

May 18, 1937.

F. McLAUGHLIN

2,080,427

CLOSURE FOR COLLAPSIBLE TUBES AND CONTAINERS

Filed Sept. 9, 1935

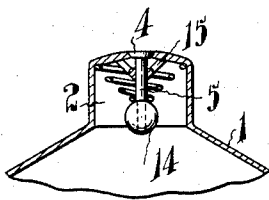


Fig. 9.

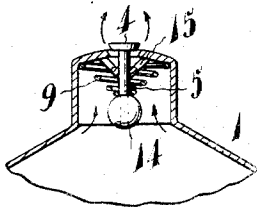


Fig. 10.

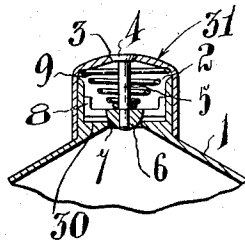


Fig. 1.

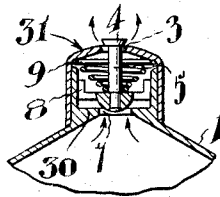


Fig. 2.

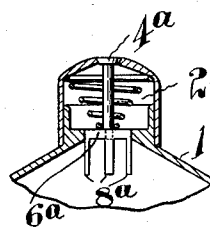


Fig. 4.

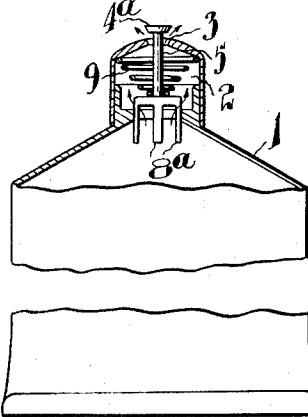


Fig. 5.

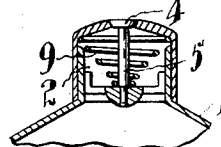


Fig. 8.

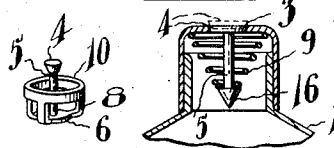


Fig. 3.

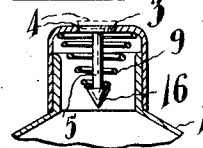


Fig. 11.

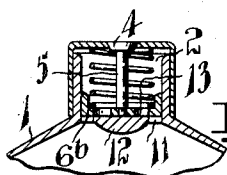


Fig. 6.

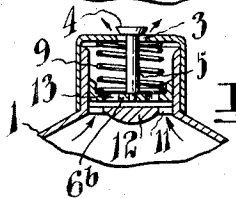


Fig. 7.

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UNITED STATES PATENT OFFICE

2,080,427

CLOSURE FOR COLLAPSIBLE TUBES AND CONTAINERS

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Application September 9, 1935, Serial No. 39,811

9 Claims. (Cl. 221-60)

This invention relates to collapsible tubes and similar containers such as used for dispensing fluid, semi-fluid or plastic substances, and particularly to closures therefor. It has been proposed to provide a closure of the type in which a valve is provided which is automatically unseated to allow the contents to escape when the tube is squeezed, and in which means are provided to automatically reseal the valve when pressure on the tube is released.

The object of the present invention is to devise a construction in which a minimum amount of pressure will be required on the tube to unseat the valve and in which the automatic seating of the valve will not be interfered with.

I attain my object by means of the constructions hereinafter described and illustrated in the accompanying drawing in which

Fig. 1 is a vertical section of one form of my invention, the valve being seated;

Fig. 2 a similar view with the valve unseated;

Fig. 3 a perspective view showing a modified form of valve member for the closure shown in Figs. 1 and 2;

Fig. 4 a vertical section of another form of my invention, the valve being seated;

Fig. 5 a similar view showing the valve unseated;

Fig. 6 a vertical section showing a modification of the closure shown in Fig. 1, the valve being seated;

Fig. 7 a similar view showing the valve unseated;

Fig. 8 a vertical section illustrating another modification of the closure shown in Fig. 1;

Fig. 9 a vertical section of another form of closure, the valve being seated;

Fig. 10 a similar view showing the valve open; and

Fig. 11, a vertical section showing modification of the closure shown in Fig. 9.

In the drawing like numerals of reference indicate corresponding parts in the different figures.

Referring to Fig. 1, 1 indicates the upper end of a collapsible tube or container, which is provided with an outlet 7 in its head and which is surrounded by an annular flange 30, over which flange is sleeved a cap 31 to complete a chamber 2 for the valve mechanism. It will be noted that the flange 30 is spaced from the edge of the outlet in the head. At the top of the cap is formed an outlet 3, which is closed by a valve 4 having a downwardly extended stem 5, on the lower end of which is mounted a plunger 6, on

which pressure is exerted by the contents of the tube, when the latter is squeezed, to unseat the valve 4.

This plunger 6 further acts as a valve to close the opening 7 and is preferably formed with a convex bottom. The plunger is also utilized as a guide to hold the valve 4 from wobbling when unseated, and for this purpose is provided with radially extending guides 8 which bear against the side walls of the chamber 2. A tapered coil spring 9 engages the inside of the top of the chamber and the upper side of the plunger 6 and tends to keep the plunger 6 and also the valve 4 seated in the bottom and top openings of the chamber. The operation of the device is as follows: When squeezing pressure is applied to the tube, the contents are forced upwardly against the plunger 6, raising it and through it the stem 5 and valve 4. The contents pass into the chamber 2 and out through the outlet 3. When a sufficient quantity has been forced out, squeezing of the tube is stopped, and the spring 9 forces the plunger and with it the valve 4 back to their seats and thus the tube is again closed.

