

[54] **MEDICAMENT VIAL STOPPER PIERCING AND NEEDLE POSITIONING DEVICE**

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[51] Int. Cl. **B65d 41/50**

[58] Field of Search **215/247, 249, 251, 253, 215/11; 141/329, 330; 128/272**

[56] **References Cited**

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[57]

ABSTRACT

A stopper for a medicament vial including a thin central zone thereof and a beveled sleeve is supported over the outer surface of the thin central zone of the stopper by means of three radially outwardly extending and arched legs anchored to the peripheral portions of the stopper at their outer ends. The sleeve is tapered toward the central area of the stopper and the end of the sleeve adjacent the stopper is beveled for piercing the thin central zone of the stopper. However, the legs support the sleeve with its beveled end at least closely adjacent the stopper and the arched legs are bendable whereby a thrust on the outer end of the sleeve will be sufficient to bend the legs and advance the beveled end of the sleeve toward the central area of the stopper for piercing the same. The sleeve includes an outer barb for retention through the thin central area of the stopper and a conventional aluminum seal is secured over the stopper and the adjacent end of the vial and also covers the stopper piercing sleeve and its bowed support legs.

6 Claims, 8 Drawing Figures

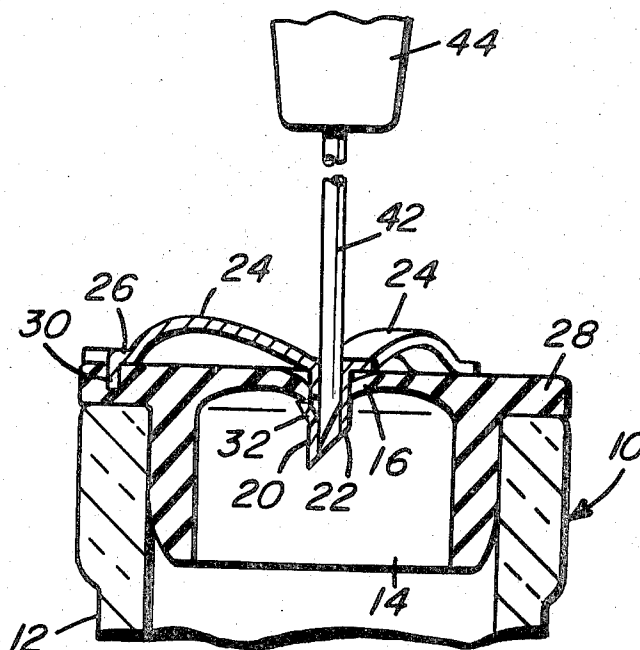


Fig. 1

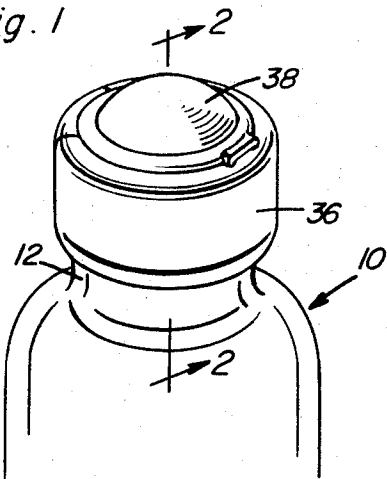


Fig. 2

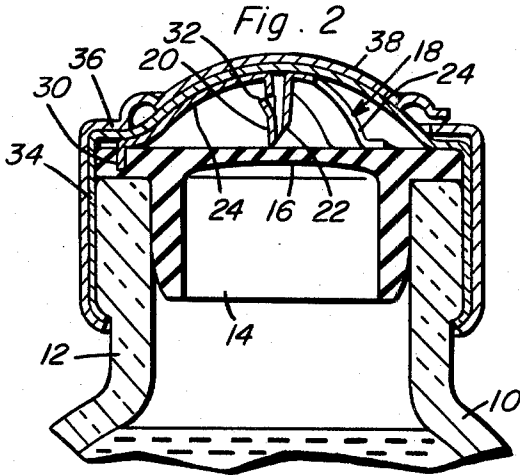


Fig. 3

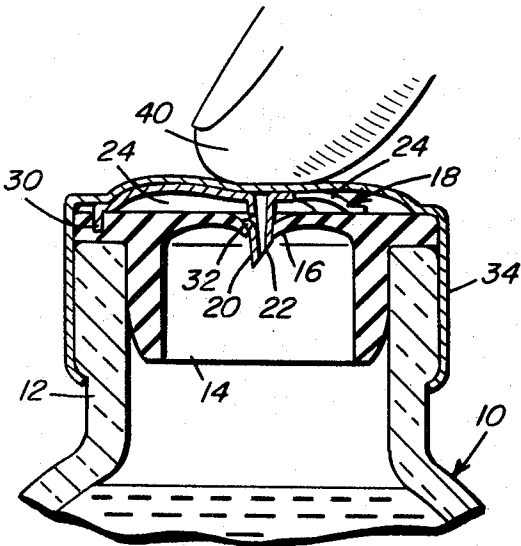


Fig. 4

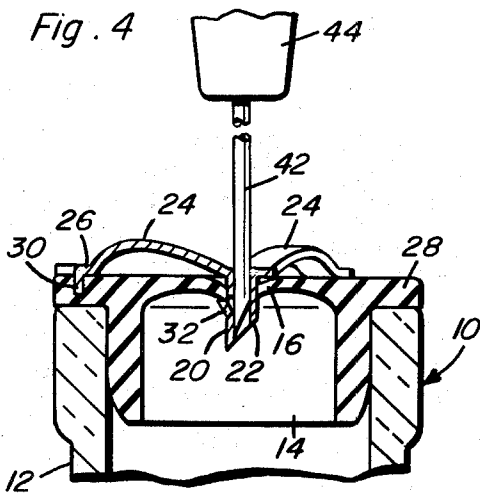


Fig. 5

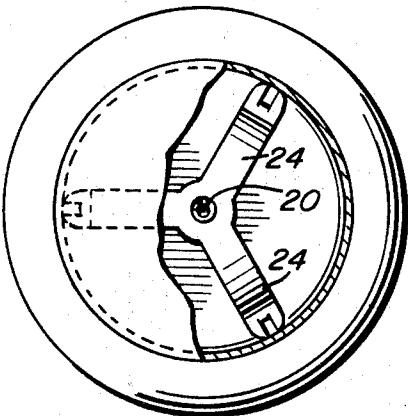


Fig. 6

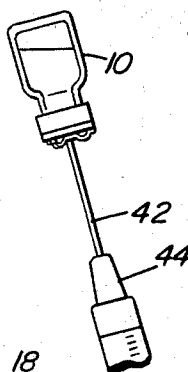


Fig. 7

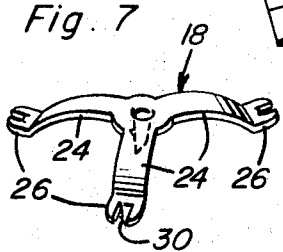
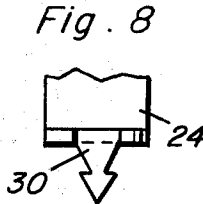


Fig. 8



MEDICAMENT VIAL STOPPER PIERCING AND NEEDLE POSITIONING DEVICE

