

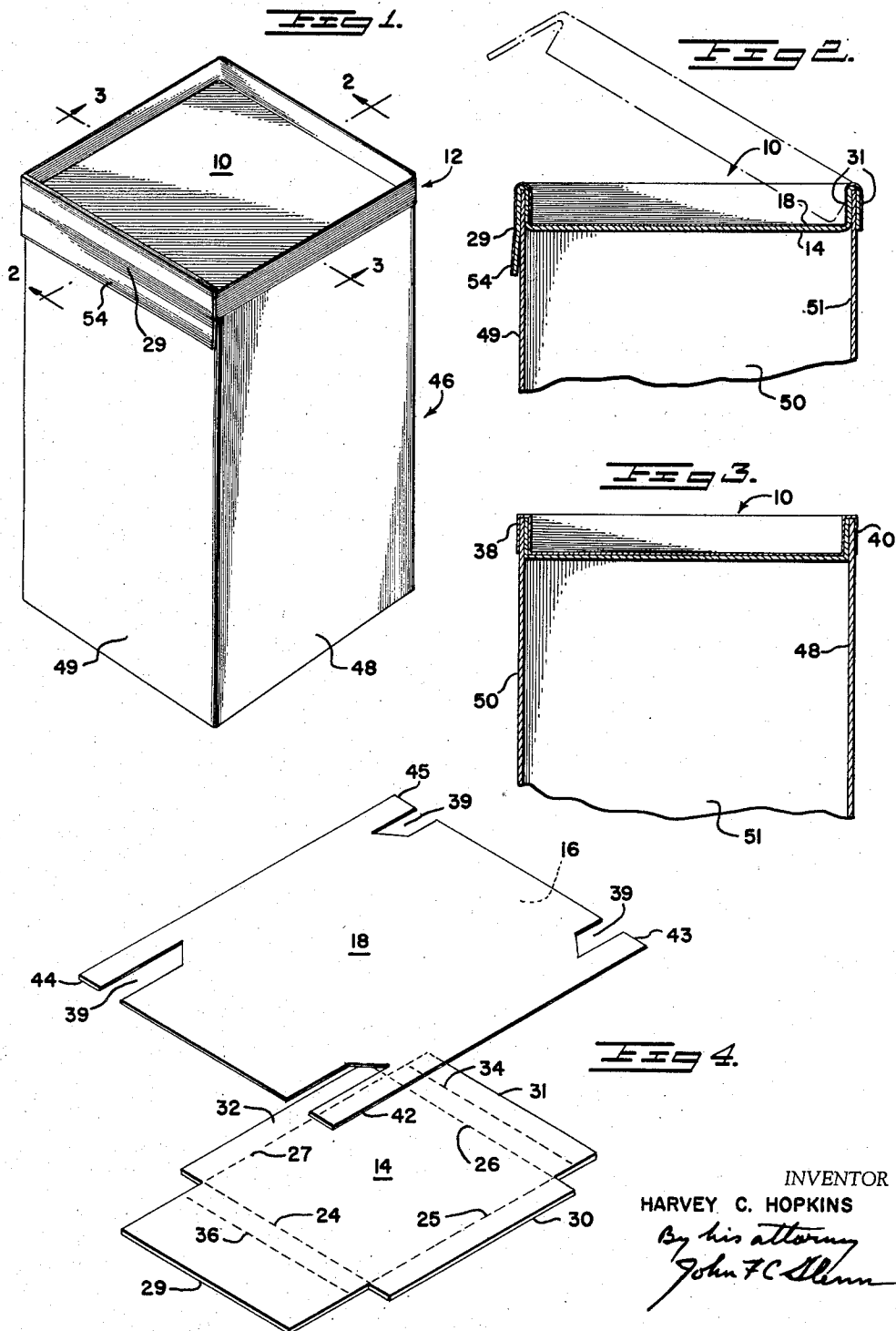
Sept. 8, 1959

H. C. HOPKINS
CONTAINER END CLOSURE

2,903,173

Filed May 9, 1956

2 Sheets-Sheet 1



INVENTOR
HARVEY C. HOPKINS
By his attorney
John F. C. Allen

Sept. 8, 1959

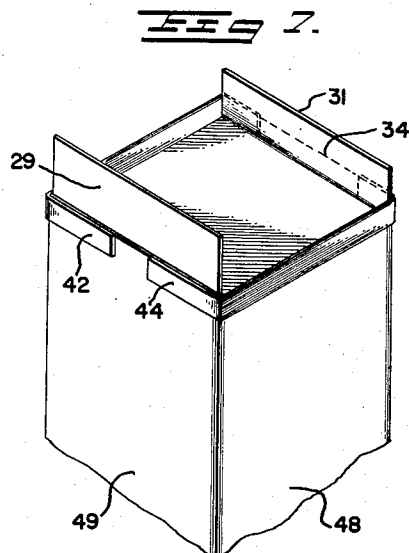
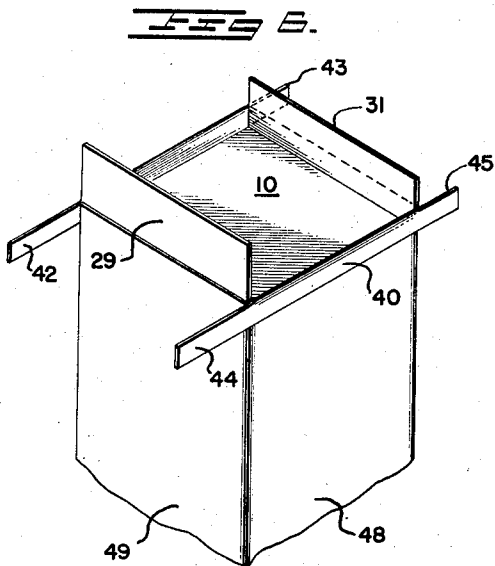
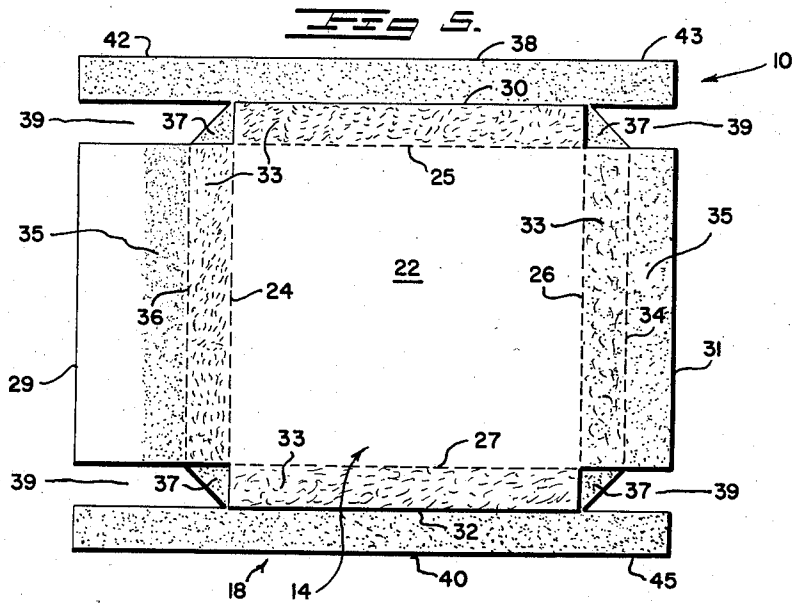
H. C. HOPKINS

2,903,173

CONTAINER END CLOSURE

Filed May 9, 1956

2 Sheets-Sheet 2



INVENTOR
HARVEY C. HOPKINS

By his attorney
John F. C. Glenn

1

2,903,173

CONTAINER END CLOSURE

Harvey C. Hopkins, Chappaqua, N.Y., assignor to King Container Corporation, New York, N.Y., a corporation of New Jersey

Application May 9, 1956, Serial No. 583,860

21 Claims. (Cl. 229—5.5)

The invention relates to a novel container and closure therefor, and particularly to a new system of closing and reopening a rectangular end of a container. The closure includes an arrangement for using easily tearable sheet material to seal part of the closure on the container, and for using a relatively stiff portion of the closure to cut edgewise through said material during the opening of the closure. While the closure is primarily intended for containers of single use products, it has the advantage of being convenient to reclose when it is desired to remove only part of the contents of the container.

