United States Patent [19]

Robinson

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[54] **MOLDED ARTICLE**

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[52] **U.S. Cl.** **220/269;** 220/270

[51] **Int. Cl.²** **B65D 41/32**

[58] **Field of Search** 220/48, 27, 44, 269, 270, 220/265

[56] **References Cited**

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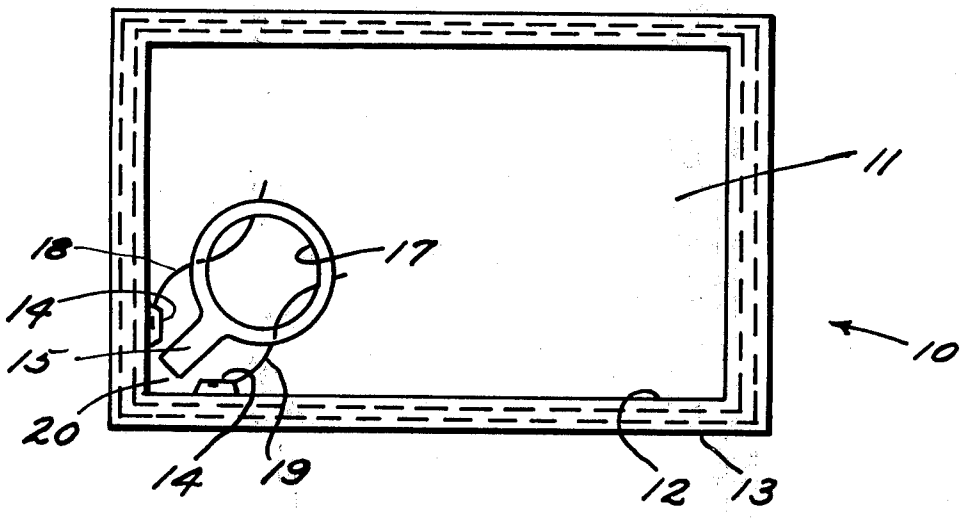
Primary Examiner—William I. Price

Assistant Examiner—R. E. Hart

[57] **ABSTRACT**

Article having re-entrant portions and molding apparatus and method of manufacture thereof enabling removal of the article from an injection mold assembly by first separating the mold portions and then causing relative movement between the article and a re-entrant defining core portion to substantially release the article from contact with all mold portions. The apparatus includes a core portion assembly and means causing relative movement between a molded article and the core portion when the apparatus is in open position to permit removal of the molded article from the molding apparatus.

