Sept. 17, 1968 J. A. WIEDEMAN 3,401,837

SELF-COLLAPSING CONTAINER

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FIG. 1

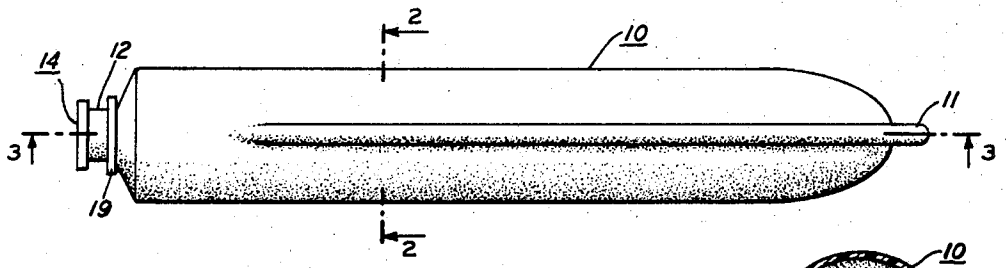


FIG. 2

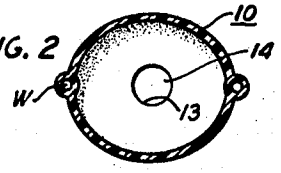


FIG. 3

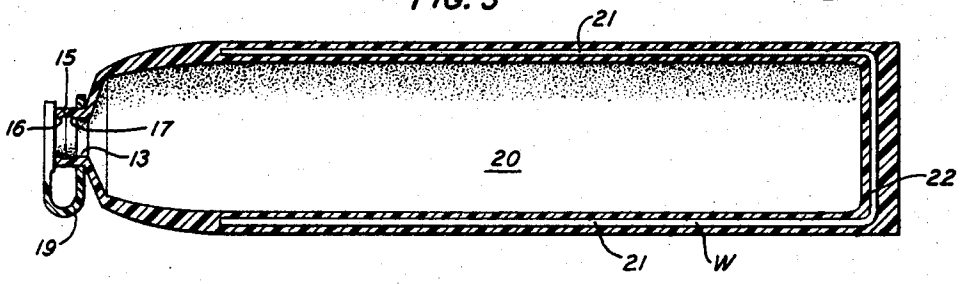


FIG. 4

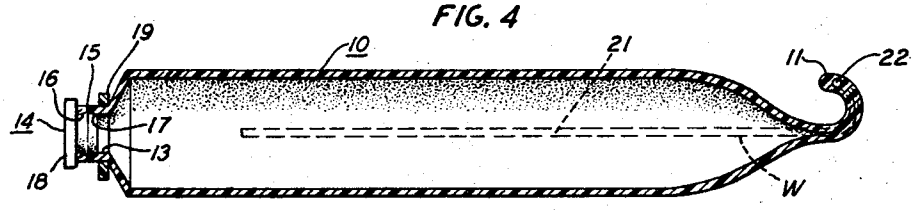
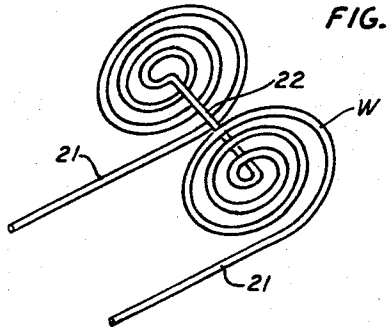


