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(54) **MULTIPLE DRUG INJECTION APPARATUS**

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(57) **ABSTRACT**

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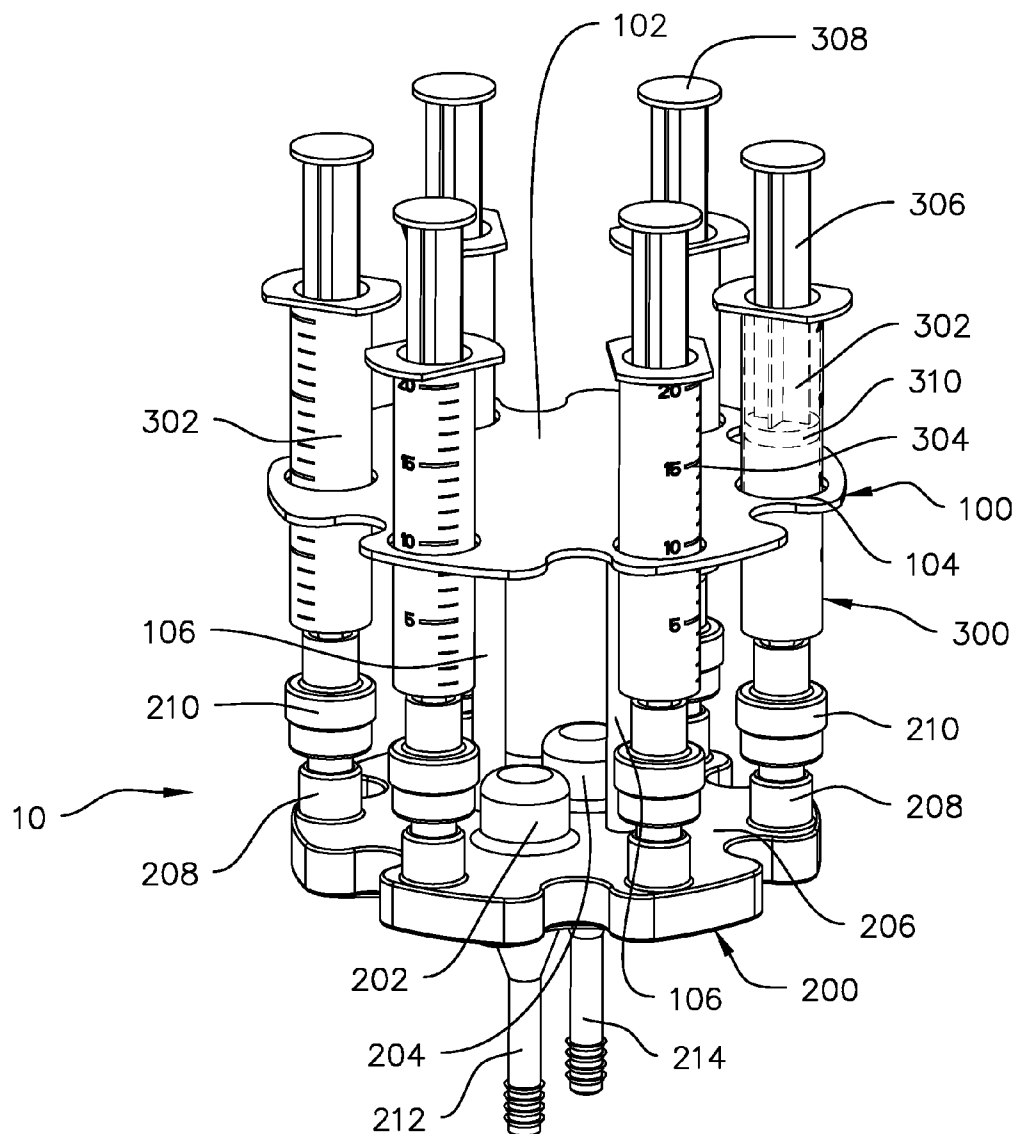
The present invention is a fluid dispensing device particularly suited to medicine but also having many other applications. The user manually and selectively dispenses any of one or more fluids, typically a drug, contained within the device. Generally, the device comprises a frame that holds multiple hypodermic syringes and channels the dispensed fluids through a manifold. A flushing solution, for example a saline solution, enters the manifold, flows past each of the points where the syringes input into the manifold and continues to flow out of the device to a patient where the flushing solution and dispensed fluid are delivered to a patient.

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Related U.S. Application Data

(63) Continuation-in-part of application No. 11/610,930, filed on Dec. 14, 2006.



