Dec. 21, 1943. A. E. SMITH 2,337,354

AMPULE CONSTRUCTION

Filed March 18, 1942

Fig. 1

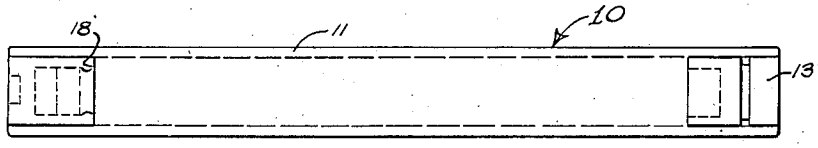


Fig. 2

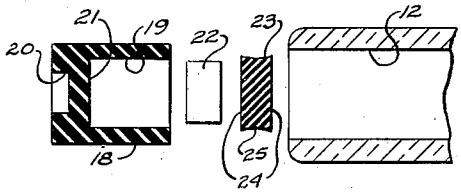


Fig. 3

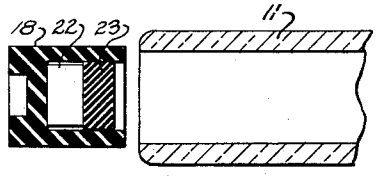


Fig. 4

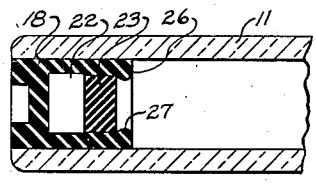


Fig. 5

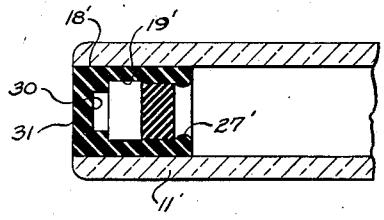
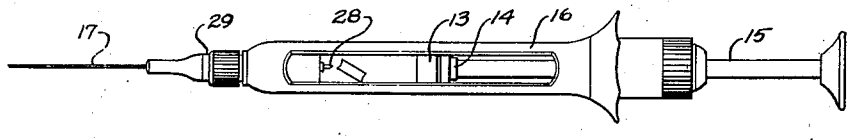


Fig. 6



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AMPOULE CONSTRUCTION

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Application March 18, 1942, Serial No. 435,133

5 Claims. (Cl. 128—272)

This invention relates to an ampoule construction.

The general object of the invention is to provide a novel construction of ampoule and cork which permits the quick preparation of a fresh solution for use in the practice of local anaesthetics and for other purposes.

In the use of local anaesthetics it has been found that when the drug remains in solution in the vehicle such as water for any great length of time that there is a discolorization of the solution and more or less of a breakdown of the medicinal ingredients. It has been proposed, as for example, in my prior Patent No. 2,251,527, granted August 5, 1941, to employ an ampoule which contains a vehicle such as water with a pair of stoppers in the ampoule and with one of the stoppers having a compartment which contains a drug and wherein means is provided for releasing the drug into the vehicle so that a fresh solution may be prepared a short time prior to its release.

The present invention relates to the ampoules of the type just described, and has particular references to an improved cork device which is extremely simple in construction and which permits ready manufacturing and at the same time provides a tight seal for the drug and yet permits ready release of the drug.

A more specific object of the invention is to provide a stopper for use in the ampoule wherein the stopper is provided with a recess and wherein a closure for the recess is held firmly in place by a bead formed by compression of the stopper walls.

Other objects and advantages of my invention will be apparent from the following description taken in connection with the accompanying drawing, wherein:

Fig. 1 is a side elevation of a transparent ampoule with stoppers therein and embodying the features of my invention;

Fig. 2 is a fragmentary, extended, section showing the various parts in separated position;

Fig. 3 is a view similar to Fig. 2 showing the cork assembled;

Fig. 4 is a view similar to Fig. 2 showing the complete assembly of the medicine holding cork in the ampoule;

Fig. 5 is a view similar to Fig. 4 showing a modification; and,

Fig. 6 is a side elevation showing a syringe with my improved ampoule construction therein.

Referring to the drawing by reference characters I have shown my invention as embodied in an ampoule construction which is indicated generally at 10.

As shown the device includes an ampoule 11 which is preferably in the form of an elongated glass tube having an axial bore 12 of substantially uniform diameter throughout.

In one end the body 11 is provided with a piston cork 13 which is adapted to be pushed inwardly by the head 14 on a plunger 15 mounted on a syringe 16 so that the contents of the ampoule may be discharged through a needle 17.

At the end of the body 11 remote from the piston cork 13 I provide a container cork 18 which is preferably made of a good grade of resilient rubber and which includes an inwardly opening recess 19 and an outwardly opening recess 20 with a pierceable diaphragm 21 defining the bottoms of both of said recesses.

The cork 18 has a cylindrical outer wall which is shown as of uniform diameter and the normal diameter of the outer wall as clearly shown in Fig. 3 is greater than the diameter of the bore 12 so that when the stopper 18 is inserted in the end of the body 11 its diameter is reduced due to the resilient material from which it is made.

In the recess 19 I arrange a medicinal tablet 22. This tablet when mixed with the liquid contents between the stoppers 13 and 18 forms a fresh solution. The medicinal tablet 22 has a cylindrical side wall and the interior diameter of the recess is preferably slightly greater than the diameter of the tablet 22 so that the tablet when inserted in the recess almost, but not completely, fills the recess as shown in Fig. 3. When however, the cork 18 is inserted in the body 11 the compression of the stopper and the reduction of its diameter causes the inner wall of the recess to lightly engage the tablet 22 as shown in Fig. 4. In certain types of construction I may use tablets of other configuration than that shown.