4 Claims, 5 Drawing Figures



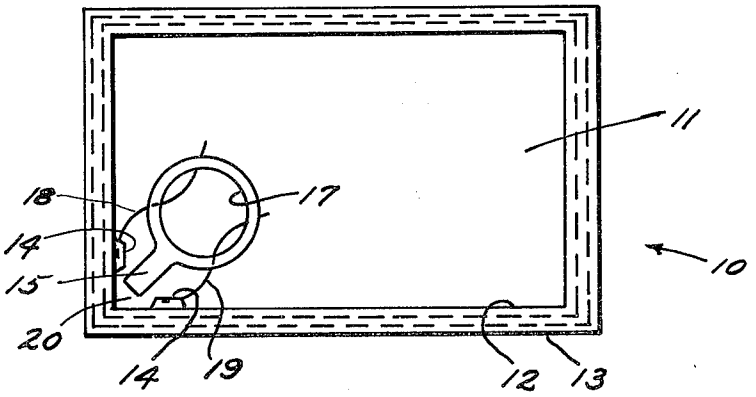


Fig. 1

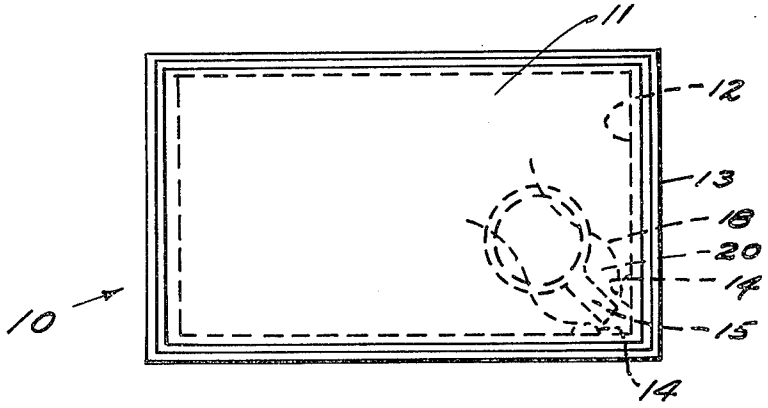


Fig. 2

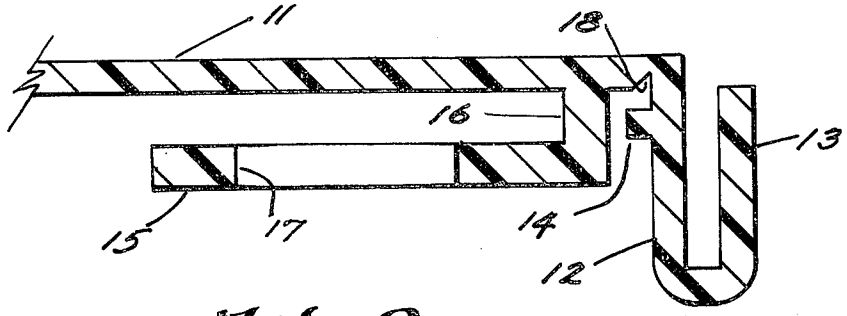


Fig. 3

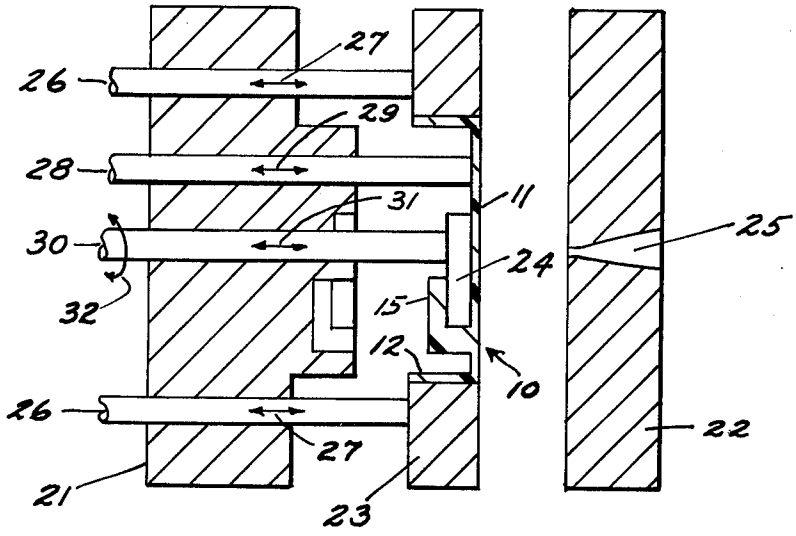

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Fig. 4

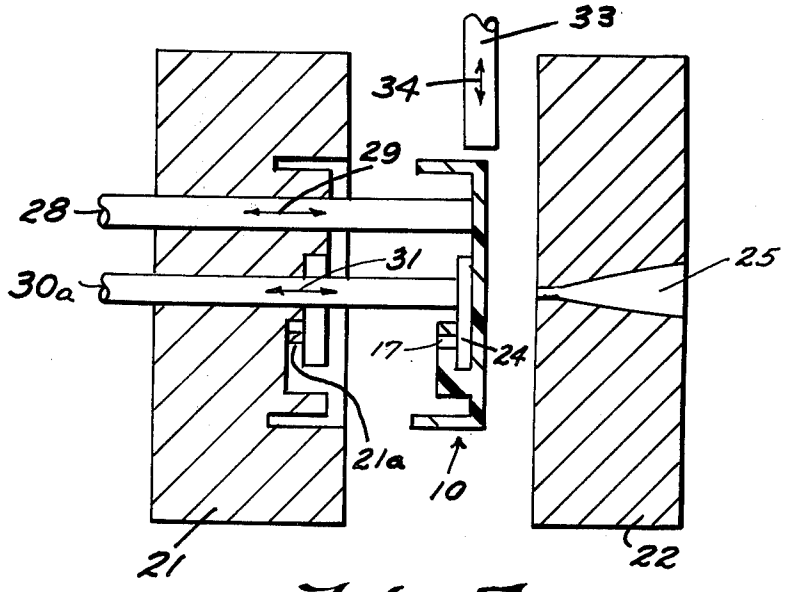

33
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28
31
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30a
17
24
21a
10
21
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Fig. 5

MOLDED ARTICLE

The present invention relates generally to merchandise packaging and, more particularly, to improvements in molded articles, molding apparatus, and method of manufacture of such articles.

