

May 29, 1945.

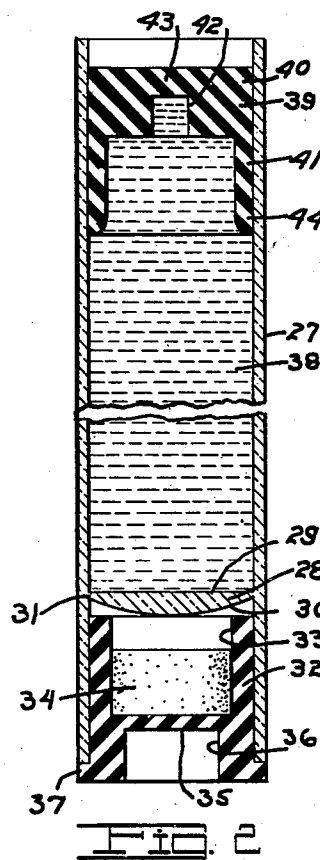
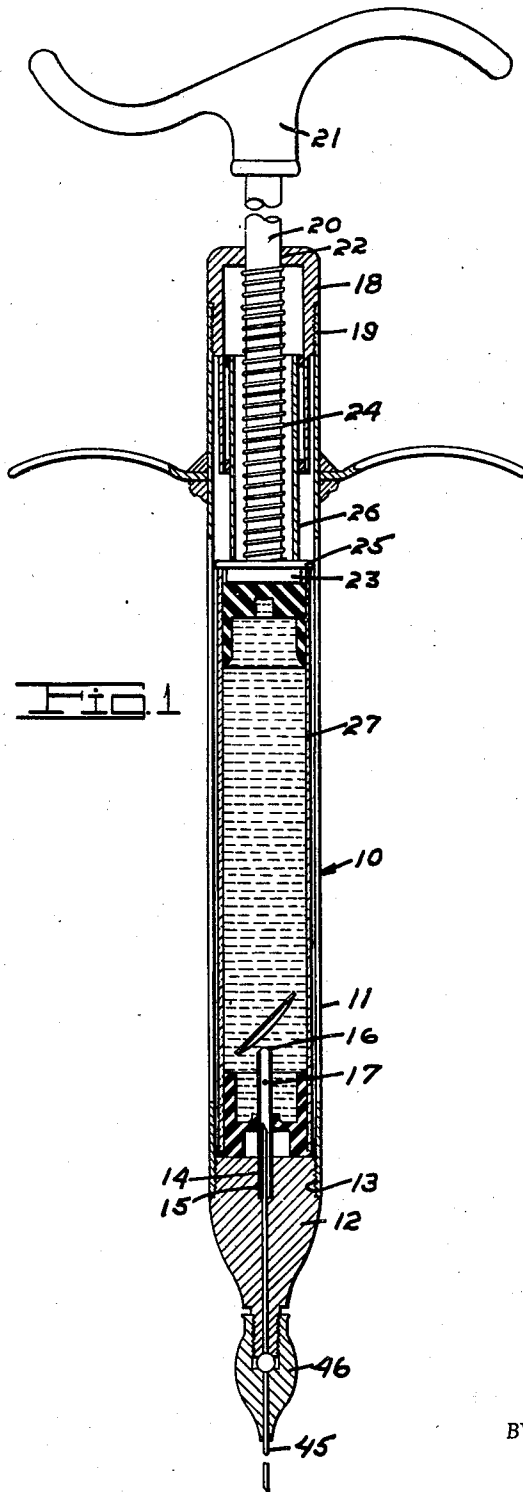
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2,377,274

