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M. DANN ET AL

2,871,858

HINGED SYRINGE BODY

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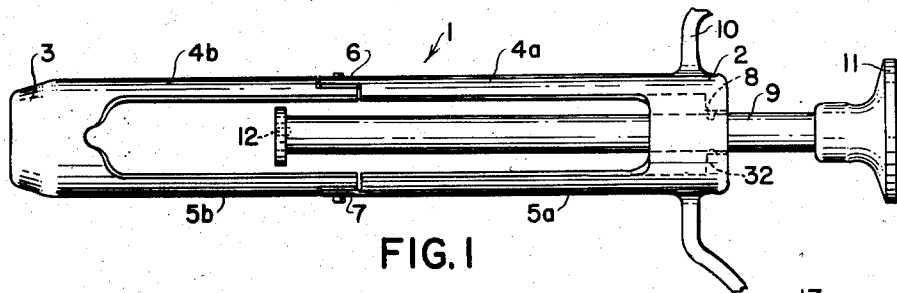


FIG. 1

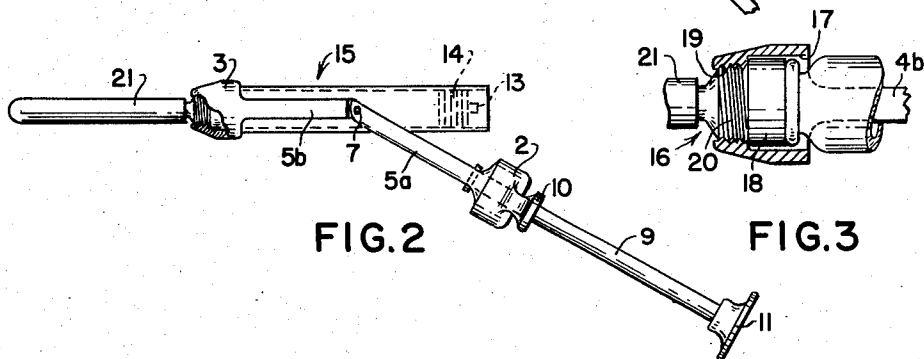


FIG. 2

FIG. 3

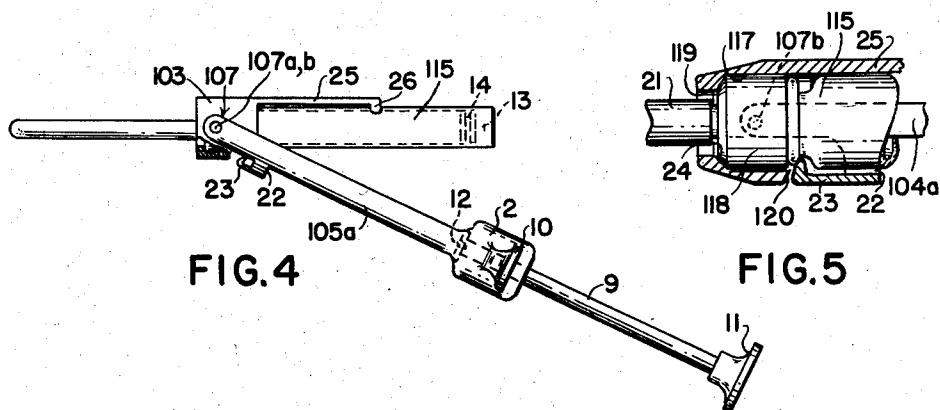


FIG. 4

FIG. 5

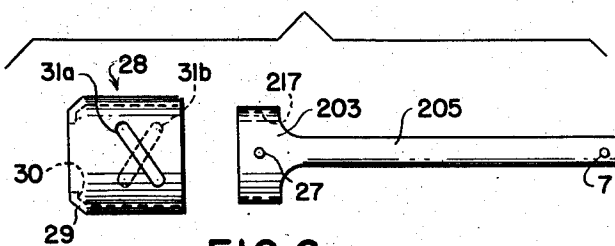


FIG. 6

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HINGED SYRINGE BODY

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6 Claims. (Cl. 128—218)

This invention relates to a hinged syringe body. More particularly it relates to a syringe body adapted to receive an injection cartridge-needle unit, the body being provided with a hinge or swivel means to facilitate loading and unloading by exposing the proximal portion of the contained cartridge, and being also provided with means to prevent longitudinal movement of the cartridge needle unit with respect to the body during both aspiration and injection.

