

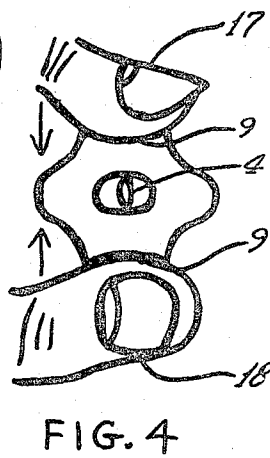
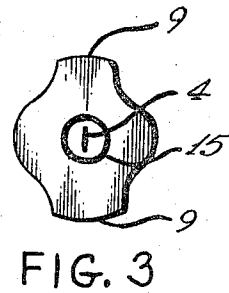
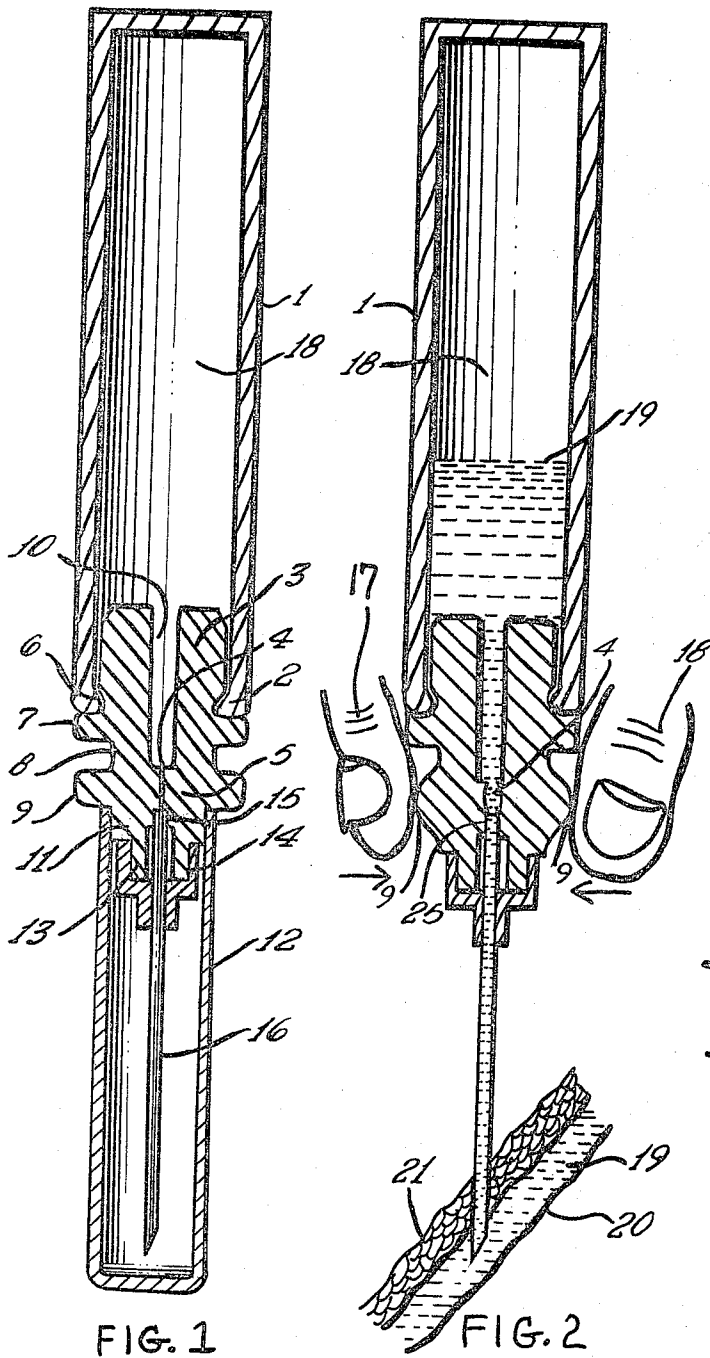
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BLOOD WITHDRAWAL DEVICE AND DISPENSER

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3,308,809 BLOOD WITHDRAWAL DEVICE AND DISPENSER

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This invention relates to a device for the withdrawal of fluid specimens and for the storage and dispensing thereof and it relates more particularly to a device for obtaining blood specimens from the human system and for the storage and dispensing thereof.

More specifically, the invention is addressed to a sealed container adapted to be employed with means for extraction of a fluid substance, such as a fluid from the human system, and in which the fluid can be stored and/or subsequently dispensed.

The usual method for extraction of blood from the human system, for the purpose of study or test, is to make use of a hypodermic syringe wherein the needle is inserted into the blood vessel and the plunger withdrawn to draw blood into the syringe. When filled, the needle is withdrawn from the vessel and covered and the syringe is set aside for laboratory use. There are a number of well known objections to the use of a syringe of the type described for the withdrawal of body fluids.

It is an object of this invention to produce a withdrawal device which makes use of a needle which can be disposed of to prevent cross-infections.

Another object is to produce a device which does not require the use of a plunger for the withdrawal of fluid and thereby avoids the problems arising when the plunger is to be withdrawn so far as to become separated from the device.

A further object is to produce a device of the type described which is simple in operation thereby to enable use other than by highly skilled personnel.

Another object is to produce a device of the type described which can be operated with one hand.

A further object is to produce a device of the type described in which a test can be performed to indicate proper insertion of the needle.

A still further object is to produce a device of the type described in which the sealed relationship can be maintained during placement of the filled device into a centrifugal machine but in which the device can be opened and sealed any number of times for the removal of fluid contained therein.

Another object is to produce a device of the type described which can be adapted for use in the dispensing of liquid under pressure without change in the construction thereof.

Specifically, it is an object of this invention to produce a device which can be used for the taking of specimens of blood or other fluid from the human system or from other source; which is sturdy in construction and easy in operation; which embodies means for determining proper placement of the needle for the removal of the fluid specimen; which is constructed of low cost and readily available materials; which can be easily assembled into a low cost unit; which can be used as a storage container in which the fluid can be maintained in a sealed relationship; which can be used for dispensing all or a portion of the fluid contained therein for purposes of testing or otherwise; which can be used as a disposable container; which embodies means for controlling flow of fluid into and out of the container; which retains the fluid in a sealed relation while enabling processing of the contained fluid, as by agitation, to achieve uniform distribution; solution or dispersion of constituents; and which is fabricated of materials

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which will not contaminate fluids coming into contact with elements thereof.

These and other objects and advantages of this invention will hereinafter appear, and for purposes of illustration, but not of limitation, embodiments of the invention are shown in the accompanying drawing, in which—

FIG. 1 is a sectional elevational view of the device embodying the features of the invention with the sealed closure or cap in position of use;

FIG. 2 is a sectional elevational view of the device shown in FIG. 1 in an intermediate stage of the filling operation;

FIG. 3 is an end view of the closure in the device shown in FIG. 1; and

FIG. 4 is a view similar to that of FIG. 3 showing the reaction to the application of force, as illustrated in FIG. 2.

Referring now to the drawing, illustration is made of a container or vial 1 having an annular, inwardly extending lip 2 at the open mouth. A rubber closure 3 is dimensioned to be received in fitting relationship within the open mouth of the container with an annular recess 6 in position to receive the annular lip 2 in an interlocking relation. The closure is formed with an annular outwardly extending portion 7 positioned to engage the outer periphery of the lip 2 when the closure is properly inserted in sealing relation into the mouth of the vial. The closure is formed with an annular recess 8 located outwardly of the portion 7 and with portions 9 beyond the recess projecting outwardly in opposite directions from the periphery of the closure.

The projecting portions 9 are crosswise aligned with the ends of a pre-punctured slit 4 extending lengthwise through an intermediate portion of the closure. The inner end of the slit 4 communicates with the outer end of a bore 10 which extends from the slit to the inner end of the closure while the outer end of the slit 4 communicates with a vestibule 15 which extends forwardly from the outer end of the slit to the outer end of the closure.

The outer end portion of the closure is formed with first and second hub sections 11 and 13 respectively with the hub section 11 being of larger dimension than the hub section 13. A needle cover 12 is dimensioned to be received in fitting relation on the hub section 11 and the hub section 13 is dimensioned to receive the hub 14 of a hypodermic needle 16 with the inner end of the needle extending into the vestibule 15. The vial is adapted to be operated with a vacuum therein.

In FIG. 2, illustration is made of the use of the device. In this illustration, the end of the needle 16 has been inserted into a blood vessel 20 for the aspiration of blood. When fingers 17 and 18 press inwardly on the projections 9, the slit 4 is caused to open, as illustrated in FIG. 4, to provide a continuous passage communicating the vestibule 15 with the bore 10 whereby the vacuum within the vial 1 will communicate through the open passages in the closure to the needle to cause blood to be withdrawn from the vessel 20 through the needle 16 and closure 3 and into the vial 1.

In FIG. 3, illustration is made of the closure 3 showing the projections 9 in crosswise alignment with the slit 4 which remains closed in the normal position shown in FIGS. 1 and 3.

In FIG. 4, illustration is made of the arrangement of elements when the lateral projections 9 are compressed by the fingers 17 and 18 to cause the slit 4 to open to form a passage therethrough.

Having described the basic construction of the device, illustration will now be made thereof in use in taking a blood sample and for dispensing a fluid when contained therein.

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When it is desired to make use of the device for the taking of a blood sample, the cover 12 is removed. The end of the needle is inserted through the disc 21 into a blood vessel 20. The lateral projections 9 are compressed between the fingers to give a momentary squeezing action which momentarily opens the slit 4. If the needle has been properly placed in the blood vessel, a few drops of blood will appear in the container. If a positive test is observed, the operator continues to compress the projections 9 to open the slit 4 until the desired amount of blood has been withdrawn from the vessel 20. In the event that blood does not show in response to the momentary compression, the needle is removed and relocated and the test is repeated until a positive indication is observed that the needle has been properly located in a blood vessel.

It will be noted that the inner end of the needle 16 is not pointed. As a result, it will not pierce or penetrate any part of the rubber closure 3. The end of the needle fits tightly within the vestibule 15 and against the forward end of the slit 4. Thus, any blood passing through the needle 16 will continue through the open slit 4 and bore 10 into the vial 1.

When the desired amount of blood has been obtained in the vial, the needle 16 is withdrawn from the vessel and the cover 12 is replaced so that the package can be sealed for transfer to the laboratory. Release of pressure from the projections 9 will enable the slit to return to closed position to seal the fluid within the vial.

Removal of blood for analysis can be effected merely by removal of the closure with a simple twist. The desired amount of blood can be poured from the vial after which the closure can be re-inserted to re-seal the container.

Instead, the needle 16 and the cover 12 can be removed from the closure and another needle, fitted with a syringe, can be inserted through the slit 4 and into the vial for the withdrawal of blood. The slit automatically closes upon withdrawal of the needle to re-seal the container.

The device can be used for dispensing fluid without change in its construction. For this purpose, the vacuum within the vial is replaced by a gaseous propellant, as by means of equipment for filling aerosol containers. Use of the device as a dispenser is the same in that application of pressure onto the projections 9 will operate to open the slit 4 to provide a continuous passage through the closure. The slit can be opened for the passage of liquid therethrough dropwise or in a continuous stream, depending upon the amount of compression. Thus the test period can also be employed when the device is used as a dispenser as by providing for the projection of only a drop or two of the fluid to make sure of the injection.

It will be understood that instead of the needle 16, different types of nozzles can be employed.

It will be apparent from the foregoing that I have provided a new and novel device embodying a combination

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of elements which are adapted for more efficient and effective use in the withdrawal of blood specimens and the like fluid materials. It will be apparent also that the device described can be utilized also as a dispenser of pressurized fluids without alteration or modification.

It will be understood that changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claims.

I claim:

1. A device of the type described comprising a vial having an open mouth, a closure of resilient material dimensioned to be received in fitting relationship in the open mouth of the vial with a portion of the closure extending outwardly from the end of the vial, axially aligned bores extending inwardly from opposite ends of the closure and terminating in spaced relationship one from the other in an intermediate portion of the closure located outwardly from the end of the vial, an elongate crosswise slit extending through the intermediate portion of the vial interconnecting the axially aligned bores one with the other, and portions extending outwardly from the closure in crosswise alignment with the slit whereby the slit opens to form a passage communicating the axially aligned bores in the closure upon deformation of the intermediate portion of the closure responsive to application of lateral pressure on the outwardly extending portions and whereby the slit automatically returns to closed position for sealing the space between said axially aligned bores in response to the release of said pressure and a hollow needle received in fitting relationship within the bore extending inwardly from the outer end of the closure.

2. A device as claimed in claim 1 which includes a seat in the form of a cylindrical section on the outer periphery of the closure and which includes a cover releasably telescoped in sealing engagement on said seat.

3. A device as claimed in claim 1 in which the hollow needle extends lengthwise through the bore extending inwardly from the outer end of the closure and in which the outer end portion of the closure is formed with a peripheral portion of cylindrical shape and which includes an elongate cover enclosing the needle and mounted in sealing relationship about said cylindrical section.

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