Aug. 12, 1952 J. V. DE BRITO 2,606,556

HYPODERMIC SYRINGE

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Fig. 1.

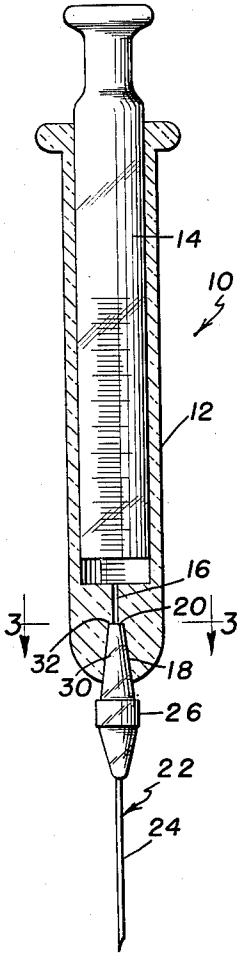


Fig. 2.

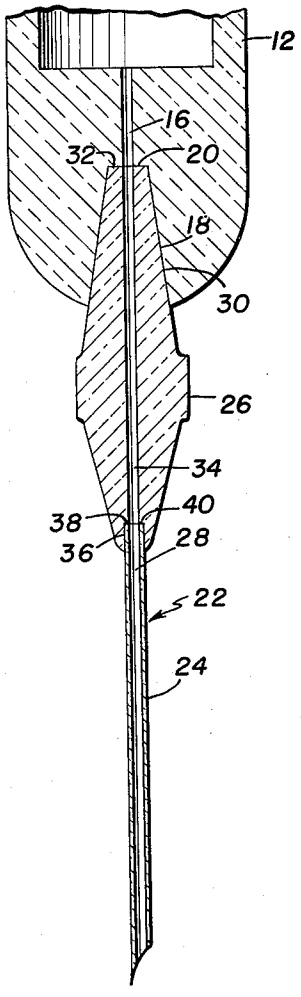
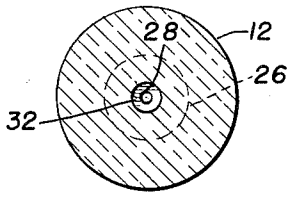


Fig. 3.



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HYPODERMIC SYRINGE

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1 Claim. (Cl. 128—218)

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This invention relates to new and useful improvements and structural refinements in hypodermic syringes, and the principal object of the invention is to provide an instrument of this nature which is extremely simple in construction, hygienic and dependable in operation, which may be readily disassembled for purposes of inspection, cleaning or sterilization, and which may be economically manufactured.

An important feature of the invention resides in the provision of means for safeguarding against accidental or unintentional expulsion or separation of the hypodermic needle from the barrel of the syringe while pressure is being applied to the contents of the barrel by the usual plunger or piston.

Another feature of the invention lies in the particular arrangement of the barrel and needle which eliminates the use of a connector conventionally employed between the two members, thus obviating at least two serious disadvantages which were incident to the presence of the conventional connector, namely, the possibility of leakage and the possibility of admission of atmospheric air during aspirations such as could cause gaseous embolism.

Other advantages of the invention result from the provision of the simple structure herein described, in which there are no recesses or blind spaces wherein coagulated blood or albumen could accumulate without being removed during sterilization and possibly cause embolism or abscesses after the instrument is subsequently used.

With the above more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention consists essentially in the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is an elevational view of the invention, with the barrel thereof shown in cross section so as to reveal the arrangement of parts;

Figure 2 is a fragmentary cross sectional view showing a portion of the barrel together with the hypodermic needle and head; and

Figure 3 is a cross sectional view, taken substantially in the plane of the line 3—3 in Figure 1.

Like characters of reference are employed to designate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings in detail, the invention is embodied in a hypodermic syringe designated generally by the reference character 10, the same consisting of the usual barrel 12 in which is reciprocable a piston or plunger 14, and it is to be noted that one end portion of the barrel is formed with an outwardly extending axial bore 16 which communicates with the interior of the barrel and has the outer end portion thereof diametrically enlarged so as to provide a frusto-conical socket 18. This socket is accurately coaxial with the bore 16, and it should be pointed out that an annular shoulder or seat 20 exists at the inner end of the socket at a point where the bore 16 enters the socket, substantially as shown.