AMPULE

Filed Feb. 20, 1943

2 Sheets-Sheet 1



BY

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2 Sheets-Sheet 2

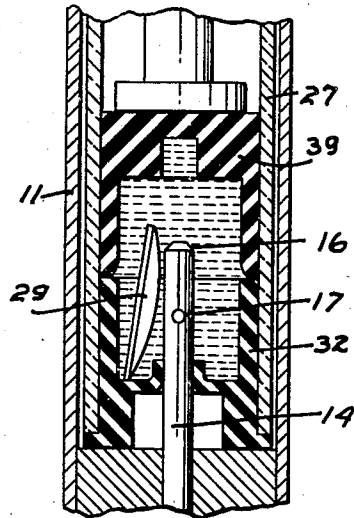


Fig. 3

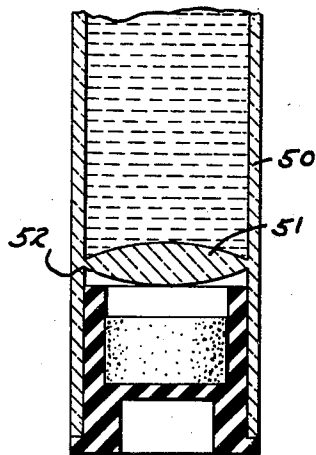


Fig. 4

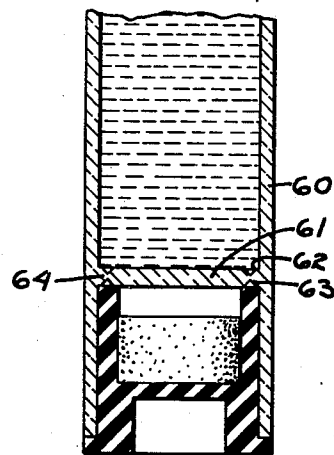


Fig. 5

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UNITED STATES PATENT OFFICE

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AMPULE

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3 Claims. (Cl. 128—272)

This invention relates to a combination syringe and ampule.

The general object of the invention is to provide an improved injecting device by means of which an operator may introduce a quantity of liquid into the veins or other parts of the body of a patient.

A more specific object of the invention is to provide a novel syringe and ampule whereby a fresh solution may be quickly prepared and injected.

A more specific object of the invention is to provide a novel ampule which may be made of plastic or similar readily worked material.

An additional object of the invention is to provide a plastic ampule having a novel integral partition member therein.

A further object of the invention is to provide a novel compartmental ampule wherein the compartments are provided by a partition formed integral with the ampule and by a pair of corks arranged at opposite ends of the ampule on either side of the partition.

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

Fig. 1 is a central sectional view through a syringe and ampule embodying the features of my invention;

Fig. 2 is a central sectional view of the ampule on an enlarged scale;

Fig. 3 is a fragmentary, sectional view, on an enlarged scale showing a portion of the syringe and of the ampule;

Fig. 4 is a fragmentary sectional view showing an ampule with a modified partition member; and

Fig. 5 is a view similar to Fig. 4 showing a further modification.

Referring to the drawings by reference characters I have shown my invention embodied in a combination ampule and syringe which is indicated generally at 10. As shown the syringe includes a barrel 11 having a front member 12 secured to the front end of the barrel by threads 13.

The front member is provided with a tube 14 which is securely fixed in a recess 15 in the front member. The tube 14 has a sharpened inner end 16 and has lateral discharge holes 17 therein. At its rear end the barrel 11 has a rear member 18 removably secured thereto as by threads 19. The rear member includes a plunger 20 having a hand grip 21 at the outer end thereof. The plunger

passes through a hole 22 in the rear member and at its front end has a piston head 23 thereon. The plunger is surrounded by a spring 24, the lower end of which engages an end member 25 on a sleeve 26. The sleeve 26 slides within the rear member 18 and the end member 25 thereon is adapted to engage the end of an ampule 27 arranged in the syringe barrel.

The ampule 27 may be made of material such as cellulose acetate, methyl methacrylate, polystyrene or other plastics which resist dissolution in water, saline and/or acid solutions. The material employed will be determined in a degree by its insolubility in the solutions which are to be contained therein. In the disclosure the applicant uses distilled water as the vehicle for the drug.

The ampule intermediate its ends and preferably near the front end thereof is provided with an integral partition 28. The partition in the disclosure has a plane rear face 29 and a convex front face 30 and as a result a thin edge portion 31 is provided where the partition is integrally connected with the tubular portion of the ampule 27.

The material of which the ampule is constructed is more or less frangible so that partition 29 may be dislodged by pressure upon the middle portion thereof.

Forward of the partition 28 I arrange a compartment stopper 32 which is preferably made of rubber and has a recess 33 in its inner end. In this recess I arrange a medicinal drug tablet 34. The outer end of the recess 33 is closed by a diaphragm 35 which is spaced on the extreme end of the stopper so a recess 36 is provided. The stopper may include an end flange 37 which engages the end of the ampule.

The ampule is filled with a suitable solvent 38 for the drug 34 and is closed by a piston cork 39 which includes a body 40 having a thin forwardly extending annular collar 41 thereon and with a central recess 42 so that a diaphragm 43 is provided. The forward end of the piston cork is shown as rounded at 44 to provide a feather edge.

