Aug. 16, 1938. R. PALMER 2,127,268

CAP AND TUBE ASSEMBLY

Filed July 9, 1937

Fig. 1.

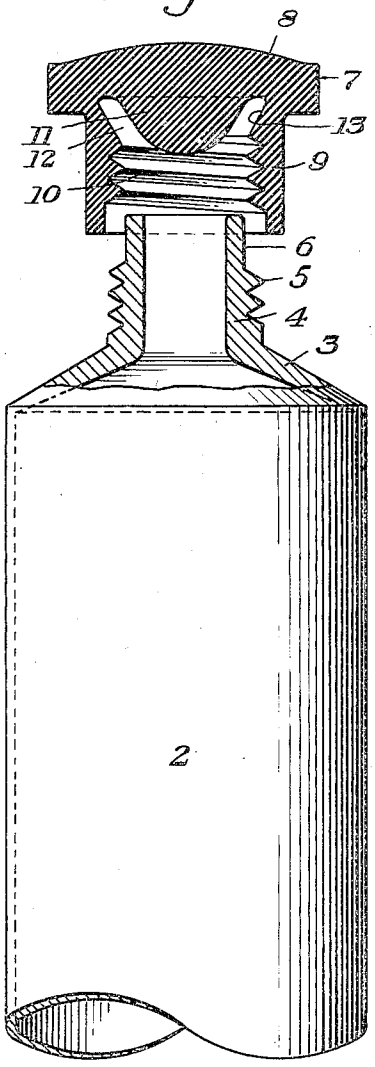
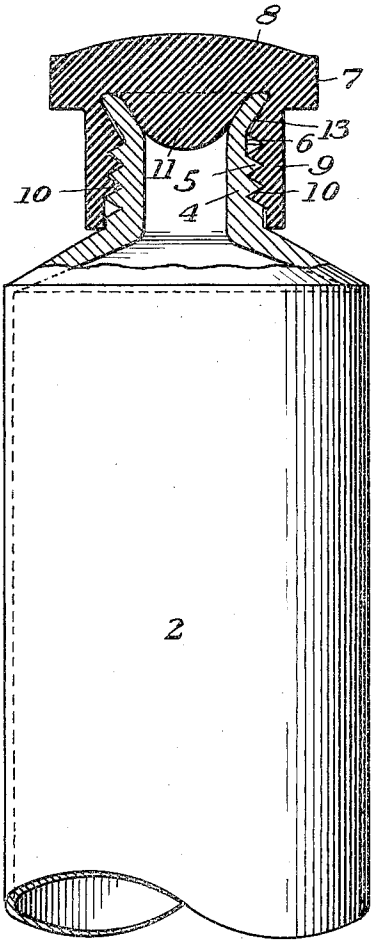


Fig. 2.



INVENTOR

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CAP AND TUBE ASSEMBLY

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1 Claim. (Cl. 221—60)

This invention relates to a collapsible tube and a cap therefor, and more particularly to an assembly of a cap and tube having means for restraining the cap against accidental removal.

Collapsible tubes of the character used for toothpaste and various cosmetics and pharmaceutical and other preparations comprise a collapsible body having a neck with a removable cap on the neck. The caps are applied to the collapsible tubes in the plant where the tubes are made, and the tubes are filled at the end opposite the cap end after which this end is sealed. The caps are generally made of a synthetic resinous material, although they may be made of metal. After the caps have been put on the tubes by the manufacturer of the tubes, it is desirable that they remain very tight on the tubes until the cap is removed by the customer who purchases the filled tubes. As now commonly constructed, the caps will sometimes become loose either from the handling of the tubes and caps or from the fact that some shrinkage of the synthetic resinous material from which the caps are formed takes place after the caps are put on the tubes. This looseness is objectionable because the cap may come off the tube while the tube is being filled, requiring that the filling machine be stopped to clean up the material which has thus escaped from an uncapped or an improperly capped tube. This looseness is undesirable after the tube has been filled and before it is acquired by the customer, because oils and volatile ingredients may escape therefrom.

