Aug. 26, 1941. K. TOTSCHNIG 2,253,738

CLOSURE FOR TUBES

Filed April 9, 1940

Fig.1

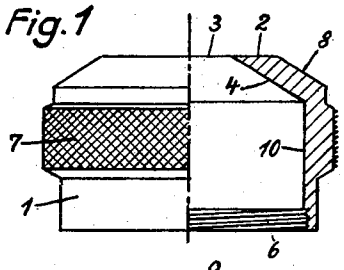


Fig.2

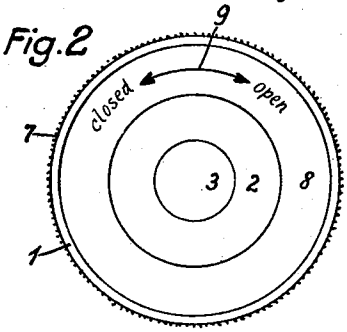


Fig.3

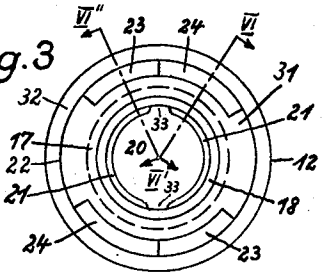


Fig.4

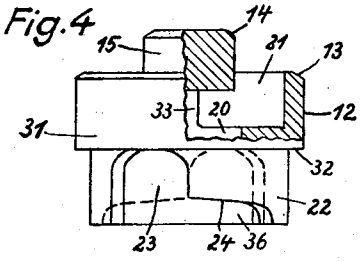


Fig.5

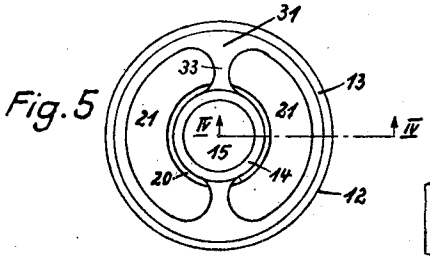


Fig.6

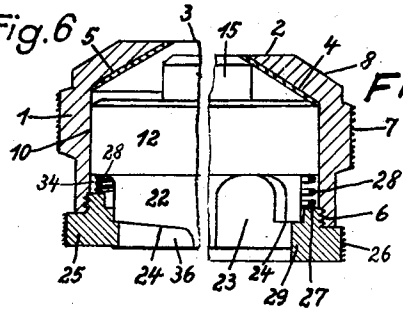


Fig.6a

Fig.7

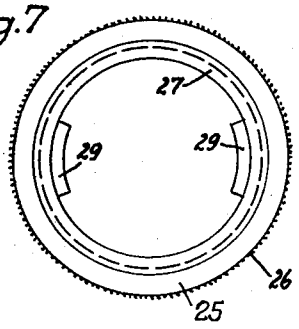


Fig.8

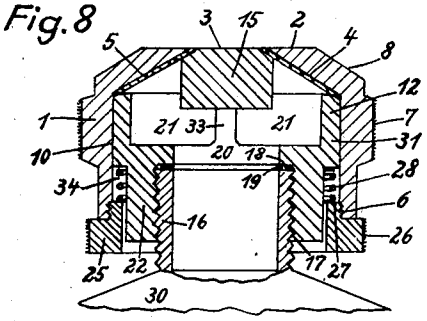
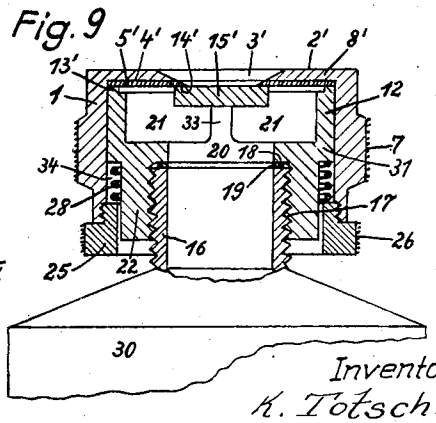


Fig.9



Inventor:
K. Totschnig

By: Glascock Downing & Seebold
Attys.

