United States Patent

[11] 3,563,426

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[54] **PLASTIC CONTAINER TOP WITH COMBINATION CLOSURE AND SPRINKLER**
10 Claims, 10 Drawing Figs.

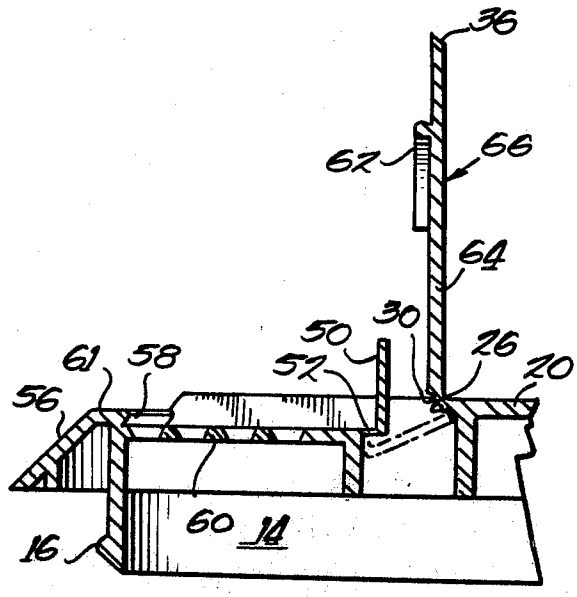
[52] **U.S. Cl.** **222/556**
[51] **Int. Cl.** **B65d 47/00**
[50] **Field of Search** 222/565, 556, 485, 545, 480

[56] **References Cited**
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3,409,188	11/1968	Wright	222/565X
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Primary Examiner—Stanley H. Tollberg
Attorney—Pendleton, Neuman, Williams & Anderson

ABSTRACT: This low-cost, one-piece integrally molded plastic container top for containers of particulate substances such as salt features a wall member having an opening with a hingedly-attached cover and a recessed perforated sprinkler plate across the opening. Access openings for mold parts adjacent the sprinkler plate are effectively sealed against undesired leakage by a snap flap molded substantially normal to said sprinkler plate and flexed athwart said opening.



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SHEET 1 OF 2

Fig. 1.

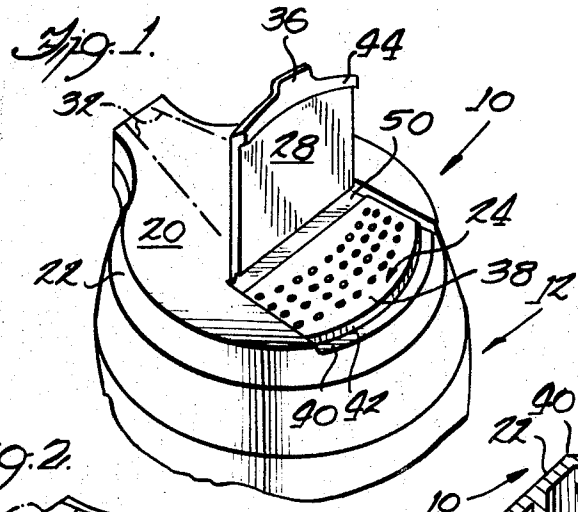


Fig. 2.

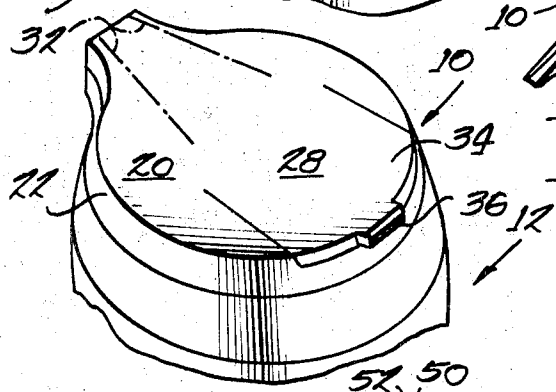


Fig. 3.

