

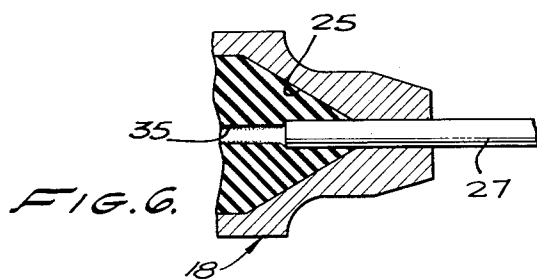
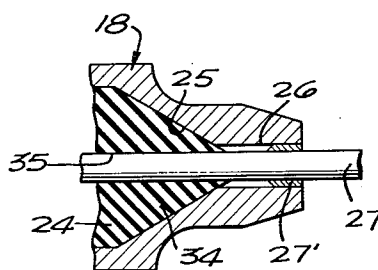
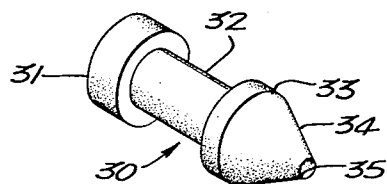
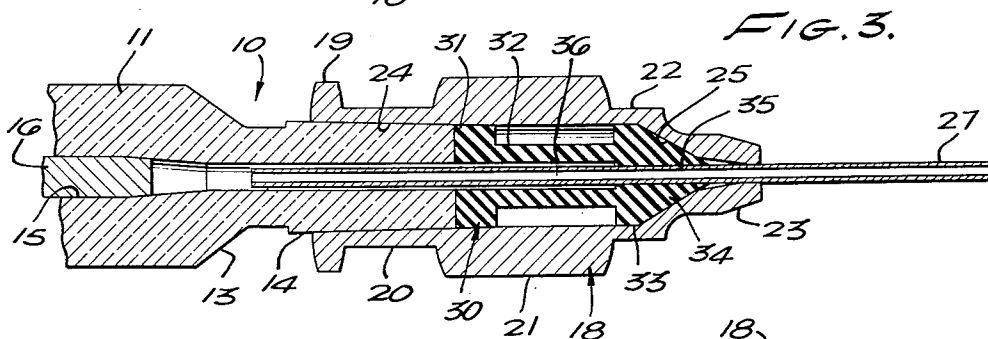
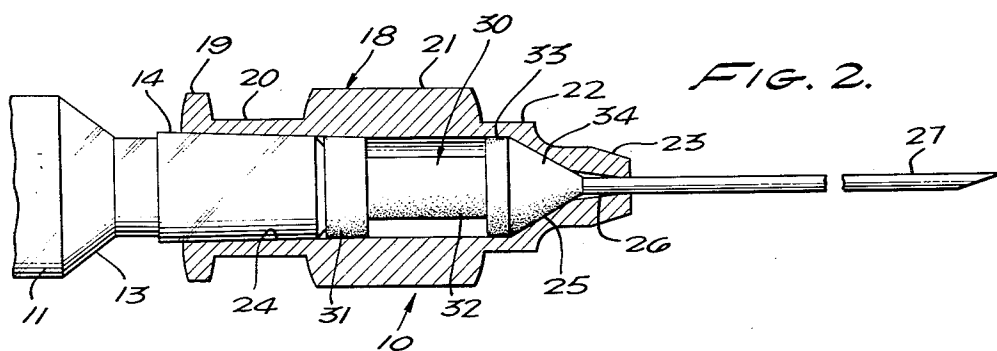
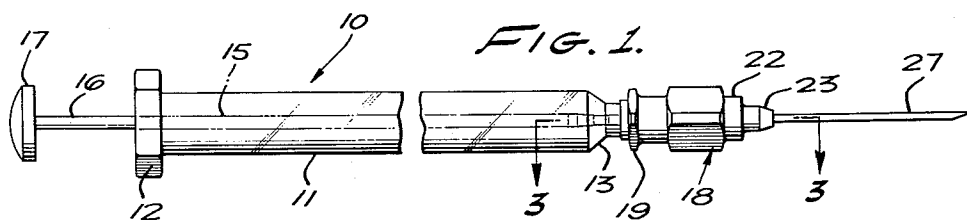
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3,035,616

SYRINGE

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SYRINGE

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This invention relates to a syringe and more particularly the type of syringe used in gas or vapor chromatography for dispensing very accurately measured minute quantities of liquid.

It has been proposed to make a syringe of the type described in which the problems of plugging up the end of the barrel so as to avoid dead space which results in loss of fluid or results in the entrainment of excess air on aspiration by permanently cementing the needle in the boss on the end of the barrel. This, however, results in a situation in which the syringe has the needle permanently affixed thereto and hence is useable only with the affixed needle and it is impossible to exchange sizes of needle.

