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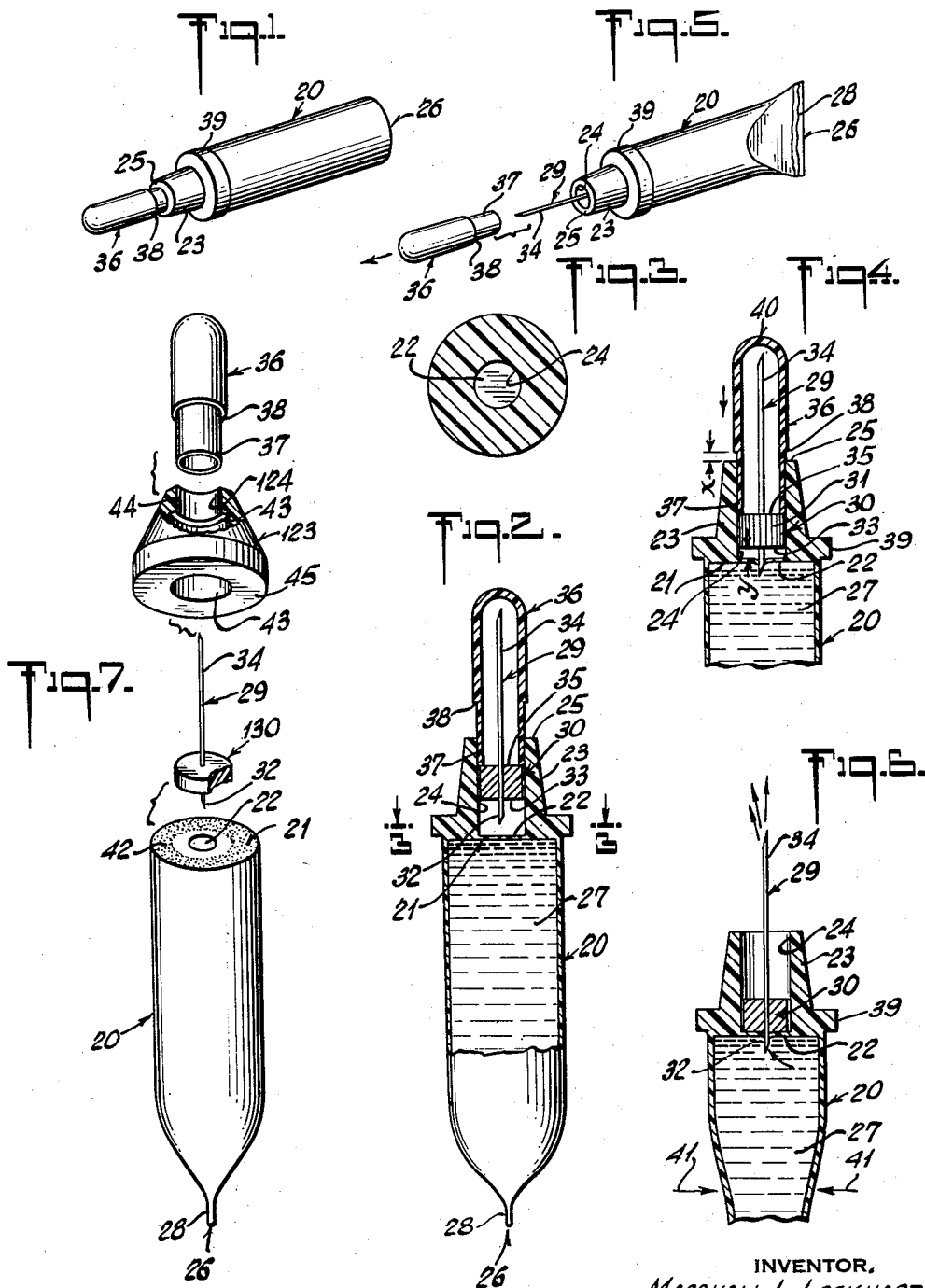
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2,625,157

SINGLE DOSAGE DISPOSABLE HYPODERMIC SYRINGE AMPOULE AND ASSEMBLY

Filed Dec. 22, 1950

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

Fig. 9.

