

Sept. 11, 1934.

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1,973,459

AUTOMATIC CLOSURE FOR OUTLET ENDS OF DISPENSING RECEPTACLES

Filed March 27, 1933

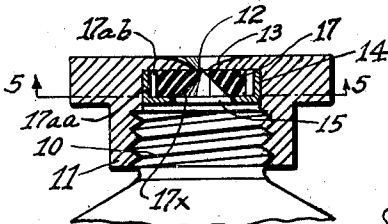


Fig-1

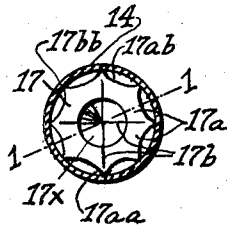


Fig-5

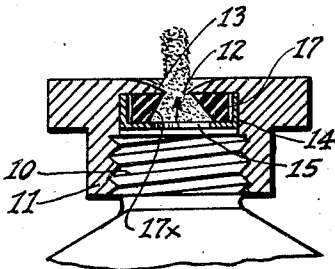


Fig-2

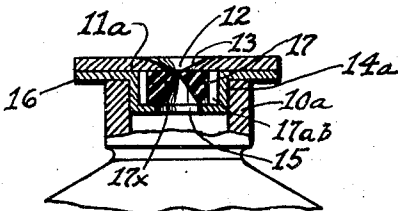


Fig-3

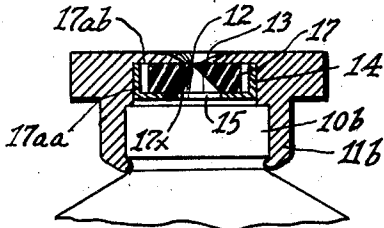


Fig-4

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1,973,459

AUTOMATIC CLOSURE FOR OUTLET ENDS
OF DISPENSING RECEPTACLESGuy B. Anderson, Baltimore, Md., assignor of
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Application March 27, 1933, Serial No. 662,933

3 Claims. (Cl. 221—60)

This invention relates to collapsible contain-
ers or other containers for dispensing fluid or
semifluid material, and specifically, to automatic
closures for outlet ends of dispensing receptacles.

One object of this invention is to provide an im-
proved and thoroughly practical outlet closure
which automatically opens under pressure of the
material being dispensed, and which automatical-
ly closes when the pressure is discontinued.

Another object is to provide the outlet end with
a dispensing orifice whose margin is substantial-
ly as thin as a knife-edge so there is the minimum
surface in contact with the closure; thereby
avoiding the cementing of the closure to the out-
let end, and the consequent resistance to the
egress of the material in case such material is of
a glutinous character; also thereby avoiding the
formation of hard lumps or crusts of material at
the outside of the dispensing orifice; hence,
avoiding the waste and inconvenience caused by
such cementing, and by such hardened parts of
material.

Another object is to provide a device of this
kind that is applicable to the outlet ends of the
containers, either within the necks, or outside of
the necks, whether the necks are screw-threaded
or not, and preferably united with an originally
separate head or cap secured to the dispensing
neck by screw-threads or by other appropriate
means.

Another object is to provide a device of this kind
that consists of a very few parts which are very
simple and easily formed, assembled and applied,
and which are made of materials that are or
may be placed in the containers for being dis-
pensed therefrom.

Other objects and important features are
pointed out or implied in the following details of
description, in connection with the accompany-
ing drawing in which:

Fig. 1 is a vertical sectional view of one form
of the invention, the section through the closure-
seat and resilient closure member being along the
line 1—1 of Fig. 5.

Fig. 2 is a view similar to Fig. 1, but showing the
closure depressed by outflowing material.

Fig. 3 is a view similar to Fig. 1, but showing
a closure-seat fitted in the neck of the container.

Fig. 4 is a view similar to Fig. 1, but showing
the closure-containing cap fitted on a threadless
neck of a container, and swaged into permanent
engagement with the neck.

Fig. 5 is a bottom plan view of a resilient closure
such as shown in Figs. 1, 2, 3 and 4, enclosed in

the closure-seat which is shown in section along
the line 5—5 of Fig. 1.

