May 7, 1968 E. S. PIERCE 3,381,686

NEEDLE MOUNTING IN A HYPODERMIC SYRINGE

Filed April 6, 1965

FIG. 1

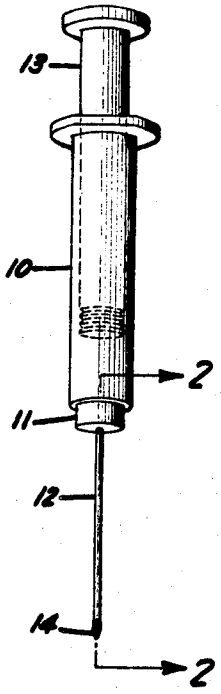


FIG. 2

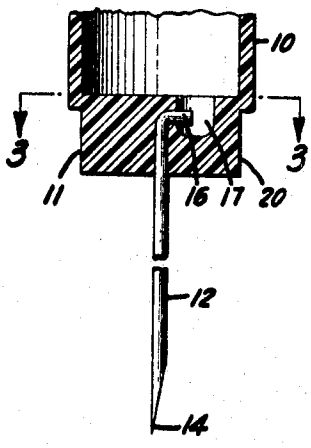


FIG. 4

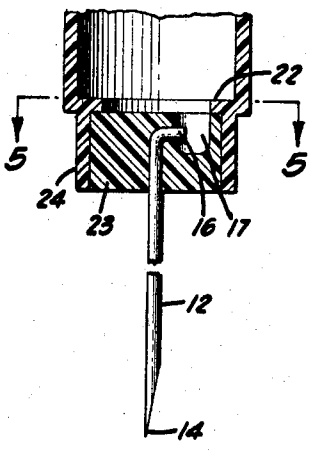


FIG. 3

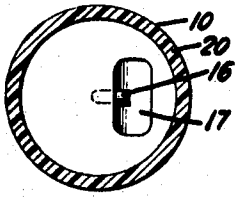


FIG. 5

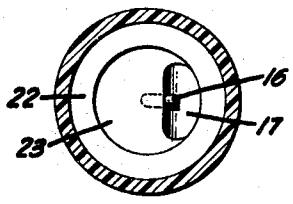


FIG. 6

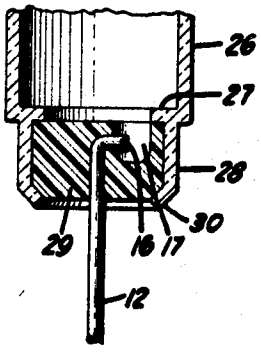
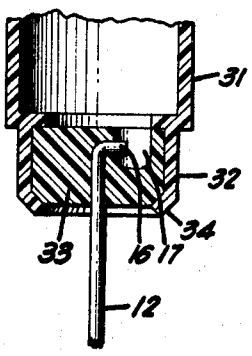


FIG. 7



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NEEDLE MOUNTING IN A HYPODERMIC SYRINGE

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ABSTRACT OF THE DISCLOSURE

A hypodermic syringe including a barrel having a hub portion in which the inner end of the cannula is imbedded, said inner end including an angular portion in communication with a recess in the hub portion which in turn is in communication with the interior of the barrel. The angular end portion of the cannula imbedded in the hub serves to prevent displacement of the cannula.

This invention relates to hypodermic syringes of the type comprising a barrel or body, which serves as a container for the medicament to be administered to a patient or for body fluids extracted from a patient, and a needle or cannula consisting of a small diameter tube sharpened at the outer end and having its other end secured in a hub which forms an end closure for the barrel. More particularly the invention is concerned with and has for its primary object the provision of improved means for connecting the cannula to the hub and the hub to the barrel whereby relative displacement thereof during use is avoided.

Another object of the invention is the provision of an improved hypodermic syringe of the type referred to in which the cannula includes an angularly projecting portion imbedded in the material of the hub and terminating at a recess formed in the hub, the recess opening into the interior of the barrel whereby communication between the bore or lumen of the cannula and the interior of the barrel is maintained.

A further object of the invention is the provision of a hypodermic syringe attaining the foregoing objects in which accordance with different embodiments the hub is made integral with the barrel, the hub is adhesively secured to the barrel, or the hub is held in position on the barrel by a retaining flange formed either before or after the hub is assembled with the barrel.

The invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description to follow and to the accompanying drawings in which:

FIG. 1 is a perspective view of the hypodermic syringe embodying features of the instant invention;

FIG. 2 is a sectional view on an enlarged scale taken on the line 2—2 of FIG. 1 looking in the direction indicated by the arrows;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2 looking in the direction indicated by the arrows;

FIG. 4 is a sectional view similar to FIG. 2 illustrating a second embodiment of certain features of the invention;

FIG. 5 is a sectional view taken on the line 5—5 of FIG. 4 looking in the direction indicated by the arrows;

FIG. 6 is a view similar to FIGS. 2 and 4 illustrating a third embodiment of certain features of the invention; and

FIG. 7 is a view similar to FIGS. 2, 4 and 6 illustrating a fourth embodiment of certain features of the invention.

Referring now to the drawings the syringe illustrated comprises a barrel **10** preferably made of a suitable plastic material such as polyethylene, polystyrene, cellulose acetate or the like. Alternatively the barrel may be made of

glass. A hub **11** which may be secured to or integral with the barrel, depending upon which of the several embodiments of the hub securing means hereinafter described is employed, supports a needle or cannula **12**, the cannula comprising a small diameter preferably stainless steel tube sharpened to a point **14** at its outer end as is conventional. The hub is suitably molded from a plastic which may be of the same type as the barrel or, particularly in the embodiment of FIG. 6, it may be of rubber or other deformable material. The syringe also includes a piston plunger **13** of any suitable type, the particular construction of the plunger and associated elements forming no part of the instant invention and hence being shown only diagrammatically.

