May 9, 1933. H. WEIRICH 1,908,584

COLLAPSIBLE TUBE

Filed Nov. 5, 1931

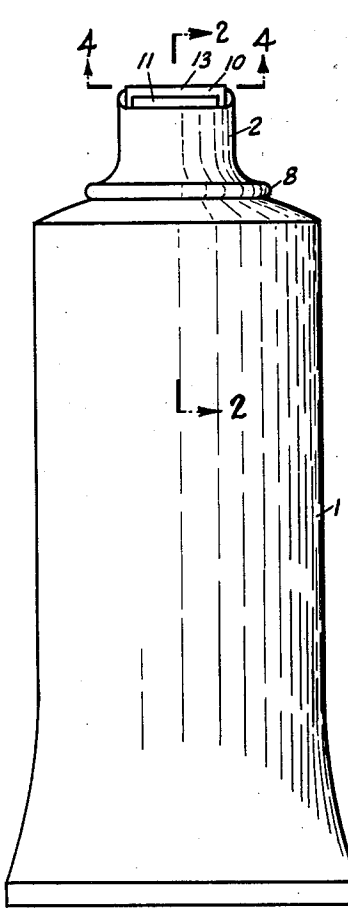


FIG. 1

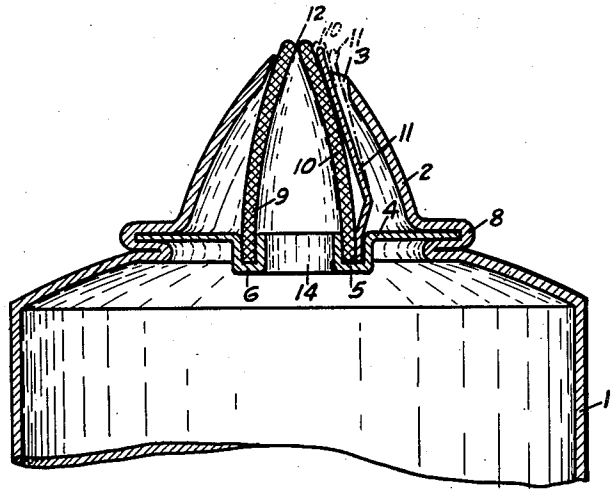


FIG. 2

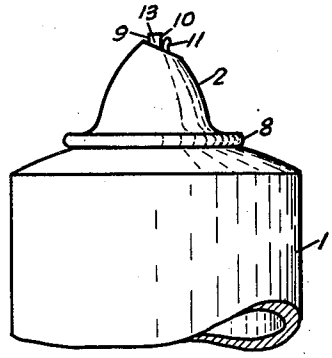


FIG. 3


FIG. 4

INVENTOR.
HEINRICH WEIRICH
BY
A. D. Caesar
ATTORNEY.

Patented May 9, 1933 1,908,584

# UNITED STATES PATENT OFFICE

HEINRICH WEIRICH, OF PHILADELPHIA, PENNSYLVANIA

## COLLAPSIBLE TUBE

Application filed November 5, 1931. Serial No. 573,131.

This invention relates to collapsible tubes and has for its object the provision of a new and improved tube of this type.

More particularly stated, one of the objects of this invention is to provide a collapsible tube with pressure responsive opening means.

Another object of this invention is to make a collapsible tube having pressure responsive opening means which will be easy to manufacture, assemble and produce.

The above as well as other objects of this invention and the advantages arising therefrom will become evident from the following description and the drawing which form a part thereof.

In the drawing:

Figure 1 is a front view of a collapsible tube equipped with my pressure responsive closing means.

Figure 2 is an enlarged section taken along the line 2—2 of Figure 1 of the upper portion of the tube shown in Figure 1. The closed or normal position of the closure member and holding spring is shown by the full lines while the dot and dash lines show the open position of these elements.

Figure 3 is a side view of the upper portion of the tube shown in Figure 1.

Figure 4 is a section taken along the line 4—4 of Figure 1. The closed position of the closure member is shown by the full lines while the open position of these elements is shown by the dot and dash lines.

Referring more particularly to the drawing wherein similar reference numerals denote similar parts, reference numeral 1 denotes the tube as a unit which terminates in a top portion 2 having an aperture 3 formed at the upper end thereof. One of the bounding walls of the aperture 3 serves to support the wall 9 of the tubular member 13 when pressure is applied to the wall 10 by the spring 11 thus furnishing the reaction surface necessary in order to permit the spring 11 to close the mouth 12 of the member 13. For the wall of the aperture 3 any other suitable reaction surface may be substituted. The lower end of the top member 2 terminates in a U-shaped flange which receives and holds the closure supporting member 4. The closure supporting member 4 is composed of a circular main body portion which has an aperture 14 formed centrally thereof. The aperture 14 is bounded by the U-shaped flanges 5 and 6 which receives and holds the walls 9 and 10 of the closure element 13. The flange portion 5 also receives an end of the spring 11 which normally presses against the closure member 13 and keeps the same in its closed position.

