BOILER CAPACITY FOR STEAM UNIT HEATERS

The capacity of the boiler should be based on the rated capacity of the unit heaters at the lowest entering air temperature and highest fan speed that will occur, plus an allowance for pipe line losses. It is unwise to install a single unit heater as the sole load on any boiler, particularly if the unit heater motor is started and stopped by thermostatic control. The wide and sudden fluctuations of load that occur under such conditions would require closer attention to the boiler than is usually possible in a small installation. Where oil or gas fuel is used in the boiler, it is possible by means of a pressure operated switch to control the boiler, in response to this

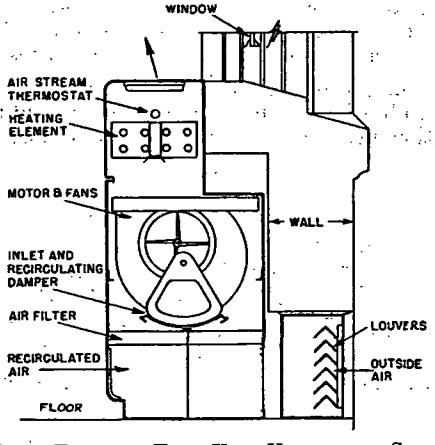


FIG. 10. TYPICAL BLOW-THROUGH TYPE UNIT VENTILATOR SHOWING ONE OF MANY ARRANGEMENTS OF DAMPERS AND HEATING ELEMENTS

rapid fluctuation. In most cases, and particularly where the boiler is coal-fired, it is advisable to use two or more smaller units instead of one large unit heater.

Steam pressures below 5 lb can be used with safety for recirculating unit heaters when their heating surfaces are designed for those pressures, and when proper provision is made for returning the condensate. If units receive air that may be at a temperature below freezing, a steam pressure of not less than 5 lb should be maintained in the heating element, or a corresponding differential in pressure between the supply and return piping should be maintained by means of a vacuum.

UNIT VENTILATORS

A unit ventilator as defined earlier in this chapter, has the function of introducing outdoor air for ventilation and cooling in addition to heating. The typical unit is arranged to introduce outdoor air and recirculated air to the room in varying quantities and is equipped with a system of control that permits both the heating and cooling effect to be varied while the fans are operating continuously. Either steam or forced hot water may be

employed as the heating medium. Unit ventilators are intended primarily for use in schools, meeting rooms, offices, or other applications where the density of occupancy indicates the need for ventilation. In normal operation, the discharge air temperature from a unit ventilator is varied in accordance with the room demands. Where a heating effect is required, the air delivered is above room temperature. Where the heat generated within the room by occupants, sun, etc., is sufficient to cause overheating, the air delivery temperature must be below that of the rooms. It is customary to equip unit ventilators with control devices that prevent the delivery of air at a temperature that will cause cold drafts. Unit venti-

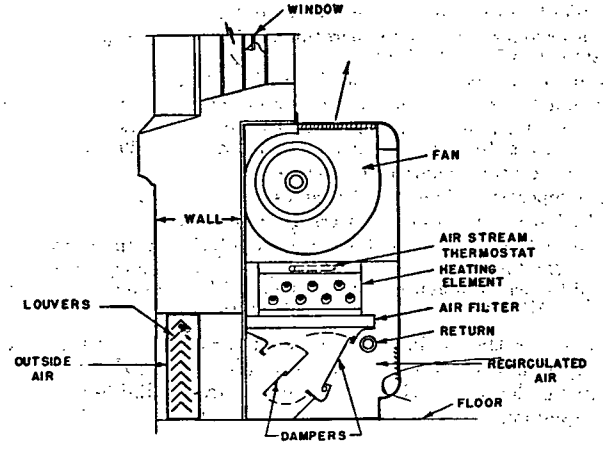


FIG. 11. TYPICAL DRAW-THROUGH TYPE UNIT VENTILATOR SHOWING ONE OF MANY ARRANGEMENTS OF DAMPERS AND HEATING ELEMENTS

lators may be of the heating element or damper controlled type, constructed on the blow-through (Fig. 10) or draw-through principle as illustrated in Fig. 11.

Ratings of Unit Ventilators

Unit ventilators are customarily cataloged with two ratings: the *anemometer rating* and the *standard air rating*. The anemometer air rating is peculiar to school house ventilation and was for many years the standard by which school officials checked and specified unit ventilator capacities. It originated as a convenient field measurement for checking air quantities, and is the basis of rating for ventilation requirements under many state and local building codes. The anemometer rating (air capacity) is obtained by averaging the air velocities obtained by an anemometer held over equal subdivisions of the outlet grille at a distance of 2 in. from the grille, and multiplying the average velocity by the gross area of the grille. (The average velocity is sometimes obtained by moving the anemometer over the outlet 2 in. from its face.) The anemometer rating is based on the