Oct. 16, 1956 C. W. HILL 2,766,754

SYRINGE ASSEMBLY

Filed July 10, 1952

Fig. 1

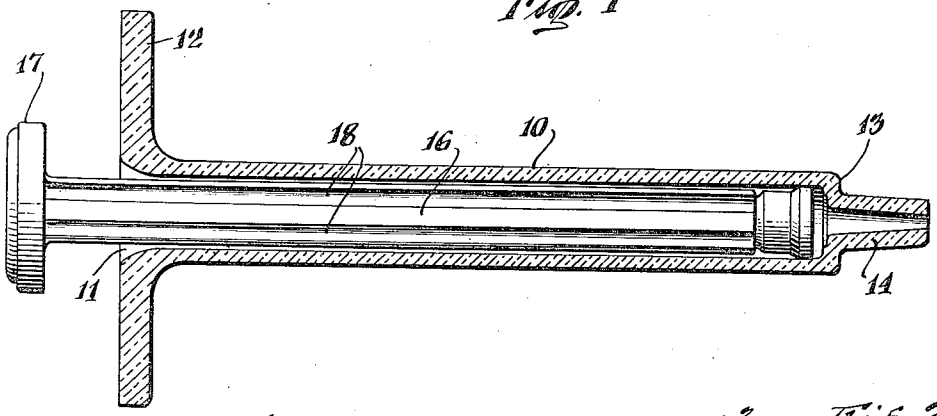


Fig. 3

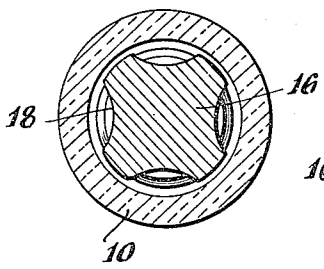


Fig. 2

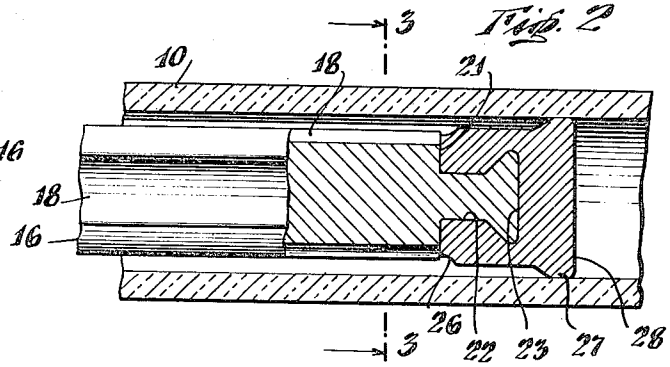


Fig. 4

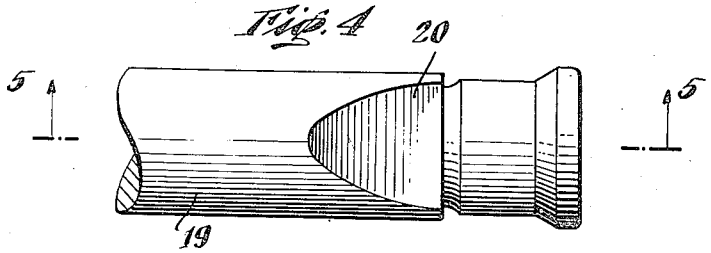
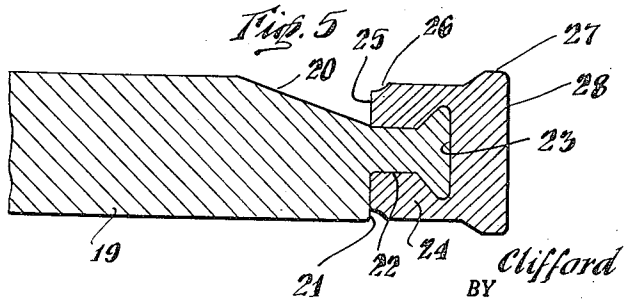


Fig. 5



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SYRINGE ASSEMBLY

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Application July 10, 1952, Serial No. 298,080

3 Claims. (Cl. 128—218)

This invention relates to a structurally and functionally improved syringe of the hypodermic type.

It is an object of the invention to furnish an assembly of this character which will embody a simple and inexpensive design and in which the physician or other user may be assured that substantially complete injection of the medicament occurs aside from the fact that the parts may be readily manipulated to provide for an aspirating action.

A further object is that of furnishing a structure which in operation will not develop an excessive drag and in which it will not be necessary to resort to time-consuming and expensive finishing techniques involving grinding, fitting and lapping of the parts.

Among additional objects are those of furnishing an apparatus including relatively few parts each individually simple and rugged in construction and designed for production by quantity manufacturing procedures; these parts being capable of ready assemblage to furnish unitary structures operating over long periods of time with freedom from all difficulties and in which the assemblies may be readily cleaned and sterilized.

With these and other objects in mind, reference is had to the attached sheet of drawings illustrating practical embodiments of the invention and in which:

Fig. 1 is a sectional side view of an assembly;

Fig. 2 is a fragmentary sectional view of certain of the parts and showing these in enlarged scale;

Fig. 3 is a transverse sectional view taken along the line 3—3 and in the direction of the arrows as indicated in Fig. 2;

Fig. 4 is a fragmentary enlarged elevation of an alternative form of structure; and

Fig. 5 is a sectional side view taken along the line 5—5 and in the direction of the arrows as indicated in Fig. 4.

Referring primarily to Fig. 1, the numeral 10 indicates the body of a syringe barrel. The rear or entrance end of the barrel bore may, in accordance with conventional practice, be flared to a desired extent as indicated at 11. Adjacent this end an outstanding flange portion 12 is preferably provided as an integral part of barrel 10. The forward end of that barrel is defined by a wall 13 continued in a tip 14 of any desired type and by means of which the hub of a detachable needle (not shown) may be secured against movement with respect to the barrel. The body of that barrel may be formed of glass or suitable plastic such as nylon.

A plunger 16 is employed in connection with the barrel. This plunger is conveniently formed of plastic such as nylon although other materials may be utilized. As shown in Fig. 1, it has a rear or head part 17 providing an actuating portion. As in Figs. 1 to 3, it may be formed with longitudinally extending grooves or flutings 18. Otherwise, as in Figs. 4 and 5, it conveniently embraces a cylindrical body 19 provided with a reduced or beveled surface 20 adjacent its forward end. Regardless of the structure employed, the inner end of the plunger preferably terminates in an extended mounting portion, the inner end of which is defined by a shoulder 21.

The mounting portion proper comprises a relatively reduced stem 22 continued in the form of a flared head 23. The edge of that head is preferably somewhat rounded and the outwardly inclined side face of the latter may extend at an angle of approximately 45° with respect to the plunger axis. As shown, sufficient spacing exists between the inner end of the head and shoulder 21 to provide an adequate bearing surface.

A tip is mounted upon and extends forwardly of the head portion 23. This tip is preferably formed of natural or sythetic rubber although other materials may be employed. It may be lubricated in any desired manner such as by employing a light film of silicone grease. The tip includes a body 24 conveniently in the form of a sleeve presenting a rear face 25 which conforms to and engages with the outer surface of shoulder 21. The edge of this sleeve may be trimmed as indicated at 26 and its diameter is conveniently substantially equal to the diameter of plunger 16 or 19. At its forward end sleeve tip 24 is enlarged to provide a sealing lip 27 for engagement with the surface of the barrel bore. The forward end of the tip preferably terminates in a flat face 28 which should conform to the inner face of end wall 13.

As is apparent, the bore of sleeve 24 has an initial diameter slightly less than the external diameter of stem portion 22. The inner end of this bore terminates in an enlarged cavity, the dimensions of which (with the tip dismounted) are slightly less than the diameter and height of head portion 23. Thus, it follows that sleeve 24 should be expanded so that head 23 may be introduced into its bore. After the parts have been ensleeved with respect to each other, the head of the plunger will lie within the enlarged cavity portion of the bore. Under these circumstances, all parts of the tip, up to those in line with the outer head face 23, will be under slight conditions of tension. Therefore, the tip will assume proper overall dimensions and be maintained against any probability of accidental displacement or movements with respect to the plunger.

At the same time, if it is desired to dismount the tip, either the beveled surface 20 or the reduced surfaces, provided incident to the flutings 18, will enable an operator to obtain access to the rear face 25 of the sleeve 24. Thereupon, by engaging this surface with his fingers or a suitable implement, the sleeve may be shifted outwardly and expanded. Accordingly, the tip may readily be stripped from association with the plunger. Under conditions of use and with the tip in mounted position, the sealing lip 27 will extend outwardly and forwardly of the plunger. Therefore, it will sealingly engage the surface of the barrel bore. Being disposed in advance of head 23, it is apparent that this portion is unaffected by the tension or other stress to which the tip parts adjacent the stem 22 and head 23 may be subjected. Also the seal being established forwardly of the plunger, practically no loss of medicament will occur as the plunger is fully projected. In one size of syringe the length of lip 27 may, for example, be .045". Therefore frictional engagement with the resultant objectionable drag is reduced to a minimum. This is aside from the fact that an effective sealing contact is established between the inner face of the barrel and the lip of the tip.

Thus, among others, the several objects of the invention as specifically aforenoted are achieved. Obviously, numerous changes in construction and rearrangement of the parts may be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. As part of a syringe assembly in combination a plung-

er to be reciprocated within the bore of a barrel, an actuating portion at one end of said plunger, a mounting at the opposite end of said plunger and a barrel-contacting tip removably supported upon said mounting and extending forwardly of said plunger, said tip comprising a sleeve portion encircling a part of said plunger and a lip forwardly of said sleeve and having a diameter greater than said sleeve and said plunger being formed with a reduced surface adjacent its mounting and whereby access may be had to one of the faces of said tip for removal of the latter.

2. As part of a syringe assembly in combination a plunger to be reciprocated within the bore of a barrel, an actuating portion at one end of said plunger, a mounting at the opposite end of said plunger and a barrel-contacting tip removably supported upon said mounting and extending forwardly of said plunger, said tip comprising a sleeve portion encircling a part of said plunger and a pressure retaining means forwardly of said sleeve and having a diameter greater than said sleeve and said plunger being formed with a reduced surface adjacent its mounting and whereby access may be had to one of the faces of said tip for removal of the latter.

3. As part of a syringe assembly in combination a plunger to be reciprocated within the bore of a barrel, an actuating portion at one end of said plunger, a mounting at the opposite end of said plunger, a barrel-contacting tip supported upon said mounting and extending forwardly of said plunger, said mounting presenting a stem and an enlarged head presenting surfaces flared in the direction of said stem, said tip being formed with a bore having an enlarged and outwardly flared base portion to receive said head with the remainder of said bore accommodating said stem, and a lip forming a part of said tip and lying wholly beyond said bore, and said plunger being formed with a reduced surface adjacent its mounting and whereby access may be had to one of the faces of said tip for removal of the latter.

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