

Sept. 23, 1952

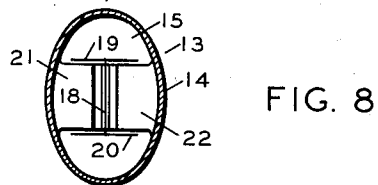
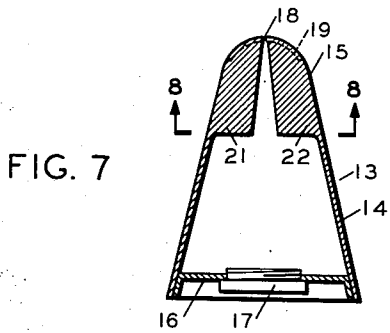
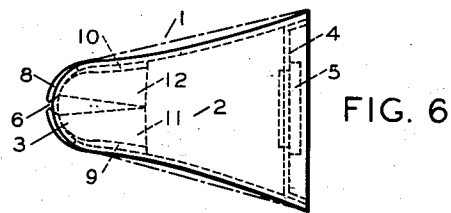
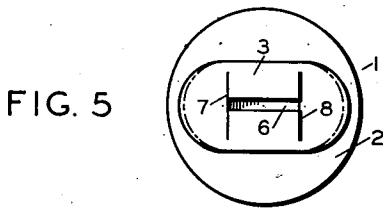
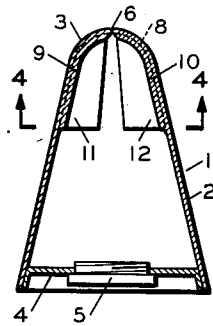
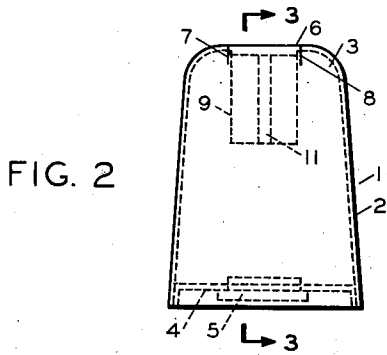
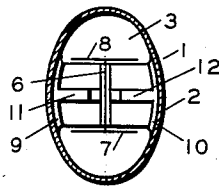
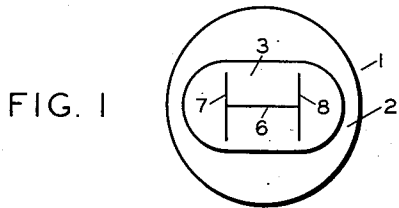
W. F. SMITH

2,611,515

RESILIENT CLOSURE FOR CONTAINERS

Filed July 5, 1946

2 SHEETS—SHEET 1



INVENTOR.

*William F. Smith*

Sept. 23, 1952

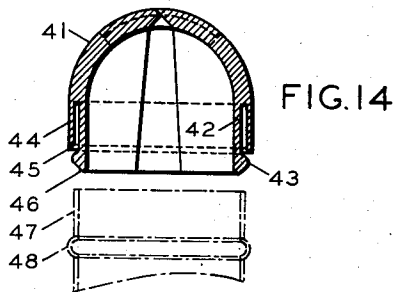
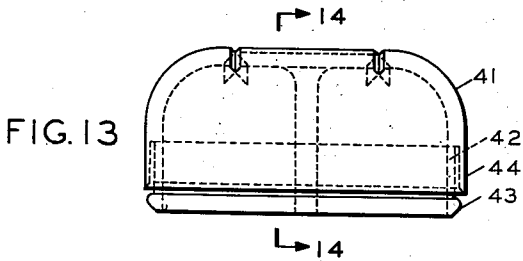
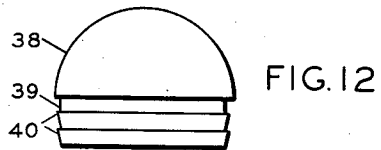
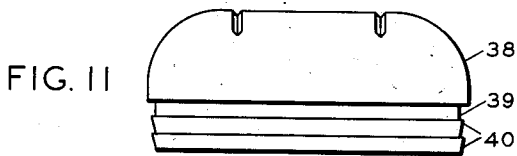
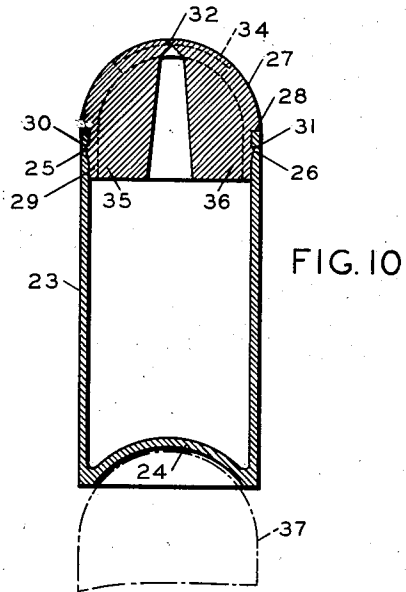
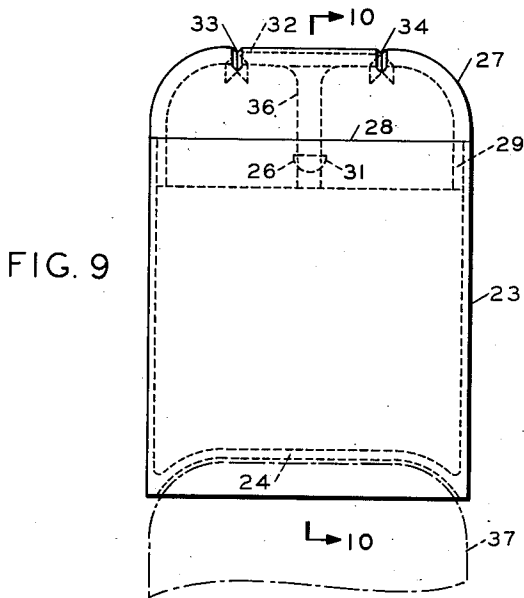
W. F. SMITH