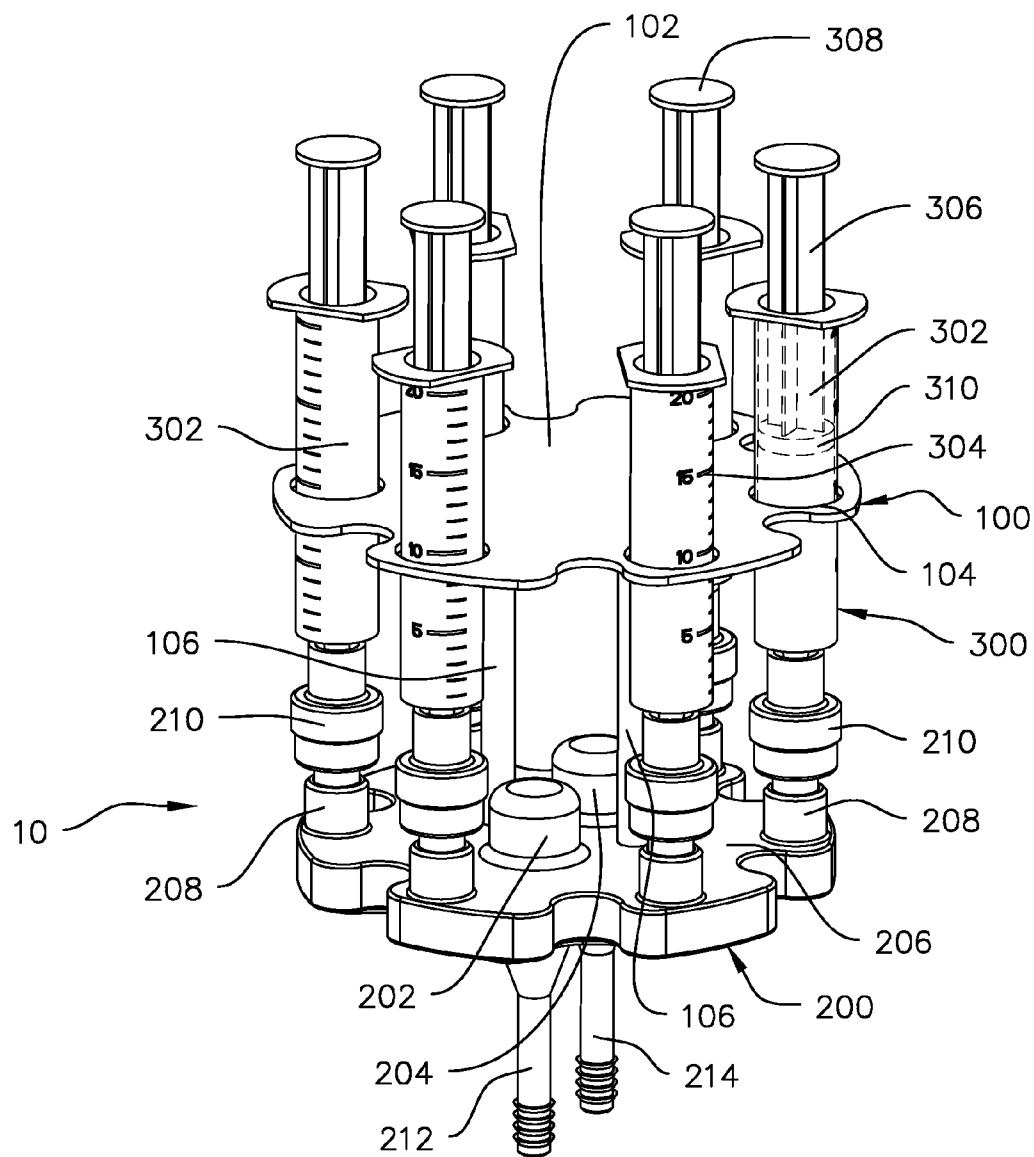


Fig. 1

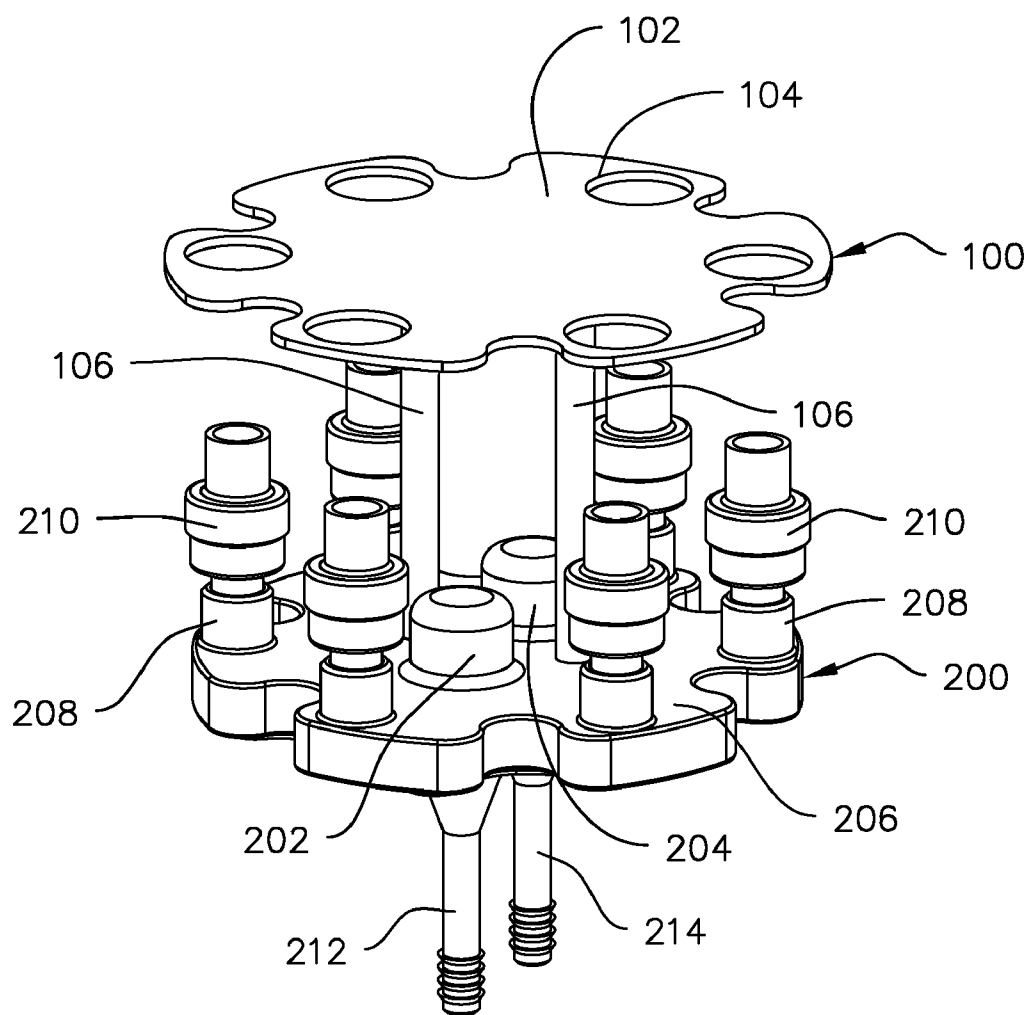


Fig. 2

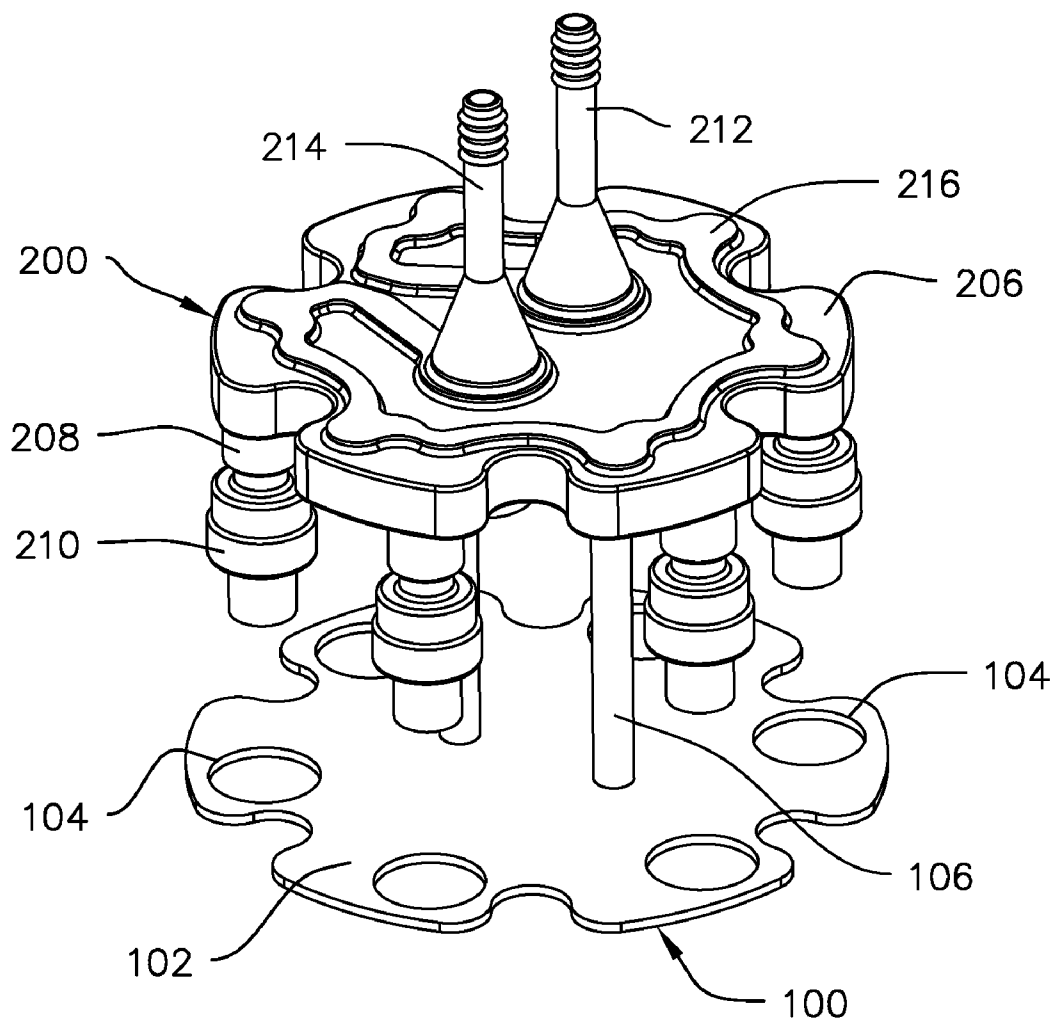


Fig. 3

MULTIPLE DRUG INJECTION APPARATUS

OTHER RELATED APPLICATIONS

[0001] The present application is a continuation-in-part pending of U.S. patent application Ser. No. 11/610,930, filed on Dec. 14, 2006, which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to fluid dispensers, and more particularly, to a fluid dispenser that in the preferred embodiment is suited to dispense drugs.

[0004] 2. Description of the Related Art

[0005] Several designs for fluid dispensers have been designed in the past. None of them, however, includes a means to selectively and simply dispense any of several fluids from a single device.

[0006] Applicant believes that the closest reference corresponds to U.S. patent application Ser. No. 11/156,575 by inventor Wesley Verkaart. However, it differs from the present invention because the Verkaart invention does not provide a means to precisely dispense liquids, does not provide a means to reduce