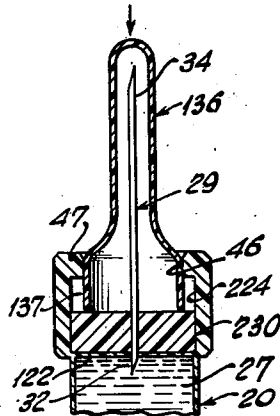
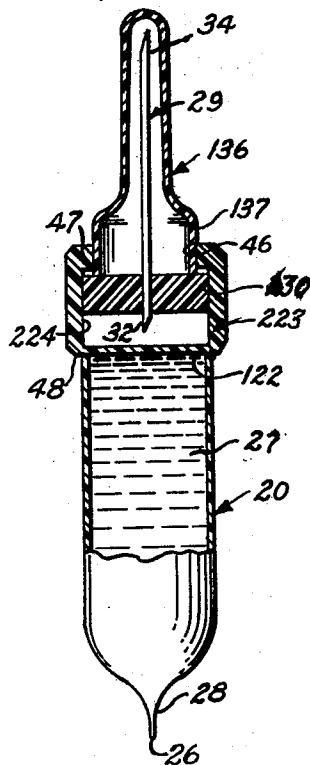


Fig. 8.



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SINGLE DOSAGE DISPOSABLE HYPODERMIC
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The present invention relates to disposable hypodermic syringe ampules and assemblies of the type which, prior to distribution, may be charged with single dosages of therapeutic liquids so that, upon subcutaneous injection of contents, the ampules or devices may be discarded.

A general object of the present invention is to provide such hypodermic syringe ampules and assemblies, the parts of each of the latter being unusually few and extremely simple in construction, readily produced on an economical mass basis, and easily assembled and charged with therapeutic fluids intended for hypodermic administration; the various embodiments featuring a movable wall container or elastic aspirating ampule capable of capacity reduction and in which the therapeutic fluid is isolated, with the container or ampule being associated with a double-ended cannula, preferably protectively-covered, and one being manipulatable in a simple manner directly relative to the other so as to bring the cannula bore into communication with the interior of the container immediately at will.

A more specific object of the present invention is to provide such a hypodermic syringe device in which a movable wall container or elastic aspirating ampule is closed by a needle-pierceable diaphragm forming the bottom of a socket in which support means is mountable to carry therein a double-ended cannula with its inner end located outward of the diaphragm, and a removable cover is mountable in the socket beyond the support means for protectively housing the cannula, the diaphragm and inner end of the needle being relatively manipulatable in a unique and very simple manner with movement of the cover in the container socket to cause the cannula to pierce through the diaphragm to communication with the interior of the container for hypodermic discharge of contents thereof by application of manual pressure to reduce the capacity of the movable wall container or elastic ampule.

Another object of the present invention is to provide such hypodermic syringe device in the form of a structure featured by a collapsible tube moldable from elastic plastic or other suitable similar material having a hollow neck extending axially from one end thereof with the bore in the neck separated from the interior of the tube by a needle-pierceable diaphragm, the hollow neck carrying therein a slidable body through which the double-ended cannula extends, with the inner end of the latter spaced outwardly from the diaphragm without intervening structure and with a cover cap having its inner open end slidably

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mounted in the neck bore beyond the support body so that the latter may be slid further into the bore by depression of the cap thereinto to cause the cannula to pierce through the diaphragm; such device thus permitting one to carry with him a dose of therapeutic composition effectively housed in a protective manner within the syringe device, which can be quickly and easily prepared for hypodermic injective use simply by first depressing and then withdrawing the cap.

A further object of the present invention is to provide structural embodiments of such hypodermic syringe device, the parts of which are readily and economically constructed, and such ampules, which permit efficient and economical use and operation or functioning thereof, as will be more fully apparent from the following descriptions of said embodiments shown by way of example in the accompanying drawings.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view to a scale slightly larger than natural size of an embodiment of the hypodermic syringe device of the present invention, with the parts thereof assembled relative to each other and with an end of the container open to receive a charge of therapeutic fluid;

Fig. 2 is a side view, with parts in axial section and broken away, of the structure shown in Fig. 1, but to a much larger scale, and indicating the container charged with a dosage of therapeutic fluid and closed;

Fig. 3 is a sectional view substantially on line 3—3 of Fig. 2;

Fig. 4 is a sectional view similar to Fig. 2, but with the bottom end of the container broken away, showing manipulation of parts to bring about communication of the cannula with the interior of the container;

Fig. 5 is a perspective view similar to Fig. 1 of the charged hypodermic device shown in Fig. 2 and indicating removal of the cap after can-

nula manipulation depicted in Fig. 4 to permit hypodermic administration of contents;

Fig. 6 is a sectional view similar to Fig. 4 showing manipulation of the hypodermic device in the expulsion of fluid contents;

Fig. 7 is an exploded perspective view of parts of a modified form of the hypodermic device shown in Figs. 1 to 6 inclusive;

Fig. 8 is a sectional view similar to Fig. 2 of another modified form of the device; and

Fig. 9 is a sectional view of the structure shown in Fig. 8, similar to Fig. 4.