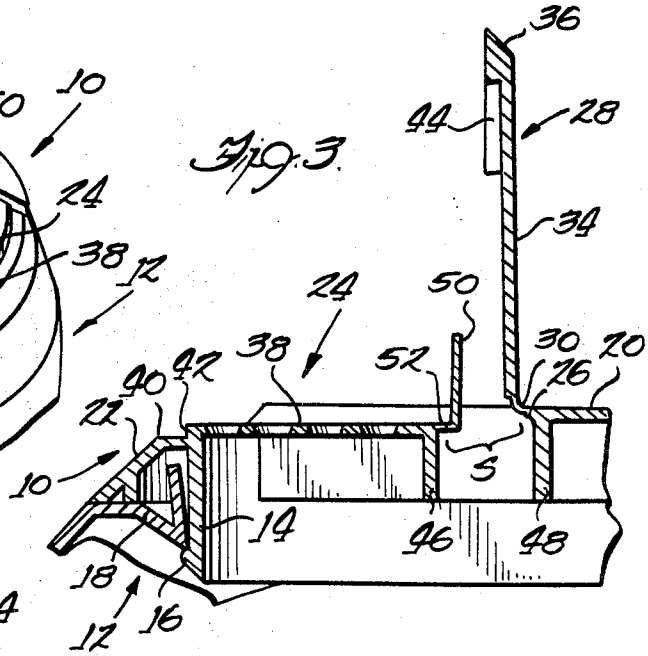


Fig. 4.

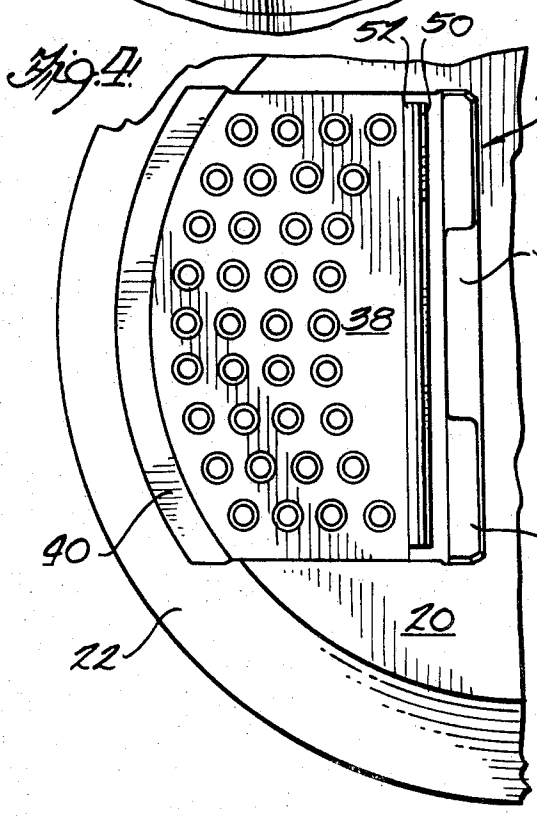
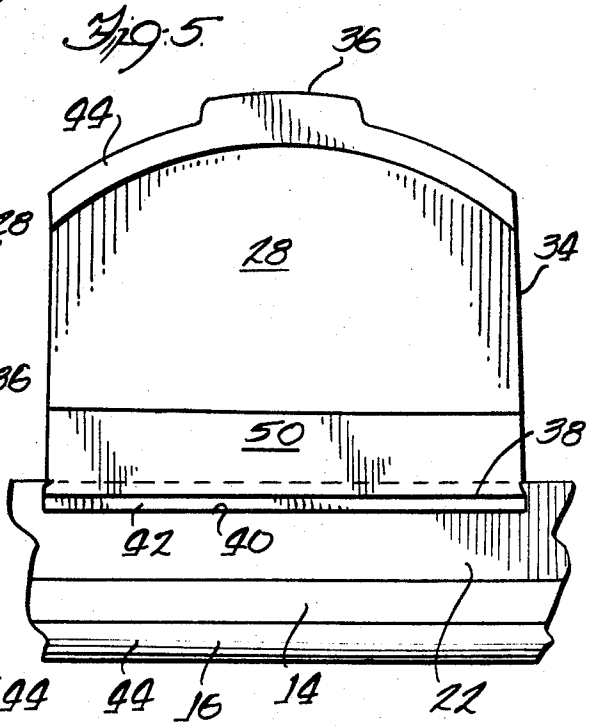


Fig. 5.