As previously mentioned an object of the invention is the provision of improved means for the mounting of cannula **12** in hub **11** whereby relative displacement thereof in the use of the syringe is positively prevented. The construction by which this object is attained will now be described with reference particularly to the embodiment of FIG. 2. Inasmuch as this feature is the same in each of the several embodiments the following description will equally well apply to the other embodiments.

Cannula **12** includes a straight section extending from point **14** to a bend defining a laterally projecting portion **16** which extends at substantially a right angle to the straight section. The projecting portion **16** and a part of the straight section adjacent thereto are imbedded in the plastic material of the hub. Hub **11** is provided with a recess **17** opening to the interior of barrel **10**, recess **17** being positioned preferably inwardly from the outer cylindrical wall **20** of the hub. As illustrated the projection portion **16** of cannula **12** extends into the recess and terminates therein. Recess **17** is of a cross-sectional area as to provide free communication between the lumen or bore of the cannula and the interior of the barrel as, for example, that illustrated in FIGS. 3 and 5.

The hub is formed to the shape illustrated and to include recess FIG. 17 by a molding operation, the cannula **12** being so supported during such operation as to have its extending end imbedded in the hub in the manner illustrated. In the embodiment of FIG. 2 the hub is also formed as an integral part of barrel **10** in one molding operation.

Referring now to FIG. 4 a second embodiment is illustrated of the hub and barrel assembly. As in the first embodiment both the hub and barrel may be molded of a suitable plastic material such as one of those mentioned above, however in this instance they are molded separately. At the end of the barrel proper there is provided a right angularly extending annular flange **22** providing a seat for the hub **23** and a circumferental longitudinal extension **24**, flange **22** and extension **24** defining an end portion or pocket to receive the hub. Hub **23** may be secured in the pocket to the flange **22** and extension **24** by any suitable adhesive as, for example, an epoxy resin or by a welding process such as ultrasonic welding.

In the embodiment illustrated in FIG. 6 the barrel **26** is preferably made of a harder or more frangible plastic, or of glass or the like. Similarly as in the embodiment of FIG. 4 the end of the barrel is provided with a right angle annular flange **27** and a circumerential longitudinal extension **28** defining a pocket to receive hub **29**. In this embodiment circumferential extension **28** is provided at its outer end with an angularly extending flange **30** serving to retain hub **29** in the pocket. Also in this embodiment hub **29** is composed of a relatively formable material such as rubber and is forced into the pocket past flange **30** where it expands to fill the pocket. Alternatively the hub may be composed of a plastic such as polypro-

pylene, polyethylene or other thermoplastic material which can be reduced to a deformable state by heat. In such case the plug is heated until softened and then forced into the pocket past flange 30 to adopt the position shown and then allowed to cool to a set condtion.

In the embodiment illustrated in FIG. 7 the barrel 31 is molded from one of the plastics referred to in connection with the embodiments of FIGS. 1, 2 and 4 or from a similar thermoplastic. Also the circumferential longitudinal extension 32 is initially of a cylindrical formation and is of a length somewhat greater than the thickness of the hub 33. In assembling the hub with the barrel the hub is positioned in the pocket defined by extension 32 and the outer portion 34 of the extension is heated to soften it and is then crimped or molded inwardly to overlie the circumferential margin of the hub. If desired an adhesive such as an epoxy resin may be employed to provide additional securement of the plug to the walls of the pocket.

Having thus described the invention in rather complete detail it will be understood that these details need not be strictly adhered to, and that various changes and modifications may be made all falling within the scope of the invention as defined by the following claims.

What is claimed is:

1. A hypodermic syringe comprising a needle cannula, a barrel, piston means within said barrel, and a hub having an outer circumferential wall and defining an end closure for said barrel and having a recess communicating with the interior of said barrel, said recess being located eccentrically of said hub and having a continuous side wall all portions of which are spaced inwardly from the circumferential wall of said hub, said cannula including a straight portion having a penetrating point at one end thereof and a terminal portion projecting at an angle to said straight portion at the other end thereof and imbedded in said hub, said terminal portion extending to said side wall of said recess.

2. A hypodermic syringe as defined in claim 1 wherein said terminal portion extends at approximately right angles to said straight portion.

3. A hypodermic syringe comprising a needle cannula, a barrel, piston means within said barrel, and a hub defining an end closure for said barrel and having a recess communicating with the interior of said barrel, said cannula including a straight portion having a penetrating point at one end thereof and a portion projecting at an angle to said straight portion at the other end thereof and imbedded in said hub, said projecting portion terminating in said recess, said barrel including a cylindrical end porton having a flange at the inner end thereof defining a pocket for receiving said hub, and an adhesive connection between a wall of said end portion and said hub.

4. A hypodermic syringe comprising a needle cannula, a barrel, piston means within said barrel, and a hub defining an end closure for said barrel and having a recess communicating with the interior of said barrel, said cannula including a straight portion having a penetrating point at one end thereof and a portion projecting at an angle to said straight portion at the other end thereof and imbedded in said hub, said projecting portion terminating in said recess, and said barrel including an end portion defined by a cylindrical wall, a flange at the inner end of said wall, and an angular inwardly extending flange at the other end of said wall, said hub being dimensioned to be snugly received within said end portion between said flanges.

5. A hypodermic syringe as defined in claim 4 wherein said end portion is formed by relatively rigid frangible material and said hub is formed of a relatively distortable material.

6. A hypodermic syringe as defined in claim 4 wherein said end portion is formed of thermoplastic material.

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