

July 29, 1969

H. A. COX, JR

3,458,087

SELF-ROLLING DISPENSING TUBE

Filed Nov. 17, 1966

3 Sheets-Sheet 1

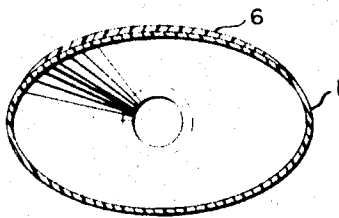
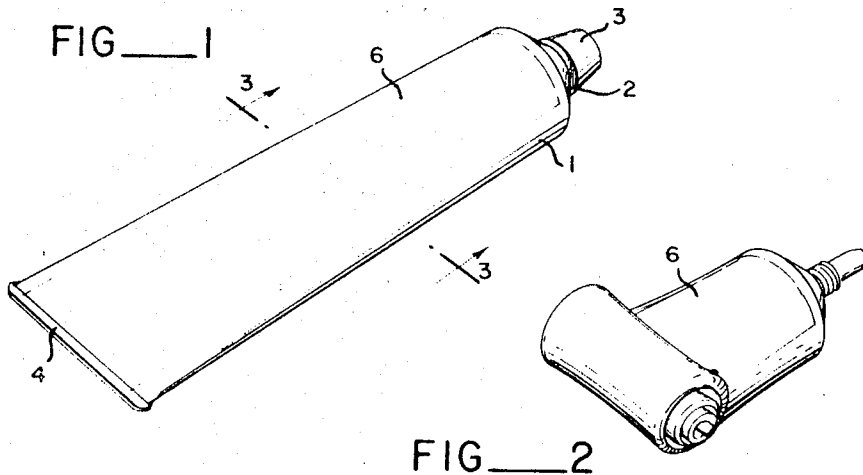


FIG 3

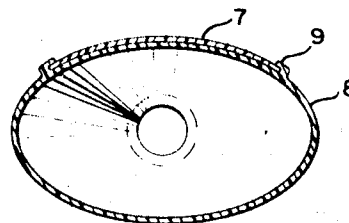


FIG 5

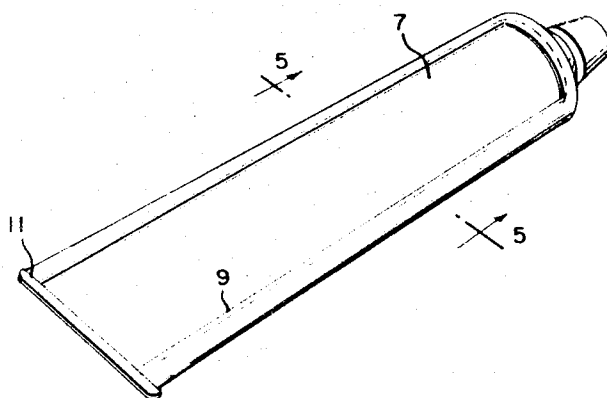


FIG 4

HERSCHEL A. COX JR.
INVENTOR.

BY *[Signature]*

ATTORNEYS

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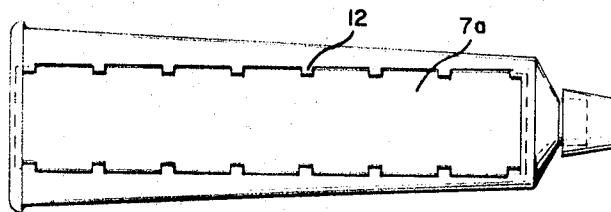


FIG. 6

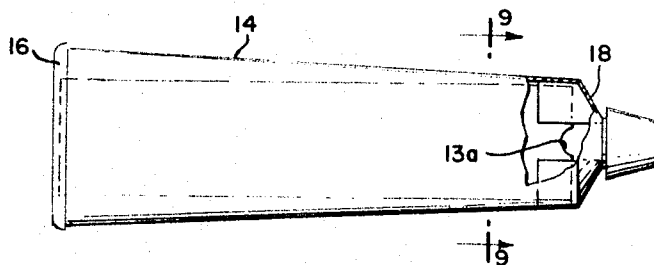


FIG. 7

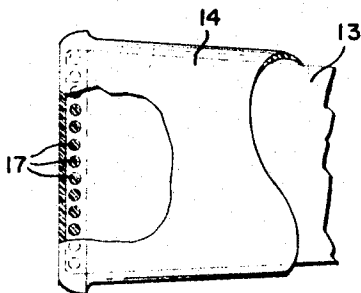


FIG. 8

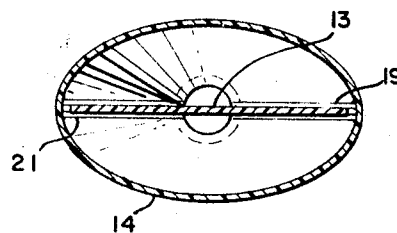


FIG. 9

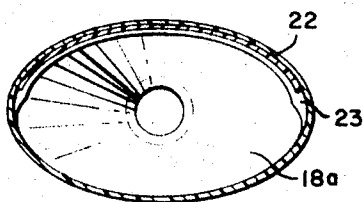


FIG. 10

HERSCHEL A. COX JR.
INVENTOR

BY

Seeds & Berry

ATTORNEYS

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H. A. COX, JR

3,458,087

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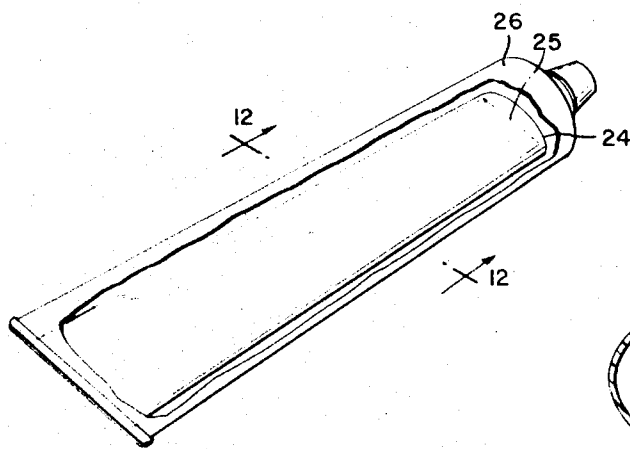


FIG. 11

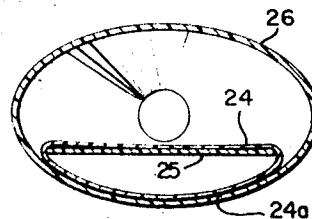


FIG. 12

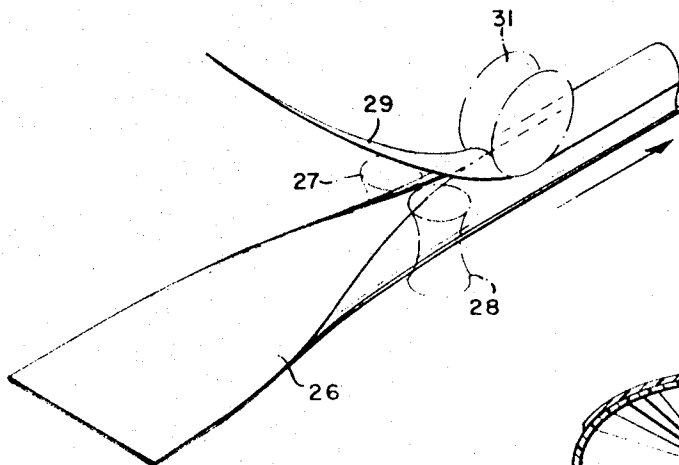


FIG. 13

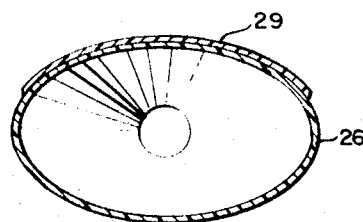


FIG. 14

HERSCHEL A. COX JR.
INVENTOR.

BY *Seeds & Sons*

ATTORNEYS

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SELF-ROLLING DISPENSING TUBE

Herschel A. Cox, Jr., 3012 Mountain Park Blvd. N.,
Issaquah, Wash. 98027

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2 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates to collapsible non-metallic tube type containers and more particularly to tube containers of this character which are self rolling as the material is dispensed.

The non-metallic tubes under consideration are usually made from organic film forming materials and common films utilized for this purpose are low-density and high-density polyethylene and in some cases vinyl and polypropylene. Tubes of this character are utilized for a wide variety of products such as pharmaceuticals, cosmetics, household products, industrial chemicals, petroleum products and even foods. The non-metallic flexible tube suffers, however, from the disadvantage of not being capable of permanent rolling or folding upon itself as the contents are removed in the manner that collapsible metallic tubes are utilized. As a result, a partially filled tube is awkward to handle and must be rolled or folded each time it is used in order to force the contents therefrom. In addition, the presence of air in the tube oftentimes results in an uncontrolled spurting or bubbling which is highly objectionable with certain materials.

The present invention has the object of providing means whereby a flexible non-metallic tube is self rolling as the contents are squeezed or dispensed therefrom in order to avoid the shortcomings of the prior art described.

