Dec. 3, 1935. R. TILMAN 2,022,989

STOPPER

Original Filed Dec. 29, 1932

Fig. 1.

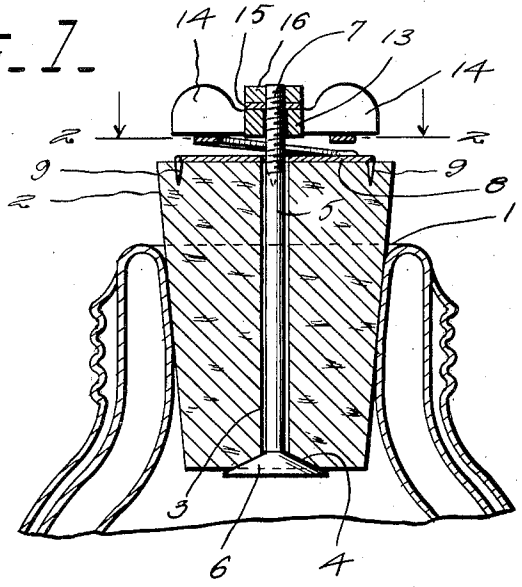


Fig. 2.

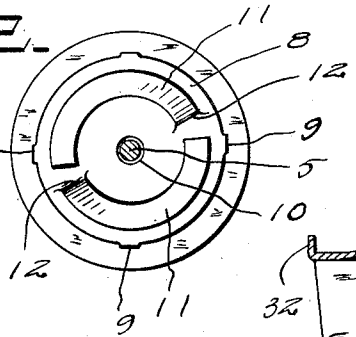


Fig. 3.

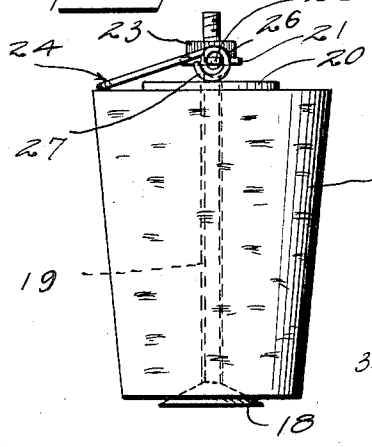


Fig. 5.

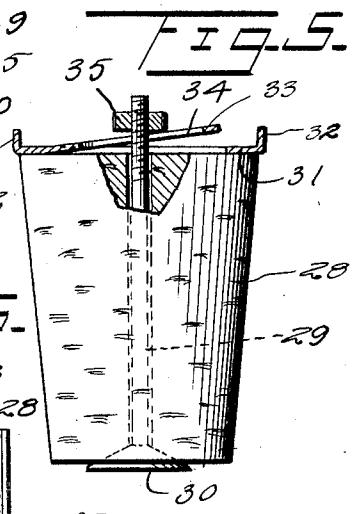


Fig. 6.

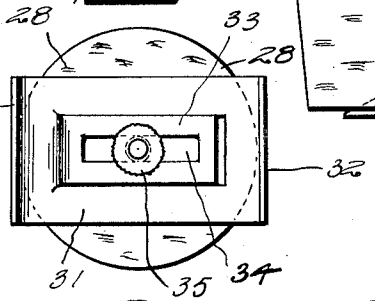
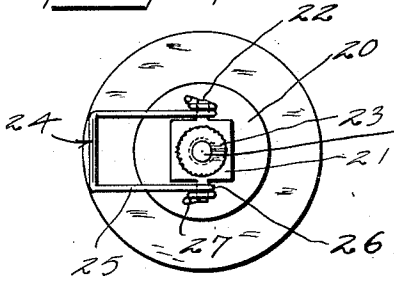


Fig. 4.



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STOPPER

Robert Tilman, Tyler, Tex.

Application December 29, 1932, Serial No. 649,378
Renewed May 2, 1935

7 Claims. (Cl. 215—54)

This invention relates to the class of stoppers of the character used in bottles or jars and pertains particularly to a valved stopper.

