NON-CORING NEEDLE

Robert R. Harrison, Park Ridge, Ill., assignor to Baxter Laboratories, Inc., Morton Grove, Ill., a corporation of Delaware

Filed July 9, 1962, Ser. No. 208,217

3 Claims. (Cl. 128—221)

The present invention relates to a novel needle device for puncturing a variety of materials, more particularly it relates to a needle type device for use in the field of parenteral fluid administration.

In the field of parenteral fluid administration the bottles of parenteral fluid, primarily those of blood, are closed with a re-sealable rubber stopper. This stopper is generally provided with an integral rubber diaphragm. In the past there has frequently been a problem in connecting fluid administration sets to said bottles. This problem has been the so-called "coring" of the stopper by the connector of said administration sets. "Coring" occurs when the connector is forced through the stopper and punches or cuts and dislodges small particles of rubber from the stopper and into the bottle of solution. The presence of such particles in the parenteral solution is obviously undesirable and actually dangerous.

It is an object of the present invention to provide a needle-like device which eliminates "coring" of the rubber stopper.

It is further an object to provide a novel piercing connector which requires a minimum of pressure to penetrate the conventional rubber stopper.

It is still further an object of the present invention to provide a piercing connector which results in a superior re-sealing of the stopper after use.

It is still further an object to provide a superior needle-like piercing device which may be used advantageously in a wide variety of materials such as rubber, skin, plastic or the like.

The above objects, and still further objects, are obtained by the exercise of the present invention. The accomplishment of these objects will become more apparent as the specification proceeds.

In the drawings, FIGURE 1 is a side elevation of the connector embodying the present invention.

FIGURE 2 is a fragmentary sectional view along line 2—2 of FIGURE 1.

FIGURE 3 is an enlarged view of the piercing point of the connector of FIGURE 1.

In the drawing is seen an embodiment of the present invention, in which the numeral 10 represents the connector generally. The connector 10 is comprised of a general piercing end 11 provided with a point 12, and a bevel cut 13, a tapered tubular Shank 14, a flange-like manipulating surface 15, and a connecting section 16. A passageway or lumen 17 extends the length of said plastic connector providing a means of continuous flow from the piercing end 11, through the tubular shank 14 and the connector 16.

The piercing end 11 is formed generally by the bevel cut portion 13, the open section of which is divided into the orifices 13A and 13B by a bridge 18. The bridge 18 extends from the tip 12 to the tubular shank 14. It joins the tip 12 at an angle larger than that of the bevel cut 13 and is provided with an angular external section 15. It is this angular blade-like section 15 which is believed to provide the superior stopper piercing action of the present connector. The blade-like section 15 as it pierces the rubber stopper slits the rubber diaphragm, and gently spreads the material of said diaphragm without "coring." The tubular portion 14 of the connector may thus be inserted through said connector with a minimum of force.

In the preferred form of the present invention the connector 10 is approximately 2 1/4 inches long and is molded of a rigid plastic material such as nylon, styrene, acrylic resins, or the like. As seen in FIGURE 3 the piercing end 11 is formed generally by the bevel cut-like portion 13 (angle 30°) and the bridge section 18. The blade-like angular external portion 19 of said bridge section rises sharply (about 45°) from the tip 12 of said connector to a level about equal to that of the lumen of the passageway 17, and then proceeds generally along a less angular path to join the main portion of the connector. The orifices 13A and 13B formed by the bevel cut 13 and the bridge 18 are relatively oval in shape and measure .356 inch long and .030 inch wide.

The slotted connector of the present invention in addition to being "non-coring," provides still further benefits when used in the administration of blood. The orifices 13A and 13B and the bridge 18 combine to provide an effective straining action which blocks, or prevents, the passage of large blood clots and strands of fibrin into the passageway 17. This straining action has been found to be doubly valuable when the connector is used in conjunction with the administration of blood from a plastic container which utilizes a metal bead valve. In such cases the strainer also prevents the metal bead from blocking the passageway 17 and thus obstructing flow through the administration set to the recipient.

It will be readily understood that a wide variety of modifications and changes may be made without departing from the spirit and scope of the present invention. While for purposes of illustration the connector has been shown as a single item it will be readily appreciated that said connector could be incorporated in a structure comprising an integral "drip tube" and filter chamber.

The embodiments of the invention in which an exclusive property or privilege is claimed are:

1. A needle-like piercing device comprising a tapered tubular shaft provided with a passageway extending therethrough, manipulating means adjacent one end of said shaft and, piercing means adjacent the other end of said shaft, said piercing means comprising a solid piercing tip at the other end of said shaft, said piercing means comprising a solid piercing tip at the other end of said shaft, a bevel-like cut portion immediately adjacent said tip, an integral relatively narrow externally angular bridge extending from said solid tip against the bevel-like cut portion to the uncut portion of the tubular shaft, said bridge dividing the portion of the passageway exposed by said bevel-like portion into two parts, the main passageway of said tubular shaft being relatively unobstructed by said bridge.

2. A needle-like piercing device comprising a tubular shaft provided with a passageway extending therethrough, manipulating means adjacent one end of said shaft and, piercing means adjacent the other end of said shaft, said piercing means comprising a solid piercing tip at the other end of said shaft, a bevel-like cut portion imme-
3,119,391

3. A needle-like piercing device comprising a tubular shaft provided with a passageway extending therethrough, manipulating means adjacent one end of said shaft and, a solid piercing tip adjacent the other end of said shaft, a bevel-like open portion immediately adjacent said tip, 10

4. An integral externally angular bridge extending from said solid tip to the main portion of the tubular shaft, said bridge dividing the portion of the passageway exposed by said bevel-like open portion into two parts.

References Cited in the file of this patent

UNITED STATES PATENTS

2,746,455 Abel .......................... May 22, 1956
2,958,545 Stelzer ........................ Nov. 1, 1960
2,989,053 Hamilton ..................... June 20, 1961