Referring to the drawings, in which like numerals identify similar parts throughout, it will be seen that an embodiment of the present invention shown in Figs. 1 to 6 inclusive may comprise a collapsible wall container 20, preferably in the form of a collapsible tube or capsule, having relatively thin, highly flexible, elastic side walls and, for this purpose, preferably made of an elastic plastic composition, such as a polyethylene composition. Desirably the composition employed is transparent, at least to a degree permitting inspection of container contents and covered parts. A further advantage of using one of the polyethylene compositions resides in the fact that they are readily molded to desired shatterproof shapes, are moisture-proof and effectively fluid-tight so that capsules thereof will not permit leakage of contained liquids even under appreciable internal pressure while being substantially inert to medicinal and therapeutic preparations intended to be stored therein and administered therefrom. Also, bodies thereof, even of substantial thickness, are readily pierceable by a needle with the material at the margin of a needle-pierced perforation having the inherent characteristic effectively of gripping the exterior of the needle to thereby form a substantially fluid-tight seal. Of course, other suitable materials having the proper characteristics to answer the demands of a particular use or desired functioning of a certain structural embodiment within the scope of the invention may be employed in the practice thereof.

As best shown in Fig. 2, one side of the collapsible wall container 20, i. e., one end 21 of the plastic tube, is closed by a needle-pierceable diaphragm 22, preferably in the form of a flexible membrane, and when made as an integral part of the elastic plastic container has certain elasticity. A head 23 is mounted upon end 21 of container 20, preferably in the form of a hollow neck having a socket, preferably in the form of a cylindrical bore 24, extending longitudinally or axially thereof, closed at its inner end or bottom by diaphragm 22. The outer end 25 of the hollow neck 23 constitutes an abutment for cooperative association with certain stop means, as explained hereinafter. As will be seen from Figs. 1 and 2, the container 20 preferably is molded integrally with the neck 23 and diaphragm 22 and has its bottom end 26 open to receive therein a charge of therapeutic fluid, such as a dosage of medicinal liquid 27. Thereafter the bottom end 26 of the tube may be securely closed by pinching opposite edges together and heat-sealing it at 28, as indicated in Fig. 2, to form a loaded elastic aspirating ampule as is more fully indicated hereinafter.

The hollow neck 23 is adapted to receive and carry therein a double-ended cannula 29, preferably supportable in the bore 24 by means of a body 30. The support body 30 may, as is best seen in Fig. 4, comprise a cylindrical slug, pref-

erably having its cylindrical surface 31 knurled or milled, which may be employed to adjust the frictional mount thereof in the bore 24 and may be formed during a rolling or crimping process of securely anchoring the cannula 29 in an axial hole therethrough. As shown, inner end 32 of the cannula 29 projects a short distance inwardly of inner side 33 of the support body 30, with its major portion or outer end 34 extending outwardly of outer side 35 of the support body. As indicated in Fig. 2, normally the support body 30 is to be mounted at a certain point in the bore 24 so that the cannula inner end 32 extends toward but short of or is spaced outwardly of the diaphragm 22 to avoid puncture of the latter. It is temporarily held in such position preferably by making the support body 30 slightly oversize, or, i. e., of a diameter slightly larger than the diameter of the bore 24, so that it will be slidable therein but can be frictionally held in any desired position. By employing elastic plastic composition from which to form the container body and its head 23, the walls of the hollow neck will have some elasticity so as to permit the desired sliding action of the support body 30 therein, especially when the latter is made of substantially rigid material, such as metallic composition, as may be preferred. Flexibility of the neck 23 may be limited to a small degree by making the walls thereof relatively thick while assuring relatively high flexibility in the container side walls by making them relatively thin, characteristic of such plastic compositions due to their unique moduli of rigidity.

