Sept. 29, 1964 E. J. MAKI 3,150,661

DISPOSABLE CARTRIDGE AND NEEDLE UNIT

Filed Sept. 19, 1962

FIG. 1

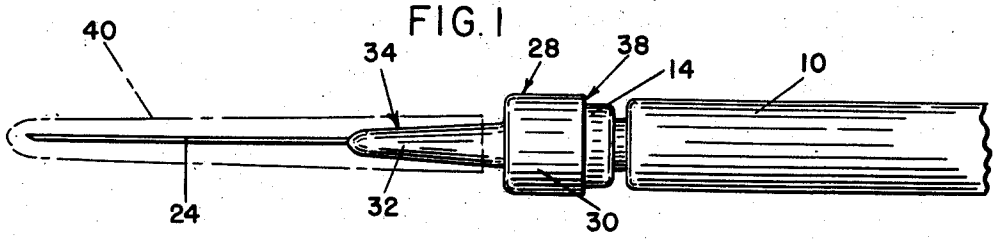


FIG. 2

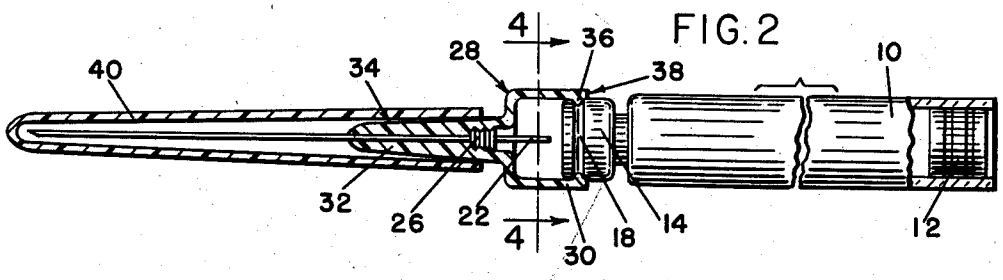


FIG. 3

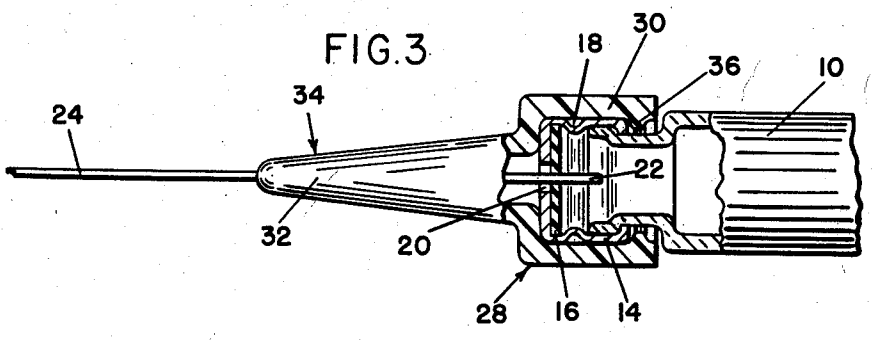
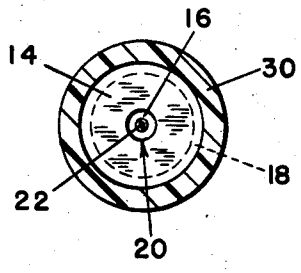


FIG. 4



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DISPOSABLE CARTRIDGE AND NEEDLE UNIT

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This invention relates to a new and improved disposable combination hypodermic needle and cartridge or ampoule which is provided with means for maintaining the parts in sterile condition for transportation, storage and use, and in which the needle and ampoule are assembled at the factory for transportation and sale as a unit. The novel disposable cartridge-needle unit can be utilized with disposable syringes but may be used with conventional dental syringes if desired.

An object of the invention resides in the provision of a needle unit comprising a plastic hub with a needle having the usual needle hub embedded therein and said plastic needle hub including an enlarged skirt portion which fits over the ferrule or metal cap on the ampoule, and the plastic needle hub and the metal cap or ferrule on the ampoule are provided with interengaging means which temporarily but relatively firmly hold the distal end of the needle in close association with but spaced from the usual diaphragm found in the ferrule or metal cap of the ampoule, whereby a firm push inwardly on the plastic hub causes disengagement of the interengaging means and the distal end of the needle to puncture the diaphragm and render the cartridge ready for use, there being provided also a sanitary needle guard which has a friction fit with an extending portion of the plastic needle hub, which guard can be removed after applying the cartridge and needle assembly to the dental syringe, all to the end that the unit is ready for use in a completely sanitary manner and may be disposed of or thrown away once it has been used so that the needle possesses the advantage that it is not touched either by hand or by instrument at any time after it is sterilized.

A further object of the invention resides in the provision of a cartridge-needle unit in which the interengaging means between the plastic needle hub and the metal cap of the ampoule includes a corresponding annular groove and annular ring-like projection which enters the groove and temporarily but firmly holds the parts together, the projection entering the groove however being of such a nature that it can be dislodged so as to move the plastic hub inwardly to puncture the diaphragm of the ampoule by the needle as aforesaid and to lock the skirt of the plastic hub to the metal cap in operative condition of the parts.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

FIG. 1 is a view in elevation illustrating the invention;

FIG. 2 is a longitudinal sectional view through parts thereof;

FIG. 3 is a longitudinal sectional view on an enlarged scale showing the needle in diaphragm-punctured position, and

FIG. 4 is an enlarged section on line 4—4 of FIG. 2.