The present invention provides a cap and tube assembly wherein there is a retention between the neck and cap of the tube other than the threaded retention which will insure the cap being retained against accidental removal and keep the tube tightly sealed until the cap is rotated with force to remove it.

The invention may be readily understood by reference to the accompanying drawing, in which

Figure 1 shows a cap and tube assembly embodying my invention, with the cap in the position about to be applied to the neck of the tube, the drawing being on an enlarged scale, the cap and the neck of the tube being illustrated in section; and

Figure 2 is a view similar to Figure 1, showing the cap screwed onto the neck of the tube.

In the drawing, 2 designates the body of the collapsible tube. It is provided with the usual shoulder 3 and with a neck 4. The neck has a threaded portion 5 and an unthreaded extension 6. Except for the unthreaded extension 6 beyond the threaded portion 5 the tube is otherwise of conventional form.

The cap, designated generally as 7, comprises a main base portion 8 having a flange or skirt 9 thereon. The flange or skirt 9 is provided with internal threads 10 for cooperation with the threaded portion 5 of the neck of the tube. Formed on the base of the cap on the inside thereof is an integral projection 11 having sloping or tapered sides. The projection 11 is surrounded by an annular outwardly flaring recess 12, this recess being formed between the side walls of the projection 11 and an outwardly flaring or sloped surface 13 inside the cap extending inwardly from the threaded portion thereof.

The cap is applied to the tube in the usual manner. It is first fitted over the end of the tube and then screwed onto the tube, the cooperating threads of the cap and the neck serving to pull the cap down on the neck of the tube. When the projection 11 engages the unthreaded extension 6 of the neck, the sloping walls thereof tend to expand the neck into the flared recess or space 12 and against the sloping surface 13. When the cap is fully screwed on, the unthreaded extension of the tube will substantially fill the recess 12 and be tightly wedged against the projection 11 and against the sloping surface 13. This not only forms a fluid-tight seal, but in order to remove the cap it is necessary to apply a rotating force thereto sufficient to contract the neck enough to enable the cap to be removed from the tube.

It will be seen that the walls of the neck beyond the threaded portion must be forced by the unscrewing of the tube inwardly until the outside diameter of the unthreaded portion is such as to clear the threads on the interior of the cap. The positive force required to accomplish this purpose is such as to effectively hold the cap against accidental removal and against removal due to shrinkage of the plastic material of which the cap is made. At the same time, the metal of which the tube is formed is a soft metal and the amount of force required to remove the cap is not such as to render the use of the tube and cap assembly inconvenient. The inclined wall 13 around the recess 12, of course, serves to bend or contract the unthreaded extension of the neck inwardly when the tube is unscrewed to the diameter where this portion of the neck will clear the threads on the inside of the cap.

I have illustrated a preferred embodiment of my invention, but it will be understood that various changes may be made therein and that the

contour of the projection 11 may be varied to meet the requirements.

I claim:

A tube and cap assembly comprising a tube having a neck with a threaded portion and an unthreaded terminal extension beyond the threaded portion, and a cooperating cap having a flange and a base, the flange being provided with interior threads to engage the threads on the neck of the tube, the inside of the base of the cap having a sloping neck-engaging projection therein adapted to be forced into the unthreaded extension of the neck of the tube, there being an annular recess around the projection to receive the unthreaded portion of the neck of the tube, said cap having an outwardly flared interior wall around said space positioned to engage the exterior of the neck of the tube when it is expanded by said projection, said annular recess formed between the projection and said outwardly flared wall also being outwardly flared, said recess being of a thickness only sufficient to receive the unthreaded portion of the tube neck, whereby said unthreaded neck portion is expanded outwardly upon entering said recess when the cap is screwed home and is contracted with the initial turning of the cap to unscrew it.

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