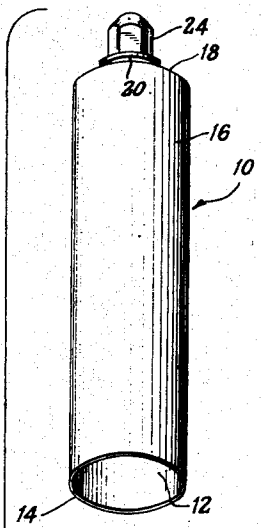
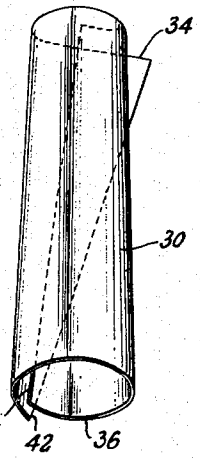
Aug. 17, 1954 S. D. BARLOW 2,686,616

COLLAPSIBLE TUBE

Filed March 4, 1950





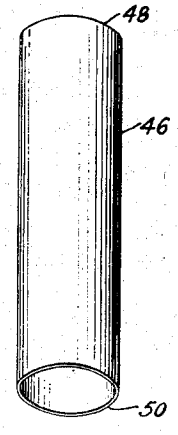
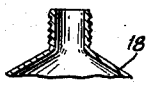


FIG. 1.

FIG. 2a.



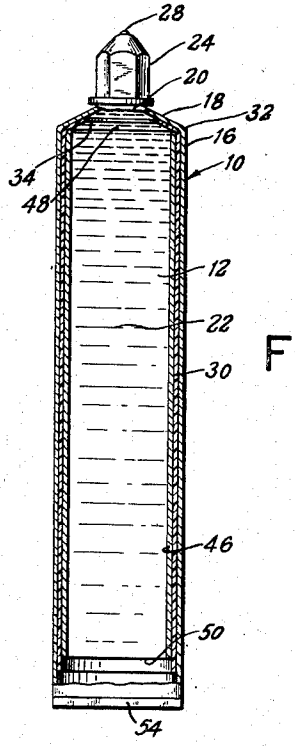


FIG. 2.

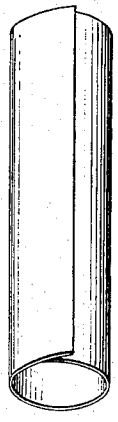


FIG. 3.

INVENTOR
SIDNEY D. BARLOW
BY Allinburn
ATTORNEY

Patented Aug. 17, 1954

2,686,616

UNITED STATES PATENT OFFICE

2,686,616

COLLAPSIBLE TUBE

Sidney D. Barlow, Mount Vernon, N. Y.

Application March 4, 1950, Serial No. 147,633

5 Claims. (Cl. 222—107)

1

This invention relates to containers in the nature of collapsible tubes and the like, and also to marking devices which include collapsible tubes as the containers for the marking fluid.

An object of the invention is to provide a novel and improved form of collapsible tube which is adapted to contain a liquid or viscous fluid to be dispensed therefrom through a discharge outlet, and in which a novel form and type of lining is provided within the collapsible tube.

Another object of the invention is to provide a novel and improved form of collapsible tube fluid container, in which there is a lining fabric which is impermeable to the fluid contents of the tube, such as, for example, polyethylene sheeting, and also a supplementary lining material which provides at least initial interior strength against leakage in the event that cracking of the tube has taken place.

A further object of the invention is to provide a novel and improved form of collapsible tube fluid container which has a discharge outlet adapted to receive mounted thereon a fluid dispensing means such as a ballpoint marking head, whereby the fluid may be dispensed therefrom for marking purposes, and in which the tube may be pressurized additionally by the application of deforming pressure upon the tube.

Still another object of the invention is to provide a combination collapsible tube and marking device of the type described, which is simple in design, inexpensive to manufacture, and effective in use.

Other objects and advantages of the invention will become apparent from the following description of a preferred embodiment thereof as illustrated in the accompanying drawings, and in which,

Fig. 1 is an exploded or disassembled view showing the component parts of the completed device, and illustrating in its upper portion; the collapsible metal tube casing which is to form the external portion of the device; in its middle portion, the impermeable intermediate lining; and in its lower portion the tubular innermost lining member;

Fig. 2 is a slightly enlarged vertical sectional view of the completed device as assembled from the parts shown in Fig. 1, with certain parts thereof in elevation and including the fluid filling inside the container;

Fig. 2*a* is a fragmentary sectional view showing my invention as applied to the usual form of collapsible dispensing tube; and

Fig. 3 is a perspective view similar to the lowermost member shown in Fig. 1, but illustrating a modified form for such member.

