June 14, 1932. P. P. LAMB 1,862,794

COLLAPSIBLE TUBE CLOSURE

Filed Nov. 19, 1931

Fig. 1.

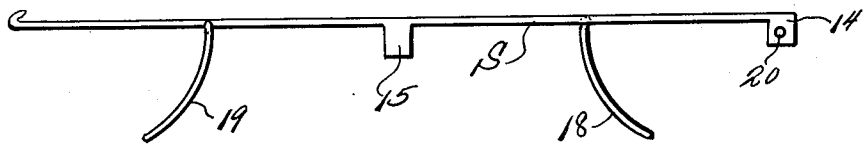


Fig. 2.

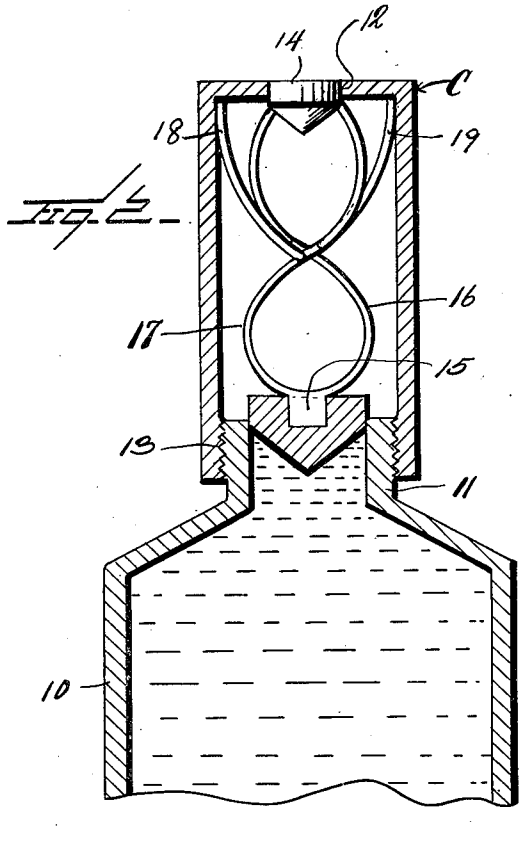
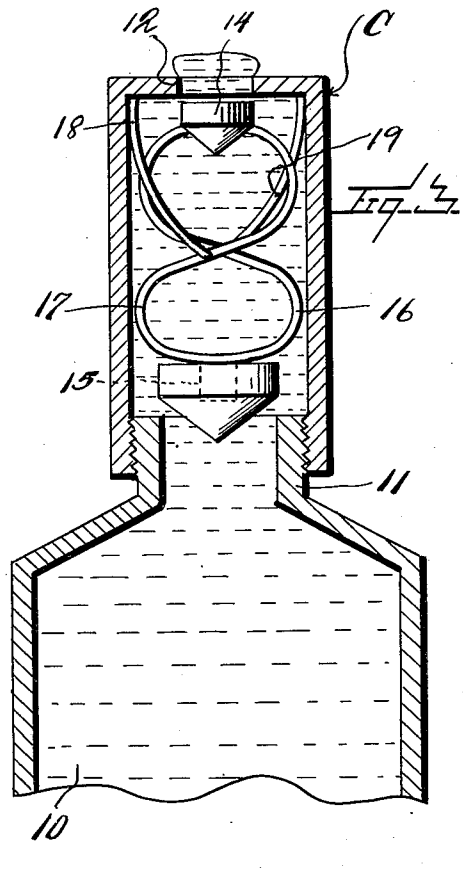


Fig. 3.



Inventor

P. P. Lamb

By Watson E. Coleman

Attorney

Patented June 14, 1932 1,862,794

UNITED STATES PATENT OFFICE

PORTER P. LAMB, OF DETROIT, MICHIGAN

COLLAPSIBLE TUBE CLOSURE

Application filed November 19, 1931. Serial No. 576,142.

This invention relates to automatic closures, and more particularly to closures adapted for use with collapsible tubes or the like.

An object of this invention is to provide a closure which may be readily mounted on any conventional type of collapsible tube or receptacle wherein the contents are forced through a discharge opening so as to close the opening when the pressure is exhausted.

Another object of this invention is to provide a double acting closure which not only closes a discharge opening in the cap, but also closes the discharge opening of the container.

A further object of this invention is to provide a device of this kind which can be readily and cheaply manufactured so that it can be used with any of the present types of collapsible paste tubes without adding unduly to the expense thereof.

The above and various other objects and advantages of this invention will in part be described in and in part be understood from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawing, wherein:—

Figure 1 is a detail side elevation of the spring in relaxed form used in the present invention;

Figure 2 is a longitudinal section of the device constructed according to the preferred embodiment of this invention, showing the closure means in closed position;

Figure 3 is a similar view but showing the closure means in open position.

Referring to the drawing wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 10 designates generally a container which, in the present instance, is shown as a collapsible tube, but I do not, of course, wish to be limited to this particular construction. The container or receptacle 10 is provided with a neck 13 having a discharge passage 11 therethrough, so that the material within the container 10 may be forced outwardly thereof through this discharge port 11 in the neck 13.

In order to provide means whereby the discharge port 11 may be automatically closed when pressure within the container 10 has been released, I have provided an automatic cap, generally designated as C, which is threadably mounted on the neck 13. This cap C is, in the present instance, substantially cylindrical in construction, and is provided at the closed end thereof with a discharge port 12 in substantial alinement with the discharge port 11 of the container 10. The discharge port 12 is of tapering construction so as to provide a seat for a valve or closure member 14, and opposed to this valve member 14 in a second valve or closure member 15, which engages the outer end of the neck 13, so as to close the discharge port 11.

A pair of spring or resilient members 16 and 17 is secured at one end to the inner closure member 15 and at the opposite end to the outer closure member 14, these springs or resilient members 16 and 17 being normally in a configuration resembling a figure 8. In other words, the spring members 16 and 17 are formed of two substantially closed loops, the point of intersection of the spring members 16 and 17 being substantially midway between the valves or closure members 14 and 15.

The spring 16 is provided with a brace or leg member 18, and in like manner, the spring 17 is provided with a spring or brace 19, which braces 18 and 19 are positioned in substantially V-shaped form with one end disposed against the side wall of the cap C adjacent the closed end thereof and the opposite end formed with the spring to which it is secured.

These braces 18 and 19 provide fulcrums for the springs 16 and 17, so that when the inner valve or closure member 15 is forced longitudinally of the cap C into open position, the inner loops or curves of the springs 16 and 17 will be compressed and the compression of these inner loops will force the outer loops to move inwardly and thereby draw the outer valve or closure member 14 away from the valve seat 12, and permit the material from the receptacle or tube 10 to be exuded.

As shown in Figure 1, the springs and valve members are originally constructed in straight form with the legs or braces 18 and 19 bent on an angle to the longitudinal axis of the straight spring, so that when the ends of the spring are brought together, they are crossed and formed into a substantial figure 8. The valve member 14 is secured to one end of the spring S and is provided with a recess 20, so as to receive the opposite end of the spring S when it is bent into the configuration disclosed in the drawing. The valve member 15 is secured to the spring S intermediate the legs 18 and 19 so that when the spring is formed into the figure 8, the valve members 14 and 15 will be substantially in alinement one with the other.

In the operation of this device, the material in the tube 10 may be forced out through the discharge port 11 by pressure applied to the end of the receptacle or tube oppositely from the discharge neck 13. This pressure will force the valve or inner closure member 15 outwardly of the outer end of the neck 13 into open position, and the inner loops of the spring members 16 and 17 will be compressed, the fulcrum of these spring members 16 and 17 being the inner converging ends of the bracing members or legs 18 and 19.

Movement of the inner closure member 15 will simultaneously move the outer portions of the spring members 16 and 17 inwardly, so as to draw the outer closure member 14 inwardly into open position, and these valve or closure members 14 and 15 will be maintained in open position for the period of time that the pressure is applied to the material in the receptacle 10. When the pressure has been exhausted on the material in the receptacle 10, the valve members 14 and 15 will be automatically forced into closed position by the spring members 16 and 17.

It will be obvious, from the foregoing, that the cap C, which is provided with the automatic closing means hereinbefore described, may be mounted on any conventional type of collapsible tube or receptacle from which the material is discharged through a discharge opening by pressure applied to the material in the receptacle.

While I have disclosed the device on a collapsible tube, it may readily be mounted on a tube wherein the walls are not of the collapsible type, but wherein means is provided for forcing material out of the discharge opening therein.

It is, of course, understood that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:—

1. A closure means comprising a cap having, a discharge opening at one end, the opposite end of the cap being open and constructed to engage the discharge end of a container, and automatic closure means disposed within the cap and normally engaging said discharge opening and discharge end of the container, said closure means automatically moving into open position upon application of pressure to the material in said container.

2. A closure means comprising a cap having a discharge opening at one end, the opposite end of the cap being open and constructed to engage the discharge end of a container, a closure member for the discharge opening, a second closure member for the discharge end of the container, and resilient means interposed between each of said closure members for constantly urging said members into closed position, movement of one of said closure members into open position automatically moving the other closure member into open position.

3. A closure means comprising a cap having a discharge opening at one end, the opposite end of the cap being opened and constructed to engage the discharge end of a container, a closure member for the discharge opening, a closure member for the discharge end of the container, and resilient means connecting each of said closure members together, said resilient means being so constructed as to move the outermost of said closure members inwardly simultaneously with the outward movement of said second closure member.

4. A closure means comprising a cap having a discharge opening at one end, the opposite end of the cap being opened and constructed to engage the discharge end of a container, an outer closure member engaging the discharge opening in the cap, an inner closure member engaging the discharge end of the container, a spring connecting each of said closure members together whereby to constantly urge said members apart and into closed position, and means engaging said spring intermediate said closure members whereby to move the outer closure member inwardly simultaneously with the outward movement of the inner closure member.

5. A closure means comprising a cap having a discharge opening at one end, the opposite end of the cap being opened and constructed to engage the discharge end of a container, an outer closure member for said discharge opening, an inner closure member adapted to engage the discharge end of the container, a pair of resilient members secured to each of said closure members and constantly urging said members apart and into closed position, and bracing members carried by

said resilient members and engaging the cap whereby to move the outer closure member inwardly into open position coactive with the outward movement of the inner closure member into open position.

6. A closure means comprising a cap having a discharge opening at one end, the opposite end of the cap being open and constructed to engage the discharge end of a container, an outer closure member for said discharge opening, an inner closure member engaging the discharge end of the container, a spring formed in substantially a figure 8 secured to each of said closure members and constantly urging said members into closed position, and a pair of fixed leg members carried by said spring and engaging the cap whereby to automatically force the outer closure member inwardly into open position simultaneously with the outward movement of the inner closure member into open position.

In testimony whereof I hereunto affix my signature.

PORTER P. LAMB.