Patented Aug. 26, 1941 2,253,738

UNITED STATES PATENT OFFICE

2,253,738

CLOSURE FOR TUBES

Karl Totschnig, Berlin, Germany

Application April 9, 1940, Serial No. 328,751
In Germany February 18, 1939

2 Claims. (Cl. 221—60)

My invention relates to improvements in closures for tubes designed for containing a liquid, viscous or plastic medium such as a toilet or medicinal preparation, and more particularly in closures of the type comprising an automatically opened and closed valve. The objects of the improvements are, first to provide a closure of this type which is tightly closed by the valve, so that the contents of the tube do not dry, which is simple in construction and which is shaped so that the medium dispensed therefrom may be completely taken therefrom. With these and other objects in view my invention consists in constructing the closure in the form of a tubular body carried by or adapted to be fixed to the tube and provided at its outer end with a seat, and a valve body in the form of a cap fitted in said tubular body and having an axial opening for the delivery of the medium from the tube therethrough, the said cap embracing the said tubular body and being seated on said valve seat.

For the purpose of explaining the invention several examples embodying the same have been shown in the accompanying drawing in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawing,

Fig. 1 is an elevation partly in section showing the valve body detached from its seat,

Fig. 2 is a top plan view of Fig. 1,

Fig. 3 is a bottom view of Fig. 4,

Fig. 4 is an elevation partly in section taken on the line IV—IV of Fig. 5 showing the tubular body having the valve seat formed thereon,

Fig. 5 is a top plan view of Fig. 4,

Figs. 6 and 6*a* are partial sectional views taken, respectively, on the lines VI'—VI'' and VI—VI' and showing the device in opened and closed positions,

Fig. 7 is a bottom view of a ring screwed to the valve body,

Fig. 8 is a sectional elevation showing the closure as applied to a tube, and

Fig. 9 is a similar sectional elevation showing a modification.

In the example shown in Figs. 1 to 8 the closure comprises a tubular body 31 adapted to be screwed to the neck 16 of a tube 30, a metal-coated packing ring 19 being interposed between the said neck and an annular shoulder 18 formed within the body 31. The said body comprises a lower portion 22 and an upper portion or flange 12 of larger diameter and providing an annular shoulder 32, and it is made integral with a plug 15 connected therewith for example by diametrically opposite ribs 33 providing laterally directed passages 21. At their top ends the flange 12 and the plug 15 are chamfered to provide conical valve seats 13, 14.

The valve body 1 comprises a cylindrical portion 10 fitting and slidable on the flange 12 and formed with a conical head 8 having an internal conical face 4 adapted to bear on the said valve seats 13 and 14. At its top the conical head is formed with a plane end face 2, which is formed with an axial delivery opening 3. Preferably a metal-coated annular packing disk 5 is placed on the face 4, and the conical head 8 and the said packing disk end around the opening 3 in a sharp edge, the top end of the disk 5 being flush with the end face 2 as is best shown in Fig. 6. The bottom end of the body 1 is internally screw-threaded, as is shown at 6, and it has an internally projecting ring 25 screwed into the same which, in the assembled closure loosely engages the reduced bottom part 22 of the tubular body 31 and provides a chamber 34 therewith, and within the said chamber a coiled spring 28 is located which bears on the top face 27 of the ring 25 and the shoulder 32 and urges the valve body 1 downwardly and into engagement with the seats 13 and 14. Preferably the upper and lower coils of the spring 28 are bent into planes so that they bear on the ring 25 and the shoulder 32 with their whole circumferences, and uniform axial pressure is exerted on the valve body 1.

The valve body 1 is formed with an outer milled portion 7, and the ring 25 is provided with an outer milled portion 26.

The reduced portion 22 of the tubular body 31 is formed with cut-out portions comprising a comparatively low portion 36 forming a slightly sloping shoulder 24 and an adjoining higher portion 23, and the ring 25 is formed with lugs 29 adapted to engage the said cut-out portions. When the said lugs engage the sloping portions 24 they force the valve body 1 downwardly and into engagement with the seats 13 and 14, so that the valve is closed, and when the valve body is turned clockwise in Fig. 2 the said lugs get into position for engagement with the higher portions 23, so that they permit the valve body to rise in opposition to the spring 28 for opening the valve and permitting the delivery of the medium from the tube 30 through the opening 3.

