Aug. 24, 1937. K. RUETZ 2,091,217

SLIDABLE CLOSURE FOR TUBES AND OTHER CONTAINERS

Filed Sept. 14, 1936

FIG. 1.

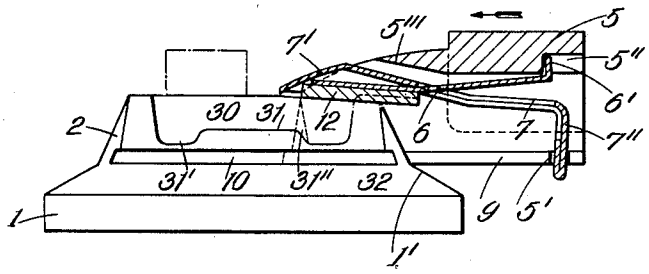


FIG. 2.

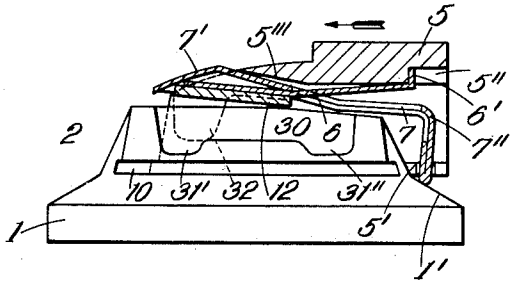


FIG. 3.

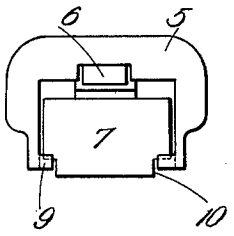


FIG. 4

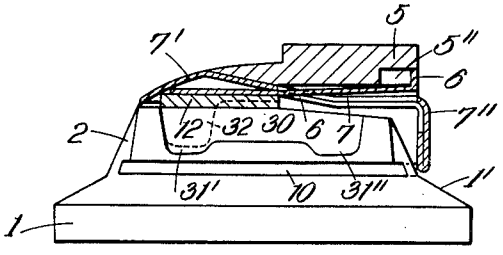
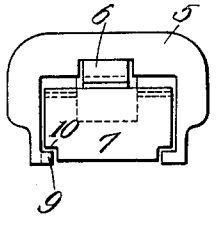


FIG. 5.



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SLIDABLE CLOSURE FOR TUBES AND OTHER CONTAINERS

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7 Claims. (Cl. 221—60)

Closing devices for tubes are known in which instead of the usual screw stopper there is used a slide which carries the packing member, for example a cork plate, which is pressed by spring pressure on to the edge of the opening of the tube. On the movement of the slide, in order to prevent the packing member from being damaged by friction on the edge of the opening of the tube, forms of construction have been produced in which the packing member is raised from the opening of the tube during the opening movement.

When such closing devices are of small dimensions, considerable difficulty is experienced in obtaining a form of construction which will meet all requirements and in particular will exert a reliable closing pressure on the opening of the tube, so long as this closing pressure is dependent exclusively on the spring force of the closing member.

The subject of the invention is a slidable closure for tubes and other containers in which this difficulty is overcome by the arrangement of a wedge device, carrying the packing member, between the outlet of the container and the slide to be actuated, this wedge member being controlled by the slide and, in the closed position, pressed thereby against the opening of the container, but, on the initiation of the opening movement of the slide, it is raised therefrom in order to prevent any friction between the packing plate and the edge of the opening of the container.

By the combination of the wedge closure device with the lifting of the packing member, maximum protection is afforded to the packing material and also satisfactory functioning of the closing device is insured.

One form of construction of the invention is shown diagrammatically in the annexed drawing.

In the drawing:—

Fig. 1 shows the upper part of a tube in front elevation, and a longitudinal section of the slide when open.

Fig. 2 shows the same form of construction with the slide in the position shortly before the end of the closing movement.

Fig. 3 is an end view of the slide seen in the direction indicated by the arrow in Fig. 2.

Fig. 4 shows the slide when closed.

Fig. 5 is a view of the slide seen in the direction opposite to that indicated by the arrow in Fig. 2.

In Fig. 1, 1 denotes the upper part, and 2 the head of a container, for example a tube, adapted to be closed by the slidable closure. The head 2 of the container is of prismatic form and is provided on both its longitudinal sides with grooves 10 and also with a recess 30 the lower edge 31 of which extends into recesses 31' and 31''.

The movable part of the closing device consists of a slide housing 5 and a wedge-shaped member 6, 7 the front part of which is in the form of a wedge device 7' carrying a packing member 12, while the rear part has on the one hand a vertical end hook 7'' which is anchored in a transverse slot 5' of the slide housing, and on the other hand a vertical end-hook 6' which is bent upwards and engages in a recess 5'' on the cover of the slide housing 5. The sides of the slide housing are bent inwards and form guide bars 9 which are guided in grooves 10 in the head 2 of the container. The front part 7' of the member 6, 7 is provided on both sides with guide plates 32 which are movable in the recesses 30 in the head of the tube.

