

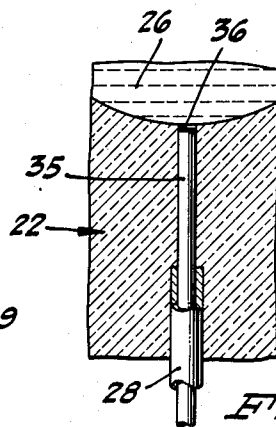
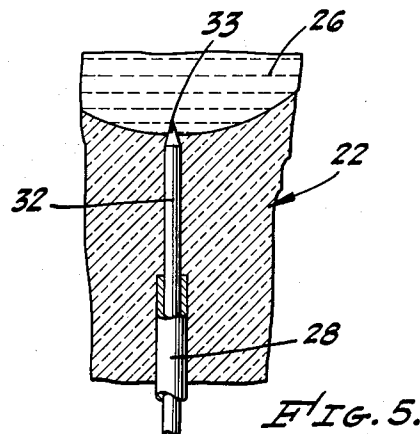
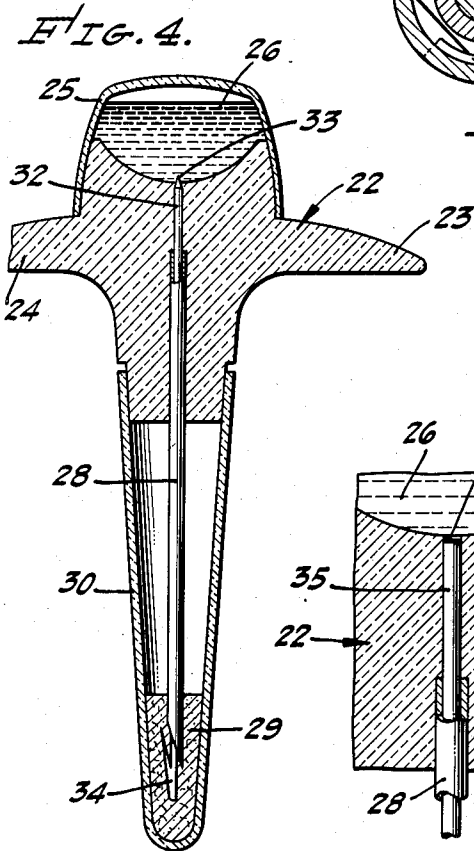
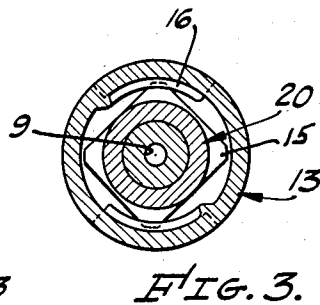
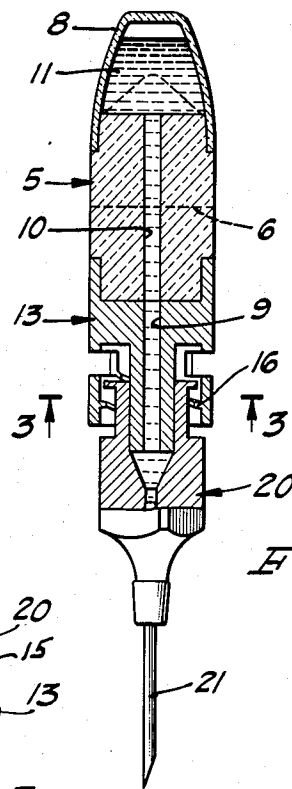
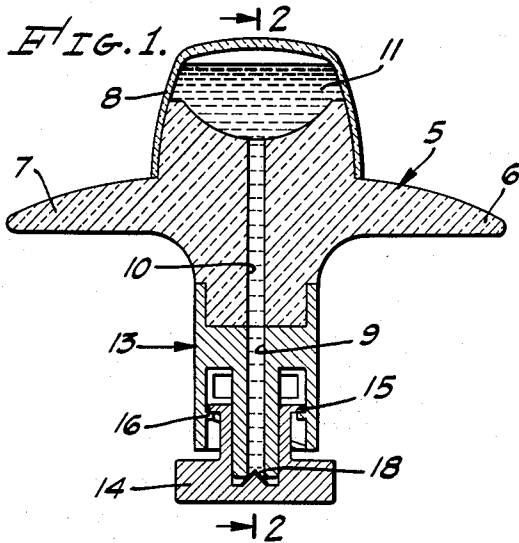
May 8, 1956

E. BARRETT ET AL
SYRINGES AND SYRINGE MIXERS

2,744,527

Filed April 21, 1952

2 Sheets-Sheet 1



INVENTORS.
ERIC BARRETT,
BY ALTINA BARRETT,
Ed R. Lushan
ATTORNEY.

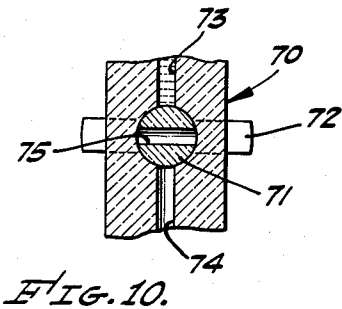
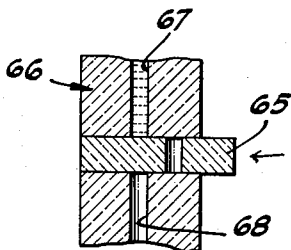
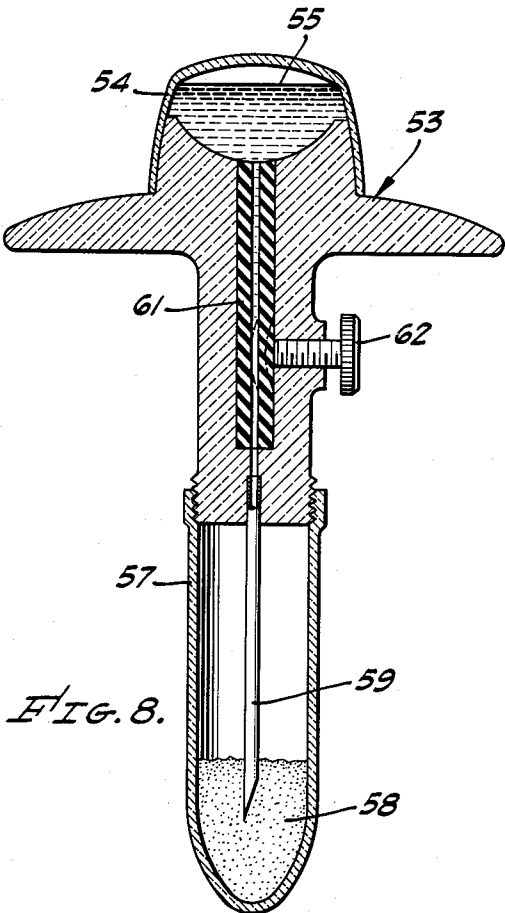
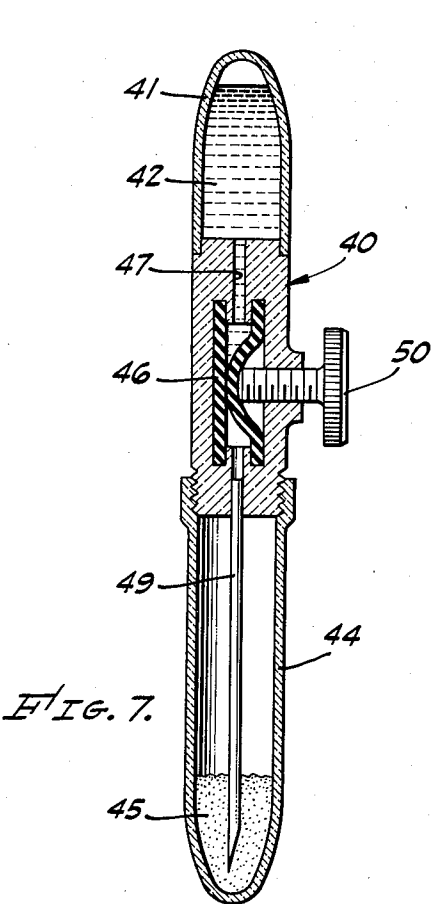
May 8, 1956

E. BARRETT ET AL
SYRINGES AND SYRINGE MIXERS

2,744,527

Filed April 21, 1952

2 Sheets-Sheet 2



INVENTORS
ERIC BARRETT,
ALTINA BARRETT,
BY
Carl R. Schaw
ATTORNEY.

