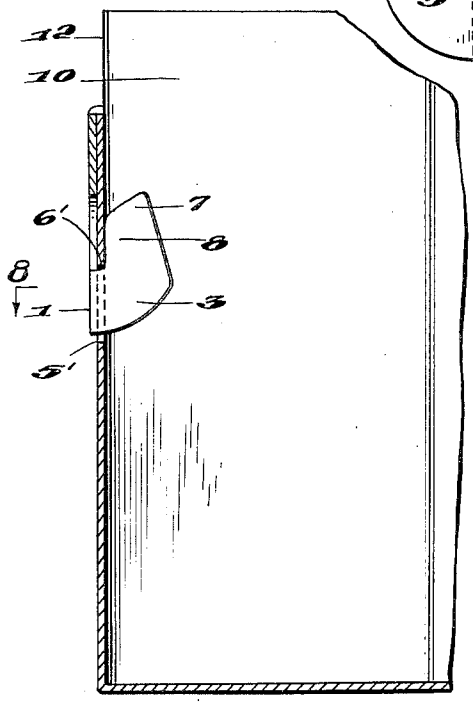
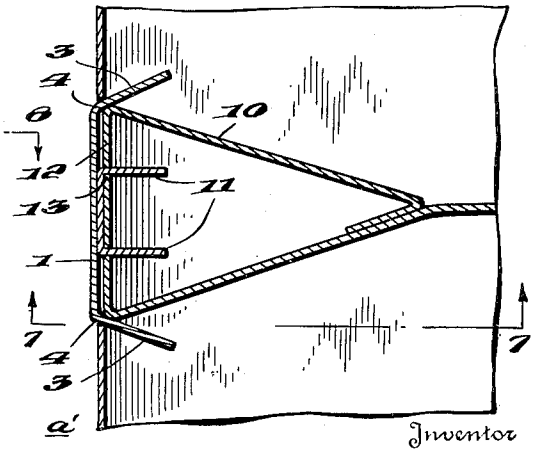


Fig. 8.



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ANCHORING MEANS FOR SHEET MATERIAL MEMBERS

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5 Claims. (Cl. 229—45)

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This invention relates to anchoring or locking means for securing together sheet material members, and is of the general type wherein a flap or tongue carried by one member is received in a slot or aperture in the other member. While the invention is primarily intended for use in anchoring or locking together box bodies and end closures, or other related parts of cardboard or fiber board boxes or containers, it is also capable of use in securing together other sheet material members or portions thereof.

It has been known heretofore to employ various locking arrangements wherein locking tabs or wings carried by one member are folded and inserted through a slot or slots in another member, to then resiliently unfold or expand so that portions thereof will be out of registry with said slot or slots to prevent withdrawal, except with considerable difficulty, without tearing or damaging same.

The primary object of the present invention is to provide an anchoring or locking means of this general type wherein the locking elements or wings may be repeatedly inserted into and withdrawn from their cooperating slots, easily and without damaging same, and at the same time are constructed and arranged in such a way as to firmly and securely withstand unintentional withdrawal resulting from forces tending to cause relative bodily motion between the sheet material members.

Other objects are: to provide such an anchoring or locking means wherein the locking members or means is especially adapted for formation in the flange of a usual cardboard or fiber board box cover, such formation requiring no additional sheet material; to provide such an anchoring or locking means which may be employed to establish a hinged connection between sheet material members; and in a modification to provide means for deflecting the locking means into firm frictional engagement with the sides of their respective slots.

In accordance with the present invention one of the sheet material members has at least one locking wing or element mounted thereon for relative rotary movement about a linear axis, to be received in a slot in another member, said slot extending radially to and terminating at the said axis. This locking wing extends for substantially one hundred and eighty degrees around said axis, and has a generally radially disposed locking edge or portion for rotary movement through and around the end of the slot into abutting engagement with the inner surface of

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said other member at a location closely adjacent to said axis to prevent bodily withdrawal of said wing from said slot. The flap or wing is maintained in said slot against rotary withdrawal, by frictional engagement with the side of the slot and, in one embodiment of the invention a deflector is provided to positively urge the flap or wing into such frictional engagement.

Thus the positive locking engagement of the locking element will be concentrated at or in the vicinity of the axis of rotary movement thereof; and forces tending to cause relative movement between the aforementioned sheet material members will also be transmitted to said axis. It follows therefore that any resulting moment of rotational force tending to rotate and retract said wing or flap from its slot will be negligible and in any event insufficient to overcome the resistance offered by the frictional engagement between the wing and the side of the slot, even though such resistance be relatively small.

