July 29, 1958 D. GABRIEL 2,845,067

VIALS CONTAINING MEDICATION UNDER PRESSURE

Filed July 1, 1955

Fig. 1.

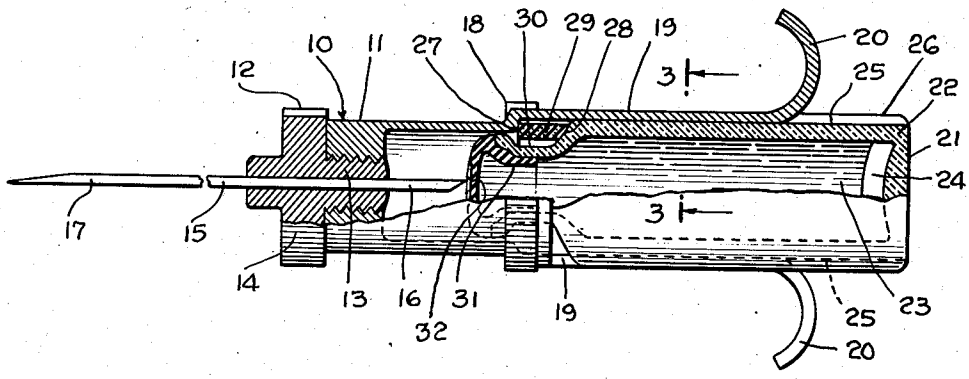


Fig. 2.

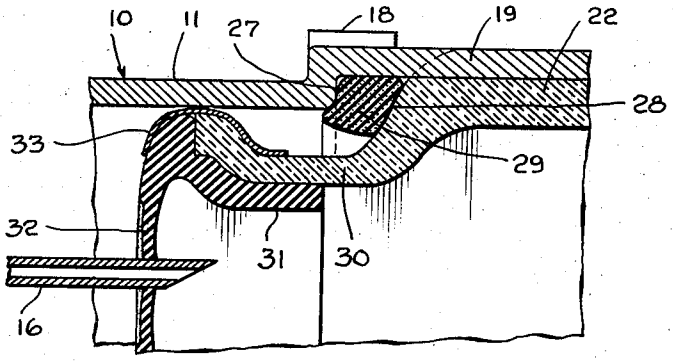


Fig. 3.

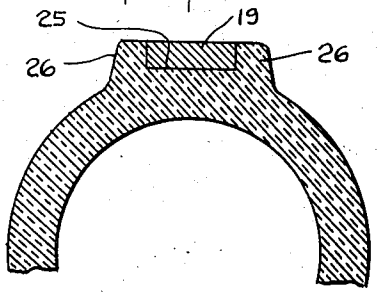
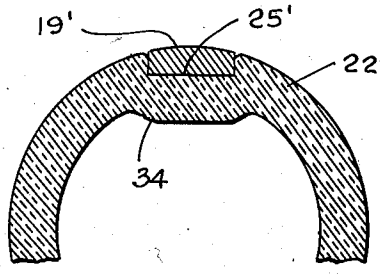


Fig. 4.



INVENTOR.
DANIEL GABRIEL

BY
Harvard E. Thompson
ATTORNEY

United States Patent Office 2,845,067 Patented July 29, 1958

2,845,067

VIALS CONTAINING MEDICATION UNDER PRESSURE

Daniel Gabriel, Bonny Blue, Va.

Application July 1, 1955, Serial No. 519,482
8 Claims. (Cl. 128—218)

This invention relates to vials or containers for supply of medication to physicians for use in conjunction with hypodermic needle units of a special design, whereby the medication contained in the vial can be directly transmitted to the body through the use of the needle unit by simply piercing the closure stopper of the vial with one end portion of the needle of said unit, so as to expose the same to the interior of the vial, thereby automatically facilitating discharge of the entire contents from the vial by the pressure contained in the vial.

Still more particularly, the invention deals with a vial of the character described, having means for positioning and alining the same in a hypodermic needle unit of special design, as well as means for normally retaining the vial in inoperative position, preparatory to applying pressure to the vial in the operation of piercing the stopper by the needle of said hypodermic unit.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

Fig. 1 is a side and sectional view of a needle unit and vial, showing the same in normal position, prior to piercing the vial.

Fig. 2 is an enlarged sectional detailed view of part of the structure shown in Fig. 1, illustrating the vial in the pierced position.

Fig. 3 is a partial enlarged section on the line 3—3 of Fig. 1; and

Fig. 4 is a view similar to Fig. 3 showing a modification.

For the purpose of illustrating one adaptation and use of my invention. I have shown, at **10**, a hypodermic needle unit, comprising a cylinder part **11** and a needle part **12**, the latter having a threaded stud portion **13** in threaded engagement with one end portion of the cylinder **11**, as clearly shown. Outwardly of the threaded portion **13**, the needle part **12** has an enlarged knurled head **14**, facilitating manual rotation thereof in coupling and uncoupling the part **12** with the cylinder **11**. Arranged centrally and longitudinally of the part **12** is a tubular hypodermic needle **15** having a short pointed inner end **16** arranged within the cylinder **11** and a longer pointed outer end **17**. The other end portion of the cylinder **11** has an enlarged knurled or roughened fingerpiece head **18**, which forms a fingergrip, facilitating operation of the needle unit in applying the end portion **17** of the needle to the body of the patient.

Extending from the head **18** are a pair of long guide and supporting arms **19**, terminating in reversely curved fingerpiece hooks **20**, the latter being engaged by two fingers of a hand in the operation of applying pressure of another finger, preferably the thumb, upon the closed end **21** of a vial **22** containing medication, as diagrammatically illustrated at **23**. To further illustrate the existence of pressure within the vial, an air or pressure

chamber is indicated at **24** adjacent the bottom wall **21**.

The arms **19** will be of sturdy construction and parallel to each other, so as to provide a firm but free support of the vial **22**, the vial having grooves **25** in opposed walls thereof, one of these grooves being shown in sectional detail in Fig. 3 of the drawing. In the construction shown, the grooves **25** are bordered by parallel spaced ribs **26** protruding from the body portion of the vial. This construction provides a controlled assemblage of the vial **22** with the unit **10**. This assemblage will maintain the vial in proper alined position in the unit. The enlarged head portion **18** forms a shoulder **27** at the second named end of the cylinder and between this shoulder and the contracted end **28** of the vial is disposed a stop ring **29** of highly yieldable material. The ring may be simply placed in position upon the shoulder **27**, prior to assemblage of the vial **22** with the unit **10**. However, it is preferred that the ring **29** be cemented to the portion **28** to constitute a part of the vial assemblage.

Extending outwardly from the contracted end **28** of the vial is a neck portion **30**, in which a rubber stopper **31** is arranged to seal the vial. The outer central portion of the stopper has a weakened wall portion **32** facilitating the piercing of the stopper by the end **16** of the needle **15**, in the manner diagrammatically shown in Fig. 2 of the drawing, so that the end **16** extends into the vial, permitting discharge of the medication which is under pressure, the pressure being so controlled as to insure discharge of the entire contents of the medication, but not so high as to create any detrimental effect in the normal handling and shipment of the vial.

The stopper **31** is sealed and retained upon the neck portion **30** by an enveloping sleeve or collar **33** in the form of a plastic or other film or thin sheeting.

In the use of my improved hypodermic unit with vials of the kind under consideration, it will be understood that the unit **10** can be sterilized as with other instruments of this type and kind and, when it is desired to apply medication, instead of utilizing the conventional type of syringe, including a needle end, all that is necessary is to insert the vial **22** in the unit, in which operation, the vial is simply brought to an eased position upon the ring **29** or the ring **29** upon the shoulder **27**; whereupon, the unit is then grasped with at least two fingers adjacent the head **18** and the needle **17** is injected into the patient; after which, two fingers of a hand are placed in the hooks **20** and the thumb of said hand then applies pressure upon the end **21** to move the vial in the direction of the needle end **16**, causing said needle end to pierce the weakened or thin wall portion **32** and enter the vial, at which time, the medication, under pressure within the vial, is automatically discharged through the needle **15** into the patient.

In the foregoing operation, the ring **29** of highly yieldable rubber, or rubber composition, is placed under compression and deformed substantially into the position diagrammatically shown in Fig. 2 of the drawing and, upon release of finger pressure upon the vial, this ring **29** will tend to move the vial outwardly. The vial is then withdrawn from the unit and the unit again made sterile to be prepared for a further use.

With a structure of the type and kind under consideration, it will be apparent that the material savings are effected to physicians in the application of medications and, further, considerable time of the physicians is saved in dispensing with a lot of unnecessary operations, which heretofore were necessary to be performed before the medication could be administered.

For purposes of description, keeping in mind general applications and uses of the invention, the vial **22** may be considered a container element, in which a liquid

medium of any type or kind is contained under pressure, the element being so constructed as to release the pressurized fluid under predetermined conditions or mode of uses.

In Fig. 4 of the drawing, I have shown a slightly modified form of vial 22', which differs from the vial 22 simply in providing inwardly set grooves 25' which result in slight enlargements or projections 34 appearing on the interior of the vial. In other words, the inwardly set grooves 25' will keep the arms, one of which is indicated at 19', within peripheral boundaries of the diameter of the vial 22'.

The sides of the grooves 25, 25' may be said to form in the vial, guide wall portions for engagement with the arms 19, 19' in keying or retaining the unit 10 against displacement from the vial while at the same time permitting longitudinal movement of the vial with respect to said unit.

With structures of the type and kind shown in Fig. 4, the area of the vial will be made sufficiently large to compensate for the inward projections 34 in order to maintain a standardized quantity of medication in the vial.

In some uses of the invention, the entire unit 10 can be economically constructed and utilized as a disposable unit. In such uses, the means for detachment of the hypodermic needle can be dispensed with.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A vial for use in conjunction with hypodermic needle units of the character described, said vial having a pierceable stopper normally sealing the vial and retaining a liquid under pressure within the vial, whereby, in piercing the stopper by the needle of a hypodermic needle unit, the characterized liquid is automatically discharged through the needle of said unit, and said vial having, on opposed walls thereof, longitudinal grooves for reception of parts on said unit.

2. A vial for use in conjunction with hypodermic needle units of the character described, said vial having a pierceable stopper normally sealing the vial and retaining a liquid under pressure within the vial, whereby, in piercing the stopper by the needle of a hypodermic needle unit, the characterized liquid is automatically discharged through the needle of said unit, said vial having, on opposed walls thereof, longitudinal grooves for reception of parts on said unit, and said grooves being bordered by outwardly projecting spaced ribs on said vial.

3. A vial for use in conjunction with hypodermic needle units of the character described, said vial having a pierceable stopper normally sealing the vial and retaining a liquid under pressure within the vial, whereby, in piercing the stopper by the needle of a hypodermic needle unit, the characterized liquid is automatically discharged through the needle of said unit, said vial having, on opposed walls thereof, longitudinal grooves for reception of parts on said unit, and said grooves being disposed within circumferential boundaries of said vial.

4. The combination with a hypodermic needle unit having a cylinder with a shoulder end and a short vial piercing needle end, of a medicinal vial containing pressurized medication, the vial including a stopper end normally sealing the vial and adapted to be pierced by said short needle end, means for yieldably seating and checking the vial on said shoulder, and said vial having guide wall portions extending beyond said shoulder end engaging a projection on the unit to retain the vial against displacement from said unit.

5. A hypodermic needle unit, comprising a cylinder, a pair of elongated arms extending from one end of the cylinder, a needle arranged in the cylinder and having a long end protruding beyond the other end of the cylinder and a short end arranged within the cylinder, a vial mounted in the unit longitudinally of and between said arms, cooperative means between the vial and arms for retaining the vial against lateral displacement from the unit, said arms having a pair of fingergrips facilitating support of the unit in operation of pressure moving the vial in the direction of the short end of said needle in movement of said short end of the needle into the vial, said vial containing a pressurized liquid dischargeable through the needle of said unit when the needle has pierced said vial, and said cooperative means comprising longitudinal guide wall portions on opposed walls of the vial between which said arms are slidably mounted.

6. The combination with a vial containing a pressurized liquid and including a pierceable rubber stopper normally sealing the vial, of a hypodermic needle unit mounted on the stopper end portion of the vial, said vial being movable longitudinally in said unit, said unit including a hypodermic needle projecting outwardly from the unit, said needle including a short inner end adapted to pierce the stopper of the vial in pressure movement of the vial in the direction of the short end of said needle, means checking initial movement of the vial into said unit, said last named means comprising a yieldable ring positioned between part of the vial and a shoulder in said unit, and said unit and vial having interengaging means keying the vial against displacement from said unit.

7. The combination with a hypodermic needle unit, including a short vial piercing needle end, of a medicinal vial containing pressurized medication arranged in said vial, the vial including a stopper end normally sealing the vial and adapted to be pierced by said short needle end, means retaining the vial against displacement from said unit, said means comprising a projecting arm on said unit arranged between guide wall portions extending longitudinally of the vial, and a pressure ring disposed between the vial and the unit in controlling movement of the vial in said unit.

8. The combination with a hypodermic needle unit, including a short vial piercing needle end, of a medicinal vial containing pressurized medication arranged in said vial, the vial including a stopper end normally sealing the vial and adapted to be pierced by said short needle end, means retaining the vial against displacement from said unit, said means comprising a projecting arm on said unit arranged between guide wall portions extending longitudinally of the vial, a pressure ring disposed between the vial end the unit in controlling movement of the vial in said unit, and said ring being secured to said vial.

References Cited in the file of this patent

UNITED STATES PATENTS

1,594,493	Brown	Aug. 3, 1926
2,168,686	Saffir	Aug. 8, 1939
2,378,205	Feras	June 12, 1945
2,554,352	Ward et al.	May 22, 1951
2,717,601	Brown	Sept. 13, 1955
2,735,735	Abel	Feb. 21, 1956

FOREIGN PATENTS

861,539	France	Oct. 28, 1940