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2,748,768

DISPOSABLE CARTRIDGE SYRINGE UNIT

Filed March 19, 1953

2 Sheets-Sheet 1

FIG. 2.

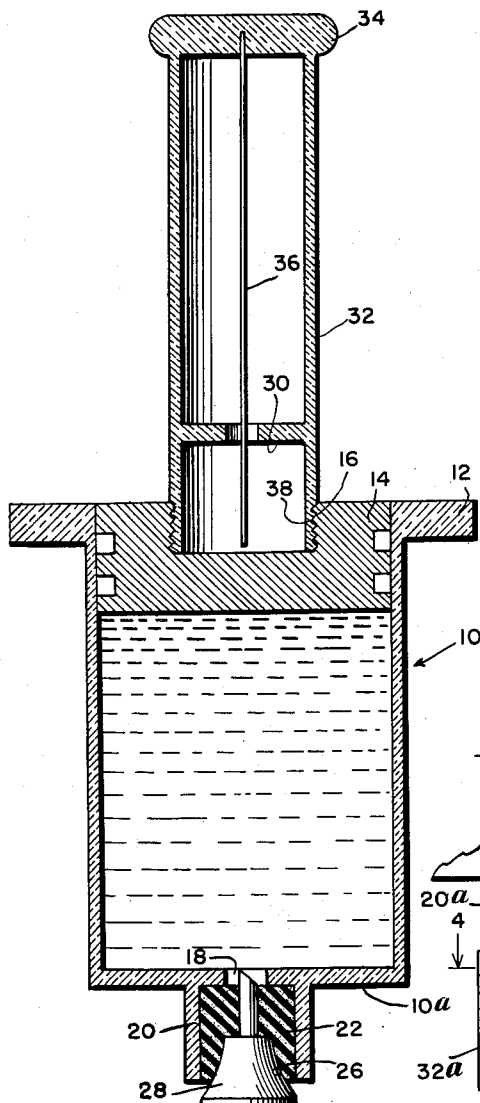


FIG. 1.

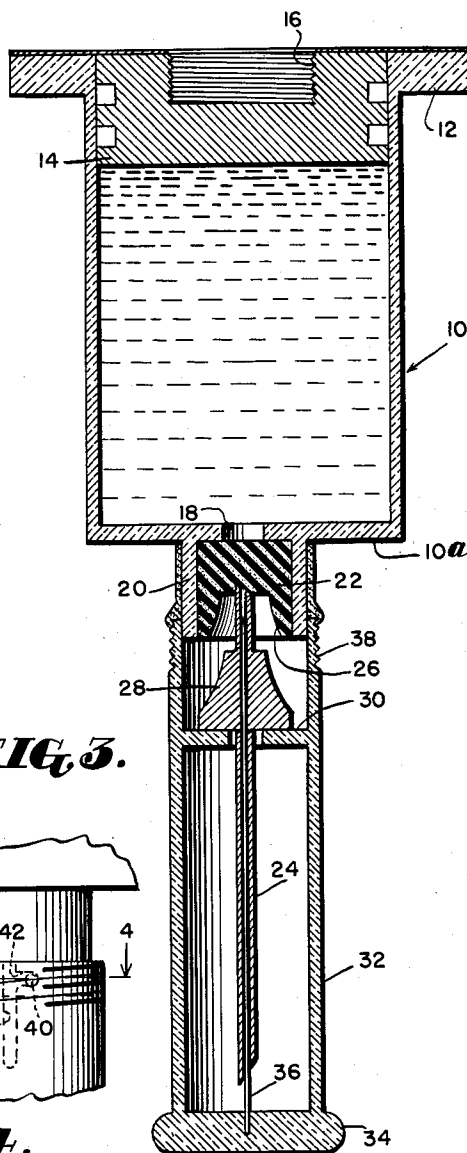


FIG. 3.

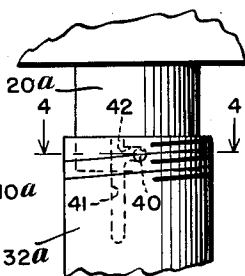
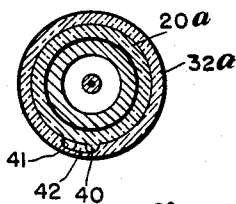


FIG. 4.