This invention relates to an apparatus for securement over the stoppered end of a medicament vial and which will be capable of piercing the stopper of the vial and enabling an hypodermic needle point to be thereafter inserted into the vial for withdrawing fluid therefrom in a manner positively preventing coring of the stopper by the hypodermic needle.

The vial stopper piercing and needle positioning device of the instant invention comprises an apparatus constructed of plastic so as to be shape retentive and yet bendable and resilient and the apparatus is positioned over the ordinary rubber stopper of a common medicament vial of the type provided with a thin central area. The plastic device consists of a tapered and beveled sleeve including three radially outwardly equally spaced support arms and the outer ends of the support arms are provided with barbed points for anchoring in the outer peripheral portions of the stopper. The arms or support legs are bowed so as to be more readily bendable and the central area of the device may be urged by finger pressure toward the thin central area of the stopper to enable the sleeve to pierce the central area of the stopper. The tapering sleeve may be pushed or depressed from within or under a sterile covering of aluminum and the sleeve is flared toward its outer end so that a hypodermic needle will seat its point securely in the sleeve and thereby be exposed through the opening of the protruding sleeve to the contents of the vial. In this manner, the hypodermic needle may be admitted into the interior of the medicament vial without penetrating a rubber plug and will thereby prevent a small core of rubber from entering the lumen of the metal needle. If the central area of the stopper pierced by the beveled sleeve cuts a small core from the center of the stopper pierced thereby, the introduction of the hypodermic needle into the sleeve behind the core will eject the core harmlessly into the vial.

