

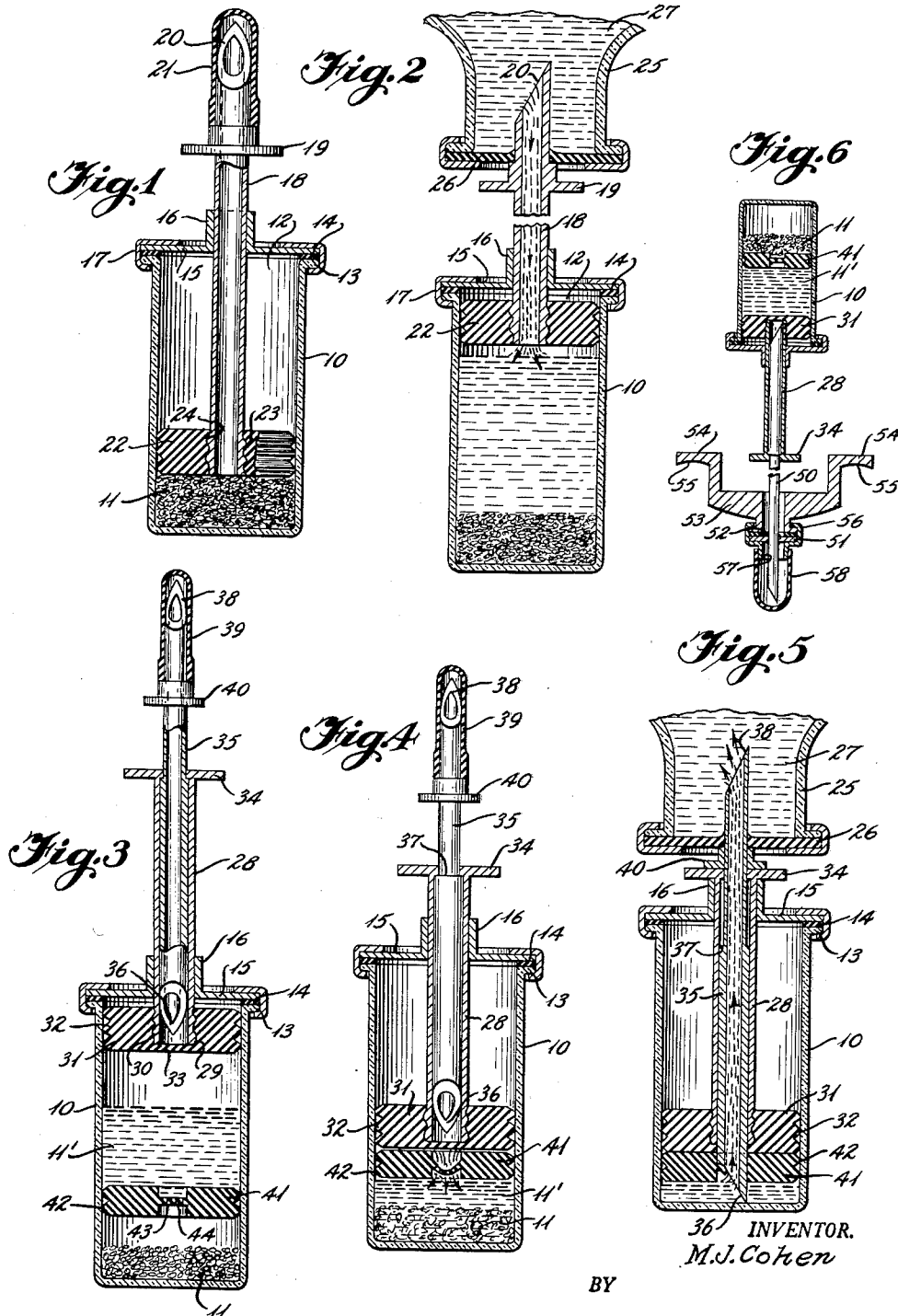
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DISPOSABLE ADDITIVE CONTAINER

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DISPOSABLE ADDITIVE CONTAINER
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This invention relates to the attention to the needs of the human body and to equipment utilized in undertaking to supply such needs in order to maintain the body in the best physical and mental condition for maximum efficiency, to preserve the same and to lengthen the life span thereof.

