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Whitty

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[54] **APPARATUS FOR INSERTING A SYRINGE NEEDLE INTO A VIAL**

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[52] **U.S. Cl.** ..... **141/27,** 141/233, 141/330, 141/375, 128/218 C

[51] **Int. Cl.** **B65b 3/32,** B67c 3/16

[58] **Field of Search** ..... 141/375 X, 1, 2, 19, 26, 141/29, 250, 266, 284, 279, 329, 311, 330, 368, 231–233; 128/218 C; 222/309

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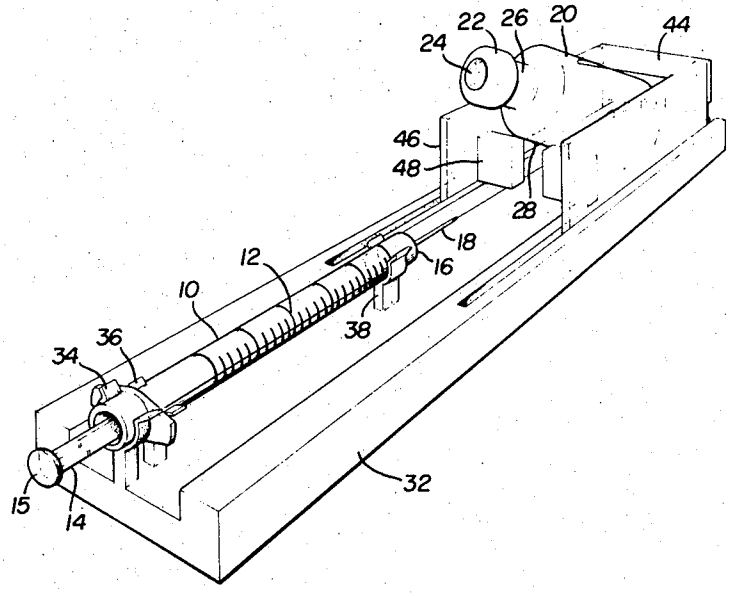
Primary Examiner—Louis R. Prince
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[57] **ABSTRACT**

A method and apparatus for inserting a syringe needle into the rubber diaphragm of a vial of medicine. The method includes the steps of positioning a needle-type syringe on a holder, positioning the vial in a carrier which is slidably mounted on the holder and sliding the carrier on the holder towards the syringe so that the vial moves into contact with the needle of the syringe and with the diaphragm of the vial being punctured by the needle.

The apparatus includes a holder, of a lightweight inexpensive material, which includes a plurality of yokes at one end to hold the syringe and a carrier slidably mounted on the holder for holding the vial. The syringe is held secure against endwise movement on the holder and the carrier holds the vial against endwise movement relative to the carrier and against lateral or vertical movement relative to the holder.