Other objects and advantages will be apparent from the following detailed description, taken in connection with the accompanying drawings, in which:

Figure 1 represents a perspective view of a portion of a usual fiber board or card board box in which the preferred form of the invention is embodied;

Figure 2, a section on the line 2—2 of Figure 1, looking in the direction of the arrows;

Figure 3, a fragmentary front elevation of one of the locking means of the invention and the adjoining portions of the box;

Figure 4, a section on the line 4—4 of Figure 3, looking in the direction of the arrows;

Figure 5, a view similar to Figure 1, showing a portion of a poultry shipping box which is especially adapted for cooperation with my improved locking means;

Figure 6, a fragmentary plan view of a portion of a box cover blank showing one of the locking means as employed in either embodiment of the invention, as same appears when in blank form prior to folding of the various portions thereof into operative position;

Figure 7, a sectional view of the modified embodiment illustrated in Figure 5, this section being taken on the line 7—7 of Figure 8, looking in the direction of the arrows; and

Figure 8, a section on the line 8—8 of Figure 7, looking in the direction of the arrows.

Referring now in detail to the accompanying drawings, and considering first the preferred embodiment of the invention illustrated in Fig-

ures 1 to 4 inclusive and 6, the reference character A therein designates any usual form of fiber board, cardboard or other sheet material box body, and the reference character B designates a usual flanged top or end closure for same. The structural details of the box body A and end closure B, except as hereinafter specified, constitute no part of the present invention.

The usual flanges or flange sections *b* of the end closure B receive and lie flush against the corresponding sides *a* of the box body A. Normally the top or closure B is removable vertically from the box body A.

The locking means of my invention are shown as embodied in such a box or container construction to positively lock or anchor the top B against removal from the box body A. In practice, a plurality of such locking means are suitably disposed at such locations, preferably one to each side of the box, as will serve to adequately maintain the box top B securely anchored or locked to the box body A. Various other suitable arrangements or dispositions of the locking means, in addition to that illustrated, will be readily apparent to those skilled in the art.

Each of the locking means is similar in construction and operation to the others. Thus referring to any one of said locking means, as shown in blank form in Figure 6, it will be seen that same comprises a preferably integral sheet material flap 1, hingedly connected to the flange *b* of the closure B for relative swinging movement about a line or axis which is defined by the fold line 2.

Carried by each flap, and foldable perpendicularly thereto along a line 4 extending radially or perpendicularly to said line or axis 2, is at least one locking element or wing 3. Preferably two such wings 3 are integrally attached to opposite linear ends of each said flap.

Formed in the sides *a* of the box body A, in the same radial planes as the respective fold lines 4 of said locking elements 3, to register with said fold lines in the unfolded condition of their respective flaps 1, are locking slots 5 to receive the respective wings or locking elements 3.

The end locking edges 6 of the slots 5 are substantially coincident with, or contiguous to, the fold line 2 defining the axis of swinging movement of each flap 1. Although the slots 5 may extend for any desired distance from the fold line or axis 2, so long as they are of sufficient length to receive the wings 3, it is desirable to form these slots only slightly longer than the fold lines 4 of said wings, and to so design each wing 3 that when folded no portion thereof will be of greater radius relative to the axis 2 than the portion immediately adjoining the fold line 4.

Such relative proportions of the wings 3 and cooperating slots 5 is illustrated in the accompanying drawings, wherein it will be seen that, when completely inserted through the slots 5, the wings 3 nearly completely occupy and substantially conceal same.

Preferably the slots 5 are of just sufficient width to accommodate the wings 3, and the inherent stiffly resilient qualities of the fiber board, cardboard or other stiffly resilient sheet material of which the box is formed, will cause the wings 3 carried by each flap 1 to partially unfold or move apart after insertion through their respective slots 5 into frictional engagement with the relatively remote side edges thereof, as shown in Figure 4 of the drawings.

An important feature of the invention resides in the particular shape of the wings 3 wherein each said wing has a free end portion 7 projecting across its respective linear axis of swinging movement 2, and each such projecting portion 7 is formed with a radial locking edge 8 in substantial alignment with its respective fold line 4. It is not essential that the radial dimensions of the locking edge 8, or of the wing 3 adjoining same, be as great as shown, it being important only that the projecting portion 7 closely adjacent the axis 2 present an edge 8 in substantial alignment with the fold line 4.

