CLAIMS

[1] A liquid delivery method for delivering a liquid by reciprocally moving a plunger in a cylinder while a selector valve is shifted in a valve chamber to change over a first position at which the cylinder and ~~communication of the cylinder and the valve chamber with~~ a channel leading to a liquid tank are communicated via ~~and communication of the cylinder and~~ the valve chamber and a second position at which the cylinder and ~~with~~ a channel leading to a delivery port are communicated via the valve chamber~~from one to the other~~, the method comprising the steps of:

~~arranging an opening/closing valve in a channel for communicating the liquid tank and the valve chamber with each other,~~

shifting the selector valve to the first ~~a~~ position ~~to establish the communication of the cylinder and the valve chamber with the channel leading to the liquid tank~~ and opening ~~the~~ an opening/closing valve disposed ~~when a liquid is filled~~ in the ~~cylinder~~ channel leading to a liquid tank when the plunger is retracted, and

shifting the selector valve to the second position ~~a position to establish the communication of the cylinder and the valve chamber with the channel leading to the delivery port~~ and closing the opening/closing valve when the ~~liquid is delivered through the delivery port~~plunger is advanced.

[2] The liquid delivery method according to Claim 1, wherein the opening/closing valve is automatically opened and closed by employing a check valve disposed in such orientation that the liquid is allowed to flow from the liquid tank to the valve chamber, but the liquid flow from the valve chamber to the liquid tank is blocked.

[3] The liquid delivery method according to Claim 1 or 2, wherein the selector valve is moved while sliding along an inner wall surface of the valve chamber without coming into tight contact with the inner wall surface of the valve chamber or without causing excessive friction.

[4] The liquid delivery method according to Claim 1, 2 or 3, wherein the selector valve is moved by rotating, in the valve chamber, a selector valve having a first opening formed to position on an axis of valve rotation and a second opening communicated with the first opening.

[5] The liquid delivery method according to any one of Claims 1 to 4, wherein the cylinder is arranged with a fore end of the plunger directed upward.

[6] A liquid delivery apparatus comprising a cylinder in which a plunger is inserted, a liquid delivery port, ~~a liquid tank, a first port communicating with the cylinder, a second port communicating with the liquid tank,~~ a valve chamber in which ~~having a third port communicating with the delivery port and including~~ a selector valve is disposed ~~therein~~, a liquid tank, and an opening/closing valve disposed between ~~in a channel for communicating~~ the valve chamber and the liquid tank ~~with each other~~,

wherein the ~~selector~~ valve chamber has a first port ~~is shifted to a position to establish the communication of~~ communicating with the cylinder, a second port capable of selectively communicating with ~~and the valve chamber with a channel leading to the liquid tank and~~ the opening/closing valve, and a third port capable of selectively communicating with the ~~is opened when a~~ liquid ~~is filled in the cylinder~~delivery port, and

the selector valve is ~~shifted~~ moved in ~~to a position to establish the communication of the cylinder and the~~ valve chamber to selectively communicate the first port with the second port or the third port.~~with a channel leading to the delivery port and the opening/close valve is closed when the liquid is delivered through the delivery port.~~

[7] The liquid delivery apparatus according to Claim 6, wherein the opening/closing valve is a check valve disposed in such an orientation that the liquid is allowed to flow from the liquid tank to the second port, but the liquid flow from the second port to the liquid tank is blocked.

[8] The liquid delivery apparatus according to Claim 6 or 7, wherein