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BOTTLE STOPPER

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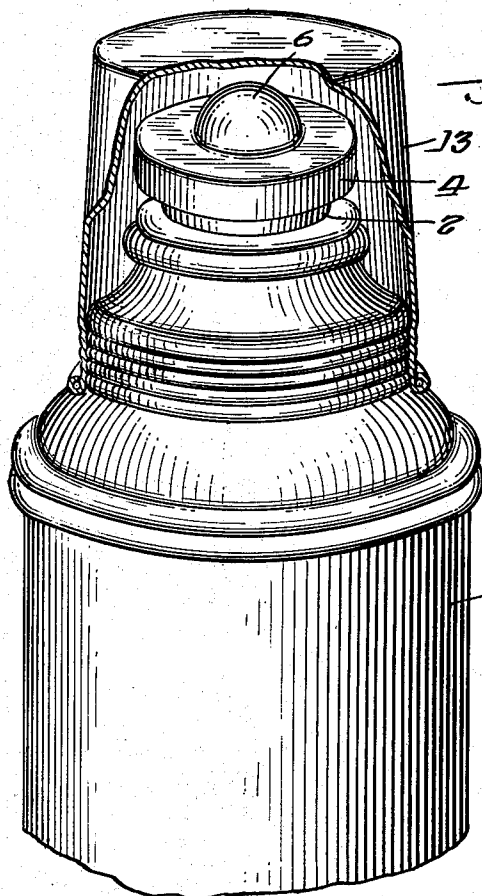


Fig. 1

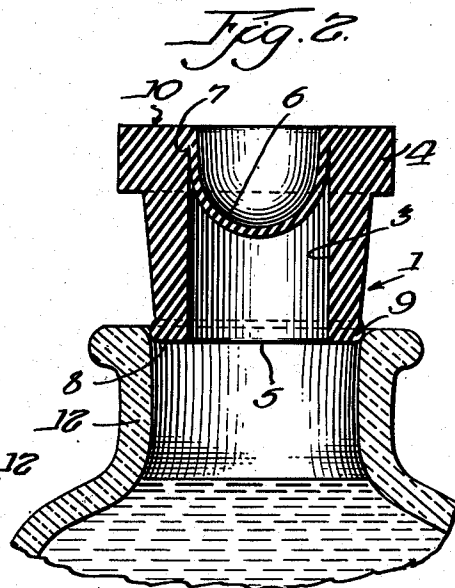


Fig. 2

Fig. 4

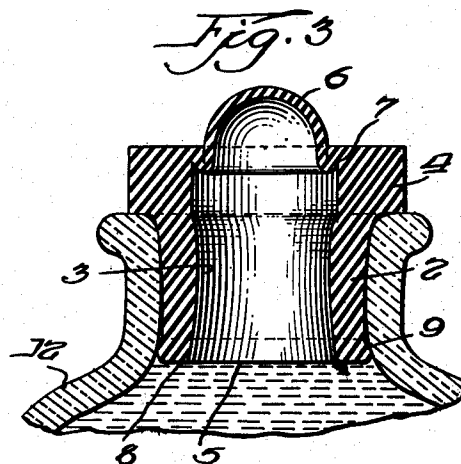
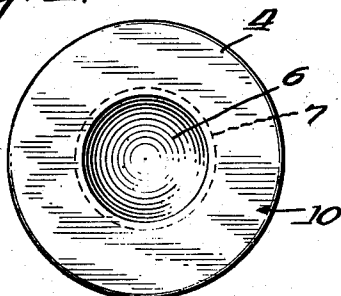


Fig. 3

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BOTTLE STOPPER

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2 Claims. (Cl. 215—47)

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My invention belongs to that general class of sealing stoppers or corks, and particularly to an improved cork or stopper for containers, the same being particularly designed for use on vacuum bottles or the like, its use, however, not being confined to vacuum bottles.

The invention has among its objects the production of a simple, convenient, durable, sanitary and inexpensive sealing device or closure for use wherever the same may be found applicable.

More particularly, the invention has as an object the production of a device of the kind described of yieldable, resilient or elastic material of cylindrical formation provided with a tubular bore open at the bottom and closed at the outer or top end by a diaphragm, movable out of or into the bore upon applying or removing the cork from the bottle, whereby the cork may be readily applied or removed from the container as hereinafter described.

The same has particularly as an object a closure of the kind described which may be readily removed from the container in which hot liquids have been placed and which may have cooled to a more or less extent, tending to create a vacuum in the bottle or container, making it more or less difficult to remove the same from the container. Likewise, in applying the cork to a bottle, the cork may be readily pushed into the bottle neck, any air or fluid pressure at the inner or bottom end of the cork being relieved by the air or fluid moving into the tubular bore of the cork.

A further object is the production of a closure or cork of the kind described which is sanitary in that it will not absorb the liquid and retain it whereby the cork may possibly become sour, smell or become rancid, and which cork may be readily washed and even boiled or sterilized without disintegration.

While the use of the cork is not limited to vacuum bottles, it has particularly as an object the production of a cork for such bottles commonly known as Thermos or like bottles which may be carried in lunch kits or pockets, the cork at all times efficiently and tightly sealing the vacuum bottle so that the heat is retained therein and leakage prevented when the bottle is laid on its side or up ended.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel

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construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawing, wherein like reference characters indicate like or corresponding parts:

Fig. 1 is a perspective view of a cork or closure applied to a Thermos bottle, only a portion of the bottle being shown;

Fig. 2 is a sectional view through the preferred form of the closure, the diaphragm positioned within the bore of the cork;

Fig. 3 is a similar view showing the diaphragm extended outwardly of the bore; and

Fig. 4 is a top view in elevation.