2,611,515

RESILIENT CLOSURE FOR CONTAINERS

Filed July 5, 1946

2 SHEETS—SHEET 2



INVENTOR.

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# UNITED STATES PATENT OFFICE

2,611,515

## RESILIENT CLOSURE FOR CONTAINERS

William F. Smith, Wilmington, Del.

Application July 5, 1946, Serial No. 681,525

2 Claims. (Cl. 222-213)

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This invention relates to the art of containers and more particularly to closures for containers. In U. S. 2,176,513 to William F. Smith there is disclosed a resilient closure for containers employing an entirely new principle of action. This new principle of action is obtained by a structure having opposed resilient lips or jaws combined but with opposed rigid members having a kind of fulcrumed action. On applying pressure to the rear ends of the opposed rigid members they are caused to tilt and to separate the resilient lips or jaws of the closure. Upon being released the lips or jaws, which are formed of a resilient material, spring to a closed position.

Resilient closures employing this principle of action may be employed for dispensing liquids, pastes, and pulverulent or comminuted materials.

The principal object of the present invention is to provide new and useful improvements in resilient closures and containers employing the principle of action disclosed in U. S. 2,176,513. More specifically, one of the objects of the invention is to provide means for limiting the flexing of the closure to insure longevity and to prevent crushing. Another object is to provide means for controlling the amount of material dispensed. Another object is to provide means for dispensing a predetermined amount of material. Another object is to provide means to insure a tight closure after dispensing comminuted material. Another object is to provide a closure adapted for mechanical assembly to a container body. Another object is to provide an improved locking relationship between the closure and the container body. Another object is to provide a dispensing container which may be manufactured in an economical manner. Another object is to provide containers adapted to be superposed with similar containers for shipping or display purposes. Other objects and advantages of the invention will appear hereinafter.

Generally described, the present invention comprises a closure comprising a resilient body member, a valve slit in the top of the body member, and reinforcing means associated with the valve slit adapted to open the valve slit and to limit the opening of the valve slit when the side walls of the container to which the closure is applied or the closure itself has external pressure applied thereto.

Preferred embodiments of the invention have been chosen for purposes of illustration and description and are shown in the accompanying drawings forming a part of the specification wherein:

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Fig. 1 is a top view of a container provided with a closure in accordance with this invention;

Fig. 2 is a front elevational view of the container;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a sectional view of the container taken as illustrated by line 4—4 of Fig. 3;

Fig. 5 is a top view of the container showing the valve slit in an open position;

Fig. 6 is a side elevational view of the container showing the valve slit in the open position;

Fig. 7 is a sectional view showing a modified form of container;

Fig. 8 is a sectional view of the modified form of container taken as illustrated by line 8—8 of Fig. 7;

Fig. 9 is a front elevational view showing still another modified form of container;

Fig. 10 is a sectional view taken along line 10—10 of Fig. 9;

Fig. 11 is a front elevational view showing a closure in accordance with this invention with means for locking to a container body;

Fig. 12 is a side elevational view of the closure;

Fig. 13 is a front elevational view showing a modified form of closure; and

Fig. 14 is a sectional view taken along line 14—14 of Fig. 13.

