

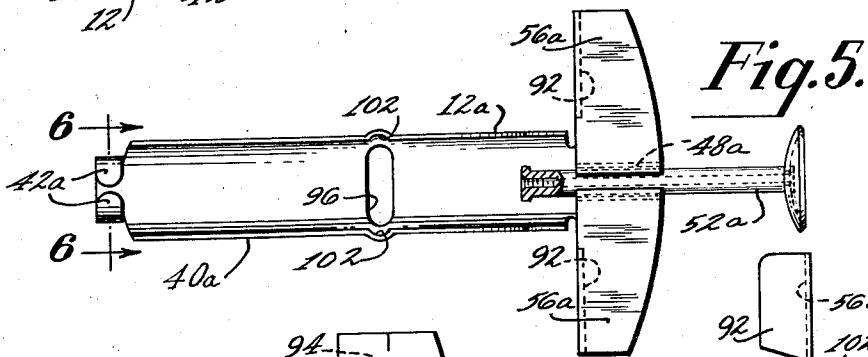
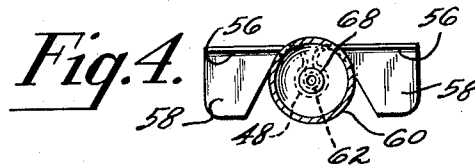
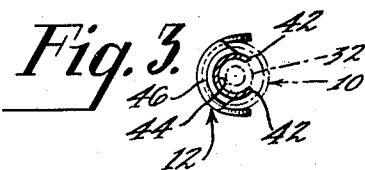
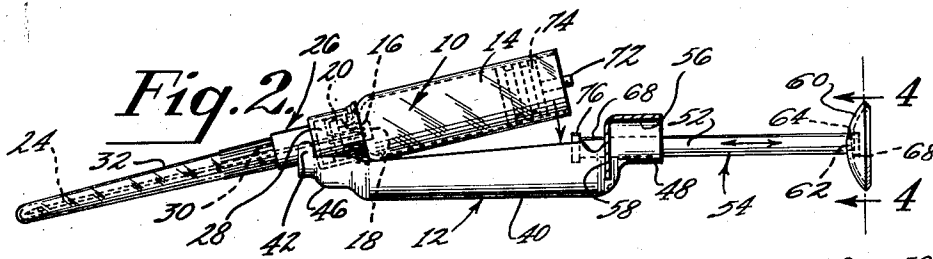
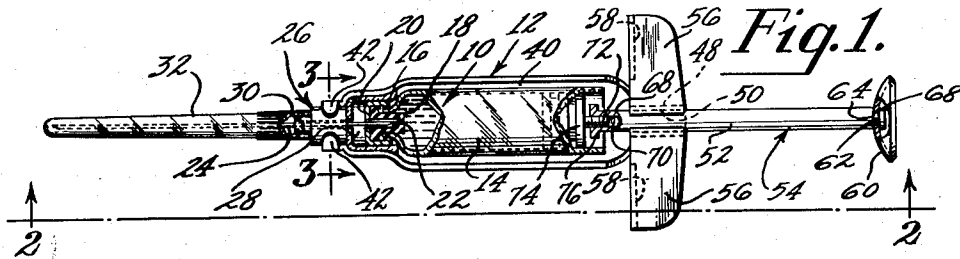
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J. H. STROOP

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HYPODERMIC SYRINGE

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HYPODERMIC SYRINGE

John H. Stroop, New York, N. Y., assignor to Chas. Pfizer & Co., Inc., Brooklyn, N. Y., a corporation of Delaware

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2 Claims. (Cl. 128—218)

This invention relates to a side-loading hypodermic syringe body, and more particularly to a side-loading hypodermic syringe body for operatively receiving disposable cartridge and needle assemblies.

Various hypodermic syringe bodies are in existence which provide facilities for injecting the medicament contained in a disposable cartridge and needle assembly. These syringe bodies assume various forms and configurations which require a number of machining and assembly operations during manufacture.

Disposable medicament-containing cartridge and needle assemblies have been accepted with enthusiasm by the medical profession. An example of a highly successful cartridge and needle assembly is described in commonly assigned copending application for U. S. Letters Patent Serial No. 264,992, filed January 4, 1952, now U. S. Patent No. 2,737,949.

