

June 23, 1936.

H. D. DAVIS

2,044,837

CLOSURE FOR COLLAPSIBLE TUBES

Filed Oct. 7, 1935

Fig. 1.

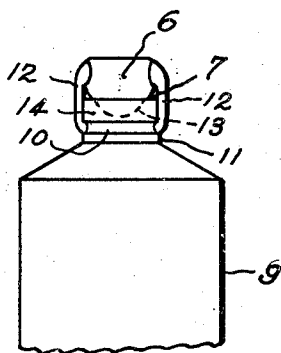


Fig. 2.

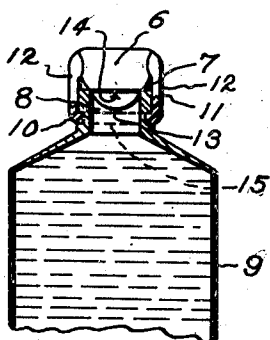


Fig. 3.

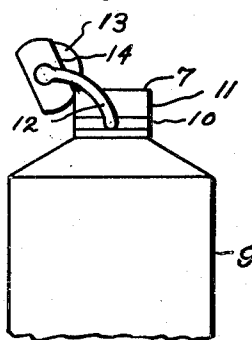


Fig. 4.

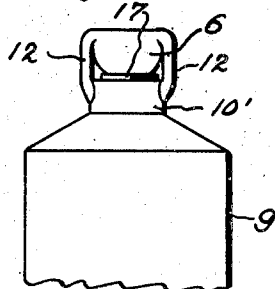
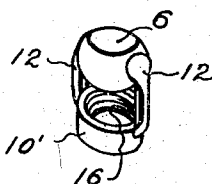


Fig. 5.



INVENTOR
HARRY D. DAVIS
BY *Chapin & Neal*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,044,837

CLOSURE FOR COLLAPSIBLE TUBES

Harry D. Davis, Springfield, Mass.

Application October 7, 1935, Serial No. 43,911

5 Claims. (Cl. 221—60)

This invention relates to improvements in closures for receptacles and is especially useful in connection with receptacles of the collapsible tube type.

More particularly, the invention has to do with a closure of the type which can be quickly and conveniently moved from open to closed position and vice versa, and which remains attached to the tube at all times, so that it cannot become lost or misplaced.

The invention has for an object to provide an improved closure means for collapsible tubes and the like, in which the closure element is held in place by elastic arms secured to a collar-like anchorage, attached to the tube in a positive, non-slip fashion—the various parts of such means preferably being made of rubber or the like and preferably in one piece.

Other objects will appear as the detailed description proceeds and will be pointed out in the appended claims.

The invention will be disclosed with reference to the accompanying drawing, in which

Figs. 1 and 2 are fragmentary exterior elevational and sectional elevational views, respectively, of a collapsible tube showing one form of my improved closure means;

Fig. 3 is a view similar to Fig. 1 except that the closure is shown displaced from the mouth of the tube;

Fig. 4 is a view taken similarly to Fig. 1 but showing another form of the invention; and

Fig. 5 is a perspective view of the form of closure means shown in Fig. 4.

Referring to this drawing, the closure means of this invention comprises a closure element 6, adapted to seat against the rim 7 which encompasses the mouth 8 of the collapsible tube 9; a collar 10 for attachment to the neck 11 of the tube; and a pair of elastic arms 12, which interconnect the element 6 and collar 10 at diametrically opposite points and are fixedly connected both to the collar and the closure element.

The element 6 has on its lower face a part 13 of a size enabling it to enter the mouth of the tube as shown in Fig. 2. At the intersection of parts 6 and 13 is a shoulder 14.

The various elements of the closure means are preferably made in one piece from suitable elastic material, such as rubber for example. While it is preferred to form the device as one piece of molded rubber, it is obvious that the several parts may, if necessary or desirable, be separately formed and suitably secured together, as for example by cementing.

The closure means described may be secured to the neck 11 of the collapsible tube in any suitable way which will positively hold the collar portion 10 against axial displacement. In the drawings two forms of securing means are shown. In Figs. 1 to 3, the collar 10 is engaged in a circumferential groove 15 in the neck 11 of the tube. In Figs. 4 and 5, the collar 10' is made of greater width and is interiorly screw threaded as at 16 to fit the usual screw threads 17 on the exterior of neck 11.

In the form shown in Figs. 1 to 3, the collar 10 has sufficient elasticity to enable it to be stretched enough to be slipped over the neck 11 and, when it reaches groove 15, it will contract and enter the groove and be firmly held therein. It is important that a firm anchorage be provided for the lower ends of arms 12, which in the operation of the device are stretched and subjected to considerable tension. Hence, the collar is engaged with neck 11 in non-slip fashion, as distinguished from sole reliance on frictional engagement of the collar with the neck of the tube. This form of the invention may be used, when the closure means is applied at the factory by the manufacturer of the tubes.

