

May 23, 1967

R. W. OGLE

3,321,098

VIAL

Filed June 29, 1965

FIG. 1

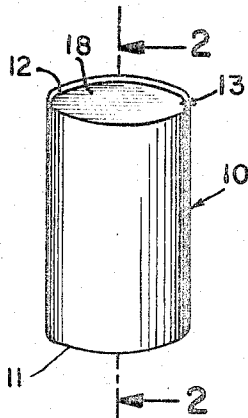


FIG. 3

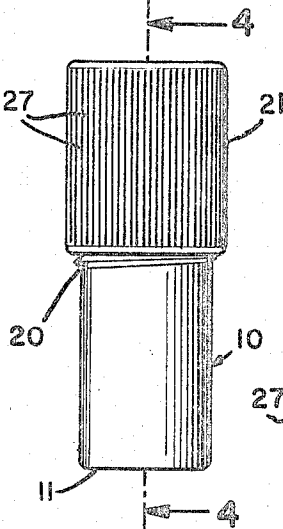


FIG. 2

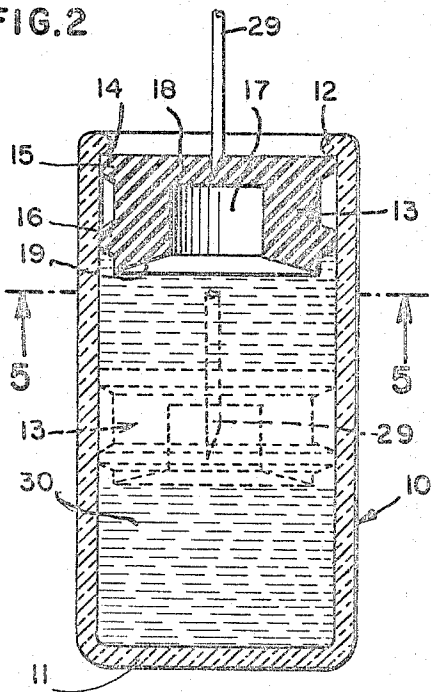


FIG. 4

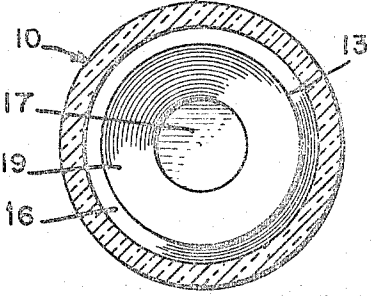
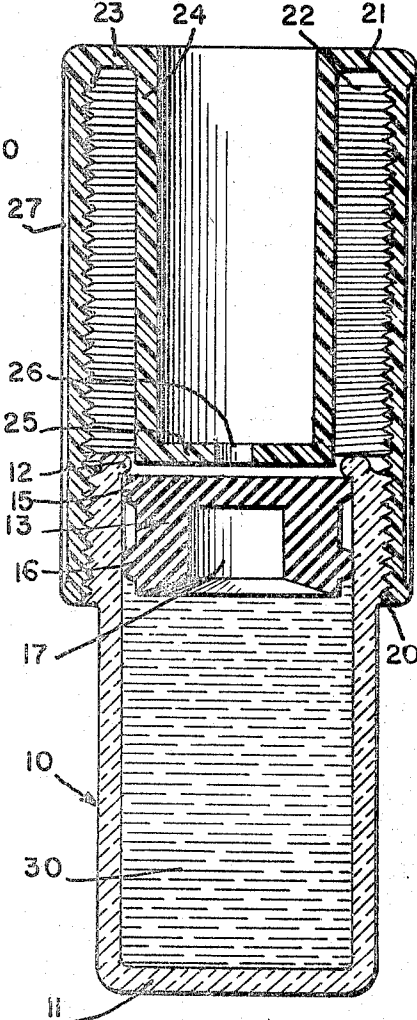


FIG. 5

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3,321,098

VIAL

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Filed June 29, 1965, Ser. No. 467,858
3 Claims. (Cl. 215—37)

This invention relates to a vial and more particularly to a multiple dose vial of a type normally supplied by pharmaceutical manufacturers to physicians, hospitals and the like, for the containing of injectable medicaments.

