

Where steam or hot water are not available the direct-fired type of heater is used. The heating element is a warm-air furnace in which coal, coke, oil or gas is burned directly. This heating element is enclosed in a casing through which a fan maintains a rapid air current by pressure. This type of heater is often used for temporary heat during building construction or where the installation of a steam or hot water plant is for some reason not justified.

UNIT AIR CONDITIONERS

For a more complete discussion of the subject of air conditioning, see Chapter 7.

With the unit type of air conditioner the requirements of a given room are met by installing the necessary number of standard complete air conditioning units, usually without any distributing duct work; the necessary air distribution being accomplished by the distribution of the units themselves. Each unit is a complete air conditioning plant in itself including spray heads or nozzles (humidifier and dehumidifier) air re-heater, fan, spray pump, automatic control, etc. These units usually are built in graduated standard sizes having capacities of from 2,500 to 10,000 cu. ft. per minute each.

Advantages of Unit Air Conditioners

The principal advantages are that the desirable results of the indirect humidification system can be applied to old buildings without installing duct work. Also where manufacturing processes are changed and departments are sub-divided or enlarged the units may easily be moved or increased in number to suit the new requirements. They are also particularly adapted for use by tenants of rented buildings since they are movable and do not become a part of the property when installed. Often there is more than sufficient saving by avoiding the elaborate duct work necessary with a central air conditioning plant to pay for the cost of the increased number of units. Standardized production and the lower costs inherent thereto are also an added advantage. Conditioning units are particularly advantageous for manufacturing plants which require different air temperatures and humidities in various rooms. Trouble with one unit does not cripple other units. Owners may approach the ultimate investment for air conditioning gradually, buying a unit at a time as expediency dictates.

Disadvantages of Unit Air Conditioners

Air conditioning units, especially in factories where considerable dust and lint occur, require frequent attention and cleaning. Attention must be given the adjustment of controls. A multiple unit installation, therefore, involves somewhat more attention than does a single unit located in the basement. In dehumidifying plants there is a decided advantage in having a single air conditioning unit located convenient to the refrigerating apparatus rather than to have a large number of water supplies and returns. For dehumidification, the central station system is to be recommended where more than three unit conditioners would be required.

Types of Unit Air Conditioning Equipment

Unit air conditioning equipment may be of the following types:

1. The air washer type which does not control the moisture content or temperature of the air but which simply cleans the air.
2. The humidifying type which controls the relative humidity without washing the air or controlling its temperature.
3. The complete air conditioning unit, which washes the air, controls its moisture content and which heats or cools the room within which the unit is located.

An air conditioning unit may be so designed that it will draw in air from the room or enclosure in which it is placed or from the outside, or by the aid of mixing dampers, may draw any predetermined mixture of

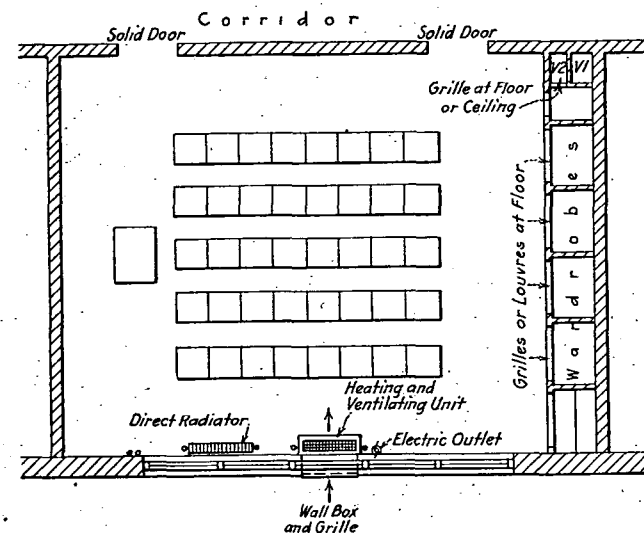


FIG. 4. SPLIT OR MODIFIED INDIVIDUAL VENT FLUE SYSTEM.

inside and outside air. This entering air passes through one or more spray or mist chambers, in which space moisture is either added to or removed from the air in accordance with the temperature of the air and of the spray water. At the same time the air is washed substantially free of dust and solid matter in this chamber. The air next travels between the customary labyrinth eliminator plates to lose its entrained water. A suitably located fan assembly causes the air to flow over a heating element before being delivered to the room. A motor-driven centrifugal pump or other means is used to deliver water from the tank built into the base of the unit to the spray heads, mist nozzles or other atomizing apparatus. In some makes of unit air conditioners, other means than spray nozzles are used to produce the required water spray or mist for the transfer of heat from air to water or vice versa. Automatic instruments control the condition of the leaving air by regulating the temperature of the spray water and also by varying the amount of steam supplied