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R. J. WILLIAMS

3,437,224

VIAL CLOSURE

Filed Jan. 18, 1967

FIG. 1.

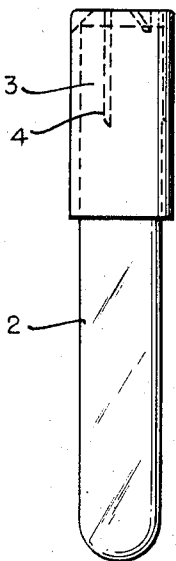


FIG. 2.

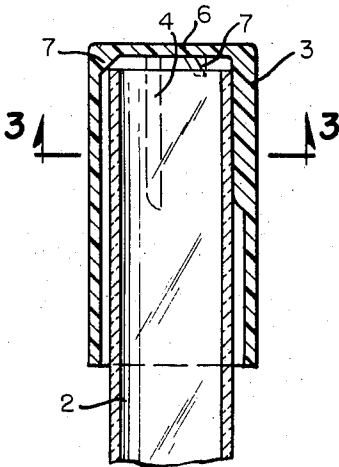


FIG. 3.

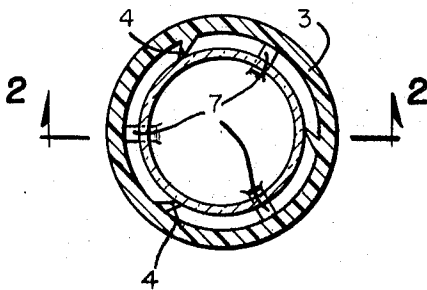
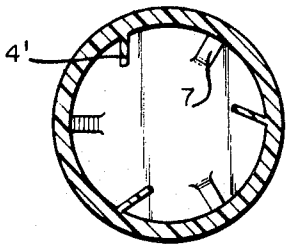


FIG. 4.



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VIAL CLOSURE

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1 Claim

ABSTRACT OF THE DISCLOSURE

A one-piece molded plastic closure or cap is provided for vials, such as are used to hold biological cultures, the cap fitting over the end of the vial in such a manner as to allow some access of air from the outside, but through a tortuous path, and being arranged to prevent contamination of the culture from the external atmosphere. The cap is provided with centering fins and stop elements which prevent the cap from completely sealing the culture, and which keep the vial centered within the cap, but out of contact with the major portion of the walls thereof, in order to allow the passage of air.

It has long been the practice to plug up the vials used for holding bacteriological cultures with a plug of absorbant cotton, which provides a tortuous path for air, thus enabling the culture to obtain the necessary air, but at the same time tends to keep out any contaminating influences from the external atmosphere. The present invention provides a substitute for this cotton plug, in the form of a sleeve-type plastic cap which fits over the top and outside of the vial, the cylindrical walls of the cap being kept out of contact with the vial by flexible fins integral with the interior wall of the cap, which tend to center the cap and to provide the small clearance necessary so that a tortuous path for the air is provided which allows "breathing" of the culture, but which prevents the access of contaminants from the external atmosphere. Stops are similarly provided near the top of the cap to prevent the rim of the vial from closely engaging the top of the cap, which would prevent the access of air. The plastic cap is an inexpensive molded unit which is sterile in its new condition, and can be readily resterilized if desired or can be thrown away after use because of the very low cost of the cap.

DESCRIPTION OF THE INVENTION

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings, in which:

FIG. 1 is a view of a vial provided with a cap according to the invention;

FIG. 2 is a sectional view of the cap and top portion of the vial, taken on line 2—2 of FIG. 3;

FIG. 3 is a sectional view taken on line 3—3 of FIG. 2; and FIG. 4 is a sectional view similar to FIG. 3, showing the cap without the vial.

Referring to FIG. 1, a glass vial 2, of the type commonly used in biological and bacteriological laboratories for holding specimens and cultures, is provided with a plastic cap 3 according to the invention. As shown in FIGS. 2 and 3, the cap is provided with a number, preferably three, of equally spaced axially extending fins 4 in the form of thin plastic vanes which extend out from the interior wall of the cylindrical portion of the cap at a slight angle, so that when a glass vial is inserted, the vanes will be bent as shown in FIG. 3, in such a manner as to maintain the vial centered with respect to the cap, and out of contact with the walls of the cap, and thereby

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providing a narrow passage between the inner wall of the cap and the outer wall of the vial, the cap being properly dimensioned for this purpose. The vanes also provide sufficient frictional force to retain the cap against accidental displacement, although the friction fit is made such that the cap can easily be put on or removed by hand. If the vial were allowed to come in contact with the top wall 6 of the cap, then the top of the vial might be sealed to an undesirable extent. To prevent this, and to provide the proper clearance for passage of air, angular stops 7 are provided between the top and side wall of the cap. It will be understood although three of these stops are shown, there could if desired be four or more such stops and a similar number of fins provided.

The fins 4 may either be made as rather thin vanes, as shown in FIG. 4, or may be somewhat tapered in cross section, or feathered, as shown in FIG. 3, the important thing being that they are made sufficiently flexible to yield when the vial is thrust into the cap, but with sufficient stiffness to hold the cap centered, and to keep it firmly in place.

It will be seen that the cap thus provides a narrow, tortuous path for air which permits the desired amount of "breathing," and permits the slow access of air to the inside of the vial, but since any contaminants in the air tend to drift slowly downward, even when they are very small in size, the likelihood of any such contaminants being able to travel up the very thin annular channel provided between the cap and the vial is reduced to a minimum. Similarly, any possible dangerous contaminating material within the vial is prevented from reaching the exterior atmosphere.

I claim:

1. A unitary molded plastic cap for a cylindrical vial,
 - (a) said cap comprising a cylindrical side member having a diameter slightly larger than a vial to be capped, and
 - (b) a top member closing one end of the cylindrical side member, the other end being open,
 - (c) a series of three thin, equally spaced flexible fins, extending inwardly from the inner side of the cylindrical side member for a sufficient radial distance to engage the outer wall of the vial within the cap and to keep the outer wall of the vial spaced from the inner wall of the cap,
 - (d) said fins extending inwardly at an angle away from a radial line between the base of the fin and the central axis of the cap, such that the insertion of a vial end into the cap tends to bend each fin so that its edge lies closer to the side wall of the cap than in the unflexed condition, and
 - (e) three equally spaced stops between the top of the cap and the rim of an inserted vial for keeping the rim of the vial out of sealing contact with the top of the cap, each said stop being a small plastic projection extending between the side and top at a sloping angle so as to maintain the vial rim centered and spaced from the top of the cap, said stops being respectively centered between the fins.

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