FIG. 5



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FIG. 6

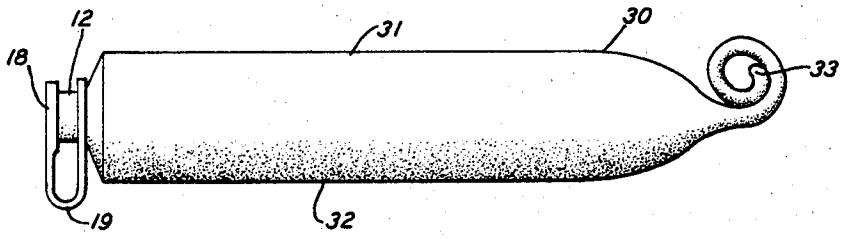


FIG. 7

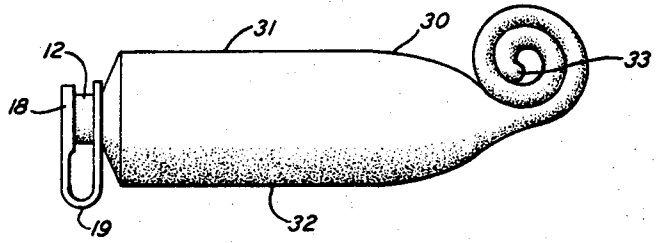
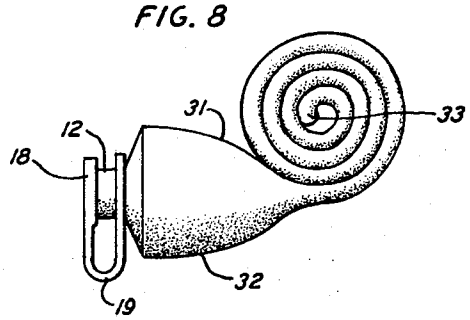


FIG. 8



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SELF-COLLAPSING CONTAINER

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ABSTRACT OF THE DISCLOSURE

A self-collapsing thermoplastic container is constructed in such a manner that the walls thereof exert an internal pressure upon the contents in such a manner that upon opening of the discharge outlet the content material may be disposed.

This invention relates to flexible collapsible plastic containers. More particularly, the present invention relates to collapsible plastic containers of the type used to contain and dispense toothpaste, creams, medicaments and any similar viscous substances, such containers including means for facilitating the dispensing of the contents thereof.

In recent years, a considerable degree of enthusiasm has been generated in the chemical industry for a class of compositions termed, "thermoplastic materials," polyethylene and polypropylene being prime examples of such compositions. The inherent advantages of these materials, namely, chemical inertness with respect to contents, ease of ornamentation and nominal cost, became self-evident to workers skilled in the packaging arts and in the years following resulted in an industrial revolution in the packaging industry.

At an early stage in this revolution, the feasibility of utilizing such materials for packaging toothpaste, cosmetics and the like was recognized. Unfortunately, a major prior art difficulty has been the efficient evacuation of the contents of the container. Thus, the normal evacuation or dispensing procedure involves the application by manual means of external pressure and in order to assure maximum evacuation the container must be continually squeezed in an inverted position or rolled end upon end (as in the case of thin walled tubes). Unfortunately, neither of these procedures has proven to be entirely satisfactory due to entrapment of contents or drawing in of air with subsequent lack of control in dispensing.

In accordance with the present invention, the prior art limitations described are effectively obviated by a novel container which automatically collapses as the contents thereof are dispensed. More specifically, the novel container is constructed in such manner that the walls thereof exert an internal pressure upon the content so that when the discharge outlet is opened the contents material may be dispensed with the concurrent collapse of the container. Application of the desired internal pressure is effected in accordance with the invention either by means of a U-shaped spring steel wire embedded in the side and closed end walls of the container or in an alternative embodiment by generating an innate force in the container walls prior to filling so that the content material may be evenly advanced through the container and out of the discharge outlet upon removal of the cap, thereby resulting in the automatic collapse of the container.

It will be understood by those skilled in the art that the present invention is described for convenience largely in terms of tube contents wherein the container is a cylinder of oval cross-section closed at one end by a crimp and at the other end by a cap of the stopper type. However, it will be readily apparent to those skilled in the art that such is for purposes of exposition only and that any thermoplastic container may be constructed as described herein.

The invention will be more readily understood from the following detailed description taken in conjunction with the accompanying drawing wherein:

FIG. 1 is a side elevational view of a typical collapsible container constructed in accordance with the invention;

FIG. 2 is a cross-sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is a sectional view of FIG. 1;

FIG. 5 is a perspective view of a coil spring wire employed in the practice of the invention prior to insertion in a container;

FIG. 6 is a side elevational view of an alternative container constructed in accordance with the invention;

FIG. 7 is a side elevational view of the container of FIG. 6 after a portion of the contents thereof have been dispensed; and

FIG. 8 is a side elevational view of the container of FIG. 7 after the container has been completely evacuated or before being filled.