Thus it will be seen that each wing 3, when folded about its fold line 4 into operative position in a radial plane relative to the linear axis 2 of its flap 1, will extend around and closely adjacent its said axis 2 for substantially 180 degrees from the plane of its flap 1, so that the free end portion 7 thereof will project across the axis 2 and be disposed in edgewise abutment with its locking edge 8 against the interior face of the box side *a* at a location closely adjacent said axis 2, when completely inserted through its respective slot 5.

It will be apparent from inspection of the blank or unfolded flap 1 and wings 3 shown in Figure 4, that the flap 1 and wings 3 are each formed from the material normally comprised in flange *b* by cutting same to the shape of said blank, and forming the fold or score lines 2 and 4 therein in usual manner. Portions of the flange *b* on either side of the locking means may be removed or cut away, as shown, to provide a neat finished appearance, though this is not essential.

In the use of the invention, prior to application of the end closure B to the box body A, the flaps 1 are all reversely folded to lie flush against the exterior surfaces of the box flange or flange section *b*. The end closure is then applied over the box body A, and the wings 3 are folded outwardly normally to their respective flaps 1, to lie in the same radial planes relative to the respective axis 2 as do their respective slots 5. With the wings in this position, the flaps 1 are then successively swung downwardly into engagement with the exterior faces of the box sides *a* between the respective pairs of slots 5, thus inserting or swinging the wings or locking elements 3 completely through the respective slots. This causes the radial locking edges 8 thereof to abut against the exterior faces of said box sides *a* in the manner hereinbefore mentioned, while engagement between the slot end edges 6 and the wings 3 disposed therethrough will prevent removal of the end closure B from the box body A.

After passing through the slots 5 into operative locking position, the wings 3 will normally tend to partially unfold away from each other into frictional engagement with the relatively remote sides of their respective slots 5 to thus maintain themselves in their operative locking position.

In such operative position it will be seen that all forces tending to cause withdrawal or removal of the top or end closure B from the box body A are transmitted to the fold lines or axes 2 of the respective locking means. Also it will be seen that such forces are opposed by the abutment of the locking wings 3 with portions of the box sides (i. e. the slot ends 6 and the inner faces of the box sides immediately adjoining said slot ends 6) at locations very nearly coincident with said fold lines or axes 2. Accordingly the resulting moments of rotational force transmitted to such flaps 1 and wings 3 by forces tend-

ing to displace the cover *b* will be insignificant and insufficient to overcome the comparatively light frictional resistance between the wings 3 and the sides or edges of their respective slots 5.

In order to swing the locking means to inoperative position to permit removal of the end closure or cover B, the various flaps 1 may each be easily raised, as by the insertion of a fingernail thereunder, and reversely swung or folded to lie flush against their respective flange sections *b*, thereby completely retracting the locking elements or wings 3 from their respective slots 5, without tearing or damaging same.

Thus the locking means may be used repeatedly without destruction or damage thereto other than that resulting from ordinary wear and tear.

Where it is desired to provide a hinged connection between the box body A and cover B, the locking means on one side of the box only are placed in operative locking engagement, whereupon the cover B may be raised and swung about the axis of the fold line 2 of said operative locking means.

In the modified form of the invention illustrated in Figures 5, 7 and 8, the locking means is illustrated as it actually appears in one commercial embodiment, wherein it is used in combination with other features of a fiber board poultry shipping box. In this modified construction, the usual ventilator or spacer posts 10 of the box are associated with the slots 5' and wings 3 in a novel manner to function as deflectors for positively urging the wings 3 into firm frictional engagement with the edges of their respective slots 5'.

The flaps 1 and locking elements 3 thereof are constructed and arranged in substantially the same manner as heretofore described in the preferred embodiment, and may be formed from a blank similar to that illustrated in Figure 6.

The slots 5' in the box sides *a'* consists of apertures left in the box sides, after locking tongues 11 integral therewith along relatively adjacent parallel edges, are folded inwardly to engage their respective deflector elements 10 and operatively position same between the relatively remote edges of the slots 5', as hereinafter set forth. It will be noted that the slots 5' are formed with end edges or edge portions 6' substantially coincident with the axes 2 of their respective adjacent flaps 1, as in the preferred embodiment heretofore described, to cooperate with the wings 3 in the manner heretofore described.

The deflector elements 10, in the present embodiment are also utilized as supporting posts projecting through conformingly shaped apertures in the box end closure B' to support similar boxes thereabove. However, the utilization of said members 10 in a capacity other than as deflector constitutes no part of the present invention. Accordingly, such other use and the structural features peculiar thereto will not be described herein in detail, other than to state that these parts may be generally similar to those disclosed in Patent 1,704,948 to Maston and, as in said patent may be combined with partitioning elements which assist in positioning same against the box sides.