It is the primary object of this invention to provide a rubber stopper puncturing devices that prevents "coring" or blocking of a hypodermic needle that enters a common medicament vial.

It is a further object of this invention to provide a controlled entry and a controlled positioning means for a hypodermic needle point within a hermetically sealed medicament vial as opposed to the ordinary manual method of achieving entry and positioning which creates problems of control commonly known to those practiced in the art.

Yet another object of this invention is to provide an apparatus which will define a hypodermic needle receiving sleeve precisely centered relative to an associated medicament vial stopper and of a size to snugly receive a hypodermic needle therethrough after the sleeve has been utilized to pierce the stopper of the medicament vial and to thereby allow the medicament vial to be supported in inverted position from the associated hypodermic needle in order that the vial of the associated syringe may be held by the user and readily filled through the utilization of only one hand.

A final object of this invention to be specifically enumerated herein is to provide a device in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a fragmentary perspective view of the upper portion of a conventional medicament vial including the stopper piercing apparatus of the instant invention and with the stopper piercing apparatus covered by a conventional sterile covering of aluminum;

FIG. 2 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 2—2 of FIG. 1;

FIG. 3 is a fragmentary vertical sectional view similar to FIG. 2 but with the central portion of the aluminum cover and the stopper piercing apparatus depressed inwardly so as to cause the sharpened and beveled inner end of the sleeve portion of the stopper piercing structure to pierce the central area of the medicament vial stopper;

FIG. 4 is a view similar to FIG. 3 but with the aluminum cover removed and the hypodermic needle of a common syringe tightly received in the sleeve portion of the stopper piercing apparatus;

FIG. 5 is a top plan view of the medicament vial illustrated in FIG. 1 with portions thereof being broken away and illustrated in horizontal sections;

FIG. 6 is a perspective view illustrating the manner in which an inverted medicament vial provided with the stopper piercing apparatus of the instant invention may be readily supported from the needle of a common syringe;

FIG. 7 is a perspective view of the vial stopper piercing and needle positioning device of the instant invention; and

FIG. 8 is a fragmentary end elevational view of the outer end of one of the support arms or legs of the stopper piercing structure.

Referring now more specifically to the drawings, the numeral 10 generally designates a common medicament vial including a diametrically reduced neck 12 having a conventional flanged stopper 14 secured therein for closing the neck 12 of the vial 10. The stopper 14 is provided with a thin central area 16 and is commonly covered by an aluminum seal having a central area thereof which may be opened to provide access to the central area 16 of the stopper 14 by the needle of a hypodermic syringe.

Conventionally, the sharpened tip of a hypodermic needle is forced through the central area 16 in order to draw liquids from the medicament vial 10. However, in forcing a sharpened hypodermic needle through the central area 16, a portion of the central area 16 is often "cored" from the stopper 14 with the result that the core of rubber removed from the central area 16 is often lodged within the sharpened end of the hypodermic needle. If such a condition exists and the vial is inverted to withdraw fluids from the vial without first dislodging the core removed from the stopper 14 from the needle, the needle is drawn into the syringe with the fluids being drawn into the syringe through the needle.

The vial stopper piercing and the needle positioning device of the instant invention may best be seen in FIG. 7 and is generally designated by the reference numeral 18. The device 18 includes a central axial sleeve 20

which is tapered and beveled as at 22. The outwardly flaring end of the sleeve 20 includes three equally spaced and radially outwardly projecting integral spring support arms or legs 24 whose outer ends include angled foot portions 26 for closely overlying the flange 28 of the stopper 14. Each of the foot portions 26 has a barbed anchor 30 struck downwardly therefrom and each of the anchors 30 is anchored in a corresponding portion of the flange 28 in order to support the device 18 securely from the stopper 14 with the sleeve 20 in axial alignment with the central area 16 of the stopper 14.

It will be noted that the sleeve 20 also includes a barb 32 struck therefrom and, from FIG. 2 of the drawings, it may be seen that when the device 18 is supported from the stopper 14 the beveled tip of the sleeve 20 just barely contacts the central area 16 of the stopper 14.