The mode of operation of the closing device is as follows:—

If the slide is in the open position shown in Fig. 1, the wedge member 6, 7 with the packing member 12 is supported by means of the guide plates 32 on both sides, in the deepened portions 31'' of the recesses 30. The end hook 7'' of the member 6, 7 is anchored in the transverse slot 5' of the slide housing 5. When, by the movement of the slide in the direction indicated by the arrow (to the left) the closing movement is initiated, then the guide plates 32, following the oblique lines of the recesses, are raised from the recesses 31'' to such an extent that they continue to slide on the horizontal part of the edge 31, whereby the front part of the member 6, 7 with the packing plate 12 is raised. At the same time an increased spring tension is produced in the member 6, 7, in that the end hook 7'', running on the oblique surface 1' of the container, is pressed upwardly. The spring tension reaches its maximum shortly after the slide has arrived in the position shown in Fig. 2, i. e. shortly before reaching the closed position. When the slide is moved further to the left beyond the position shown in Fig. 2, then, under the influence of spring pressure, the guide plates 32 slide into the recesses 31' and the packing member 12 is pressed on to the opening of the container, while the slide 5, after the end hook 7'' has been forced out of the slot 5', can be moved further without the member 6, 7 being carried along, until it bears with its oblique surface 5''' (Figs. 1 and 2) against the surface of the wedge-

shaped front part 7' of the member 6, 7, thereby securing the members 7' and 12 in the closed position.

The function of the closing device during the opening operation is as follows:—When the slide 5 is moved to the right, first of all the pressure of the slide cover on the wedge member 7' (which at first does not participate in the movement of the slide) ceases. As soon as the slide seizes the hook 6' of the members 6, 7 sliding in the recess 5'' in the cover of the slide, the hook 6' is displaced whereby the guide plates 32, following the oblique surfaces of the recesses 31', are raised, whereby the packing member 12 is lifted out of the opening of the container. Then the plates 32 continue to slide on the horizontal part of the edges 31 until, under the influence of spring pressure, they again arrive in the recesses 31'' and therefore into the position which they assume when the slide is in the open position.

The co-operation of the slide cover with the wedge-shaped member 7' makes the reliable functioning of the closing device largely independent of the spring force of the member 6, 7, an eventual state of fatigue of this member being balanced by the closing pressure of the slide.

Instead of the member 6, 7 being made flexible, it can be made completely rigid and in its place the cover of the slide made flexible in such manner that, at least when the slide is in certain positions, it exerts a flexible pressure on the intermediate member 6, 7.

As may be seen from Fig. 4, the transverse edge of the wedge member 7' on the one hand and the oblique surface 5''' in the cover of the slide housing 5, which acts on the wedge member 7', are of such dimensions that when the slide is closed, an unbroken surface with a continuous curve is obtained; similarly, when the closure is in the closed position, the sharp end edge of the wedge member 7' engages with the corresponding edge of the head of the container. The knife-like design of the end of the wedge member 7' ensures a smooth movement over the polished surface during the closing movement.

The slide 11 may be made of metal or of an artificial material.

Having thus described the nature of the said invention and the best means I know of carrying the same into practical effect, I claim:—

1. A slidable closure for a container, comprising a slide, a wedge device located between the slide and the outlet aperture of the container, a packing member carried by the wedge device, and controlling means for said wedge device operative by the slide when moved into its closed position to press the packing member against the edge of the aperture in the container and to raise it therefrom at the commencement of the opening movement of the slide.

2. A slidable closure for a container, comprising a slide provided with a housing, a wedge device located between the slide housing and the outlet aperture of the container, a packing member carried by the wedge device, and controlling means for said wedge device operative by the slide when in its closed position to press the packing member against the edge of the aperture in the container and to raise it therefrom at the commencement of the opening movement of the slide.

3. A slidable closure for a container, comprising a slide, a wedge device located between the slide and the outlet aperture of the container, a flexible packing member carried by the wedge device, and means for operating the wedge device, when the slide is moved into closed position to press the packing member against the edge of the aperture in the container and to raise the packing member therefrom at the commencement of the opening movement of the slide.

4. A slidable closure for a container, comprising a slide, a wedge device located between the slide and the outlet aperture of the container and embodying a leaf spring one end of which is located to abut against the slide, a packing member carried by the other end of the leaf spring, and means operative by the slide when moved into its closed position to press said packing against the edge of the aperture in the container, the abutting of the leaf spring against the slide at the commencement of the opening movement thereof raising the packing member from the edge of the aperture in the container.

5. A slidable closure for a container, comprising a slide provided with a transverse slot, a wedge device located between the slide and the outlet aperture of the container and having a downwardly bent hook to enter the slot in the slide, for movement thereby, a packing member carried by the wedge device, means cooperative with the hook on the wedge member when the slide is moved into closed position to press the packing member against the edge of the aperture in the container, and means operative at the commencement of the opening movement of the slide for raising the packing member from the edge of the aperture in the container.

6. The combination of a container having recesses at opposite sides thereof, and a closure comprising a slide provided with guide plates operable in said recesses, a wedge device located between the slide and the outlet aperture of the container, a packing member carried by the wedge device, means operative upon the wedge device when the slide is moved into closed position to press the packing member against the edge of the aperture in the container, and means operative upon the wedge member at the commencement of the opening movement of the slide to raise the packing member from the edge of the aperture in the container.

7. A slidable closure for a container, such closure comprising a slide provided with a cover having an oblique surface, a wedge device located between the slide cover and the outlet aperture of the container, a packing member carried by the wedge member, such wedge device being engaged by the oblique surface on the slide when the latter is in closed position and thereby caused to press the packing member against the edge of the aperture in the container, and means operative by the slide at the commencement of its opening movement to raise the packing member from the edge of the aperture in the container.

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