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Fig. 6.

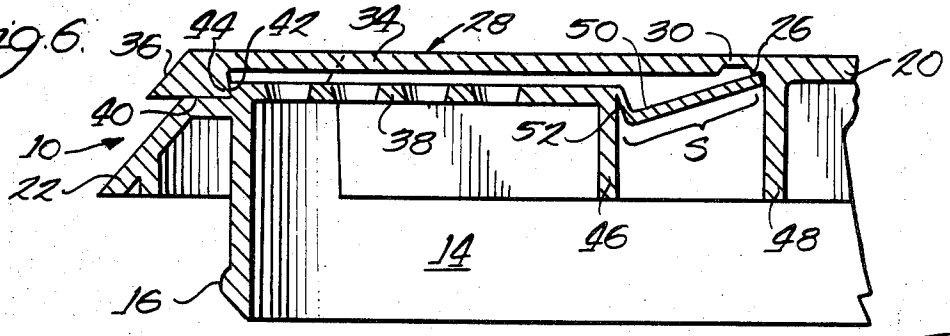


Fig. 7.

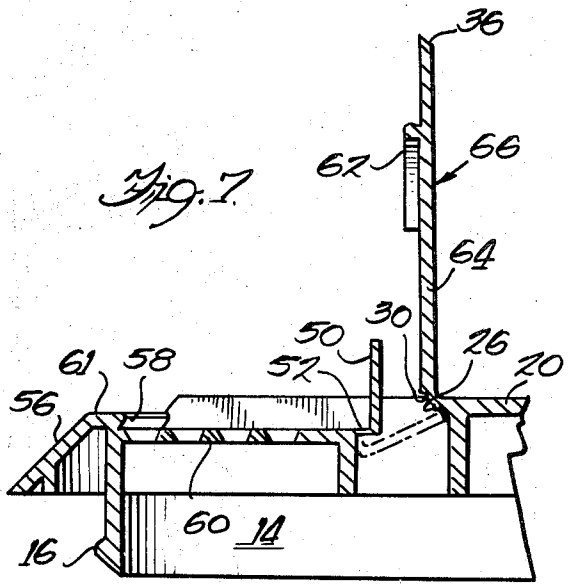


Fig. 8.

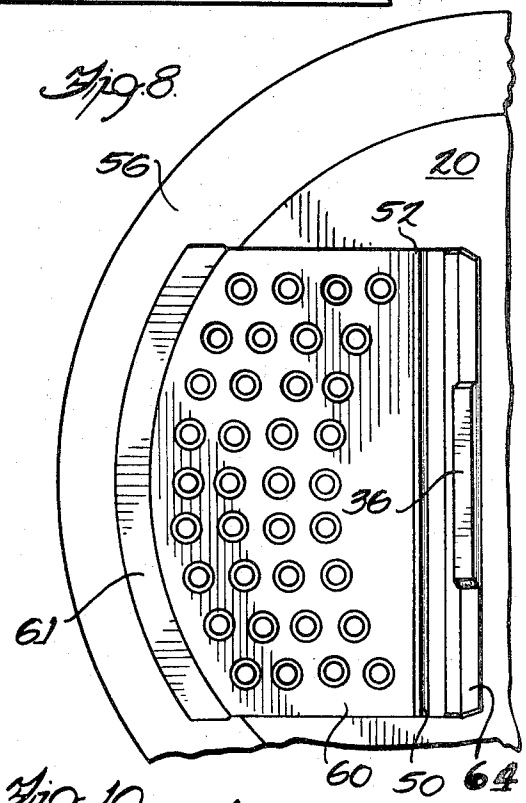


Fig. 9.