As illustrated, the cork, generally indicated by the numeral 1, consists of a body 2 of semi-elastic material such as rubber, having an interior bore 3 and a flange 4 at the top, the body being open at the bottom as indicated at 5. The bore is closed at the top by a flexible diaphragm 6 preferably formed integrally with the body. The body portion 2 is preferably of some thickness but compressible, and the diaphragm 6 is of a substantially reduced thickness so that it is readily flexible, the thickness of the material at 7 at the outer end of the bore being substantially equal to the thickness of the diaphragm in the preferred construction.

The transverse area of the bore is preferably greater than the area of the bottom face 8 of the body. In the preferred construction the body member 2 is increased in diameter by a bead 9 at the inner end. As shown in Fig. 2, the material at the juncture of the diaphragm and body at the flange 4 is preferably spaced back from the top face 10 of the flange. The diaphragm 6 is of such flexibility that it may be drawn or pushed into the bore 3 as shown in Fig. 2 or be pushed outwardly as shown in Fig. 3. I have shown the cork or stopper in connection with a vacuum bottle 12, it being understood that 12 represents any type of bottle or container, the cork being designed or proportioned to closely fit the inner wall of the neck of the bottle when the same is inserted in the bottle neck.

Assuming that the bottle is filled with liquid to a reasonable fullness, allowing for a cork to be inserted, the inner end of the cork is moistened, either by applying water thereto or by placing it in position to enter the bottle whereupon the bottle may be tipped so as to allow the liquid to wet the inner wall of the bottle neck. The cork may be readily seated by placing the thumb and first finger around the top of the cork, pressing it down firmly into the bottle with a

slight turning action. As the cork is pressed down into position, the trapped liquid and compressed air below will force the diaphragm at the inside of the cork to become an enlarged bulb on the top of the cork as illustrated in Fig. 3.

Assuming that the vacuum bottle is filled with hot liquid to a reasonable fullness allowing the cork to be inserted, in a short time a partial vacuum formed from the loss of heat from the contents of the bottle as the liquid cools will produce a suction on the lower portion of the cork, drawing it more tightly into the bottle. It will be obvious that the cork may be readily applied to the bottle and pushed into seating position as the trapped liquid or compressed air due to action of the diaphragm will not cushion the cork and resist its insertion in the bottle neck.

The bulb formed by the diaphragm at the outer end of the cork is not deflated by the vacuum when the contents of the bottle cools because the aperture into the bulb is of less superficial area than the lower or end portion of the cork. The cork may be readily removed from the bottle by the thumb and forefinger with a slight turning action and in most instances the diaphragm returns to its position inside the body of the cork as the cork is withdrawn. If, however, there is any hesitation, a slight touch of the bulb with the finger will cause the diaphragm to snap back into the bore.

From the foregoing it will be obvious that the insertion of the cork in the bottle neck is not opposed or resisted by the air or liquid pressure inside the container so that it may be fully seated and firmly grip the inner wall of the bottle neck. Obviously, the removal of the cork in the manner mentioned may be facilitated by the diaphragm being drawn inwardly by the air in the bulb breaking the vacuum. While the cork and diaphragm may be constructed of any suitable material, I prefer to use firm but pliable rubber which is sanitary since it will not absorb the liquid and become sour or rancid, which cork may be readily sterilized without disintegration. The body and diaphragm being of integral construction, the cork may be economically manufactured and of course in sizes to fit the particular bottle with which the same is to be employed. I wish to be understood, however, that the body of the cork and the diaphragm need not be integral as shown, but the integral construction is fool-proof, automatic in operation and for reasons of economy in manufacturing is preferred.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. An elastomeric bottle stopper of the kind described comprising an elongated elastic annular body having an enlarged flange at the outer end and a bead on the periphery thereof at the opposite end and provided with a tubular bore extending from end to end of the body, and an elastic substantially hemispherical diaphragm molded integrally with the body of the stopper at the outer end of the bore, the normal overall outer surface area of said diaphragm being less than the inner surface area whereby the diaphragm is normally biased within the tubular bore, said diaphragm being flexible and substantially thin so as to extend out of or into the body of the stopper to increase or decrease the interior fluid capacity of the bore, said diaphragm formed contiguous to the bore and adjacent the outer face of the flange, whereby said diaphragm under internal pressure is adapted to flex outwardly in a substantially spherical shape so that a portion of the outer surface thereof is in contact with the bore contiguous thereto, and said diaphragm under externally applied pressure after being flexed outwardly adapted to flex inwardly into its normally biased substantially spherical shape so that a portion of the inner surface thereof is in contact with the bore contiguous thereto for ease in removal of the stopper from the bottle.

2. A bottle stopper of the kind described comprising an elongated elastic annular body provided with a tubular bore extending from end to end of the body, and an elastic substantially hemispherical diaphragm molded integrally with the body of the stopper at the outer end of the bore and said diaphragm being normally retained within the tubular bore, said diaphragm being flexible and substantially thin and adapted as molded to extend out of or into the body of the stopper, the normal overall outer surface area of said diaphragm being less than the inner surface area thereof whereby the diaphragm is normally biased within the tubular bore under non-use conditions of the stopper yet adapted to be extended out of the stopper by any applied internal pressure greater than the biasing force normally retaining the diaphragm within the tubular bore, and the hemispherical diaphragm together with the tubular bore allowing lateral deformation of the annular body and diaphragm during the insertion and removal of the stopper.

GEORGE A. KIMBER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
267,349	Hupfel	Nov. 14, 1882
1,130,611	Keeran	Mar. 2, 1915
1,814,141	Fox et al.	July 14, 1931
2,040,798	Schoonmaker	May 12, 1936
2,266,270	Roth	Dec. 16, 1941
2,353,674	Kimber	July 18, 1944