BACKGROUND

In the packaging of food and/or beverages as well as other merchandise, which may be granular, powdered, or liquid, it is desirable to provide closure means that can be easily and economically produced in desired quantities and which are useful and effective to enclose and/or seal various types of contents within various types of containers formed of various materials and having a wide variety of shapes and configurations such as circular, oval, square, rectangular, polygonal, etc.

In certain instances, it is desirable that the container-closure combination be sealed in a manner capable of preventing leakage when the seal is subjected to a high pressure differential so as to provide a suitable barrier when vacuum filling and sealing methods of packaging are employed. In other instances, a seal preventing air tightness and/or moisture tightness at relatively low pressure differences is sufficient. And, in still other instances, it may be sufficient that the closure functions essentially as a cover to avoid spilling of the contents of the container and/or avoid contamination of such contents by foreign material.

It is further desirable to provide means for ease of opening such a closure and, particularly when a container-closure combination encloses contents of granular, powdered, or liquid material, it is equally desirable to provide a closure which also provides features of reclosability and/or means for dispensing such contents, and to provide means and method of manufacturing a closure embodying such desirable features.

SUMMARY

A principal object of the present invention is to provide an improved article, apparatus and method embodying the above-noted desirable features. In accordance with the invention, this is achieved by providing a closure member of molded synthetic resinous material shaped to conform with the shape of a container and capable of being sealed thereto. The closure member is provided score lines defining a weakened section and forming margins of a tearable and reclosable lift tab having a portion which can be easily grasped for easy opening and/or reclosing the tab. The closure is manufactured by a method and with apparatus which utilizes a special core portion of the apparatus and which involves causing relative movement between the molded closure and the core portion when the mold apparatus is in its open position to permit removal of the closure from the apparatus.

DESCRIPTION

Additional objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a top plan view of a closure article embodying the present invention;

FIG. 2 is a bottom plan view of the article of FIG. 1;

FIG. 3 is an enlarged fragmentary sectional view looking in the direction of arrows 3—3 in FIG. 2;

FIG. 4 is a view illustrating molding apparatus and method in accordance with the invention; and

FIG. 5 is a view of a modification of the apparatus and method of FIG. 4.

Referring to the drawings, a closure member embodying the present invention is indicated generally at 10. The closure includes a top portion 11 having depending therefrom a marginal skirt 12 having a reversely turned end portion 13 spaced apart from the skirt portion. Additionally, skirt portion 12 may include one or more depending portions 14 projecting inwardly from the skirt. A handle-like member 15 is connected to the top portion 11 by a connecting portion 16 and is spaced apart from the top portion to facilitate grasping of the handle member which also may be provided with an opening 17 to further assist grasping of the handle-like member.

The top portion 11 is provided with one or more score lines 18, 19 which define therebetween a removable tear strip or tab 20 of desired shape. As shown in the drawings, tab 20 is shaped to form a spout-like opening to dispense liquid, powdered, or granular contents enclosed within the container-closure combination. The score lines intersect at a corner of the closure top, as shown in FIGS. 1 and 2, and these score lines provide a weakened section in the closure top, as shown in FIG. 3, which can be easily ruptured when the handle-like member is lifted and pulled upwardly.

It is believed that use and operation of the device will be apparent from the foregoing description. A container, not shown, and its contents are enclosed by the closure member with the upper edge of the container received between skirt 12 and the reversely turned portion 13. A suitable seal is effected between the closure and the container walls.

When it is decided to remove some of the contents from the container, the handle-like portion is grasped and lifted upwardly and pulled sufficiently to effect rupture of the weakened sections along score lines 18, 19 thus opening the container and forming tab portion 20. The contents or some portion thereof can then be poured through the resulting opening in the closure top, following which, the container can be reclosed by pushing the tab portion downwardly and snapping it past projections 14 which serve to maintain the container in a closed condition until the handle-like portion is again lifted with sufficient force to move the tab past projecting portions 14.