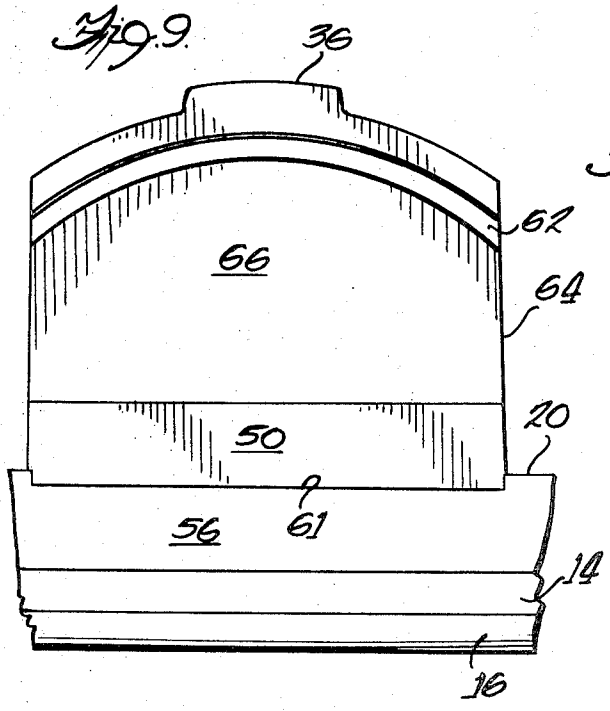
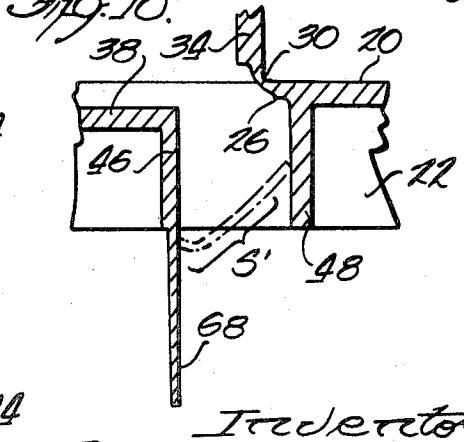


Fig. 10.



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PLASTIC CONTAINER TOP WITH COMBINATION CLOSURE AND SPRINKLER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a plastic closure and sprinkler device for particulate materials and more specially to a low-cost, one-piece, integrally molded closure and sprinkler which lends itself to production by conventional techniques, preferably injection molding with simple two-section opposed dies.

For convenience herein, the invention will be described with particular reference to salt (sodium chloride) sprinkler and closure devices. It should be understood, however, that the invention is not limited thereto and can be embodied in the form of a sprinkler (or shaker) device to a wide variety of materials, but, most advantageously, for particulate solids, e.g., various condiments in granular form, granular sugar, granular foodstuffs and other edible and nonedible granular substances.

2. Description of the Prior Art

The dispensing of particulate material, such as salt, presents a number of problems. Among these problems is the requirement of providing at extremely low cost a convenient, sanitary, stackable, attractive and structurally-sound package from which the salt can be dispensed selectively by pouring or sprinkling but which can be resealed after each use. The stringent cost limitation has led to efforts to mold one-piece snap-on container tops including resealable pouring spouts and sprinkler devices.

Such efforts have met with only limited success. For example, in one case, the resulting combination top did not present a substantially planar surface in the closed position for convenience of stacking, but instead employed upstanding nibs or projecting buttons for securing the closure. Another disadvantage arose from the fact that undesired spaces had to be included in the sprinkler plate for mold parts, thus presenting excessive sifting or bypass leakage problems and defeating the function of the foraminous sprinkler plate, e.g., fine sifting and the retention of undesired large particles. This shortcoming is particularly apparent when using small-diameter spaced perforations for extra-fine distribution of particles. Certain efforts successfully coped with this latter problem but utilized movable sealing means for the mold spaces which for certain applications are undesirable.

It is therefore an object of the present invention to provide a low-cost resealable sprinkler which is integrally molded as part of a container top and copes with these problems. It is a more specific object to provide a low-cost, integrally molded closure and sprinkler which can be molded by simple two-section injection molding techniques. It is another object to provide a low-cost closure and sprinkler combination which is free from projecting nibs and presents a planar top surface in the closed position for ease of stacking. It is another object to provide a closure and sprinkler combination which is free from undesired open areas on or adjacent the recessed sprinkler plate or grate in all positions of the closure from the open to the closed position. It is still another object to provide a closure and sprinkler combination wherein spaces for mold parts are closed by nonmovable seals. These and other objects of the present invention will become apparent as a detailed description proceeds.