The closure element 13 may be made of any material desired having the necessary qualities of flexibility and non permeability to the substance within the tube. At present I prefer to make the closure member 13 of cloth covered with cellophane or similar material. The cellophane on the outside makes the cloth airtight while the soft irregular surface formed by the cloth constituting the inner surface of the tube helps to form a closed and airtight mouth when the ends of the walls 9 and 10 are pressed together, thus obviating the possibility of any opening in the mouth of the closure member when pressure is applied to close the same. I prefer to apply the cellophane in the form of a varnish. It is to be understood, however, that it may be applied in any desired manner. It is also to be understood that for the cellophane any lacquer which will make the outer surface of the cloth or other member which is used as a closure member airtight may be substituted. It is also to be understood that if desired the cellophane or lacquer may be applied on the inner surface of the cloth. I, however, prefer that the inner surface be made of cloth or some similar material which results in a practically airtight mouth due, among other things, to the binding of the many soft irregular surfaces when pressure is applied to the same. It is to be understood that for the cellophane treated cloth may be substituted any material which has the necessary qualities of airtightness and flexibility.

In use pressure against the walls of the tube 1 is transmitted to its contents and results in an outward pressure against the walls 9 and 10 of the member 13 and also an upward pressure against the mouth 12 of the

member 13. This forces the wall 10 and spring 11 to assume the positions shown by the dot and dash lines in Figure 2 and results in the opening of the mouth 12 of the closure member 13. (The open position of the mouth 12 is shown by the dot and dash lines in Figure 4.) When the pressure on the tube 1 is released the spring 11 forces the mouth 12 of the element 13 to close thus stopping any further flow of the contents from the tube.

It is obvious that the spring 11 should be strong enough to normally keep the mouth 12 closed yet weak enough to yield to the pressure ordinarily applied by persons squeezing a collapsible tube for the purpose of removing its contents.

The portion 2 serves as a protecting member for the closure element 13. This protecting member may be dispensed with if desired. If the member 2 is dispensed with some element which will serve as a pressure and reacting surface to hold the element 13 against the pressure of the spring 11 should be substituted therefor. One such element is a wall member extending upwardly from the member 4 and contacting with the upper end of the wall 9; another is a second spring member 11.

The disclosure herein is to be understood as being for the purpose of illustration only and not for the purpose of limitation since many changes may be made in the device herein disclosed without departing from the spirit of my invention. For instance, the material from which any one or all of the elements of which the ensemble herein disclosed is composed may be varied. Or the shape and size of any one or all of the elements constituting the ensemble herein disclosed may be varied. Of course, the contents of the tube may be varied. At present the contents of the collapsible tubes may be pastes or semi-liquids such as tooth-pastes, paints, putty, glue and the like. The above as well as other changes may be made without departing from the spirit of my invention which consists in providing a collapsible tube with a closure member having a flexible mouth associated with a resilient member positioned for normally keeping the flexible mouth in its closed position. For this reason it is my desire that the claims which are hereunto appended for the purpose of defining my invention should be limited only by the prior art.

Having described my invention what I claim as new and useful is:—

1. As an article of manufacture a collapsible tube, a plate having an aperture formed therein carried by the said collapsible tube, a closure member adapted to assume either an open or a closed position carried by the said plate and positioned for normally closing the said aperture formed in the said plate, and resilient means carried by the said plate and positioned for normally keeping the said closure member in its closed position.

2. As an article of manufacture a collapsible tube having an aperture formed therein at one of its ends, a plate having an aperture formed therein positioned within the said tube below the said tube aperture for dividing the said tube into two compartments, a closure member adapted to occupy an open or a closed position carried by the said plate and positioned so that its lower end contacts with and encircles the bounding walls of the said plate aperture and its upper end extends into the said tube aperture, the width of the said closure member in its closed position being less than the width of the said tube aperture, and a resilient member positioned for normally keeping the said closure member in its closed position.

3 As an article of manufacture a collapsible tube having an aperture formed in the upper end thereof, a U-shaped flange formed in the said tube near its apertured end for receiving a dividing plate, a dividing plate having an aperture formed therein carried by the said U-shaped flange member and positioned within the said tube for dividing the said tube into two compartments, a U-shaped flange member formed on the said plate as a bounding member for the said plate aperture, a tubular closure member adapted to occupy an open and a closed position positioned upon the said plate so that its lower of its ends anchored in the said plate flange and encircles the said plate aperture and its upper end extends through the said tube aperture, the width of the said upper end of the said closure member in its closed position being less than the width of the said tube aperture, and a resilient member having one of its ends anchored in the said plate flange and the other of its ends extending freely into the said tube aperture and normally contacting with the said upper end of the said closure member to force the said upper end of the said closure member to remain in its closed position, the said free end of the said resilient member in its normal position being entirely free of the bounding walls of the said tube aperture.

4. As an article of manufacture a collapsible tube consisting of a body member, a closure member adapted to assume an open or a closed position carried by the said body member, resilient means positioned for normally keeping the said closure member in its closed position, and pressure reacting means positioned on the said body member for furnishing a bearing and reacting surface for the said closure member.

In testimony whereof I hereby affix my signature.

HEINRICH WEIRICH.