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BLOOD SAMPLE COLLECTION APPARATUS

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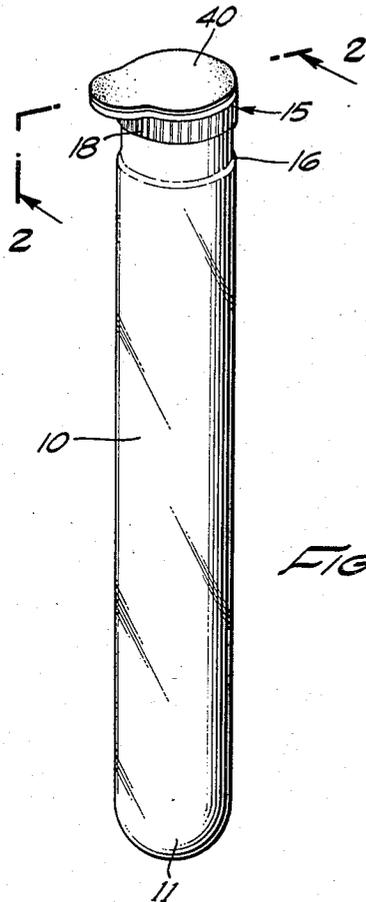


FIG. 1.

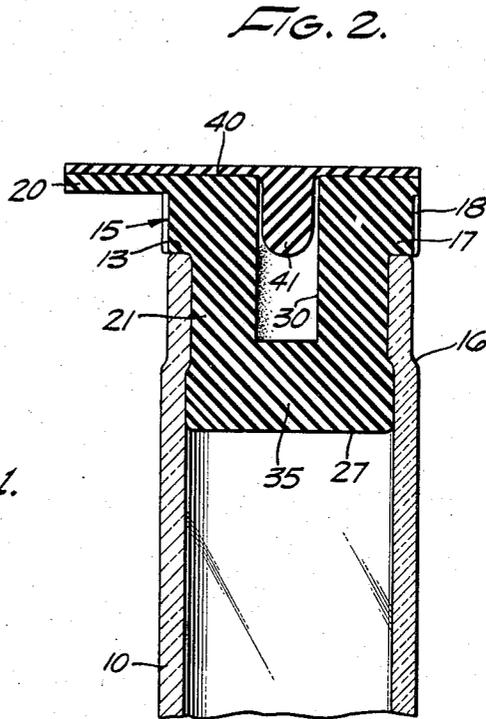


FIG. 2.

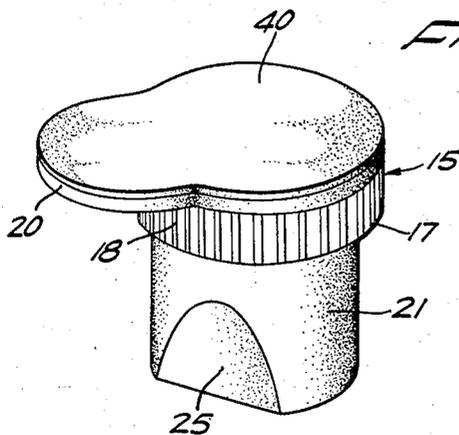


FIG. 3.

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## BLOOD SAMPLE COLLECTION APPARATUS

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3 Claims. (Cl. 128—272)

This invention relates to apparatus for the collection of blood samples and has particular reference to improved apparatus used in drawing or otherwise collecting blood from veins.

Conventional practices in the collection of blood samples from live subjects include the use of an evacuated tube or vial closed at one end by a stopper of rubber or other resilient material adapted to be pierced by a cannula or hollow needle which is either directly or indirectly in communication with a vein of the patient. The stopper is generally formed with an inner axial recess extending partially from the lower end thereof and in many cases a similar recess extends downwardly from the top of the stopper. In either event, a diaphragm is thus formed in the stopper, the primary purpose of the diaphragm being to present a reduced-thickness portion permitting ready insertion of the needle therethrough. Such stoppers are disadvantageous from the standpoint that a portion of the blood in the vial tends to collect in the inner recess and upon opening of the vial by removal of the stopper this blood often splatters the working area with droplets, generally spotting the clothes of the user or other surrounding surfaces. Another disadvantage of stoppers which include the top recess is that dust, dirt and other foreign particles settle therein and such foreign particles are difficult if not impossible to remove, thus resulting in a condition of existing or potential contamination.

