

March 20, 1962

L. H. GILLON
BOTTLE STOPPER

3,025,991

Filed May 23, 1960

FIG. 1 -

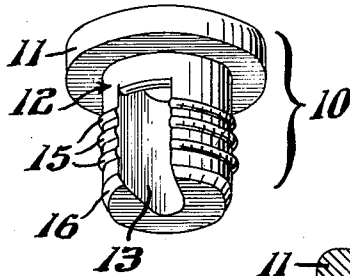


FIG. 2 -

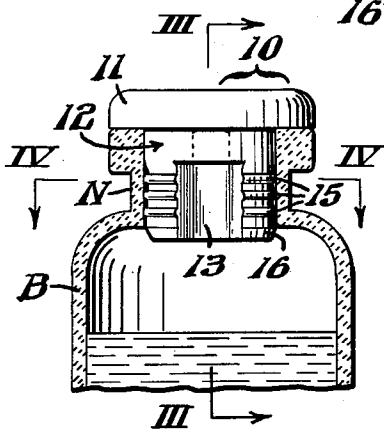


FIG. 3 -

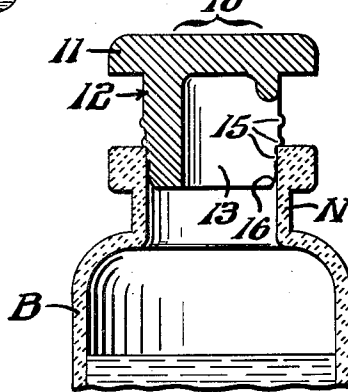


FIG. 5 -

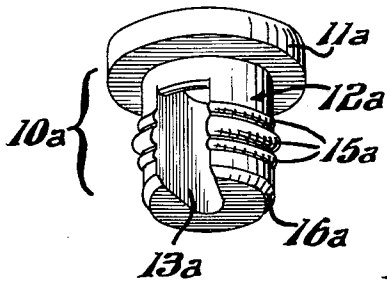


FIG. 6 -

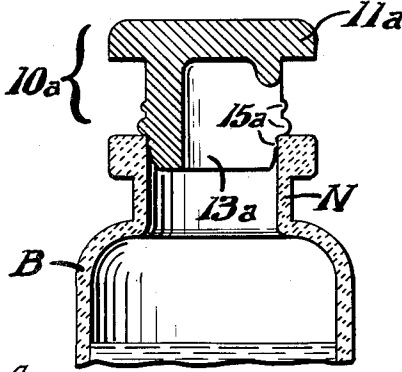
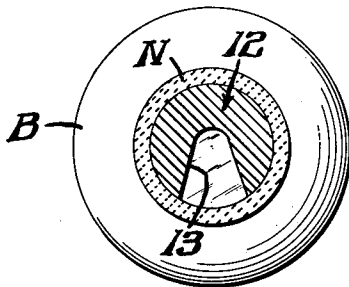


FIG. 4 -



INVENTOR.
James H. Gillon,
BY *Paul & Paul*
ATTORNEYS.

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3,025,991

BOTTLE STOPPER

James H. Gillon, Bala Cynwyd, Pa., assignor to Carron Products Co., Philadelphia, Pa., a firm
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2 Claims. (Cl. 215—56)

The invention relates to resilient stoppers for use with bottles or vials, which are or may be used for various types of parenteral solutions or the like. It relates particularly to a resilient stopper possessing particular configurations that render it satisfactory for application to bottles or vials either by hand or by automatic stoppering machines.

It is an object of my invention to provide a resilient stopper especially suitable for facilitating evacuation of gases or vapors from bottles or vials developed during the lyophilizing, or freeze-drying of pharmaceutical, biological or other products produced by this method of manufacture.

An additional object of my invention is to provide a resilient bottle or vial stopper having a membrane which may be readily pierced by a hypodermic needle or the like, when the product is to be administered and which will re-seal subsequently to prevent contamination of that portion of the product remaining in the bottle or vial.

Other objects of the invention are to provide a resilient stopper with a substantially cylindrical plug or body portion of a larger diameter than the neck opening in the bottle or vial with which the stopper will be used; with a flange or head extending from the outer end of the stopper to afford a surface for effectively sealing the bottle or vial by the application of an aluminum seal or other standard type of seal. Such seals are well known to those skilled in the art.

