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HYPODERMIC NEEDLE UNIT FOR DISCHARGE OF MEDICATIONS FROM PRESSURIZED VIALS

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This invention relates to a special type of hypodermic needle unit, which is designed for use directly in connection with vials containing medication, in which the medication in the vial is under pressure, whereby, in insertion of and pressure feeding of the vial in the unit, the medication contents of the vial, in its entirety, is automatically discharged through the needle of the unit.

More particularly, the invention deals with a unit of the character described, wherein a fingergrasp portion, or head, is provided on the unit, facilitating injection of the needle of the unit into the body, preparatory to injecting medication and, further, with other fingerpiece hooks for supporting the unit in the operation of pressure moving the medication vial into position, piercing the stopper end of the vial in the pressure discharge of the medication through said needle.

Still more particularly, the invention deals with a unit of the character described, wherein the needle part of the unit is detachable, facilitating use of different types and kinds of needles with a single 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; and

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

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 fingergrasp, 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

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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 aligned 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 ele-

ment being so constructed as to release the pressurized fluid under predetermined conditions or mode of uses.

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.

From a consideration of Fig. 1 of the drawing, it will appear that the long parallel guide and supporting arms 19 extend from the end surface of the head 18. Further, it will be noted that inner surfaces of the arms are in alignment with the bore of the head; thus, there is no interference to the inward movement of the vial 22 as it acts upon the yieldable ring 29 seating on the shoulder 27, as is clearly noted in Fig. 2 of the drawing.

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

1. A hypodermic needle unit for vials of the character described, said unit comprising a tubular cylinder and a needle part, one end of the cylinder having a threaded bore, the other end of the cylinder having an enlarged tubular head, the bore of which is of greater diameter than the diameter of said cylinder to form a shoulder in said head, a pair of long parallel guide and supporting arms extending integrally from the end surface of the head, said needle part having a threaded portion engaging the threaded bore of the cylinder, a knurled head on the needle part at the first named end of the cylinder, a tubular hypodermic needle in said needle part, said needle having a long outer end and a short inner end arranged in the cylinder, and the free end of said short inner end terminating inwardly of said shoulder.

2. A hypodermic needle unit for vials of the character described, said unit comprising a tubular cylinder and a needle part, one end of the cylinder having a threaded bore, the other end of the cylinder having an enlarged tubular head, the bore of which is of greater diameter than the diameter of said cylinder to form a shoulder in said head, a pair of long parallel guide and supporting arms extending integrally from the end surface of the head, said needle part having a threaded portion engaging the threaded bore of the cylinder, a knurled head on the needle part at the first named end of the cylinder, a tubular hypodermic needle in said needle part, said needle having a long outer end and a short inner end arranged in the cylinder, the free end of said short inner end terminating inwardly of said shoulder, and the inner surfaces of said arms being in alignment with the bore of said tubular head.

3. A hypodermic needle unit for vials of the character described, said unit comprising a tubular cylinder and a needle part, one end of the cylinder having a threaded bore, the other end of the cylinder having an enlarged tubular head, the bore of which is of greater diameter than the diameter of said cylinder to form a shoulder in said head, a pair of long parallel guide and supporting arms extending integrally from the end surface of the head, said needle part having a threaded portion engaging the threaded bore of the cylinder, a knurled head on the needle part at the first named end of the cylinder, a tubular hypodermic needle in said needle part, said needle having a long outer end and a short inner end arranged in the cylinder, the free end of said short inner end terminating inwardly of said shoulder, and a yieldable ring seating directly on said shoulder.

4. A hypodermic needle unit for vials of the character described, said unit comprising a tubular cylinder and a needle part, one end of the cylinder having a threaded bore, the other end of the cylinder having an enlarged tubular head, a pair of long parallel guide and supporting arms extending from the end surface of the head, inner surfaces of the arms being in alignment with the bore of said head, the diameter of said cylinder being less than the diameter of said bore to form, within the head, a shoulder, a yieldable ring seating on said shoulder, said needle part having a threaded portion engaging the threaded bore of the cylinder, a knurled head on the needle part at the first named end of the cylinder, a tubular hypodermic needle in said needle part, said needle having a long outer end and a short inner end arranged in the cylinder and terminating short of said shoulder, and ends of said arms terminating in curved finger-grip members.

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