The specimen thus determined in the sampling valve **10** is discharged at low speed up to the exit of the sampling valve **10**, and is discharged at usual speed thereafter.

EMBODIMENT 2

FIG. **6** and FIG. **7** are schematic diagrams of the apparatus of this embodiment. The reagent discharge means is a pump C'2 possessing a working chamber **38** separated into an air chamber **40** and a liquid chamber **42** by means of a thin film **36** such as a diaphragm. The construction comprises a three-way changeover valve V3 connected to the air chamber **40**, a positive pressure supply line L1 connected to the three-way changeover valve V3, a negative pressure supply line L2 connected to the three-way changeover valve V3, a small volume part T1 and a valve V4 disposed in the positive pressure supply line L1. The liquid chamber **42** is connected to the valve V2.

In this way, the working chamber **38** is separated into the air chamber **40** and liquid chamber **42** by the thin film **36**, and positive pressure and negative pressure are supplied into the air chamber **40** by changing over through the three-way changeover valve V3. By supplying positive pressure or negative pressure to the air chamber **40**, the thin film **36** is deformed, and the volume of the liquid chamber **42** varies, so that a specific volume of liquid may be sucked in or discharged.

Besides, the small volume part T1 is installed between the three-way changeover valve V3 of the positive pressure supply line L1 and the valve V4, and by opening the valve V4, the small volume part T1 is brought into communication with the positive pressure source, and by closing the valve V4, the small volume part T1 is isolated from the positive pressure source.

The volume of the small volume part T1 may only be enough to operate the thin film, and a small volume tank or an enlarged part may be used; or a connection tube or a connection pipe only may be used.

FIG. **8** to FIG. **10** relate to an example of the pump C'2. Numeral **56** is a passage communicating with the liquid chamber **42**, and **58** is a passage communicating with the air chamber **40**. When an operating force is not applied in the passage **58**, the thin film **36** is not deformed as shown in FIG. **8**, and the reagent does not come in or go out from the passage **56**. When a negative pressure is applied in the passage **58**, that is, when the air in the air chamber **40** is purged out, the thin film **36** is deformed to the right side as shown in FIG. **9**, and the reagent flows into the liquid chamber **42**. When a positive pressure is applied in the passage **58**, that is, when air is sent into the air chamber **40**, the thin film **36** is deformed to the left side as shown in FIG. **10**, and the reagent is discharged from the passage **56**.

Referring next to FIG. **11**, the operating state of the valves V2, V3, V4 and the suction and discharge state of the pump C'2 are explained.

Usually, the three-way changeover valve V3 is connected so that the driving pressure of the pump C'2 may be a negative pressure. At this time, the valve V2 is changed over so that the reagent may be drawn into the liquid chamber **42** of the pump C'2 from the reagent vessel **26**. In this case, the valve V4 is open, and the small volume part T1 is in a positive pressure state.

Before the discharge action, the valve V4 is closed so that the positive pressure may not be directly applied to the pump C'2, and the valves V2, V3 are changed over, so that the valve V2 may communicate with the sampling valve **10**, and so that the air chamber **40** and the small volume part T1 may communicate with each other through the valve V3, thereby entering into the initial discharge action. After the initial discharge action, the valve V4 is opened, and the usual discharge is done by consuming all the liquid remaining in the pump C'2.

The other construction and function of this embodiment are the same as in Embodiment 1.

Being thus constructed, the invention brings about the following effects.

(1) The specimen flows slowly in the narrow passage, and at a usual speed in wide passages. Accordingly, without damaging the specimen, the specimen and reagent may be mixed in a short time, and the processing capacity of the apparatus will not be lowered.

(2) In the apparatus, only one reagent discharge means is needed, and the cost may be reduced accordingly. Meanwhile, in order to keep the total discharge volume S, constant both discharge volumes S1, S2 of the discharge means C2, C3 must be uniform. Since there is only one discharge means, the total discharge is uniform. It may be considered that the ratio of the slow discharge and usual discharge may fluctuate somewhat, but it does not matter practically. Thus, the total discharge volume may be easily controlled uniformly.

Having described preferred embodiments of the invention with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

What is claimed is:

1. A method for diluting and mixing a liquid specimen for preparing a mixed solution of the liquid specimen and a reagent at a specific ratio, using a sampling valve, the method comprising the steps of:

shifting the sampling valve to a suction mode and aspirating a specific volume of liquid specimen into the sampling valve;

shifting the sampling valve to a delivery mode; and

discharging the liquid specimen from the sampling valve by an initial pulse of a predetermined reagent volume until the liquid specimen is out of the sampling valve and thereafter by a further pulse, wherein the flow rate associated with the further pulse is greater than the flow rate associated with the initial pulse.

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