The closure is especially adapted for use with containers of rectangular cross-section, which is the shape ideal for storing and shipping the maximum quantity of product in a given space. The closure and container may be fabricated separately, and then assembled, or the container side-seam may be sealed on the same equipment which attaches the closure. The latter procedure is particularly convenient when the container bodies are shipped flat to be assembled at a packing plant, since the closure members are preferably shipped separately in rolls and are cut to shape and combined as they are assembled to the bodies at the packing plant.

For a better understanding of the invention, reference is now made to the present preferred embodiment of the invention shown, for purposes of illustration only, in the accompanying drawings. In the drawings:

Figure 1 is a perspective view of a container closed at the upper end with a closure embodying the invention;

Figures 2 and 3 are vertical sections through the planes indicated at 2—2 and 3—3 in Figure 1, with the lower portion of the container broken away, and with the open position of the closure indicated in dotted lines in Figure 2.

Figure 4 is a perspective view showing the foil and paperboard components of the closure of the invention in their original flat form, and spaced apart for the purposes of illustration;

Figure 5 is an enlarged plan view of the closure of the invention in its original flat form, with the paperboard component above the foil component;

Figure 6 is a view corresponding to Figure 1, but in reduced scale and showing the closure on the container before the opposite end flaps and foil tongues are folded into final position; and

Figure 7 is a view corresponding to Figure 6, after the foil tongues have been folded into final position, but with the end flaps still up.

The illustrated embodiment of the invention comprises an end closure 10, and a container 12 of rectangular cross-section on which the closure 10 is mounted (Figures 1—3). The closure 10 is a laminate consisting of a paperboard component 14 secured by heat-bonding adhesive 16 to a foil component 18. Other relatively stiff material may be substituted for paperboard in component 14, and other material which is effective for sealing and is relatively easy to tear, such as plastic film, cellophane or

2

treated paper, or various sheet laminates, may be substituted for foil in component 18.

As shown in Figures 4 and 5, the paperboard component 14 of the closure 10 has a rectangular central area 22 bounded by four score lines 24—27 which respectively mark the line of division between the central area 22 and four rectangular flaps 29—32. The opposite side flaps 30 and 32 are of equal size, are relatively narrow, and have no additional score lines. The end flap 31 is about twice as wide, measured from the score line 26, as the side flaps 30 or 32 measured from the score lines 25 or 27, and has an additional score line 34 extending across its length parallel to the score line 26, and spaced the same distance from the score line 26 as the outer edges of the side flaps 30 or 32 are spaced from the respective score lines 25 or 27. The other end flap 29 has a score line 36 extending across its length parallel to the score line 24, and spaced the same distance therefrom as the spacing between score lines 26 and 34. However, the end flap 29 is substantially longer, measured from the score line 36, than the end flap 31 measured from the corresponding score line 34. All of the score lines are preferably scored on both sides of the paperboard to facilitate bending.

In order to facilitate opening the closure, a coating of wax 33 is applied to the whole area of the non-foil covered side of flaps 30 and 32, to the area of the non-foil covered side of flap 29 between score lines 24 and 36, and to the non-foil covered side of flap 31 between score lines 26 and 34. The wax 33 prevents these areas from sticking to the opposite surfaces of the container body walls during the process of heat-sealing the closure on the container body, regardless of the presence of an underlying coating of heat bonding material on the said flaps, or on the container body walls. On the other hand, in order to anchor the closure on the container body, a heat-bonding adhesive 35 is applied to an area of the non-foil covered side of flap 29 equal to the area between score lines 24 and 36, but on the other side of score line 36, and to the non-foil covered side of flap 31 between the score line 34 and the end edge of flap 31. A further consideration is to protect the inner surfaces of the paperboard member 14 from penetration by the product packed in the container, and one procedure in accordance with the invention is to apply a thermoplastic protective coating to the roll of paperboard from which the paperboard members 14 are cut, on the side which is not covered with foil (preferably in a central stripe corresponding to the area of the end flaps 29 and 31, and the central area 22, but omitting the area of the side flaps 30 and 32). Such a coating will not only act as a protective coating where needed, but also will serve as the above-mentioned adhesive 35 on the desired areas of end flaps 29 and 31. If such coating is used, subsequent application of wax 33 as described above is necessary. If such coating is not used, adhesive 35 is preferably spot printed in the areas stated above, and wax 33 can then be omitted, unless it is required by reason of the presence of a like coating on the container body walls.

