

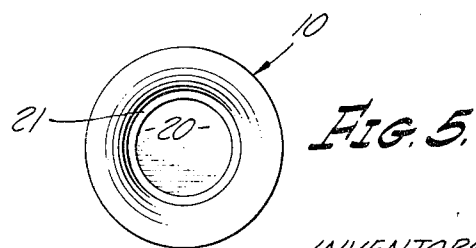
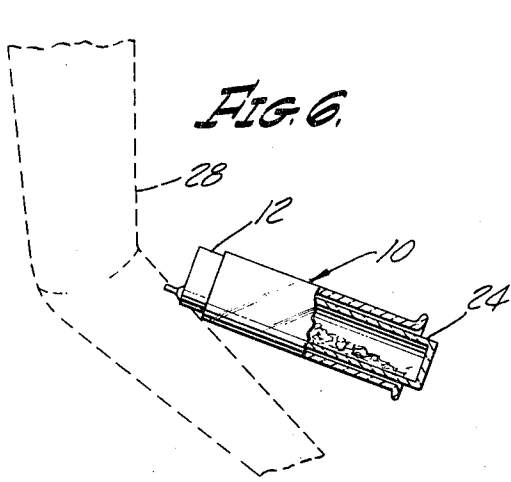
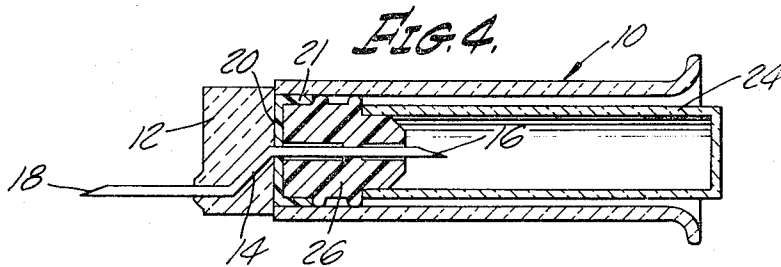
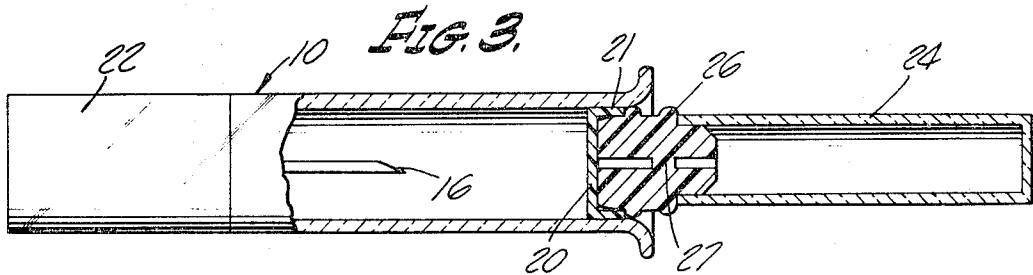
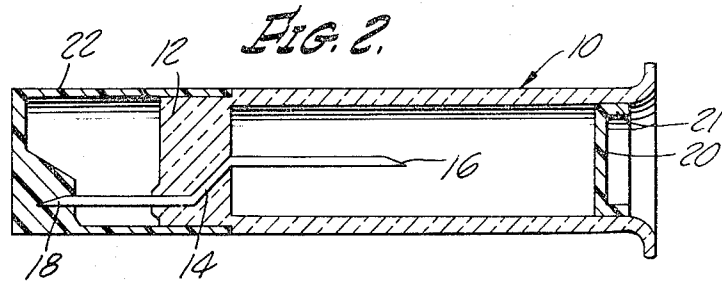
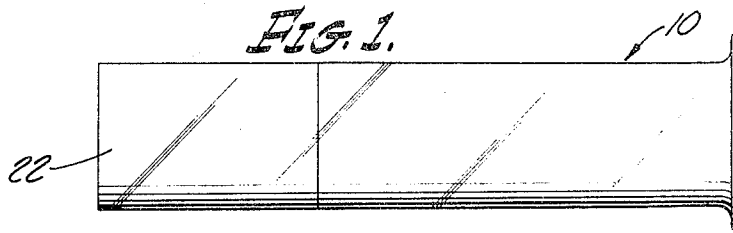
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UNITIZED NEEDLE AND HOLDER

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UNITIZED NEEDLE AND HOLDER

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3 Claims

ABSTRACT OF THE DISCLOSURE

A blood pilot tube holder sealed at one end with a cannula support carrying a sharpened cannula inner end extending into the tube and sealed at the opposing end by a thin, slidable diaphragm which during use is slid down the holder with a blood pilot tube until it is pierced by the cannula point.

