Dec. 3, 1968

M. J. COHEN

3,413,974

HYPODERMIC SYRINGES

Filed June 26, 1963

3 Sheets-Sheet 1

FIG. 1

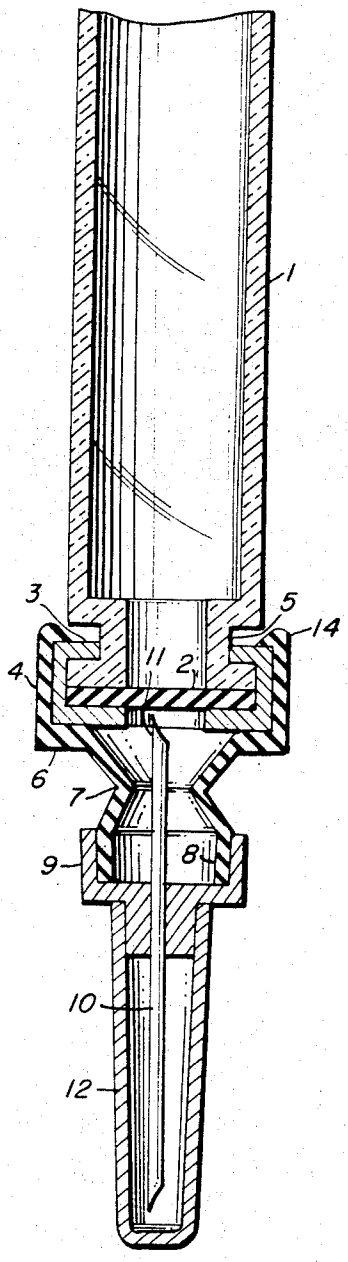


FIG. 2

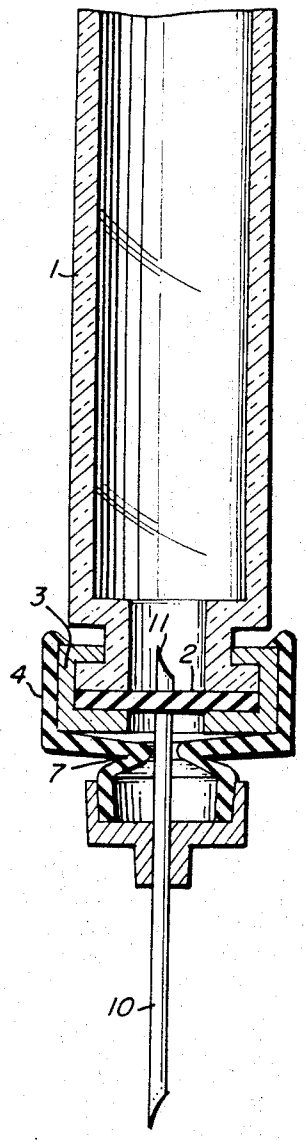
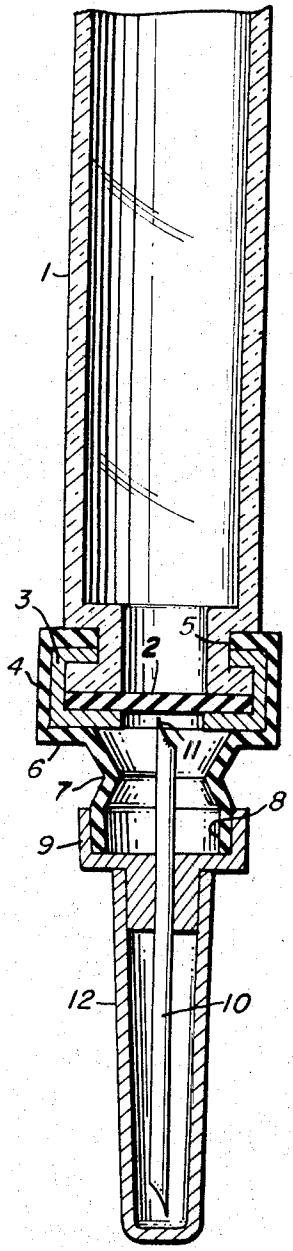


FIG. 3



INVENTOR.