Cover means 36, preferably in the form of an elongated cup-shaped cap, is provided with the external diameter of its inner end 37 preferably slightly larger than the diameter of the bore 24, so as to be slidable therein but capable of being securely held frictionally in any desired position. The protective cap 36 may be formed of a relatively rigid material, such as metal or one of many plastic compositions, and is preferably of transparent material to permit observation of the housed cannula and relatively shatterproof. It will be understood, however, that if made with relatively thick side walls, cap 36 may be formed of a composition similar to that employed in the molding of the ampule or container 20 and its integral neck 23. As a result, the edge of the inner end 37 of cap 36 will abut the outer face 35 of the support body 30, and in the embodiment of the invention illustrated in Figs. 1 to 6 inclusive, may be employed to push the latter inward or down into the bore 24. The cap 36 is provided with suitable stop means to limit its sliding action into the bore 24, and for this purpose preferably is provided with a shoulder 38 adapted to abut against the outer end 25 of the neck 23, and may be formed by reducing the inner end 37 in section as best shown in Fig. 5. Of course, cap 36 is of a length sufficiently to house the outwardly-extending end 34 of the cannula 29 protectively without damage or contamination thereof, and the stop means or shoulder 38 is located at a distance from the edge of the inner end 37 preferably sufficient to permit the support body 30 to be slid inward in bore 24 just far enough as to assure that the inner end 32 of the cannula will pierce through or puncture the diaphragm 22 sufficiently to communicate the cannula bore with the interior of ampule 20. Accordingly, the distance between the edge of the inner end 37 of the cap 36 and the stop shoulder 38 will approach the difference between

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the depth of the bore 24 and the longitudinal thickness or length of the support body 30, and preferably will be slightly less than that difference so that the support body will not be injuriously jammed against the relatively thin diaphragm 32. This will be apparent from Fig. 4 wherein it is indicated that the support body 30 is being slid forward by depression of the cap 36, with the distance y between the inner face 33 of the body 30 and the diaphragm 22 slightly greater than the distance x between the outer end 25 of neck 23 and the cap shoulder 38.

In operation of the hypodermic syringe embodiment shown in Figs. 1 to 6 inclusive, after a charge of therapeutic fluid 27 has been sealed within the container tube 20 to form a loaded ampule, the device may be used for effective distribution of single dosages. For example, it may be effectively employed for supplying soldiers in the field with narcotic doses to be self-administered hypodermically in emergencies. Since the preferred composition is substantially shatterproof, such devices may be carried with assurance that they will not be damaged or burst with rough usage. They are quickly and easily manipulated, which is highly important for self-administration by a severely injured person.

It is a simple matter for one to grasp the tubular container 20, with its head flange 39 tending to assure a secure non-slip grasp thereof, and depress the cap 36 by pushing on the outer end 40 thereof to cause it to telescope into the hollow neck 23 and slide the support block 30 forward in the bore 24 to puncture of the diaphragm 22. Thus, the bore of the cannula 29 is brought into communication with the interior and the contents of the container or ampule 20, as is indicated in Fig. 6. Since diaphragm 22 is formed of elastic material, the margins of the hole pierced therein by the inner cannula end 32 will securely grip the external surface of needle 29 to provide an effective fluid-tight seal at that point. The cap 36 is then withdrawn from the bore 24, as indicated in Fig. 5 and the outer end 34 of the cannula 29 thrust into the patient's flesh so that the contained medicinal dosage may be subcutaneously administered by applying mechanical pressure to opposite sides of the thin walls of the container or ampule 20, i. e., collapse it in the direction of the arrows 41, 41 in Fig. 6 to expel the fluid through the cannula. Due to the cheapness of the hypodermic device, it may be and is intended to be discarded after expulsion of contents in the hypodermic administration thereof.

The above described structure also has further advantages making it acceptably useful by physicians and other technicians who insist on an aspirating action for a show of blood at the inner end of the cannula. As is well known, some medicinal or therapeutic compositions are intended for intravenous injection and others for intermuscular injection. To assure proper insertion of the cannula in a vein aspiration for a show of blood is employed, and it is also used to indicate when the needle of a syringe for administering an intermuscular injection is improperly located in a vein. By forming the walls of the container or ampule 20 of elastic material, such aspiration is permitted since if squeezing pressure on the side walls of the container is momentarily relieved, suction will be created to develop the show of blood at the inner end 32 of the cannula.