In Fig. 3 a modified form of plunger 6' is shown in which the guides 8' are connected at their upper ends by a ring or band 10.

In Figs. 4 and 5 is shown a construction operating similarly to that shown in Figs. 1 and 2. The plunger 6^a, however, instead of seating against the edges of the opening 7 has a sliding fit therein and the guides 8^a extend downwardly and engage the sides of the opening to hold the valve mechanism centrally of the openings.

In Figs. 6 and 7 is shown a further modification in which a series of openings 11 are formed in a partition 12 across the neck of the tube, and the plunger 6^b is formed with a series of openings 13 for the passage of the material after the plunger has been lifted.

In Fig. 8 is shown a construction similar to that shown in Figs. 1 and 2, but with the partition omitted in which the opening 7 is formed. In this construction to open the valve, pressure is exerted directly on the under side of the valve 4.

In Figs. 9 and 10 the stem 5 of the valve 4 has a ball-shaped shoulder 14 on its lower end with the upper side of which the spring 9 engages. A guide 15 extends downwardly from the head of the tube for supporting and centering the stem 5.

In Fig. 11 is shown a closure similar to that shown in Fig. 9. The stem 5 is provided with a

cone-shaped member 16 at its lower end, which may be used to expand the small coils of the spring 9 during assembly, said small coils engaging the back of said cone-shaped member as shown and preventing withdrawal of the latter.

What I claim as my invention is:

1. A collapsible tube or container having an outlet in its head; an annular flange surrounding said outlet and in spaced relation thereto; a cap sleeved on said flange, said cap having an outlet in its head; a valve controlling the outlet in the cap; a stem connected with the valve; a guide on said stem slidably engaging the inside of the flange, a spring engaging the under side of the head of the cap and the upper side of said guide normally tending to hold the valve seated, the central portion of said guide being formed as a valve to close the outlet in the tube when the cap valve is in seated position.
2. A collapsible tube or container having an outlet in its head; an annular flange surrounding said outlet and in spaced relation thereto; a cap sleeved on said flange, said cap having an outlet in its head; a valve controlling the outlet in the cap; a stem connected with the valve; a guide on said stem slidably engaging the inside of the flange, a spring engaging the under side of the head of the cap and the upper side of said guide normally tending to hold the valve seated, the central portion of said guide being formed as a valve to close the outlet in the tube when the cap valve is in seated position; the seat engaging surface of the valve portion of said guide being convexed.
3. A collapsible tube or container having an outlet in its head; a hollow cap on said head, said cap also having an outlet in its head, the inner wall of said cap being in spaced relation to the outlet in the tube head; a valve controlling the outlet in the cap; a stem connected with the valve; a guide on said stem slidably engaging the inner side wall of the cap; and a spring engaging the under side of the head of the cap and the upper side of said guide normally tending to hold the valve seated; the central portion of said guide being formed as a valve to close the outlet in the tube when the cap valve is in seated position.
4. A collapsible tube or container having an outlet in its head; a hollow cap on said head, said cap also having an outlet in its head, the inner wall of said cap being in spaced relation to the outlet in the tube head; a valve controlling the outlet in the cap; a stem connected with the valve; a guide on said stem slidably engaging the inner side wall of the cap; and a spring engaging the under side of the head of the cap and the upper side of said guide normally tending to hold the valve seated; the central portion of said guide being formed as a valve to close the outlet in the tube when the cap valve is in seated position; the seat engaging surface of the valve portion of said guide being convexed.

5. A collapsible tube or container having an outlet in its head; a hollow cap on said head, said cap also having an outlet in its head, the inner wall of said cap being in spaced relation to the outlet in the tube head; a valve controlling the outlet in the cap; a stem connected with the valve; a guide on said stem slidably engaging the inner side wall of the cap; and a spring engaging the under side of the head of the cap and the upper side of said guide normally tending to hold the valve seated; said guide comprising a central valve portion to close the outlet of the tube when the cap valve is in seated position and guide fingers radially extending from said valve portion.

6. A collapsible tube or container having an outlet in its head; a hollow cap on said head, said cap also having an outlet in its head in alignment with the outlet in the head of the container, a stem slidable through said cap outlet; a valve on one end of the stem for closing the cap outlet; a valve on the other end of the stem for closing the tube outlet; the tube outlet and its valve being of greater cross sectional area than the cap outlet and valve; and means normally tending to move said stem and valves to outlet closing position.

7. A collapsible tube or container having an outlet in its head; a hollow cap on said head, said cap also having an outlet in its head in alignment with the outlet in the head of the container, a stem slidable through said cap outlet; a valve on one end of the stem for closing the cap outlet; a valve on the other end of the stem for closing the tube outlet; and means normally tending to move said stem and valves to outlet closing position.

8. A collapsible tube or container having an outlet in its head; a hollow cap on said head, said cap also having an outlet in its head in alignment with the outlet in the head of the container, a stem slidable through said cap outlet; a valve on one end of the stem for closing the cap outlet; a valve on the other end of the stem for closing the tube outlet, and means normally tending to move said stem and valves to outlet closing position; and guide means on said tube valve for maintaining it when unseated in axial alignment with the outlets.

9. A collapsible tube or container having an outlet in its head; a hollow cap on said head, said cap also having an outlet in its head in alignment with the outlet in the head of the container, a stem slidable through said cap outlet; a valve on one end of the stem for closing the cap outlet; a valve on the other end of the stem for closing the tube outlet; the tube outlet and its valve being of greater cross sectional area than the cap outlet and valve; and means normally tending to move said stem and valves to outlet closing position; and guide means on said tube valve for maintaining it when unseated in axial alignment with the outlets.

FRANK McLAUGHLIN.