With reference now more particularly to the drawing wherein like numerals denote corresponding parts, a collapsible container of the type normally utilized to contain toothpaste and the like is shown. The inventive container **10** is essentially a cylinder of oval across-section constructed of a thermoplastic material having one end sealed as at **11**, thereby defining a chamber **20**, and the other or discharge end provided with a neck portion **12** through which a discharge passage extends. In order to removably secure a stopper **14** in neck **12** to prevent the inadvertent escape of contents therethrough passageway **13** is enlarged as at **15** and provided with tapering side walls **16** and **17**. Stopper **14** is of the same configuration and size as walls **15** and **16**, so assuring that passageway **13** will receive the stopper **14** and hold it securely until removed by pulling upon tab **18** secured thereto, tab **18** being fastened to neck **12** by means of an elongated ribbon **19**.

Embedded in the thin side and end walls of container **10** is a U-shaped spring steel wire, designated W, comprising a pair of leg members **21** connected to each other at the lower extremity of container **10** by means of base member **22**. Leg members **21** of spring wire W are normally in a coiled position (note FIG. 5); however, in the fabrication of tube **10** members **21** are held in an open position, and after filling container **10**, extend in a straight line along the wall of the container (see FIG. 1).

In use, tab **18** is pulled away from neck **12**, so resulting in the removal of stopper **14** and opening of passage **13**. Upon the application of external pressure to the side walls of container **10**, contents of the tube are ejected. As chamber **20** is gradually evacuated, leg portions **21** of wire W cause end portion **11** to wind upon itself (see FIG. 4) until container **10** is virtually empty. At this point wire W will once again assume its normal position as shown in FIG. 5.

The inventive container described herein has been found to be particularly advantageous in that essentially all of the contents of container **10** will be evacuated without the necessity of the user collapsing the tube and rolling it end upon end to assure maximum evacuation of contents, thereby avoiding the prior art limitation of entrapment of contents.

Referring now to FIGS. 6, 7, and 8, an alternative embodiment of the present invention is shown wherein container **30** is so constructed as to automatically collapse so that when the discharge outlet is opened the content material may be evenly advanced through the container and out of the discharge outlet.

This embodiment of the invention involves pretreating the thermoplastic composition employed in the fabrication of the container by impressing an innate force or pre-

stress upon walls **31** and **32** of container **30**, thereby compelling end **33** to coil upon itself as the tube contents are evacuated. This unique effect is attained by subjecting container **30** to a heating step while in the coiled position as shown in FIG. 8. Thus, this goal is attained by heating container **30**, in the coiled position as shown in FIG. 8 to a temperature of the order of 200° C. for a time period of the order of 5 minutes maxima being dictated by the softening point of the material. Thereafter, tube **30** is filled with the desired content material, thereby resulting in unwinding of the container and the development of an internal force. Upon opening of the container, the content material is dispened and the walls automatically collapse, so resulting in coiling of the tube as shown in FIGS. 7 and 8.

While the invention has been described in detail in the foregoing specification and the drawing similarly illustrates the same, the aforesaid is by way of illustration only and is not restrictive in character. The several modifications which will readily suggest themselves to persons skilled in the art are all considered within the scope of the invention. Thus, it will be understood that the configuration of the container utilized may take the form of a rectangle, a chamber or any other polygonal form.

What is claimed is:

1. A collapsible thermoplastic container for fluent material including a chamber defined by a pair of opposite side walls, an end wall and a neck portion mounted opposite the said end wall, said neck portion having a conduit communicating with said chamber, stopper means removably mounted on said neck portion, and means for collapsing said container, to exert internal pressure on said fluent material, said means comprising a pair of elongated, but normally coiled, spring members embedded in said opposite side walls.

2. The container of claim **1** wherein said spring members are joined to each other and to said end wall by an elongated member in said end wall connecting said spring members.

References Cited

UNITED STATES PATENTS

1,731,703	10/1929	Bourke	222—99
2,430,046	11/1947	Dreyfus	222—107

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HADD S. LANE, *Assistant Examiner.*