

[54] **STABILIZED SYRINGE ASSEMBLY**

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[22] Filed: **Sept. 17, 1970**

[21] Appl. No.: **73,007**

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[52] U.S. Cl.128/232, 128/213, 128/224

[51] Int. Cl.A61m 1/00

[58] Field of Search.....128/232, 233, 224, 213, 214,
128/215, 239, 247; 222/566, 571, 572, 206,
92

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ABSTRACT

A stabilized squeeze bulb syringe assembly including a plurality of stabilizing arms projecting outwardly from the assembly to provide, with the bulb, a tripoint support for the assembly on a horizontal surface. The nozzle of the syringe barrel is thereby maintained in an upwardly inclined direction. The stabilizing arms serve also as finger grips to assist in squeezing the bulb when the contents of the syringe assembly are to be discharged.

8 Claims, 5 Drawing Figures

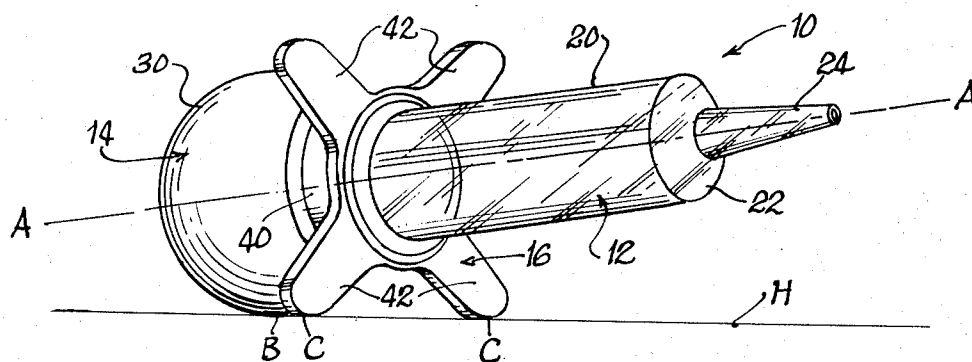


FIG. 1

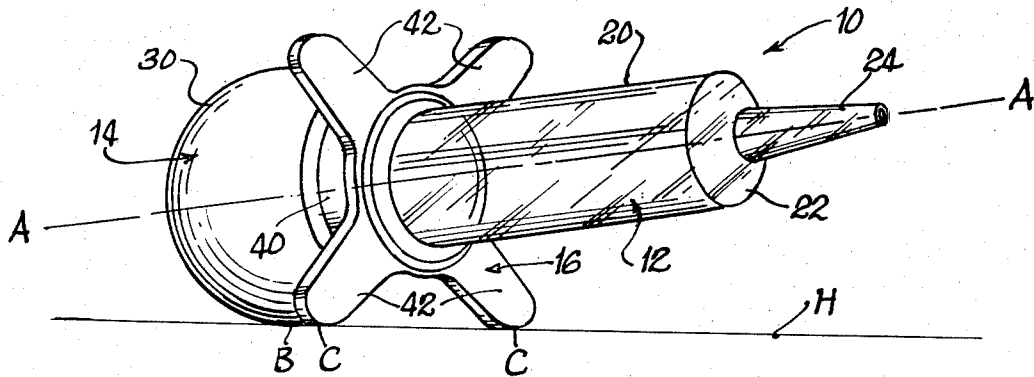


FIG. 2

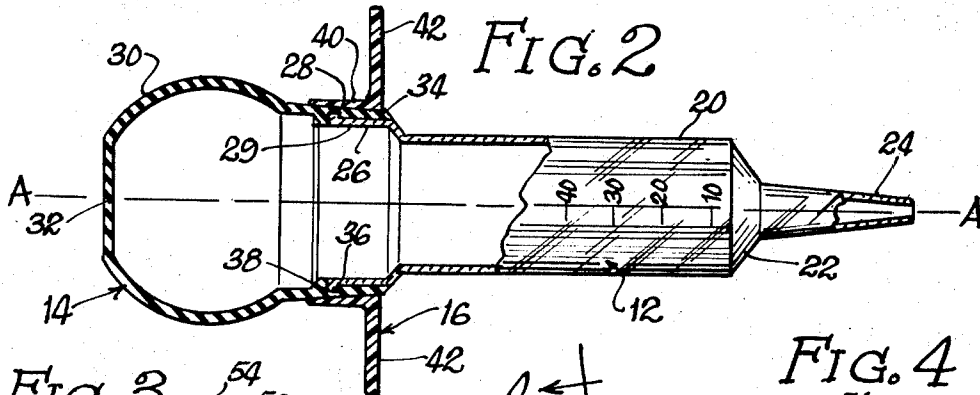


FIG. 3

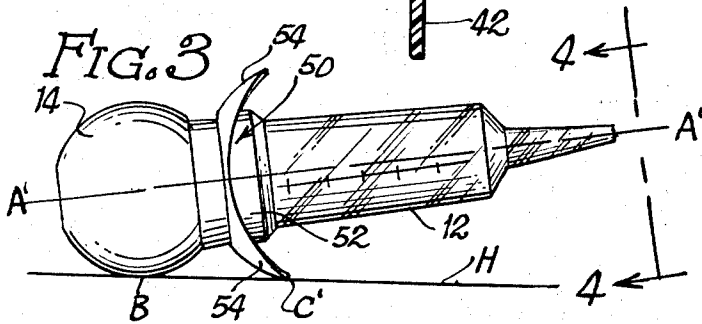


FIG. 4

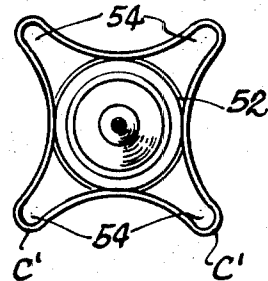
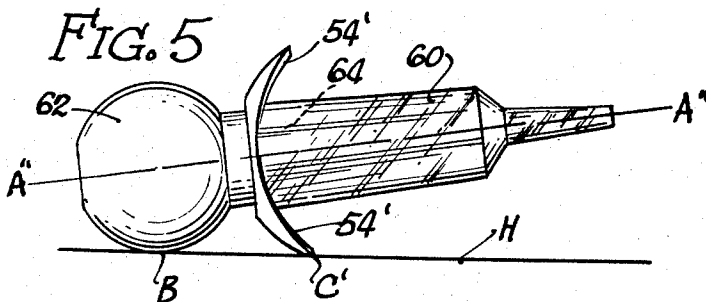


FIG. 5



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STABILIZED SYRINGE ASSEMBLY

This invention relates to a stabilized syringe assembly in which stabilizing means are provided to prevent the nozzle from coming into contaminating contact with a support surface such as a table. The stabilizing means also assist in the discharge of the fluid from the syringe assembly by providing finger grips for use during the squeezing of the associated squeeze bulb.

There are a variety of squeeze bulb syringe assemblies presently on the market for medical use. In each of these a resilient squeeze bulb is sealingly secured to a syringe barrel, the bulb being squeezable to discharge a measured or calibrated amount of fluid from the syringe assembly.

In such squeeze bulb assemblies the barrel is elongate and generally tubular and terminates in a nozzle at one end. The other end defines a wide mouthed opening to which the squeeze bulb is secured. In some such assemblies a squeeze bulb mounting sleeve is inserted into the barrel opening to sealingly engage the barrel internally. Such barrel and sleeve assemblies are frequently difficult to disassemble, especially when a separate sleeve insert is used to assure proper sealing.

In other syringe assemblies a squeeze bulb mounting sleeve is dimensioned to sealingly grip the external surface of the barrel adjacent the opening. To assure proper sealing in such assemblies it has been found to be highly desirable to provide a locking means to surroundingly clamp the sleeve to the barrel.

With each such prior art assembly great care must be taken to make certain that the nozzle does not come into contact with a support surface, such as a table, upon which the assembly is placed prior to use. In prior art constructions depressions have been provided in bulb ends so that the assemblies might be supported vertically prior to use. Such an assembly is not very stable and is easily knocked over. In other instances support stands, such as wide mouthed bottles into which an assembly is inserted, have been used. Those require sanitary bottles and, of course, a separate element to be available for use.

In accordance with this invention, stabilizing support means are provided. These comprise at least a pair of multipurpose stabilizing arms which are secured to a syringe assembly. Pairs of these arms, together with the squeeze bulb, form a tripoint support means for the assembly which serves to maintain the nozzle of the barrel in an upwardly inclined position when the assembly is placed on a table or the like, thereby to prevent the nozzle from contacting the table. Preferably the stabilizing arms are integrally formed with a lock ring for sealingly securing the bulb to the barrel. Desirably, the stabilizing arms are four in number and are equidistantly spaced about the periphery of the lock ring.

These stabilizing arms not only stabilize the syringe assembly on a horizontal surface, but also serve as finger grips to assist a user in squeezing the bulb when the contents of the syringe assembly are to be discharged. In at least one preferred embodiment of this invention, the stabilizing arms project both outwardly from the central lengthwise axis of the assembly and forwardly toward the nozzle end of the barrel, thereby to move their ends even farther forward with respect to the lengthwise center of gravity of the sy-

inge assembly than when the stabilizing arms are flat or coplanar.

These and other objects, features and advantages of this invention will become apparent from the following description and drawings of which:

FIG. 1 is a perspective view of a first preferred embodiment of an irrigator syringe assembly of this invention;

FIG. 2 is a side elevational view, partially in section, of the assembly of FIG. 1;

FIG. 3 is a side elevational view of another preferred embodiment of a syringe assembly of this invention;

FIG. 4 is a front view of the assembly of FIG. 3, taken substantially along the line 4—4 of FIG. 3; and

FIG. 5 is a side elevational view of yet another preferred embodiment of this invention.

Referring first to FIGs. 1 and 2 of the drawings, a stabilized irrigator syringe assembly 10 of this invention comprise a barrel member 12, a hollow sanitary elastomeric squeeze bulb assembly 14 and a stabilizer lock ring assembly 16.

Barrel member 12 comprises a suitably calibrated elongate tubular barrel 20 and a frustoconical end portion 22 which terminates in a coaxial nozzle 24. At its other end barrel 20 terminates in a mounting hub 26 circumscribed by an annular lip 28. That end of the barrel defines a wide-mouthed opening 29.

Bulb assembly 14 comprises a generally spherical hollow squeeze bulb segment 30 with an axial depression 32 at one end. Depression 32 is sometimes used as a "stand" for the assembly 10, although it need not be present in assemblies made in accordance with this invention. At its other end, bulb segment 30 terminates in a mounting sleeve 34 which is generally cylindrical in shape. Internally sleeve 34 is generally complementary in configuration and size to mounting hub 26. Sleeve 34 defines an annular recess 36 which is complementary to and adapted to receive annular lip 28, and further provides an annular shoulder 38 adjacent recess 36 to limit telescopic movement of the bulb assembly 14 downwardly along mounting hub 26 when bulb assembly 14 is telescopically assembled to barrel member 12.

Stabilizer lock ring assembly 16 is molded, desirably from a medium impact polystyrene. It comprises a continuous lock ring segment 40 to which are secured a plurality of integrally molded flat coplanar stabilizing arms 42. In the embodiment of FIGS. 1 and 2, four stabilizing arms 42 are provided at equal 90° intervals around the periphery of lock ring segment 40. The ends of the stabilizing arms 42 are discrete and each end is equidistantly spaced from the lengthwise central axis A—A of the syringe assembly 10.

Stabilizing arms 42 perform a number of functions. One is to provide external gripping means to facilitate movement of the lock ring segment into locking engagement with the barrel and bulb assembly. Another is to facilitate gripping by a user of the assembly as illustrated in FIG. 2 to assist in the user's squeezing of the bulb when the contents of the syringe assembly are to be discharged.

A further and most important function of the stabilizing arms is graphically illustrated in FIG. 1. There it will be seen that a pair of the arm ends rest at points C upon a horizontal surface H forwardly of the lengthwise

center of gravity of the bulb, barrel and contents. Those arm ends project outwardly from the central or lengthwise axis A—A of the unit farther than the lateralmost extent of the bulb, i.e., at point B (FIG. 1) where the bulb contacts the support surface H. Thus the arm ends and bulb provide a stable tripoint support or stand for the syringe assembly. As such, when the assembly is placed on a surface such as a table, the nozzle 24 will remain in the upwardly extending position illustrated in FIG. 1, and will not accidentally tip into contact with the table. This prevents contamination of the nozzle, and prevents contamination of the stream of fluid to be discharged from the nozzle.

The lock ring segment 40 is generally tubular in shape. Internally it is slightly frustoconical in configuration. Preferably it is generally complementary in shape to the external surface configuration of mounting sleeve 34 against which it acts to compress the mounting sleeve into sealing engagement with the barrel member 12.

To assemble the members as illustrated in FIG. 2, the mounting sleeve 34 of squeeze bulb assembly 14 is telescopically moved into seating engagement upon mounting hub 26. Desirably the fit of sleeve 34 and hub 26 is a resilient gripping one which means that the unstretched internal diameter of sleeve 34 is slightly less than the external diameter of hub 26. Telescopic assembly of the bulb and barrel is limited by the interlocking engagement of the annular lip 28 and the annular recess 36, and further by the engagement of shoulder 38 with the upper end of the barrel adjacent lip 28.

To maintain the telescopically assembled relationship of the bulb and barrel, the stabilizer lock ring assembly 16 is telescopically moved into engagement with the mounting sleeve 34. The tapered confronting surfaces of sleeve 34 and lock ring segment 40 are gradually forced tighter together until the compressed telescopically sealed relationship of the bulb and barrel illustrated in FIG. 2 is reached. At this point the lock ring segment 40 exerts sufficient force against the sleeve to make withdrawal of the sleeve of the bulb from the mounting hub exceedingly difficult.

As so assembled, the stabilizer lock ring provides the stabilizer arms which in the position of FIG. 1 project beyond the lateralmost projection of the bulb, thereby to provide the tripoint support for the barrel and bulb assembly, which, even when filled with liquid, stabilizes the assembly to maintain the nozzle in the upwardly inclined position illustrated in FIG. 1.

A further embodiment of this invention is illustrated in FIGS. 3 and 4. In those figures the bulb and barrel members are substantially identical to those of the embodiment of FIGS. 1 and 2. However, the stabilizer lock ring assembly 50 is somewhat different.

The stabilizer lock ring assembly 50 of FIGS. 3 and 4 may be formed of a medium impact polystyrene. A continuous lock ring segment 52 substantially identical to that of the embodiment of FIGS. 1 and 2 integrally mounts a plurality of stabilizing arms 54 which project outwardly from the lock ring segment 40 at the edge of the lock ring segment closest to the bulb. Stabilizing arms 54 are generally parti-spherical in shape and merge into each other adjacent their intersections with the lock ring segment 52. Stabilizing arms 54, as seen in

FIG. 3, project outwardly from the central axis A'—A' of the coaxial bulb and barrel assembly farther than the lateralmost extent of the bulb assembly 14. Therefore, when the assembly is placed on a horizontal surface H, such as a table, the tripoint support at points B and C' serves to maintain nozzle 24 in a stable upwardly inclined position above horizontal surface H.

It will be noted that the stabilizing arms 54 project forwardly toward the nozzle beyond the forwardmost portion of the lock ring segment 52. This enhances the stabilized supporting characteristics of the assembly of FIGS. 3 and 4 by moving the supporting location of the ends of the arms 54 even further forward of the center of gravity than the arms of the lock ring assembly 16 of the embodiment of FIGS. 1 and 2.

FIG. 5 illustrates yet another embodiment of this invention. In FIG. 5, the barrel 60 is similar to the barrels of FIGS. 1 to 4 except that the rearwardmost edge of barrel 60 is integrally molded with four stabilizing arms 54 of the character and disposition illustrated in FIGS. 3 and 4. Thus, rather than placing the stabilizing arms on a lock ring, the barrel itself mounts the stabilizing arms 54'.

In this embodiment, the coaxial squeeze bulb 62 provides a mounting sleeve 64. Mounting sleeve 64 is received internally of the barrel in a frictional sealing fit which both seals the mounting sleeve to the interior of the barrel and tends to preclude accidental withdrawal of the bulb from the barrel. The ends of the stabilizing arms 54' are spaced from the central axis A'—A' a distance greater than the lateralmost extent of bulb 62, and contact the surface H at points C', bulb 62 contacting the surface H at point B thereby to provide the tripoint support for the assembly. The stabilizing arms 54' so positioned serve to provide a stabilized syringe assembly of the character described in connection with the embodiments of FIGS. 1 to 4.

In a typical syringe assembly of this invention, such as that of FIGS. 3 and 4, a barrel assembly is molded of transparent polystyrene. The barrel assembly is about 5.2 inches in length including a nozzle length of about 1.5 inches and a mounting hub length of about 0.44 inches. The mounting hub is about 1.34 inches in diameter externally. The bulb is molded of synthetic rubber, such as a styrene-butadiene block copolymer made by Shell Chemical Company under the designation Kraton 2109, having a wall thickness of about 0.09 inches. The largest internal diameter of the bulb is about 2.13 inches. The internal diameter of the mounting sleeve is about 1.33 inches. The external surface of the mounting sleeve tapers from a diameter of about 1.45 inches to about 1.60 inches adjacent the squeeze bulb portion.

The lock ring assembly of FIGS. 3 and 4 is molded of a medium impact polystyrene and provides a lock ring segment having an inner surface about 0.5 inch in width which tapers from a diameter about 1.44 inches to about 1.53 inches thereby to assure a compressive sealing fit with the bulb mounting sleeve. The integral stabilizing arms extend outwardly about 1.83 inches from the central axis of the lock ring. The ends of the arms extend forwardly of the lock ring segment about 0.125 inch. Pairs of stabilizing arms when resting on a horizontal surface lie on a chordal segment spaced about 1.34 inches from the central axis of the lock ring.

That is greater than the distance of the lateralmost point of the bulb (which is about 1.15 inches from the central axis of the bulb and syringe assembly) thereby assuring the upward angling of the nozzle in the position of rest illustrated in FIGS. 3 and 4.

The overall syringe assembly is about 7.5 inches in length, the arm ends contacting the horizontal surface about 4.7 inches from the nozzle. The center of gravity of the assembly is even farther from the nozzle, i.e., at least about 5 inches or more, both when empty and when filled or partially filled with liquid to be discharged, thereby assuring the maintenance of the stabilized position of the assembly and nozzle on a table or the like as illustrated in the drawings.

In each of the illustrated embodiments it will be observed that at least a pair of stabilizing arms associated with a syringe bulb and barrel assembly are positioned to contact a horizontal support surface at points spaced from the central axis of the syringe assembly which are farther from the central axis than the point at which the lateralmost portion of the bulb contacts that surface, thereby to maintain the nozzle in an upwardly inclined position. Further the points at which the stabilizing arms contact the surface H are forwardly of the lengthwise center of gravity of the assembly both when the assembly is empty and when the assembly is full or partially full of the liquid to be discharged therefrom.

What is claimed is:

1. An elongate stabilized syringe assembly comprising an elongate tubular barrel member terminating in a coaxial nozzle at one end and defining an enlarged opening at the other end, a coaxial squeeze bulb sealingly secured to said barrel member adjacent said opening to prevent the escape of fluid from said other end, at least one pair of separate stabilizing arms secured to said assembly adjacent the end of said barrel member defining said opening so as to sealingly compress said bulb into engagement with said barrel, said arms each defining an end spaced from the other which is spaced forwardly of the squeeze bulb beyond the lengthwise center of gravity of the syringe assembly both when empty and when filled with fluid, said pair of arm ends resting on points on a horizontal surface spaced farther from the central lengthwise axis of said assembly than the lateralmost extent of said squeeze

bulb, said bulb and arm ends providing a tripoint support for said assembly for maintaining said nozzle in an upwardly inclined position.

2. In the syringe assembly of claim 1 wherein said stabilizing arms are integrally formed with said barrel.

3. In the syringe assembly of claim 1 wherein there are four stabilizing arms each equidistantly spaced from the other and each providing an arm end equidistant from said central lengthwise axis.

4. In the syringe assembly of claim 1 wherein said stabilizing arms are coplanar.

5. In the syringe assembly of claim 1 wherein said stabilizing arms project forwardly toward said nozzle from their points of securement to said assembly.

6. An elongate stabilized syringe assembly comprising an elongate tubular barrel member terminating in a coaxial nozzle at one end and defining an enlarged opening at the other end, a coaxial squeeze bulb sealingly secured to said barrel member adjacent said opening to prevent the escape of fluid from said other end, at least one pair of stabilizing arms secured to said assembly at the end of said barrel member defining said opening, said arms each defining an end which is spaced forwardly of the squeeze bulb beyond the lengthwise center of gravity of the syringe assembly both when empty and when filled with fluid, said pair of arm ends resting on points on a horizontal surface spaced farther from the central lengthwise axis of said assembly than the lateralmost extent of said squeeze bulb, said bulb and arm ends providing a tripoint support for said assembly for maintaining said nozzle in an upwardly inclined position, wherein said stabilizing arms are integrally formed with a lock ring and said squeeze bulb is fitted externally to said barrel member, said lock ring being telescopically seated on said squeeze bulb to sealingly compress said bulb into engagement with said barrel.

7. In the syringe assembly of claim 6 in which said lock ring mounts four equidistantly spaced stabilizing arms, each providing an end equidistant from said central lengthwise axis.

8. In the syringe assembly of claim 6 wherein said stabilizing arms project forwardly toward said nozzle from their points of securement to said lock ring.

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