SUMMARY OF THE INVENTION

In brief, these objects are achieved in a particular embodiment by a one-piece molded plastic closure and sprinkler which comprises a preferably-flat wall member having an opening preferably with at least one straight side and securing means adjacent peripheral portions for attachment to a vessel such as a salt container. The securing means is preferably in the form of a snap fitting, e.g., depending flanges on the wall member with enlarged engageable surfaces adjacent the lower extremity which engage depending flanges on the open end of the container. The wall member is preferably reinforced for structural strength by transverse flanges or the like, e.g., depending transverse webs.

A cover for, and substantially registering with, the opening is integrally molded in an upstanding position (i.e., vertical with respect to the flat wall member), usually along the straight side, by means of a thinned section whereby the cover can be hingedly flexed from the upstanding molded position to a preferably-coplanar closed position. The cover has means for releasably securing the cover in the closed position, e.g., detent means or equivalents. A tab portion on the cover periphery preferably overhangs the wall member in the closed position so as to facilitate digital opening of said cover.

A perforated sprinkler plate or sifter grate is integrally molded to the undersurface of the flat wall member and extends substantially across the opening. It terminates spacedly from the inner, straight side so as to provide an access space for mold parts associated with molding the cover, including detent portions and inner portions of the cover and the thinned hinge section.

The resulting access space, which is essential so that all surfaces are engageable by dual mold cavities and has heretofore resulted in undesired leakage, is sealed against granular flow by an integral flap molded substantially normal to the sprinkler plate and dimensioned and disposed relative to the access space to be flexed athwart thereto and snapped into nonmovable sealing engagement therewith, as will become apparent from the detailed description hereinafter. Thus the flow of particulate materials is substantially limited to the apertures or perforations in the sprinkler grate at all positions of the cover.

The apertures in the sprinkler plate may have various configurations, including cylindrical, frustoconical (funnel shaped), rectilinear, combination curved and straight sided polygonal orifices and the like. The sprinkler plate itself may be substantially flush with the underside of the flat wall member or substantially recessed below said wall member.

Because of recognized advantages, the structure of the present invention is molded as a unitary structure in plastic. The selected plastic should be readily moldable by conventional low cost techniques and should preferably have high strength, reasonable resilience and sufficient body to maintain shape under normal usage. It should also be inert, nontoxic, free from objectionable odors, and should otherwise meet structural, sanitary and aesthetic requirements.

Suitable plastics may include, but are not limited to, polyethylenes, polypropylenes, polyamides, accetate-butyrate copolymers, polyvinyl chloride polymers and copolymers, polystyrene, and compatible combinations thereof, preferably polyethylenes and/or polypropylenes, which have what the art refers to as excellent "living hinge" properties. The plastic those with little tolerance to the normal flexure, may also contain necessary or desirable additives, such as dyes, plasticizers, extenders, and the like, as those skilled in the plastic molding art will recognize.

While plastics having excellent "living hinge" properties are employed, the life of the hinge can be adjusted, if desired, by proper selection and formulation of the plastic composition, as those skilled in the art will recognize. Thus, while the plastic may be formulated to outlive the normal span of usage of the salt container, it may be adjusted for sanitary reasons to prevent repeated reusage thereof.

A particular feature of the apparatus is the fact that when the cover and sealing snap flap are disposed at right angles to the flat wall member, the apparatus can be molded in one piece by conventional, inexpensive dual-mold techniques. Yet, after the snap flap is flexed into sealing position, the structure is free of undesired mold-access spaces which cause leakage and defeat the purposes of the perforated sprinkler. Thus, a relatively inexpensive, simplified, high-speed two-section injection mold, one section approaching in a direction substantially perpendicular to the wall member and the other section approaching from the opposite direction, can be employed.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be more clearly understood from the following detailed description of a specific embodiment, read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of a preferred embodiment of the present invention in place on a fragmentally-illustrated salt container, the combination closure and sprinkler being shown in the open or sprinkling position and the snap flap flexed into the sealing position;