In Figs. 1, 2, 3, 4, 5, and 6, a container 1 is provided with a resilient body member 2 formed to provide a convex top 3 and has a bottom 4 secured thereto provided with a screw plug 5 for filling the container. A valve slit comprising a longitudinal slit 6 abutted by transverse slits 7 and 8 is provided in the top. A reinforced portion 9 and a reinforced portion 10 are provided on each side of the longitudinal slit. A wedge-shaped element 11 and a wedge-shaped element 12 extend inwardly from the reinforced portions 9 and 10. When the resilient body member 2 is squeezed, the valve slit opens as illustrated in Figs. 5 and 6 and the elements 11 and 12 make contact with each other to limit the extent of opening. This embodiment is of particular utility for salt and pepper shakers and the like.

In Fig. 7 and Fig. 8 a modified form of container is illustrated. In this embodiment, a container 13 is provided with a resilient body member 14 formed to provide a convex top 15 and has a bottom 16 secured thereto provided with a screw plug 17 for filling the container. A valve slit, similar to that described above, comprising a longitudinal slit 18 abutted by transverse slits 19 and 20 is provided in the top. A thickened wedge-

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shaped portion 21 and a thickened wedge-shaped portion 22 are provided on each side of the longitudinal slit. The thickened portions 21 and 22 serve as reinforcing means for the valve slit. When the resilient body member 14 is squeezed, the valve slit opens as heretofore illustrated and the thickened portions 21 and 22 contact each other to limit the extent of opening and form a substantial seal. In this manner the material in back of the thickened wedge-shaped portions 21 and 22 is held back when these portions are in contact with each other, thereby providing a metering effect as to the amount of material dispensed. This embodiment is of particular utility in the dispensing of spices and the like wherein it is desired to dispense a predetermined amount of material as a measure. For example, one vigorous squeeze of the container may equal one-fourth teaspoon, etc. Moreover, the thickened portions employed in this embodiment broke up materials which tend to lump in the container.

In Fig. 9 and Fig. 10 still another modified form of container is illustrated. In this embodiment, a preformed resilient body member 23 is provided with a concave bottom 24 and a pair of indentations 25 and 26. A convex, resilient closure 27 having a shoulder 28 and a flange 29 is affixed to the body member 23. A pair of protrusions 30 and 31 are carried by the flange 29. These protrusions 30 and 31 are compatible with the indentations 25 and 26 and when the shoulder 28 engages the top of the body member 23 they come into register with each other to provide a locking relationship. A valve slit comprising a longitudinal slit 32 abutted by transverse slits 33 and 34 is provided in the top of the closure 27. A portion of the closure on each side of the slits is tapered so that the slits have sharp meeting surfaces. A wedge-shaped element 35 and a wedge-shaped element 36 are provided on each side of the longitudinal slit 32 and extend inwardly. The elements 35 and 36 serve as reinforcing means for the valve slit. When the body member 23 is squeezed, the valve slit opens as heretofore illustrated and the elements 35 and 36 cause the valve slit to open and limit the amount of opening by contact with each other. In this embodiment the material of the body member along the longitudinal slit is of sufficient thickness to withstand any tendency of distortion. Moreover, the concave bottom 24 is formed to be compatible with at least a portion of the closure of a similar container as represented by 37. This embodiment is of particular utility in the dispensing of comminuted materials such as spices wherein it is desired to stack the containers for display or other purposes.

In Fig. 11 and Fig. 12, a convex, resilient closure 38 is illustrated. This closure is similar in construction to the closure illustrated in Figs. 9 and 10, with the exception that in this embodiment the flange 39 is provided with sharp edged projections 40. These sharp edged projections 40 lock the closure to a container body which is relatively softer than the sharp edged projections. This embodiment is of particular utility wherein it is desired to affix the closure to a soft container body such as paper and the like.