mixing of the dispensed fluids, does not permit the user to select the dispensed fluids, does not permit the user to remove a single fluid vessel while the remaining vessels may stay in use, does not provide a simple hand operated dispensing mechanism, all of which are provided for in the present invention.

[0007] Other patents describing the closest subject matter provide for a number of more or less complicated features that fail to solve the problem in an efficient and economical way. None of these patents suggest the novel features of the present invention.

SUMMARY OF THE INVENTION

[0008] The instant invention is generally a fluid dispensing device comprising a frame assembly further comprising one or more posts connected to a plate. Said plate has multiple bores dimensioned to accept a vessel such as a syringe. Said posts connect said frame assembly to a manifold assembly. Said manifold assembly connects to a vessel assembly and channels a fluid contained inside the vessel assembly through the manifold assembly and out of the device through a common port.

[0009] In one embodiment of the invention the vessel assemblies are individually removable from the frame assembly and manifold assembly. In another embodiment the frame assembly, manifold assembly and vessel assembly are fused into a single unit.

[0010] Prior to dispensing a fluid the respective vessel is filled with a pre-selected fluid. When in use the frame assembly, manifold assembly and vessel assembly are connected into a single unit. The vessel assembly is emptied by the user pressing on a head, transferring force through a shaft onto a piston inside the vessel thereby forcing the contents of the vessel out of the vessel, through the manifold assembly and out of the device through a common port.

[0011] It is therefore one of the main objects of the present invention to provide a device that contains fluid that can be dispensed quickly.

[0012] It is another object of this invention to provide a device that can reduce human error in the dispensing of fluid.

[0013] It is an object of this invention to provide a compact and efficient fluid dispensing device.

