

[54] RESEALING CLOSURE FOR CANS AND THE LIKE

[72] Inventor: Jonas C. Harschel, 8 Maripasa Court, Burlingame, Calif. 94010

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[51] Int. Cl.B65d 39/12

[58] Field of Search220/24.5; 215/52, 53, 54

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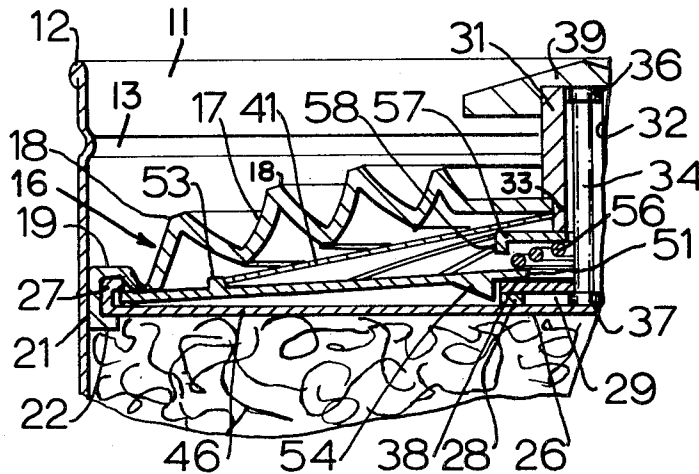
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Primary Examiner—George E. Lowrance
Attorney—Julian Caplan

[57] ABSTRACT

A closure to fit cans to reseal same when the contents have been partially removed. Top and bottom radially stretchable diaphragms enclose top and bottom flexible disks. Top flexible conical member is depressed by a handle and has means cooperating with means on the bottom flexible conical member to first radially expand the latter and then to lock the same in expanded condition so as to force the edges of the diaphragms into sealing engagement with the can wall. Pulling the handle upward disengages the flexible members from each other and permits the parts to assume collapsed condition out of sealing contact with the can wall.