MILTON J. COHEN

Dec. 3, 1968

M. J. COHEN

3,413,974

HYPODERMIC SYRINGES

Filed June 26, 1963

3 Sheets-Sheet 2

FIG. 4

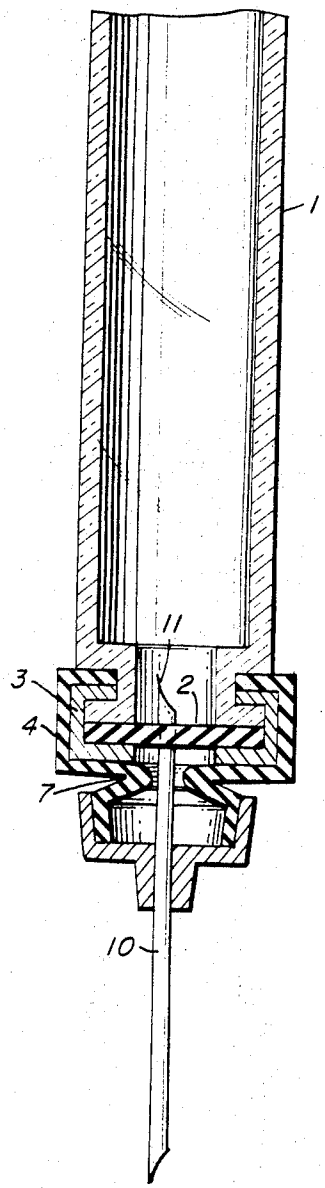


FIG. 5

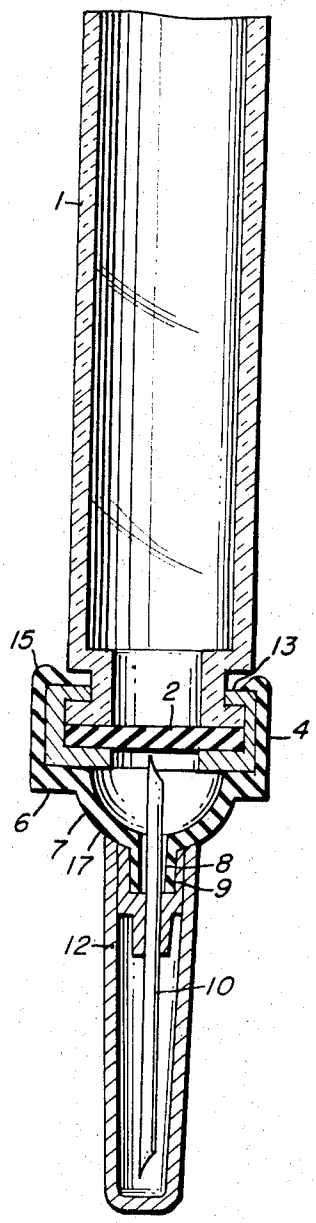
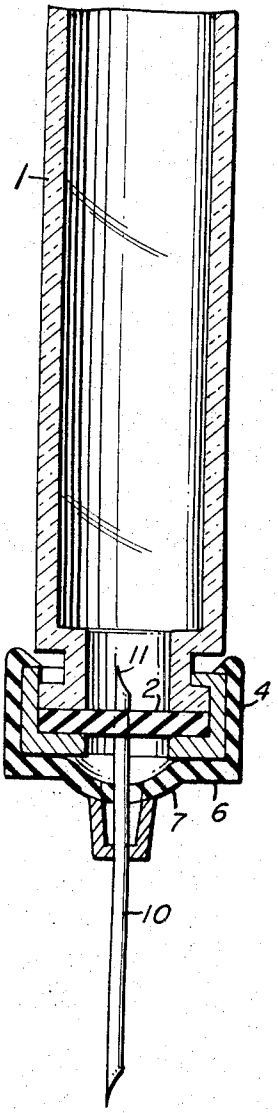


FIG. 6



INVENTOR.