This invention relates to a novel blood pilot tube holder and to the novel combination comprising said holder and said tube.

It is routine practice in hospitals to employ an evacuated, stoppered blood tube to collect blood samples. These samples are normally collected by placing the stoppered pilot tube in a holder having a cannula therein, one end of which is adapted to be injected into the arm or leg of the patient and the other end being adapted to puncture the stopper in the pilot tube to thus enable the vacuum within the pilot tube to withdraw the required sample from the patient by suction through the cannula. Frequently the holder containing the cannula is maintained in storage for a protracted period before use, and in any event, is subjected to all of the hazards of shipping. One of the principal hazards in the shipping and storage of the holder is that the cannula may become contaminated with dirt, bacteria, and the like before use. Obviously, if the cannula is contaminated, the contamination may be inadvertently injected into the patient when the cannula end is inserted in the patient for the purpose of withdrawing the blood sample. Yet another hazard associated with the presence of contaminants on the cannula is that the blood sample may become contaminated in the blood withdrawal process thereby leading to erroneous analytical results in subsequent blood analyses. Contamination of the blood sample may also lead to unnatural clotting or other deterioration of the blood making the sample unsuitable for any study or analytical purposes. Thus, it can be seen that there has existed a long-felt want for a simple fool-proof means whereby the cannula in a holder for a blood pilot tube may be kept in a sterile condition until use and yet can still be operated in conjunction with the blood pilot tube whereby the vacuum in the pilot tube may effectively withdraw the desired blood samples through the cannula of the holder.

Accordingly, it is a principal object of the present invention to provide a novel holder for a blood pilot tube wherein the cannula in the holder is maintained in a sterile condition during storage and transit.

More particularly, it is an object of the present invention to provide a holder for a blood pilot tube wherein the cannula is protected at one end by a cannula cover and at the other end by a slidable diaphragm fitted within the holder.

It is also an object of the present invention to provide a novel combination comprising a holder having therein a cannula, a diaphragm slidably received within said holder for preventing contamination of the cannula, and received within the holder a blood pilot tube.

These and other objects and advantages of the inven-

tion will become apparent from the following description taken in conjunction with the accompanying drawing.

Briefly, the present invention comprises a holder including a tubular portion having one end wall, a cannula having two sharpened ends, said cannula traversing said end wall at the approximate intermediate portion of the cannula; slidably fitted within the tubular portion of the holder a diaphragm sheath to maintain that portion of the cannula extending into the tube in a sterile condition prior to use. The invention further includes the utilization of a needle cover over that portion of the cannula which extends beyond the end wall of the tube portion. The invention still further comprises the combination of the above-described holder in conjunction with a blood pilot tube comprising a tubular member having a diameter smaller than the diameter of the tube portion of the holder, said blood pilot tube being closed at one end and having a puncturable stopper in the other end. The pilot tube is adapted to be used to force the diaphragm to slide down the inside of the tube of the holder whereby the diaphragm and the stopper are punctured by the cannula of the holder.

Turning to the drawings:

FIG. 1 is a plan view of the blood pilot tube holder of the present invention in its packaged form.

FIG. 2 is a sectional view of the device of FIG. 1.

FIG. 3 is a partial sectional view of the device of FIG. 1 showing a blood pilot tube and its associated stopper in contact with the diaphragm within the holder.

FIG. 4 shows the parts of FIG. 3 wherein the blood pilot tube has been forced into the tube portion of the holder and over the cannula.

FIG. 5 is an end view of the device of FIG. 4.

FIG. 6 shows the device of FIG. 4 inserted into the arm of the patient whereby a blood sample may be removed from the patient's arm.

With reference to the drawings, more specifically, in shipment and storage, the device of the invention appears as in FIGS. 1, 2 and 5. The pilot tube holder 10 is provided with end wall 12 through which passes cannula 14 having a sharpened inner end 16 and a sharpened outer end 18. Slidably mounted within holder 10 is the diaphragm sheath 20 which forms an aseptic seal against the sides of the holder and effectively isolates the inner end 16 of the cannula 14 from contamination. The sheath 20 has an upstanding rim 21 around its periphery which also aids in sealing the cannula from contamination. The outer end 18 of cannula 14 is protected by cannula cover 22 which also forms an aseptic seal on holder 10.

In FIGS. 3, 4 and 6, there is shown the pilot tube holder 10 in combination with the pilot tube 24. The pilot tube 24 is provided with a stopper 26 and is sufficiently smaller in diameter than the tubular portion of holder 10 so that it can be easily received in the holder as shown in FIGS. 4 and 6.