5 Claims, 6 Drawing Figures



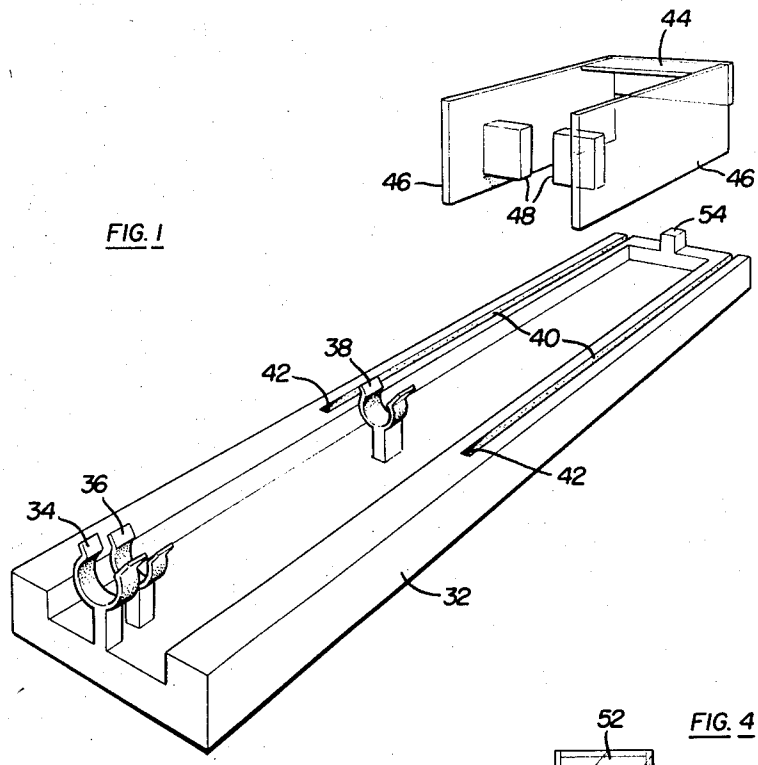


FIG. 1

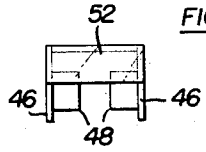
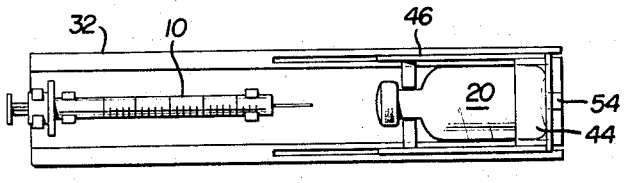


FIG. 4

FIG. 5



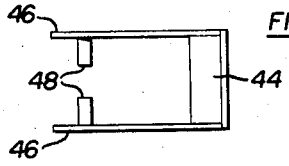


FIG. 3

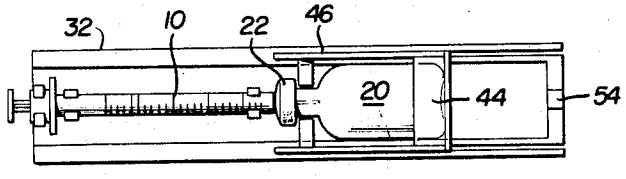


FIG. 6

FIG. 2

APPARATUS FOR INSERTING A SYRINGE NEEDLE INTO A VIAL

BACKGROUND OF THE INVENTION

In the filling of syringes from a multiple dose injection vial, it is well known that if the needle of the syringe is not properly positioned, the needle may bend or break as it engages the rubber diaphragm in the vial.

Furthermore, patients who are self-injecting medication such as insulin often have poor vision and the resulting problem in properly lining up the syringe and the vial.

In addition, patients with poor vision, often place their thumb on the diaphragm of the vial and then guide the needle into the diaphragm by placing the needle against the side of the thumb. This, however, results in some contamination of the diaphragm.

Yet another problem occurs in the insertion of a needle of a syringe into a vial if the patient has any one of a number of afflictions which is manifested by an unsteady or shaking hand.

Therefore, it is an object of the present invention to provide an inexpensive, lightweight apparatus for holding a syringe and a vial and for properly inserting the needle of the syringe into the vial.

It is another object of the present invention to provide an apparatus for assisting patients who are either blind or have low vision to properly insert a needle of a syringe into the rubber diaphragm of a vial.

Yet another object of the present invention is the provision of apparatus, bulky enough so that a patient with a physical affliction which prevents him from handling small objects, may insert the needle of a syringe into a multiple injection vial.

SUMMARY OF THE INVENTION

The present method includes the steps of positioning a needle-type syringe on a lightweight holder with the needle extending inwardly and the holder securing the syringe against endwise movement, positioning the vial horizontally in a carrier which is slidably mounted on the holder, the vial being positioned with the diaphragm end disposed toward the needle of the syringe and the carrier holding the vial against endwise movement relative to the carrier and, sliding the carrier on the holder toward the needle until the diaphragm of the vial is punctured by the needle so that the vial receives the needle fully inserted.

The apparatus includes a holder manufactured of a lightweight inexpensive material of sufficient bulk to be handled by persons with physical afflictions, the holder having a plurality of yokes for maintaining the syringe with the needle extending inwardly and the syringe secured against endwise movement. The apparatus further includes a carrier slidably mounted on the holder with the carrier for holding the vial with the diaphragm end of the vial disposed toward the needle. The vial is held against endwise movement relative to the carrier and against lateral and vertical movement relative to the holder.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing objects of the present invention, together with other objects and advantages which may be attained by its use, will become more apparent upon reading the following detailed description taken in conjunction with the drawings.

In the drawings, wherein like reference numerals identify corresponding parts:

FIG. **1** is an exploded illustrative view of the apparatus of the present invention;

FIG. **2** is an illustration of the elongated holder of the present invention showing a syringe properly supported thereon and a vial being inserted into the carrier;

FIG. **3** is a top plan view of the carrier of the present invention;

FIG. **4** is a side view as seen in the direction of the arrows **4—4** of FIG. **3**;

FIG. **5** is a top plan view of the apparatus of the present invention prior to sliding the carrier toward the syringe; and

FIG. **6** is a top plan view of the present invention after the carrier has been slid toward the syringe.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings, there is illustrated a syringe **10** having a barrel **12** and a plunger **14** disposed within the barrel. The plunger extends outward from the barrel at a first end and terminates in a knob or plunger push means **15.** The other end of the barrel is referred to as the needle end **16** and a needle **18** projects outwardly therefrom.

The vial **20** includes a metallic cap **22** having a central diaphragm **24** which is normally of rubber. The vial includes a neck **26,** sides **28** and a bottom **30.** Both the syringe and the vial are old and well known.

Conventionally, when a person wishes to fill a syringe, the vial is taken in one hand and the syringe in the other and the needle of the syringe is pushed through the rubber diaphragm of the vial. Then the plunger of the syringe is withdrawn to fill the syringe with the proper dosage of medicine.

Persons with limited dexterity, physical afflictions or other handicaps have great difficulty in properly holding both the vial and syringe and inserting the needle of the syringe through the rubber diaphragm of the vial. Furthermore, it is unfortunate but true that many diabetics also suffer from vision problems. Therefore, it is understandable that many patients who would otherwise be able to self-inject medicine and thereby be somewhat more self-sufficient are unable to do so.

To assist persons in properly inserting the needle of the syringe into the vial, the apparatus of the present invention includes a holder **32** having a plurality of yokes **34, 36, 38** which engage the barrel **12** of the syringe with the needle **18** extending longitudinally inward along the holder. The holder includes a plurality of tracks **40** which have track ends or stops as at **42** into which the carrier **44** of the present invention is slidably mounted.

The carrier **44** includes side walls **46** having internal flanges **48,** a top **50** which extends only partially over the carrier and a rear wall **52** which extends downward from the top **50** only a short distance.

The method of the present invention includes positioning the syringe **10** horizontally on the holder with the needle **18** extending longitudinally inward and the yokes **34, 36** and **38** securely holding the syringe against longitudinal movement.

A vial **20** is positioned within the carrier **44** such as by inserting the bottom **30** through the opening between the end of the top **50** and the internal flanges **48.**

The vial is positioned horizontally as in FIGS. 5 and 6 within the carrier such that the diaphragm end 24 is disposed toward the needle end 16 of the syringe. The carrier holds the vial against longitudinal movement relative to the carrier itself. Furthermore, the top 50 and sides 46 hold the vial against vertical and lateral movement relative to the holder.

With the vial properly positioned within the carrier, the carrier is slid along the tracks of the holder toward the syringe so that the vial and carrier move together and the diaphragm of the vial moves into contact with the needle of the syringe. Further sliding of the carrier causes the vial to be punctured by the needle and move past the needle so that the vial receives the needle fully inserted.