2

Collapsible tubes filled with a fluid or other material to be discharged therefrom, are very often bent out of shape or otherwise deformed while in use so that its appearance is unsightly. Further, such deformation may, if not controlled, cause a break in the outer metallic housing, so that the fluid may leak out. Accordingly, it is important to strengthen the device and minimize the probability of such breaking and also make it impermeable to the fluid in the event such a break should nevertheless take place, and the present invention shows how this may be done effectively, and at low cost. Further, this application also shows how such an improved collapsible tube may be employed as a marking device.

In order to understand clearly the nature of the invention and the best means for carrying it out, reference may now be had to the drawings, in which like numerals denote similar parts throughout the several views.

As seen in the illustrations, there is a main outer housing 10 which may initially be generally cylindrical in contour, with an axial bore 12 which is initially open at the bottom 14. The housing bore 12 is closed at the top in the manner shown in Figs. 1 and 2, by converging the walls 16 of the main tube conically forming a frusto-cone top 18 which is open at the top and carries an upstanding threaded discharge collar 20 from which the contents 22 of the collapsible tube may be discharged or dispensed.

Such dispensing may be controlled as desired, for example, by mounting upon the discharge collar 20, a ball point marking device or head 24 which has an axial bore extending vertically therethrough to conduct the fluid 22 up into contact with the ball 26 which is disposed in a spherical socket for universal motion therein under the influence of moving contact with an outside surface upon which the marking fluid 22 is to be dispensed to mark the same. The main housing tube 10 has walls 16 which are quite thin, so that they will readily yield to the requisite degree of squeezing or compression between the fingers of the hand of the user when liquid or fluid 22 is to be dispensed therefrom. It may be made of thin metal for example, such as aluminum foil, or other suitable materials well known to the art.

In accordance with my invention I place inside the main housing tube 10, an intermediate lining sheet 30 which may be a rectangular sheet of polyethylene or other flexible material which is

impermeable to the fluid 22, and not substantially subject to chemical action therefrom or thereon. This impermeable lining sheet 30 should have a length axially of the tube 10, from slightly above the location 32 on main tube wall 16 where the conical wall 18 begins right down about to a point near the lower edge 14 of the main outer tube wall 16 but preferably spaced from the extreme lower edge thereof. I prefer to make my intermediate impermeable lining 30 of a flat rectangular sheet rolled into tubular shape with its vertical edges 42 and 44 brought into overlapping relationship so that when placed inside the main outer tube 10, it will adjust itself to lie in intimate contact with the inner wall of the main tube 10 without any space between the edges 42 and 44. It is noted that a portion of the lining 30 adjacent the upper end thereof is angularly bent to follow the contour of the conical wall portion 18, past the point 32.

Inside the impermeable intermediate lining 30, I next place a cylindrical tube 46 which is of an outside diameter such that it fits sufficiently snugly inside the impermeable lining 30 when inserted therein and into the main outer tube 10. At the same time, its outside diameter should not be so great that it is difficult to insert it without forcing.

The tube 46 may be made of cardboard, paper board, or other suitable fibrous material which has a certain degree of inherent stiffness characteristic of cardboard, but yet will yield easily to suitable finger pressure applied from the outside when the fluid 22 is to be dispensed. It also serves to contain the impermeable lining 30 against the inside surface of the main tube 10 to help maintain the tube 10 against undesired acute angular bending and deformation.

It is noted that, due to the construction as above described, in the event of a break in the wall of the tube 10, the flexible sheet 30 will be forced into the break to prevent leakage. From Figs. 1 and 2, it is seen that the upper edge 48 of tube 46 is inserted to the same level as the location 32. It is however, shorter axially than the main tube 10, and hence its lower edge 50 is spaced from the lower edge of the sheet 30. After filling, the lower edge of the tube 10 is then sealed off in any manner well known to the art, such as bending, crimping, etc.