As indicated in Fig. 7, a modified form of the

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invention may be formed of a greater number of parts suitably assembled or mounted together. For example, the collapsible wall tube or ampule 20 may be formed from a length of tubing or elastic plastic composition closed at one end 21 by an integral membrane, with the center area thereof constituting diaphragm 22, and with a surrounding marginal area 42 suitably provided with cement. Head 123 may, if desired, be formed of different material, such as substantially rigid plastic composition, having a bore 124 counter-bored from the lower end, as indicated at 43, to provide an internal flange 44. The bottom face 45 of head 123 is intended to be adhered to the closed end 21 of container or ampule 20 by the cement in the area 42. However, prior to such cement affixation of the head to the container or ampule, the cannula unit comprising needle 29 mounted through a suitable support block 130 will be inserted in the counterbored bore 124 from the bottom end thereof. If relatively rigid material is employed for the formation of head 123, it is to be understood that relatively elastic or resilient material may be employed in making the support body 130 so that it will slide in the counterbored portion of bore 124 with appreciable frictional resistance when its external diameter is slightly larger than the internal diameter of the counter-bore. Also in such case permitted contraction of elastic body 130 may allow it to be snapped into counterbored portion 43 of bore 124 down past internal flange 44. Consequently, in such construction there is assurance that the cannula inner end 32 will be held out away from the diaphragm 22 securely until puncture of the latter is desired. The cover cap 36 may be similar to that employed in the embodiment shown in Figs. 1 to 6 inclusive, and, of course, will be used to force the cannula unit forward to puncture of the diaphragm 22. The operation of that embodiment in the hypodermic administration of contents may be similar to that practiced with the use of the construction shown in Figs. 1 to 6 inclusive.

Another modification of the device of the present invention is shown in Figs. 8 and 9 in which is proposed the employment of a support body 230 of elastic material of appreciably greater diameter frictionally held in a larger bore 224 in a thinner walled neck 223, preferably of elastic plastic material and molded integrally with the container or ampule 20. The socket or bore 224 is reduced in section at its outer end as indicated at 46 so that the resulting internal flange 47 may be employed to assure retention of the support body 230 and its cannula 29 in the socket 224. The support body 230 is readily inserted into the socket 224 by virtue of the elasticity of both the former and the retaining flange 47, permitting the support body to be squeezed through the restricted throat at 46. The cover cap 136 may be similar to 36 of the embodiments of Figs. 1 to 7 inclusive, except that its inner end 137 may be enlarged to be frictionally gripped within restrictive throat 46, but, of course, will be slidable therethrough. The embodiment in Figs. 8 and 9 also dispenses with the employment of stop means to limit inward sliding motion of the support body 230 since by forming it of relatively non-rigid material, providing the diaphragm 122 of much larger area, and preferably by locating the juncture 48 of the side walls of container tube or ampule 20 radially inward of the inner walls of the socket 224, there is relatively no tendency

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for rupture of the diaphragm when the support body is jammed up thereagainst in the manner indicated in Fig. 9. It will be understood, of course, that after the diaphragm 122 has been pierced by the inner end 32 of the cannula in the manner proposed in Fig. 9, the cover 139 will then be withdrawn so that that embodiment of the hypodermic syringe device may be used in a manner similar to that indicated above in connection with the forms of the invention shown in Figs. 1 to 7 inclusive.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description are efficiently attained and, since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A single dosage, disposable hypodermic syringe comprising, a collapsible ampule having a longitudinally-extending bore in one end sealed off inwardly of its outer end by a pierceable membrane, slidable means frictionally receivable in said bore outward of said membrane, a longitudinally-extending double-ended cannula carried by said slidable means with the length of the latter and that of the inner end of said cannula extending beyond said slidable means together being appreciably less than the depth of said bore to space the tip of the cannula inner end outwardly from said membrane when said slidable means is initially positioned into the outer end of said bore, and a removable cover mounted over the outer end of said cannula with its inner end slidably receivable in said bore to engage said slidable means and push it inward to pierce said cannula inner end through said membrane.

2. A single dosage, disposable hypodermic syringe comprising, in combination, a collapsible tube having a hollow neck extending from one end thereof with its bore sealed off at the bottom by a needle-pierceable membrane, an oversized block slidably received in the neck bore and frictionally held temporarily in an outward position, a double-ended cannula mounted through said block with its inner piercing end spaced outwardly from said membrane with no intervening structure to be ready for puncture by the cannula inner end with forward sliding of said body into said bore, and a removable cap slidably mounted in said bore protectively over the outer end of said cannula with its inner end engageable against the outer side of said block so as to push the latter inward with depression of said cap for puncturing said membrane.