7 Claims, 6 Drawing Figures



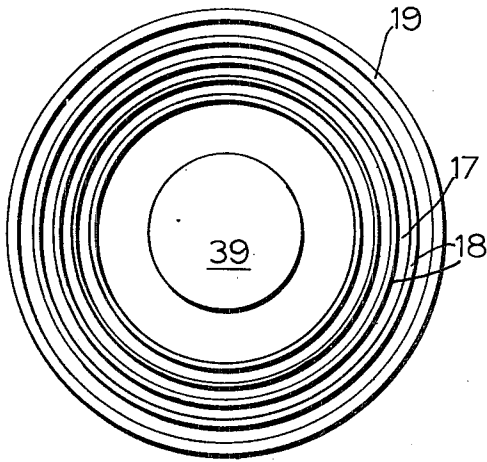


FIG. 1

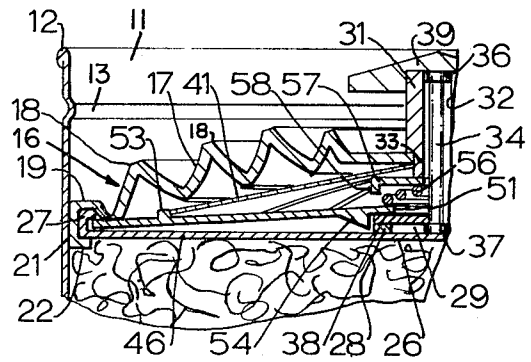


FIG. 2

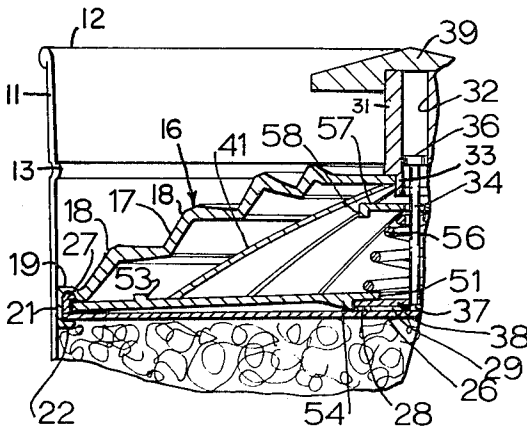


FIG. 3

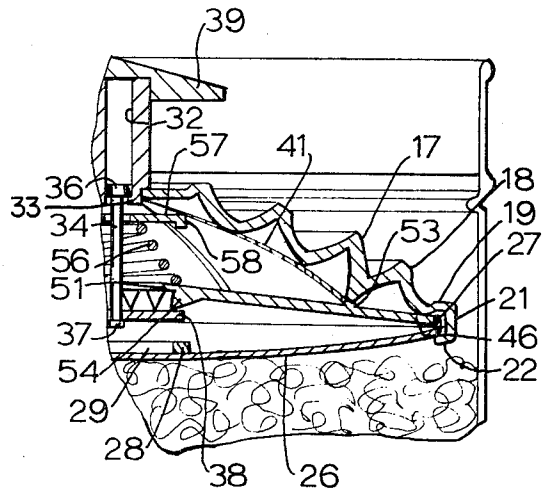


FIG. 4

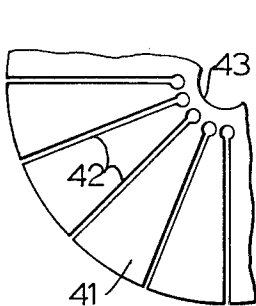


FIG. 5

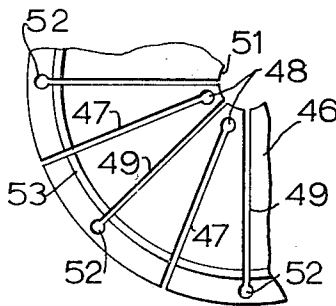


FIG. 6

INVENTOR
JONAS C. HARSCHEL
BY *Julian Caplan*
ATTORNEY

RESEALING CLOSURE FOR CANS AND THE LIKE

This invention relates to a new and useful resealing closure for cans and the like. After the top of a can or other container has been removed, the present invention provides a convenient resealing closure. The closure prevents air circulation into the interior of the container and thus reduces oxidation of the product remaining in the can and also prevents the escape of volatile substance in the remaining product.

A feature of the invention is the provision of a closure which expands and contracts radially. When the closure is contracted it slips into the interior of the can easily even though there are beads formed in the can body. When the device is expanded, its radial dimension is increased so that it is sealed against the wall of the container.

A feature and particular advantage of the invention is the fact that it is simple to operate either in expanding to sealing position or contracting to position for insertion and removal. The mechanical operation to expand and contract the closure may be performed with one hand. Hence it is not necessary to insert both hands inside the container in order to operate the closure.

A further advantage of the invention is the fact that the closure seals in position at any location inside the can either near the top or the bottom. As has been stated, occasionally beads are rolled in the sides of the can and the closure may be located to seal at the bead location or at the straight cylindrical portion of the can above or below the bead.

Still another advantage of the invention is that when the seal is operated to seal at the top of the contents the action of the spring expands the top flexible diaphragm to create a pressure differential between the contents and outside atmosphere to help seal at the edges and retard oxidation of the contents.

Another advantage of the invention is the fact that it is dust and dirt-proof. Further, to promote sanitation, the device may be easily washed and the parts are not damaged by washing. In addition, the device is very compact and may be inserted inside the can when only a small portion of the contents have been dispensed.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

FIG. 1 is the top plan of the closure;

FIG. 2 is a fragmentary vertical sectional view through a diameter of the device showing the device in the act of being inserted into a can, with the knob depressed by the user;

FIG. 3 is a view similar to FIG. 2 showing the device with the knob released and in sealing position;

FIG. 4 is a view similar to FIG. 2 showing the device in contracted position with the knob raised for removal from or insertion into a can;

FIGS. 5 and 6 are fragmentary view of portions of elements of the closure.

The closure which is the subject of this invention is illustrated in the accompanying drawings for sealing relative to a can 11 which has an open top 12 from which the lid has been removed. To illustrate the versatility of the device, the can 11 may be formed with a bead 13 rolled into the side below the top 12 to strengthen the can body. The device will slip by such a bead to seal below the same or will seal against the bead itself. It will further be understood that the present invention is shown sealing against a can 11 merely by way of illustration and that the device may be used with a variety of other receptacles.

Closure 16 consists of a plurality of annular members which interfit to form a compact device having its mechanical portions enclosed. A top diaphragm 17 is formed of an elastomeric material which compresses axially of the can and also radially. The material is smooth and sufficiently soft so that when the device is expanded the outer edge of the diaphragm 17 will form a hermetic seal with the interior of the can 11.

To provide axial and radial flexibility, diaphragm 17 is formed with a plurality of siphon-bellows-type pleats 18. At the perimeter is a ledge 19 and depending therefrom is a short vertical skirt 21 having a narrow inturned flange 22. Bottom diaphragm 26 is formed of a material similar to diaphragm 17 and it is essentially flat. At its perimeter, diaphragm 26 is formed with an inwardly turned rim 27 which fits between ledge 19 and flange 22. Formed integrally with or fixed to the top of diaphragm 26 is a ring 28 having a diameter about one-third that of diaphragm 26.

Fitting in a central hole in upper diaphragm 17 is stem 31 which is formed with a central bore 32. A reduced diameter neck 33 projects inside and is fixed to the inner edge of upper diaphragm 17. Neck 33 is formed with a hole in which slides pin 34 having an enlarged head 36 which fits slideably within the bore 32 and which also has at its lower end an enlargement 37 on the underside of washer 38, which rests upon the top of ring 28. The top of bore 32 is closed off by a handle knob 39 which is gripped by the fingers. Raising or depressing knob 39 causes the bellowslike diaphragm 17 to move axially relative to bottom diaphragm 26.

Inside top diaphragm 17 is a truncated conical member 41. Member 41 is a thin member formed with a plurality of radial slots 42 extending from points adjacent the center to the outer edge. A central hole 43 of disk 41 fits around neck 33. Disk 41 is flexible in an axial direction. When the height of disk 41 is reduced by pushing downward on knob 39, the slots 42 spread apart and the outside diameter of the base of member 41 expands. Comparison of the slant height of disk 41 in the contracted position of FIG. 4 and the expanded positions of FIGS. 3 and 3 illustrate this feature.

Below member 41 is a lower truncated conical member 46 of material similar to member 41 but having a larger outside diameter and a larger inside diameter. Member 46 is formed with a plurality of radial slots 47 which extend from points adjacent the inner edge of the member to the perimeter and with alternating slots 49 which extend from the center hole 51 to points 52 adjacent but spaced inwardly of the perimeter. On the top surface of member 46 is a circular rim 53 adjacent but spaced inwardly from points 52. On the bottom of member 46 spaced outwardly from hole 51 are detents 54. The location of rim 53 is such that the outer edge of conical member 41 lodges inside same and rests on top of the member 46. The location of detents 54 is such that in the contracted position shown in FIG. 4 said detents ride on top of washer 38 but in the expanded position of FIG. 3, the detents snap outside of washer 38 and ring 28, thereby holding the member 46 in radially expanded position. The outer edge of member 46 fits inside the inturned rim 27 of bottom diaphragm 26. Hence when the member 41 is depressed, its outer edge forces rim 53 outwardly until detents 54 lock outside ring 28. Such outward expansion of member 46 stretches diaphragms 17 and 26 outwardly so that they are in the expanded position of FIG. 3 sealing against the interior wall of can 11. Washer 57 having downward extending tips 58 is located on pin 34 below member 41. When handle 39 is depressed, neck 33 depresses washer 57 and tips 58 bear on member 46 to flatten same (FIG. 2). Depression of knob 39 forces member 46 into a slightly upward-concave shape, member 46 functioning somewhat in the manner of a disk-shaped, overcenter spring.

To assist in holding the device in the position shown in FIG. 2 against unintentional dislodgment, a spiral spring 56 is located so that its large diameter rests upon the top of member 46 and its small diameter is uppermost and is in engagement with washer 57 which fits around pin 34 and contacts the bottom of neck 33.

The operation of the closure is as follows: Assuming that the device is in the contracted position of FIG. 4, handle knob 39 is gripped with one hand and the device is inserted through the top 12 of can 11 until the bottom of diaphragm 26 encounters the contents of the can, which stops further downward movement of diaphragm 26. Downward movement of knob 39 causes the top member 41 to be flattened axially and thereby

expanded radially. Tips 58 flatten and cause outward expansion of member 46 to a slightly upward-concave, overcenter position which holds the parts expanded. If the contents are solid or if the bottom of the can is encountered, the head 36 of the pin may slide up through bore 32 to permit the knob 39 to be depressed a sufficient distance to expand the closure. Flattening of member 41 pushes outwardly on rim 53 and thus forces member 46 radially outwardly and downwardly until detents 54 lock outside of ring 28. The detents 54 are held in down position by the force of spring 56 on the top of member 46. As the member 46 expands outwardly, flexible bottom diaphragm 26 is stretched outwardly and the top diaphragm 17 is likewise deformed outwardly to the position of FIG. 2. Release of knob 39 allows the parts to assume the position of FIG. 3. In the position of FIG. 3 the closure 16 has sealed against the inside of the can wall 11 and is held in such sealing engagement by reason of the fact that the detents 54 have snapped outside ring 28.

When it is desired to remove the closure, the user grips knob 39 and pulls upwardly. The enlargement 37 on the lower end of pin 34 raises washer 38 which pulls member 46 upwardly until the detents 54 are above the level of washer 34 and ring 28. The member 46 then increases in height axially and diminishes in diameter and the member 41 correspondingly increases in height and diminishes in diameter. Thus, the position of FIG. 4 is again reached so that the diaphragms 17 and 26 are contracted and no longer seal against the can 11.

What is claimed is:

1. A resealing closure comprising a radially expandable circular diaphragm, a first flexible radially expandable circular member having its perimeter in engagement with the perimeter of said diaphragm whereby upon expansion of said first member said diaphragm is expanded to seal against the interior of a wall into which said closure is inserted, a second flexible, radially expandable and axially flexible truncated conical member, manual grip means for depressing said second member to flatten and expand said second member, cooperating means on said members whereby when said second member is flattened said first member and said diaphragm are

radially expanded, latch means for detachably securing said first member in expanded position, and detaching means for detaching said latch means to release said first member for radial contraction thereof, said grip means operatively connected to said detaching means whereby upon lifting said grip means said latch means is rendered inoperative, said latch means comprises second cooperating means consisting of detents on said first member and a circular third member engageable with said detents, said third member movable with said grip member.

2. A closure according to claim 1 which further comprises an annular, conical, axially and radially flexible second diaphragm in sealing relation at its periphery to said first-mentioned diaphragm and sealed at its inner diameter to said grip means.

3. A closure according to claim 2 in which said third member comprises a ring on the top of said second diaphragm, said first member flexible between an unlatched position with said detents above and within the vertical projection of said ring and a latched position with said detents at the level of and abutting the outside edge of said ring.

4. A closure according to claim 3 which further comprises resilient means bearing against said members to bias said members apart into an inoperative position of said closure when said latch means is unlatched.

5. A closure according to claim 1 in which said cooperating means comprises a circular rim on the top of said first member, the base of said second member located inside said rim and upon flattening of said second member said base forces said rim outward.

6. A closure according to claim 1 in which said grip means comprises a handle operatively connected to said second means adjacent the apex of said second member, said detaching means comprising a disk positioned under the center of said first member and a sliding connection between said handle and said disk to raise said disk when said handle is pulled upward.

7. A closure according to claim 6 in which said handle is formed with a hollow stem and said sliding connection is at least partially retractable within said stem.

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