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The hypodermic needle unit, designated generally by the reference character 22, consists of the needle proper 24, on the shank of which is mounted an elongated head 26. The needle proper 24, as well as the head 26, is formed with a longitudinal passage 28, this passage preferably being of exactly the same diameter as the aforementioned bore 16.

The needle head 18 includes a frusto-conical portion 30 terminating in an end wall or surface 32, this frusto-conical portion of the head being removably pressed in the frusto-conical socket 18 in such manner that the end wall 32 of the head abuts the aforementioned shoulder or seat 20.

It should be emphasized at this point that the bore 16, the passage 28, the socket 18, and the portion 30 of the head 26, as well as the surfaces 20, 32 are very accurately made, so that when the head 26 is applied to the barrel 12, the surfaces 20, 32 are in firm abutment and the passage 28 is so aligned with the bore 16 that the walls of the passage and bore present an unbroken, uninterrupted continuity.

As a result, when the plunger or piston 14 is caused to exert pressure on the fluid in the barrel 12, that fluid pressure will be transmitted outwardly through the bore 16 and passage 28, while no pressure is exerted on the end surface 32 of the head 26. Under such circumstances, the head 26 will not be accidentally or unintentionally expelled from the barrel, the possibility of leakage will be minimized, crevices will not be formed wherein bacteria could accumulate, and admittance of atmospheric air into the barrel during aspiration will not be possible.

It should be repeated that proper fitting of the needle head in the barrel is of extreme importance, since the surfaces of the socket 18 and head portion 30, as well as the surfaces 20, 32, must be in firm contact. Of course, it is not absolutely necessary for the head portion 30 to fit tightly

in the socket 18, since the conventionally experienced tendency for the liquid under pressure to expel the hypodermic needle does not present itself in this form of construction.

The head 26 may, of course, be formed integrally with the needle proper 24, but if it is desired to form these two components separately, a connection similar to that already described is employed. That is to say, the passage 28 extending through the head 26, as indicated at 34, may be regarded as an equivalent to the aforementioned bore 16, the outer end portion of which is diametrically enlarged to provide a socket 36 for the shank of the needle proper 24. Here again, the socket 36 is accurately coaxial with the bore or passage 34, and the diameter of the passage 28 in the needle proper 24 is preferably equal to the diameter of the bore or passage 34 in the head.

The formation of the socket 36 again results in the provision of a shoulder or seat 38 at the inner end of said socket, which abuts the end surface 40 of the needle shank. When the needle proper 24 is applied to the head 26, the passages 28, 34 will constitute an uninterrupted longitudinal continuation of one another, so that fluid pressure cannot possibly be exerted on the end surface 40 to cause accidental expulsion of the needle.

Although the contacting surfaces 20, 32 and 38, 40 are shown in the accompanying drawings as being flat, they may, of course, be complementally concave, convex, or conical.

It is to be noted that the invention eliminates the use of the usual tip which was conventionally formed as an integral unit with the barrel to receive the needle and which, by being easily broken, rendered the entire syringe useless and expensive to replace. In the instant device, the needle unit 22 may, of course, be replaced per se, and several needle units may be used with a common barrel.

It is believed that the advantages and use of the invention will be clearly apparent from the foregoing disclosure and, accordingly, further description thereof at this point is deemed unnecessary.

Having described the invention, what is claimed as new is:

In a hypodermic syringe, the combination of a barrel having an end portion formed with an outwardly extending axial bore, the outer end portion of said bore being diametrically enlarged to provide a socket coaxial with said bore and a shoulder at the inner end of said socket, said socket having an unthreaded frusto-conical lateral wall, a needle provided with a longitudinal passage no smaller in diameter than said bore, and a diametrically enlarged coaxial head provided on said needle and removably positioned in said socket, said head having an end wall at its inner end in abutment with said shoulder and also having an unthreaded frusto-conical lateral surface in frictional engagement with the lateral wall of said socket, the abutting shoulder and end wall being disposed in a plane perpendicular to the axis of said bore and passage, and the lateral surface of the head in frictional engagement with the lateral wall of the socket, constituting sole means for sustaining said head in said socket.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,084,257	Dewitt	Jan. 13, 1914
1,523,068	Hein	Jan. 13, 1925
1,683,350	Hein	Sept. 4, 1928

FOREIGN PATENTS

Number	Country	Date
370,877	France	Feb. 20, 1907
377,754	Great Britain	Aug. 4, 1932
385,262	Great Britain	Mar. 13, 1931