3. A single dosage, disposable hypodermic syringe comprising, a collapsible tube having a longitudinally-extending bore in one end sealed off inwardly a certain distance from its outer end by a pierceable membrane, slidable means of certain longitudinal length frictionally received and temporarily held in said bore outward a second predetermined distance from said mem-

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brane with no intervening blocking structure, a longitudinally-extending double-ended cannula carried by said slidable means with its inner end projecting beyond the latter a distance less than the second-mentioned distance to be spaced outwardly of said membrane, a removable elongated cap mounted over the outer end of said cannula with its inner end slidably received in said bore to engage said slidable means and push it inward to pierce said cannula inner end through said membrane, and stop means on said cap to limit inward travel of said slidable means in said bore short of said membrane but sufficient to assure piercing of said cannula inner end completely through said membrane.

4. The hypodermic syringe as defined in claim 3 characterized by the location of said stop means on said cap a distance slightly less than the difference between the longitudinal length of said slidable means and said first-mentioned distance to engage tube structure at the outer end of said bore for so limiting inward travel of said slidable means.

5. A single dosage, disposable hypodermic syringe comprising, a collapsible tube having a longitudinally-extending bore of certain depth defined at and sealed off at its inner end by a pierceable membrane, slidable means of certain longitudinal length frictionally received and temporarily held in said bore outward a predetermined distance from said membrane with no intervening blocking structure, a longitudinally-extending double-ended cannula carried by said slidable means with its inner end projecting beyond the latter a distance less than the mentioned distance to be spaced outwardly of said membrane, and a removable cup-shaped elongated slidable cap having its open inner end frictionally received within the outer end of said bore beyond said slidable means and covering said cannula, said cap having a stop shoulder outward of its inner end a distance slightly less than the difference between the depth of said bore and the longitudinal length of said slidable means.

6. A single dosage, disposable hypodermic syringe comprising, in combination; a fluid-exPELLING and aspirating, elastic plastic tubular ampule having an integral hollow neck extending axially from one end thereof provided with a cylindrical bore of certain depth sealed off at its bottom by a needle-pierceable membrane located a certain distance from the outer end of said neck; a substantially cylindrical, slightly oversize slide of relatively rigid material and certain longitudinal thickness frictionally received and temporarily held in an outward position in the bore with no intervening blocking structure; a double-ended cannula mounted through said slide with its inner end extending toward but short of said membrane and capable of piercing the latter when moved forward; and a removable, cup-shaped, elongated slidable cap having its open inner end frictionally received within the outer end of said bore and covering said cannula with its inner end engageable against said slide to push it forward in said bore with depression of said cap, said cap having an external shoulder thereon adapted to engage the outer end of said neck for limiting inward travel thereof and located a distance from the inner end of said cap slightly less than the difference between the depth of said bore and the thickness of said slide.

7. A single dosage, disposable hypodermic syringe comprising, in combination; a fluid-exPELLING and aspirating, elastic tubular ampule of polyethylene composition having an integral hol-

low neck extending axially from one end thereof with the side walls thereof being imperforate and provided with an axially-extending socket defined at its bottom by a needle-pierceable elastic membrane element of substantially the same composition; a substantially cylindrical, slightly oversize, substantially inelastic support body frictionally mounted wholly within the outer end of said socket outward of said membrane element; a double-ended cannula mounted through said support body with its inner end element spaced outwardly from said membrane element there being no intervening blocking structure between said membrane element and said cannula inner end element with the latter being capable of piercing said membrane element when those two elements are brought together; and a removable, cup-shaped, elongated slidable cap of plastic having a rigidity substantially greater than that of said tube composition with its side walls and outer end being imperforate and having its inner end open and of a diameter substantially equal to that of said support body; said socket being of a depth greater than the combined lengths of said cannula inner end element, said support body and a portion of the open inner end of said cap whereby the latter is frictionally received within the outer end of said bore beyond said support body and covering the outer end of said cannula; said neck, the unpierced membrane element and said cap forming a telescopic enclosure protectively housing said double-ended cannula in a substantially hermetically-tight manner with said cap being adapted to be telescoped into said neck to push said cannula inner end element forward to puncture of said membrane element and then out of said neck to uncover said cannula outer end for injective use.

