No. 614,410. Patented Nov. 15, 1898.

R. B. PRICE.

COLLAPSIBLE TUBE.

(Application filed Oct. 29, 1897.)

(No Model.)

Fig. 1.

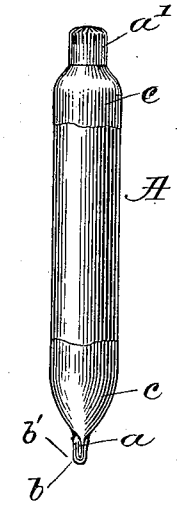
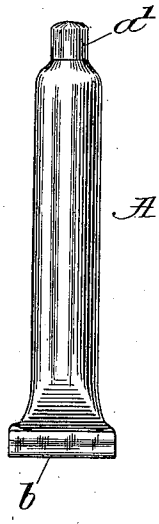


Fig. 2.



Witnesses:
A. C. Harmon.
Thomas J. Drummond.

Inventor:
Raymond B. Price.
by Crosby & Gregory
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

RAYMOND B. PRICE, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO THE BOSTON WOVEN HOSE AND RUBBER COMPANY, OF BOSTON, MASSACHUSETTS.

COLLAPSIBLE TUBE.

SPECIFICATION forming part of Letters Patent No. 614,410, dated November 15, 1898.

Application filed October 29, 1897. Serial No. 656,755. (No model.)

To all whom it may concern:

Be it known that I, RAYMOND B. PRICE, of North Cambridge, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Collapsible Tubes, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention has for its object to provide convenient and improved means for hermetically sealing a usually collapsible tube or analogous article.

For certain purposes—for instance, such as inclosing an extremely volatile substance—it is indispensable that the tube or receptacle shall not be opened in the slightest degree to the air, but shall be absolutely air-tight. Usually tubes or collapsible sacks of this kind are rolled over and crimped at one end and provided at the opposite end with a threaded cap; but these means of closing the tube are not perfectly air-tight and in practice permit the contained substance, especially if it be very volatile, to dry out. Accordingly I provide a relatively stiff and unyielding clip to embrace the crimped end of the tube, and I coat or dip both ends of the tube in one or more solutions, all as will be more fully set forth in the course of the following description and will be more particularly defined in the appended claims, reference being had to the accompanying drawings, illustrative of my invention.

In the drawings, Figure 1 is a side elevation showing the tube in the process of being sealed according to my invention. Fig. 2 is a front elevation of the tube completely sealed.

By the term "collapsible tube" as herein used I mean to include not only the ordinary paint-tube, but any sack-like inclosure similar thereto or used for a similar purpose.

In the drawings I have illustrated an ordinary tube A of this variety, having a crimped-over lower end *a* and a usual cap *a'* screwed onto the upper end. It is found in practice that when these tubes are subjected to varying degrees of heat, which may happen in storing or keeping the filled tubes before use, the metal of the tubes and caps expands and contracts, so as to prevent them from being air-tight no matter how tightly the cap may be screwed on.

In pursuing my invention for hermetically sealing the tubes I inclose the lower end *a* with a U-shaped clip *b*, this clip being formed of brass, tin, or other relatively stiff and unyielding material, said clip being firmly compressed into clamping engagement with the end *a*, so as to be non-removable therefrom.

It will be observed that the free or outer ends of the U-clamp are slightly flaring from each other, or, in other words, the clip is compressed intermediate its length at *b'* more than elsewhere, this provision being made in order to prevent the extreme ends of the clip from digging into and cutting the yielding material of the tube proper, this feature also providing a better gripping contact with the tube.

Having properly secured the clip *b*, as stated, I first dip or wash the tubes in bichromate of potash or other alkali to clean it, and then I dip the opposite ends of the tube, after the latter has been filled and closed, into a gluey solution of any suitable viscous tenacious substance, such as ordinary glue or gelatin, as indicated at *c*, Fig. 1.

Preferably the glue or other substance is hot and of sufficient fluidity to enable it to penetrate all the crevices and openings to be found in the respective ends of the tube, and upon cooling it forms a tough layer, adhering with more or less tenacity to the metal of the tube. The gluey layer, however, is easily abraded or dislodged from the tube, and accordingly as a final step in the process I dip the ends of the tube in varnish, collodion, or other substance which dries hard and smooth. Preferably this last coating will be colored or dyed to such lustrous or metallic color as will give the tube an attractive finish, and, if desired, the entire tube may be dipped in the varnish-coating. The result is that the tube is sealed absolutely air-tight, so that it will withstand any reasonable amount of handling and any usual conditions of expansion and contraction under varying temperatures without becoming loosened or opened to the slightest extent, so that by this provision the contents of the tube are absolutely prevented from volatilization and drying out.

Having fully described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. A collapsible tube having its end coated with an impervious layer of gluey substance, said layer being applied directly to the tube proper and extending entirely over and slightly beyond the end of the tube, and having a second layer of hard-finish substance like varnish entirely enveloping said first layer, substantially as described.

2. A collapsible tube having one end crimped over and the other end provided with a removable cap, in combination with a clamping device permanently and unyieldingly pinching together said crimped-over end, a layer of gluey substance enveloping said crimped-over end and its clamp, and also enveloping the opposite end of the tube including its cap, and an external layer or coating of varnish-like substance, whereby the tube is hermetically sealed, substantially as described.

3. The herein-described process of hermetically sealing a collapsible tube, said process consisting of dipping or washing the closed tube in an alkali-bath, then dipping the opposite ends thereof in a bath of tough viscous substance, permitting the coating thereof to dry, and finally coating the ends of the tube with collodion or other varnish, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RAYMOND B. PRICE.

Witnesses:

HARRY A. MACKUSICK,

ABRAHAM R. DURYEE.