The device 18 may be constructed of any suitable material such as a flexible and resilient plastic. After the device 18 is secured to the stopper 14, a conventional aluminum seal 34 is secured over the device 18 and about the neck 12. Finally, a cap 36 of aluminum is secured over the seal 34 and includes a removable central portion 38 which may be bent upwardly and away to expose the seal 34 preparatory to the central portion of the seal 34 being torn away to expose the outer end of the sleeve 20. Thereafter, finger pressure as at 40 may be utilized to depress the central portion of the device 18 in the manner illustrated in FIG. 3 of the drawings whereby the sharpened and barbed sleeve 20 will pierce the central area 16 of the stopper 14 and the barb 32 will retain the lower end of the sleeve 20 through the central area 16 in the manner illustrated in FIG. 4. Thereafter, the needle 42 of a hypodermic syringe 44 may be tightly wedged downwardly into the sleeve 20 in order to securely engage the needle 42 with the sleeve 20. Thereafter, the syringe 44 may be held in one hand and swung to an inverted position such as that illustrated in FIG. 6 and the plunger (not shown) of the syringe 44 may be retracted to draw liquid from the vial 10 into the syringe 44.

Because of the taper of the sleeve 20, the device 10 can be designed to accept a standard needle gauge, using different devices to accept different gauges, or one tapered design can be used to accept all gauges as long as the point of the needle 42 engages firmly within the sleeve 20.

To enter the vial 10, the needle point of a common syringe is directed toward the flared outer end of the sleeve 20. The sleeve 20 then guides the point of the syringe needle 42 into the sleeve 20 until the syringe needle 42 is securely lodged in the sleeve 20 with a firm pressure from the operator. As soon as the syringe needle 42 is firmly lodged within the sleeve 20, it does not matter whether the syringe needle 42 protrudes only slightly or considerably greater into the vial 10. In this manner, smaller gauge needles 42 may actually be forced through the sleeve 20 while larger gauge needles will only wedge in the sleeve 20 and not project through the latter. By this type of operation, critical manufacturing tolerances are not required for the sleeve 20.

Of course, by first piercing the central area 16 of the stopper 14 with the sleeve 20, the hypodermic needle 42 is not required to penetrate a rubber plug and, therefore, a small cylinder or core of rubber cannot be lodged in the beveled end of the needle 42 for subse-

quent movement into the syringe 44 as liquids are withdrawn from the vial 10.

When the needle 42 is tightly received in the sleeve 20, the vial 10 then becomes a steady and secure extension of the syringe. Accordingly, an operator can, with only one hand on the syringe barrel, easily lift the vial in an arc until it is upside down or almost upside down. He can then freely use either hand or both hands to manipulate the syringe, without touching the vial, in order to fill the syringe while the syringe needle is in a secure and ideal entering position to accept the contents of the vial. The freedom of having both hands to operate the syringe and having the proper and controlled penetration of the syringe needle allows a much simpler and much more efficient filling of a syringe than the method now commonly used, which requires one hand to do the cumbersome work of two. Moreover, the simple and unique filling method hereinbefore set forth does not require the needle to lay in the hand or to be touched by the hand as the present, commonly used method does.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. In combination with a vial having a stopper therein for closing the vial, said stopper including spaced outer peripheral portions and a thin central portion a stopper piercing and needle gripping attachment for said stopper, said attachment comprising an axially short sleeve constructed of shape retentive and yet resilient material, positioned on the outer side of the central portion of said stopper with one end of the sleeve in end opposing relation relative to said central area of said stopper, and support means supporting said sleeve from said stopper for advancement toward and movement of said one end of said sleeve through said central area, said one end of said sleeve being beveled and sharpened, said sleeve tapering, both internally and externally, toward said one end thereof, whereby said tapered sleeve receives a syringe needle in the large diameter end of said sleeve, after the sleeve has been inwardly displaced to pierce said central area, and said needle is tightly gripped by said sleeve for total support of the sleeve and said vial from the needle when the vial is disposed in an inverted position with the needle positioned therebelow.

2. The combination of claim 1 wherein said sleeve includes an outer barb, outer barb centrally of the axial length of said sleeve and projects away from the piercing end of said sleeve.

3. The combination of claim 1 wherein said support means comprises flexible leg portions carried by said sleeve projecting outwardly therefrom and anchored to said outer peripheral portions of said stopper.

4. The combination of claim 3 wherein said legs are equally spaced about said sleeve and carried by the other end portion thereof.

5. The combination of claim 4 wherein said legs are longitudinally bowed.

6. The combination of claim 5 wherein the outer ends of said legs include barbed anchors imbedded in said outer peripheral portions of said stopper.

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