This invention relates to dispensing apparatus and more particularly to a dispensing closure for collapsible type fluid containers.

Various types of closure devices have been provided for collapsible tube type containers that are usually provided for dispensing creams, pastes, lotions and the like. Most of these closures, however, require the use of a removable member for opening the top of the tube, which members often become lost and misplaced, thereby giving rise to various inconveniences and damage to the contents of the container.

Accordingly, an object of the present invention is to provide a novel dispensing closure device for various types of collapsible containers in which the closure device is maintained in assembly with the container and has pressure responsive means for automatically dispensing the contents of the container through self contained valve means.

Another object of the present invention is to provide a dispensing closure device in which a tip is provided with a plurality of intersecting slits that define a predetermined quantity of flexible segments, which segments are adapted to spread apart in response to the build up of internal pressure within the container so as to automatically dispense the contents therethrough and in response to cessation of such pressure, the segments automatically close so as to prevent further loss of the contents or contamination thereof.

A still further object of the present invention is to provide a dispenser closure device that is simple in construction, efficient in operation, and which will overcome the aforementioned difficulties.

All of the foregoing and still further objects and advantages of this invention will become apparent from a study of the following specification, taken in connection with the accompanying drawing, wherein:

Figure 1 is a perspective view of a dispensing device made in accordance with one form of the present invention;

Figure 2 is a plan view of the device shown in Figure 1;

Figure 3 is a side view, with parts broken away, of the device shown in Figure 1;

Figure 4 is a side view, with parts broken away, of a modified form of the present invention in operative use;

Figure 5 is an elevational view taken along line 5—5 of Figure 4;

Figure 6 is a front elevational view of a still further modified form of the present invention;

Figure 7 is a top plan view of the device shown in Figure 6;

Figure 8 is a cross sectional view taken along line 8—8 of Figure 7;

Figure 9 is a view similar to Figure 7, showing the closure device in an open position;

Figure 10 is a side elevational view showing the manner in which the device shown in Figures 6 to 9 is operated;

Figure 11 is a view similar to Figure 10, showing the parts in a completely open position; and

Figure 12 is an exploded perspective view, with parts broken away, of a still further modified form of the present invention.

Referring now to the drawing and more particularly to Figures 1 to 3 thereof, a dispensing closure device is made in accordance with one form of the present invention is shown to include a collapsible tube 12 that has a conical closure member 11 at the upper end thereof. The apex of this member 11 is provided with a plurality of intersecting slits 14 that divide the tip into a plurality of individual flexible quadrants 15. As is more clearly shown in Figure 3, the closure member 11 is hollow so that upon exerting a pressure upon the tube 12, an internal pressure is built up within the contents 16 thereof so as to force the quadrants 15 apart, thereby permitting the egress of the fluid therefrom.

In Figures 4 and 5, a modified form 20 of the present invention is shown wherein the closure member is in the form of a separate cap 21 that is integrally secured to the outlet member 22 of a collapsible tube 23. This cap 21 is also of conical shape and is provided with a plurality of intersecting slits 24 at its apex. These slits divide the apex of the cap 21 into a plurality of separate flexible quadrants 25. Thus, upon the pressure exerted upon the tube 23, the contents thereof are operative to urge the flexible quadrants 25 apart so that the toothpaste 26 is expelled therethrough and may be applied to a brush 27 without removing any separate closure member. Upon release of the squeezing pressure upon the tube, the quadrants will return to their normally closed position, thereby cutting off the continued flow of fluid therefrom.

In Figures 6 to 11, a still further modified form 30 of the present invention is shown wherein the closure member is a combination of two elements. A sleeve 31 of hollow cylindrical configuration is secured to the outlet member 32 of the collapsible tube 34. A separate closure member 36 having a hollow cylindrical lower portion and a conical upper portion is slidably supported upon the sleeve 31. The conical portion of the member 36 is provided with a plurality of intersecting slits 37 that divide that end into a plurality of individual flexible sections 38. This arrangement may be operated in the manner hereinafter described in connection with Figures 1 to 5, but may, if desired, be manually operated in the manner shown in Figures 10 and 11. By exerting a downward pull upon the closure member 36, the upper end of the sleeve 31 is operative to urge the sections 38 apart so that the contents of the tube may be poured or otherwise ejected therefrom without having to first build up the necessary pressure to force the sections 38 apart. Upon dispensing the desired amount of material, the closure member 36 may be raised from the lowered position 36a to the upper closed position as shown in Figure 6, whereupon the tube 34 is automatically sealed. Because of the resiliency of the material from which the closure member 36 is constructed, the sections 38 readily move between the closed position and the open position 35a.

In Figure 12, a still further modified form 40 of the present invention is shown that is quite similar to the embodiment described in connection with Figures 6 to 11. However, in this arrangement, the sleeve 41 is provided with an external helical thread 43 that is adapted to cooperate with a matching internal thread 44 on the closure member 46. The upper end of the closure member 46 is also of conical configuration and is provided with a plurality of intersecting slits 47 that divide that end of the member into a plurality of substantially equal flexible sections 48. Thus, the sleeve 41 may be applied to the outlet member of a collapsible container in the aforementioned manner. Then, by rotating the closure member 46 relative to the sleeve 41, the upper
end of the sleeve 41 is operative to engage the inside surfaces of the sections 48 to spread them apart in a manner similar to that shown in Figures 10 and 11. However, because of the threaded engagement of the parts, the threads provide a mechanical advantage for spreading the sections apart during the rotational movement of the closure member 46, rather than having to exert a sufficient downward force upon the closure member to obtain this result.

It will be recognized that any type of flexible material may be used for constructing the aforementioned embodiments of this invention. However, it has been found that various types of plastic material are particularly suited to this construction and provide a device that is easy to manufacture, and extremely low in cost. Because of the self-sealing action of this device, the contents within the container are not exposed to the atmosphere any longer than necessary, thereby providing for a sanitary and efficient assembly.

While this invention has been described with particular reference to the construction shown in the drawing, it is to be understood that such is not to be construed as importing limitations upon the invention, which is best defined by the claim appended hereto.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

A dispenser closure device for collapsible containers having fluid material stored therewithin, comprising, in combination, a flexible outlet member having a hollow conical tip open at one end, a plurality of intersecting slit lines extending across the apex of the opposite end of said tip and defining a plurality of flexible arcuate segments, all of said segments being of substantially identical size and shape with the outermost portions of said segments defining said apex being deformable between the sides of each other and an open spaced apart relationship for permitting the passage of a fluid mass therethrough in response to the establishment of an internal pressure forcing said segments apart, said container being provided with an outlet extension supporting said outlet member thereon, and said one end of said flexible member comprising a base slidably receiving said outlet extension therewithin, whereby the manual squeezing of said container is operative to pressurize the mass contained therein, and to establish said internal pressure to deform said segments into said open spaced relationship and to force said material outwardly through said opposite end of said tip through said intersecting slit means extending across said apex thereof upon movement of said arcuate outermost portions of said segments to said open spaced relationship.

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