Jan. 1, 1957 E. FREEDMAN 2,776,077

RESILIENT SPRING ENVELOPE FOR COLLAPSIBLE TUBES

Filed Feb. 28, 1951

Fig. 1

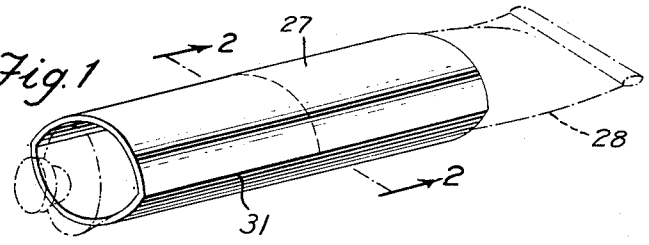


Fig. 2

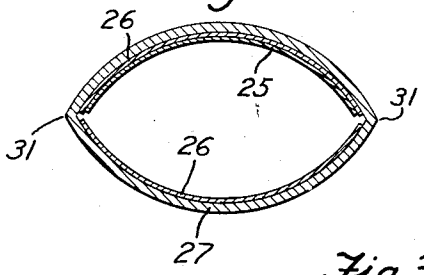


Fig. 3

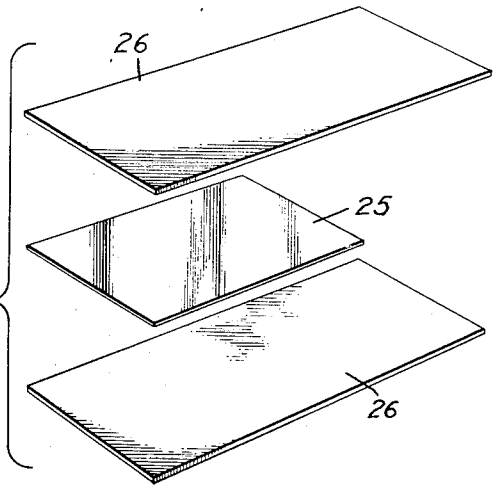
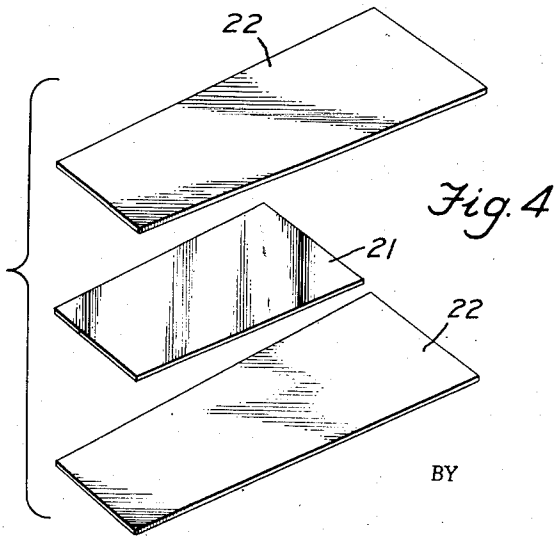


Fig. 4



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RESILIENT SPRING ENVELOPE FOR COLLAPSIBLE TUBES

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Application February 28, 1951, Serial No. 213,165

2 Claims. (Cl. 222—103)

This invention relates to a resilient envelope for collapsible tubes, simplified over those described in my patent application Serial No. 109,578, August 10, 1949, U. S. Patent No. 2,600,631, June 17, 1952.

The object of this invention is to provide all of the advantages enumerated in my previous application, while making the construction of the spring device more simple and cheaper.

Broadly speaking, these advantages consist of having a resilient envelope and spring combination, which provides continuous pressure against the walls of a collapsible tube and which tends to empty it of its contents. It also protects the collapsible tube from mutilation and breakage.

It is among the objects of the invention to provide a flexible spring envelope for collapsible tubes with seated ball ends containing liquid or paste, such as lacquer dye for furs, silks and other fabrics, of simple, inexpensive construction, providing a continuous pressure against the walls of the tube so that the liquid, will at all times be fed automatically to the ball end providing automatic continuous flow of the material in the tube when desired.

Another object is to provide a resilient envelope for collapsible tubes, the pressure of which can be easily chosen depending upon the character of the liquid, cream, dye, ointment or other material to be dispensed from the tube.

The tubes for which the resilient envelope is particularly adapted are collapsible tubes with a ball point seated within a rigid walled ball socket at the applicator end of the tube. The dye, marking ink, or other incompressible liquid completely fills the tube. The resilient envelope exerts a sustained pressure against the collapsible walls of the tube to cause said walls to become displaced in direction to diminish the volumetric capacity as the dye or other liquid or cream is dispensed at the ball point, thereby maintaining the walls of the tube at all times in intimate engagement with the entire surface of the dye, or other liquid material in the tube and accordingly preventing the formation of voids in the tube. The sustained pressure against the outer walls of the tube is provided by the resilient envelope and is sufficient to overcome the resistance of the material from which the tube is made, such as lead or plastic, so that the column of dye or other liquid or cream is pressed forward affirmatively to urge the ball against its seat. The resilient envelope extends longitudinally around the collapsible tube.

