Safe, Convenient Pipetting Station

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A simple convenient pipetting station is described that eliminates the need for mouth pipetting. Necessary components, fabrication procedures, and operating techniques are given.

Pipetting by mouth should be discouraged in the laboratory. When working with corrosive or toxic chemicals or infectious disease agents, mouth pipetting is a hazardous procedure. Although mouth pipetting nonhazardous material does not pose a hazard, it becomes so automatic that one often forgets and pipettes hazardous material by mouth. It is a good policy to abstain from putting anything in your mouth while working in a laboratory whether it be cigarettes, food, beverages, or a pipette.

The major hazards of pipetting by mouth are: (i) accidental aspiration of fluid being pipetted, (ii) aspiration of vapors from the fluid being pipetted, (iii) aspiration of aerosols from the fluid when pipetting with unplugged pipette, and (iv) contamination of the proximal end of the pipette by the users contaminated finger, resulting in oral contamination. The hazards are covered in detail by Wedum (3) and Phillips and Bailey (2).

Most commercially available pipetting devices (1) must be attached to the pipette. This makes the pipette more cumbersome and difficult to use. Many pipetting devices will also fit only one size pipette requiring a unit for each size pipette. The unit described in this note (Fig. 1) is a pipetting station that does not attach to the pipette. It will accommodate all sizes of pipettes from the small disposable 1-ml pipette to the large volumetric pipette. The only change necessary when changing pipette sizes is the level of vacuum.

Fabrication procedure. The pipetting station base was cut from a piece of brass plate 1 inch (2.54 cm) thick (Fig. 2, no. 4). A hole (0.837 inch in diameter [ca. 2.13 cm] by 0.75 inch deep [ca. 1.9 cm]) was machined in the center of the base. The stand pipe (Fig. 2, no. 3) was threaded on one end, 14 threads per inch. The pipe die was adjusted to cut the threads deeper than normal to accommodate the coarser threads of the coupling. The other end of the stand pipe was press fitted into the base. A 11/32 inch in diameter (ca. 0.88 cm) hole was drilled from the side of the base to converge with the standpipe (Fig. 2). One-eighth inch (ca. 0.311 cm) NPT threads were tapped in this hole to accommodate the needle valve.

The pipetter head (Fig. 2, no. 8), 7/8 inch (ca. 2.219 cm) in diameter and 5/16 inch (ca. 0.8 cm) thick, was machined from brass plate. The head was machined to securely hold a size B vaccine bottle stopper (Fig. 2, no. 10). A hole was drilled in the side of the pipetter head to accommodate the tip of the flexible spout. The pipetter head was then silver soldered to the flexible spout tip. A hole (1/32 inch [ca. 0.08 cm] in diameter) was drilled through the center of a size B vaccine bottle stopper (Fig. 2, no. 9) with a small hand grinder that had a carborundum bit.

The stopper was inserted into the head, the spout was connected to the standpipe, and the

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Flexible spout 13", straight tip
2. Coupling
3. 1/2" brass pipe
4. 1" x 4" brass base
5. Brass needle valve
6. 1/8" brass hose nipple
7. Fiberglass filter
8. Pipetter head
9. Vaccine bottle stopper, size B
10. Cross section pipetter head

FIG. 2. Construction drawing of pipetting station and parts list. The brass base, brass standpipe, and pipetter head were made in a machine shop. The filter was made from the bulb section of a 5-ml volumetric pipette filled with FM004 filter media (Owens-Corning Fiberglas Corp.). The other parts were obtained as follows: (i) straight tip flexible spout (No. 328) (13 inches [ca. 33.02 cm] long), Eagle Mfg. Co.; (ii) coupling (HA-24), Eagle Mfg. Co.; (iii) gasket (HA-10), Eagle Mfg. Co.; (iv) brass needle valve (M-312M2B) (1/8-inch NPT-M inlet and outlet), Matheson Gas Products; (v) brass hose nipple (1/8-inch NPT-F), McMaster-Carr Supply Co.

valve, hose nipple, and filter were attached to the base. A small diameter hose connected the filter to a low vacuum source (Fig. 1).

Use of pipetting station. The pipetting station is very easy to use (Fig. 1). One simply holds the pipette as usual, between the thumb and second finger. The proximal end of the pipette is placed into the concave opening of the vaccine bottle stopper and, at the same time, the index finger is pressed down upon the top of the pipetter head. When the fluid reaches the desired level in the pipette, pressure on the pipetter head is released. At the same time the pipette is withdrawn and the index finger is placed over the end as is done when pipetting by mouth. From this point on pipetting is the same as when pipetting by mouth.

With a little practice pipetting can be done as fast with this pipetting station as by mouth, or even faster. If the pipetting station becomes contaminated with pipetting liquids, it can be disconnected from the vacuum source and sterilized in an autoclave.

LITERATURE CITED
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