MOLDING APPARATUS AND METHOD

One molding apparatus and method for manufacturing closures in accordance with the present invention is illustrated in FIG. 4. The apparatus includes first and second mold portions 21, 22 and an intermediate portion 23. In the closed position of these mold portions, their surfaces define an enclosed mold cavity corresponding to the desired shape of the molded article to be produced during the molding operation when molding material is introduced into the mold cavity through an opening 25 provided in the mold portion 22. A core or shoe 24 is inserted within the mold cavity and cooperates therewith to form a re-entrant portion of the article to be molded. Intermediate portion 23 is fixed to guides 26 which extend through mold portion 21 and are reciprocable relative thereto in the directions indicated by double arrows 27. An ejector member 28 similarly extends through mold portion 21 and is reciprocable relative thereto in directions indicated by the double arrows 29. The core or shoe is fixed to a rod 30 which also extends through mold portion 21. Rod 30 is

reciprocable relative to mold portion **21** in the directions indicated by double arrows **31** and is also rotatable relative to mold portion **21** in the directions indicated by double arrows **32.**

As shown in FIG. **4,** mold portions **21, 22,** and **23** are shown in the open position of the mold but it is to be understtod that all of these mold portions are movable relative to one another between open and closed positions of the mold apparatus.

When it is desired to produce a molded part such as closure **10,** the respective mold portions are placed in the closed position of the mold apparatus, following which molding material is introduced into the mold cavity through opening **25.** The molding material is introduced into the cavity under pressure and thus flows to all parts of the cavity until the cavity is completely filled. The respective mold portions are maintained in their closed position until the molding material within the mold cavity has cooled and/or set sufficiently for the molded part to retain its shape, following which, the respective mold portions are moved to their open position as illustrated in FIG. **4.** At this stage, the molded article has been completely separated from mold portion **21** and is retained within intermediate portion **23.** The core **24** has been displaced relative to mold portion **21** along with the molded article **10** but otherwise, core **24** remains in the same position relative to the molded article as it occupied when it and the molded article were confined within the mold cavity in the closed position of the mold. The core **24** is then rotated relative to the molded article **10** by causing rotation of rod **30** until the core is no longer in contact with re-entrant portion **15.** Thereafter, the ejector **28** moves to the right in the drawing and pushes the molded article out of the intermediate member **23.** When the molded article has thus been removed from the molding apparatus, the respective mold portions can again be moved to the closed position and the apparatus is then ready for the molding of a subsequent article.

FIG. **5** shows a modification of the embodiment of FIG. **4.** This modified embodiment also shows the various mold portions in the open position. In the modified embodiment, the intermediate mold portion is eliminated and the mold cavity is formed entirely within mold portion **21.** A mold portion **21a** projects partially into the mold cavity to define an opening **17** in the molded part. Core **24** is fixed to a rod **30a** similar to rod **30** but differs in that rod **30a** is mounted for reciprocable movement in the direction of double arrows **31** relative to mold portion **21,** but is not rotatable relative thereto. A second ejector **33** is mounted for reciprocable movement in the direction of double arrows **34.**

Use and operation of the molding apparatus to produce a molded part is somewhat similar to that described heretofore in connection with the embodiment of FIG. **4.** With the mold portions **21, 22** in closed position, molding material is injected through opening **25** into the mold cavity. After the material in the mold cavity has cooled and/or set up sufficiently to retain its shape, the mold portions **21, 22** are separated to the open position shown in FIG. **5** and ejector **28** is moved to the right to remove the molded article from the mold cavity to the position shown in FIG. **5.** The ejector is then retracted and the second ejector is moved in a downward direction to push the then molded article away from core **24.** After the molded article has been removed from the core, the mold portions are again closed and are then ready for a subsequent molding operation.

While particular embodiments of the invention have been illustrated and described, it will be obvious that various changes and modifications can be made without departing from the invention and it is intended to cover in the appended claims all such changes and modifications that fall within the true spirit and scope of the invention.

What is claimed is:

1. In a closure having a skirt portion for sealing engagement with a container, the combination comprising

a wall portion joined to other portions of the closure and defining weakened sections in said wall portion and forming marginal edges of a severable and re-closable spout-like tab including a crisp portion and additionally including a retention tab adjacent said crisp and joined to other portions of the closure,

rupture-producing means including a member joined to said wall portion and having a distal end spaced apart from said wall portion and readily graspable by a user, and

stress concentration means adjacent each of said weakened sections and augmenting and transferring force from said rupture-producing means to cause rupture of said wall portion along said weakened sections and thereby form and open said tab when a force is applied to said member.

2. Structure according to claim **1,** wherein said stress concentration means angularly intersect one another.

3. Structure according to claim **1,** wherein said top portion includes a plurality of marginal portions with adjacent marginal portions intersecting one another.

4. Structure according to claim **1,** wherein said distal end is enlarged relative to other portions of said member and defines an opening therein and additionally including a retention tab adjacent said cusp and joined to other portions of the closure.

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