WINDOW VENTILATORS

A window ventilator illustrated in Fig. 10 consists of filter and switch controlled motor driven fans enclosed in a cabinet to be mounted on the window sill. Such units accomplish ventilation, air cleaning, and air circulation, but have no means of heating the air. The direction of air discharge is manually adjustable for seasonal operation.

UNIT HUMIDIFIERS

Unit humidifiers which may be procured in the market at the present time, fall into four general classifications, depending on the method of causing evaporation. These are as follows: (1) *Nozzle Type*, (2) *Rotary Type*, (3) *Cascade Type*, and (4) *Heater Type*.

In the *nozzle type* of humidifier water is sprayed into the air and

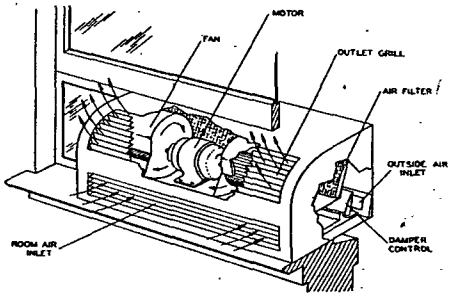

FIG. 10. TYPICAL WINDOW VENTILATOR

evaporation is effected by adiabatic exchange of energy. Units of this type in simplest form spray a fine mist of water directly into the air in a space. They are used to a great extent in the textile industry.

To the simple type of nozzle unit may be added the following accessories: a water heater whose function is to increase the vapor pressure, an air heater to heat the air either before or after humidification takes place, a screen or air filter over which the water is sprayed and through which the air is drawn for intimate contact with the water, a fan to create an air stream and to deliver air to the space to be humidified, and a housing to enclose all the elements. This type of unit is procurable in practically all of the variations mentioned. It has the disadvantage of clogging the nozzles and must be serviced continually.

Fig. 11 illustrates a nozzle unit having a humidifying capacity sufficient for a residence or small building. These units usually include air filters and in some cases provide ventilation air by means of an outside air duct connection to the unit. The units are available for either floor or ceiling mounting and are usually placed in a central location in the basement with short supply and return duct connections from the first floor. Room air is brought into the unit through the return duct connection, is passed over a tempering coil heated by steam or hot water, and is then humidified by passing through some type of spray humidifier. Surplus moisture is removed by an eliminator and the humidified air is delivered to the room through a duct connection. Since a large percentage of the tempering

coil capacity is transformed into latent heat during the humidifying process, the unit does not generally eliminate any existing steam radiation but does tend to improve comfort conditions by supplying heating during the off-period of furnace operation[7].

In the *rotary type* of humidifier the spray is created by rotating vanes or discs which throw the water by centrifugal force and in so doing break it up into a fine mist. In all other respects, this type of humidifier is similar to the nozzle type. It has the advantage over the nozzle type of being less liable to become clogged.

In the *cascade type* the humidification takes place by water falling in sheets over a series of baffles or trays. This type is usually furnished with a fan, air heater, and air filter all enclosed in a housing.

In the *heater type* of humidifier the water is heated either to the boiling point or to a temperature at which the water vapor readily passes into the air stream. There are many variations of this type of humidifier.

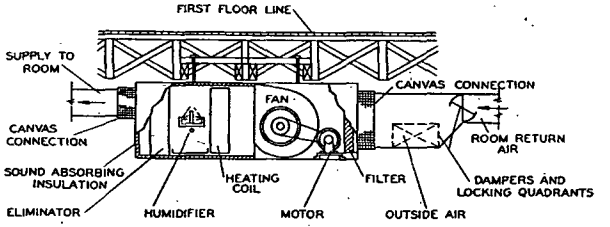

FIG. 11. TYPICAL UNIT HUMIDIFIER OF THE SPRAY TYPE WITH STEAM COIL TO PREHEAT THE AIR FOR RESIDENCES

In the simplest form the heating element using steam, hot water, gas, oil or electricity, is placed in a pan or vessel of water and the vapor passes from the surface of the water to the stream of air.

A modification of this type of humidifier is the combination of spray nozzle and heater type in which the water is sprayed over a hot surface and evaporated. It has the disadvantage of accumulating scale on the surfaces of the vessel or heating surface.

For a discussion of various methods of humidification see Chapter 37.

REFERENCES

1—See *National Fan Manufacturers Association* standard definitions in Chapter 32.

2—Standard Code for Testing and Rating Steam Unit Heaters (A.S.H.V.E. TRANSACTIONS, Vol. 36, 1930, p. 165), prepared by a Joint Code Committee of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS and the *Industrial Unit Heater Association* and adopted 1930.

3—Standard Code for Testing Hot Water Unit Heaters prepared by Engineering Committee of *Industrial Unit Heater Association*. Adopted by *Industrial Unit Heater Association* August 1942 and published September 1942.

4—A.S.H.V.E. RESEARCH REPORT No. 958—Temperature Gradient Observations in a Large Heated Space, by G. L. Larson, D. W. Nelson and O. C. Cromer (A.S.H.V.E. TRANSACTIONS, Vol. 39, 1933, p. 243). A.S.H.V.E. RESEARCH REPORT No. 1011—Tests of Three Heating Systems in an Industrial Type of Building by G. L. Larson, D. W. Nelson and John James (A.S.H.V.E. TRANSACTIONS, Vol. 41, 1935, p. 185).

5—A.S.H.V.E. Standard Code for Testing and Rating Steam Unit Ventilators (A.S.H.V.E. TRANSACTIONS, Vol. 38, 1932, p. 25).

6—A.S.H.V.E. RESEARCH REPORT No. 936—Investigation of Air Outlets in Class Room Ventilation, by G. L. Larson, D. W. Nelson and R. W. Kubasta (A.S.H.V.E. TRANSACTIONS, Vol. 38, 1932, p. 463). A.S.H.V.E. RESEARCH REPORT No. 1017—Air Supply to Classrooms in Relation to Vent Flue Openings, by F. C. Houghten, Carl Gutberlet and M. F. Lichtenfels (A.S.H.V.E. TRANSACTIONS, Vol. 41, 1935, p. 279).

7—Estimating the Humidification Requirements of Residences, by W. H. Severns (Papers Presented at the First Annual Conference on Air Conditioning, University of Illinois, *Engineering Experiment Station Circular, No. 26*, October, 1936).