In use the rear member 18 is removed and the ampule 27 is inserted in the barrel of the syringe. The act of seating the ampule in the barrel, that is the moving forward of the ampule, causes the pointed portion 16 of the tube 14 to pierce the diaphragm 35 and impinge upon partition 28. The partition is thus broken at its thin weak edge to allow the drug 34 and solvent 38 to mix so that a fresh solution is provided.

A needle 45 is secured to the front member 12 by means of a cap 46 and the syringe is ready for use. The operator inserts the needle and then presses on the finger grip portion 21 which moves the stopper 40 into the ampule thereby forcing fluid through the discharge aperture 17 and thence to and through the needle 45 the upper end of which projects part way into the tube 14.

The tube 14 projects into the syringe barrel a distance greater than the distance from the partition 28 to the forward end of the ampule so that breaking of the member 28 will be assured. When the ampule is seated in the barrel as in Fig. 3 it will be noted that the piston cork has moved down to engage the front cork and has trapped the broken away closure 28 between the corks.

In Fig. 4 I show a modification of the invention wherein the ampule 50 is provided with an integral partition 51 which is convex on both sides and has a thin edge portion 52 by means of which it is connected integrally with the side wall of the ampule. In Fig. 5 the ampule 60 is provided with partition 61 which is plane on both sides and has upper and lower grooves 62 and 63 therein forming a thin portion 64 by means of which it is connected with the ampule wall.

The use of the ampule shown in Figs. 4 and 5 is similar to that in connection with the ampule shown in Fig. 2 and a further description is believed unnecessary.

The relatively thick central portion of the partition together with the weakened peripheral portion assures that pressure of the tube 14 will break the partition and that the tube will not merely pierce the partition without breaking it away.

The double convex partition provides a maximum center thickness so that the partition will not be punctured but will break away. This type of partition may be used with the softer plastics. The double plane faced partition is preferably employed with the brittle or more frangible materials while the plano-convex partition gives strength with a thick center and with a minimum amount of material.

From the foregoing description it will be apparent that I have invented a novel combination syringe and ampule which can be economically manufactured and is efficient for its intended use.

Having thus described my invention, I claim:

1. An ampule having a tubular portion made of plastic material, a slidable piston member positioned within the upper end of the ampule, a puncturable stopper positioned within the lower end of the ampule, said stopper having a compartment housing a drug and an open top communicating with said compartment, said ampule having an integral partition of plastic material positioned just above said stopper, said ampule containing a solvent for the drug between the slidable piston and the partition, said stopper adapted to be pierced by an instrument inserted

therethrough, said plastic partition having an enlarged body portion and a thinner edge portion where the partition is integrally joined to said tubular portion, said partition adapted because of its enlarged body portion to resist fractional breakage, said partition adapted upon receipt of non-magnetic and direct pressure of an instrument inserted upwardly within said ampule to break away cleanly in a single piece at said edge portion from said tubular portion, and descend through the open top of said stopper into said compartment for entrapment therein.

2. An ampule having a tubular portion made of plastic material, a slidable piston member positioned within the upper end of the ampule, a puncturable stopper positioned within the lower end of the ampule, said stopper having a compartment housing a drug and an open top communicating with said compartment, said ampule having an integral partition of plastic material positioned just above said stopper, said ampule containing a solvent for the drug between the slidable piston and the partition, said stopper adapted to be pierced by an instrument inserted therethrough, said plastic partition having an enlarged plano-convex body portion and a thinner edge portion where the partition is integrally joined to said tubular portion, said partition adapted because of its enlarged body portion to resist fractional breakage, said partition adapted upon receipt of non-magnetic and direct pressure of an instrument inserted upwardly within said ampule to break away cleanly in a single piece at said edge portion from said tubular portion, and descend through the open top of said stopper into said compartment for entrapment therein.

3. An ampule having a tubular portion made of plastic material, a slidable piston member positioned within the upper end of the ampule, a puncturable stopper positioned within the lower end of the ampule, said stopper having a compartment housing a drug and an open top communicating with said compartment, said ampule having an integral partition of plastic material positioned just above said stopper, said ampule containing a solvent for the drug between the slidable piston and the partition, said stopper adapted to be pierced by an instrument inserted therethrough, said plastic partition having an enlarged double-convex body portion and a thinner edge portion where the partition is integrally joined to said tubular portion, said partition adapted because of its enlarged body portion to resist fractional breakage, said partition adapted upon receipt of non-magnetic and direct pressure of an instrument inserted upwardly within said ampule to break away cleanly in a single piece at said edge portion from said tubular portion, and descend through the open top of said stopper into said compartment for entrapment therein.

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