The foil component 18 covers the entire area of one side of the paperboard component 14, and is co-extensive with the outer edges of the end flaps 29 and 31. In addition, the foil component 18 has webs 37 extending across the triangular space where each end of each of the side flaps 30 and 32 makes a corner with the adjacent end of the end flaps 29 and 31 between the score lines 24 and 36, in the case of flap 29, and between the score lines 26 and 34, in the case of flap 31. These triangular webs 37 are each folded along lines extending radially from the said adjacent corners, and the adhesive-coated areas thereof which are folded together are sealed during the final mounting of the closure on the container, in

order to insure a protective seal at the inside corner where each of the triangular webs 37 is located. The foil component 18 also has two rectangular extensions 38 and 40 projecting beyond the outer edges of the side flaps 30 and 32, these extensions being longer in both directions than the side flaps 30 and 32, so that they respectively have tongues 42 and 44 paralleling and extending as far as the end flap 29, and tongues 43 and 45 paralleling and extending as far as the end flap 31. The foil component 18 thus has a rectangular area of the same length as the paperboard component 14 between the outer edges of its end flaps 29 and 31, but of greater width than the paperboard component 14 between the outer edges of its side flaps 30 and 32, and has four notches 39 extending in pairs from opposite ends of the rectangular area of the foil component 18 to define the outer edges of the webs 37 and end flap portions of the foil, and the inner edges of the foil tongues 42—45.

The foil component 18 is coated with the adhesive 16 entirely over one side, and is subsequently bonded to the prescored paperboard component 14. That bonding operation does not affect the adhesive 16 on the foil webs 37, the foil extensions 38 and 40, and the foil tongues 42—45, and consequently that adhesive is available for subsequent use in sealing the closure on the container body. Such construction is adapted for efficient production, such as by trimming a strip of paperboard to the shape of a series of the components 14 integrally joined with the outer edge of the flap 29 of one unit connected to the outer edge of the flap 31 of the next unit; scoring each component 14 with the scorelines 24—27, 34 and 36, on both sides of the paperboard strip; passing the strip through heated pressure rolls against a wider strip of foil coated with the adhesive 16 on the side of the foil against the paperboard, so that the two strips are bonded together; applying adhesive 35 and wax 33 to the non-foil covered side of the paperboard, where necessary, as previously described; and simultaneously cutting apart the laminated units and cutting the notches 39 in the foil component 18.

When the closure 10 is sealed on one end of the body 46 of container 12, the body 46 is preferably held on a conventional mandrel which extends through the open bottom of the body 46, against the body side walls 48—51, to a level spaced from the top of the body 46 by a distance substantially equal to the spacing between score lines 24 and 36, and 26 and 34, respectively, which spacing equals the width of the side flaps 30 and 32 as measured from the score lines 25 and 27, respectively. The closure 10, with the foil component 18 above the paperboard component 14, is bent along the score lines 24—27 to raise the flaps 29—32, and is held by a conventional chuck while being inserted in the upper end of the body 46 to a depth substantially equal to the above-mentioned spacing between score lines 24 and 36, and 26 and 34, respectively. The foil extensions 38 and 40 are bent over the top edges of body sides 48 and 50, and are brought down against the latter sides. The tongues 42 and 44 are folded around the outside of the upper end of body wall 49, and the tongues 43 and 45 are folded around the outside of the upper end of body wall 51 (Figures 6 and 7) these tongues strengthen the corners, but may be omitted. The end flaps 29 and 31 are then bent along scorelines 36 and 34 and folded down over those sides, and over the tongues 42 and 44, and 43 and 45. The webs 37 are folded outwardly of the four corners formed when the flaps 29—32 are initially bent up on score lines 24—27, and are subsequently crimped between said corners and the adjacent inside corners formed by the upper ends of the body walls 48—51. One or more heating irons, successively or simultaneously, are applied against the outside of the downturned foil extensions 38 and 40, against the downturned portion of flap 31, and against an equal area at the top of the downturned portion of flap 29; until the adhesive 16

bonds the foil extensions 38 and 40 to the upper ends of the body sides 48 and 50, bonds the foil tongues 42 and 44 to the upper end of body wall 49, bonds the foil tongues 43 and 45 to the upper end of body wall 51, and bonds the crimped webs 37 between the obtuse corners formed by the upturned closure flaps 29—32 and the acute corners formed by the body walls 48—51; and until adhesive 35 bonds the upper part of the downturned portion of end flap 29 to the outside of body wall 49 and to the foil tongues 42 and 44, and bonds the end flap 31 to the outside of the upper end of container wall 51, and to the foil tongues 43 and 45. Such bonding thoroughly seals the closure 10 on the end of the container body 46. No heat or pressure is applied to the lowermost end portion of flap 29, in order to leave it unbonded and available as a convenient tab 54 for opening the closure. After the closure 10 has been applied, the container body 46 may be filled, and then closed at its opposite end by conventional means.

The closure 10 is opened by grasping the unbonded tab 54 formed by the lower end of the flap 29, and pulling it up to tear away the part of the flap 29 bonded by adhesive 35 to the outside of the container body side wall 49. Continued pulling of the flap 29 breaks the seal at webs 37 adjacent flap 29, causes the side flaps 30 and 32 to swing upwardly and with their upper edges cut through the foil which passes over and seals the juncture of said flaps with the container walls 48 and 50, and finally pivots the closure on the score line 34 through any desired angle (up to about 270°), whereby the end of the container may be opened as much as may be desired. However, the closure is preferably swung up less than 90°, which keeps part of each of the side flaps 30 and 32 against the inside of the adjacent body walls 50 and 48 (Figure 2) and thus facilitates swinging the closure back to its original closed position. The return movement is further facilitated by the fact that the portion of end flap 31 beyond its score line 34 remains bonded to the outside of the upper end of body wall 51, so that the closure is accurately guided back to closed position by swinging about the score line 34 as a fixed pivot axis relative to the container body. The side flaps 30 and 32 are not bonded to the container body, but act as transverse stiffeners of the closure, and, as mentioned above, are carried upwardly like knives, when the opening movement of the closure begins, so that their upper edges cut through the adjacent portions of the foil extensions 38 and 40, thus freeing the closure to continue its opening movement. When the opened closure is returned to closed position, the original hermetic seal is broken, except along the flap 31, but the contact of the side flaps 30 and 32 with the inside of the body walls 50 and 48 and of the flap 29 with the inside area and top edge of the body wall 49, together with the unbroken seal along the flap 31, provide an adequate seal at the top of the container for purposes of temporary storage.

The closure 10 can also be applied in reverse position, with the paperboard component 14 on the outside. In that case the foil component 18 is coated with adhesive where it lies against the paperboard component 14, and the other side of the foil component 18 is coated with adhesive wherever the foil extends beyond the paperboard, and is coated with adhesive and wax, respectively, on the areas of the foil corresponding to the areas of the paperboard component 14 which have been described above as covered with adhesive 35 and wax 33 (see Figure 5).

As a further improvement, the upper end of the container body 46 can be necked in so that in packing the containers the upper end will nest inside the walls of the lower end, the latter being fitted with a bottom closure which is channeled to receive the walls formed by the bent-over flaps of the closure 10, but has a downwardly dished central area adapted to fit against the area 22 of the closure 10. That arrangement protects the closure

5

10 from transit damage, and saves some of the space which would otherwise be lost as a result of having recessed ends.

While I have illustrated and described a present preferred embodiment of the invention, it will be understood that it may be otherwise variously embodied and practiced within the scope of the following claims.

1. A paperboard container comprising a body having four sides forming a rectangular opening at one end of the body and a rectangular closure for the opening, said closure formed of a sheet of paperboard and a sheet of sealing material secured together, said closure hinged at one side to one of the container walls, said sheet of sealing material bonded to the exposed outer surface of said paperboard sheet and extending beyond the paperboard sheet and secured to the outside of the container walls and means integrally connected to said closure adapted to sever the sealing material whereby access to the interior of the container is gained, said last mentioned means including an upwardly extending flap on each side of the closure adjacent the hinged side, a surface of each flap resting flush against a surface of the adjacent walls of the container body.