FIG. 2 is a fragmentary perspective view of the embodiment of FIG. 1 with the combination closure and sprinkler in the nondispensing position;

FIG. 3 is a fragmentary elevation view in section showing a preferred embodiment of the closure and sprinkler with the closure and snap flap in the upstanding or molding positions;

FIG. 4 is a fragmentary overhead plan view of the embodiment of FIG. 3;

FIG. 5 is a fragmentary elevation view of the embodiment of FIG. 3 viewed from the left side;

FIG. 6 is a fragmentary elevation view in section of the embodiment of FIG. 3 with the closure flexed into the closed position and the snap flap flexed into the sealing position;

FIG. 7 is a fragmentary elevation view in section of another embodiment illustrating a variation of the detent means for releasably securing the closure in the closed position;

FIG. 8 is a fragmentary overhead plan view of the embodiment of FIG. 7;

FIG. 9 is a fragmentary elevation view of the embodiment of FIG. 7 viewed from the left side; and

FIG. 10 is a fragmentary elevation view in section of another embodiment featuring a snap flap molded in a downwardly-depending position, the snap flap being flexed upwardly for sealing purposes as indicated in broken lines.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to the drawings, a preferred embodiment of the plastic container top of the present invention is indicated generally as top member **10** and is mounted, preferably by an internal snap fitting, on vessel **12**, such as a cylindrical salt container having a narrowed intermediate waist. While vessel **12** is not, per se, part of the present invention, there are manifestly cooperating and interacting structures between top **10** and vessel **12**. For example, as shown in FIG. 3, top **10** may have a depending flange **14** with shoulder or rim **16** which engages an internal flange **18** on container or vessel **12** to form a snap fitting.

The top member **10** comprises wall member **20**, which in the illustrated embodiment is substantially flat, except for outwardly and downwardly extending peripheral edge flange **22**. While top member **10** is depicted as the whole top for an open ended container, it may also constitute a plug-type insert or the like with peripheral recesses, grooves or equivalents, which insert is snap fitted into an aperture in the top wall of a container. Manifestly, wall member **20** could have elongated depending sides which could constitute the walls of the vessel, thus requiring only a bottom fitting or closure. The depending sides could take the form of elongated downward extensions of either edge flange **22** (in which case depending flange **14** could be eliminated) or depending flange **14** (in which case edge flange **22** could be eliminated).

In this specific embodiment, top member **10** is injection-molded from injection-molding grade, high-density polyethylene having a density of about .95, and vessel **12** on which it is snap fitted is blow-molded from blow-molding grade high-density polyethylene having a density of about .96. Wall thicknesses may vary from 25 to 50 mils. Different colors for the top and vessel may be selected for utilitarian and decorative purposes. Either or both components may be opaque, translucent or transparent. Wall member **20** has at least one opening therethrough, generally indicated at **24**, said opening preferably having at least one straight side **26** (FIGS. **3**, **4** and **6**) to which cover **28** is integrally molded along a thinned section **30**. Straight side **26** would not be apparent in an overhead plan view when the cover is in the closed position as shown in FIGS. **2** and **6** because thinned section **30** is integrally molded therewith, presenting an unbroken exterior surface to the viewer.

In a preferred embodiment, wall member **20** may also have a second opening, preferably opposite opening **24**, as indicated in dashed lines at **32** (FIGS. **1** and **2**). In this opening is mounted an integrally formed dispensing spout, the specific structure of which not being, per se, part of the present invention. A preferred form of dispensing spout is disclosed, for example, in a copending application of Albert Yochim, Ser. No. 766,720, filed Oct. 11, 1968, and entitled "DISPENSING APPARATUS."

Cover **28** comprises a substantially flat web **34** which is molded in the vertical position shown in FIGS. **1**, **3**, **4** and **5**. Because of thinned section **30**, it can be flexed to the closed position shown in FIGS. **2** and **6** so as to register with opening **24**, whereby its upper surface is disposed in coplanar relationship with the upper surface of wall member **20**. This facilitates stacking during storage, shipping and display and presents an aesthetically-appealing appearance. Tab **36**, adjacent the center of cover **28**, projects outwardly beyond wall member **20**, whereby tab **36** can be digitally engaged so as to open cover **28**, as is best depicted in FIG. **6**. Alternatively, flange **22** can be indented or cut back inwardly to expose peripheral portions of the inner surface of the cover to permit insertion of a fingernail or tip of a finger for opening the same.