1

2,744,527

SYRINGES AND SYRINGE MIXERS

Eric Barrett and Altina Barrett, Los Angeles, Calif.; Altina Barrett, administratrix of said Eric Barrett, deceased

Application April 21, 1952, Serial No. 283,354

12 Claims. (Cl. 128—216)

This invention relates to hypodermic injection syringes, ampoules, and combination ampoule-syringes, particularly syringes and ampoules of the type disclosed and claimed in our co-pending U. S. application, Ser. No. 253,798, filed October 30, 1951, and combination ampoule-syringes of the mixing type.

In our prior application, we have disclosed a combination ampoule-syringe in which aspiration is automatically obtained before injection. In this manner, a test is made for either intravenous or extravascular types of injections.

The present invention is directed to improvements in the above mentioned type of syringe or combination ampoule-syringe. One of these improvements is in the form of the ampoule which involves a fluid containing portion and the body portion of a syringe. The end of the body portion is provided with a connector to which may be attached a stopper member or a needle member. Another improvement is in a combination ampoule-syringe which maintains two ingredients separated until they are to be mixed just prior to injection. It has been found that in many instances when two substances are to be injected in mixed form the mixing thereof just prior to injection provides better results. This is because many mixtures are not stable. Another feature is the use of a stylet for the needle bore to prevent clogging and fluid contamination.

The principal object of the invention, therefore, is to facilitate the injection of fluids.

Another object of the invention is to provide an improved combination ampoule-syringe which may be readily shipped and then combined with the remaining portion of the complete syringe at the time of use.

A further object of the invention is to provide an improved type of ampoule which includes a portion of a syringe.

A still further object of the invention is to provide an ampoule or a combination ampoule-syringe which prevents contact of the injection fluid with any metal of the syringe, such as the metal of a needle, which is incompatible with the fluid.

A still further object of the invention is to provide a combination ampoule and syringe, wherein a mixture of two ingredients may be made just prior to injection.

A still further object of the invention is to provide a stylet for a syringe needle bore which prevents clogging of the bore and does not require contact with the fingers for its removal to prevent contamination of the needle point.

Although the novel features which are believed to be characteristic of this invention will be pointed out with particularity in the appended claims, the manner of its organization and the mode of its operation will be better understood by referring to the following description, read in conjunction with the accompanying drawings, forming a part hereof, in which:

Fig. 1 is a cross-sectional view of one embodiment of the invention.

Fig. 2 is a cross-sectional view taken along the lines

2

2—2 of Fig. 1, in which a needle has been attached to the modification shown in Fig. 1.

Fig. 3 is a cross-sectional view taken along the line 3—3 of Fig. 2.

Fig. 4 is a second modification of the invention in which the fluid to be injected is maintained isolated from the needle of the syringe.

Fig. 5 is a detail view of the modification shown in Fig. 4.

Fig. 6 is a detail view of a second modification of an isolating construction for the ampoule fluid.

Fig. 7 is a cross-sectional view of a third modification of the invention, wherein two ingredients may be mixed just prior to injection.

Fig. 8 is a cross-sectional view of a second modification of the mixing device such as shown in Fig. 7, and

Figs. 9 and 10 are detail views of valve structures which may be used in the modifications shown in Figs. 7 and 8.

Referring now to the drawings, in which the same numerals identify like elements, a body portion 5 of rigid plastic material has two finger wing extensions 6 and 7 and a cap-like fluid container 8, these elements being of the same type as disclosed in our above mentioned co-pending application. That is, the cap 8 is non-spherical, non-cylindrical, and tapered in shape, a cross-sectional dimension in one direction across the cap being greater than the cross-sectional dimension across the cap at right angles thereto, one of the cross-sectional dimensions being greater than the height of the cap. Thus, pressure on the cap perpendicular to the cross-sectional dimensions across the cap first produces outward bulging of the cap across its narrowest dimension to increase the internal volume of the cap, and further pressure on the cap in the same direction decreases the internal volume of the cap. The body section 5 has a bore 10 communicating with the interior of the cap 8 in which a fluid 11 is contained, the fluid extending down the bore 10 to the end of the channel and through the bore 9 of a connector 13. The connector 13 may be of any well-known type of syringe connector, to which a needle may be connected, one such type being known as a "Luer-Lok."

In Fig. 1, a stopper member 14 is shown connected through its square flange member 15 to the thread-like interior member 16 of the connector. When the stopper is in position, the center V portion 18 seals the bore 9 within the connector 13, which is in alignment with the bore 10 in the body member 5. In this manner, the unit shown in Fig. 1 may be shipped to the points of use, and when it is to be used, stop member 14 is removed and the regular type of needle unit 20, as shown in Fig. 2, is attached, this unit having a needle 21 of any well-known type. In Fig. 3, the member 15 is shown with the interior bore 9. As this may be any standard commercial connector, further explanation thereof is not made.

Referring now to Figs. 4, 5, and 6, a body section 22 with its finger wings 23 and 24 has a cap 25 enclosing a fluid 26. This unit is also of the general type shown in our above mentioned co-pending application, wherein the bore within the body portion 22 connects with the bore of a needle 28, which extends into a soft, spongy, amorphous material 29 at the bottom of a sealing cap 30. As mentioned above, many fluids to be injected may corrode metal or become contaminated by contact with metal, and to prevent the fluid 26 from contacting the metal of the needle 28, a stylet 32 has been provided. The stylet has a tapered point 33 and a hook portion 34 at the other end thereof. Thus, after the fluid has been inserted in the cap 25, the stylet 32 is inserted in the bore 28 and pressed tightly into the tapered seat in the body 22. The next operation is to insert the barbed end 34 of the body 22, and, in doing so, the barbed end 34 of the

3

stylet is inserted into the soft material 29 along with the tip of the needle. The material may harden later to provide a firm connection for the stylet. When it is desired to use the syringe, the cap 30 is removed, which removes also the stylet from the syringe, making the unit available for use. Thus, possible contamination of the needle point by the fingers is avoided.

Another form of isolator for the fluid 26 is shown in Fig. 6, whereby the tip of the stylet 35 has been coated with a nonreacting material 36 which may be of chromium, nickel, platinum, or similar metal. Since the stylet 35 tightly fits the bore of the body portion 22, the fluid 26 will only come in contact with the material which is inactive thereto.

Referring now to Fig. 7, a mixer type of combination ampoule and syringe is shown. This unit has a body portion 40, a cap 41, in which is a solution 42, this unit being of the same general type shown in our above mentioned co-pending application. In this form, however, the body section 40 has the opposite end from the cap threaded, and on which is threaded a cap member 44 which contains a powdered material or a liquid 45. Between the two cap members, and within the body portion 40, is a flexible tubular section 46 which communicates with the bore 47 of the body portion 40, and also with the bore of the needle 49. Threaded into one side of the body 40 is a thumb screw 50 which normally is advanced until the wall of the tube 46 is collapsed to seal the fluid in the cap 41 from the material in the cap 44. The combination ampoule-syringe may thus be shipped or transported in the manner shown in Fig. 7. However, when it is desired to make an injection, the thumb screw 50 is backed off and the cap 41 compressed to force the fluid 42 into the member 44. Several manipulations of the cap 41 are made at intervals until the powder 45 has been entirely dissolved or mixed with the fluid 42 or two liquids mixed. After this has been accomplished and the final mixture is in the cap 41, the cap 44 is then unscrewed and the syringe is ready for making an injection.

A similar form of mixing syringe is shown in Fig. 8, wherein the body portion 53 has a cap 54 containing a liquid 55 and another threaded cap 57 containing a powder or liquid 58, the needle being shown at 59. In this combination, a flexible resilient tube member 61 is inserted within an enlarged bore of the body member 53, the bore of which communicates with the bore of the needle 59 through the body 53. In this modification, a thumb nut 62 compresses the flexible tube 61 to isolate the fluid 55 from the powder or liquid 58. When it is desired to mix the fluid and powder or liquid, the thumb screw is backed off and the fluid forced into the cap 57 until the powder is completely dissolved or mixed with the fluid or the fluids mixed, after which the mixture is drawn into the cap 54. The cap 57 is then removed and the syringe is ready for use.

As shown in Figs. 9 and 10, a sliding element 65 within the body portion 66 may be used to isolate the bore 67 from the bore 68 when in the position shown. However, when moved in the direction of the arrow, the two bores may be aligned to permit the mixing operation. In Fig. 10, the body portion 70 has a rotary valve element 71 therein, which may be rotated by a finger member 72, and thus, the bore 73 will be connected with bore 74 when the bore 75 of the valve is in alignment with the other bores. The same feature of aspiration before injection is present in the above described forms of combination ampoule-syringes, together with the other features incorporated therein, all of the modifications described above having stopping means for the fluid in the aspiration cap. Furthermore, either the body portions or the caps or both may be transparent to permit the results of aspiration to be observed.

We claim:

1. An ampoule comprising a body portion having a bore therein, finger wings extending from opposite sides

4

of said body portion, a flexible cap attached to one end of said body portion within which a solution is adapted to be contained, said cap having one cross-sectional dimension greater than the cross-sectional dimension at right angles thereto in a plane perpendicular to said bore. one of said cross-sectional dimensions being greater than the height of said cap, pressure on said cap perpendicular to said plane first produces outward bulging of said cap across its narrower width to increase the internal volume of said cap, and further pressure on said cap in the same direction decreasing the internal volume of said cap, a needle connector attached to the other end of said body portion and having a bore in alignment with the bore in said body portion, and a closing cap member on said connector, said member having a portion insertable in the bore of said connector for closing the bore in said connector.

2. An ampoule comprising a body portion having a bore therein, finger wings extending from opposite sides of said body portion, a flexible cap member mounted on one end of said body portion in which a fluid is adapted to be contained, said cap having one cross-sectional dimension greater than the cross-sectional dimension at right angles thereto and in a plane perpendicular to said bore, one of said cross-sectional dimensions being greater than the height of said cap, pressure on the cap perpendicular to said plane first produces outward bulging of said cap across its narrower width to increase the internal volume of said cap, and further pressure on said cap in the same direction decreases the internal volume of said cap, and a connector attached to the other end of said body portion and having a bore in alignment with the bore in said body portion, said bore in said connector being adapted to be closed, and a needle connected to said connector through which any fluid in said cap member may be injected when said bore is open.

3. An ampoule comprising a body portion having a closeable bore therein, finger wings extending from opposite sides of said body portion, a flexible cap attached to one end of said body portion and within which a fluid is adapted to be contained, said cap being wider in one direction than in another direction perpendicular thereto, pressure on said cap sufficient to deform said cap first produces outward bulging of said cap across its narrower width to increase the internal volume of said cap, further pressure on said cap in the same direction decreasing the internal volume of said cap, and means for closing said body portion bore.

4. An ampoule in accordance with claim 3 in which said last mentioned means is a connector having a bore in alignment with said body portion bore, and a cap member on said connector having a portion insertable in said connector bore.

5. An ampoule in accordance with claim 3 in which a needle extends from the other end of said body portion, a stylet within the bore of said needle and the bore of said body portion, said stylet having an end member adapted to seal said fluid within said cap.

6. A combination in accordance with claim 5, in which the other end of said stylet is disposed within a needle cap member and has a barb thereon for removing said stylet from said needle, together with the removal of said needle cap member.

7. A combination in accordance with claim 5, in which said stylet has the end member thereof coated with material inactive to said fluid.

8. An ampoule in accordance with claim 3, a second cap is mounted on the other end of said body portion containing an ingredient to be mixed with any fluid in said first mentioned cap, a needle extending into said second mentioned cap, a conduit intermediate said first mentioned cap and the bore of said needle, and means for closing and opening said conduit to permit the passage of said fluid therethrough.

9. A mixer type of combination ampoule and syringe

5

in accordance with claim 8, in which said last mentioned means includes a screw which collapses said conduit to close the bore thereof when said screw is in one position, and permits said bore of said conduit to open when said screw is in another position.

10. A mixer type of combination ampoule and syringe in accordance with claim 8, in which said last mentioned means includes a valve having a bore therein adapted to communicate with the bores in said body portion and in said needle when said valve is in one position, said valve isolating the bores in said body portion and in said needle when in another position.

11. An ampoule in accordance with claim 3 in which a needle is attached to said body portion, a second cap is attached to said body portion, said second cap containing an ingredient to be mixed with any fluid in said first mentioned cap and injected when mixed together, and a valve in said body portion for maintaining said ingredient and fluid isolated from one another until said ingredient and fluid are to be mixed.

5

10

15

20

6

12. An ampoule-syringe in accordance with claim 11, in which one of said caps is adapted to inject the ingredient therein into and out of said second mentioned cap, said other cap containing said needle and adapted to be removed from said body portion to expose said needle for injection.

References Cited in the file of this patent

UNITED STATES PATENTS

388,029	Dunn	Aug. 21, 1888
1,021,146	Greeley	Mar. 26, 1912
2,535,310	Mattison	Dec. 26, 1950

FOREIGN PATENTS

520,414	Great Britain	Apr. 23, 1940
809,698	Germany	Aug. 2, 1951
832,493	France	July 4, 1938
997,245	France	Sept. 12, 1951