When removable needles are used in connection with this type of syringe it is common to mount the needle in what is known as a luer mount, sometimes with merely a press fit on the boss on the end of the barrel of the needle and sometimes with what is known as a luer lock which is a threaded connection between the luer mount and the boss. In any event such a connection commonly results in a space between the end of the boss on the barrel and the interior end of the luer mount which when dealing with extremely valuable substances causes a loss of the substance which is undesirable and in using the needle to aspirate provides a space for the receipt of an undesirable amount of air.

It is accordingly one object of this invention to provide a syringe of the type described which obviates the difficulties above-referred to and at the same time provides a secure seal not only to the needle, but between the stopper provided and the interior of the luer mount.

It is a further object of this invention to provide such a device in which the stopper provides two separate seals between the stopper and the interior of the luer mount.

It is a further object of this invention to provide such a stopper in which the needle mounting in the lower mount is held in the stopper under hoop tension.

These and other objects, features and advantages will be apparent from the annexed specification in which:

FIGURE 1 is a plan view of a syringe embodying the present invention.

FIGURE 2 is an enlarged fragmentary view with one-half of the luer mount being cut away and being shown in section.

FIGURE 3 is a section taken on the line 3-3 of FIGURE 1.

FIGURE 4 is a perspective elevation of the stopper.

FIGURE 5 in a fragmentary section showing an alternate method of securing the needle in the luer mount.

FIGURE 6 is an enlarged fragmentary section showing the manner of inserting the needle in the stopper.

Referring now more particularly to the drawings, there is shown a syringe indicated generally by the numeral 10 and including a hollow barrel 11 having a shoulder 12 formed at one end, a tapered end 13 and a hollow boss

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14. The barrel is provided with an internal bore 15 adapted to receive a slidable piston 16 carrying a thumb button 17 on its free end. The barrel is normally provided with a graduated scale. Devices of this invention have been provided with graduations of 1.0 microliter or .001 cc. The luer needle mount is indicated by the number 18 and conventionally consists of a shoulder 19 at one end, an annular portion 20, a generally rectangular cross-section portion 21, a second annular portion 22 merging with a tapered portion 23. A cylindrical bore 24 is provided in the mount communicating with tapering section 25 which in turn merges with an internally conical section 26. A needle 27 is mounted in the needle mount either by swedging the end 23 as is shown in FIGURES 2 and 3 or by soldering the needle therein as shown at 27' in FIGURE 5. The essence of the present invention consists in providing a stopper 30 shown in perspective elevation in FIGURE 4 and consisting of a generally cylindrical end 31, an annular recess 32, a cylindrical portion 33 and a conical end portion 34. Stopper 30 is formed of a resilient material such as neoprene or rubber and is provided with a bore 35 and an enlarged bore 36. The stopper 30 is designed to be placed in the luer mount 18 with a conical end 34 seated in the tapering section 25 and sealed thereto. The needle 27 is inserted by simply forcing the end thereof into the bore 35 and stretching the bore, thus compressing the resilient material of the stopper resulting in a gripping action of the stopper to the needle which is what is herein referred to as hoop tension. When the boss 14 engages the end 31 of stopper 30 it tends to compress the stopper which assures that the cone-shaped end 34 is driven into sealing contact with the tapered end 25. It further assures or reinforces a gripping action of the interior of the bore 35 on the needle 27 and assures a sealing contact of the cylindrical portion 31 with the bore 24 of the luer mount. In this manner the space normally existing between the end of the boss 14 and the conical-shaped taper 25 of the luer mount is completely sealed off and plugged, so that valuable medicaments and other liquids being administered by this syringe are not lost and no space exists in this portion of the syringe for the introduction of objectionable amounts of air during aspiration.

While there has been described what is at present considered the preferred embodiment of the invention, it will be understood by those skilled in the art that various changes and alterations may be made therein without departing from the essence of the invention and it is intended to cover herein all such changes and alterations as come within the true spirit and scope of the annexed claims.

I claim:

1. A syringe comprising: a barrel and a plunger slidably mounted therein; said barrel having a hollow boss on the end thereof, a luer needle mount removably positioned on said boss, a resilient stopper mounted in said luer needle mount; said stopper having a conical outer end adapted to seat in said needle mount and seal thereto, an annular recess on said stopper and a substantially cylindrical other end adapted to form a second seal to said needle mount; said stopper having one end formed with a first central bore and having an enlarged central bore communicating therewith, a needle carried by said

stopper, said needle entering said first bore and being held and sealed therein under hoop tension and extending through said enlarged bore into said hollow boss.

2. A syringe as set forth in claim 1 in which the needle is of larger diameter than the original internal diameter of said first bore.

3. A syringe as set forth in claim 1 in which said boss engages said substantially cylindrical end and forces the same into sealing engagement with said needle mount.

4. A syringe as set forth in claim 1 in which the needle is of larger diameter than the original internal diameter of said first bore and in which said boss engages said substantially cylindrical end and forces the same into sealing engagement with said needle mount.

5. A syringe as set forth in claim 1 in which the needle is supported both by the luer mount and by the stopper.

6. A syringe as set forth in claim 4 in which the needle is supported both by the luer mount and by the stopper.

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