Most injectable medication is packaged in multi-dose glass containers sealed by an immovable rubber stopper, further held in place by an aluminum seal. To withdraw a dose, the physician's practice is to take a sterile syringe and inject into such vial an amount of air equal to the liquid dose to be removed. Obviously this introduction of non-sterile air into the vial contaminates said vial. Each successive withdrawal adds to this contamination. Though drug manufacturers, recognizing this contamination, provide in each vial a preservative, it has been found that in cases of severely contaminated air this preservative becomes ineffective at least by the seventh, eighth, or ninth withdrawal.

The primary object of this invention is to provide a vial for the packaging of injectables where the withdrawal of same is accomplished without the necessity of adding air to accomplish such withdrawal.

This invention differs from the existing vials in that the stopper is movable, rather than immovable. The stopper is provided with rings of a greater diameter than the inner diameter of the vial so as to preserve sterility and preclude the possibility of leakage.

The physician inserts no air, but merely pulls back on the syringe plunger and as the syringe fills with the liquid, thus creating a vacuum within the vial, such vacuum acting upon the stopper in such a way as to draw it forward for a distance equal to the displacement of the liquid being withdrawn.

A further object of this invention is to provide the movable stopper above referred to so that after one or more doses have been removed from the vial the resulting space which is left in the vial can be filled and will be filled by the downward movement of the stopper and in the event that the rings on the stopper provides such resistance as would resist the downward movement of the stopper in the device shown in FIGURE 2 the stopper may then merely be pushed downwardly by the thumb of the operator to occupy the evacuated space or in the device of FIGURE 4 the screw cap may be turned to press the stopper down, in which, of course, mechanical advantage is derived by the pitch of the screw to aid in forcing the stopper into the evacuated space.

These and further objects, features and advantages will be apparent from the annexed specification in which:

FIGURE 1 is a perspective elevation of a vial embodying the present invention;

FIGURE 2 is an enlarged vertical section taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a perspective elevation of a modification of the invention;

FIGURE 4 is an enlarged vertical section taken on the line 4—4 of FIGURE 3; and

FIGURE 5 is a section taken on the line 5—5 of FIGURE 2.

Referring now more particularly to the drawings the invention is illustrated as including a vial 10 preferably made of glass and having a closed bottom end 11. The upper end of the vial is open and the upper wall of the cylindrical vial 10 is preferably curled inwardly as at 12, although in certain cases this will be omitted.

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A stopper 13, preferably formed of natural or synthetic rubber is provided and has a flat top 14. An upper outstanding ridge 15 is spaced from a lower outstanding ridge 16. The stopper 13 is provided with a central bore or cylindrical opening 17 having a thin upper wall 18. If desired the bottom of the stopper 13 may have beveled bottom end walls 19, as shown.

The stopper 13 is, of course, resilient, and in their extended condition the diameter of the ridges 15 and 16 is greater than the internal diameter of the vial 10 so that in use the ridges present a press fit in the vial, sufficient to securely close the vial against the admission of air or other contamination but insufficient to prevent sliding of the stopper 13 downwardly in the vial 10 when air is withdrawn therefrom.

In FIGURES 3 and 4 there is shown another embodiment of the invention in which the upper end of the vial 10 is provided on its exterior with male threads 20 and a cap 21 of generally cylindrical shape the inner walls of which carry female threads 22 adapted to mate with the threads 20, as shown in FIGURE 4.

The cap 21 has an upper annular wall 23 from which depends a cylindrically formed member 24 terminating in an inwardly extending bottom wall 25 having a centrally disposed opening or hole 26 therein. The exterior of the cap 21 may be knurled as at 27.