2. A paperboard container comprising a body having four sides forming a rectangular opening at one end of the body, and a rectangular closure for the opening, said closure having one side hinged to one of the side walls, an upwardly extending flap carried by the closure on each of the sides adjacent to the hinged side, an easily tearable sheet material bonded to the outer surface of said closure adapted to seal the closure in the rectangular opening, said sheet material extending over the upper edges of said upwardly extending flaps and secured to the outside of the two adjacent container walls, whereby the upper edges of said flaps serve as knife-edges to sever the sealing material when the closure is swung upwardly about its hinge.

3. A paperboard container comprising a body having four sides forming a rectangular opening at one end of the body, and a rectangular closure for the opening, said closure having one side hinged to one of the side walls, flaps on the remaining three sides of the closure, said three flaps bent upwardly, whereby they press lightly upon the adjacent container walls, an easily tearable sheet material bonded to the outer surface of said closure adapted to seal the closure in the rectangular opening, said sheet material extending over the upper edges of the two flaps adjacent the hinged side of the closure, the upper edges of said two flaps severing the sealing material when the closure is swung upwardly about its hinge in opening the container, and said three flaps providing a reseal when the closure is swung downwardly to close the container.

4. A container comprising a body having four side walls forming a rectangular opening at one end of the body, and a closure sealing said opening and comprising a first component of relatively stiff sheet material, said first component having a central area extending across the said opening at a level spaced inwardly from the ends of the walls forming said opening, and having a pair of flaps extending integrally from two opposite sides of the central area, and overlapping both sides of the ends of the adjacent pair of opposite walls forming said opening, both of said flaps being bonded to the said adjacent walls, but one of said flaps having an exterior, downwardly extending extremity which is not bonded to the adjacent wall surface; and said closure comprising a second component of easily tearable sheet material overlying and bonded to the first component, and having extensions beyond the first component which are bonded to the other of said pairs of opposite walls to seal the said opening, said downwardly inclined first component flap extremity adapted to lift one end of the closure whereby the second component will be torn, and the container opened.

5. A container according to claim 4, in which the first

6

closure component is of paperboard, and the second closure component is of metal foil.

6. A container according to claim 4, in which the flap having said extremity is not bonded to the interior wall surface overlapped by said flap, and the other flap is not bonded to the interior wall surface which it overlaps.

7. A container according to claim 4, in which the first component of said closure has a second pair of flaps extending integrally from opposite sides of said central area at right angles thereto, said flaps extending against the adjacent side walls of the container body up to but not beyond the edges of said walls forming said opening, and being unbonded to said side walls; and in which said second component of the closure extends over said second pair of flaps and down the exterior surfaces of the side walls adjacent said flaps, and is bonded to said exterior surfaces.

8. A container according to claim 7 in which the portions of the second component extending past the second pair of flaps over the exterior surfaces of the adjacent container body walls, each have an extension wrapped around an adjacent exterior corner of the container and bonded between one of the first pair of flaps and the adjacent container body wall.

9. A container according to claim 7 in which the portions of the second component extending past the second pair of flaps over the exterior surfaces of the adjacent container body walls, each have an extension wrapped around an adjacent exterior corner of the container and bonded between one of the first pair of flaps and the adjacent container body wall, and an opposite extension wrapped around the adjacent exterior corner of the container and bonded between the other of the first pair of flaps and the adjacent container wall.

10. A container according to claim 7 in which a crimped web of the second component extends across each corner formed between adjacent ends of the two pairs of flaps.

11. A container comprising a body having four side walls forming a rectangular opening at one end of the body, and a closure sealing said opening and comprising a first component of relatively stiff sheet material, said first component having a central area extending across the said opening at a level spaced inwardly from the ends of the walls forming said opening, and four substantially rectangular flaps extending integrally from said central area at right angles thereto against the adjacent interior surfaces of the side walls toward said opening, one pair of said flaps on opposite sides of the central area being of unequal length, the shorter flap being folded over the end of the adjacent wall and bonded to at least the exterior surface of said wall, and the longer flap being folded over the end of the adjacent wall and bonded to the exterior surface of said wall only adjacent its end, thereby leaving an unbonded outside tab at the end of the longer flap; the other pair of flaps being shorter, extending only to the opening, and being unbonded to the container side walls; and said closure comprising a second component of flexible and readily tearable sheet material, which overlies and is bonded to the outer portions of the first component within the opening, and has extensions, beyond the second pair of flaps which are folded over the ends of the side walls adjacent the second pair of flaps, and are bonded to the exterior surfaces of the latter walls.