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DISPOSABLE CARTRIDGE SYRINGE UNIT

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3 Claims. (Cl. 128—218)

This invention relates generally to the class of surgery and is directed particularly to instruments for administering medicines hypodermically.

A principal object of the present invention is to provide an improved combination disposable cartridge syringe unit designed in a novel manner wherein the medicament containing cartridge carries a needle and a shield for the same and the needle shield is adapted to be used when removed from its needle shielding position as a means for effecting the discharge of the contents of the cartridge through the needle.

Another object of the invention is to provide in a disposable cartridge-syringe unit, a combined plunger and stopper for the cartridge and a detachable needle shield with means for connecting an end of the shield with the plunger-stopper whereby the shield becomes an operating stem for the plunger.

Still another object of the invention is to provide in a combination cartridge-syringe unit of the above described character, a novel means for effecting the sealing connection of the needle shield with the cartridge and for effecting the axial shifting of the needle by the shield for forcing one end of the needle through a sealing or outlet stopper so as to place the needle in proper position for the discharge of the contents of the cartridge by a socketed and threaded stopper in the opposite end of the cartridge from the needle, to which an end of the needle shield is attachable.

Other objects and advantages of the invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming a part of the specification, with the understanding, however, that the invention is not to be limited to the exact details of construction shown and described since obvious modifications will occur to a person skilled in the art.

In the drawing:

Figure 1 is a view in longitudinal section of a disposable cartridge syringe unit constructed in accordance with the present invention and prior to the separation of the needle guard tube from the cartridge.

Figure 2 is a longitudinal sectional view of the invention showing the needle guard connected to the plunger for use as a plunger stem.

Figure 3 is a detailed view illustrating a locking connection between the needle guard and the cartridge nipple.

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a view in longitudinal section of a modified embodiment of the invention illustrating an adaptation by which a specimen can be withdrawn from a vessel for laboratory examination.

Figure 6 is a view in longitudinal section of the embodiment shown in Figure 5, wherein the needle shield is shown applied to the plunger unit.

Figure 7 is a transverse sectional view taken substantially on the line 7—7 of Figure 5.

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Figure 8 is a transverse sectional view taken substantially on the line 8—8 of Figure 5.

Referring now more particularly to the drawing the numeral 10 generally designates the medicament carrying cartridge which is in the form of a cylindrical receptacle or barrel.

One end of the cartridge receptacle 10, which may be defined as the rear or back end, is provided with a surrounding flange 12 for facilitating the holding of the cartridge between the fingers and this end of the cartridge is closed by a stopper 14 of suitable resilient material which can be forced into the bore of the cartridge so as to form a fluid and air tight joint. Such stopper is designed to be used also as a plunger for ejecting the contents of the cartridge as hereinafter pointed out and the stopper is provided, in accordance with the present invention, with the threaded socket 16 which opens through its outer end, as shown, for the purpose to be described.

At the forward end the cartridge end wall 10a is provided with an outlet opening 18 and this opening on the outer side of the wall is defined by or encircled by the forwardly extended teat or collar 20 which is of an inside diameter larger than the opening 18.

Fitted tightly within the collar or teat 20 is a sealing stopper 22 of a suitable material which may be penetrated by a pointed end of a hypodermic needle such as that indicated at 24. The stopper 22 seats tightly against the wall 10a in the bottom of the sleeve 20 and the forward side of the stopper has a conical socket 26 therein, for the purpose hereinafter set forth.

The needle 24 is pointed at both ends and adjacent to the end which enters the cartridge through the opening 18, the needle has formed therearound, a collar 28 which is of conical form and adapted to fit snugly in the socket 26 of the stopper 22 when the pointed rear end of the needle is forced through the stopper. The forward side of the collar is flat and is adapted to seat against an annular shoulder 30 which is formed around the interior of a tubular needle shield 32, in the manner illustrated.

The needle shield 32 is open at one end and such open end is adapted to snugly receive the sleeve or teat 20 and the needle 24 positions centrally in the shield as illustrated with the collar 28 resting upon the shoulder 30 as shown and previously described.

The outer end of the needle shield is closed by a circular or disk-like head 34 which functions as a thumb rest when the shield is employed as a stem for the plunger-stopper 14.

Fixed in the center of the inner surface of the shield head 34 is an end of a stylet 36. When the needle shield is in position with its open end engaged around the teat or sleeve 20 the stylet 36 will be extended through the needle and the inner end of the needle adjacent to the collar 28, will be embedded in the stopper 22 but does not extend through the stopper.

The needle shield is externally screw threaded at its attached end as indicated at 38 and this end of the shield is of the proper diameter and carries the proper threads, for threaded engagement in the socket 16 of the stopper 14.

When the cartridge, needle and needle shield are assembled for the maintenance of the medicament in the cartridge in sterile condition and for the proper protection of the needle until ready for use, the back or inner end of the double pointed needle is embedded slightly in the stopper 22 as previously stated and the collar 28 rests against the annular shoulder 30. Also the open end of the needle shield in which the teat or sleeve is engaged, is spaced from the wall 10a of the cartridge and the area between the end of the shield and the wall 10a is sealed

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with a suitable, readily removable sealing agent such as paraffin or the like.

When it is desired to prepare the syringe for use, the user twists or turns the needle shield on the teat so as to break the paraffin seal and also forces the needle shield toward the end wall 10a of the cartridge cylinder, thereby forcing the cartridge end of the needle entirely through the stopper 22. The needle shield is then withdrawn carrying with it the stylet 36, and the threaded end of the shield is secured in the socket 16 so that the needle shield thus becomes a plunger stem, by means of which the forcing of the stopper 14 inwardly is effected to eject the cartridge contents through the needle.

After use of the unit the same may be destroyed or otherwise disposed of.

While the illustration of the invention shows a stylet in the needle and secured to the head end of the shield, this feature of the invention may be dispensed with if desired.

In Figures 3 and 4 a slightly modified form of the connection between the shield and the cartridge teat is illustrated, wherein the teat or sleeve 20a is provided with a short laterally directed pin 40 upon its outer side and the inside wall of the needle shield, here designated 32a is provided with a longitudinally directed groove 41 having a lateral extension 42 as shown. It will be readily apparent that with this arrangement when the needle shield is placed in shielding position the pin 40 will be run into the groove 41 until it reaches the lateral portion 42, whereupon the shield can be turned slightly to engage the pin in the lateral part of the groove, thus holding the shield in position until the unit is ready for use. The user may then reversely turn the shield to bring the pin back into the groove 41, whereupon the shield can be shifted lengthwise on the teat as in the case of the shield 32 to effect the penetration of the stopper 22 by the cartridge end of the needle.

It will also be apparent from the foregoing that needles of different sizes and lengths may be used in the present invention without having to modify any of the features of the invention as the needle collar 28 and the portion of the needle lying between the collar and the stopper 22 can be of the same size for all types of needles.

Figures 5 to 8 inclusive illustrate a further embodiment of the invention, wherein the structure is designed to facilitate the taking of sterile specimens of blood, etc., to be sent for laboratory examinations.

In this embodiment the numeral 50 generally designates the cartridge receptacle which at the back end has the finger flange 51, while the forward end which is closed by the wall 52, has extending therefrom the axially directed teat or collar 53.

The center of the forward end wall 52 has the opening 54 therethrough for the purpose hereinafter set forth.

Within the teat is fitted tightly the soft rubber plug 55 which closes the opening 54 and which upon the outer end is provided with the conical recess 56.

The numeral 57 designates the piston plug which has a normal position at the inner end of the cartridge receptacle as illustrated. This plug 57 is provided in the center of the side remote from the opening 54, with a threaded socket 58.

Adapted to close the outer end of the cartridge is an open or chambered plug 59 which is provided with a flange 60 which normally bears against the outer end of the cartridge as illustrated. The chambered plug 59 serves to seal and maintain sterile the full length of the interior of the cartridge. This chambered plug 59 is provided with the chamber 61, the wall of which is screw threaded as indicated at 62, at the outer end of the plug or adjacent to the open end of the chamber.

The chamber 61 is designed to carry sterile swab material 63 and the chamber is sealed, for the protection of the material 63, by suitable sealing material 64 which may be in the form of foil or other material which can be readily

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broken or stripped off when the user of the device desires to extract the swab material, or to attach the hereinafter described shield which functions as a stem for the actuation of the plugs.

Integral with the inner or bottom end of the chambered plug 59 is a coupling body by which the plugs 57 and 59 are connected together. Such coupling body is here shown as comprising four longitudinally extending webs 65 which are joined together in a cruciform arrangement as shown in Figure 7, and are, of course, integral at their outer ends with the bottom of the chambered plug 59.

At the forward or inner ends of the webs 65 there is provided on the longitudinal center of the joined webs, the axially directed threaded stud 66 which is designed for threaded engagement in the socket 58 which is formed in the piston plug 57.

The numeral 67 designates the needle shield which, like the shield 32, is in the form of an elongate cylinder which is opened at one end and closed by the wall 68 at the opposite end.

This shield 67 is externally threaded at the open end as indicated at 69 and is of a diameter for threaded engagement in the open end of the chamber 61.

Within the shield 67 is the annular shoulder 70 through the opening 71 of which extends the stylet 72 which is fixed at one end in the wall 68 of the shield.

As in the first embodiment, the opening 71 also receives the needle 73 which carries adjacent to one end, the conical collar 74 which rests upon the side of the shoulder 70 adjacent to the open or threaded end of the shield.

The unit is provided with the open end of the shield engaged over the open end of the teat 53 as illustrated in Figure 5, with the short end of the needle slightly imbedded in the soft rubber plug 55 as illustrated. In this position of the shield and needle the shield collar 74 rests on the shoulder 70 and the stylet extends through the needle as illustrated. In order to maintain the interior of the shield and the needle sterile, a suitable sealing composition in the form of wax or the like is placed around the teat to overlie the joint between the latter and the end of the shield as indicated at 75. This sealing material is of a nature which can be readily broken when the shield is turned so as to permit the shield to be forced up on the teat for the purpose of extending the short end of the needle through the plug 55 and into the opening 54 in the manner as shown in Figure 6.

As will be readily understood, when the shield is removed it then is employed as a plunger stem by having the threaded end engaged in the threaded socket 61 as shown in Figure 6, after tearing out the sealing foil 64.

In the use of this second embodiment of the invention, after the needle shield has been removed and attached as illustrated in Figure 6 to the chambered plug 59, the needle 73 is inserted into the vessel from which a specimen is to be taken and an outward pull is applied to the shield 67, which now functions as a plunger stem, until the chamber of the cartridge is filled with the specimen. The plug 57 acting as a piston to provide the necessary suction, would thus be drawn outwardly in advance of the fluid entering the cartridge. After the cartridge has been filled the needle would be withdrawn from the vessel and then detached from the cartridge, the soft rubber plug 55 closing behind the withdrawn end of the needle to retain the fluid in the cartridge.

After the plug 57 has been drawn into the outer end of the cartridge the chambered plug 59 and the webs 65 connected therewith would be detached from the plug 57 by unscrewing the threaded stud 66. The cartridge, thus divested of needle, a chambered plug unit and shield, may then be sent to the laboratory for the examination of the sterile contents.

If the user should desire to salvage the needle, the needle could be replaced in the shield and shield then replaced in shielding position on the teat of the cartridge in the manner illustrated in Figure 5.

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From the foregoing it will be seen that there is provided by the present invention a novel combination disposable cartridge and syringe by means of which a physician or other person can carry a medicine ready for injection without having to bother with the sterilizing of a needle or the filling of a syringe at the place of administration, as is the present practice.

I claim:

1. A disposable cartridge-syringe unit comprising, in combination, a barrel open at one end and having an outlet opening centered in its other end, an axially extending teat projecting outwardly from about said outlet opening, a sealing stopper in the teat and closing said opening, a tubular needle shield having one end open and removably engaged with said teat, a double pointed needle within said shield and having one pointed end normally embedded in said stopper, a plunger-stopper closing the said open end of the barrel and adapted to be forcibly moved inwardly to eject the content of the barrel outwardly of said outlet opening, means for coupling the said open end of the shield with the said plunger-stopper for employment of the shield as an actuating stem therefor after the removal of the shield from the teat and cooperative means

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carried by said needle and the shield whereby the said one pointed end is forced through said stopper by axial movement of the shield on the teat toward the barrel to establish communication between the bore of the needle and the interior of the barrel.

2. The invention according to claim 1, wherein said cooperative means comprises a collar encircling the needle adjacent to the said embedded point, and an annular shoulder within the shield for abutting engagement with the collar upon said axial movement of the shield.

3. The invention according to claim 1, wherein said sealing stopper has a tapered socket in its outer end, and said collar being of conical form to seat in the socket and form a seal therewith.

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