The primary object of the present invention is to provide a stopper having a passage therethrough and a valve controlling the same whereby the creation of a pressure within a bottle into which the stopper is placed may be avoided by setting the valve in open position to permit the escape of air as the stopper is forced into position.

A bottle stopper of the ordinary type, after being used several times, becomes smooth and it is difficult to retain it in position in the mouth of a bottle or jar. Added to this difficulty is the fact that as the stopper is forced into the jar, especially where the jar is filled with a liquid, some air is compressed in the bottle between the stopper and the liquid and this acts as a cushion and forces the stopper out as soon as it is released. This is particularly true of large stoppers of the character used in vacuum bottles.

By providing such stoppers with valves of the character herein set forth the air trapped in the bottle or jar may be permitted to escape as the stopper is forced into position, so that even though the stopper has been worn smooth there will be no internal pressure tending to force it from position.

After the stopper has been placed in position the valve is closed and the contents of the receptacle cannot escape and as the pressure upon the outside of the stopper is the same as that within the bottle and against the inside of the stopper the stopper will retain its position. In addition to obtaining this desirable result it becomes possible to completely fill the bottle, whereas heretofore some air space had to be left between the contents of the bottle and the stopper in order to effect the insertion of the stopper.

A further object of the invention is to provide a valved stopper in which novel means is employed for resiliently retaining the valve in closed position.

Still another object of the invention is to provide a valved stopper wherein means is employed for compensating for any looseness which may develop in the valve as the result of the compression of the material from which the stopper is formed.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Figure 1 is a view in vertical section through the mouth portion of a vacuum bottle showing in vertical section a valved stopper constructed in accordance with the present invention;

Figure 2 is a sectional view taken substantially upon the line 2—2 of Figure 1;

Figure 3 is a view in side elevation of a stopper having a modified form of valve;

Figure 4 is a top plan view of the modification shown in Figure 3;

Figure 5 is a view partly in side elevation and partly in section of a still further modification of the structure;

Figure 6 is a view in top plan of the modification illustrated in Figure 5.

Referring now more particularly to the drawing wherein like numerals of reference indicate corresponding parts throughout the several views, the numeral 1 indicates generally the mouth of a vacuum bottle in which is shown a stopper 2 having a valve structure incorporated therewith in accordance with the present invention.

In carrying out the present invention the stopper 2 is provided with the longitudinally extending passage 3 and at the constricted end of the stopper a conical depression 4 is formed which at its center communicates with the passage 3 and which constitutes a seat for a valve head.

Extending longitudinally through the passage 3 is a valve stem 5 which upon one end is integral with the valve head 6, the under face of which is of substantially conical formation as shown to seat upon the surface of the conical depression 4 in the manner illustrated.

The opposite end of the valve stem 5 extends a substantial distance above or beyond the outer end of the stopper 2 and is screw-threaded as indicated at 7.

Positioned against the enlarged outer end surface or face of the stopper 2 is a plate 8 which at its outer edge is provided with integral spurs 9 which are forced into the body of the stopper to retain the plate in position thereon. The center of the plate 8 is provided with the aperture 10 which aligns with the passage 3 and upon the top surface thereof are mounted the two arcuate spring tongues 11 each of which is secured at one end to the plate as indicated at

12 while its other end is disposed in spaced relation therewith. These tongues are arranged concentrically with respect to the aperture 8, the fixed end of one tongue being adjacent the free end of the other.

Mounted for free rotation about the threaded end portion of the stem 5 is a winged collar which is indicated by the numeral 13, the wings of which are indicated by the numerals 14. The under surfaces or edges of the wings 14 of this collar extend radially from the stem 5 beyond the spring tongues 11 and are adapted to ride thereonto when the device is in use.