Another object of the present invention is to provide a non-metallic flexible tube of the character described with a self-coiling or self-rolling element which does not interfere with the dispensing of the contents of the tube.

Another object of the present invention is to provide a self-rolling flexible non-metallic tube of the character described which is simple in construction and capable of being mass produced with present manufacturing facilities.

These and other objects and advantages of the present invention will be understood by those skilled in the art from the following specification and appended claims and from the accompanying drawings.

DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view of a non-metallic flexible tube according to the present invention;

FIG. 2 illustrates a partially filled flexible tube according to the present invention in its rolled condition;

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

FIG. 4 illustrates a self-rolling flexible tube according to one modification of the invention;

FIG. 5 is a cross sectional view taken along lines 5—5 of FIG. 4;

FIG. 6 illustrates a slight modification of the form of the invention shown in FIG. 4;

FIG. 7 illustrates another modification of the invention wherein a self-rolling strip is utilized within the body of the container;

FIG. 8 illustrates one method of anchoring the self-rolling strip illustrated in FIG. 7;

FIG. 9 is a cross sectional view taken along line 9—9 of FIG. 7;

FIG. 10 is a sectional view similar to FIG. 9 showing

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an alternate method for attaching the internal self-rolling strip at the head end of the tube;

FIG. 11 illustrates still another embodiment of the invention wherein the internal self-rolling strip is located within a separate tube of film material within the outer dispensing tube;

FIG. 12 is a cross sectional view taken along line 12—12 of FIG. 11;

FIG. 13 illustrates a method of fabricating the flexible tube while simultaneously applying the self-rolling strip externally thereto; and

FIG. 14 is a cross sectional view of a tube body formed according to the method illustrated in FIG. 13.

DESCRIPTION OF INVENTION

Referring now to the drawings wherein like reference numerals indicate identical parts in the various views, FIG. 1 illustrates a typical tube dispenser having a body 1, a shoulder 2 and a cap 3 with the foot end of the tube being usually crimped and either heat sealed, so as to fuse the material, or sealed with a compatible adhesive as illustrated at 4. As previously mentioned, many organic film forming materials are used for constructing the body of flexible tube containers, the most common being polyethylene, vinyl and propylene. It will be understood, however, that the present invention is not limited to the particular chemical composition of the tube body. Film material made from the aforementioned substances and utilized in tube making may be varied widely in thickness and density but will always possess the quality of being flexible, pliable or limp. According to the present invention a self-coiling or self-rolling strip of non-metallic film substance is utilized in combination with the commonly known flexible tube structure. The self-rolling strip has "memory" or the ability to return to a preconditioned rolled form after having been flattened for extended periods of time. The most commonly known material of this type is Mylar produced by E. I. du Pont de Nemours & Company (Inc.) which is a polyester film made from polyethylene terephthalate, a polymer formed by the condensation reaction of ethylene glycol and terephthalic acid. This material can be provided with memory for self rolling by first rolling the film and then heat treating while in the rolled condition. Although a specific material has been described, equivalent material capable of possessing "memory" for self rolling may be utilized as long as it is compatible with the material of the tube and does not interfere with the contents of the tube.

As illustrated in FIGS. 1 through 3, a self-rolling strip 6 is laminated to the surface of one side of the tube and this may be accomplished by bonding with a suitable adhesive. Such adhesives are available for bonding polyester film to itself or to practically any other material and heat sealing or bonding is commonly practiced. Furthermore, a strip such as strip 6 which acts to roll the tube as shown in FIG. 2, as the material is dispensed, may also be used for displaying advertising material since such plastics are capable of being embossed, metallized, punched, dyed or coated by various known methods. The thickness of the film strip 6 may be determined by the character of the film from which the body of the tube is constructed. Thus, a light gauge tube material may be rolled with a relatively light gauge memory strip and some of the heavier gauge high density film material will require a heavy gauge memory strip.

FIGS. 4 and 5 illustrate a second form wherein the memory strip 7 is attached to the side wall of the tube 8 by means of external retaining projections or flaps 9 which may be formed on the surface of the tube body when it is produced. In this instance, the strip 7 is supplied separately from the tube and may either be inserted

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after filling or may be inserted before the seal 11 is made as a means for insuring that the strip 7 is positively retained on the tube surface.

FIG. 6 illustrates a slightly modified form of the device shown in FIGS. 4 and 5 wherein the strip 7a is retained by a plurality of tabular projections 12 along each lateral edge as illustrated. The strip 7a may be otherwise identical to the strip 7.

