Communications

Simple Manual Pipette for Toxic Reagents

Because of the many varied chemical reagent solutions in use in our laboratory for biochemical analyses, the need arose for a safe method of pipetting toxic solutions to avoid getting any dangerous or toxic solutions in the operator's mouth, either by carelessness, by fumes, by overpipetting, or by air traps.

A simple automatic pipette was therefore devised and constructed to handle small volumes of toxic reagents (*1*). It has been used in this laboratory to pipette silver nitrate reagent, sodium hydroxide solutions, concentrated ammoniacal solutions, sodium cyanide reagent, sulfuric, nitric, and trichloracetic acid solutions, phenol reagent, and molybdate-sulfuric acid reagent.

The component parts are a standard bottle with a standard taper mouth, a standard taper ground joint, and a standard pipette, of Pyrex glass, with the ring seal and the side-arm tube fabricated by hand (*2*). The complete assembly is interchangeable so that a 1-liter bottle pipette can be cleaned and used in another 1-liter bottle. We have used both 5- and 10-ml pipettes and 500- and 1000-ml bottles for various reagent solutions, and they have exhibited excellent strength in usage.

The automatic pipette reagent bottle (Fig. 1) consists of a 1000-ml Pyrex reagent bottle *A* with S.T. opening fitted with a 29/42 S.T. Pyrex ground joint *D*. The ring seal *C* is made by sealing a 5- or 10-ml red-line Pyrex measuring pipette *B* to the S.T. ground joint well above the top graduation of the pipette so that the accuracy of the pipette is not altered. The rubber pressure bulb *G* is fitted to an 8-mm tube that is sealed to the ground joint *H*. The thumb safety air-pressure release *F* is a small 8-mm opening, slightly flared and fire-polished. The S.T. joint fitting *E* for the bottle is lubricated with silicone stopcock grease (*3*) to facilitate both ease of removal of the entire assembly and a clear view of the graduations when making measurements. A small washer *J* of tygon tubing is fitted below the top of the pipette, and when not in use, a Pyrex Wasserman tube *K*, cut in half and packed with glass wool in the sealed end, acts as a closure for the mouth of the pipette to minimize contamination or evaporation of the reagent or solution in the bottle. In use, manual pressure is exerted on the rubber bulb, with the thumb sealing the safety opening *F*, forcing the solution in the bottle up into the pipette. When the solution is above the zero mark but below the mouth of the pipette, the safety opening is released, allowing equalization of air pressure, and the forefinger is immediately applied to the opening of the pipette. The pipette assembly is then removed from the bottle and the excess solution allowed to run back to the zero mark. The solution in the pipette, with the forefinger as control, is then dispensed as usual in any amount up to 10 ml.

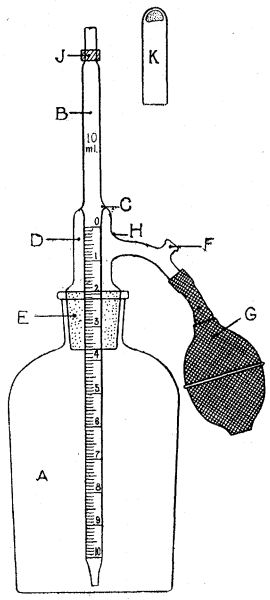

Fig. 1. Pipette for toxic reagents.

The actual filling and zero adjustment of a 10-ml sample of solution in this apparatus takes less than 15 sec and it has proved satisfactory to the personnel who have been using it. More than six of these assemblies have been in constant daily use for a 4-mo period without breakage or freezing of the closure.

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Notes

1. This pipette has been found useful during technical procedures carried out in The Johns Hopkins Hospital on a project supported by a contract between the U.S. Atomic Energy Commission and The Johns Hopkins University with Dr. John Eager Howard as Research Contract Director.
2. Made to specifications by T. Elmo Maiolatesi, Baltimore, Md.
3. Dow-Corning Silicone Stopcock Grease, which has proved impervious to most of the reagents we have used with the pipette assembly.

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Constant Current or Constant Voltage?

It is sometimes stated that for paper electrophoresis one needs *constant current* not *constant voltage*. The very active development of paper electrophoresis now going on makes it desirable to consider the basis of this statement. The following analysis shows that it is sometimes true and sometimes not.

The *desideratum* in electrophoresis is a known, constant, and reproducible electric field for which the field strength *E* can be measured in volts per centimeter.