MILTON J. COHEN

Dec. 3, 1968 M. J. COHEN 3,413,974

HYPODERMIC SYRINGES

Filed June 26, 1963 3 Sheets-Sheet 3

FIG. 9

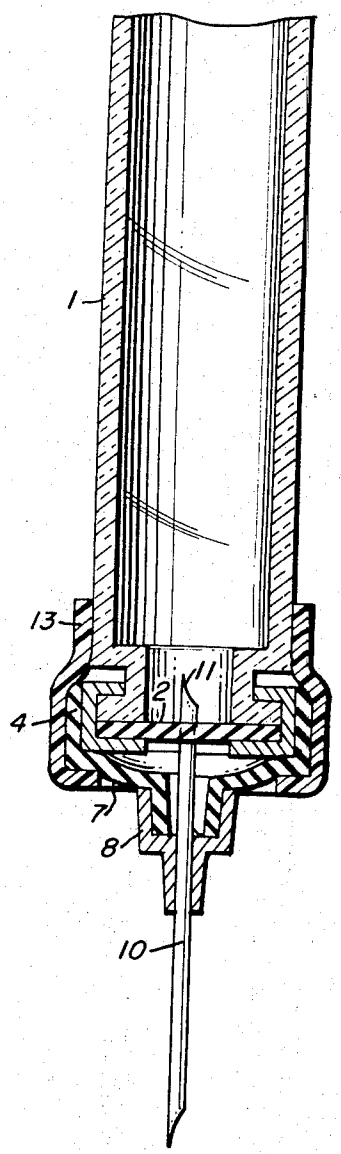


FIG. 8

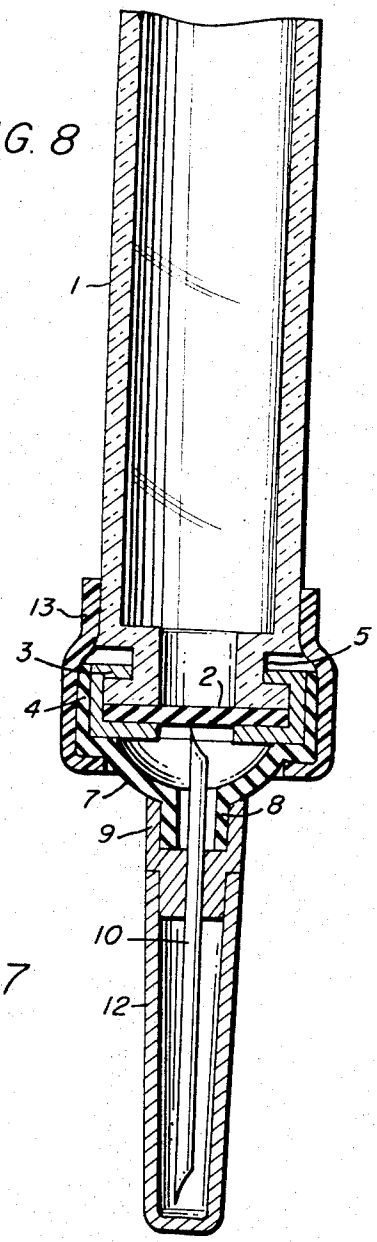
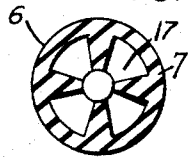


FIG. 7



INVENTOR.
MILTON J. COHEN

United States Patent Office 3,413,974
Patented Dec. 3, 1968

3,413,974

HYPODERMIC SYRINGES

Milton J. Cohen, 7111 Connecticut Ave.,
Chevy Chase, Md. 20015

Filed June 26, 1963, Ser. No. 290,745
7 Claims. (Cl. 128—218)

This invention relates to the treatment of human ills and to the equipment employed, and more particularly to the facilities used in the combination and injection of medicines into the human body for the treatment of certain symptoms and conditions.

This invention is directed specifically to disposeable hypodermic syringes by means of which injections of medication in solution can be made and to the construction of such syringes, particularly in regards to a novel type of needle and hub combination used and to a novel type of attachment of said combination to an uncovered glass cartridge, or the crimped aluminum seal of an assembled dental cartridge, or to any type of glass barrel.

It is an object of this invention to produce a satisfactory disposeable syringe at a reasonable cost.

Another object of the invention is to simplify and improve the attachment of a hypodermic needle and hub to a glass cartridge, assembled or unassembled or to any glass barrel receiving an attaching hub and needle.

Another object is to provide a novel flexible hub capable of inward movement without becoming detached from the syringe.

Another object is to provide modifications of said flexible hub, all similar in action but differing mainly in form of construction.

Another object is to provide a novel means of attaching said hubs or any other type of hub to a syringe by means of a heat-shrinkable plastic sleeve.

Another object is to produce a novel hub or hubs capable of allowing its contained needle to penetrate a rubber diaphragm of a filled dental cartridge when desired only to allow ejection of the contents of said cartridge.

Other objects and advantages of this invention will be apparent from the following description taken in conjunction with the accompanying drawings:

FIGURE 1 illustrates a longitudinal view, in cross-section, of one form of the collapsible hub attached to a syringe before use.

FIGURE 2 illustrates the same as FIGURE 1, with the hub in position after use.

FIGURE 3 illustrates a longitudinal cross sectional view of a modified form of the collapsible hub before use.

FIGURE 4 illustrates the same as FIGURE 3 with the hub in position after use.

FIGURE 5 illustrates a longitudinal cross section of a second modification of the collapsible hub attached to a syringe.

FIGURE 6 illustrates the same as FIGURE 5, with the hub in position after use.

FIGURE 7 illustrates a gross front view of the modified hub of FIGURE 5.

FIGURE 8 illustrates a longitudinal cross section of the second modification of the hub, showing novel means of attaching that hub to a cartridge before use.

FIGURE 9 illustrates the similar view as in FIGURE 8, showing the novel form of attachment after shrinking of the plastic sleeve performing the attachment.

Briefly stated, normally when an assembled filled aluminum sealed cartridge is used, it is inserted into a metal syringe holder to which one attaches a hypodermic needle. When the insertion is complete, the rear end of the needle has pierced the rubber diaphragm at the forward end of the cartridge, said diaphragm being held on

by a said aluminum cap. This means then, that in using such a container, one must sterilize the holder, attach a hypodermic needle and insert the cartridge into the holder which allows contact of the needle with the contents of the cartridge ready for use. This invention is a method of reducing movements for assembly of the above components, plus definitely assuring the user of a completely assembled sterile container and needle, plus a measured sterile dose of medication within said container. In this device, the needle and hub are permanently attached to the pre-assembled cartridge ready for use, so that the entire unit is a complete one, and is merely dropped into the metal re-usable holder, this action causing the hub to collapse and allow penetration of the needle through the diaphragm, after which the needle guard is removed and the syringe is ready for use. This complete unit could be used also with a disposeable holder, thus reducing the steps even further in assembling for use. In the modification of the collapsible hub, this hub is of different construction although it accomplishes the same purpose of the basic hub above, and may be preferable in that it may be easier to mold and therefore would cost less to produce. Also presented is a novel means of attachment of a needle-hub assembly to a glass cartridge or any other type of a barrel, by the use of a heat-shrinkable plastic tube, said tube having a tubular appearance when first placed on and encompassing the parts concerned, and after a stream of concentrated high heated air is played upon that tube, it immediately shrinks permanently to a tightly held grip upon all parts concerned so that finished needle-hub assembly is permanently attached to the glass barrel.

Referring to the drawings:

FIGURE 1, shows a glass cartridge **1**, having lying across its forward end a rubber puncturable disk **2**, said washer being held affixed against the cartridge by an aluminum crimp cap **3**. A needle hub **8** is integrally attached to a flexible body **7**, said body in turn being continuous with a means of attachment **14**, the base of said attachment resting on the outer surface of the crimp cap **3**, said attachment gripping by a snap-on means the under surface of the crimp cap **3**, or a rolling on of said attachment **14**, in the area of the neck **5** of the cartridge. Attached by means of friction fit in this case, although any other means of needle attachment could be used, is a needle hub **9**, to which is affixed a hypodermic needle **10**, the inner point **11** resting in close proximity to the rubber puncturable disk, **2**, the outer area of the needle being protected by a guard **12**.

In FIGURE 2, the syringe has been actuated, resulting in the inner point of the needle penetrating through the puncturable disk **2**, the flexible body **7** completely compressed, with its inner walls in intimate contact with the outer surface of the crimp cap **3**.

FIGURE 3, the description is similar to that of FIGURE 1, there being a difference, in that the entire integral unit of hub **8**, flexible body **7**, body base **6** and means of attachment is permanently affixed to, around, and behind the aluminum crimp cap **3**, by a crimping in of the outer periphery of said affixing means, to the neck **5** of the cartridge.

In FIGURE 4, the description is again the same as in FIGURE 2, the device having been actuated, with the hub collapsed, the penetration occurring, et cetera, and showing the crimping means of attachment around the cartridge neck **5**.

In FIGURE 5, is shown a cartridge **1**, to which is secured at its forward necked end, a puncturable rubber disk **2**, said washer being affixed there by an aluminum crimp cap **3**, attached to and around said crimp cap **3** by means of a snap-on friction fit **15**, is the base of a flexible body

7, said body being integral with said means of snap-on attachment 15, the flexible body 7 being concave in shape, with cutouts 17 in its center to facilitate collapsing, although the cutout could be eliminated. The base of the concavity is continuous with a hub 8 for gripping a needle 10, around which is a guard 12.

In FIGURE 6, the syringe has been actuated with the flexible body 7, having collapsed, allowing the inner point 11 of the needle 10 to penetrate the puncturable disk 2.

In FIGURE 7 is shown a direct anterior view of the flexible body 7 showing the skeletonizing or cutouts of its center.

In FIGURE 8, the description is similar to that of FIGURE 5, with the difference being in the attachment of said flexible body 7 to said cartridge 1. Lying on and around the crimp cap 3 is the skirt 4, integral with the flexible body 7, to permanently secure said body 7 and skirt 4 to the cartridge 1, a novel means of attachment is used in the form of a heat-shrunk sleeve 13, said sleeve being of plastic, tubular in appearance before shrinking, and after concentrated heat is applied, said sleeve shrinks tightly around all parts contacted to provide a tight encapsulation of great mechanical strength, free of stress and cut-through failure, and permanently securing the flexible body 7 and its skirt 4 to the crimp cap 3 and to the area of the neck 5 and its adjacent area of the cartridge 1, to produce a permanent attachment of the flexible hub and needle assembly to a glass cartridge or any other glass barrel.

In FIGURE 9, actuation of the syringe has been started, and the flexible body 7 has collapsed allowing penetration of the inner needle point 11 through the puncturable rubber disk 2. The heat-shrunk sleeve 13 has maintained its ability to permanently secure the needle-hub assembly to the glass cartridge.

In the operation of the basic syringe and its modification, the syringe shown in FIGURE 1, is dropped into a syringe holder and it is pushed into final position, simultaneously the flexible body 7 collapses causing the needle point 11 to penetrate the puncturable rubber disk 2, as in FIGURE 2, which allows the solution within the barrel to be able to be ejected. Pressure on the attached plunger rod causes said solution to be ejected. Upon emptying the barrel, the entire assembled unit is withdrawn from the holder and discarded. Instead of insertion into a re-usable holder, the assembled unit could be used in a disposeable holder, the guard 12 being replaced by a combination needle cover and plunger shaft. The above applies to either the basic structure of the collapsible body or its modification.

It will be apparent that foregoing disclosure relates to only preferred embodiments of the invention and that it is intended to cover all changes and modification of the examples of the invention herein chosen for the purposes of the disclosure, which do not constitute departure from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. A disposeable hypodermic syringe comprising a glass barrel, having a flange about the neck at one end, a puncturable rubber disk resting against said flange, an aluminum member sealing and securing said disk to said flange,

a hubbed body secured against the disk end of said cartridge, said body being concave in shape, said concave body capable of collapsing upon pressure directed toward the cartridge, the body terminating outwardly in a hub, a hypodermic needle affixed to the hub with an end portion extending into the hubbed body to a position adjacent the disk for penetration of said disk upon collapsing said concave body.

2. A disposeable hypodermic syringe, comprising a glass barrel, a cap punctuable desk combination sealing the forward end of said barrel, a concave hubbed body secured to the outer surface of the sealing combination, said body capable of collapsing inwardly in response to pressure directed upon said body, the body terminating outwardly in a hub, a hypodermic needle affixed in said hub, said needle being in a position to penetrate said disk upon collapsing of said concave body.

3. A disposeable hypodermic syringe, comprising a glass cartridge, a means sealing said cartridge at its forward end comprising an aluminum-seal and puncturable rubber disk, a collapsible hub including means for holding a hypodermic needle secured to said seal and disk, said means for securing the collapsible hub to said sealed disk comprising a heat-shrinkable plastic tubular sheath, which forms a completed permanently attached needle hub combination.

4. A disposable hypodermic syringe comprising a tubular container having an annular flange about the neck at one open end, a resilient puncturable disk member spanning the open end and resting on said flange, means securing said disk to said flange to seal the open end of the container, a needle hub having a portion at one end for attachment to the sealed end of the container, a tubular extension at the other end and a collapsible portion intermediate the ends to enable displacement of the tubular extension in the direction towards the open end of the container during collapse, a needle supported in said extension with an end portion of the needle extending outwardly beyond the needle hub while the other end portion is disposed within said needle hub adjacent the outside of the sealing disk.

5. A disposable hypodermic syringe as claimed in claim 4 in which the inner end of the needle is spaced outwardly from the washer by an amount less than the endwise displacement of the hub extension from normal to collapsed position whereby the end of the needle penetrates the disk when the needle hub is collapsed.

6. A disposable hypodermic syringe as claimed in claim 4 in which the container is a glass cartridge.

7. A disposable hypodermic syringe as claimed in claim 4 in which the disk is a rubber disk.

References Cited

UNITED STATES PATENTS

2,699,167 1/1955 Raiche ..... 128—216

FOREIGN PATENTS

1,038,330 6/1953 France.

LOUIS G. MANCENE, *Primary Examiner.*

R. PESHOCK, *Assistant Examiner.*