Referring in detail to the drawings, there is shown an ampoule **10** which is customarily made of glass or other appropriate material and which has a piston plunger **12** for use in the well recognized manner. At its opposite end the ampoule is provided with a metal cap or ferrule **14** which closes this end of the ampoule and which also serves to hold the diaphragm **16** in position. Just behind the diaphragm **16** the metal cap **14** is annularly indented

forming a circular groove illustrated at **18**, the metal of the metal cap being turned over the diaphragm, tending to hold the same in position and being apertured as at **20** to allow for the distal end **22** of the needle to puncture the diaphragm when in the FIG. 3 position.

The needle proper is indicated at **24** and is provided with a needle hub **26** which is embedded in a plastic needle hub cap or the like generally indicated by the reference numeral **28**. This hub cap is provided with a skirt portion **30** which is longer than the distal end of the needle **22** and it is also provided with an elongated forward end member **32** which has an exterior tapered surface as indicated at **34**, the hub **26** of the needle being embedded in the extending portion **32** so that the needle is immovably fixed with relation to the plastic cap construction **28**.

At the open end of the skirt portion **30**, it is provided with an interior annular flange or inwardly directed circular projection indicated by the reference numeral **36** and this is located substantially at the outer or open end of the plastic cap **28** which terminates in an edge **38**. A sanitary needle guard **40** is provided to slide onto and frictionally fit the extending tapered surface **34** of the plastic hub cap and some effort must be exerted in order to remove this needle guard.

In the first instance, the parts are assembled so that the inwardly directed flange or projection **36** at the open end of the plastic cap **28** is lodged within the annular groove **18** of the metal cap **14** as clearly shown in FIG. 2, in which condition the distal end of the needle at **22** is held in spaced relation with relation to the diaphragm of the metal cap so that it cannot accidentally puncture the same.

When it is desired to use the needle as for making an injection, a firm inward push, i.e., from left to right in FIG. 2 on the plastic hub **28**, will cause dislodgment of the inwardly directed annular projection **36** from its interengaging annular groove **18**, and then of course the needle assembly may be moved continuously inwardly until the end of the needle at **22** punctures the diaphragm (see FIG. 3). The parts are so arranged that the plastic hub **28** becomes seated in the FIG. 3 position, with the inwardly directed projection **36** now located just behind the crimped-over shoulder of the metal cap **14**, and in this condition dislodgment of the needle assembly from the cartridge or ampoule **10** is very unlikely. In other words, means is provided locking the plastic hub in injection position and at least in part insofar as projection **36** is concerned this is the same means that temporarily holds the needle assembly in the FIG. 2 position for shipping and storage.

Of course after use of the material in the cartridge or ampoule, the entire unit can be thrown away and it is pointed out that the device can be used by itself given some means of exerting pressure on the plunger piston **12**, but at the same time the entire unit can be located and positioned in a conventional dental syringe and the cap **40** can thereafter be removed just prior to use. Also the plastic hub **28** is made of plastic which is somewhat yieldable and for this reason the annular projection **36** tends to stay in its groove **18** but can be dislodged as stated so as to move inwardly to the right in FIG. 2 to the FIG. 3 position and there snap over and become locked to the metal cap **14** in injection position of the parts.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. A disposable cartridge and hypodermic needle unit comprising in combination a cartridge having a plunger closing one end thereof and a cap closing the opposite

end, said cap being apertured and enclosing and holding a diaphragm therein, said cap including a crimped edge forming a shoulder;

with a plastic needle hub including means for holding a hypodermic needle thereto, an open-ended skirt on the hub, the distal end of the needle being located generally centrally within said skirt,

and interengaging means including an annular mating complementary projection and indentation construction between said skirt and said cap for temporarily holding the plastic needle hub in position on the cap with the distal end of the needle spaced from the diaphragm for transportation and storage of the unit, said interengaging means however being capable of being dislodged by an inward push on the plastic needle hub relative to the cap on the cartridge to cause the projection and indentation to become dislodged and the skirt to slide inwardly over the cap and the distal end of the needle to puncture the diaphragm, the now disengaged means on the skirt being lodged behind the shoulder on the cap locking the needle in operative condition.

2. The cartridge and hypodermic needle unit of claim 1 wherein said projection is on the skirt and the indentation is an annular groove on the cap.

3. The cartridge and hypodermic needle unit of claim 1 wherein said projection is on the skirt and the annular indentation on the cap, the annular indentation on the cap being located adjacent the extreme end portion thereof, said cap extending inwardly with respect to said cartridge from said annular indentation to the crimped edge thereof.

4. The cartridge and hypodermic needle unit of claim 1 wherein said projection is on the skirt and the indentation on the cap, the projection on the skirt being inwardly directed adjacent the open end of said skirt.

References Cited in the file of this patent

UNITED STATES PATENTS

2,661,740	Hickey	Dec. 8, 1953
2,687,727	Lawshe	Aug. 31, 1954
2,828,743	Ashkenay et al.	Apr. 1, 1958
2,894,509	Bednarz	July 14, 1959

FOREIGN PATENTS

210,267	Austria	Sept. 12, 1957