In operation, when it is desired to take a blood sample, the package as shipped (shown in FIGS. 1 and 2) is taken, and the cannula cover 22 is removed. An evacuated blood sampling or pilot tube 24 having a stopper therein is then placed in the holder 10 so that engagement is made with sheath 20. The nurse or other operator of the unit then forces the sheath 20 down the tubular portion of holder 10 by pushing on the tube 24 until the sheath 20 has been pierced by the scarf of the inner end 16 of cannula 14, and the scarf has just begun to penetrate the stopper 26 (thin web portion 27 as shown in the drawings). The rim 21 prevents the tipping of the sheath as it is pushed down the length of the holder. The outer end 18 of cannula 14 is then inserted into the arm 28 of the patient and the penetration of stopper 26 by scarf of cannula end 16 is completed by the further application of force to the pilot tube 24. As soon as the scarf of can-

nula end 16 completely penetrates the stopper 26, the blood sample is drawn from the patient into pilot tube 24 due to the vacuum in the tube 24.

As has been indicated, the pilot tube 24 should be pushed into holder 10 so that sheath 20 is completely penetrated and stopper 26 is partially penetrated by the scarf of inner end 16 of cannula 14 prior to the insertion of outer cannula end 18 into the patient. This is necessary to prevent the injection of air or other gases into the blood stream of the patient which might cause an embolism.

As will be immediately apparent to those skilled in the art, numerous variations on the structures depicted in the drawings are possible, and hence within the scope of our invention. For example, the cannula 14 need not have an intermediate obtuse portion as shown in the drawings. The cannula may be straight, or have a U-shaped intermediate portion, or have other configurations common among the known cannulae. Likewise, the outer end 18 of the cannula need not be offset with respect to the longitudinal axis of holder 10. While the outer cannula end is preferably offset to facilitate insertion into the vein of the patient, it is to be understood that the outer cannula end may also be aligned axially with holder 10.

The cannula cover 22 may be of any configuration provided it affords at least one seal between the cannula end 18 and the atmosphere for the maintenance of sterility. For example, end wall 12 may be provided with a boss from which outer cannula end 18 extends. In this case, the cannula cover would be of the same approximate diameter as the boss to provide a seal between the cover and the boss.

The blood pilot tube may be provided with a stopper projecting beyond the end of the tube as shown in the drawings. Optionally, the stopper may be flush with or recessed from the end of the pilot tube. The stopper may be provided with a thin web portion in its center to permit easier penetration by the cannula as shown, or may be uniform in cross-section, or be of other configuration. Where the stopper is flush or recessed, the end of the pilot tube 24 rather than the stopper can be used to push the sheath 20 along the length of holder 10.

The sheath 20 preferably has a small up-turned portion around its periphery as shown in the drawings. This improves the seal and also prevents dislodgement during shipping and handling, as well as preventing tipping when it is being forced down the length of holder 10 and over the cannula.

By the present invention, there is provided a simple unit for the collection of blood samples. The constructions involved are readily assembled and foolproof. Yet they are very effective in the maintenance of sterility of all the surfaces which contact either the patient or the blood sample. For this reason, the invention represents a substantial advance in the art by reducing the possibility

of infection of the patient and the collection of defect blood samples.

While the drawings depict one form of the invention, it will be understood that many variations are possible within the spirit and scope of our invention. For example, the holder need not be of cylindrical configuration, but may be of any cross-section. Likewise, the holder need not be completely closed at the end supporting the cannula or around the sides thereof. In the drawings, one form of the cover is shown. However, any other form of the cannula cover capable of protecting the protruding end of the cannula may be used.

Having fully described the invention, it is intended that it be limited only by the lawful scope of the appended claims.

We claim:

1. A novel blood sampling assembly comprising a hollow tubular cylindrical holder having one supporting end for a cannula, extending from the supporting end of said holder a cannula, said cannula passing through said supporting end and having a sharpened outer end and a sharpened inner end, slidably received within said holder and sealing the opposing end thereof a thin permanently mounted diaphragm which completely spans said holder and is capable of being punctured by said inner end of said cannula upon being slid longitudinally within said holder, a cannula cover covering said outer end of said cannula, received within said holder a cylindrical blood pilot tube having an open end and a closed end, said open end containing a stopper, said stopper and tube having a diameter smaller than the inner diameter of said holder whereby said tube and stopper may be inserted into the open end of said holder to abut said diaphragm and push said diaphragm over the said inner end of the cannula and puncture said stopper.

2. The apparatus of claim 1 wherein the portion of said cannula intermediate said inner and outer ends and embedded within said supporting end is obtuse with respect to said end portions.

3. The holder of claim 1 wherein the diaphragm has a thin upstanding rim around its periphery extending toward said open end of the holder and sealing upon the inner wall of said holder.

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