

March 27, 1962

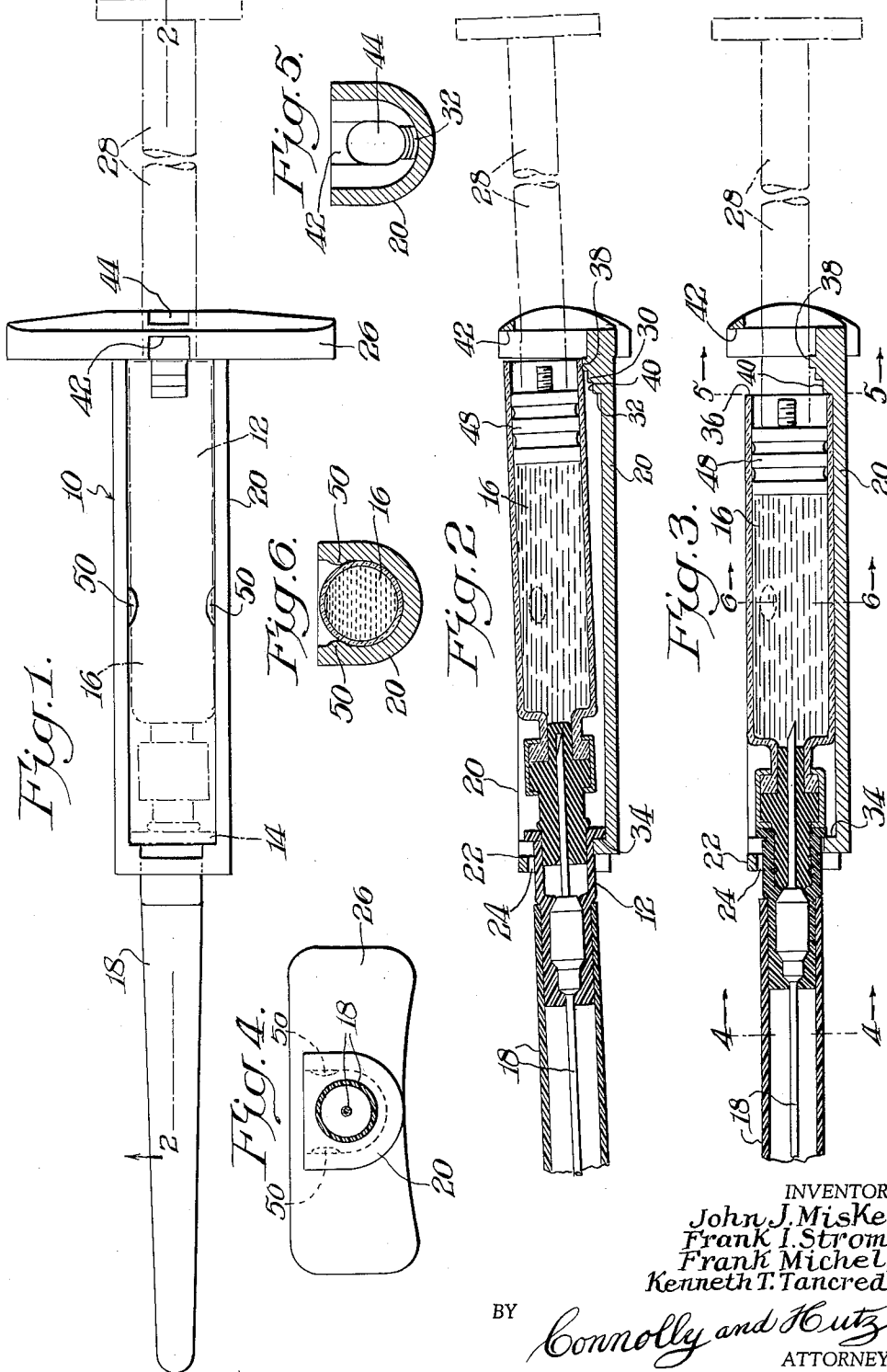
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3,026,873