An advantageous property of a syringe body to be used with a disposable cartridge and needle assembly is a simple structure which conserves material and is economical to manufacture. When the cost of the unit is maintained at a minimum, the use of the disposable type unit is encouraged. Even a slight saving in the cost of a single mass-produced unit can add up to an appreciable sum.

An object of this invention is to provide a novel structure for a hypodermic syringe body which is conveniently used with disposable medicament-containing cartridge and needle assemblies and is simple and inexpensive to manufacture.

In accordance with this invention a hypodermic syringe body for operatively receiving a disposable cartridge and needle assembly is fabricated from a single sheet of malleable material. This sheet is laid out in a pattern which provides the major functional portions of the body when it is subjected to a simple forming operation. After forming, the body includes a central shallow trough-shaped portion for receiving the cartridge. One end of the body includes curved fingers through which the needle end of the assembly is inserted at an angle which permits the cartridge to clear the rear of the body and to be rotated into the trough. The other end of the body which is remote from the curved fingers is formed in an arc to provide a passageway for the syringe plunger rod and then continued in a diametrically opposite directions to form finger grips or tabs which extend from opposite sides of the body. Portions of the tabs are bent down to form finger grips for the syringe. The fingers further provide means for anchoring the cartridge in the body when the contents are discharged. The central portion in the interest of economy may be reduced to a mere connecting strip.

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 in which:

Fig. 1 is a plan view of an embodiment of this inven-

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tion assembled with a representative disposable cartridge and needle assembly;

Fig. 2 is a cross-sectional view in elevation taken through Fig. 1 along the line 2—2 looking in the direction of the arrows showing the representative cartridge and needle assembly as it is being rotated to be loaded into the syringe body;

Fig. 3 is a cross-sectional view in elevation taken through Fig. 1 along the line 3—3 and looking in the direction of the arrows;

Fig. 4 is a cross-sectional view in elevation taken through Fig. 2 along the line 4—4 and looking in the direction of the arrows;

Fig. 5 is a plan view of another embodiment of this invention;

Fig. 6 is a cross-sectional view in elevation taken through Fig. 5 along the line 6—6 and looking in the direction of the arrows; and

Fig. 7 is a layout pattern of the embodiment shown in Fig. 6 before it is formed into the syringe body.

In Fig. 1 a disposable cartridge and needle assembly 10, of the type fully described and claimed in copending application for U. S. Letters Patent Serial No. 264,992 filed January 4, 1952, now U. S. Patent No. 2,737,949, is shown assembled within the hypodermic syringe body 12. The body 12 is formed of a single sheet of malleable material, cold rolled steel, for example. This body may be conveniently fabricated of a sheet of 22 gauge cold rolled steel (approximately .030 inch thick). Other malleable materials such as brass, aluminum or copper might also be used. A cold rolled steel body may be protected from corrosion after forming by dip or spray painting, for example. Other forms of corrosion protection may be galvanizing, plating (such as cadmium plating) or any other economical coating procedure. The syringe body might also conceivably be fabricated from sheets of nonmetallic materials such as a plastic which is capable of being shaped and then maintaining the formed configuration.

The disposable cartridge and needle assembly 10 includes an ampule or cartridge 14 preferably made of glass, having at one end a reduced neck portion 16 terminating in an annular lip which is sealed by a stopper 18 secured within the neck 16 by means of a ferrule 20. The stopper 18 includes an axial needle receiving recess 22 terminating in a thin wall which normally separates the inner end of a double pointed needle 24 from the contents of the cartridge 14. Ferrule 20 is also provided with a central opening to permit passage of the needle 24 into the stopper.

Needle 24 is provided with a cylindrical hub 26 having an enlarged end 28 which carries a skirt encasing the outer periphery of ferrule 20. The other end 30 of hub 26 is reduced in diameter to receive a needle cover member 32 which hermetically seals the needle. Details of this cartridge and needle assembly are provided in aforementioned copending application for U. S. Letters Patent Serial No. 264,992, now U. S. Patent No. 2,737,949.

Referring to Figs. 1 through 4, the structure of an embodiment of this invention is described in conjunction with this representative cartridge and needle assembly 10 to indicate its features of novelty and how they cooperate with a representative cartridge and needle assembly 10. The body 12 of the syringe includes a shallow trough-shaped central portion 40 which receives the medicament-containing cartridge 14 of the assembly. One end of the body 12 formed of the single sheet of material is shaped to provide curved fingers 42. These fingers form an arc 44 of a diameter and arcuate enclosure which permits angular insertion of the needle cover 32 portion of the assembly 10 and subsequent rotation of the cartridge 14 into the shallow trough-shaped portion of the body 12. The needle

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portion of the assembly 10 is fully inserted through the arc 44 provided by fingers 42, and the front portion of the cartridge, determined by the front edge of enlarged portion 28 of hub 26, is arrested by the rear edges of fingers 42. The cartridge portion of the assembly is then rotated about the axis provided by the rear edges of fingers 42 to be guided into the shallow trough 40. The tips of fingers 42 are rounded to facilitate rotation of the cartridge into the trough 40 during the loading operation.

The portion 46 of the body intermediate the trough-shaped portion 40 and the fingers 42 is reduced in cross section from the main portion 40 to receive the cylindrical hub 26 of the cartridge assembly 10. The shoulder defined by the front edge of the enlarged portion 28 of hub 26 may be considered as a junction point between the cartridge and needle. The rear edges of fingers 42, therefore, may be described as providing a motion-arresting shoulder for the junction point between the needle and cartridge portions of disposable assembly 10.

The other end 48 of the body is further reduced in cross section and formed in an arcuate channel 50 which provides a passageway for receiving and guiding the shaft 52 of plunger rod assembly 54. Plunger rod assembly 54 is later described in detail.

After forming channel 50 the body is extended to form wings or tabs 56 extending from opposite sides of the body. The tabs 56 include notched extensions 58 which are bent at right angles to the plane of wings 56 to form finger grips for the syringe. These extensions 58 are notched to allow this right angle bend without interference from the remainder of the body.

The plunger rod assembly 54 includes a dished disc 60 fastened to the rear end of rod 52 to provide a means for applying thumb pressure to discharge the syringe. Rod 52 may be conveniently formed of 17 gauge ($\frac{3}{16}$ inch diameter) cold rolled steel tubing. Disc 60 is conveniently fastened to the rear end of rod 52, for example, by insertion of end 62 of reduced cross section of rod 52 within a hole 64 in the center of the disc. The disc 60 is secured to the rod by expanding the extreme end 68 of the rod against the disc 60.

The front end 68 of tubular rod 52 is internally threaded at 70 for engaging the stud 72 extending from the plunger 74 of the cartridge 10. The front end of the rod 52 is flared at 76 to maintain it anchored within the slot 48 in the absence of a cartridge 10.

By virtue of the novel configuration herein described, body 12 provides structural attributes which enable it to operatively receive a disposable cartridge and needle assembly and efficiently inject the contents of the cartridge. The needle cover 32, of course, is removed before injection. The front end of rod 52 may be maintained uniform in cross section with the rest of the rod to allow withdrawal of the rod, if so desired. The central portion of the body may be reduced to a strip which has sufficient strength to maintain the extremities of the body in operative relationship. This may further simplify the structure.

Figs. 5 through 7 describe another embodiment of this invention. Fig. 7 particularly shows a pattern outlined on a single sheet of malleable material to provide a blank for forming the aforementioned one-piece body. This embodiment is similar in many respects to the embodiment shown in Figs. 1 through 4. Parts shown in Figs. 5 through 7 identical to those shown in Figs. 1 through 4 are, therefore, designated by the same reference characters followed by the suffix "a".

Referring to Fig. 7 a blank 80 is laid out in a pattern which provides the operative or functional features of the hypodermic syringe body. This blank 80 may be generally described as laid out in a T-shaped pattern. The cross bar portion 82 provides extending wings 84 for forming the finger grip portion of the syringe body. The upright portion 86 provides a longitudinal sheet for forming the shallow trough-shaped portion of the syringe. The

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upright portion 86 of the T terminates in fingers 88 which are later bent to form the cartridge arresting or retaining portion of the body. Portions of the pattern 90 form notches between the wings 84 and upright 86. Portions 92 of the wings 84 lying below the dashed bending lines 94 are bent to form tabs to provide the finger grips. Notches 90 provide clearance between the tabs 92 and the upper portion of the upright 86 to allow bending of the tabs without interference by the syringe body. An elongated hole 96 is provided across the center of upright 86 for purposes which are later described.

To avoid needless repetition, the parts of the embodiment shown in Figs. 5 through 7 which are identical to those shown in the embodiment described in Figs. 1 through 4 are not specifically described.

Referring to Figs. 5 and 6, the fingers 42a are directly connected to the main body or shallow trough portion 40a. This eliminates the transition portion 46 shown in Figs. 1 through 4 for engaging the hub between the needle and cartridge. The rear portion of the body connecting the wings 56a to the trough-shaped portion of the body is pinched close together as shown at 100 to properly position the channel 48a which guides and receives the plunger rod 52a.

The elongated cutout 96 and the remainder of the circumferential portion of the body 40a in line with the elongated hole 96 are indented at 102 to form a curved indentation about the circumference of the body. This indentation provides a means for receiving a protuberance which may be included for various purposes about the circumference of a disposable cartridge and needle assembly.

The operation of an embodiment of this invention, including loading of the disposable cartridge and needle assembly into the body and injection of the contents of the cartridge, may be best understood by reference to Figs. 1 and 2. Fig. 2 shows the cover-protected needle portion of the assembly inserted into the arc provided by the fingers 42 with the shoulder provided by the front edge of enlarged portion 28 of needle hub 26 bearing against the rear edges of fingers 42. The configuration of the fingers 42 particularly the open portion of the arc enables the cover protected needle portion to be inserted at an angle which permits the cartridge portion 14 of the assembly to clear the rear portion of the body particularly the finger grips 56. The rounded rear edges of the fingers 42 then facilitate rotation of the assembly 10 into the position shown in Fig. 1 with the cartridge lying within the trough 40. The front end of plunger rod 76 is then screwed on to the stud 72 of plunger 74 of the cartridge 10.

The contents of the syringe are injected after removal of the needle cover 32 by exerting pressure with the thumb on the disc 60 of the plunger rod assembly 54 while the finger grips 56 are grasped by two other fingers. This initially forces the ferrule 20 of the cartridge forward within the skirt provided by needle hub section 28. This causes the inner end of double-pointed needle 24 to pierce the stopper 18 to place the inner end of the needle in communication with the contents of the cartridge. Subsequent pressure pushes the plunger 74 forward which in turn forces the contents of the cartridge out through the needle.

This simple structure, therefore, provides means for anchoring the forward portion of the cartridge for initially forcing the needle through the stopper and then discharging the contents of the cartridge through the needle. The rear portion of the body provides finger grips and a passageway for guiding the plunger rod.

As will be apparent to one skilled in the art, modifications and equivalents of these embodiments may be employed without departing from the spirit of this invention.

What is claimed is:

1. A hypodermic syringe body for operatively receiving a disposable cartridge and needle assembly joined by

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a needle hub, said body comprising a sheet of malleable material, said sheet being formed to provide a shallow trough-shaped central portion for receiving the cartridge portion of said assembly, one end of said body including curved fingers, each of said fingers being formed in a portion of a circular arc included within a plane disposed perpendicular to the length of said body, said fingers terminating a distance from each other to provide a space between their ends which permits insertion of the needle portion of said assembly through said fingers at an angle allowing the cartridge portion of the assembly to clear the rear of the body and to be pivoted into its operative position within the trough-shaped portion of said body, said fingers being long enough and their ends sufficiently close to each other to anchor said cartridge

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within said body, and the end of said body remote from said fingers forming a passageway for guiding a plunger rod and extending to form finger grips for said syringe body.

- 5 2. A hypodermic syringe body as set forth in claim 1 wherein said body includes a transition portion between said fingers and said shallow trough-shaped central portion, said transition portion being shaped to conform to said hub, said fingers being rounded to facilitate rotation of said cartridge into said trough-shaped portion.

References Cited in the file of this patent

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