

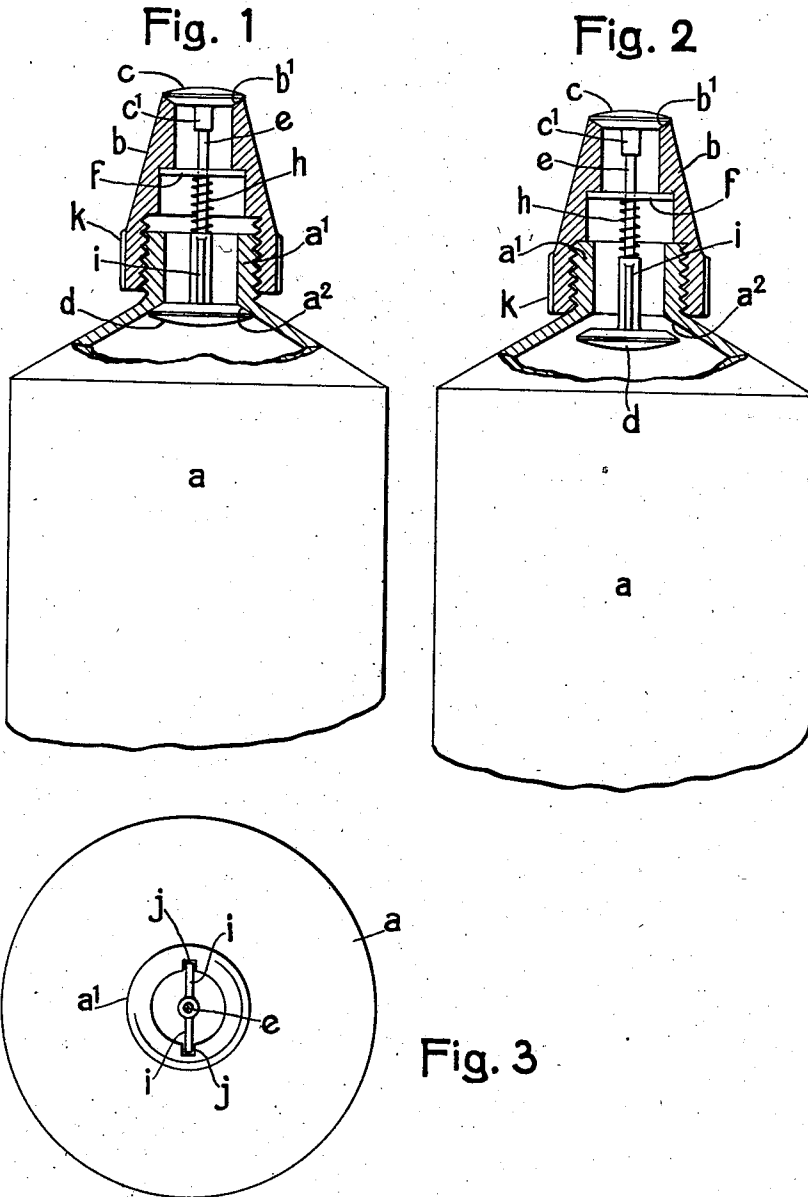
Dec. 19, 1939.

E. ISLER

2,183,912

CLOSURE DEVICE FOR COLLAPSIBLE TUBES

Filed July 7, 1939



Inventor:
E. Isler
By E. F. Mendenhall

UNITED STATES PATENT OFFICE

2,183,912

CLOSURE DEVICE FOR COLLAPSIBLE
TUBES

Ernst Isler, Basel, Switzerland, assignor to
Steatit Verkaufsgesellschaft A. G. (Steatite
Trading Ltd.), Basel, Switzerland

Application July 7, 1939, Serial No. 283,272
In Switzerland August 3, 1938

4 Claims. (Cl. 221-60)

The present invention relates to a closure device for collapsible tubes comprising a closure cap screwed on to the neck of the tube and an outlet valve subject to spring pressure seated on the closure cap and adapted to be opened upon pressure exerted on the tube owing to the displacement of the contents thereof, for the purpose of permitting the desired amount of the contents to leave the tube.

According to the invention an additional valve is combined with the outlet valve, this additional valve being seated on the neck of the tube, and being so disposed with respect to the closure cap and the outlet valve that when the closure cap is fully screwed on to the neck, the additional valve is in its open position so as to admit the outlet valve to be pressed open; on the other hand, when the closure cap is rotated in the unscrewing direction and the outlet valve is accordingly displaced, the additional valve is enabled to be brought to its closing position.

It is an important advantage of the closure according to the invention that it remains out of contact with the contents of the tube until the tube is used for the first time; this is due to the fact that the additional valve is brought to its closing position. Accordingly the closure remains in proper working condition even when the tube has been kept in store for a substantial time. This is not always the case with the hitherto known tube closures into which when the tubes are filled, part of the contents will penetrate, and when the tubes are kept in store for a relatively long time the closure will be stuck together by this part of the contents becoming hardened.

In order that the invention may be clearly understood, a constructional example is illustrated in the drawing in which:

Figures 1 and 2 show partly in section and partly in elevation, at an enlarged scale a tube, the closure of which is shown in two different positions respectively, and

Figure 3 is an axial view of the tube from which certain parts of the closure have been removed.

The tube body *a* is provided with an externally threaded neck *a*¹ on which a closure cap *b* is screwed; the upper edge of this cap forms a valve seat *b*¹ for the outlet valve *c*. An additional valve *d* is provided below the valve *c* and seated at *a*² in the tube neck *a*¹. In this manner a kind of double valve is provided for the tube closure comprising a common valve rod *e*, on the upper end of which the valve *c* is slid with a tight fit by means of an extension sleeve *c*¹ provided on the valve *c*. A screw spring *h* tending to displace

the valve rod *e* downwardly and to apply the valve *c* to its seat *b*¹ is provided on the valve rod *e* between a shoulder of this rod and a cross-bar *f* forming an abutment, which is supported against an internal shoulder of the closure cap *b* and through which the valve rod *e* passes. Two oppositely extending ribs *i* are provided at the lower end portion of the valve rod *e* and arranged to engage slidably into two corresponding guiding grooves *j* (Figure 3) formed in the inner surface of the tube neck *a*¹, in order to provide a reliable guide for the valve rod *e* during its displacing movements.

When the closure cap *b* is rotated in the unscrewing direction, the valve seat *b*¹ with the valve *c* is displaced upwardly, and consequently the additional valve *d* connected with the valve *c* will come to bear on its seat *a*² as shown in Figure 1.

In this condition of the closure the tube is filled from its rear end. As the additional valve *d* is closed, the contents of the tube are prevented from penetrating into the closure during filling, so that the closure cannot become stuck even after a prolonged storage of the filled tube.

In order to withdraw the desired amount of the contents, it is necessary to turn first the closure cap *b* in the closing direction, whereby the additional valve *d* is removed from its seat *a*² (see Figure 2). When now pressure is exerted on the tube, in the first use thereof, part of the contents will pass the open additional valve *d* into the closure cap *b* whence it finally escapes lifting the outlet valve *c* from its seat *b*¹ out of the closure. In accordance with the lifting of the valve *c* from its seat *b*¹ during the issuing of the contents, the additional valve *d* will evidently approach its own seat *a*². However by suitably dimensioning the parts of the twin valve, provision is made so that the contents pressed out of the tube cannot fully close the additional valve *d* when the closure cap *b* has been fully screwed home, and accordingly both valves will be simultaneously open when the contents of the tube are issued. When the desired amount of the contents has been taken from the tube, the pressure exerted on the latter is released and consequently the valve *c* will again be pressed by the spring *h* upon its seat *b*¹. If desired, the closure cap *b* may in addition be screwed upwardly so as also to press the valve *d* to its seat in the above described manner, thus sealing the tube twice.

In order to facilitate the screwing movements of the closure cap *b*, the latter is provided at its lower circumference with corrugations *k*.

What I claim is:

1. A closure device for collapsible tubes, comprising a screwthreaded tube neck, a closure sleeve threaded at one end for engagement with said screw threads of the tube neck, a valve seat on a face of said closure sleeve, another valve seat on an opposed face of said tube neck, two oppositely arranged coaxial valves, an outer one and an inner one, each facing one of said valve seats, means for rigidly coupling together said valves and spring means to elastically hold the same within the said closure sleeve so as to allow closure and opening of the inner valve when screwing up and down the said closure sleeve, whilst an opening of the outer valve for outlet is only possible in down-screwed position of the said closure sleeve and consequent open position of the inner valve.

2. A closure device as claimed in claim 1, in which one of said valve seats is provided on the internal face of the tube neck, the other of said valve seats being provided at the front face of said sleeve, and said valves being rigidly coupled together by a common valve shaft.

3. A closure device as claimed in claim 1, in which said valves are rigidly connected by a common shaft, cooperating longitudinal guiding means being provided on said shaft and on said tube neck.

4. A closure device as claimed in claim 1, in which said valves are rigidly connected by a common shaft, a spring being mounted on the latter between an abutment thereof and an abutment member provided inside said closure sleeve.

ERNST ISLER.