Collapsible tubes used for dyes, marking ink, creams, oils, ointments and other similar materials are apt to become damaged by dropping, or punctured by coming in contact with other articles, and to crack or break by rolling or squeezing, thus permitting the contents to escape. The resilient envelope of the invention provides a protective covering for such tubes which can be easily applied and adequately enclose the tube preventing injury, providing ample space for advertising the produce and automatically providing continuous pressure to dispense

the contents of the tube when the ball end is used during applications of the contents.

In the dyeing of furs, silks and other materials, particularly, it is necessary to feed the dye continuously to the pelt, or other materials with an even and uniform flow of dye, to obtain clear marking, thus prevent loss of time due to stoppage of flow which often occurs in the ordinary flexible marking tube.

Normally, a residual amount of dye, or other material remains in the folded collapsible tube thus causing a percentage of loss of the contents of the tube. This invention saves such loss.

Another object of this invention is to provide a method of controlling the emission of materials of varied viscosity by a light finger tip pressure on the spring envelope. This is done by having the spring pressure tending to collapse the lead or plastic tube approximately balance the resistance of flow of material. To cause the emission of the material, it is simply necessary to remove the top from the tube and apply a light pressure tending to bring the spring to its relaxed position. This will cause the emission of material from tube until the finger pressure is removed.

Another object is to construct a simplified device that will overcome the objections to the use of plastic, paper and similar collapsible tubes since the spring envelope will keep the walls of the tubes in contact with the material in said tubes thereby preventing the intake of air when material is not being forced out and also overcoming the resiliency of the plastic or paper tubes which are some of the disadvantages in the use of plastic or paper tubes.

For a fuller understanding of the nature of this invention, reference is had to the following detailed description in connection with the accompanying drawings in which are shown several variations of this invention.

Fig. 1 is a view of a filled collapsible tube enclosed in a resilient spring envelope.

Fig. 2 is a cross section of the resilient envelope in a bowed condition.

Fig. 3 is an unassembled view of the rectangular design of the spring element **25** and the cardboards **26**.

Fig. 4 is an unassembled view of the trapezoidal design of the spring element **21** and the cardboard elements **22**.

Referring to Fig. 1, **28** is a collapsible tube, **27** is the flexible covering and **31** is the edge of the flexible covering forming a resilient envelope.

Referring to Figs. 2 and 3, **25** is the spring element, **26** are the two cardboards or similar backing material, **27** is the flexible covering, **31** are the edges of the flexible covering.

This simplified spring envelope differs from previous application, Serial No. 109,578, U. S. Patent No. 2,600,631, in that the spring pressure in Figs. 1 and 2 is caused by one spring **25** inside a flexible covering **27** holding cardboard **26** against the sides of a collapsible tube **28** by said flexible covering **27**. The resilient envelope will be held firmly against the collapsible tube. The pressure of the spring and the flexible covering against the collapsible tube tends to bring the tube to a flattened shape and so to empty the tube of its contents, either through a ball point valve or open tube, depending upon the viscosity of material used.

The purpose of the trapezoidal shape shown in Figure 4 is that in this form the pressure at the bottom of the tube caused by short base of trapezoidal spring, **21**, is greater than that at the top of the collapsible tube, thus tending to keep the material within the tube, at the top or mouth of said tube until the tube is empty.

The present invention may be advantageously applied by way of example with tubes for inks, creams, ointments, perfumes, pastes, mucilage or similar materials.

It is obvious that various changes, shapes and modifications can be made in details of construction and arrangements of parts and materials without departing from the general spirit of this invention.

I claim:

1. A resilient envelope adapted to operate on a collapsible tube for dispensing liquid or semi-solid material, said envelope comprising one spring steel leaf, substantially rectangular in shape, and two cardboard protecting forms, and a flexible material which encloses the spring and cardboard elements, forming a tightly fitting sleeve for said steel spring and cardboard, permitting said steel spring to be bowed, and forming an envelope, one side of which consists of the flexible material, the spring and one cardboard form, and the other side of which consists of the other cardboard form and the flexible material, said envelope protecting said collapsible tube and exerting substantially uniform and continuous pressure along at least a major portion of the length of said collapsible tube at substantially right angles to the axis thereof, progressively to collapse said tube as said material is emptied from the end of said tube and to urge the walls of said tube into intimate engagement with the material within said tube and to exert forward pressure on the material within said tube.

2. A resilient envelope adapted to operate on a collapsible tube for dispensing liquid or semi-solid material, said envelope comprising one spring steel leaf, substantially trapezoidal in shape, and two cardboard protecting forms, and a flexible material which encloses the spring and cardboard elements, forming a tightly fitting sleeve for said steel spring and cardboard, permitting said steel spring to be bowed, and forming an envelope, one side of which consists of the flexible material, the spring and one cardboard form, and the other side of which consists of the other cardboard form and the flexible material, said envelope protecting said collapsible tube and exerting substantially uniform and continuous pressure along at least a major portion of the length of said collapsible tube at substantially right angles to the axis thereof, progressively to collapse said tube as said material is emptied from the end of said tube and to urge the walls of said tube into intimate engagement with the material within said tube and to exert forward pressure on the material within said tube.

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