Each deflector element 10 illustrated is of generally tubular cross-section, having one panel 12 disposed flush against the inner face of the box side wall *a'*, between the planes of the relatively remote parallel edges of its cooperating slots 5'. As will be seen in Figure 8, each said panel 12 is

provided with slots 13, suitably shaped and disposed to receive the locking tongues 11 aforementioned. The specific shape and arrangement of the tongues 11 and slots 13 may be in accordance with various prior art teachings, as such details per se constitute no part of the present invention.

The operation of this modified form of the invention is similar to that of the preferred embodiment heretofore described except that the locking wings 3 are inserted through the slots 5' between the relatively remote edges thereof and the respective opposite lateral edges or corners of the deflector element 10. The element 10 is so proportioned relative to the slots 5' that it deflects the wings 3 into firm frictional engagement with the relatively remote edges of said slots 5', as clearly shown in Figure 8.

I claim:

1. Anchoring means for securing together two sheet material members comprising an inherently resilient sheet material flap, a hinge connection between said flap and one of said members defining a fixed axis of swinging movement for said flap, a wing carried by said flap and foldable perpendicularly thereto along a fold line extending radially from said axis, the other of said members being formed with a slot in registry with said fold line in the operative position of said flap to receive said wing, said slot having an end edge substantially coincident with said axis and a side edge extending parallel to said fold line, said wing being insertible through and retractible from said slot during swinging movement of said flap, and having a free end portion projecting across said axis, said portion being formed with a radial locking edge disposed at substantially one hundred and eighty degrees relative to the fold line of said wing to engage the inner surface of said other member closely adjacent said axis and prevent linear withdrawal of said wing from said slot, in combination with a deflector element associated with said other member to deflect said wing into frictional engagement with the aforesaid side edge of said slot.

2. Anchoring means for securing a box end closure to a box body, said closure being formed with a fold line and said anchoring means comprising an inherently resilient sheet material flap connected to said closure along said fold line for relative swinging movement about a linear axis defined by said fold line, wings integral with said flap and foldable perpendicularly inwardly thereto along fold lines extending radially from said axis, said box body being formed with slots respectively in registry with said fold lines in the operative position of said flap to receive said wings, said slots having end edges substantially coincident with said axis and relatively remote side edges extending in planes parallel to said fold lines, said wings being insertible through and retractible from said slots during swinging movement of said flap, and having free end portions projecting across said axis, said portions respectively being formed with radial locking edges disposed in alignment with the fold lines of said wings to engage the inner surface of the box body closely adjacent said axis and prevent linear withdrawal of said wings from said slots, said wings inherently resiliently partially unfolding after insertion through said slots to frictionally engage said side edges thereof and resist rotary withdrawal therefrom.

3. Anchoring means for securing a first sheet material member to a second sheet material mem-

ber having a pair of parallel linearly coextensive slots therethrough comprising, a sheet material flap hingedly connected to said first member along a fold line extending transversely to said slots for relative swinging movement about a fixed axis defined by said fold line, said slots terminating at said fold line, a pair of wings carried by said flap for insertion in said respective slots, said wings being integrally connected to said flap and foldable relative thereto along parallel fold lines extending radially from said axis, said wings having free end portions projecting across said axis, said end portions having locking edges in alignment with their respective fold lines.

4. Anchoring means for securing a first sheet material member to a second sheet material member having a linear slot therethrough comprising, a sheet material flap hingedly connected to said first member along a fold line extending transversely to said slots, for swinging movement about a fixed axis defined by said fold line, said slots terminating at said fold line, and a locking wing carried by said flap for insertion in said slot, said wing being connected to said flap along a fold line extending radially from said axis and foldable about the axis defined by said fold line, said wing having a free end portion projecting across the fixed axis of said flap, said end portion having a locking edge in alignment with said fold line.

5. Anchoring means for securing a first sheet material member to a second sheet material member having a pair of parallel linearly coextensive slots therethrough, said anchoring means comprising, a sheet material flap hingedly connected along a fold line to said first member for relative swinging movement about a fixed axis defined by said fold line, a pair of wings carried by said flap for insertion in said respective slots, said wings being integrally connected to said flap and foldable relative thereto along parallel fold lines extending radially from opposite ends of said first fold line, the free edges of the wings lying within a radius from the respective ends of the first named fold line not greater than the lengths of the respective fold lines connecting said wings to said flap, said wings having free end portions projecting across said fixed axis, said end portions having locking edges in alignment with their respective fold lines.

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