

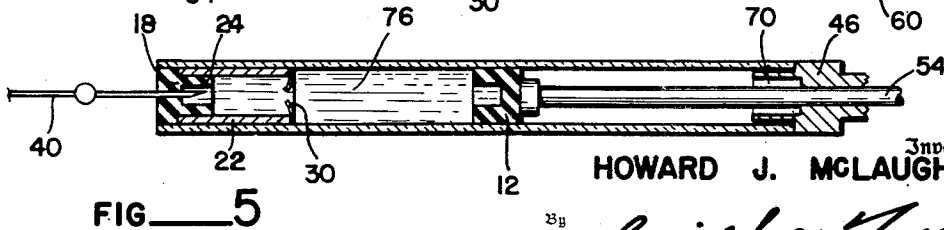
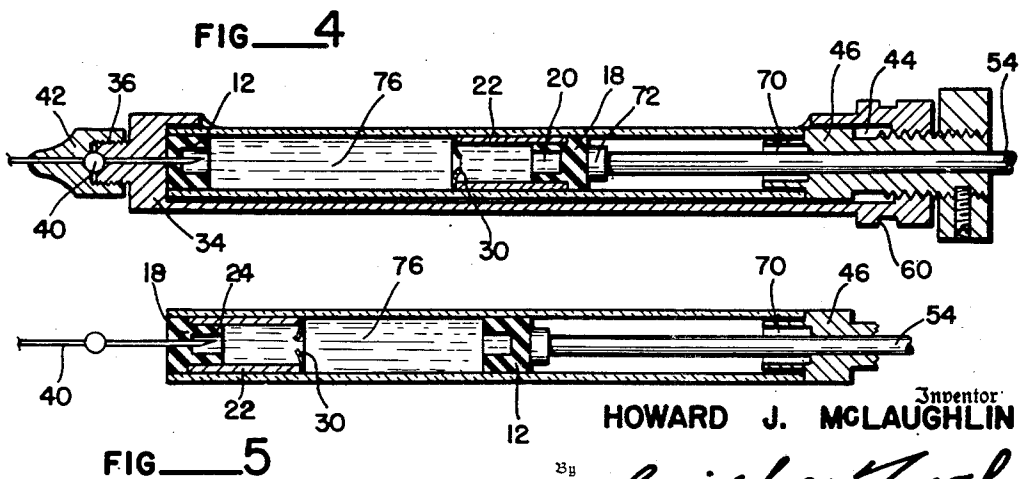
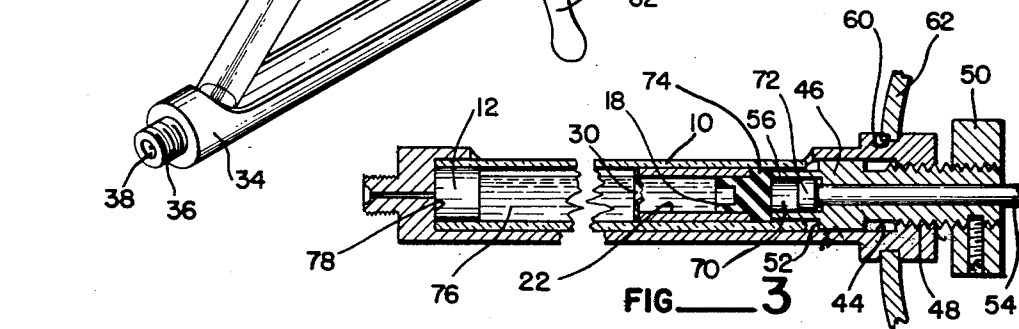
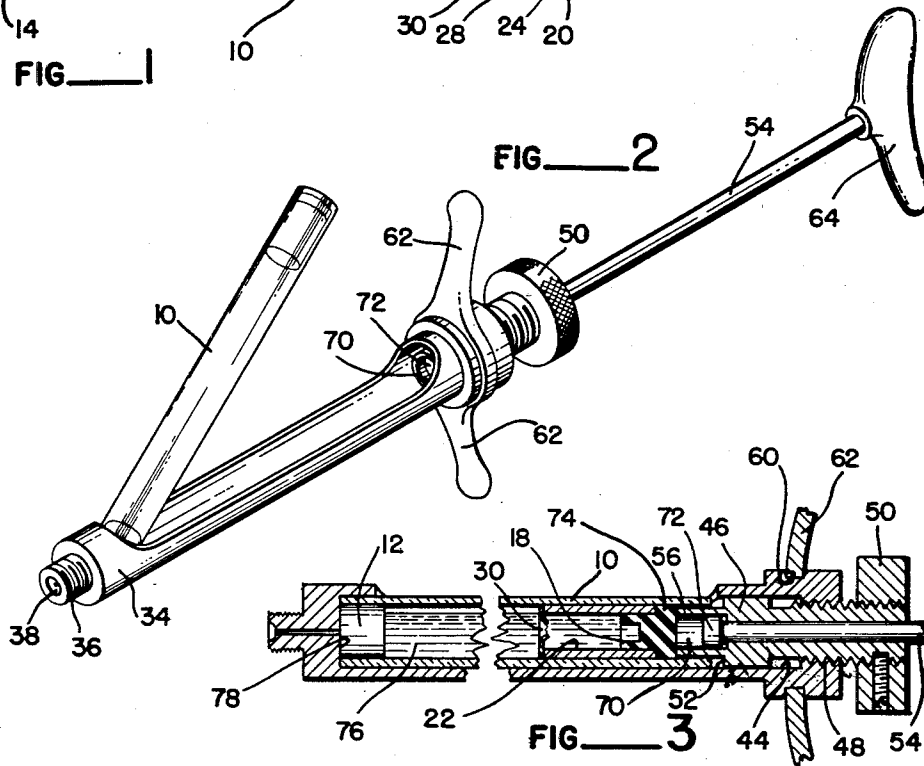
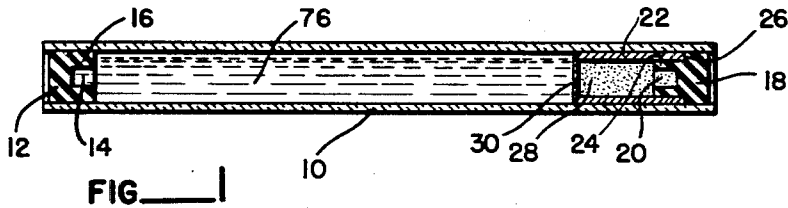
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H. J. McLAUGHLIN

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MEANS OF ADMINISTERING PROCAINE AND LIKE PREPARATIONS

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Inventor: HOWARD J. McLAUGHLIN

By *Smith & Tuck*

Attorneys

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MEANS OF ADMINISTERING PROCAINE AND
LIKE PREPARATIONS

Howard J. McLaughlin, Seattle, Wash.

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4 Claims. (Cl. 128—272)

This present invention relates to a normal method of producing a dental solution on the order of novocaine, used in a hypodermic syringe, wherein the various powdered drugs are contained in a watertight container which in turn is sealed into a tube containing an amount of distilled water which is sterile and in an amount to produce the percentage solution required. The modified ampule containing the unmixed ingredients is inserted in a special type of hypodermic syringe which is so arranged that the final movement in seating the ampule in the syringe applies sufficient pressure to the water within the ampule to rupture a frangible container of the dry chemicals and which then go into solution in the water. Means are further provided so that the solution is discharged out through the conventional hypodermic needle in the conventional manner.

Experience, particularly within the dental profession, has recorded a large number of cases where a serious infection or death has resulted through the injection into a patient's tissues of procaine solutions which have been so long in storage that chemical decomposition has taken place to the extent that lethal or semi-lethal solutions have resulted. In many instances such chemical breakdowns in the standard solutions that have been prepared for medical and dental use have been caused by lack of attention on the part of supply house personnel where, when new ampules have been made up for use, they quite often are put on top of those remaining in the bin or storage containers, to the end that some of the same may not be used for long periods. It is to guard against such unfortunate conditions that I have provided my modified ampule and the associated syringe so as to insure that each patient will receive a fresh sterile solution. Good practice normally indicates that novocaine should not be used in solution by itself, but is usually arranged with a suitable amount of sodium bicarbonate and epinephrine, as the most common additives now used, and in some cases penicillin also is added or is used in various combinations. These chemicals in their dry, pulverized state, or tablet form, do not interact chemically with each other; consequently as long as the element remains separated from the water long periods of storage could produce no harmful solution, and by having the element all in a single long tube, with the powder or tablets sealed in a second transparent tube, any leakage could immediately be detected thus further safeguarding the patient against any improper solution.

The principal object of my present invention therefore is to provide a new means for insuring that procaine or cocaine solutions used for injection by means of a hypodermic syringe will be in the pure state as prescribed when they are put to use.

A further object of my invention is to provide a transparent container for a given quantity of sterile, distilled water together with an amount of dry ingredients packed separately in an inner container which is also transparent.

A further object of this invention is to provide a syringe adapted for use with such a container arranged so that the initial movement of the container within the syringe moves one of the end stoppers inwardly to the extent that hydrostatic pressure is created sufficient to break the frangible seal for the chemical container.

A further object of this invention is to provide a syringe adapted for use with the container which, after the chemicals are mixed with water, will then function as do the various syringes with which doctors and dentists are familiar.

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Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is a longitudinal sectional view through a container or modified ampule made after the teachings of this present invention;

Figure 2 is a perspective view showing a syringe of the type satisfactory for use with this container;

Figure 3 is a broken, sectional view through a portion of my syringe and container and illustrating the means employed to rupture the frangible seal for the chemical container;

Figure 4 is a longitudinal, sectional view, with a part of the syringe broken away, illustrating the manner of using my equipment;

Figure 5 is a fragmentary sectional view showing certain parts of Figure 4 in the same general relationship illustrating the action occurring when the container is placed within the syringe inverted end-for-end from the showing of Figure 4.

Referring more particularly to the disclosure in the drawings, the numeral 10 designates the usual rigid, transparent glass tube forming the main body portion of the solution container or modified ampule. One end of tube 10 is closed by the resilient stopper 12, usually made of rubber, and this stopper is provided with an axial recessed portion 14 which serves on one hand to form a protection for the tip of the hypodermic needle when it passes through the same and further provides the annular flange 16 so that the pressure on the inside of the tube 10 acting in accordance with the normal obturation principles of such stoppers tends to force the same out against the inner walls of the tube and thus provides the maximum obturation.

The opposite end of tube 10 is similarly provided with a resilient stopper 18. This stopper has the axial recess 20 comparable in function to recess 14. However this stopper 18 has a further function and to achieve this the stopper is reduced in diameter at 24 so as to provide a rest for the slidable transparent tube 22. By having stopper 18 thus formed, the abutment portion 26 abutting the end of tube 22 will cause the endwise displacement of the tube when pressure is applied to stopper 18. Tube 22 is provided as a receiver or capsule for the substantially dehydrated powder 28 which is to be dispensed, and to protect the stable local anesthetic powder during the period of storage, a waterproof frangible diaphragm or wall 30 seals the end of tube 22 thus protecting from moisture the powder 28, which for dental use is normally a mixture of procaine, sodium bicarbonate, and epinephrine. These powdered drugs may be compressed into tablets if desired.

The ampule shown in Figure 1 may be used in various types of syringes with minor adaptations of the same. A suitable syringe for use with this new type of ampule is illustrated in Figure 2 and with the arrangement of this syringe the ampule may be placed in the recess within the syringe with either end toward the dispensing hypodermic needle. The two different placements are shown in Figure 4 and in fragmentary form in Figure 5. The syringe itself consists of a metal body portion 34. The most convenient manner of inserting the ampule 10 is to cut away one side of body 34 as is illustrated in Figure 2. At the discharge end body 34 is provided with a threaded portion 36 of reduced diameter which is provided with a seat at 38 so as to accept a conventional form of hypodermic needle 40. The needle is secured in operative position by a threaded clamp member 42. At its opposite end body 34 is provided with a cylindrical bore 44 in which is disposed for limited reciprocation the screw plunger 46. Plunger 46 is provided with a threaded portion 48 which threads engage complementary threads in body 34 and may be turned by, preferably, a narrow nut 50 fixedly secured by some convenient means to member 46. An enlarged portion of plunger 46 provides the annular abutment surface 52, which, when the plunger is fully screwed down into place, serves to engage and hold in place the tube 10 of the ampule. Axially disposed within member 46 is the liquid expelling piston or plunger 54. This plunger is provided preferably with an enlarged

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piston portion 72 adapted to contact and then to move stopper 18 longitudinally of tube 10. The resilient stopper 18 is used to form the obturation device for use with piston 56 and thus prevent leakage of liquid past the same when pressure is applied to rod 54.

Revolvably secured to the enlarged end of housing 34 as in groove 60 is the finger rest portion 62. This is preferably formed with two opposite ends of similar construction and normally serves as seats for the index and second finger when the syringe is in use, with the thumb applying pressure to the thumb rest 64 which is secured, in turn, to the end of rod 54. It is desirable that rest member 62 be revolvable with respect to body 34 so the user of the syringe can have the open portion of housing 34 uppermost to view the functioning of the syringe when it is in use and expelling the fluid.

Piston 72 is positioned for limited reciprocation within a counterbored portion 70 formed in the screw plunger 46 and this in turn forms a tubular extension 56 of member 46. The purpose of this tubular extension is to engage stopper 18 out near its periphery, so that the pressure applied by the screwing in of member 46 will be applied to the relatively fixed flange 74 forming part of stopper 18, and thus a limited amount of movement can be given to tube 22 and its contents. This movement, by virtue of the threaded engagement of threads 48 makes it possible to apply a very considerable pressure to the tube of cartridge 22 and to force it down into the liquid 76, which normally entirely fills the tube 10, except for that portion occupied by stoppers 12 and 18 and tube 22 and its contents. In referring to Figures 3 and 4, it is to be noted that stopper 12 comes to a solid abutment against wall 78 of housing 34. Consequently as pressure is applied by turning nut 50, a great deal of hydraulic hydrostatic pressure is available to rupture membrane 30 to the end that the liquid 76 can then flow into the body of powder within tube 22 and dissolve the same, thus making a solution of the proper concentration within tube 10. Pressure is continued on thumb nut 50 until shoulder 52 contacts the end of tube 10 and serves to hold the same securely in place for the dispensing operation.

During the dispensing operation pressure is applied to thumb rest 64 moving rod 54 axially with respect to tube 10 and thus forcing liquid out through needle 40. Normally the first liquid is waste and is forced out with the needle uppermost in order that any included air may be first expelled before making an injection.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of a means of administering procaine and like preparations.

Having thus disclosed the invention, I claim:

1. An ampule for a local anesthetic in the nature of procaine and the like, comprising: a rigid, transparent tube; a resilient stopper positioned in each end of said tube; a first of said stoppers having its sides recessed at its inner end forming a reduced diameter portion; a capsule having rigid, waterproof, transparent, tube-shaped side walls positioned in said tube at the inner end of said first stopper with the recessed, reduced diameter portion of said first stopper positioned in the adjacent end of said capsule and sealing the same, said capsule having a waterproof, frangible end wall at the other end thereof; said first stopper and said capsule being slidable under force longitudinally of said tube; and a quantity of sterile water positioned in said tube outside of said capsule; and a quantity of said local anesthetic, in a substantially de-

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hydrated, stable powder, positioned in said capsule in a condition so as to be more compressible than said water.

2. An ampule for a local anesthetic in the nature of procaine and the like, comprising: a rigid, transparent tube; a resilient stopper positioned in each end of said tube; a first of said stoppers having its sides recessed at its inner end forming a reduced diameter portion; a capsule having rigid, waterproof tube-shaped side walls positioned in said tube at the end of said first stopper with the recessed, reduced diameter portion of said first stopper positioned in the adjacent end of said capsule and sealing the same, said capsule having a waterproof, frangible end wall at the other end thereof; at least one of said stoppers being movable under force longitudinally of said tube; a quantity of sterile water positioned in said tube outside of said capsule; and a quantity of said local anesthetic, in a substantially dehydrated, stable powder, positioned in said capsule in a condition so as to be more compressible than said water.

3. An ampule for a local anesthetic in the nature of procaine and the like, comprising: a rigid tube and a stopper positioned in each end of said tube together forming an ampule container, at least one of said stoppers being slidable longitudinally of said tube under the amount of force capable of application by a manually operated syringe, said ampule container having a watertight capsule disposed therein between said stoppers having a wall portion which is frangible under hydrostatic pressure of an amount capable of application by such manually operated syringe, a liquid medium, of a type suitable for mixing with such anesthetic, positioned in said tube outside of said capsule, and a quantity of said local anesthetic in a stable form positioned in said capsule in a condition and amount so as to be more compressible than said liquid medium permitting fracture of said frangible wall portion under such hydrostatic pressure.

4. An ampule for a local anesthetic in the nature of procaine and the like, comprising: a rigid tube and a stopper positioned in each end of said tube together forming an ampule container, at least one of said stoppers being slidable longitudinally of said tube under the amount of force capable of application by a manually operated syringe, said ampule container having a watertight capsule disposed therein between said stoppers having a wall portion which is frangible under hydrostatic pressure of an amount capable of application by such manually operated syringe, a liquid medium, of a type suitable for mixing with such anesthetic, positioned in said tube outside of said capsule, and a quantity of said local anesthetic in a stable form positioned in said capsule in a condition and amount so as to be more compressible than said liquid medium permitting fracture of said frangible wall portion under such hydrostatic pressure, at least a portion of the walls of said tube and of said capsule being transparent and aligned so as to permit visual inspection of the condition of said anesthetic.

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