In use the vial 10 will be filled or substantially filled with a sterile injectable medicament 30. If the user, commonly a physician or nurse, desires to use the invention a syringe of the type having a barrel and a plunger, such as is shown in Ogle Patent No. 2,700,386, may be inserted with the needle 29 piercing the thin wall 18 and having its plunger fully pushed to the bottom of the barrel, thus excluding all air from the barrel of the syringe. The operator then pulls back upon the syringe plunger and draws fluid 30 from the vial. Referring to FIGURE 2 the extraction of fluid 30 from the vial 10 will cause the stopper 13 to pass downwardly as shown in dotted lines in FIGURE 2 to occupy the space vacated by the fluid extracted. If the press fit of the ridges 15 and 16 is too tight to permit mere atmospheric pressure to thus depress the stopper 13 it can be aided by finger pressure on the flat top 14 or by the means provided in the alternative embodiment of FIGURES 3 and 4.

In the embodiment of FIGURES 3 and 4 the device is operated as before except that the syringe needle 29 is inserted through hole 26 as well as wall 18 and if more pressure is needed to depress stopper 13, cap 21 is turned, forcing wall 25 to engage the flat top 14 of the stopper and thereafter to depress the stopper to the limit imposed by the remaining fluid. It will be appreciated that proper selection of pitch for the threads 20 and 22 will provide for any desired mechanical advantage to assist in depressing stopper 13. As a matter of fact after the needle of the syringe has punctured the wall 18 in the device shown in FIGURES 3 and 4 and become immersed in the fluid 30 turning of the cap 21 to exert pressure on the stopper 13 will force fluid 30 upwardly into the needle and into the syringe and continued application of such pressure will force such fluid into the syringe so as to automatically raise the plunger of the syringe as the fluid enters the syringe with the result that the syringe may be filled with the desired dose without any force ever being applied by the operator to withdraw the plunger of the syringe.

While there has been described what is at present considered are preferred embodiments of the present invention, it will be appreciated by those skilled in the art that various changes and modifications can be made therein without departing from the essence of the invention and it is intended to cover herein all such changes and modifications as come within the true spirit and scope of the appended claims.

I claim:

1. A single compartment medicament vial comprising a cylindrical container of substantially uniform diameter having a closed end and an open end, said container being adapted to contain an injectable medicament; a resilient stopper in said open end having ridges forming a sealing engagement with the inner walls of said container and a relatively thin portion adapted to be pierced by a syringe needle; and the ridges on said stopper exerting a friction force against the inner walls of said container less than the normal atmospheric force on the top of said stopper, said stopper being slidable downward in said container upon withdrawal of a portion of said medicament under the influence of normal vacuum.

2. A medicament vial as set forth in claim 1 wherein said cylindrical container is turned over and inward at its upper edge.

3. A single compartment medicament vial comprising a cylindrical container of substantially uniform diameter having a closed end and an open end, said container being adapted to contain an injectable medicament; a resilient stopper in said open end having ridges forming a sealing engagement with the inner walls of said container and a relatively thin portion adapted to be pierced

by a syringe needle, the ridges on said stopper exerting a friction force against the inner walls of said container less than normal atmospheric force on the top of said stopper, said stopper being slidable downwardly in said container upon withdrawal of a portion of said medicament under the influence of normal vacuum; and said cylindrical container having male threads formed on its outer wall adjacent the open end thereof and a cap thereover having female threads engageable with said male threads and another portion engageable with said stopper to exert downward pressure on said stopper upon turning of said cap to thread said cap downwardly over said vial.

References Cited by the Examiner

UNITED STATES PATENTS

Re. 25,113	1/1962	Wilburn	128—218
2,562,129	7/1951	Scherer	128—272 X
2,706,479	4/1955	Lockhart	128—272 X
3,198,194	8/1965	Wilburn	128—272

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