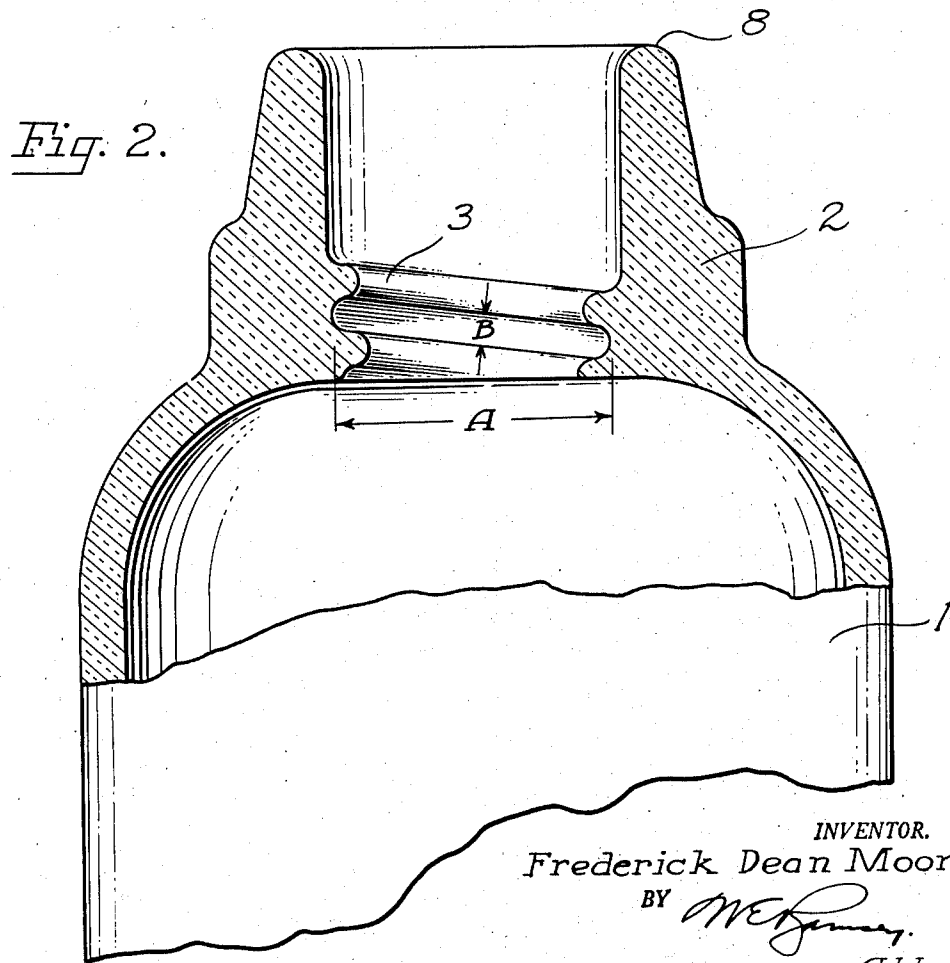
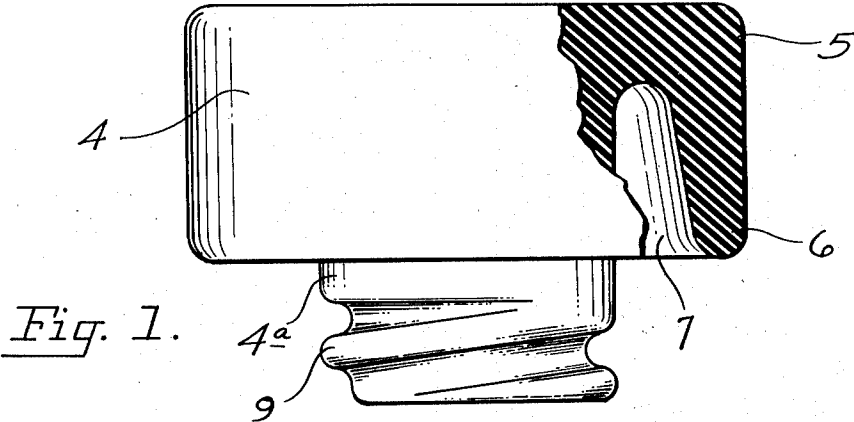


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F. D. MOORE
COMBINED CAP AND DISK
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COMBINED CAP AND DISK

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1

My invention relates to a container seal adapted to close the mouth of a container in which is stored a liquid or gas under pressure.

It is an object of my invention to provide such a pressure seal with a construction which permits the effecting and releasing of the seal by hand, thereby obviating the use of special instruments or tools.

It is a further object of my invention to provide a dustproof cap or crest on my pressure seal and to so construct the cap and seal that they are not destroyed by use whereby the same may be unscrewed to effect and release a seal many times over a prolonged period of time.

Seals for containers filled with liquids which are under pressure or of a highly volatile nature normally utilize either a soldered or crimped metal construction or a friction held, forcibly effected, cork stopper construction. Such constructions, however, have a common dual disadvantage, in that they require the use of can openers, bottle openers, punches or other special tools to release the seal and, once released, the seal cannot be again effected. My invention seeks to overcome this disadvantage by providing a complementary stopper and container construction which requires the use of no tools yet which can be reused an indefinite number of times.

In accordance therewith, it is a particular object of my invention to provide a pressure seal by constructing a container neck and a stopper therefor with complementary helical threads.

A further object of my invention is to construct the helical threads of a container neck of decreasing thread valley cross sectional area while constructing the complementary helical threads of an elastic stopper of uniform thread cross sectional area so that a force fit is effected as the stopper is rotated into seating relation within the container neck.

An additional object is to provide the helical threads of a container neck with a progressively decreasing root diameter while providing the threads of an elastic stopper with a uniform root diameter thereby effecting a force fit seal as the stopper is rotated into the container neck.

These and other objects and advantages of my invention will appear in the following detailed description with reference to the accompanying drawings, wherein:

Fig. 1 is a side view, partially in section, of the stopper of my invention; and

Fig. 2 is a side view, partially in section, of the container of my invention showing the helical threads of decreasing root diameter and decreasing thread valley cross sectional area.

The container 1 of my invention may be of any desired shape or configuration depending upon the use to which it is to be put. To facilitate a better understanding of my invention, I have

2

shown a container with a reduced neck portion 2 terminating in a rim portion 8. Within the neck portion 2, I have formed, as, for example, by molding, helical screw threads 3 for complementary cooperation with the screw threads on a stopper.

The elastic stopper 4 of my invention is shown removed from the neck of the container 1 to illustrate more clearly the complementary construction of these two parts. As is shown in Fig. 1, the top or crest portion 5 of the stopper 4 having a central plug portion 4a is constructed with an overhanging lip 6. The under cut or peripherally recessed portion 7 of the lip is thereby made to conform to the contour of the rim of the neck 8 of the container and to bound the latter. Such conformation serves to effect a dust-proof seal between the container neck and the stopper lip when the stopper is in place. Furthermore, since I prefer to form the recessed portion 7 of the lip 6 on my flexible stopper somewhat smaller than the rim of the neck 8 of the container, this construction allows the lip 6 to flex somewhat as the stopper is being turned into place, thus providing a dust-proof seal over the container rim.

On the lower or depending plug portion 4a of my stopper 4, I prefer to construct helical threads 9 for complementary engagement with the corresponding helical screw threads 3 in the container neck. In order to effect a pressure seal, however, I do not construct the helical threads on the stopper and the helical threads in the container neck identically, but instead, employ varying root diameters and thread cross sectional area imposed upon identical pitches. This construction is best illustrated by reference to Fig. 2 wherein the distance A is a typical root diameter. In my invention, this root diameter A is not uniform. Instead, progressing from the top of the helical thread to the bottom thereof, the root diameter A decreases. Similarly, as shown at B in Fig. 2, the width of each thread root or valley decreases as the thread progresses from top to bottom. This decrease in thread width presents a progressively decreasing cross sectional area to a stopper thread progressing therealong and causes the sides of the stopper threads to be compressed as they progress along the thread valley.

Stated differently, Fig. 1 indicates the manner in which the constant pitch helical threads 9 have a thread valley which is concave in cross-section and have a thread protuberance which is convex in cross-section. These thread valleys and protuberances are of uniform cross-sectional area. The constant pitch helical threads 3, on the other hand, are of progressively decreasing cross-sectional area, yet they too have thread valleys which are concave in cross-section and

thread protuberances which are convex in cross-section.

The threads 9 on the stopper 4, on the other hand, are of uniform diameter and of uniform cross sectional area. Furthermore, I prefer to construct my stopper 4 of an elastic or distortable yet tasteless material such as rubber or a tough, torsion resistant, plastic. This construction allows the threads on the stopper to be compressed and the main body portion of the stopper to be flexed as the stopper is turned into the complementary threads in the bottle neck.

In the operation of my device, the stopper 4 is inserted in the neck 2 of the container and rotated. As the helical threads 9 on the stopper progress along the complementary helical valleys in the screw threads 3 of the container, they meet with both a decreasing root diameter and a decreasing valley cross sectional area. At the same time, the top of the container neck 8 is meeting with a slightly decreased section of the under cut or recessed portion 7 of the stopper lip. Continuing rotations of the stopper cause the flexible lip and screw threads of the stopper to effect a dust-proof seal about the rim of the container neck and a pressure seal around the screw threads of the container neck respectively. At the precise instant that sufficient rotation has taken place to effect a pressure seal around the screw threads in the container neck, the top of the recessed portion 7 of the stopper will come to rest upon the rim of neck 8 of the container. Thus, a coaction between the screw thread seal and the recess portion seal is provided in the form of a stop or travel limit device, whereby the operational limit of travel of both seals is governed by the predetermined depth of the recess 7. With the stopper completely in place, these seals will hold true for a long period of time.

It should be noted, that any one of my three means of sealing can be used alone, together, or in combination. For purposes of illustration, I have shown an embodiment of my invention wherein all three means are used. These three means of effecting a seal are: (1) the decreasing root diameter of the helical screw threads, (2) the decreasing cross sectional area of the valley of the screw threads, and (3) the slightly decreasing width of the peripherally recessed portion of the stopper lip. My invention therefore comprehends within the scope thereof the use of any individual means of sealing, or the use of a combination of the means, or the concurrent cooperative use of all three means. The means or combination of means employed in a given construction will depend upon such variable factors as the pressure to be sealed and the protection therefore desired.

Another feature of my invention resides in the provision of a peripheral outline of the stopper 4 which is adapted easily to be grasped in the hand. Thus, while I contemplate the mechanized insertion of my stopper where large numbers thereof are employed, as for example, in large bottling plants, the stopper is equally as effective when inserted or removed by hand. If, for example, my invention is used in conjunction with carbonated beverages, the container seal will not only preserve the effervescence of the original contents, but will allow manual re-sealing of the container after a portion of the contents is used. Subsequent seals are as effective as was the initial seal and the complementary

stopper and container may be reused numerous times.

I claim:

1. A container seal, comprising a container having a neck carrying an internal helical thread having a thread valley which is concave in cross-section and thread protuberances which are convex in cross-section, said concave internal thread valley having a progressively decreasing cross-sectional area, and an elastic stopper carrying a complementary external helical thread having a thread valley which is concave in cross-section and thread protuberances which are convex in cross-section, said external thread valley and protuberances having a uniform cross-sectional area for compressibly coacting with the container neck internal threads.

2. A container seal, comprising a container having a neck carrying internal helical threads of progressively decreasing root diameter, said internal threads having thread valleys which are concave in cross-section and thread protuberances which are convex in cross-section, said internal thread valley having a progressively decreasing cross-sectional area, and an elastic stopper with complementary external helical threads of uniform root diameter, said external threads having thread valleys which are concave in cross-section and thread protuberances which are convex in cross-section, said external thread having a uniform cross-sectional area for compressibly coacting with the container neck threads.

3. A dust-proof container seal, comprising a container having a neck with a marginal rim portion and with a constant pitch internal helical thread having a thread valley which is concave in cross-section, said internal thread valley having a decreasing cross sectional area progressing toward the container neck base, and an elastic stopper compressed in the container neck, said stopper comprising a central plug portion and a crest portion joined to one end thereof, the plug portion peripherally carrying an external constant pitch complementary thread with thread protuberances which are convex in cross-section and which have a uniform cross-sectional area, said crest portion having a lip overlying the container neck and extending about the marginal rim portion thereof.

4. A dust-proof container seal, comprising a container having a neck with a marginal rim portion and with internal helical threads which progressively decrease in root diameter, said internal threads having thread valleys which are concave in cross-section and thread protuberances which are convex in cross-section, said internal thread valley having a progressively decreasing cross-sectional area, and an elastic stopper compressed in the container neck, said stopper comprising a central plug portion and a crest portion joined to one end thereof, the plug portion having external complementary threads of uniform root diameter, said external threads having thread valleys which are concave in cross-section and thread protuberances which are convex in cross-section, said external thread having a uniform cross-sectional area, the stopper crest portion having a dust protector lip overlying the container neck.

5. A dust-proof container seal, comprising a container having a neck with a marginal rim portion and with constant pitch internal helical threads progressively decreasing in root diameter, said internal threads having a thread valley which

5

is concave in cross-section, the cross-sectional area of said concave valley progressively decreasing toward the base of said container neck, an elastic stopper sealingly compressed in the container neck, said stopper comprising a central plug portion and a crest portion joined to one end thereof, said stopper plug portion carrying constant pitch external complementary helical threads of uniform root diameter, said external threads having lateral thread protuberances which are convex in cross-section, the cross-sectional area of said external thread protuberances being uniform, the stopper crest portion having formed thereon a peripheral flexible lip means for rotary actuation of said stopper, and an inverted peripheral recess means, concave in cross-section formed between said stopper crest portion and said flexible lip means for encompassing and sealing the marginal rim portion of said con-

6

tainer neck, said peripheral recess having a progressively decreasing cross-section toward said stopper crest portion to flex said lip means and cause the lip to seal tightly said marginal rim portion.

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