The sliding of the carrier may be stopped either by the abutting relationship between the side walls 46 of the carrier and the track ends 42 or by contact with the cap 22 and diaphragm 24 with the needle end 16 of the barrel 12 of the syringe.

The holder and carrier of the present invention may be manufactured of a lightweight inexpensive plastic and, for use with standard insulin vials and syringes, the holder would be seven inches long and one and one quarter inches wide. The carrier is approximately one inch wide, one inch high and two and one half inches long. The carrier moves inwardly a distance of one and one half inches until the needle is fully inserted. On the return movement of the carrier, a stop 54 mounted on the holder serves to alert the user that the vial and carrier are fully withdrawn and returned to a rest position. In the rest position (FIG. 5) the holder, carrier, vial and syringe may be stored, such as in a refrigerator, until the next use of the syringe. Disposable syringes may, of course, be used with the present invention.

The present invention provides significant benefits for blind patients as well as for those with physical afflictions which prevent them from grasping small objects. The yokes provide for proper alignment of the syringe. The carrier provides for foolproof loading of the vial since the neck of the vial is supported by the flanges 48 and thus the vial is secured between the flanges 48 and the rear wall 52 of the carrier. Sliding the carrier inwardly automatically engages the needle of the vial without bending or damaging the needle and sliding the carrier outwardly automatically disengages the needle.

The physical bulk of the plate and carrier are sufficient that persons with physical afflictions will not have to hold small objects separately and attempt to negotiate the needle into the diaphragm of the vial. Furthermore, a person suffering from an affliction such as arthritis still can utilize the present invention since it is not necessary to open and close the hand to slide the carrier.

The foregoing is a description of one embodiment of the present invention and it should not be read in a restrictive sense but only as describing the underlying concepts of the present method and apparatus. The invention may be further developed within the scope of the following claims.

What is claimed is:

1. Apparatus for assisting persons to insert the needle of a conventional barrel-and-plunger type syringe into the diaphragm of a vial such as a multiple dose injection vial, said apparatus for moving the vial toward the needle, which is stationary, until the needle penetrates the diaphragm, comprising:

a lightweight, inexpensive elongated holder having a first portion for positioning a vial and a second portion for releasably retaining a syringe, said syringe and vial being positioned for storage with the vial diaphragm and the syringe needle in an opposed, spaced apart relationship,

said second portion of said holder including a plurality of yokes to engage the barrel of the syringe and releasably retain the syringe against vertical, lateral and endwise movement with the needle disposed inwardly parallel to the longitudinal axis of the holder, and

a carrier slidably mounted on the first portion of said holder,

said carrier for holding the vial, with the diaphragm end toward the needle, against endwise movement relative to the carrier and against lateral and vertical movement relative to the holder,

whereby, upon sliding the carrier on the holder toward the needle end of the syringe, the vial in the carrier moves closer to and ultimately against the needle with the diaphragm being punctured thereby, and upon further sliding of the carrier the needle penetrates the diaphragm and is fully inserted therethrough into the vial.

2. The apparatus of claim **1** wherein said holder includes a plurality of tracks in which said carrier is slidably mounted, the ends of said tracks for stopping the sliding of the carrier when the needle has penetrated the diaphragm and is fully inserted in the vial.

3. The apparatus of claim **1** wherein the sliding of the carrier is limited by the physical contact of the diaphragm end of the vial with the needle end of the barrel of the syringe.

4. The apparatus of claim **1** wherein the carrier includes:

side walls for limiting lateral movement of the vial relative to the holder, and

transverse internal flanges to engage the neck of said vial to limit endwise movement of the vial with respect to the carrier, and

a rear wall to abut the bottom of the vial and further limit said endwise movement.

5. The apparatus of claim **1** and further including a stop mounted on said holder,

said stop for cooperating with the bottom of the vial and thereby limiting endwise movement of the vial and carrier, away from the needle end of the syringe relative to the holder.

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