Oct. 29, 1940. W. ERHARD 2,219,301

HYPODERMIC UNIT

Filed April 15, 1939

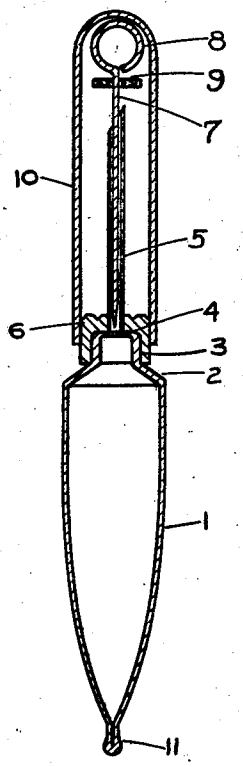

FIG. 1

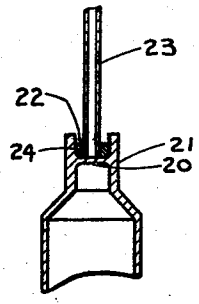

FIG. 2

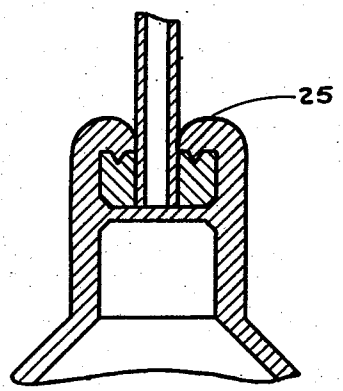

FIG. 3

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HYPODERMIC UNIT

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6 Claims. (Cl. 128—216)

This invention relates to hypodermic units—i. e., units enabling medicines and other substances to be promptly and efficiently administered by injection directly from sterile original packages—, and has for its object the provision of such units characterized by exceptional simplicity of structure, inexpensiveness of manufacture, and ease, convenience, and dependability in use.

The hypodermic unit of this invention comprises essentially (1) a hermetically sealed collapsible soft-metal tube having a readily-pierceable blind (i. e., integrally-closed) discharge end; (2) a hypodermic needle having a base rigidly secured to the tube, the lumen of the needle communicating with the outside of the blind end; (3) a stiff wire, preferably headed at its outer end and pointed at its inner end, in the lumen of the needle; preferably, (4) a guard disc impaled on the wire near the head; and preferably (5) a detachable protective cover enclosing the needle and the wire.

The invention will be described in detail in connection with the accompanying drawing wherein:

Fig. 1 is an axial section of a hypodermic unit embodying my invention;

Fig. 2 is a fragmentary axial section of a similar unit in which there is provided a different means for connecting the collapsible tube and the hypodermic needle; and

Fig. 3 is a somewhat enlarged fragmentary axial section of the unit shown in Fig. 2, with the connection completed.

Referring first to Fig. 1, the unit shown comprises a collapsible soft-metal tube 1 having a conventionally-shaped shoulder 2, an unthreaded neck 3, and a blind end 4, the tube having been formed by extrusion, in the customary manner. The shoulder and neck of the tube are preferably thicker than the body of the tube, for rigidity; and the blind end 4 is relatively thin, at least at its center, so as to be readily pierceable by a stiff wire. A hypodermic needle 5 is secured—as by welding, soldering, or otherwise (for example by being made integral)—to a base, preferably of the type of hub 6, and the hub, which has an inner diameter slightly less than the external diameter of the tube neck, is forced upon the tube neck and thus frictionally engaged therewith to form a rigid attachment. Alternatively, the hub may be of greater diameter than the neck and cemented or otherwise attached thereto; and the base may assume any of various other shapes. Within the lumen of the needle is a stiff, pointed wire 7 having its outer end modified to form a head or handle 8, the wire being longer than the lumen of the needle and being thus adapted to puncture the blind end of the tube when thrust inwardly. Preferably the wire has impaled thereon a guard disc 9 of thick paper or other protective material which will not dull the point of the hypodermic needle. A protective cover 10 of synthetic plastic or the like, preferably transparent, such as Celluloid or Hycoloid, is frictionally engaged with the hub of the needle, the engagement being tight enough to exclude contaminants but permitting the cover to be readily pulled off for use of the hypodermic unit.

