March 5, 1957 C. B. ROBERTS 2,783,909

STOPPER FOR AMPOULES AND THE LIKE

Filed April 19, 1954

Fig. 1.

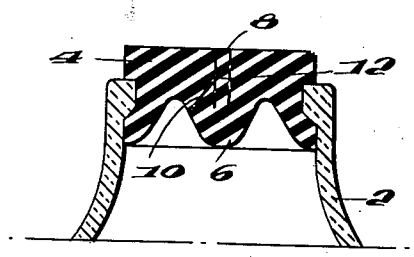


Fig. 3.

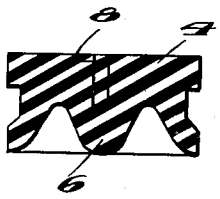


Fig. 2.

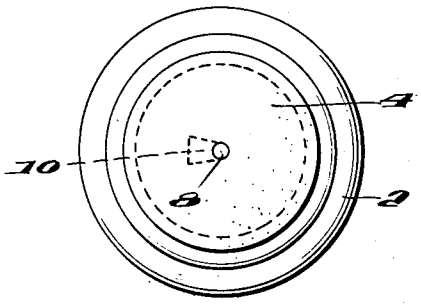


Fig. 4.

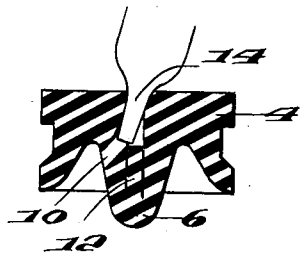


Fig. 5.

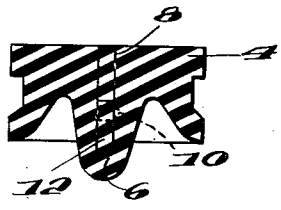
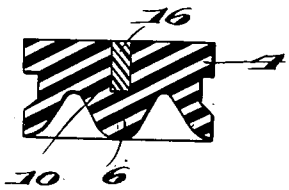


Fig. 6.



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2,783,909

STOPPER FOR AMPOULES AND THE LIKE

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Application April 19, 1954, Serial No. 424,202

5 Claims. (Cl. 215—74)

The invention relates to container closures, and more especially to stoppers for ampoules containing pharmaceutical materials intended for hypodermic injection.

It is the usual practice to package pharmaceutical preparations intended for hypodermic injection in ampoules closed by a rubber stopper or diaphragm which is pierced by the hypodermic needle when all or a part of the contents are to be administered. I have found that there are often undesirable reactions, not attributable to the contents of the ampoule, when pharmaceuticals so packaged are injected hypodermically into the patient. Close examination shows that the hypodermic needle, in piercing the rubber diaphragm, often tears or cuts off tiny particles of rubber which enter the solution or suspension within the ampoule and may then be drawn into the syringe and administered to the patient along with the intended medicine. Rubber is such a foreign substance that it can cause considerable discomfort and serious disturbance of the system.

The primary object of the invention is to provide an arrangement which avoids the disadvantages of the prior art.

Another object of the invention is to provide an arrangement which is normally tightly sealed, but which can be manipulated so that fluid can be withdrawn from the interior of an ampoule without the necessity of piercing a piece of rubber.

Still another object of the invention is to provide such an arrangement in which the opening through which the liquid is withdrawn can be again tightly closed after the withdrawal, so as to prevent contamination of the material remaining in the ampoule.

Further objects and advantages of the invention will appear more fully from the following description especially when taken in conjunction with the accompanying drawings which form a part thereof.

In the drawings:

Fig. 1 shows in closed section a stopper embodying by invention in closed position.

Fig. 2 is a top plan view thereof.

Fig. 3 is a cross-sectional through the stopper at right angles to Fig. 1.

Fig. 4 shows the stopper in open position, in section similar to Fig. 1.

Fig. 5 is a view similar to Fig. 4 at right angles thereto, and

Fig. 6 is a view similar to Fig. 1 showing a modified form of stopper.

The stopper of the invention is formed primarily of rubber or some other elastic material which is adapted to fit into the neck 2 of an ampoule or other bottle. The stopper 4 has a central downward projection 6. Cut into the top of the stopper and extending downwardly in the direction of the projection, but terminating short of the lower surface of the projection, is an annular cut or slit

8. A second slit 10 extends from the side wall of the projection to the wall of the slit 8. The space within the annular slit is filled, in the form shown in Fig. 1 by an integral part of the stopper indicated at 12.

With such an arrangement, it is possible to withdraw liquid from the interior of the ampoule without piercing the rubber thereof. As shown in Figs. 4 and 5, the projecting end 14 of a hypodermic syringe (that is, the portion on which the needle hub is ordinarily mounted) is pushed down on the portion 12 and depresses it downwardly through the resiliency of the rubber to the position shown in Figs. 4 and 5. This causes the slit 10 to open up, and provides communication with the interior of the ampoule. By turning the ampoule over so the liquid stands in the top part thereof, such liquid can be withdrawn into the syringe by pulling back to piston to any desired degree.

When the syringe is withdrawn, the resiliency of the rubber restores the parts to the position shown in Fig. 1 and thus closes the stopper tightly and prevents leakage or contamination of the material remaining in the ampoule.

The modification shown in Fig. 6 differs only in that, instead of having the filling of the annular slit 8 formed of the same material as the body of the stopper, it is formed of some other material, preferably a rigid material such as a plug 16 of a plastic material.

While I have described herein some embodiments of my invention, I wish it to be understood that I do not intend to limit myself thereby except within the scope of the claims hereto or hereinafter appended.

I claim:

1. A stopper of elastic material having a projection on its lower face and having an annular cut extending downwardly from its upper face in the direction of but terminating short of the lower surface of said projection, and having a slit from one side wall of said projection to the said cut.

2. A stopper as claimed in claim 1 in which said slit is downwardly inclined away from the cut.

3. A stopper as claimed in claim 2 in which said slit diverges downwardly and outwardly.

4. A stopper having a projection on its lower face and having an annular slit extending downwardly from its upper face in the direction of, but terminating short of the lower surface of said projection, at least that portion of the stopper outside the slit being formed of elastic material, and having a normally closed slit in a plane forming an acute angle to the longitudinal axis of the stopper from one side wall of said projection to said annular slit, the space within said annular slit being completely filled, said second slit opening in the side wall only of the projection.

5. A stopper as claimed in claim 4, in which said second slit is downwardly inclined away from the annular slit.

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