The invention relates particularly to the administration of medicinal and like substances to the body and to apparatus or equipment employed for the intravenous injection or introduction into the blood stream of necessary substances and utilizing an infusion flask or holder and an additive container for supplementing the contents of the infusion flask, all of which substances and equipment must be kept sterile.

In the introduction of matter into the circulatory system of the human body fluids are allowed to flow by gravity from a container through a tube and a needle into a vein of the patient and substances are added to such fluids, all of which is more or less complicated because of the necessity for supporting the infusion flask and the container for the additive and making the necessary connection while maintaining the equipment and materials in sterile condition.

It is an object of the invention to simplify the process of injecting matter including an additive into the circulatory system of the human body by providing an additive container for matter to be supplied to an infusion flask or holder and a needle through which the additive can be introduced into the infusion flask as well as means for applying pressure for withdrawing fluid from the infusion flask for mixing with the additive and for returning the mixture into the infusion flask.

Another object of the invention is to provide an additive container having a transparency to allow the contents to be observed, a pump for producing either suction or compression, and a needle which can be inserted through a wall into an infusion flask with minimum effort.

A further object of the invention is to provide a relatively simple and inexpensive multiple compartment additive container for two substances normally kept separate but with mechanism by which they can be combined, mixed and then introduced into the infusion flask for injection into the veins of a patient.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the drawings, wherein:

FIG. 1 is a longitudinal section illustrating one application of the invention;

FIG. 2, a similar view illustrating its application to an infusion flask and fluid from the latter drawn into the additive container;

FIG. 3, a similar view of a modified form of additive container with multiple substances;

FIG. 4, a similar view with the parts in different positions and the substances combined;

FIG. 5, a similar section of the device applied to an infusion flask and the solution injected thereinto; and

FIG. 6, a modified form for use as a hypodermic syringe.

Briefly stated, the invention is an additive container for the supply of matter into an infusion flask from which the solution can flow by gravity through a tube and a needle into the circulatory system of a patient or recipient or for use with a hypodermic syringe to force the solution into such circulatory system, such additive con-

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tainer having a portion for the additive, a needle for piercing the infusion flask for the establishment of communication therewith, means for producing suction or pressure, the needle being provided with a cap so that when the cap is removed the needle can be inserted through the wall of the infusion flask and fluid within the infusion flask can be drawn into the additive container for mixing with the additive either in liquid or powdered form and thereafter the solution can be directly introduced into the infusion flask for injection into the circulatory system of the patient. The additive container may have two compartments for maintaining the contents separate until it is desired to administer the same, whereupon they can be mixed and injected either into an infusion flask or directly into a patient.

With continued reference to the drawings, a transparent flask or container is provided in the form of a bottle or vial 10 adapted to contain an additive 11 in either wet or dry form. The bottle or vial has an open end 12 providing access into said container and with an outwardly turned flange 13 substantially at right angles to the axis of the bottle. Against the outwardly turned flange 13 is disposed a rubber washer or gasket 14 against which is disposed the base flange 15 of a shaft guiding sleeve 16. The outwardly turned flange 13, the gasket 14 and the base flange 15 are fastened together by means of a clamping ring 17.

Received within the shaft guiding sleeve 16 is a shaft forming tube 18 with an annulus or outwardly extending disk forming a finger grip 19. One end of the shaft forming tube is sharpened to provide a needle point 20 over which a protective cover 21 is disposed while about the inner end of the shaft is mounted a piston 22 held in any desired manner. The piston contains multiple peripheral ribs or corrugations the diameter of which is such that they are slightly compressed and fitted within the bottle or vial 10. If desired the piston may have an internally threaded opening 23 which engages the external threads 24 on the shaft at the end portion thereof.

After placing the additive 11, such as lyophilized material or other material, in the vial the end of the tubular shaft with the piston or plunger thereon is inserted within the bottle or vial in close proximity to the material after which a clamping ring 17 is crimped about the outwardly turned flange of the bottle and the base flange 15 of the shaft guide with the gasket 14 therebetween securing the parts in assembled relation giving a rigid, permanent combination of the shaft guide and shaft assembly and all sealed against leakage with the shaft movable through the shaft guide.

In the use of the device the needle cover is removed and by grasping the finger grip 19 the sharp end 20 of the needle is inserted into an infusion flask 25 by forcing the needle point 20 through the rubber closure 26 of the infusion flask while the latter is inverted, thereby bringing the bore of the needle in communication with the fluid 27 in the flask. Then while holding the needle and flask with one hand the bottle or vial is grasped by the other hand and pulled to cause the piston within the bottle or vial to be moved axially toward the opposite end thereby drawing the fluid 27 by suction from the infusion flask into the bottle or flask where it comes in contact and mixes and forms a solution with the additive or lyophilized material. Thereafter the needle with the additive container attached is removed from the infusion flask and the bottle or vial is shaken to insure complete mixing, after which the needle attached to the additive bottle or vial is reinserted into the infusion flask and with the fingers about the flange on the tubular shaft and the thumb on the bottom of the bottle or vial the piston is moved toward the bottom of the bottle or vial to expel the contents through the tubular shaft and the needle into the

infusion flask. The needle attached to the bottle or vial may then be removed and discarded with the latter.

In FIGS. 3, 4 and 5 a modified form of additive container is disclosed in which multiple substances are maintained in separate compartments until the time of use when they are mixed and injected through a needle of similar type into an infusion flask or other container.

In the modified form of the device a bottle or vial 10 of glass or other transparent material or other type of container of uniform diameter throughout its length is adapted to contain an additive 11 and a liquid 11', such container having an outwardly extending flange 13 against which is placed a gasket 14 in contact with which is disposed a base 15 of a sleeve 16 forming a shaft guide. The flange 13 and the base 15 with the gasket 14 therebetween are fastened together by means of a clamping ring 17.

A tubular piston shaft 28 is received within the sleeve 16 of the shaft guide and is provided at its lower end with external threads 29 which engage an internally threaded opening 30 in a solid body forming a piston 31 having multiple ribs 32 which are compressed and engage the inner wall of the container 10. The unthreaded remote end of the piston shaft is provided with an annular flange or manipulating disk 34 by which the piston can be moved axially within the vial or container.

The threaded opening or cavity 30 in the piston extends axially substantially through the piston 31 leaving a thin easily perforated web or wall portion 33 adapted to be pierced by a tubular or hollow needle 35 having a sharpened point 36 at one end. The needle is provided with a shoulder 37 substantially midway of its length which engages the disk 34 and prevents the complete withdrawal from the piston shaft 28. The opposite end of the needle has a sharpened point 38 covered by a removable cap 39 for inserting the needle into an infusion flask 25 through the rubber closure 26. The needle also is provided with an enlarged portion forming a finger grip 40 intermediate the point 38 and the shoulder 37 for applying sufficient pressure to cause the needle to penetrate the web 33.

The additive 11 and the fluid 11' preferably are maintained in separate compartments within the vial until just prior to use and this is accomplished by providing the container with partitioning means in the form of a free piston 41 constituting partitioning means having spaced annular ribs 42 which are compressed to be inserted in the vial in compressed condition. The piston 41 is provided with a reduced portion having a central web 43 in axial alignment with the web 33 and the end of the piston and such web has one or more slits 44. The slits 44 are normally closed to prevent the intermingling of the fluid and the additive but when the piston 31 is moved axially within the vial pressure against the fluid 11' will force such fluid through the slits to the other side of the partitioning means for commingling with the additive 11.

In order to discharge the contents of the vial or container after the fluid 11' and additive 11 have been mixed the tubular needle 35 is depressed to pierce the thin wall 33 so that when the piston is moved further towards the end of the vial from the position shown in FIG. 4 the mixed contents of the container will be forced through the bore of the needle.

In operation the piston 31 is moved downwardly to cause the fluid 11' to pass through the slits 44 to mix with the additive 11 after agitation of which the needle 35 may be inserted through the closure 26 of an infusion flask 25 and the operating portions 40 and 34 brought together with the parts in telescoped relation as shown in FIG. 5 with the piston 41 substantially against the closed end of the vial or container whereupon the injection or introduction into the infusion flask will have been consummated.

If desired the needle 35 may be replaced by a hypo-

dermic needle 50 (FIG. 6) for use with a blood receiving bottle where blood is removed for testing purposes and as a hypodermic syringe for maintaining the fluid and the additive in separate compartments until immediately prior to the injection. A disk 51 is attached to the needle 50 by cement 52 or formed integrally therewith and such disk supports a gasket 53 and a yoke 54 having finger gripping portions 55. The disk 51, gasket 53 and yoke 54 are maintained in fixed relation by a crimp cap 56 having a sleeve 57 projecting from one end thereof and adapted to receive a cap 58.

In the operation of this modification the fluid 11' is forced through the slit in the free piston 41 in the same manner as previously described. After complete commingling is accomplished by agitation the hypodermic needle is injected and the vial forced toward the yoke 53 to discharge the contents of the vial through the needle 50.

It will be obvious to one skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the accompanying claims.

What is claimed is:

1. Apparatus for retaining substances separated prior to use comprising a substantially cylindrical container, a piston slidably mounted in said container, said piston having an imperforate diaphragm, a hollow shaft connected to said piston in axial alignment with said diaphragm and extending outwardly of said container, partitioning means having a split wall portion separating said container into multiple compartments, substances to be mixed located in each of said compartments, means for moving said piston to force the substance in one compartment through the split wall portion of said partitioning means into the next compartment, means for piercing said diaphragm, said piercing means being axially slidable in said hollow shaft to penetrate said diaphragm and extending outwardly of the free of said shaft whereby continued movement of said piston in the same direction will move said partitioning means and discharge said substances through said hollow shaft.

2. A disposable additive container comprising a transparent substantially cylindrical vial having an open end, a closure for said opening having shaft guiding means, a hollow shaft received within said shaft guiding means, a piston connected to one end of said shaft, a diaphragm carried by said piston closing the end of said shaft, partitioning means dividing said vial into multiple compartments for containing substances to be mixed, said partitioning means having a relatively thin split wall portion, a dry medicament received within one of said compartments and a liquid vehicle received within the other compartment, means for moving said piston in one direction to apply pressure to said liquid vehicle to force the vehicle from one compartment through said split wall portion into the other compartment to commingle the vehicle and the medicament, means for piercing said diaphragm, said piercing means being axially slidable in said hollow shaft to penetrate said diaphragm and extending outwardly of the free end of said shaft whereby when said piston is moved further in the same direction said partitioning means will be moved to discharge the medicament suspended in the vehicle through the hollow shaft.

3. A disposable additive container comprising a substantially cylindrical container, shaft guiding means in one end of said container, a hollow shaft slidably carried by said shaft guiding means, a first piston connected to the inner end of said shaft, said piston having a thin imperforate wall portion closing the end of said shaft, a second piston dividing said container into multiple compartments for containing substances to be mixed, said second piston having a relatively thin split wall portion, means for moving said shaft and said first piston in one direction to

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apply pressure to the substance in one compartment to force the substance through said split wall portion into the other compartment, means for piercing said imperforate wall portion of the first piston, said piercing means being axially slidable in said hollow shaft to penetrate said imperforate wall and extending outwardly of the free end of said shaft whereby when said first piston is moved further in the same direction said second piston will be moved to discharge the commingled substances through the split wall portion of the second piston and through the hollow shaft.

4. Apparatus for retaining substances separated until immediately prior to use comprising a substantially cylindrical container having shaft guiding means in one end, a hollow shaft slidably received within said shaft guiding means, a piston connected to the inner end of said shaft, said piston having a thin imperforate wall portion close to the end of said shaft, partitioning means having a relatively thin split wall portion dividing said container into multiple compartments, substances to be mixed located in each of said compartments, means for moving said piston in one direction for forcing the substance in one

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compartment through the split wall portion of the intermediate partitioning means into the next compartment, means for piercing the thin wall portion of said piston when the substances have been combined, said piercing means being axially slidable in said hollow shaft to penetrate said imperforate wall portion, said piercing means extending outwardly of the free end of said shaft whereby continued movement of said piston in the same direction will move said partitioning means and force said combined substances through the split wall portion of said partitioning means and through said hollow shaft.

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