In Fig. 13 and Fig. 14, a convex, resilient closure 41 is illustrated. This closure, likewise, is similar in construction to the closure illustrated in Figs. 9 and 10, with the exception that in this embodiment the closure 41 has an annular bifurcation having its interior branch 42 provided with a protrusion 43 and having its exterior branch 44 ter-

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minating near the upper portion of the protrusion. The lower edges 45 and 46 of the branches being tapered upwardly and inwardly toward each other to facilitate engagement with a container body represented by 47. In this embodiment when the closure 41 is affixed to the container body 47, the protrusion 43 is in register with the bead 48 on the container body and the wall of the container body is held between the branches 42 and 44 to insure a tight seal. This embodiment is of particular utility in the dispensing of pulverulent materials such as tooth powders, bath powders, and similar substances, wherein it is desired to employ a resilient, metal container body.

The principles of the present invention are applicable for manufacturing containers for dispensing a variety of materials which may be used for a variety of purposes. For example, for salt and pepper a shaking action is desirable, for sugar a combined shaking and pouring action, for bath and baby powders a combined shaking and vigorous squeeze action to squirt the powder, for tooth powder a vigorous squeeze action to deposit a measured amount on the toothbrush, for spices a shaking or vigorous squeeze action to give a measured amount, for insecticides a vigorous squeeze action to squirt the insecticide in crevices and the like, for liquids a pouring or shaking action, for semiliquids or pastes a firm squeezing action, etc. Therefore, it is evident that various changes in the specific forms shown and described may be made within the scope of the claims without departing from the spirit of the invention.

As hereinbefore set forth the material of construction for the closure or the combination closure with container body is a resilient material. However, this is not to be construed as precluding the use of other materials of construction in combination with means for providing the desired resiliency. The preferred materials of construction for the closure are the thermoplastic resins, particularly polyethylene, cellulose acetate, and ethyl cellulose. These materials are also preferred when the closure and container body are molded integrally. When the closure is affixed to a container body, any of the materials conventionally used, such as paper and metal, may be employed providing they impart the required resiliency.

From the foregoing, it will be seen that the present invention provides for the attainment of the objects set forth in a simple, convenient, and economical manner and that the advantages are multifold. The opposed wedge-shaped reinforcing elements give a rigidity to the closure which permits mechanical assembly with a forced fit into container bodies as well as prevents overflexing in use and possible crushing in use and shipping. The locking means on the closure in combination with its rigidity to permit a forced fit provides an exceedingly expedient means of manufacture. The sharp meeting surfaces at the valve slit prevent large granules of comminuted material from being caught in the jaws of the valve slit upon closing. The thickened wedge-shaped portions on each side of the longitudinal slit provide a crushing surface for material tending to lump as well as providing means for dispensing a predetermined amount of material.

Containers employing the principle of this invention may be filled from the bottom, even under pressure, because the fulcrumed action involved causes the valve slit to close tighter as internal pressure within the container is increased. Thus,

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a thin membrane such as a lacquer coating may be applied over the valve slit to provide an absolute hermetical seal without danger of the seal rupturing due to container "breathing." This is particularly advantageous in connection with the packaging of materials containing highly volatile constituents, such as a perfume. The thin membrane is, of course, ruptured by the first manipulation of the user, but it is the period between manufacture and use during which the qualities of the product must be carefully preserved as this period may be of indefinite length. Containers employing the principle of this invention may be used as shake-type or sprinkle-type containers and as squirt-type containers by simple manipulation.

What I claim and desire to protect by Letters Patent is:

1. A closure for containers comprising a resilient body member, a longitudinal valve slit in the top of the body member abutted by a transverse slit on each end, and said body member having two sidewalls with two opposed wedge-shaped reinforcing members extending inwardly from the top of the body member downwardly along its respective sidewall and each with the apex of the wedge located adjacent its respective side of the valve slit, said opposed wedge-shaped reinforcing members being in spaced relationship to each other whereby the lower portion of each of the wedge-shaped reinforcing members is capable of contacting the other upon squeezing said sidewalls to open the valve slit.

2. A closure for containers comprising a resilient body member, a longitudinal valve slit in the top of the body member abutted by a transverse

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slit on each end, and said body member having two sidewalls with two opposed wedge-shaped reinforcing members substantially coextensive with the longitudinal valve slit and extending inwardly from the top of the body member downwardly along its respective sidewall and each with the apex of the wedge located adjacent its respective side of the valve slit, said opposed wedge-shaped reinforcing members being in spaced relationship to each other whereby the lower surface of each of the wedge-shaped reinforcing members is capable of contacting the other to crush any lumpy material disposed therebetween upon squeezing said sidewalls to open the valve slit.

WILLIAM F. SMITH.

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