A Hot-Air Apparatus Dryer for General Laboratory Use[1]

J. F. CORWIN

Antioch College, Yellow Springs, Ohio

A survey of the literature shows that a number of workers have felt the need of a good, quick method of drying glass apparatus (*1*). However, all of these dryers either have been designed for a special purpose or require some unusual techniques for building them. The design of an air dryer for general laboratory use should take into account the following requirements:

(1) It should be constructed of easily available, commercial materials of standard design, so that construction and replacement of parts is not a burden.

(2) It should fit well into the common arrangement of laboratory utilities.

(3) It should be equipped with sufficient protective devices so that the usual errors in use will not result in breakdown of the equipment.

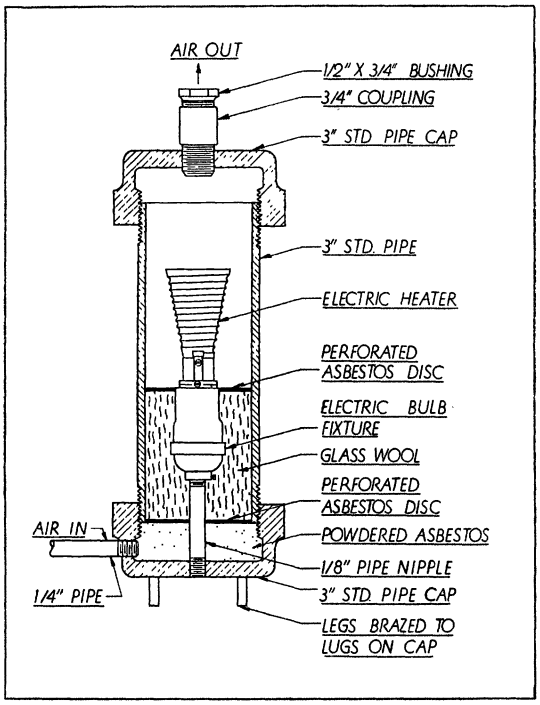

FIG. 1

The design of the equipment reported here, which has been in use in all of the student laboratories at Antioch College for the past three years, fulfills these requirements.

The air heater (Fig. 1) has an over-all height of 24 inches and should be placed at the end of a laboratory table where it can be connected directly to the utility lines that generally run through uprights, down the middle or at the back of the table. The compressed-air line is connected to the heater through a steam valve which offers easy regulation of the pressure. The electrical connection should be made with asbestos-covered wire, and the electric fixture should be porcelain to prevent a short circuit if the heater is accidentally left on without air flowing through it. The connection to the electrical utility source should be made through a standard switch box containing a safety light to show when the heater is on. The asbestos and glass-wool packing may be omitted if the air line is free from oil. When the threaded caps are not tightened to the pipe which forms the body of the heater, they are easily removed for replacement of the heating coil or packing. The unit is painted with aluminum paint or heat-resistant lacquer to prevent rusting in the usual laboratory atmosphere.

The apparatus to be dried is inverted and hung on a tubular, glass or metal support which is inserted into the coupling at the top of the heater. Although glass supports are subject to breakage, they may be made with little trouble to fit special types of drying problems and are not a source of contamination when kept clean. Metal supports may be used when special types of contamination are not objectionable. The supports are fitted to the heater by expanding the tubing over a narrow area so that it just slips inside the coupling at the top with the expanded portion resting on the nipple and a short unexpanded length extending through the nipple into the heater. The bushing is then dropped over the support and tightened until it rests firmly on the expanded portion. When glass is used, the expanded portion should be protected from the raw metal surfaces by asbestos cord.

Fig. 2 shows two designs of tubular, pyrex glass supports that have been used with success. Design A, made from 10-mm. standard-wall glass, was used for larger apparatus, where

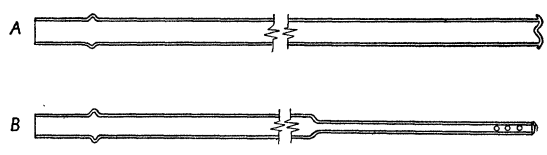

FIG. 2

considerable volume of air is needed. The bushing must be placed on the tubing before the upper end is flared. Design B, made of 5-mm. glass sealed to a 10-mm. section, allows smaller apparatus for micro and semimicro work to be dried. The sealed-off upper end kept the light pieces from being blown off the support, while the small holes in the sides furnished sufficient hot air. The length of the support may be varied at will; those used were approximately 12 inches long.

The cost of this type of drying equipment is small, and it can be installed by a plumber and an electrician. Its use by students clears drying ovens, facilitates laboratory work, and allows apparatus to be returned, dry, to the stockroom. From a cold start, the time required to obtain hot air is about 40 seconds.

[1] The author wishes to acknowledge suggestions on change of design made by R. A. Borden and E. L. Birch.

Reference

1. BASKERVILLE, C., and STEVENSON, R. *J. Amer. chem. Soc.*, 1911, **32**, 650; BOCK, J. C., and GILBERT, M. *J. lab. clin. Med.*, 1925, **10**, 579–581; LANG, J. *Z. physik. Chem.*, 1913, **25**, 290–295; BICK, I. R. C. *J. chem. Educ.*, 1946, **23**, 127.