For easy insertion of the intermediate lining 30 and the reinforcing tube 46, I prefer to form the rectangular sheet shown in Fig. 1, roughly in the shape of a cylinder, but not quite, so that its edges 42 and 44 are angularly inclined to the axis of the tube and intersect each other. I then insert the upper end portion of the semi-tubular lining 30 in the middle of Fig. 1, partly inside the opening 14 of the main tube 10, and then insert the upper end portion of the tube 46 inside the projecting portion of the lining 30 and partly inside the main tube bore 12.

I then push upwards so that the tube 46 telescopes inside the line 30, which at the same time telescopes inside the main tube bore 12, giving them a slight turning motion if necessary, so that they slide snugly inside the main tube 10, to the positions shown at 32 in Fig. 2. Upon squeezing the tube 10, the fluid 22 is pressurized and forced out through the discharge collar 20, or through any dispensing or marking member such as 24, mounted thereon.

It is thus seen that I have provided a collapsible tube construction which will be inhibited from becoming deformed during use and in which leakage of the fluid to be dispensed will be prevented.

While in Figs. 1 and 2 I have illustrated my invention as applied to a collapsible marking tube, it is understood that my construction can also be applied in the case of other types of collapsible dispensing tubes, such as for example, tooth paste tubes, ointment tubes, etc. where the discharge opening is as shown in Fig. 2*a* and in which any standard type of screw threaded cap may be employed.

While in Fig. 1, I have shown the tube 46 as a standard type of cardboard tube it is understood that any other type of tube may be employed such as that shown in Fig. 3 where the tube is constructed from a flat sheet, rolled into tubular shape, with overlapping vertical edges, similar to the shape and construction as the flexible tube 30.

Although I have described my invention in specific terms, it will be understood that various changes may be made in size, shape, materials and arrangement without departing from the spirit and scope of the invention as claimed.

I claim:

1. A collapsible tube comprising a main housing having an axial bore and formed of material yieldable under a compression force, a discharge opening in said housing communicating with said bore, an independent inner tubular reinforcing member, said tubular member being open at the top and bottom and disposed in said bore, independent lining material surrounding said tubular member and disposed intermediate said main housing and said inner tubular reinforcing member said lining material being of such size as to have its adjacent edges freely adjustably overlapping and fluid material in said reinforcing tubular member, said fluid being dischargeable through said discharge opening upon the application of external compression force upon said main housing.

2. The construction according to claim 1, wherein said discharge opening carries valve means normally closed to control the discharge of said fluid therefrom.

3. A container comprising a main housing formed of yieldable material and having a first bore formed therein, with a discharge outlet, an independent inner reinforcing tube open at the top and bottom and disposed in said bore and spaced from said main housing, an independent substantially impermeable intermediate lining sheet disposed intermediate said main housing and said inner reinforcing tube and directly contactably engaging the inner surface of said main housing, said lining sheet having substantially a tubular shape with adjacent edges in freely adjustable overlapping relationship, so that all three members fit snugly together, and fluid disposed inside said inner reinforcing tube whereby, upon application of compression force upon the outer surface of said main housing, said fluid is subjected to pressure forcing it out through said discharge outlet.

4. The construction according to claim 3, wherein said main housing has a thin metallic wall.

5. Container construction comprising a hollow main tube formed of thin wall deformable material with a discharge outlet opening out of a first end of said main tube, an impermeable sheet lining said hollow main tube and of such size that its adjacent edges will freely and adjustably overlap, an inner reinforcing tube lining said im-

permeable sheet lining, and serving to hold the sheet lining substantially in contact with the wall of the main tube, fluid disposed within said inner tube, the second end portion of said hollow main tube being closed to seal said fluid against leakage, said inner reinforcing tube being relatively more rigid than said impermeable sheet, and said impermeable sheet lining being longer than said inner reinforcing tube.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,322,426	Gearhart	Nov. 18, 1919
1,481,339	Barron	Jan. 22, 1924
1,831,751	Rado	Nov. 10, 1931
2,113,695	Krannak	Apr. 12, 1938
2,274,258	Roselle	Feb. 24, 1942
2,337,264	Nissen	Dec. 21, 1943

FOREIGN PATENTS

Number	Country	Date
525,357	Great Britain	Aug. 27, 1940
554,938	Great Britain	July 26, 1943