ASPIRATING HYPODERMIC SYRINGE HOLDER

Filed March 6, 1959

2 Sheets-Sheet 1



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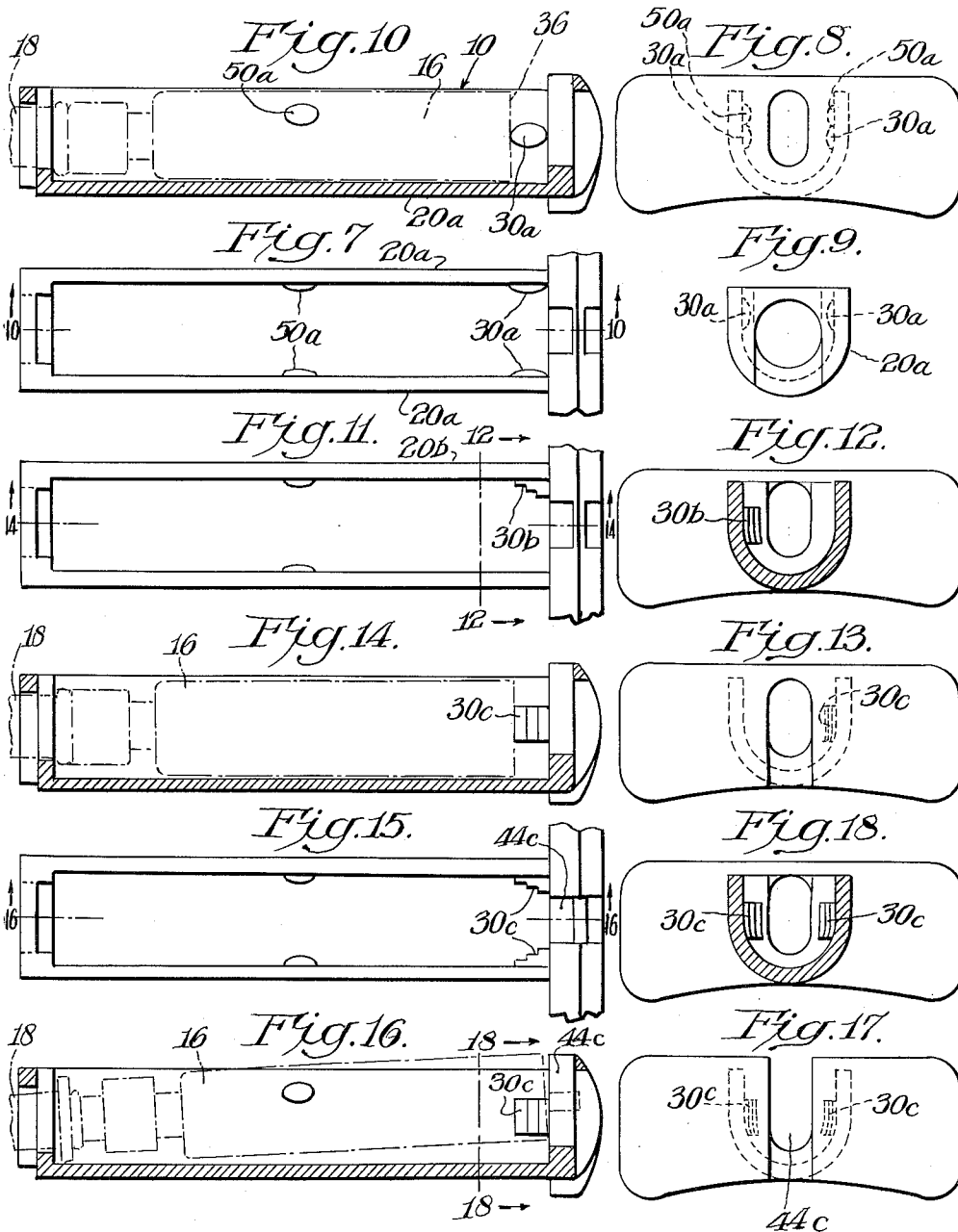
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ASPIRATING HYPODERMIC SYRINGE HOLDER

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Filed Mar. 6, 1959, Ser. No. 797,624
9 Claims. (Cl. 128-218)

This invention relates to a holder for a hypodermic syringe incorporating a disposable needle and cartridge which are longitudinally compressed to establish communication therebetween before injection, and more particularly relates to such a holder which facilitates the aspirating movement of the syringe before injection of its contents.

A variety of convenient and inexpensive holders for the aforementioned type of hypodermic cartridge and needle assembly have been proposed. This type of holder is convenient and inexpensive enough to discard after a single usage, however, it does not restrain the cartridge in its forward position which makes it slightly difficult to draw the plunger slightly backward to aspirate before injection. Aspiration is performed after the needle is inserted under the skin and prior to injection to make sure that the needle has not penetrated a blood vessel. If a slight backward tug upon the plunger does not draw any blood into the cartridge, it is properly inserted. However, should the plunger move freely backward, and blood appear in the cartridge, this is an indication that the needle has been improperly inserted into a blood vessel.

The use of a side-loading hypodermic syringe body which locks the cartridge and needle assembly together after they have been compressed has also been proposed. However, the cartridge and needle assembly must be forced together before loading into this type of holder which requires two operating adjustments rather than the one simple movement required to load into other holders in which the cartridge and needle are automatically compressed as the assembly is being inserted into the holder.

An object of this invention is accordingly to provide a convenient and economical holder for a hypodermic syringe incorporating a cartridge and needle assembly which are longitudinally compressed to establish communication therebetween which permits the assembly to be forced together as it is being loaded into the body and subsequently restrains the assembly from being moved backward or apart to facilitate aspiration prior to injection.

In accordance with this invention, a novel holder for the aforementioned type of hypodermic syringe includes a trough-shaped body for receiving the cartridge and needle hub. The front wall of the body includes a passageway which is large enough to permit the needle to pass through it and small enough to restrain the hub within the body. Finger grips extend laterally from the body, and a projection extends within the rear portion of the body. This projection is constructed and arranged to permit the rear end of the cartridge to slip in front of it when the assembly is loaded into the trough with its needle extending through the passageway through the front wall and sufficient pressure is exerted upon the cartridge in its direction of insertion to force the cartridge and needle together. The end of this projection nearest the front wall is spaced therefrom approximately the distance from this front wall to the rear end of the cartridge after the cartridge and needle assembly have been longitudinally forced together or compressed in a forward direction thereby providing a highly convenient means for locking the cartridge against a subsequent backward pull and facilitating aspiration prior to injection.

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Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a plan view of one embodiment of this invention with a cartridge and needle assembly inserted therein shown in phantom outline;

FIG. 2 is a cross-sectional view in elevation taken through the embodiment shown in FIG. 1 which illustrates a preliminary phase of operation with the cartridge and needle assembly shown in solid outline;

FIG. 3 is a cross-sectional view similar to FIG. 2 in a subsequent phase of operation;

FIGS. 4, 5 and 6 are cross-sectional views respectively taken through FIG. 3 along the lines 4-4, 5-5, and 6-6;

FIG. 7 is a plan view partially broken away of another embodiment of this invention;

FIGS. 8 and 9 are respectively rear and front views in elevation of the embodiment shown in FIG. 7;

FIG. 10 is a cross-sectional view taken through FIG. 7 along the line 10-10;

FIG. 11 is a plan view partially broken away of still another embodiment of this invention;

FIG. 12 is a cross-sectional view taken through FIG. 11 along the line 12-12;

FIG. 13 is a rear view in elevation of the embodiment shown in FIG. 11;

FIG. 14 is a cross-sectional view taken through FIG. 11 along the line 14-14;

FIG. 15 is a plan view partially broken away of a further embodiment of this invention;

FIG. 16 is a cross-sectional view taken through FIG. 15 along the line 16-16;

FIG. 17 is a rear view in elevation of the embodiment shown in FIG. 15; and

FIG. 18 is a cross-sectional view taken through FIG. 16 along the line 18-18.

In FIGS. 1 and 3-6 are shown a hypodermic syringe holder 10 into which is loaded a hypodermic cartridge and needle assembly 12 of the type which is adapted for longitudinal movement together while the hub 14 of the needle is restrained to establish communication between the cartridge and needle. This cartridge and needle assembly is, for example, of the type described in commonly assigned, copending application Serial No. 771,871 filed November 4, 1958; and it may also be made, for example, in the form of other functionally similar cartridge and needle assemblies such as those described in U.S. Letters Patent No. 2,737,949.

FIGS. 1 and 2 show the relative positions of the cartridge 16 and covered needle 18 before they are forced longitudinally together or compressed to establish communication therebetween, and FIGS. 3-6 show the relative positions of holder 10, cartridge 16 and needle 18 after they are forced longitudinally together within the holder.

As shown in FIGS. 1-6, holder 10 includes a trough-shaped body 20 which receives cartridge 16 and hub 14. This body includes a front wall 22 having a passageway 24 formed therein which is large enough to permit covered needle 18 to pass through it while hub 14 is restrained within the trough. Finger projections 26 extend laterally from the body to provide gripping surfaces for the fingers while thumb pressure is exerted upon plunger rod 28.

Body 20 is, for example, made of a moldable plastic material such as polystyrene. Nylon and cellulose acetate and the like may also be used to provide economically manufactured bodies which also have resilient properties which cooperate with ridges and projections to lock the cartridge in its operative position. However, an operative

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body may also be economically made, for example, of a white metal by the die-casting process.

A projection 30 extends within the rear portion of body 20 and includes a front surface 32 which is spaced from the inner surface 34 of the front wall 22 of body 20 approximately the distance from surface 34 to the rear end 36 of cartridge 16 after cartridge 16 and needle 18 are compressed into the position shown in FIG. 3. Projection 30 is constructed and arranged to permit the rear end 36 of cartridge 16 to slip in front of its front surface 32 when cartridge 16 and needle 18 are inserted into body 20 with covered needle 18 extending through passageway 24 in the condition shown in FIG. 2. Projection 30, is for example, made stepped in form and inclined outwardly toward the inner wall of the body from a high point 38 disposed towards the rear of body 20 towards a lower point or step 40 disposed towards the front of body 20. Projection 30 preferably includes several steps, for example three steps, to accommodate minor variations in overall length of cartridge and needle assembly before these are compressed into the position shown in FIG. 3. The rear end 36 of cartridge 16 accordingly rests on one of these steps and drops down one or more as cartridge 16 and needle 18 are compressed to the condition shown in FIG. 3.

Body 20 includes, for example, a rear wall 42 which is cut out to form a slot 44 disposed parallel to the side walls of body 20. Slot 44 is, for example, extended or long enough, as shown in FIG. 5, to permit a plunger rod 28 to be inserted through it and engaged with plunger 48 of cartridge 16 when cartridge 16 is in the preliminary inclined position shown in FIG. 2.

A pair of ridges 50 are, for example, disposed within the inner surfaces of the side walls of body 20 and extend a short distance therewithin for locking cartridge 16 under them when it is snapped past ridges 50 to the position shown in FIG. 2. In this position ridges 50 exert a slight laterally downwardly directed pressure on cartridge 16, holding it firmly within holder 10 even before plunger rod 28 is inserted through slot 44 and engaged with plunger 48. If desired, cartridge and holder may be assembled in this position for packaging and shipping, without danger of disengagement. Ridges 50 are made to extend a short enough distance within the side walls of body 20 to easily permit cartridge 16 to be snapped past them into the body.

Holder 10 accordingly permits an assembly of the type incorporating a cartridge 16 and a needle 18 to be easily loaded through its open side and, after plunger rod 28 is attached thereto, pressure in one direction straight forwardly compresses cartridge 16 and needle 18. At the same time ridges 50 urge cartridge 16 toward the floor of body 20 so that the rear end 36 of the cartridge drops past projection 30 and locks in front of front projection surface 32, assuming the position illustrated in FIG. 3. The relative positions of cartridge 16 and ridges 50 at this time are shown in FIG. 6. Cartridge 16 and hub 14 of the needle 18 are now automatically locked in the forward compressed condition which holds the assembly motionless within the holder in the compressed condition thereby facilitating the application of a backward aspirating tug upon plunger rod 28.

Variations within the concept of this invention are shown in FIGS. 7-17. In FIGS. 7-10, for example, is shown a holder 10 which includes a pair of small curved humps 30a formed in the side walls at the rear of holder 10 to provide the locking function of projection 30 in FIGS. 1-6. Humps 30a, as shown, are of small enough extent and in conjunction with the relatively elastic plastic materials of which the cartridge and the holder of body 20a may be made easily permit the rear 36 of a cartridge 16 to be snapped in front of projections 30a to lock a compressed cartridge 16 and needle 18 in the forward compressed condition and thereby facilitate aspiration.

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A pair of ridges 50a similar to ridges 50 in FIGS. 1-6 are formed in the side walls of body 20a to lock cartridge 16 firmly within holder 10. Ridges 50a are generally similar in form to projections 30a in FIGS. 7-10; but these different names are retained to better differentiate their operative functions.

In the embodiment shown in FIGS. 11-14, a projection 30b similar to stepped projection 30a is formed in the side wall of body 20b. However, it performs substantially the same functions described relative to FIGS. 1-6.

In the embodiments shown in FIGS. 15-18, a pair of stepped projections 30c are provided at the rear of the side walls of body 20c and, accordingly, provide corresponding functions to stepped projections 30b and 30. However, the provision of a pair of them in the embodiment shown in FIGS. 15-18 helps stabilize the cartridge as it is compressed and locked in position.

Slot 44c in FIGS. 15-18 is open at its top in distinction to the slots shown in the other embodiments to facilitate the insertion of a cartridge 16 and a needle 18 to which a plunger rod 28 (not shown in FIGS. 15-18) has been previously attached. Furthermore, it is thereby demonstrated that the rear wall itself might be entirely eliminated, for example, in the form shown in FIGS. 15-18 without preventing the holder from adequately retaining the cartridge because body 20 is, for example, made to fit closely enough about cartridge 16 to laterally confine it throughout all of its operative phases.

What is claimed is:

1. A hypodermic syringe holder for manipulating a cartridge and needle assembly which are longitudinally compressed while the hub of the needle is restrained to establish communication therebetween, said holder comprising a trough-shaped body for receiving said cartridge and said needle hub, said body having a front wall including a passageway which is large enough to permit said needle to pass therethrough and small enough to restrain said hub within said body, finger grips extending laterally from said body, a stationary projection extending from said body within the rear portion of said body, said projection including a number of steps extending from a lowest step disposed adjacent said inner wall of said body to a highest step disposed remote from said inner wall of said body, said lowest and highest steps being respectively disposed toward the front and rear of said holder, said projection being constructed and arranged far enough to the rear of said body at a predetermined distance from said front wall to permit the rear end of said cartridge to slip in front of one of said steps when said assembly is inserted into said trough with its needle extending through said passageway and said cartridge and needle assembly are compressed thereby locking said compressed assembly in its forward position against a subsequent backward pull to facilitate aspiration prior to injection, said trough including a slotted rear wall, and the slot in said rear wall being disposed parallel to the sides of said trough and being long enough to permit attachment of a plunger rod to said assembly before it is compressed for applying pressure to compress said cartridge and needle assembly and to dispose the rear end of said cartridge in front of one of said steps of said projection for locking said compressed assembly within body in front of said projection.

2. A syringe holder as set forth in claim 1 wherein said projection is disposed at the bottom of said body.

3. A syringe holder as set forth in claim 1 wherein said projection is disposed at the side of said body.

4. A syringe holder as set forth in claim 3 wherein a pair of said projections are disposed upon opposite sides of said body.

5. A hypodermic syringe holder as set forth in claim 1 wherein a ridge is disposed upon the inner wall of said trough-shaped body adjacent the outer edges of said body, said ridge being of limited enough projection with-

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in said trough to have said cartridge snap past it while it is being inserted within said body with its rear end in front of one of said steps, and said ridge extending inwardly far enough within said trough to lock said cartridge within said trough after it is inserted therewithin.

6. A syringe holder as set forth in claim 5 wherein a pair of said ridges are disposed upon opposite sides of the inner wall of said body.

7. A syringe holder as set forth in claim 1 wherein said slot is oval-shaped.

8. A syringe holder as set forth in claim 1 wherein said slot has an open upper end.

9. A hypodermic syringe comprising the holder set forth in claim 1 in further combination with one of said

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cartridge and needle assemblies incorporating a plunger in said cartridge for ejecting a fluid from said cartridge and a rod connected to said plunger for actuating it, and said cartridge and needle assembly being inserted and locked into said body as set forth in claim 1.

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