The hypodermic unit is assembled as follows: The open tube is placed on a mandrel providing internal support for the tube neck, the needle hub is positioned over the neck and forced into frictional engagement therewith, the wire is inserted into the needle, and the protective cover attached.

The collapsible tube is then filled with the desired medicine or other substance,—inter alia, narcotics, tetanus antitoxin, and insulin—in the usual manner through its open end, and that is suitably closed, preferably hermetically sealed, as by electrically forming a bead-weld 11; and finally the completed unit is heat-sterilized in the usual manner. Alternatively, the needle, wire, and protective cover may be assembled first, the needle hub being provided with a flange at the edge of its skirt, and the assembly forced upon the neck of the tube by pressing the hub flange and mandrel together.

In using the unit of this invention, the protective cover is first removed and the wire, as by pressure on its head, thrust inwardly to puncture the blind end of the tube, the guard disc preventing injury to the needle point as well as contamination thereof by the fingers, and serving also to assist withdrawal of the wire. The wire is then withdrawn, the needle introduced into the subject, and the tube squeezed between the fingers to inject the contents thereof into the subject. Alternatively, the puncturing movement of the wire may be effected by merely pushing the cover toward the tube; and moreover the wire may be fixed to the distal end of the cover so as to be removable therewith, in a single operation.

In Fig. 2 there is shown an alternative means of effecting a rigid inseparable connection between the hypodermic needle and the collapsible tube. An integral, readily-pierceable partition 20 is situated within the bore of the neck 21 so as to

provide an outer cavity 22. The needle 23 is secured to a base consisting of a disc 24, and the disc is inserted in the cavity and rigidly secured therein by soldering, welding, or by turning over the edge of the neck 21, as shown at 25 in Fig. 3.

The invention may be variously otherwise embodied—for example as to form of protective cover, wire handle, and shapes, proportions, and arrangements of the several elements—within the scope of the appended claims.

I claim:

1. A hypodermic unit comprising a collapsible soft-metal tube having an integrally extruded, readily-pierceable blind end, and a hypodermic needle having a base immovably secured to the tube, the lumen of the needle communicating with the outside of the blind end.

2. A hypodermic unit comprising a collapsible soft-metal tube having an integrally extruded, readily-pierceable blind end, a hypodermic needle having a base immovably secured to the tube, the lumen of the needle communicating with the outside of the blind end, and a stiff wire longer than and carried in the lumen of the needle.

3. A hypodermic unit comprising a collapsible soft-metal tube having an integrally extruded, readily-pierceable blind end, a hypodermic needle having a base immovably secured to the tube, the lumen of the needle communicating with the outside of said blind end, a stiff wire longer than and carried in the lumen of the needle, and a detachable protective cover enclosing the needle and the wire.

4. A hypodermic unit comprising a collapsible soft-metal tube having an integrally extruded, readily-pierceable blind end, a hypodermic needle having a base immovably secured to the tube, the lumen of the needle communicating with the outside of the blind end, a stiff wire longer than and carried in the lumen of the needle, and a guard disc impaled on the wire beyond the outer end of the needle.

5. A hypodermic unit comprising a collapsible soft-metal tube having a neck provided with an integrally extruded, readily-pierceable blind end, and a hypodermic needle having a hub frictionally and immovably engaging the outside of the neck, the lumen of the needle communicating with the outside of the blind end.

6. A hypodermic unit comprising a collapsible soft-metal tube having a neck provided with an integrally extruded, readily-pierceable partition in its bore, and a hypodermic needle having a base immovably secured in the bore above the partition, the lumen of the needle communicating with the outside of the partition.

WM. ERHARD.