The form shown in Figs. 4 and 5 is preferred for several reasons. It may be supplied by the manufacturer of the tubes or sold separately to be applied by the purchaser in place of the usual screw-threaded closure cap. Moreover, this form of connecting means is easy for anyone to apply and it has the advantage that it enables the arms 12 to be easily adjusted to secure just the right degree of tension. The collar 10' is screwed down until the closure element 6 seats on the rim 7 and then it is screwed down an additional amount to place the arms 12 under sufficient tension to resist removal of the closure element. This tension is such that no amount of pressure, which can be applied to the tube in the manner used to expel its contents, will displace the closure element 6. The tube will burst before the element 6 can be forced from its seat. Also, it is preferable to have the arms so strong that the closure cannot be removed by a straight upward pull. Having in mind these conditions, it will be appreciated that a firm, positive and non-slipping attachment of collars 10 or 10' to the tube is required.

In using the device, the closure element is moved laterally from the position shown in Fig. 1 to that shown in Fig. 3. One holds the tube in one hand and displaces element 6 by pressing against it with the thumb. This operation is facilitated by

the shoulder 14 which engages the rim of hole 8 at one side when pressure is applied to element 6 at the opposite side. The groove formed at the intersection of elements 6 and 13 catches on the sharp edge of hole 8 and prevents slipping of the closure on the fulcrum provided by the rim of the hole 8, during the operation of rolling the closure out of covering relation with the hole. Then, when the element 6 has been moved into the position of Fig. 3 the same groove engages the sharp outer peripheral edge formed at the upper end of neck 11 and firmly holds it in its open position. It is considered important to have arms 12 fixedly connected to the closure element 6, as distinguished from the so-called "bail" connections of the prior art, which enable the closure element to rotate on the bail. With the use of the strong, tough, though somewhat elastic, arms 12, which enable the application of considerable tension to hold the closure 6 in place, it would be difficult to unseat the closure if the latter were free to rotate. Hence, the shoulder 14 is important in that it provides for an effective, non-slip engagement with the fulcrum during the operating of unseating the closure.

The closure means of this invention is of simple construction and capable of being manufactured in quantities at low unit cost. Cost is an important consideration in devices of this character because, in order for the device to be salable, its cost must be kept down to a point where it is not much greater than the cost of the usual screw-threaded cap. This device has this cost advantage. It also provides a very effective closure for the receptacle and one which can be easily and conveniently opened and closed and one which can be easily cleaned and kept clean because of the use of rubber and the elimination of all metal parts.

I claim:

1. The combination with a receptacle having a neck with a discharge passage therethrough, of a closure element seated on the end of said neck to close said passage, a collar-like anchorage fixed to said neck and held against axial displacement thereon, and elastic arms interconnecting said element and anchorage at diametrically opposite points and fixedly connected to both said element and anchorage; said element, anchorage and arms being made of rubber; said arms being under tension when said element is seated, said element being movable laterally out of covering relation with said passage and said arms by their flexure and elongation enabling such movement.

2. The combination with a receptacle having an exteriorly screw-threaded neck with a discharge passage therethrough, of a closure element seated on the end of said neck to close said passage, an anchorage in the form of an interiorly screw-threaded collar threaded upon said neck and thereby adjustably fixed thereto and held against axial displacement, and elastic arms interconnecting said element and anchorage at diametrically opposite points and fixedly connected to both said element and anchorage, said arms being under tension when said element is

seated; said element, anchorage and arms being made of rubber; said element being movable laterally out of covering relation with said passage and said arms by their flexure and elongation enabling such movement.

3. The combination with a receptacle having a neck with a discharge passage therethrough, of a closure element seated on the end of said neck to close said passage, said element having fixed thereto a part which enters the outer end of said passage when the element is seated, said part and element intersecting with a shoulder and defining at the intersection a circular groove, a collar-like anchorage fixed to said neck and held against axial displacement thereon, and elastic arms interconnecting said element and anchorage at diametrically opposite points and fixedly connected to both said element and anchorage; said element, anchorage and arms being made of rubber; said arms being under tension when said element is seated, said element being movable laterally out of covering relation with said passage and said arms by their flexure and elongation enabling such movement, said groove catching on the rim of said passage when the closure element is thrust laterally to unseat it and thus holding said element against slippage on the fulcrum afforded by said rim during the unseating of the closure.

4. The combination with a receptacle having a neck with a discharge passage therethrough, of a closure element seated on the end of said neck to close said passage, said element having fixed thereto a part which enters the outer end of said passage when the element is seated, said part and element intersecting with a shoulder and defining at the intersection a circular groove, a collar-like anchorage fixed to said neck and held against axial displacement thereon, and elastic arms interconnecting said element and anchorage at diametrically opposite points and fixedly connected to both said element and anchorage; said element, anchorage and arms being made of rubber; said arms being under tension when said element is seated, said element being movable laterally out of covering relation with said passage and said arms by their flexure and elongation enabling such movement, said groove catching on the rim of said passage when the closure element is thrust laterally to unseat it and thus holding said element against slippage on the fulcrum afforded by said rim during the unseating of the closure, said groove catching on the outer rim of said end when said element is unseated to releasably hold it in unseated position.

5. A one-piece closure means for collapsible tubes and the like, comprising a closure element, an interiorly screw-threaded collar for attachment to the tube, and tension arms interconnecting said element and collar at diametrically opposite points and fixedly connected both to the collar and element; said element, collar, and arms made of one molded piece of rubber.

HARRY D. DAVIS.