8. The hypodermic syringe as defined in claim 7 characterized by the provision of a circumferential stop shoulder on the outer side of said cap to engage the outer end of said neck for limiting inward travel of said body in said bore short of said membrane element to prevent said body from being pushed forward to rupture of said membrane element but sufficient to assure piercing of said cannula inner end completely through said membrane element.

9. A single dosage, disposable hypodermic syringe comprising, in combination; an elastic plastic, aspirating, tubular, liquid-expelling ampule having an integral, hollow, coaxial neck extending from one end with the bore therein closed off at its inner bottom end by an integral, needle-pierceable, transversely-extending, elastic membrane; a substantially cylindrical, rigid support body of a certain length and a diameter slightly larger than said bore frictionally receivable in the latter; a double-ended cannula rigidly mounted through said body with its inner end extending from the inner end of said body a distance appreciably less than the depth of said bore minus the length of said body so that the latter may be wholly engaged within the bore with an outer portion of the latter beyond said body free to receive another element and with the cannula inner end outward of said membrane; and a cup-shaped, elongated, substantially rigid cover receivable of the outer end of said cannula with its inner open end abutted against the outer end of said body, said cover inner end being of a diameter slightly greater than that of said bore to be frictionally engaged in the outer portion of said bore in a slidable manner to push said body forward into said bore, said cover having a circumfer-

ential shoulder located outward of said cover inner end at a distance greater than the difference between the depth of said bore and the combined thickness of said membrane and lengths of said body and said cannula inner end but less than the difference between the depth of said bore and the length of said body substantially aligned with the outer end of said neck to engage the latter to limit inward travel of said cover and body in said bore short of said membrane with puncture of the latter by said cannula inner end.

10. A single dosage, disposable hypodermic syringe comprising, in combination; a container having flexible side walls for reducing the internal capacity thereof and closed at one end by a needle-pierceable membrane; a head fixedly mounted on said container end and having an elongated, longitudinally-extending, closed-wall bore of certain lateral dimension and depth terminating at said membrane; a relatively short support body slidably mounted wholly within said bore and of slightly larger lateral dimension with one of said head and body elements being formed of relatively elastic material to assure frictional mountation of the latter in the former temporarily to hold said body in an initial outward, relatively-fixed, wholly-housed position; a double-ended cannula mounted through said support body having an inner piercing end of certain length extending inward of said body toward said membrane with no structure intervening said cannula end and membrane, the combined lengths of said inner cannula end and said body being appreciably less than the depth of said bore whereby the tip of said cannula end is spaced outwardly from said membrane when said body is in its initial outward and wholly-housed position, said cannula having an outer injecting end extending outward from said body and out of said bore beyond said head for injective use; and an elongated, open-mouth, cup-shaped, imperforate protective cover slidably and removably telescoped inward over the outer end of said cannula and having an open inner end frictionally engaged into and telescopically received by said bore on the outer side of said body to be slidable inwardly therein with the internal diameter of its open inner end less than the external diameter of said body so that the edge of that cover end will engage said body to push it forward to puncture of said membrane by said cannula inner end with telescopic depression of said cover; said telescoped head and cover together forming a substantially hermetically-sealed protective enclosure housing said cannula in a sterile manner.

11. The syringe structure as defined in claim 10 characterized by said container and head being provided as a unitary structure made from elastic plastic material with said container constituting an elastic collapsible tube and its bored head constituting an elastic, elongated, imperforate hollow neck extending from one end of said tube and defining with said membrane a cylindrical socket in which said body in the form of a cylindrical hub is slidably mounted, said cover being in the form of an elongated, cup-shaped, relatively rigid capsule with its inner end and said hub being of substantially equal diameter slightly larger than the bore of said elastic neck to be frictionally and slidably mounted therein.

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(References on following page)

11

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,288,174	Pittenger	Dec. 17, 1918
1,522,198	Marcy	Jan. 6, 1925
1,687,502	Marcy	Oct. 16, 1928
1,929,616	Vopata	Oct. 10, 1933

5

Number
2,022,369
2,371,086
2,445,477

12

Name	Date
Curtis	Nov. 26, 1935
Watson et al.	Mar. 6, 1945
Folkman	July 20, 1948

FOREIGN PATENTS

Number	Country	Date
117,415	Australia	Aug. 18, 1943
573,611	Great Britain	Nov. 28, 1945
545,068	France	July 12, 1922
28,009	Switzerland	Mar. 11, 1903

10