In order to seal the tablet 22 in the recess I provide a closure disk 23 which is preferably made of rubber and which is preferably somewhat soft. The disk is of general cylindrical form with the diameter of the ends 24 preferably slightly greater than the diameter at the intermediate portion 25 so that the side wall of the disk is slightly cupped in cross section.

After the tablet 22 is inserted in the recess 19, the disk 23 is inserted as in Fig. 3. The greatest external diameter of the disk 23 is very slightly greater than the internal diameter of the re-

cess 19 so that the disk readily moves into place with just enough friction to prevent its accidental removal.

After the disk 23 is inserted in the stopper 18, the stopper is inserted in the end of the ampoule and due to its being larger than the bore 11 the stopper is compressed. As a result the periphery of the disk is tightly engaged by the wall of the recess 19. The disk is spaced inwardly from the inner end 26 of the stopper and as a result the compressed rubber is free to expand inwardly and seals the disk in place. The extreme inner end of the stopper beyond the disk 25 is forced inwardly so that a resilient bead 27 is provided which overhangs the disk 23 as shown in Fig. 4. This resilient overhanging bead forms a tight seal and prevents ready removal of the disk 23. The disk 23 is preferably of such axial thickness and sufficient rigidity that it will not be unduly distorted in shape due to the pressure upon its periphery.

After the ampoule is made, to employ the same, it may be placed in the syringe as shown at 16 and the diaphragm 21 may be pierced by a tube 28 on the front member 29 of the syringe thereby dislodging the disk 23. The particular type of syringe shown forms no part of the present invention.

In Fig. 5 I show a modification of my invention wherein parts similar to those previously described are designated by similarly primed reference numerals. In the modification the cork 18' has a recess 19' and has a second recess 30 which opens inwardly and communicates with the recess 19'. A pierceable diaphragm 31 is provided at the front end of the stopper. The stopper front end is without depressions and is flush with the adjacent end of the body of the ampoule 11'.

From the foregoing description it will be apparent that I have invented a novel ampoule construction which can be economically manufactured and which is highly efficient for its intended purpose.

Having thus described my invention, I claim:

1. The combination of a cylindrical body having an axial bore and a cork in said bore, said cork having a recess opening inwardly whereby an inner annular flange is provided, said inner flange being resilient and having an unbroken inner cylindrical wall, the cork having a pierceable diaphragm defining the outer end of said recess, a medicinal preparation in said recess, and a compressible disk in said recess, and engaging said resilient skirt, the side wall of said disk being cupped in cross section, said disk having an outer wall which is of substantially the same diameter as the normal internal diameter of said inner flange when the cork is expanded, said disk being spaced from the outer end of said inner flange, the outer end portion of the inner flange being forced inwardly by engagement with the inner wall of the cylindrical body whereby an inwardly directed resilient bead results and holds the disk in place.

2. The combination of a cylindrical body having an axial bore and a cork in said bore, said cork being made of resilient material and having a normal diameter when the cork is expanded which is greater than the diameter of the bore, said cork having a recess opening inwardly whereby an inner annular flange is provided, said inner flange having an unbroken inner cylindrical wall, the cork having a pierceable diaphragm defining the outer end of said recess, a medicinal tablet in said recess, said medicinal tablet having a cylindrical side wall, said inner flange having a normal inner diameter when the cork is expanded slightly greater than the diameter of the cylindrical medicinal tablet, and a resilient disk in said recess, said disk having an outer wall of a diameter which is substantially the same as the normal internal diameter of said inner flange when the cork is expanded, said disk being spaced from the outer end of said inner flange, the outer end portion of the inner flange being forced inwardly by engagement with the inner wall of the cylindrical body whereby an inwardly directed resilient bead results and holds the resilient disk in place.

3. The combination of a cylindrical body having an axial bore and a cork in said bore, said cork being made of resilient material and having a normal diameter when the cork is expanded which is greater than the diameter of the bore, said cork having a recess opening inwardly whereby an inner annular flange is provided, the cork having a closure defining the outer end of said recess, a medicinal preparation in said recess, and a disk in said recess, said disk being arranged beyond the preparation and spaced from the outer end of said inner flange, the entire periphery of said disk sealingly engaging the inner wall of said recess, the outer end portion of the inner flange being forced inwardly immediately beyond the disk by engagement with the inner wall of the cylindrical body whereby an inwardly directed, continuous, resilient bead results and holds the disk in place.

4. For use in an ampoule, a cork, said cork being made of resilient material and having a recess opening inwardly from one end whereby an annular flange is provided, said flange having an unbroken inner cylindrical wall, the cork having a closure defining the outer end of said recess, a medicinal preparation in said recess, and a disk in said recess, said disk having an outer wall which is of substantially the same diameter as the normal internal diameter of said inner flange, said disk being spaced from the outer end of said flange, the entire periphery of said disk sealingly engaging the inner wall of said recess, the outer end portion of the flange immediately beyond the disk being adapted to be forced inwardly by engagement with the inner wall of an ampoule to thereby provide an inwardly directed resilient bead which serves to hold the disk in place.

5. For use in an ampoule, a cork, said cork being made of resilient material and having a recess opening inwardly from one end whereby an annular flange is provided, said flange having an unbroken inner cylindrical wall, the cork having a closure defining the outer end of said recess, a medicinal preparation in said recess, and a soft disk in said recess, said disk having an outer wall which is of substantially the same diameter as the normal internal diameter of said inner flange, said disk being spaced from the outer end of said inner flange, the entire periphery of said disk sealingly engaging the inner wall of said recess, the outer end portion of the inner flange immediately beyond the disk being adapted to be forced inwardly by engagement with the inner wall of an ampoule to thereby provide an inwardly directed resilient bead which serves to hold the disk in place.

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