2. Flexibility and mobility of equipment. Unitary equipment can be readily located in existing buildings without the necessity of running large ducts through floors and many partitions. Such equipment can be shifted to meet changing requirements. Tenants may obtain the advantages of conditioning when the entire building is not equipped with a conditioning system. In industrial process work, the flexibility of unitary equipment is also advantageous.

3. Lower installation costs. The fact that the equipment arrives on the job in an assembled condition, coupled with the lesser problems of duct work and connecting piping, materially reduces installation costs.

4. Small capacities. The small capacities available in unitary equipment have brought the advantages of controlled air conditions to a number of small offices, stores, shops, and individual rooms where specially designed and built central system equipment would have been uneconomic.

Definitions

With the growth of the unit equipment industry, it becomes increasingly evident that there is no sharp line of demarcation, on the basis of capacity, between a unit and a central plant system. The definitions contained in a code, Standard Method of Rating and Testing Air Conditioning Equipment[1], have helped to clarify and identify the various types of equipment since the definitions are given on a purely functional basis. The following definitions are taken from the code:

1. A *Heating Unit* is a specific air treating combination consisting of means for air circulation and heating within prescribed temperature limits.

2. A *Heating Air Conditioning Unit* is a specific air treating combination consisting of means for ventilation, air circulation, air cleaning and heat transfer with control means for heating and maintaining humidity within prescribed limits.

3. A *Humidifying Unit* adds water vapor to and circulates air in a space to be humidified.

4. A *Free Delivery Type Unit* takes in air and discharges it directly to the space to be treated without external elements which impose air resistance.

5. A *Pressure Type Unit* is for use with one or more external elements which impose air resistance.

UNIT HEATERS

A unit heater consists of the combination of a heating element and fan or blower having a common enclosure and placed within or adjacent to the space to be heated. Generally no ducts are attached to inlets or outlets, although it is common practice with many unit heater applications to equip the heaters with directional outlets or adjustable louvers. While unit heaters are designed primarily to handle all recirculated air, they may be installed to handle either partial or total outdoor air.

Features

A wide variety of structural designs is available. All employ some form of heat transfer surface, supplied with steam, hot water, gas or electric heat. Air is always forced over or drawn through the heat transfer surface by a fan of either the propeller or centrifugal type. Heating surfaces may be in the form of non-ferrous or steel pipe coils, non-ferrous or steel pipe with extended surfaces, cast-iron, or pressed or built-up sections of the cartridge or automotive type.

[1]Prepared by a Joint Committee of the *American Society of Refrigerating Engineers*, AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, *Refrigerating Machinery Association*, *National Electrical Manufacturers' Association* and *Air Conditioning Manufacturers' Association*.

Compared with the older method of heating by radiation, properly designed and applied unit heaters should:

1. Circulate air in the building at a rapid rate but without objectionable draft.

2. Reduce the temperature differential between the floor and ceiling.

3. Direct the heated air so that uniform temperature distribution will be obtained throughout the heated space.

4. Prevent or remove the cold stratum of air commonly found at the floor level.

5. Reduce the number of heating elements required and thereby decrease the cost and extent of the piping necessary.

6. Maintain a closer control of room temperature either manually or by means of simple thermostats.

7. Produce an economy in heating costs resulting from the sum total of the above advantages.

8. Provide a means of saving floor area or room space due to the compactness of the equipment and flexibility of application.

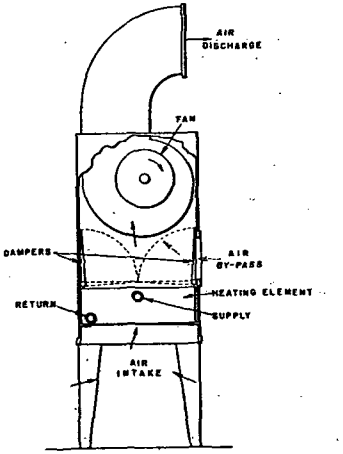


FIG. 1. FLOOR MOUNTED UNIT HEATER, HOUSED TYPE FAN

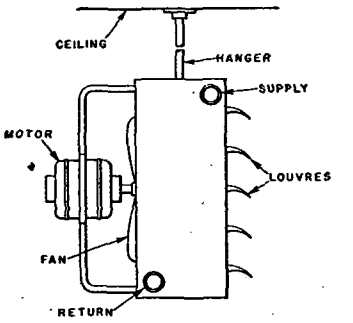


FIG. 2. SUSPENDED UNIT HEATER, PROPELLER TYPE FAN

Types of Units

There are two major types of unit heaters, centrifugal housed fan type and propeller fan type. The housed fan high velocity (1500 to 2500 fpm) discharge units, with outlets adjustable to deliver air in several directions, are able to project their heating effect over distances of from 30 ft to as much as 200 ft from the unit. This makes possible the location of these units at considerable distances from each other, thus reducing greatly the piping and loss of floor space due to the heating equipment. Figs. 1 and 3 illustrate the housed fan type of unit.

Propeller fan type of unit heater is used extensively to heat the small commercial establishment, although this type of unit is also available in very large sizes. Fig. 2 illustrates a propeller fan type of heater. A code[2] governing the number of sizes of propeller fan-type units as well as

[2]Standards for Propeller Type Unit Heaters prepared and adopted by the *Industrial Unit Heater Association*, June, 1938.