Referring to this drawing in detail, in which
similar reference numerals refer to similar parts
in the several views, the invention is described
in detail as follows:

In the form shown in Figs. 1 and 2, the exter-
nally screw-threaded neck of the collapsible tube
or receptacle is shown, while the unthreaded neck
(of Figs. 3 and 4) is shown at 10a and 10b, respec-
tively. The screw-cap or dispensing head of
Figs. 1 and 2 is shown at 11, that of Fig. 3 is
shown at 11a, that of Fig. 4 is shown at 11b. In
each assembly-view, the cap or dispensing head
is formed with an outlet or dispensing orifice 12
which has a knife-edge margin, the surrounding
material being tapered inward to the orifice from
a circle around the latter, so that the relatively
thick part around each orifice supports the rela-
tively thin or knife-edge margin of the orifice;
that is, the margin 13 which is substantially as
thin and acute as an ordinary knife edge. The
knife-edge margin is shown at 13 in Figs. 1, 2, 3
and 4.

In Figs. 1, 2 and 4, the closure-seat 14 is in
the form of an annulus or a cylindrical cup hav-
ing a central opening 15; while the closure-seat
of Fig. 3 is shown at 14a and has a central open-
ing 15 which has an outer marginal flange 16.
The openings 15 are the outlets of the closure-
seats which are tightly fitted in the respective
caps or heads so as to be firmly united there-
with; while the marginal parts around the open-
ings 15 hold the respective closures 17 in their
operative positions.

Now, referring to Fig. 5, it is seen that the
resilient closure 17 comprises a number of seg-
mental parts 17a whose inner parts are separated
by slots or slits 17b and whose outer ends are
united by narrow resilient elements 17aa at the
outer ends of the slits. The purpose of these
elements 17aa is to hold the resilient segments
in properly assembled relation while placing them
in the closure-seat 14 or 14a; for when they
have been properly assembled they would operate
the same if the slits or joints 17b were long
enough to eliminate the uniting elements 17aa.
Each segment 17a has one or more concavities
17ab between angular resilient parts 17aa and
17bb which are pressure-fitted against the in-
ner surface of the wall of the closure seat 14 or
14a and combine therewith and with the inner
surface of the dispensing head or cap 11, 11a or
11b, to form air pockets in which air and resil-
ient material of the closure can be depressed by

the outflowing fluid or semi-fluid against the centrally and outwardly converging surfaces 17x of the resilient segments. The air in the pockets 17ab combines with the resiliency of the closure-segments (especially of their angular parts 17aa and 17bb) to return them to the outlet-closing relation shown in Figs. 1, 3 and 4.

For use in dispensing certain materials, the exposed parts of the closure 17 may be covered with suitable chemical-resistant material, as previously explained for the closure 17c—17d.

The main distinctive features that are common to the several forms of this invention are the resilient compressible closures, their air-pockets, their confinement wholly within the non-collapsible ends comprising the necks and dispensing heads, their retaining closure-seats which are originally separate and now tight-fitted in the dispensing heads, and the knife-edge margins of the dispensing outlets.

Although I have described these embodiments of my invention quite specifically, it is not my intention to limit my patent protection to these exact details of construction, arrangement or materials, for the invention is susceptible of numerous changes within the scope of the inventive ideas as implied and claimed.

What I claim as my invention is:

1. In combination with a dispensing receptacle which includes a hollow neck, an originally separate hollow head secured on said neck, an originally separate closure-seat tight-fitted in said originally separate hollow head, a closure integrally formed with resilient parts which are combined with contiguous parts in said head and closure seat to form an air-pocket into

which a part of the resilient closure can be compressed against air in the air-pocket when pressure is properly applied for compressing the closure, the inherent resiliency of the closure and of the air in said air-pocket being effective to normally hold said closure against the margin of said outlet for closing the latter.

2. In combination with a dispensing receptacle having a non-collapsible hollow end formed with an outlet orifice, a closure seat in said hollow end and integrally formed with a continuous wall, a closure having resilient parts snugly fitted against said continuous wall and having a concavity that combines with the wall to form an air-tight pocket that excludes liquid and provides a space in which the closure can be compressed against air-pressure, the closure being normally held by its inherent resiliency against the margin of the outlet orifice for closing the latter and being properly shaped and arranged to be compressed towards said air-tight pocket and away from said outlet orifice by pressure thereon of liquid or semi-liquid within said hollow end of the receptacle.

3. An element of a dispensing receptacle comprising a resilient closure formed of a set of angular segments having sides normally fitted closely against one another and having their apexes normally meeting at the central part, said central part being of proper outwardly converging shape to be separated by outward pressure of fluid thereagainst for providing an outlet orifice, each of said segments being formed with a concavity in a side opposite to the apex of the angular segments.

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