Perforated sprinkler plate **38** is integrally molded to the undersurface of wall member **20** and extends substantially across opening **24**. It extends to edge flange **22** which is cut back so as to form shoulder **40**, thereby exposing the outer peripheral edge of sprinkler plate **38**. This outer peripheral edge is inwardly cut back to form a detent receiving offset **42**.

Cover **28** has at its outer extremity a complementary peripheral detent **44** which is snapped into offset **42** to hold cover **28**, in a closed position, as shown in FIG. **6**. To open cover **28**, tab **36** is digitally engaged to flex detent **44** out of offset **42**.

Perforated sprinkler plate **38** terminates in spaced relation, horizontally and vertically, from side **26**, whereby an access space S (FIGS. **3** and **6**), generally bounded by transverse strengthening flanges **46** and **48**, is provided Space S provides an access for mold parts which approach vertically upwardly in FIGS. **3** and **6** to form, in conjunction with mold parts approaching from the opposite direction, cover **28**, including detent **44** and thinned section **30**, as those skilled in the molding arts will appreciate. Mold access space S manifestly would cause gross leakage problems if not sealed.

In the present invention this problem is solved by integrally molding snap flap **50** at right angles to thinned extension **52** of plate **38**, in a plane generally parallel to that of cover **28**. Snap flap **50** is dimensioned so that it can be flexed across access space S and snapped beneath straight edge **26** as shown in FIG. **6** whereby access space S is sealed. The natural resiliency and "memory" of thinned section **52** firmly biases flap **50** against the undersurface of wall member **20** adjacent side **26**.

Thus, once flap **50** is snapped into the sealing position shown in FIG. **6**, it is substantially nonmovable and the flow of particulate materials is limited to the perforations in sprinkler plate **38** but only when the cover **28** is not closed. In a sense, snap flap **50** provides a permanent seal for access space S, whereas cover **28** provides a selectively releasable seal for the sprinkler plate perforations.

Another embodiment of the present invention is shown in FIGS. **7—9** which is substantially the same as the embodiment of FIGS. **1—6** except that the detent arrangement for holding the cover closed is reversed. For ease of reference, identical parts in the two embodiments bear the same reference numerals. In the embodiment of FIGS. **7—9**, sprinkler plate **60** is recessed further below wall member **20** whereby it is below shoulder **61**. A detent-receiving offset **58** is formed on the inner periphery of shoulder **61** above and adjacent sprinkler

plate 60. Offset 58 receives in releasably-securing engagement the semicircular complementary detent 62 on the undersurface of web 64 of cover 66.

Another embodiment of the present invention is depicted in FIG. 10 wherein the snap flap 68 is molded as an extension to strengthening flange 46 in a direction opposite to that of the embodiments of FIGS. 1—9. Snap flap 68 is then flexed upwardly in a counterclockwise direction in FIG. 10 so as to snap past flange 48, whereby the edge thereof is biased against flange 48, as depicted in broken lines. This also effectively seals access space S. This embodiment may be used on connection with the cover embodiments of either FIGS. 1—6 or 7—9.

The capability of molding container top 10 in a simple two-section injection mold is a particularly advantageous aspect of the present invention. Thus, when covers 28 or 66 are in a fully upright position, that is, webs 34 or 64 are perpendicular to wall member 20, and snap flaps 50 or 68 are perpendicular to plates 60 or 38, respectively, the structure can be molded in its entirety using an injection-type mold, the two sections of which move in opposite or opposed vertical directions as viewed in FIGS. 3 and 7. The two mold sections are brought together, the plastic injected, the two mold sections are separated and the resulting container top is readily removed. This avoids the high cost of, and lower production rates associated with, complex multisection molds. This simplicity of molding is vitally important in meeting the critical, low-cost requirement.