As appears from Fig. 4, the pitch of the sloping shoulders 24 is such that it rises from the right to the left, and therefore it is opposite to the pitch of the screw-threads 17 of the neck 16. Thus, when the valve is to be opened the valve

body 1 is turned in clockwise direction, that is in the direction in which the tubular body 31 is screwed downwardly on the neck 16. This is important, because, if the lugs 29 are in very tight engagement with the shoulders 24, and the valve body 1 is turned on the tubular body 31 for opening the valve, the moment is transmitted to the tubular body 31, which would be unscrewed from the neck 16 if the screw-threads of the said neck and the slope of the shoulders 24 had the same sense. However, in the construction shown in the figure the valve body 1 has the tendency to screw the tubular body 31 downwardly on the neck 16 if it is screwed clockwise for opening the valve.

In order that the direction in which the valve body must be rotated for opening the valve may be readily ascertained arrows 9 are arranged on the top face of the tubular body and the words "Open and Closed" are engraved in the said top face.

When the material delivered from the closure is removed pressure is exerted on the valve body tending to force the same on its seat. Thus the action of the spring 28 is assisted.

For closing the valve only circumferential movement of the valve body with the lugs 29 sliding on the sloping shoulders 24 is needed, and no axial movement of the valve body. Therefore no additional material is forced through the valve by the closing movement thereof. By the said circumferential movement the valve body rubs on the seats 13 and 14, and thereby any residue of the dispensed medium is removed.

From the foregoing description of the closure it will be understood that the valve seats 13 and 14 engage the packing disk 5 respectively at its inner and outer margins. Thus the seat 14 closes the opening 3, and the seat 13 prevents the escape of the medium between the flange 12 and the valve body 1. Further any access of air to the medium within the tube is effectively prevented. The medium delivered by internal pressure from the tube 30 flows upwardly through the neck 16, an axial passage 20 made in the tubular body 31 and the laterally directed passages 21. When the valve is closed the top face of the plug 15, the upper end of the packing disk 5 and the top face 2 of the valve body 1 lie flush, and therefore there is no corner where a residue of the medium delivered from the tube might be collected. Thus the closure is not spoilt by dried material left thereon.

The modification shown in Fig. 9 is similar to the construction described with reference to Figs. 1 to 8, and the same letters of reference have been used to indicate corresponding parts, so that it is not necessary to repeat the description of the said parts. As distinguished from the said construction shown in Figs. 1 to 8, the top face of the plug 15 and the seats 13' and 14' are located in the same plane, and accordingly the upper face 2' of the head 8' is perpendicular to the axis of the closure. The opening 3' of the valve body 1 is formed with outwardly flaring walls thus providing a flat pocket in which the medium delivered from the tube may be collected. This construction is preferred in colour tubes, because the painter likes to press a supply of colour from the tube and to keep the same thereon and use the same as occasion arises.

While in describing the invention reference has been made to particular examples embodying the same I wish it to be understood that my invention is not limited to the constructions shown in the figures and that various changes may be made in the general arrangement of the closure without departing from the invention. For example I do not limit myself to the construction shown herein in which the ring 25 is connected to the valve body 1 by screw-threads. In some cases I prefer rigidly to connect the same with the said tubular body by rolling or otherwise, because after once applying the closure to the tube it is not necessary to remove the valve body from the seat. The closure may be made from any suitable material, such for example as metal or artificial resin. The manufacture of the closure from artificial resin is preferred for the reason that it is less expensive than the manufacture of the closure from metal, so that the closure may be cast aside after having once been used, and it is not necessary to fit therein a new packing disk 5.

Further, I do not limit myself to a construction in which the tubular body 31 is secured to a neck of the tube. It may be made integral therewith or rigidly fixed thereto, in which case the aforesaid relation of the pitches of the slope of the sloping shoulders 24 and the screw-threads 17 may be left out of consideration. Thus the valve may be opened by turning the valve body 1 anticlockwise rather than clockwise, which is the common practice in opening closures.

I claim:

1. In a closure for tubes comprising a tubular body carried by a tube and formed at its outer face with a valve seat, a valve body in the form of a cap embracing the outer portion of said tubular body and formed with an axial opening and bearing on said seat, said tubular body being formed with a cylindrical portion providing a guide for said valve body and a portion of reduced diameter defining a shoulder, a ring fixed internally to said valve body and engaging said portion of reduced diameter, and a coiled spring intermediate said shoulder and ring normally urging said valve body on said seat.

2. In a closure as claimed in claim 1, the improvement herein described which consists in interengaging lugs and cut-out portions being provided respectively on said ring and said tubular body, each of said cut-out portions having a sloping part for forcing said valve body on its seat and an adjoining part permitting relative axial movement of said lug and cut-out portion.

KARL TOTSCHNIG.