a diameter smaller than the diameter of the end needle ball or plug **103** to be sealed thereby when the end needle ball or plug **103** is seated but larger in diameter than the hollow needle **83** to permit overflow liquid to flow upwardly and out to the overflow outlet **29** into the overflow tube **28** (FIG. **2**). The spring **93** creates bias between sealing plate **109** and socket **97** to force the socket over the cap and to force the ball **103** into insert **104** and seal this socket. The reservoir **115** is defined by the walls of the insert **104**, ball **103** and "O" ring **111**. It is vented by drain **29**.

The socket **97** is sealed by the ball **103** to permit purging of hoses without liquid flowing into the containers and to close the socket **97** against leakage while it is being withdrawn from or inserted onto the cap of a container or while it is between containers. The reservoir **115** is blocked by sealed plates **106** and **109** compressing on "O" ring **111** to avoid flow of liquid upwardly during a purge operation, or when liquid is overflowing the container. The posts defining the upper portion of the cage **87** extend upwardly beyond the shoulder **118** to permit compression of the spring **93** between the shoulder **118** and the plate **106** as the needle **83** moves downwardly. They are loosely mounted in holes such as **117** to permit movement laterally of the cage **87** for alignment of the socket **97** with the cap of the container. The socket moves laterally within a range of 0.002 inch and ⅛ inch of true position.

In FIG. **10**, there is shown an elevational view of the hollow needle **83** having the nipple **116** on one end to receive a hose through which sample liquid is pumped, the support boss **117** through which it passes near the upper end for fastening to the moveable shoulder **118** (FIG. **9**), an elongated hollow stem with openings **114** radially extending through its walls near the end and the plug or ball **103** at the very tip.

As shown in this view, the hollow needle **83** may be connected by a flexible hose or other member to a source of sample and moved downwardly and upwardly. The small holes **114** enable liquid to be gently ejected outwardly in a radial direction while the needle moves longitudinally. The end ball **103** serves as a plug to close the socket **97** so that liquid does not flow outwardly from the reservior **115** on top of the container or distributor (FIG. **2**) while the needle is being pulled upwardly such as between containers.

With this arrangement, the overflowing water when the hollow needle **83** is at the bottom, purges the container and the sides of the valve. While the hollow needle **83** is being withdrawn, the pattern of liquid, moving laterally outwardly and causing further overflow as the hollow needle **83** moves up, strips any bubbles that remain around the hollow needle **83** and the container while preserving the integrity of the liquid.

The container is only open while it is being filled and only slightly open at that point in time. The opening is actually closed by liquid flowing outwardly so that there can be no contamination and the gentle filling action avoids agitation that might cause the escape of a large amount of volatile material in the liquid. The water movement is adequate to force the bubbles of air free from surfaces by overcoming the adhesion forces but not so vigorous as to free volatile material in the sample. The containers are closed and transported in the container rack. The entire rack can be shipped. It is easily removed from the distributor.

In FIG. **11**, there is shown a longitudinal sectional view of a bladder pump **16** having an air inlet port **150**, a water inlet port **158** and a water outlet port **152**. The air inlet port **150** is connected to the compressor **17** (FIG. **1**) to receive

pressure and vacuum alternately. The water inlet port **158** is closed by a spring biased valve element as part of a check valve **162** to permit the entry of liquid and prevent the exit of liquid or air, and the water outlet port **152** is closed by a check valve **164** to prevent water from flowing in but permitting it to flow out. The spring biased check valves permit the pump to be horizontal, vertical or any position between horizontal and vertical and still function.

A steel wall **156** circumscribes the pump with a coaxial bladder **160** being mounted inside of it and an apertured cage tube **154** being mounted along the longitudinal axis of the pump within the bladder **160**. The wall **156**, the bladder **160** and the cage **154** are all cylindrical tubes coaxial with each other to form a first cylindrical tubular passageway between the wall **156** and bladder **160** to receive air under positive pressure or suction air from the air inlet port **150**, a second tubular cylindrical passageway between the inner cage tube **154** and a bladder **160** for water communicating with the water inlet port **158** and a third solid cylindrical passageway for water communicating with the water inlet port **158** and water outlet port **152**.

In operation, vacuum or negative pressure is applied to the air inlet port **150** by the compressor **17** (FIG. **1**) while the water inlet port **158** of the bladder pump is submerged. Water is pulled into the water inlet port **158** through a filter **157** and inlet port **158** past the check valve **162** as the bladder **160** is pulled toward the wall **156** by the vacuum pressure. Next, pressure is applied to the air inlet port **150** causing the bladder **160** to be pushed inwardly toward the cage **154**, forcing water through the check valve **164**, out of the water outlet port **152** and closing the check valve **162**. These cycles are repeated.

With this arrangement, liquid can be pumped without substantial submergence of the pump so that it operates under low or substantially no head such as in very shallow water. Moreover, it can push a column of water from a depth deeper than 26 feet, such as for example as low as 250 feet or lower. The combination of exhaust and positive pressure increases the pressure head through which the liquid can be pumped and permits pumping at a faster rate, and reduces the time of pumping. The pumping rate is increased because liquid is pulled in faster. Moreover, the life of the bladder is increased because there are normally no tension forces on the bladder to stretch it since it is moved by pressure differentials rather than by stretching and releasing it. It should be no more than ten feet in length, and in the preferred embodiment, is two feet in length.

In FIG. **12**, there is shown a block diagram **120** of a program for operating the sampler comprising the general section **122** representing the off state, the sequence **124** representing the stand-by state and the sequence **126** representing the run state. During the off state, the decision program step **128** checks the on/off key and recirculates the off sequence if the key is off. If it is on, it sequences to the standby state **124**.

In the stand-by state **124**, if the decision step **130** on the on/off key indicates off, the program recirculates back to step **128**. If the off key is not on, the program sequences to step **132** and tests it. If the program key is not on, the program sequences to step **138** for the set up key and if that is not on, it sequences to step **140** for the run key. If the run key is on, the program sequences to step **142** which is the sampling step in the run sequence **126**. If the step of testing the program key **132** is positive, then the program sequences to step **134** of doing a program sequence. After that, it tests for the set up key step **138**. If that decision is positive then