[0014] It is an object of this invention to reduce waste and costs associated with storage and disposal of waste.

[0015] It is an object of this invention to provide a device that permits a reduced time to change between fluids dispensed.

[0016] It is an object of this invention to permit rapid reloading of fluid in a safe and efficient manner.

[0017] It is an object of this invention to have a device that can dispense various fluids common to a particular application of use.

[0018] It is still another object of the present invention to provide a device that can be used effectively and safely, in certain embodiments, for emergency medicine, combat medicine, first responders, anesthesiology, dentistry, veterinary medicine and many medical situations.

[0019] It is yet another object of this invention to provide such a device that is inexpensive to manufacture and maintain while retaining its effectiveness.

[0020] Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] With the above and other related objects in view, the invention consists in the details of construction and combination of parts as will be more fully understood from the following description, when read in conjunction with the accompanying drawings in which:

[0022] FIG. 1 represents a perspective view of an embodiment of the invention.

[0023] FIG. 2 shows a perspective view of an embodiment of the invention without the vessel assembly.

[0024] FIG. 3 illustrates a perspective view of the underside of an embodiment of the invention showing greater detail of the manifold assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0025] Referring now to the drawings, where the present invention is generally referred to with numeral 10, it can be observed in FIG. 1 that in this embodiment it basically includes a frame assembly 100, a manifold assembly 200 and a vessel assembly 300.

[0026] The frame assembly 100 comprises, inter alia, a plate 102, multiple bores 104 and one or more posts 106. In the preferred embodiment said posts 106 intersect at a substantially right angle and are rigidly affixed to the plate 102. Said plate 102 has a series of bores 104 that are dimensioned to permit a vessel assembly 300 to pass through easily but small enough to prevent the vessel assembly 300 from excessive lateral movement inside the bore 104.

[0027] The vessel assembly 300 comprises, inter alia, a vessel 302, a head 308, a shaft 306 and piston 310. In the preferred embodiment the vessel 302 is a common hypodermic syringe with graduations 304 to indicate the volume of fluid contained inside the vessel 302. In one method of use the vessel assemblies 300 are provided to the user pre-filled and/or pre-installed into the frame assembly 100 and manifold assembly 300. In an alternate method of use the user fills the

vessel **302** (typically a syringe) with the selected fluid and connects the vessel assembly **300** to the frame assembly **100** and manifold assembly **200**.

[0028] When the vessel assembly **300** is full and attached to the frame assembly **100** and manifold assembly **200** the fluid contained inside the vessel **302** may be dispensed by the user by pressing on the head **308** which transfers force to the piston **310** through the shaft **306**. The piston **310** then exerts the force onto the fluid contained inside the vessel **302** and the fluid is expelled from the vessel **302** into the manifold assembly **200**.

[0029] The manifold assembly **200** comprises, inter alia, a chamber **202**, a chamber **204**, a frame **206**, receivers **208**, valves **210**, a port **212**, a port **214** and a channel **216**. The manifold assembly **200** is rigidly affixed to, or optionally removable from, the frame assembly **100** at the terminus of the posts **106** opposite the plate **102**. Said channel **216** has a terminus at port **212** and is open at each of the receivers **208** to accept fluid dispensed from the vessel **302** and with the opposite terminus at port **214**.

[0030] In the preferred embodiment each of the vessel assemblies **300** is connected to a valve **210**. Said valve **210** is preferably a one way valve to prevent backflow from the manifold assembly **200** into the respective vessel assembly **300**. When dispensing a fluid from a vessel assembly **300** the fluid is expelled from the vessel **302** through the valve **210**, through the receiver **208** and into the channel **216**. A carrier solution, for example a saline drip, enters port **212**, passes through chamber **202** and flows through the channel **216** past each receiver **208** where the fluid being dispensed meets the carrier solution and both fluids exit the invention through chamber **204** and port **214** to the patient. In typical use the carrier solution is gravity fed through a tube (not shown) connected to port **212**. Another tube (not shown) is connected to the port **214** that delivers the carrier solution and dispensed fluid to the patient.

[0031] Chamber **202** and chamber **204** are optional and if present provide a feature to trap any gas mixed into the fluid being dispensed to aid in avoiding an embolus being delivered to the patient. While the invention is being prepared for use the chambers **202** and **204** can be cleared of any unwanted gas bubbles by inverting the invention so that the volume inside the chambers **202** and **204** is below the level of the channel **216** thereby permitting any gas bubbles to float to the surface and exit port **214** and be discharged from the device and discarded before entering a patient.

[0032] The vessel assembly **300** may be connected to the valve **210** by threads, a snap together connector, or may be permanently affixed or by any other means that provide for a substantially leak-free seal between the vessel assembly **300** and the manifold assembly **200**. The valve **210** may be connected to the receiver **208** by threads, a snap together connector, or may be permanently affixed or by any other means that provide for a substantially leak-free seal between the valve **210** and the receiver **208**.

[0033] In the preferred embodiment of the invention the receiver **208** is formed integrally with the frame **206** but may also be connected to the frame **206** by threads, a snap together connector, or may be permanently affixed or by any other means that provide for a substantially leak-free seal between the frame **206** and the receiver **208**.

[0034] The preferred method of using the device comprises filling the multiple vessels **302** with various drugs (or other fluids as the application of the device may merit) or obtaining

pre-filled vessels **302**. The fluids contained in the vessels **302** may vary to prepare the user for a particular application such as for example anesthesiology course, a set of medications suited to combat medicine or emergency trauma or any other series of fluids that the user may desire handy for a particular application of the device. The vessel assembly **300** is then fit through a bore **104** in the plate **102** and secured to the manifold assembly **200** so as to avoid any leakage of fluid. A flushing solution is fed into port **212** and passes through the channel **216** and out of the device through port **214**. The user may optionally invert the device while the flushing solution is flowing but before attaching to the patient to evacuate any unwanted bubbles from the manifold assembly **200**. The port **214** is then connected to the patient by tubing to carry the fluid to the patient. The user can then dispense the drug from the vessel assembly **300** by forcing the piston **310** into the vessel **302** thereby dispensing the drug into the manifold assembly **200** where the flushing fluid carries the drug through the channel **216** in the manifold assembly **200** out of the device through port **214** and onto the patient.

[0035] The foregoing description conveys the best understanding of the objectives and advantages of the present invention. Different embodiments may be made of the inventive concept of this invention. It is to be understood that all matter disclosed herein is to be interpreted merely as illustrative, and not in a limiting sense.

What is claimed is:

1. A fluid dispensing device comprising:

- a) a frame assembly comprising a plate with bores around the periphery of the plate where said bores are dimensioned to securely accept a vessel;
- b) a vessel assembly comprising a vessel sealed on one end by a movable piston and the opposite end connected to a manifold assembly;
- c) a manifold assembly comprising a receiver that accepts a vessel and a channel that channels the dispensed fluid from each of said vessels through a port out of the device.

2. A fluid dispensing device set forth in claim 1 further characterized in that vessel is removably connected to said manifold assembly.

3. A fluid dispensing device set forth in claim 1 further characterized in that a one-way valve is inserted between the vessel assembly and the manifold assembly preventing back-flow of fluid from the manifold assembly into the vessel assembly.

4. A fluid dispensing device set forth in claim 1 further characterized in that the force to dispense the fluid contained in the vessel is supplied by a human hand depressing a head connected to a shaft connected to said piston.

5. A fluid dispensing device set forth in claim 1 further characterized in that said manifold assembly has a port for an external fluid source to enter said manifold and flush through said channel and exit through a second port.

6. A fluid dispensing device set forth in claim 1 further characterized in that there is a chamber between the vessel and the common port out of the device that acts as a bubble trap.

7. A method of using the fluid dispensing device as set forth in claim 1 further characterized in that the fluids dispensed are drugs pre-selected for a specific medical procedure.

8. A method of using the fluid dispensing device as in claim **1** where the fluids dispensed are lubricants, food products, gasses, liquids, chemical reagents, tints, colorants, stains, paints or gels.

9. A fluid dispensing device comprising:

- a) a frame assembly comprising a bore to hold a vessel and a post to connect the frame assembly to a manifold assembly;
- b) a vessel assembly comprising a vessel containing a fluid to be dispensed and a means to depress a piston into the vessel thereby dispensing the fluid contained inside the vessel;
- c) a manifold assembly that channels the fluids to be dispensed from said vessel through a port out of the device.

10. A fluid dispensing device set forth in claim **9** further characterized in that said manifold assembly has a port for an external fluid source enter the manifold assembly and flush fluids dispensed into the manifold assembly through a second port out of the device.

11. A fluid dispensing device set forth in claim **9** further characterized in that one way valves are between each of said vessels and said manifold assembly thereby preventing flow from the manifold assembly into the vessel.

12. A fluid dispensing device set forth in claim **9** further characterized in that said manifold assembly includes a chamber that acts as a bubble trap.

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