In the design of syringe bodies adapted to be used with cartridge-needle units precharged with an injectable drug, one of the essentials is to provide means for securing cartridge and needle against longitudinal movement during aspiration and injection. Meeting this requirement is complicated by the fact that tolerances for the lengths of the glass tube constituting the body of the cartridge are not close and accordingly provision must be made for considerable variation in this dimension. Such means must also be extremely simple to operate, have a minimum of parts and be cheap to manufacture.

Various devices of this type are now in successful use but are thought capable of improvement as to convenience, simplicity and cost.

It is one object of this invention to provide a device of this kind of improved convenience in use. It is a further object to provide a device of improved simplicity, devoid of springs and sliding parts other than the essential plunger rod. It is an additional object to provide such a device which will be extremely economical to manufacture.

According to this invention a syringe body is provided having a hinge or pivot intermediate its extreme ends and so located as to expose the proximal portion of the contained cartridge when the proximal end of the syringe body is swung out of axial alignment. This permits ready insertion or removal of a cartridge-needle unit. The cartridge-needle unit is secured in the distal end of the syringe body by one of several means described below—e. g. a threaded connection, a cam lock or a bayonet-type lock. One advantage of this design is that the entire proximal portion of the cartridge is exposed for manipulation by the fingers during insertion and removal—a substantial convenience. Another advantage is that the securing means for the cartridge is not affected by variations in length of the cartridge tube.

Other advantages will be apparent to those skilled in the art from the following description and accompanying drawing which are intended to be exemplary only and not to limit the scope of our invention which is defined in the appended claims.

In the drawing,

Fig. 1 is an enlarged top view of one form of our syringe body without a contained cartridge-needle unit;

Fig. 2 is a side view, partly in section, of the same form of syringe body with a contained cartridge-needle unit, the proximal part of the body being in the "open" position—i. e. swung out of axial alignment;

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Fig. 3 is an enlarged sectional detail of the distal end of the syringe of Fig. 2;

Fig. 4 is a side view, partly in section, of another form of our syringe body with a cartridge-needle unit inserted, the proximal part of the body being in the "open" or non-aligned position;

Fig. 5 is an enlarged sectional detail of the distal end of the syringe of Fig. 4; and

Fig. 6 is an exploded view of a modified retaining means applicable to a syringe body of the general type shown in Figs. 1 and 2.

In the drawing, Figs. 1, 2 and 3, a syringe body 1 is shown having a proximal member 2 and a distal member 3, joined by two strips 4a, b and 5a, b hinged intermediate their ends at 6 and 7, on small studs fixed, for example, on parts 4b and 5b. The syringe body may be made of any suitable material such as metal or a suitable plastic.

The proximal member 2 has an axial hole 8 in which a push rod 9 is slidably mounted, and is provided with two conventional finger pieces 10. The push rod 9 has a thumb piece 11 at its proximal end and a threaded hole 12 at its distal adapted to engage a threaded stud 13 fixed in slidable plunger 14 of a cartridge-needle unit 15.

The distal member 3 has an axial bore adapted to receive the threaded hub and ferrule 16 of a cartridge-needle unit such as is disclosed in Dann Patent No. 2,671,450; the proximal portion 17 of the bore is cylindrical to receive the cylindrical portion 18 of the hub, and the distal portion 19 of the bore is threaded to receive the threaded portion 20 of the hub. The threaded portion of the bore 19 is wide enough to pass the rubber sheath 21 surrounding an injection needle mounted in hub 16.

In using the syringe illustrated in Figs. 1-3, the user swings aside the proximal part of the syringe body 4a, 5a . . . 2 . . . 9 . . . 11, inserts a cartridge-needle unit 15 in end member 3 and screws it home; he then swings the two parts of the syringe body into line and screws home the push rod on stud 13 of plunger 14. After withdrawing sheath 21, the syringe is prepared for aspiration or injection.

In the modification illustrated in Figs. 4 and 5, the hinge 107 is located on the distal member 103 of the syringe body, studs 107a and b being fixed on opposite sides of distal member 103. Proximal member 2 and push rod 9—12 are constructed as in Figs. 1 and 2, but strips 104a and 105a extend on both sides the full length of the syringe body, as shown in Figs. 4 and 5. Strips 104a and 105a are connected by an integral U-shaped member 22 from which a J-shaped cam 23 is struck up towards the axis of the syringe body. Cam 23 is of such a size and shape that, when the proximal and distal parts of the syringe body are aligned, cam 23 bears against the proximal surface of hub or ferrule 118, as shown in Fig. 5, thus securing the cartridge-needle unit 115 against longitudinal movement.

The distal member 103 is generally cylindrical, with a cylindrical bore 117 narrowed at its distal end 119 to provide a shoulder 24 to receive the thrust of cam 23. The opening 119 is wide enough to permit passage of needle and sheath 21. The member is cut away at 120 to allow space for cam 23. Member 103 may be provided with a proximally extending strip 25 having a short inverted U-shaped end 26 which serves to steady cartridge-needle unit 115 when the syringe is being prepared for use.

Needle hub 118 is of the type having no screw thread, but this modification of syringe body may obviously be adapted for use with threaded needle hubs, in which case, however, the screw thread on the needle hub does not function to secure the cartridge-needle unit. Opening

119 in this case is made larger than the major diameter of the thread.

To prepare this form of syringe for use, the user simply inserts the cartridge-needle unit 115 in member 103, aligns the two parts of the syringe body, and engages push rod 9 with stud 13 of plunger 14 as before. It is unnecessary to screw the cartridge-needle unit into the syringe body, since the act of aligning the two parts engages cam 23 with needle hub 118 and forces it against shoulder 24, thus securing the unit against longitudinal movement in aspirating and injecting.

Fig. 6 illustrates a modification of the form of syringe body illustrated in Figs. 1 and 2. In the modified form the part of the body proximal to hinges 6 and 7 is identical with that in Figs. 1 and 2; the distal member, however, is different. Strips 265, analogous to strips 4b and 5b, terminate in a distal member 203 which has a cylindrical bore 217 adapted to receive the needle hub of a cartridge-needle unit and which is provided on opposite sides with small fixed studs 27.

Member 203 is closed distally by a generally cylindrical tubular cap 28, which, however, is contracted distally at 29. The interior dimensions of the cap are such as to provide an easy slip fit over member 203. The distal contraction 29 leaves an opening sufficiently wide to pass needle and sheath 21 but provides a shoulder 30 against which the distal end of a needle hub abuts when the syringe is prepared for use. Cap 28 has slots 31a and b on opposite sides which mate with studs 27 when assembled. These slots are slanted as shown so that when cap 28 is rotated on member 203, it is advanced or retracted axially; the axial movement is greater than the manufacturing variations in the lengths of the glass tubes of the cartridge-needle units.

In use, after a cartridge-needle unit has been inserted and the push rod engaged with the plunger as described above, cap 28 is turned so as to cause shoulder 30 to bear on the needle hub, forcing the cartridge-needle unit proximally. The proximal end then bears against shoulder 32 (Fig. 1), formed by the end wall of member 2, and the unit is thus held firmly against axial movement.

From the above description, it will be seen that we have described a syringe body adapted for use with cartridge-needle units which is extremely simple to manipulate, which is cheap to manufacture, and which is effective in use; it is devoid of springs, followers and similar complications.

In the specification and claims, "distal" and "distally" indicate a direction towards the needle, and "proximal" and "proximally" the opposite direction.

We claim:

1. A non-separable syringe body adapted to be used with an injection cartridge-needle unit, comprising a gen-

erally cylindrical proximal member provided with a slidable push rod having means for positively engaging the cartridge plunger, a generally cylindrical distal member adapted to receive the needle hub of the cartridge-needle unit, hinged strips connecting proximal and distal members, the hinges being located so that when the members are swung out of line a substantial part of the proximal end of a cartridge contained in the syringe body is exposed, and means for securing the contained cartridge-needle unit against axial movement, said securing means being structurally independent of said hinges and comprising two cooperating elements associated with said distal member, one of said elements being structurally incorporated in said distal member, whereby the syringe may be used both for injection and aspiration without displacement of cartridge or needle.

2. A syringe body as defined in claim 1 in which the means for securing the contained cartridge needle unit against axial movement comprises a screw thread.

3. A syringe body as defined in claim 1 in which the hinge is located intermediate the proximal and distal members.

4. A syringe body as defined in claim 1 in which the means for securing the contained cartridge-needle unit against axial movement comprises a cam and shoulder.

5. A syringe body as defined in claim 4 in which the hinge is located on the distal member.

6. In a syringe body adapted to receive and be used with a cartridge-needle unit, having a push rod slidably mounted in its proximal end, the push rod having means for positively engaging the plunger of a contained cartridge and the syringe body having means for retaining the cartridge against axial movement, the improvement which comprises: a hinge so positioned that the proximal portion of the syringe body can be swung out of axial alignment to expose a substantial portion of the proximal part of a contained cartridge, the distal end of the syringe body comprising a generally cylindrical portion, and means associated with the distal end to secure the contained cartridge-needle unit against axial movement, said securing means being structurally independent of said hinges and comprising two cooperating elements, one of said elements being structurally incorporated in said generally cylindrical end portion.

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