Another important object of the invention is to provide a stopper with one or more ribs on the plug portion thereof, which ribs may be uniformly or irregularly spaced and of the same or lesser diameter and thickness. Such ribs may be used as stops to control the depth of insertion of the stopper into the bottle or vial, thereby controlling the size of the opening afforded to permit the flow of gases in processing or the speed of evacuation prior to full insertion of the stopper to close the bottle or vial.

Further object of the invention is to provide a resilient, readily compressible stopper for bottles or vials with an opening in one side of the cylindrical plug portion which, when partially inserted, will permit the free flow of air into or from the container.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein:

FIG. 1 is a perspective view of a stopper embodying my invention in one form;

FIG. 2 is a view fragmentarily showing a bottle or vial in section with a stopper of FIG. 1 in place and in elevation;

FIG. 3 is a section taken as indicated by the angled arrows III—III in FIG. 2 with a stopper partly withdrawn;

FIG. 4 is a cross section taken as indicated by the angled arrows IV—IV in FIG. 3;

FIG. 5 is a perspective view of a modified form of the stopper; and

FIG. 6 is a view similar to FIG. 3 showing the modified stopper partially inserted into the bottle or vial.

With more detailed reference first to FIGS. 1—4 of these drawings, the stopper of my invention in the form there illustrated is comprehensively designated by the numeral 10. It is to be understood that the stopper is molded or otherwise fashioned in practice, of rubber or

other suitably resilient material. As shown, the stopper 10 has a flat head 11 and a generally cylindrical plug portion 12 of smaller diameter pendent from said head, said plug portion having a relatively narrow radial slot 13 with flared or splayed sides extending vertically from the bottom of the plug portion to said head, and horizontally to an appropriate distance into one side of said plug portion but sufficiently short of the other side to avoid weakening the opposite wall area. As shown further, the body portion 12 of the stopper is provided with an uneven number (in this instance 3) of spaced circumferential beads or ridges 15 and its bottom edge is rounded or beveled off as at 16. The diameters of the body portion 12 of the stopper and of the ridges 15 are somewhat larger than the internal diameter of the neck N of the bottle B, however, so as to engage tightly into the neck with a tight compression fit, and with the flange projection of the head 11 bearing fluid seal tight against the mouth top of the bottle or vial. For release of air or gases from the bottle, the stopper 15 is partially inserted for exposure of the portion of the side vent slot 13 above the bottle mouth with one or the other of the circumferential ridges 15 stopped against the top of the bottle mouth as instanced in FIG. 3. Ordinarily, the mid-ridge of the group 15 is used to limit the extent to which the stopper is inserted during lyophilizing, or freezing, or drying of pharmaceutical biologicals or other products with which the bottle or vial is filled. It is to be noted that the thickness of the membrane between the top of the cap and the hollow 13 of the plug portion 12 is such that it is easily penetrated by a hypodermic needle when some or all of the contents of the bottle or vial are to be withdrawn. It is to be further noted that the flaring or splaying of the sides of slot is advantageous in that it does not impede outward flow of the gases or vapors from the bottle or vial.

Modified stopper illustrated in FIGS. 5 and 6 differs from the first described form only in that the mid-ridge 15a on the plug is thicker and larger in diameter than the other ridges. Therefore, in order to obviate the necessity for repetitive description, all of the other elements in the modification having their counterparts in the first described embodiment have been identified by the same reference numerals previously used with addition, however, in each instance of the letter "a" for convenience of more ready distinction.

Having thus described my invention, I claim:

1. As a new product of manufacture, a bottle stopper of resilient material having a flat circular head, and a coaxial pendent cylindrical plug extension adapted to engage into the mouth of the bottle with a compression fit, said extension having a radial slot which flares outwardly from the center of the stopper and terminates short of the head, and being provided with at least three outwardly projecting circumferential stop ribs for selective engagement with the top of the bottle mouth to determine different positions of insertion for the stopper.

2. A bottle stopper characterized as in claim 1, in which the ribs are three in number and of which ribs the center one of the group is wider and projects outwardly to a greater extent than the others.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,025,991

March 20, 1962

James H. Gillon

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the drawings, line 1, name of inventor, for "L. H. GILLON" read -- J. H. GILLON --.

Signed and sealed this 17th day of July 1962.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents