

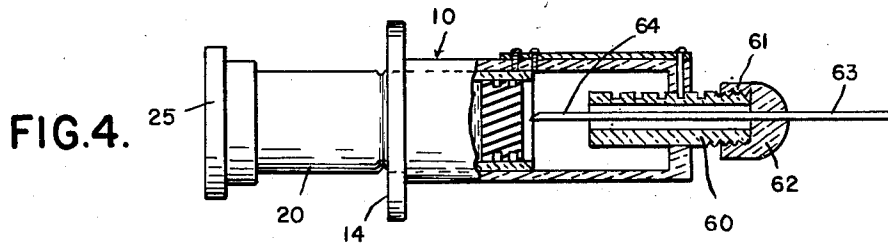
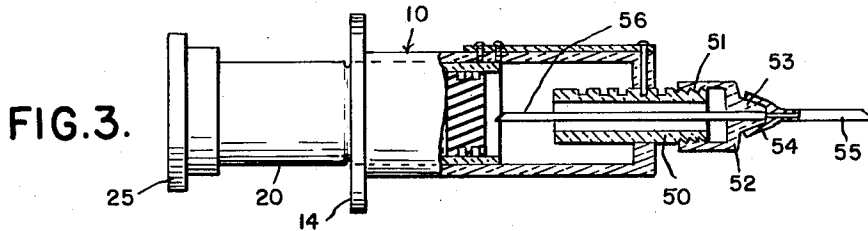
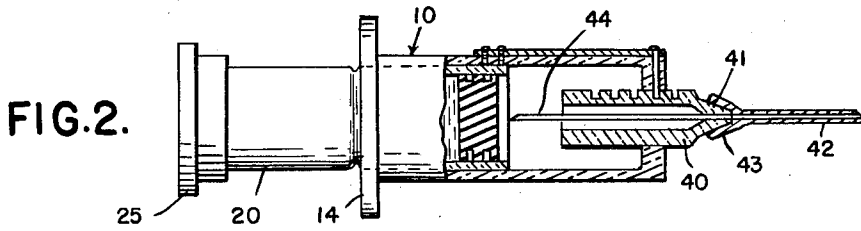
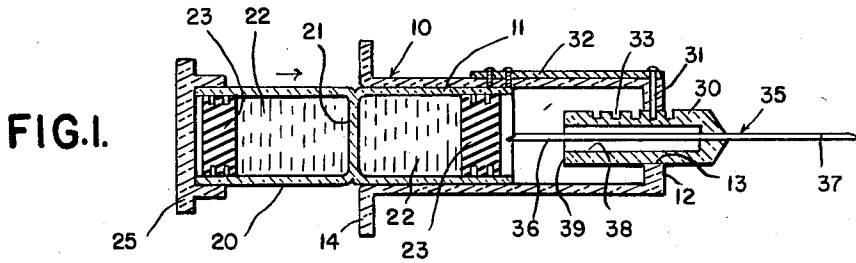
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HYPODERMIC SYRINGE

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HYPODERMIC SYRINGE

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19 Claims. (Cl. 128—220)

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The present invention relates to a hypodermic syringe and more particularly to a hypodermic syringe of the type adapted to receive an ampoule having a seal received in one end and capable of piston-like movement therein.

It is an object of the present invention in a hypodermic syringe of the character described to provide means for predetermining dosage administered in fractions or multiples thereof of the contents of the syringe.

It is a further object of the present invention to provide a hypodermic syringe of the character described characterized by the removability and replaceability of either or both the inner and outer portions of the needle.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a longitudinal sectional view of a hypodermic syringe embodying the present invention;

Figure 2 is a side elevation partly in section of a somewhat different modification of the improved hypodermic syringe;

Figure 3 is a longitudinal view partly in section of yet another embodiment of the improved hypodermic syringe; and

Figure 4 is a longitudinal view partly in section of a fourth embodiment of the present invention.

Referring first to Figure 1, the hypodermic syringe comprises a barrel 10 having a generally cylindrical body portion 11 open at one end and having its opposite end closed by an end wall 12 which is provided with a central, preferably non-circular opening 13 therein. The open end of the barrel 10 is provided with a pair of lateral projections 14 which serve as finger pieces during use of the syringe, as will subsequently be described.

The syringe is intended for use with an ampoule 20, which is illustrated as comprising an elongated, generally cylindrical body formed of glass and open at both ends. A central partition 21 is provided and the material to be administered is contained within the chambers 22 located within the ampoule outwardly from the central partition 21. Each end of the ampoule 20 is provided with a seal 23 which is formed of a material easily penetrated by the end of a hollow needle but which is adapted to sealingly engage the needle after penetration. Certain rubber compositions are suitable for the seals and these are well known in the art. The seals 23 are adapted to have a piston-like sliding movement within the interior of the ampoule, for a purpose which will subsequently be described. A separate removable cap 25 is provided which fits over the outer end of the ampoule 20 and cooperates with the finger pieces 14 previously described so that pressure

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may be applied therebetween to force the ampoule downwardly toward the closed end of the barrel.

Adjustably received within the central opening in the end wall 12 of the barrel is a seal stop 30 of the same cross sectional shape as the central opening 13 and which is slidably mounted therein. In practice, other means could be employed for effecting adjustment of the seal stop 30 longitudinally of the barrel 10, as for example a threaded connection for the seal stop 30 in the opening 13, but I have chosen to illustrate adjusting means which takes the form of a locking element 31 slidable in a passage formed transversely of the end wall 12 and communicating with the central opening 13. A leaf spring 32 is secured to the outer surface of the barrel and is effective to urge the element 31 inwardly toward the seal abutment 30. A plurality of recesses 33 are provided in the outer wall of the seal abutment 30 in alignment with the element 31. It is for the purpose of maintaining the series of recesses 33 in alignment with the element 31 that the central opening 13 and the seal abutment 30 are made of noncircular cross section, so as to prevent relative rotation therebetween.

Preferably the outer surface of the seal stop 30 is provided with indicia indicating the dosage which will result from each particular setting of the seal stop.

A double-ended needle 35 is provided which in use is supported against movement relative to the barrel and the needle 35 has an inner portion 36 which extends inwardly of the barrel beyond the end of the seal stop 30 and is adapted to penetrate the seal 23 as the ampoule 20 is moved to the right, as seen in this figure. The outer portion 37 of the needle extends outwardly beyond the end of the assembly and is the portion thereof which is adapted to penetrate the skin of a patient. In the embodiment illustrated in Figure 1, the needle 35 is a unitary, integral, hollow, metallic tube which is rigidly and permanently secured to the seal abutment 30. It will be observed that in the preferred form of the invention the seal abutment 30 at its inner end is of tubular construction having a central opening 38 through which the inner portion 36 of the needle extends. The end 39 of the seal abutment is adapted to engage the seal 23 after the inner portion 36 of the needle has penetrated the seal 23. Further movement of the ampoule 20 to the right, as seen in Figure 1, will result in a relative sliding movement of the piston-like seal 23 to the left, thus applying pressure to the liquid contained within the chamber 22 of the ampoule, which in turn forces it outwardly through the needle 35. It will be apparent from an inspection of this figure that the dosage administered by full movement of the ampoule into the barrel 10, which movement is limited by the engagement of the end of the

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ampoule with the bottom wall 12 of the barrel, is determined by the amount which the seal abutment 30 projects inwardly beyond the end wall 12 of the barrel. It will further be apparent that if desired the contents of the chamber 22 may be administered in a series of doses, each of which is a predetermined fraction or multiple thereof of the contents of the chamber 22 when filled. It will further be observed that employing the double-ended ampoule illustrated in Figure 1, after the material at one end of the ampoule is exhausted the ampoule may be reversed in the barrel and the material in the other end thereof administered in like manner.

The modification illustrated in Figure 2 is essentially similar to that illustrated in Figure 1 and only the feature of difference will be described. In this modification the tube abutment illustrated at 40 has its outer portion formed as a male Luer fitting 41. The outer portion 42 of the needle is provided with a conventional female Luer type fitting 43. This construction permits replacement of the outer portion of the needle as the same becomes dulled or otherwise unsuitable for continued use. The inner portion 44 of the double-ended needle in this modification is permanently secured to the tube abutment 40.

Referring now to Figure 3, a somewhat different embodiment of the invention is illustrated. In this modification the outer end of the seal abutment 50 is provided with threads as indicated at 51 for receiving a coupling 52. The coupling 52 at its outer end is provided with a male Luer type fitting 53 which is adapted to receive a similar Luer type fitting 54 secured to the outer portion 55 of the double-ended needle. In this modification the inner portion 56 of the double-ended needle is permanently secured to the coupling 52. As a result, both the outer portion 55 and the inner portion 56 of the double-ended needle may be replaced independently as desired.

Referring now to Figure 4, yet another embodiment of the invention is illustrated in which the seal stop 60 is provided with threads at its outer end as indicated at 61. A cooperatively threaded fitting 62 is provided which screws over the thread 61. The fitting 62 carries the double-ended needle, having an outer portion 63 and an inner portion 64. In this case the double-ended needle is a single integral needle of the type illustrated in Figure 1, but may be replaced in the tube stop 60, as is plainly apparent from Figure 4.

While I have illustrated and described in considerable detail four specific embodiments of my improved hypodermic syringe, it will be appreciated that this full illustration and description has been given merely to enable those skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A hypodermic syringe adapted to employ an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, said syringe comprising a barrel open at one end to receive the end of the ampoule having the penetrable seal therein, a hollow double-ended needle at the other end of said barrel, a seal-engaging abutment at said other end of the barrel, an ampoule-engaging abutment at said other end of the barrel, means mounting one of said abutments for movement longitudinally of said barrel relative to the other abutment, and rigid step-by-step positioning means for retaining said movable abutment rigidly in a selected one of a plurality of positions of adjustment rel-

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ative to the other abutment to predetermine the dosage subsequently administered by movement of said ampoule into said barrel against its abutment.

2. A syringe as defined in claim 1, in which said positioning means includes selectively engageable step-by-step positioning elements carried by said barrel and the movable abutment and effective to so position said abutments as to administer predetermined fractions or multiples thereof of the contents of said ampoule in successive injections.

3. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, said barrel being closed at the other end to provide a stop for the inward movement of said ampoule into said barrel, a seal abutment located in the other end of said barrel and adjustable therein to predetermine the dosage injected by movement of said ampoule fully into said barrel, a double-ended needle carried at said other end of said barrel, said needle having a portion extending into said barrel beyond said seal abutment to penetrate said seal prior to its piston-like movement resulting from movement of said ampoule after engagement of said seal abutment by said seal and step-by-step positioning means between said barrel and said seal abutment, said means comprising an element retained against longitudinal displacement on said barrel, and a plurality of stepped portions on said seal abutment selectively engageable with said element.

4. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, a seal abutment located in the other end of said barrel and preliminarily adjustable therein to predetermine the dosage subsequently injected by movement of said ampoule fully into said barrel, a double-ended needle carried at said other end of said barrel, said needle having a portion extending into said barrel beyond said seal abutment to penetrate said seal prior to its piston-like movement resulting from movement of said ampoule after engagement of said seal abutment by said seal, said seal abutment comprising a tubular member surrounding said needle and step-by-step positioning means between said barrel and said seal abutment, said means comprising an element retained against longitudinal displacement on said barrel, and a plurality of stepped portions on said seal abutment selectively engageable with said element.

5. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, a seal abutment located in the other end of said barrel and adjustable therein to predetermine the dosage injected by movement of said ampoule fully into said barrel, a double-ended needle carried at said other end of said barrel, said needle having a portion extending into said barrel beyond said seal abutment to penetrate said seal prior to its piston-like movement resulting from movement of said ampoule after engagement of said seal abutment by said seal, said seal abutment comprising a tubular member surrounding said needle, said needle being carried by and movable with said seal abutment and step-by-step positioning means between said barrel and said seal abutment, said means comprising an ele-

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ment retained against longitudinal displacement on said barrel, and a plurality of stepped portions on said seal abutment selectively engageable with said element.

6. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in the central opening, positioning means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule fully into said barrel, and a double-ended needle carried at said other end of said barrel, said needle having a portion extending into said barrel beyond said seal abutment to penetrate said seal prior to its piston-like movement resulting from movement of said ampoule after engagement of said seal abutment by said seal said positioning means comprising a plurality of positioning portions spaced longitudinally of said seal abutment, and an element carried by said barrel and selectively engageable with any one of said portions.

7. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in the central opening, means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule fully into said barrel, and a double-ended needle carried at said other end of said barrel, said needle having a portion extending into said barrel beyond said seal abutment to penetrate said seal prior to its piston-like movement resulting from movement of said ampoule after engagement of said seal abutment by said seal, said means comprising a spring pressed element, said seal abutment having a plurality of openings for selective engagement by said element.

8. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, positioning means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule into engagement with the end wall of said barrel, and a double-ended needle having an inner seal-penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient said positioning means comprising a plurality of positioning portions spaced longitudinally of said seal abutment, and an element carried by said barrel and selectively engageable with any one of said portions.

9. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, positioning means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule into engagement with the end wall of said barrel, and a

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double-ended needle having an inner seal-penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient, said needle being formed from a single piece of metal carried by said seal abutment said positioning means comprising a plurality of positioning portions spaced longitudinally of said seal abutment, and an element carried by said barrel and selectively engageable with any one of said portion.

10. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, positioning means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule into engagement with the end wall of said barrel, and a double-ended needle having an inner seal penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient, said needle being formed from a single piece of metal permanently carried by said seal abutment said positioning means comprising a plurality of positioning portions spaced longitudinally of said seal abutment, and an element carried by said barrel and selectively engageable with any one of said portions.

11. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule into engagement with the end wall of said barrel, and a double-ended needle having an inner seal-penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient, the outer end of said seal abutment being shaped to form a Luer fitting, the outer portion of said needle having a Luer fitting and being removable from said abutment.

12. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule into engagement with the end wall of said barrel, and a double-ended needle having an inner seal penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient, the inner portion of said needle being permanently mounted in said seal abutment, the outer end of said seal abutment being shaped to form a Luer fitting, the outer portion of said needle having a Luer fitting and being removable from said abutment.

13. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central

opening therein, a seal abutment slidably mounted in said central opening, positioning means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule into engagement with the end wall of said barrel, and a double-ended needle having an inner seal-penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient, a coupling member detachably secured to the outer end of said abutment, the inner portion of said needle being carried by said coupling member said positioning means comprising a plurality of positioning portions spaced longitudinally of said seal abutment, and an element carried by said barrel and selectively engageable with any one of said portions.

14. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, positioning means for securing said seal abutment in different positions of adjustment to predetermine the dosage injected by movement of said ampoule into engagement with the end wall of said barrel, and a double-ended needle having an inner seal-penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient, a coupling member detachably secured to the outer end of said abutment, the outer portion of said needle being carried by said coupling member said positioning means comprising a plurality of positioning portions spaced longitudinally of said seal abutment, and an element carried by said barrel and selectively engageable with any one of said portions.

15. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, said central opening and said seal abutment having a non-circular cross section, a transverse passage in said end wall communicating with said central opening, said abutment having a series of recesses in alignment with said passage, a positioning element slidable in said recess and selectively engageable with said recesses, resilient means urging said element toward said recesses, and a double-ended needle having an inner seal-penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient.

16. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, said central opening and said seal abutment having a non-circular cross section, a transverse passage in said end wall communicating with said central opening, said abutment having a series of recesses in alignment with said passage, a positioning element slidable in said recess and selectively engageable with said recesses, resilient means urging said element toward said recesses, and a double-ended

needle having an inner seal-penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient, one of the portions of said needle being removable from said abutment.

17. A hypodermic syringe comprising a barrel open at one end for receiving an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, an end wall at the other end of said barrel having a central opening therein, a seal abutment slidably mounted in said central opening, said central opening and said seal abutment having a non-circular cross section, a transverse passage in said end wall communicating with said central opening, said abutment having a series of recesses in alignment with said passage, a positioning element slidable in said recess and selectively engageable with said recesses, resilient means urging said element toward said recesses, and a double-ended needle having an inner seal-penetrating portion extending into said barrel beyond said seal abutment and an outer portion for penetrating the skin of a patient, the outer portion of said needle having a Luer fitting for detachably connecting it to said abutment.

18. A hypodermic syringe adapted to employ an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, said syringe comprising a barrel slidably receiving said ampoule, a hollow, double-ended needle at one end of said barrel, a seal-engaging abutment in said barrel, an ampoule-engaging abutment in said barrel, one of said abutments being adjustable longitudinally of said barrel, and positioning means on said barrel retained against longitudinal movement relative thereto and selectively engageable with longitudinally spaced portions of said adjustable abutment to lock said adjustable abutment in position to predetermine the dosage subsequently administered by movement of said ampoule against its abutment.

19. A hypodermic syringe adapted to employ an ampoule of the type having a penetrable seal in one end capable of piston-like movement therein, said syringe comprising a barrel open at one end to receive the end of the ampoule having the penetrable seal therein, a hollow double-ended needle at the other end of said barrel, seal-engaging abutment means at said other end of the barrel, ampoule-engaging abutment means at said other end of the barrel, means for effecting relative adjustment longitudinally of said barrel between the seal and ampoule-engaging portions of said abutment means, including means for retaining said seal and ampoule engaging portions rigidly in a selected one of a plurality of positions of relative adjustment to predetermine the dosage subsequently administered by movement of said ampoule into said barrel against the ampoule engaging portion of the ampoule abutment means.

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