Conventional molding techniques are employed. For example, ½° tapers are provided on vertical surfaces to facilitate removal of the molded structure from the mold. Recesses, offsets (e.g., 42 and 58) and the like are sized and configured so that they can be readily flexed or otherwise snapped from the mold. High-speed, multicavity molds are used. These and other techniques are well-known to those skilled in the molding arts.

Because thinned section 30 is, as aforementioned, a "memory" hinge, the stresses therein tend to hold cover 28 or 66 in the open position. When cover 28 or 66 is flexed to a closed position, it is releasably secured in such position by means of the detent means already described. Various equivalent combinations of detents and offsets and equivalents thereof may be substituted as those skilled in the art will recognize in the light of the present disclosure.

Transverse flanges 46 and 48 in conjunction with depending flange 14 and peripheral edge flange 22 or 56 provide substantial rigidity to the container top, particularly when it is snap fitted to vessel 12. In fact, the combination of dispensing top 10 and container 12 interact to provide a substantially rigid unitary structure even when molded with relatively thin plastic walls, e.g., 25 to 50 mils.

From the above description it is apparent that the objects of the present invention have been achieved. While only certain embodiments have been illustrated, many alternative modifications will be apparent from the above description to those skilled in the art. For example, snap flap 68 could be integrally molded as an extension of transverse flange 48, rather than 46, and then flexed clockwise athwart the access space S' to be retained by flange 46. These and other alternatives are considered within the spirit and scope of the present invention, and coverage thereof is intended by this application.

I claim:

1. A one-piece molded plastic closure and sprinkler device for particulate materials comprising:

a. a wall member having an opening therethrough and securing means adjacent peripheral portions thereof for attachment to another wall portion of a vessel

b. a cover for said opening integrally molded in an upstanding position to said wall member along one side of said opening by means of a thinned section, whereby said cover can be hingedly flexed along said thinned section from said upstanding molded position to a closed position;

c. a perforated plate integrally molded to inner surfaces of said wall member and extending substantially across said opening and terminating in spaced relation from said one side, whereby an access space is provided for mold portions associated with said cover; and

d. flap means molded substantially normal to the plane of a sprinkler plate and dimensioned and disposed relative to the access space to be flexed athwart thereto and snapped into nonmovable sealing engagement with the opposed side of the access space so as to substantially seal the same against granular flow.

2. The device of claim 1 wherein said flap means is integrally molded to a thinned extension of said perforated plate adjacent said access space, said thinned extension permitting said flap to be flexed so that the opposed extremity of said flap is engaged adjacent said one side.

3. The device of claim 1 including a plurality of depending transverse webs on the inner surface of said wall member and wherein said flap means is integrally molded as an extension of one of said webs whereby the extremity of said flap engages another of said webs when flexed athwart said access space to seal the same.

4. The device of claim 1 including recess and complementary detent means for releasably securing said cover in a closed position.

5. The device of claim 1 wherein peripheral portions of said cover member when in the closed position project beyond said wall member whereby said peripheral portions can be digitally engaged for opening said cover.

6. The device of claim 5 wherein said peripheral portions comprise a central projecting tab.

7. The device of claim 1 wherein said securing means comprises a depending flange with enlarged engageable surfaces adjacent the lower extremity thereof for snap fitting said device to a vessel.

8. The device of claim 1 wherein substantially all surfaces are engageable by dual mold cavities approaching from two opposite directions when said cover and said flap means are disposed in planes normal to said wall member.

9. The device of claim 1 wherein said apparatus is integrally molded of high density polyethylene.

10. The device of claim 1 wherein said wall member is substantially flat and the exterior surface of said cover is substantially coplanar therewith when said cover is in the closed position.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,563,426 Dated February 16, 1971

Inventor(s) Benjamin M. Bartilson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 9, "specially" should read --specifically--;

Column 2, line 53, before "those" insert --, particularly--;

Column 2, line 53, cancel "the normal" and insert --repeated-

Column 4, line 44, after provided insert a period --.--;

Column 5, line 11, "on" should read --in--;

Column 6, line 8, after "vessel" insert a semicolon --;--.

Signed and sealed this 13th day of July 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents