

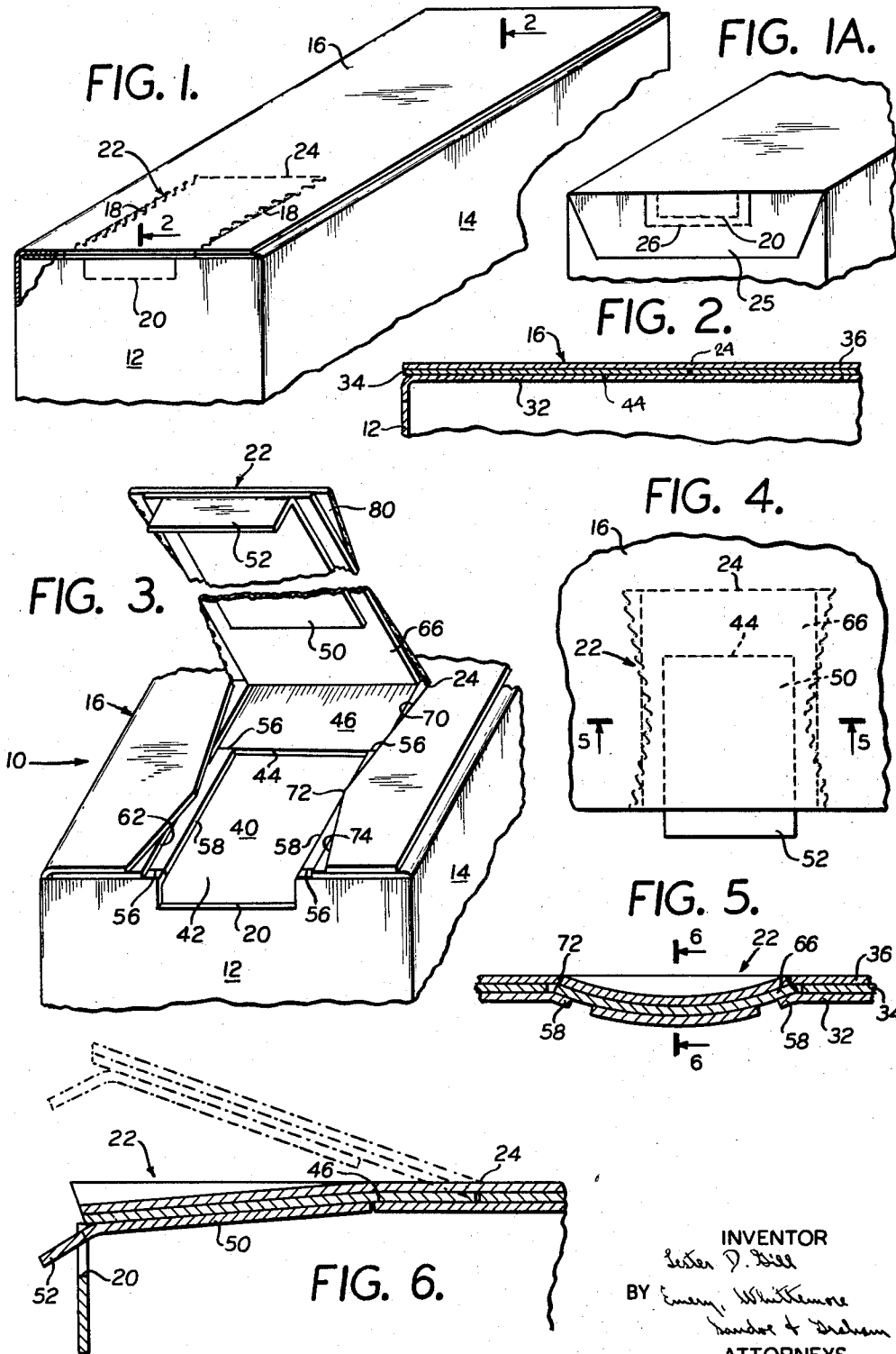
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CLOSURE FOR BOX WITH CANTILEVER SUPPORT

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3,147,905 CLOSURE FOR BOX WITH CANTILEVER SUPPORT

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This invention relates to boxes and more especially to boxes which are made of a piece of sheet material that forms side walls having end flaps which are folded into an overlapping relation to form an end wall of the box. Ordinarily both the top and bottom of the box are closed in this fashion.

Where boxes are to be used as containers for granular material, such as cereals, soap powders and the like, it is common practice to provide a tab which can be cut or torn open to make a discharge outlet through which the contents of the box can be poured. Since all of the contents of the box are not ordinarily used at the same time it is convenient to have the tab hinged to the end wall of the box so that it can be closed to prevent spilling of the contents when the box is to be put away until further use.

It is an object of this invention to provide an improved construction for boxes of the character indicated and which are suitable for use and not only for granular material but also for liquids or for various solid material having pieces small enough to come through the opening, for example spaghetti and dog biscuits. It is an object to provide a tab which is easily opened but which locks in closed position so that the contents of the box can not spill or slide out as a result of accidental overturning of the box. It is another object to provide such a tab with a locking structure that can be reused many times without losing its effectiveness, even though the box is made of relatively soft and inexpensive cardboard.

Another object of the invention is to provide a tab formed from material displaced from the end of a box, and hinged to the box, and constructed with underlying supporting means that prevent the tab from being pushed all the way through the discharge opening when pressed into closed position with sufficient force for locking the tab closed. In the preferred construction, the supporting means are provided entirely from portions of the box structure itself and by the correlation of the sizes of the openings through the different flaps of the box, and by the relative shapes of these openings.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views:

FIGURE 1 is an isometric view of the upper portion of a box made in accordance with this invention, the box being shown in its original condition;

FIGURE 1a is a view similar to FIGURE 1 but showing a modified form of the invention;

FIGURE 2 is an enlarged sectional view taken on the plane 2-2 of FIGURE 1;

FIGURE 3 is an enlarged fragmentary view, similar to FIGURE 1 but showing the tab of the box in open position preparatory to pouring the contents of the box through the opening;

FIGURE 4 is a fragmentary top view of the tab and part of the end of the box which is shown in FIGURE 3; and

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FIGURES 5 and 6 are enlarged sectional views taken on the lines 5-5 and 6-6, respectively, of FIGURES 4 and 5.

FIGURE 1 shows a box 10 having side walls including a side 12 and a front side 14, and having a top wall 16, a tab formed of material which is to be displaced from the top wall 16, and the side wall 12, is delineated by incised tear lines 18 at the top wall 16 and by an incised tear line 20 in the side wall 12.

The tab, which is not yet severed from the top wall 16 and side wall 12, is indicated in FIGURE 1 by the reference character 22. The box 10 is made of flexible material, and preferably stiff, flexible material. Along a portion of the tab 22 there is no incised tear line and the tab is bent along this portion to provide a hinge by which it is connected with the top wall 16. If the material of the box is quite stiff, a bend line 24 may be stamped at the hinge location when the box blank is originally cut.

FIGURE 1a shows a construction which is similar to FIGURE 1 except that the box is made with a Van Buren ear 25 which is a panel extending from one side of the middle layer of the box top. The construction of the box top of FIGURE 1 will be described in detail in connection with the other figures, and it should be understood that the construction of FIGURE 1a is the same except for the addition of the Van Buren ear 25 and the provision of a tab 26 which is delineated by incised tear lines in the Van Buren ear; the tab 26 being slightly larger than the tab 20 to allow for tolerances in the operation of the machinery by which the boxes are made, although the exact dimensions of these tabs will vary and the tab 20 may be eliminated and the tab 26 becomes a slight extension of the top panel 34. When such a small tab 26 is used, it may be cut free, when making the box blank, of the remaining area of the Van Buren ear.

FIGURE 2 is a sectional view through the top wall 16 and shows the top wall made of three layers, including a bottom flap 32, which is a panel of one-piece construction with the side 12 and hinged to and folded inwardly at the top of the side. The top wall 16 includes also an intermediate flap 34 which is a panel attached to the upper end of the front side 14 and which is folded inwardly to cover the bottom flap 32. The top wall 16 includes also a top flap 36 which is a panel of a back side of the box opposite the front side 14 and which is folded inwardly to cover the other flaps 32 and 34. These flaps 32, 34 and 36 are secured together by adhesive, such as glue, across most of their confronting faces and those portions which are not to be secured together are covered with ink and/or varnish or any material resistant to the adhesive when the box blank is printed. The adhesive does not stick to the inked and/or varnished areas.

FIGURE 3 shows the box 10 after the tab 22 has been torn along the incised lines and swung into open position to expose an opening 40 through which the contents of the box can be dispensed. There are openings through all of the flaps 32, 34 and 36 but the opening through each flap is of a somewhat different size and shape from the other openings and the discharge opening 40 is formed where open areas through the different flaps coincide with one another.

In the bottom flap 32 there is an opening 42 and this opening 42 extends from the incised line 20 upwardly and then rearwardly to a back edge 44. There is a substantial area 46 of the bottom flap 32 exposed when the

tab 22 is raised; and this area 46 of the flap 32 provides a cantilever support for limiting downward movement of the tab 22 when the tab is pushed back into closed position.

The material displaced from the opening 42 forms a lower layer 50 of the tab 22 and the portion of this lower layer 50, which is displaced from the side 12, leaves an ear 52 at the end of the tab 22. This ear 52 provides additional means for limiting downward movement of the tab 22, as shown in FIGURE 6, where the ear 52 is of a size and in position to abut against the edge of the incised line 20 as the portion of the tab 22, remote from the hinge line 24, distorts to a downwardly-arched contour as the result of pressure exerted against it when closing the tab.

Referring again to FIGURE 3, when the material used is quite stiff, there are short cuts 56 extending back from edge portions 58 of the opening 42 so as to leave these edge portions 58 free to flex downwardly in the manner shown in FIGURE 5. Thus, the edge portions 58 provide a yielding support for the tab 22, while not interfering with the flexing of the tab or its movement into locking relation with the other edges of the openings through the flaps 34 and 36.

The opening through the intermediate flap 34 has edges 62 which are preferably parallel to one another and more widely spaced than the edge portions 58 of the opening 40. The material displaced from the opening in the flap 34 between the edges 62 provides an intermediate layer 66 of the tab 22. This intermediate layer 66 is secured to the lower layer 50 throughout their confronting faces. The edges 62 extend back to the region of the hinge line 24, but the intermediate layer 66 of the tab 22 is preferably cut from the flap 34 at the region of the hinge line so that only one layer of the tab 22 serves as a hinge. If the material is somewhat thinner or more flexible, a score line can be used in place of this cut.

The opening through the top flap 36 has edges 70 extending forwardly from the hinge line 24 and converging with one another as far as a location 72. Beyond this location 72, the opening through the top flap has edges 74, which are continuations of the edges 70, but which diverge as they extend forwardly.

At the front and back of the opening through the top flap 36, this opening is wider than the opening through the intermediate flap 34; that is, it is wider than the spacing of the edges 62. However, at the location 72, and for some distance both ahead of and behind the location 72, the edges 70 and 74 are more closely spaced from one another than are the edges 62. Thus the intermediate layer 66, which was displaced from between the edges 62 is wider than the opening through the top flap 36 at the location 72, and when the tab 22 is pushed into closed position, as shown in FIGURE 5, the sides of the intermediate layer 66 of the tab 22 jam against or under the edges of the opening in the top layer at the location 72.

The material displaced from the top flap 36 between the edges 70 and 74, forms a top layer 80 of the tab 22 and this top layer is secured to the intermediate layer 66 throughout most or all of the confronting faces of the uppermost layers 66 and 80.

In those regions where the top layer 80 is wider than the intermediate layer 66, the wider portions of the top layer contact with the areas of the intermediate layer which extend beyond the edges 70 and 74. In making the box blank, ink and/or varnish or some other expedient is used to prevent the gluing together of those faces of the tab 22 which overlie confronting surfaces of the flaps 32, 34 and 36, which are adjacent to the openings from which the layers of the tab are displaced. Thus there is no connection between the tab 22 and the flaps, other than the connections along the incised lines 18 and 20, to prevent opening of the flap 22.

Terms of orientation in the description are, of course,

relative; and changes and modifications can be made, particularly changes in shapes of the openings, without departing from the invention as defined in the claims.

What is claimed is:

1. In a box that has a top formed by a bottom flap, an intermediate flap covering the bottom flap, and a top flap covering the intermediate flap, the improvement which comprises openings through said flaps with a portion of the area of each opening in alignment with a portion of the area of each of the other openings to provide a discharge outlet for the box, all of the openings extending all the way to a common side of the box, a tab, at least a part of which is displaced from one of the two uppermost flaps to form the opening through that flap, the tab being hinged to the flap from which said part is displaced and being substantially longer than the opening through the bottom flap and being hinged at a location back from the opening through the bottom flap, the bottom flap having a portion beyond its opening and adjacent to the hinged connection of the tab and that serves as a support to limit downward movement of the tab when closing the discharge opening, the opening through one of the flaps for a portion, and only a portion, of the length of that opening being narrower than is the corresponding portion of the length of the tab so that the side edges of the tab jam against or extend under the edges of the narrower portion of the opening.

2. The box described in claim 1 and in which the box has sides and the flaps are panels hinged to the sides and folded over at the ends of the sides to form a top of the box, and all of the flaps are at the upper ends of adjacent side panels of a blank from which the box is made.

3. The box described in claim 1 and in which a portion of the tab is formed by material displaced from said common side of the box to which the openings extend.

4. The box described in claim 3 and in which there is an incised tear line spaced downward from the end of the box and delineating the portion of that tab that is formed by material displaced from said common side of the box whereby the release of the tab to start the opening of the box can be started by pressing a thumbnail into said incised tear line.

5. The box described in claim 1 and in which at least a portion of the tab is formed by material displaced from the top flap and originally delineated by incised tear lines before the box is opened for the first time.

6. The box described in claim 5 and in which the portion of the tab that is formed from material displaced from the side of the box is of one-piece construction with the material that is displaced from the bottom flap, and the material displaced from the top and bottom flaps form layers of the tab.

7. The box described in claim 6 and in which the tab has three layers including an intermediate layer formed by material displaced from the intermediate flap.

8. The box described in claim 3 and in which only the top layer of the tab is hinged to the flap from which it is displaced, and only the bottom layer includes material displaced from the side of the box.

9. In a box that has a top formed by a bottom flap, an intermediate flap covering the bottom flap, and a top flap covering the intermediate flap, the improvement which comprises openings through said flaps with a portion of the area of each opening in alignment with a portion of the area of each of the other openings to provide a discharge outlet for the box, a tab, at least a part of which is displaced from one of the two uppermost flaps to form the opening through that flap, the tab being hinged to the flap from which said part is displaced and it being substantially longer than the opening through the bottom flap and being hinged at a location back from the opening through the bottom flap, said bottom flap having a portion beyond its opening and adjacent to the hinged connection

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of the tab which serves as a support to limit downward movement of the tab when closing the discharge opening, the opening through the top flap having edges that converge to a minimum opening with and then converge toward the end of that opening, the layer of the tab that is displaced from the intermediate flap being wider than the minimum width of the opening through the top flap whereby edges of the intermediate flap jam against or extend under the edges at said minimum opening width so that the edges of the narrower portion of the opening in the top flap press the tab down against the portion of

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the bottom flap that supports the tab, and the opening through the bottom flap having resilient edges under the upper edges that press the tab down.

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