FIG. 7 illustrates another form of the invention wherein the memory strip or self-rolling strip is located inside the body of the tube. In this instance, the internal strip 13 may be inserted into the body 14 prior to filling with the bottom end of the strip 13 being sealed to the body when the seal 16 is formed. In the event that the material of the memory strip 13 is not compatible with the material of the tube body so as to be fusible therewith, the strip 13 may be formed with a plurality of holes 17 through which the material of the body 14 may be caused to flow during heat sealing to form a morticed joint to securely hold the strip. At the opposite end of the tube adjacent to the shoulder 18 the tube may be formed with means to receive the self-rolling strip to stabilize its position within the tube and yet allow the strip to move longitudinally relative to the body a slight amount when the tube is rolled or coiled. FIG. 9 shows one means of retaining the end of the strip wherein slotted internal projections 19 and 21 are formed on the inside wall of the head end of the tube. These projections may be formed when the head is molded. The projections 19 and 21 will be of sufficient length to allow the strip 13 to travel the necessary amount during coiling. If desirable the end of the strip 13 may be notched as at 13a to provide ample room for dispensing the contents.

FIG. 10 shows an alternate method for attaching the head end of a memory strip 22 wherein a slotted retainer member 23 is formed at the head end of the tube adjacent the shoulder portion 18a. In this instance, the self-rolling strip 22 may be identical with strip 13 but will lie along the wall of the body on the inside surface. The slotted retainer member 23 may also be of sufficient length to allow the strip 22 to travel as it is rolled.

FIGS. 11 and 12 illustrate still another embodiment wherein the memory strip 24 is inserted within a light gauge flexible film tube 25 contained within the tube body 26. In this instance the inner tube 24 may be placed within the tube 26 at time of formation and bonded to one wall thereof as at 24a. This will prevent the tube 24 from rolling up independently of the tube 26. The tube 24 may be unattached at the head end of the tube as shown in FIG. 11. The strip 25 is then inserted within the tube 24 and the tube 26 filled. The tube 24 prevents the strip 25 from rolling up on itself and the outer tube 26 will be rolled only as the contents are dispersed.

FIGS. 13 and 14 illustrate one method of forming the tube body simultaneously with laminating a memory strip onto the outside surface. According to this method, the body portion 26 of the tube is formed by feeding a strip of film of the right width between the forming rolls 27 and 28 to form a round or elliptical configuration by abutting the lateral edges of the film. As the edges come

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into abutment to form the tube, a continuous strip of self-rolling material 29 is fed onto the surface of the tube over the butt joint with the proper adhesive thereon to seal the tube across the joint. The tubes with the memory strip on them may then be cut into proper lengths, capped, filled and sealed in a conventional manner.

From the foregoing description, it will be apparent to those skilled in the art that the present invention offers a significant improvement in flexible non-metallic dispensing tubes of the character described. The presence of the self-rolling memory strip allows the contents to be completely and more easily dispensed thus retaining the economy and safety of a non-metallic tube while overcoming the disadvantages thereof. The arrangement and types of structural components utilized within this invention may be subjected to numerous modifications well within the purview of this invention and applicant intends only to be limited to a liberal interpretation of the specification and appended claims.

What I claim is:

1. In combination; a flexible non-metallic tube container having the foot end thereof sealed and the head end thereof provided with closure means, a thin elongated memory strip, said memory strip being preconditioned to roll upon itself and to resist unrolling with spring tension, said memory strip being positioned within the body of said tube with one end of said strip connected to the tube body at the foot end and retention means connected to the head of the tube for engaging the other end of the strip, said retention means being so located as to hold said other end of the strip against the inside surface of the tube wall and so constructed as to allow relative longitudinal movement of the strip to facilitate rolling.

2. In combination; a flexible non-metallic tube container having the foot end thereof sealed and the head end thereof provided with closure means, a thin elongated memory strip, said memory strip being preconditioned to roll upon itself and to resist unrolling with spring tension, said memory strip being positioned within the body of said tube container inserted between said tube container and a second tube within the tube container connected to the tube container at the foot end and along the length thereof to prevent said strip from rolling independently of the tube container with said second tube being of suitable dimension to allow insertion of said memory strip prior to filling the tube container.

References Cited

UNITED STATES PATENTS

1,731,703	10/1929	Bourke	222—99
2,435,251	2/1948	Tome	222—107 X
3,191,810	6/1965	Johnston	222—183
3,259,276	7/1966	Chase	222—100

FOREIGN PATENTS

730,513	3/1966	Canada.
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ROBERT B. REEVES, Primary Examiner

N. L. STACK, JR., Assistant Examiner