Threaded onto the stem 5 and holding the collar 13 in position against longitudinal movement in one direction are the nuts 15 and 16, the outer one of which, which is indicated by the numeral 16, acting as a lock nut for the other one.

In the use of the valved stopper, when the same is to be placed in position in the mouth of the bottle the collar 13 is rotated so that the wings thereof will lie across the ends 12 of the spring tongues thereby allowing the stem 5 to shift so as to remove the valve head 6 from its seat. The stopper 2 may then be inserted into the bottle and the air therein will escape by way of the passage 3, thus permitting the stopper to be forced firmly into position. After the stopper has been so placed the wings 14 and the collar are rotated so that the wings will ride onto the raised ends of the spring tongues and the tongues will, therefore, operate to resiliently draw the valve 6 onto its seat 4 through the outwardly directed pressure exerted thereby against the wings of the collar.

As the seat 4 becomes forced more deeply into the body of the cork the nuts 15 and 16 may be threaded inwardly so as to move the collar 13 inwardly and, therefore, compensate for this change in the position of the seat with respect to the collar and wings and thereby make it possible to have the device always operate satisfactorily.

In Figure 3 a modified form of the invention is illustrated wherein the stopper is indicated by the numeral 17. The valve element 18 and the stem 19 are the same in this construction as in the form shown in Figure 1 and at the outer or large end of the cork body there is mounted against the end face thereof the plate 20 through the center of which the stem 19 passes.

Threaded onto the outer end of the stem 19 is the plate 21 which is provided with laterally extending fingers 22 at opposite edges thereof. This plate is held in position by the lock nut 23.

For retaining the valve 18 in the desired closed position there is provided a swinging latch element which is in the form of a substantially U-shaped spring wire frame 24, the side members or legs 25 of which are formed at their free ends to provide the coils 26, each of which consists of two or more convolutions. As shown in Figure 3 the legs 25 of the frame 24 are tangential to the convolutions of the coils 26 and the outer convolution 27 of each coil is made slightly larger than the inner ones so as to operate as a cam element when the member 24 is oscillated in one direction about the plate fingers 22 which, as shown extend through the coils. It will thus be seen that by throwing the latch frame 24 over in one direction the outer convolutions 27 of the coils 26 will bear against the underlying plate 20 and thus draw the stem 19 through the stopper and seat the valve 18. As the material of the latch frame 24 is of spring wire the convolutions 27 will form a resilient means for holding the valve 18 upon its seat. As in the case of the structure shown in Figure 1, when the need arises for adjusting the degree of pressure of the valve upon its seat this may be effected by threading the plate 21 inwardly upon the stem 19 and also threading inwardly the lock nut 23 which holds the plate in position.

In Figures 5 and 6 is illustrated a further modification of the valve holding means. In these figures the stopper is indicated generally by the numeral 28 and as in the other cases it is provided with a central passage or bore through which extends the stem 29 of a valve 30 which positions against a seat formed in the end face of the stopper at the inner or smaller end thereof.

In this form of the invention there is provided the elongated rectangular plate 31 which is preferably provided with the upturned transverse end flanges 32 and which has struck from its central portion the elongated tongue 33. This tongue is integral at one end with the plate 31 from which it is formed and has cut therein the longitudinally extending slot 34. The tongue 33 is sprung upwardly as illustrated in Figure 5 and the threaded upper end of the stem 29 passes through the slot 34 thereof and carries the nut 35 which bears against the top surface of the spring tongue 33 when the valve 30 is seated. The spring tongue, operating against the nut 35, thus acts to draw the valve 30 onto its seat and when it is desired to release the valve this is effected by sliding the plate 31 in a direction to move the attached end of the spring tongue 33 toward the stem, thus relieving the nut 35 of the resilient pressure exerted thereagainst by the tongue. It will thus be seen that in this case as in the structures shown in Figures 1 and 3 the valve will be held upon its seat by a yieldable or resilient pressure and as will also be readily apparent the degree of tightness to which the valve is drawn to its seat may be regulated by the adjustment of the nut 35 on the stem 29.

From the foregoing it will be readily appreciated that by using any one of the several forms of valved stoppers herein disclosed the bottle in which the stopper is placed may be entirely filled and no internal pressure will be created as the stopper is inserted if the valve elements thereof are released so that any entrapped air may pass outwardly through the passages in the stoppers. After the stoppers have been placed in position the passages are securely closed by the proper manipulation of the means provided for drawing the valves to their seats.

Having thus described the invention, what is claimed is:—

1. A stopper having a passage longitudinally therethrough and a valve seat at one end thereof, a valve positioned upon said seat, a stem carried by the valve and extending through the passage beyond the opposite end thereof, a pair of resilient tongue members disposed concentrically about the valve stem at the end of the stopper opposite that engaged by the valve, and means rotatably mounted upon the valve stem for frictionally engaging said resilient tongues to place the same under tension for the resilient maintenance of the valve upon its seat.

2. A stopper having a passage longitudinally therethrough and a valve seat at one end thereof, a valve positioned upon said seat, a stem carried by the valve and extending through the passage beyond the opposite end thereof, a pair of

resilient tongue members disposed concentrically about the valve stem at the end of the stopper opposite that engaged by the valve, means rotatably mounted upon the valve stem for frictionally engaging said resilient tongues to place the same under tension for the resilient maintenance of the valve upon its seat, and means carried by the stem for regulating the degree of tension exerted by the resilient tongues against the said rotatable means carried by the stem.

3. A stopper having a central passage therethrough, a valve element opposing one end of the stopper, a stem carried by the valve and passing through the passage and projecting beyond the end remote from the element, an element adjustably mounted upon the stem, an oscillatable latch carried by the second element, and resilient camming means operated by said latch when the latter is moved in one direction to resiliently draw said valve against the adjacent end of the stopper to close said passage.

4. In a stopper, a body designed for free insertion into and removable from a receptacle mouth, said body having a passage therethrough, a stem freely shiftable through the passage, a valve element on one end of the stem for contact with the adjacent end of the body, a manually movable member upon the other end of the body adapted to assume an operative and an inoperative position, and resilient means affected only when said member is moved to operative position to shift said stem in one direction to resiliently hold the valve element in position to close the passage through the body.

5. In a stopper, a body designed for free insertion into and removable from a receptacle mouth, said body having a passage therethrough, a stem freely shiftable through the passage, a valve element on one end of the stem for contact with the adjacent end of the body, a manually movable member upon the other end of the body adapted to assume an operative and an inoperative position, resilient means affected only when said member is moved to operative position to shift said stem in one direction to resiliently hold the valve element in position to close the passage through the body, and means adjustable longitudinally on said stem for changing the tension of the resilient means when the said member is in operative position.

6. In a stopper, a body having a central passage therethrough, a valve element disposed at one end of the body and adapted to close said passage, a stem carried by the element and passing through said passage and projecting beyond the other end of the body, a plate member adjustably mounted upon the said other end of the stem and having a pair of oppositely directed laterally extending ears, a pair of cam members each oscillatably mounted upon an ear, and means connecting the cam members to facilitate oscillating the same simultaneously, said cam members when oscillated exerting pressure against the adjacent body to shift said stem and draw the valve member into position against the opposite end of the body.

7. In a stopper, a body having a central passage therethrough, a stem passing entirely through said passage, a valve element carried upon the stem at one end, the opposite end of the stem being threaded, a plate having a central aperture through which the threaded end of the stem passes, a pair of ears extending from opposite edges of the plate, a nut threaded upon the stem and engaging the top of the plate, and a substantially U-shaped frame having side portions each terminating at its free end in a series of convolutions which receive one of said ears to form a rocking connection therewith, one convolution of each series being eccentrically formed for contact with the body to cause the shifting of the stem when the frame is rocked upon the ears.

ROBERT TILMAN.