One of the principal objects of this invention is to provide a novel blood sample collection apparatus which is not subject to these and other disadvantages of the apparatus of the prior art.

Another object of this invention is to provide a novel blood sample collection apparatus and more particularly a novel stopper therefor, the stopper being provided with a reduced-thickness area but having substantially smooth top and bottom surfaces.

Other objects and advantages of this invention it is believed will be readily apparent from the following detailed description of a preferred embodiment thereof when read in connection with the accompanying drawings.

In the drawings:

Figure 1 is a perspective view of the apparatus of this invention.

Figure 2 is a sectional elevation, on an enlarged scale, taken substantially on the line 2—2 of Figure 1.

Figure 3 is a perspective view, on an enlarged scale, of the stopper of this invention.

Referring now to the drawings, the apparatus of this invention includes a tube or vial 10, preferably of glass, having a closed bottom end 11, the top open end 13 being closed by a stopper 15. Preferably the open end 13 is of slightly reduced diameter providing a circumferential shoulder 16.

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The stopper 15 is made of rubber or rubber-like material of suitable composition and has a flanged head portion 17 overlying the end of the vial 10. The periphery 18 of the head portion is fluted and a tab portion 20 extends from the head portion, providing a means for facilitating removal and handling of the stopper. Integral with the head portion 17 is a body portion 21 which extends into the open end of the vial, the diameter of the body portion being somewhat larger than the inside diameter of the vial so that the body portion is under compression when inserted into the vial as shown. The lower end of the body portion is bevelled as at 25 to facilitate assembly of the stopper and the vial.

As shown in Figure 2, the bottom surface 27 of the body portion is substantially planar and is imperforate, having no recess therein as is the case with conventional stoppers utilized in such apparatus.

The head portion 17 is provided with a central recess 30 extending downwardly from the top thereof a substantial distance into the body portion, the portion of the stopper between the bottom of the recess and the stopper bottom surface 27 comprising a diaphragm 35. Secured to and covering the top surface of the stopper by suitable means, such as by vulcanization, is a relatively thin, imperforate cover member 40 of the same material as the stopper itself. Preferably, the cover member is provided with a generally cylindrical, depending plug element 41 which fits closely in the upper portion of the recess 30 to reinforce the portion of the cover member which overlies the recess.

From the above description it will be understood that an improved stopper and vial assembly for blood sample collecting has been provided. The stopper is so designed as to avoid the customary upper and lower recesses which are troublesome from the standpoint of sterility maintenance and of pickup of blood with the resultant spattering of droplets thereof when the stopper is removed from the vial. The stopper is provided with a completely sealed and sterile central void, made possible by the recess and cover member, reducing the effective thickness of rubber through which the needle must be inserted. Without such a void it would be extremely difficult, if not impossible, to pierce the stopper with the needle.

Having fully described our invention, it is to be understood that we do not wish to be limited to the details set forth, but our invention is of the full scope of the appended claims.

We claim:

1. In a blood sample collection apparatus, a stopper of resilient material, said stopper having a central recess extending downwardly from the top thereof, the bottom of said stopper being imperforate, and an imperforate relatively thin, pierceable cover element of the same material as said stopper, said cover element being vulcanized to the top of said stopper whereby a central void is formed in said stopper.

2. In a blood sample collection apparatus, a stopper of resilient material, said stopper having a central recess extending downwardly from the top thereof, the bottom of said stopper being imperforate, and an imperforate, pierceable cover element non-releasably secured to the top of said stopper, said cover member having a plug member depending therefrom into the upper portion of said recess whereby a central void is formed in said stopper.

3. In a blood sample collection apparatus, a stopper of resilient material, said stopper having a central re-

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cess extending downwardly from the top thereof, the bottom of said stopper being imperforate, and an imperforate relatively thin, pierceable cover element of the same material as said stopper, said cover element being vulcanized to the top of said stopper, said cover member having a plug member depending therefrom into the upper portion of said recess whereby a central void is formed in said stopper.

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References Cited in the file of this patent

UNITED STATES PATENTS

197,595	Brown	Nov. 27, 1877
5 2,784,865	Rieke	Mar. 12, 1957

FOREIGN PATENTS

558,998	Great Britain	Jan. 31, 1944
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