12. A container comprising a body having four side walls forming a rectangular opening at one end of the body, and a closure sealing said opening and comprising a sheet of relatively stiff material, said sheet having a central area extending across the said opening at a level spaced inwardly from the ends of the walls forming said opening, and four substantially rectangular flaps extending integrally from said central area at right angles thereto against the adjacent interior surfaces of the side walls toward said opening, one pair of said flaps on opposite sides of the central area being of unequal length, the

shorter flap being folded over the end of the adjacent wall and bonded to at least the exterior surface of said wall, and the longer flap being folded over the end of the adjacent wall and bonded to the exterior surface of said wall only adjacent its end, thereby leaving an unbonded outside tab at the end of the longer flap; the other pair of flaps being shorter, and extending toward but not beyond said opening.

13. A closure for the rectangular end of a container, comprising a first component of relatively stiff sheet material, having a rectangular central area and four integral flaps extending one from each border of the central area, one pair of flaps on opposite sides of the central area extending equally from the adjacent border thereof, the third flap extending about twice as far from the central area, and the fourth flap extending still further from the central area; and a second component of flexible and readily tearable sheet material, the second component being bonded over substantially the whole external area of the first component, and extending beyond said first component to form a web between adjacent side edges of the flaps at each corner of the said central area, and also to form an extension beyond each of the first-mentioned pair of flaps.

14. A closure according to claim 13 in which the first component is paperboard, and the second is metal foil.

15. A closure according to claim 13 in which each of the extensions of the second component has a pair of oppositely extending tongues projecting in the direction of the said third and fourth flaps, respectively.

16. A closure according to claim 13 in which adhesive covers the entire surface of one side of the second component, including its extensions, and part of said adhesive bonds the two components together.

17. A closure according to claim 13 in which score lines are scored in the first component where each flap joins the central area, and across the third and fourth flaps parallel to the score line at the base of the flap and spaced from the latter score line by a distance equal to the space between the score line at the base of each of the first pair of flaps and the parallel outer edge thereof.

18. A closure according to claim 17 in which adhesive covers a certain area of the side of the third flap not bonded to the second component, the said certain area lying between the outer edge of the third flap parallel to the score lines across said flap, and the score line nearest

said edge; and in which adhesive covers a certain area of the side of the fourth flap which is not bonded to the second component, the latter certain area being between the outer edge of the fourth flap and the nearest score line across that flap, and being adjacent said score line and spaced away from said edge.

19. A closure according to claim 17 in which a non-adherent coating covers certain areas on the side of the first component not bonded to the second component, said areas extending across substantially the whole of the first and second flaps, and between the two score lines across the third flap and the two score lines across the fourth flap.

20. A container comprising a body having a dispensing opening and a closure for said opening, said closure having at least a portion thereof hinged to the container body, at least a pair of flaps terminating in edges carried by the closure one on each side of the hinged portion, frangible material bonded to the outer surface of at least the peripheral area of said closure adjacent said flaps, a portion of said material extending beyond said flaps is secured to the surface of the container adjacent said flaps and adapted to seal the closure within the dispensing opening, said flap edges severing the frangible material when the closure is swung upwardly about its hinge.

21. A container as defined in claim 20, including means integral with said closure extending beyond the borders of the dispensing opening and sealed to the outer surface of the container when the closure is in a closed position, said means adapted to swing said closure upwardly about said hinge when a lifting force is applied to said means.

References Cited in the file of this patent

UNITED STATES PATENTS

35	1,152,355	Sutton	Aug. 31, 1915
	1,707,946	Roth	Apr. 2, 1929
	2,152,400	Da Rold	Mar. 28, 1939
	2,290,749	Hildebrandt	July 21, 1942
	2,398,405	Brooks	Apr. 16, 1946
40	2,465,842	Brooks	Mar. 29, 1949
	2,665,616	Jungmayr	Jan. 12, 1954
	2,757,851	Moore	Aug. 7, 1956

FOREIGN PATENTS

45	4,690	Great Britain	1910
	479,059	Great Britain	Jan. 31, 1938
	1,078,705	France	May 12, 1954