

humidification. If the air washer is supplied with refrigerated water, this unit would become a year-round conditioner.

For fuel oil the equipment shown in Fig. 19 can be installed to obtain warm, filtered, and humidified air. An oil burner and heat exchanger provide the heat. A cooling section may be inserted between the fan and the heat interchanger, cold water, or refrigerant being circulated through the cooling element. For thermostatic control, a room thermostat is provided to start the oil burner when the temperature falls, the rising temperature in the heat interchanger causes the thermostat to start the fan. As soon as the temperature in the house rises to normal, the room thermostat shuts down the oil burner and operates the thermostat controlling the fans.

BASIS OF RATING

In the past, the unit air conditioning industry has been handicapped by the lack of any standard method of rating. Recently a tentative code has been prepared defining a complete rating method⁶.

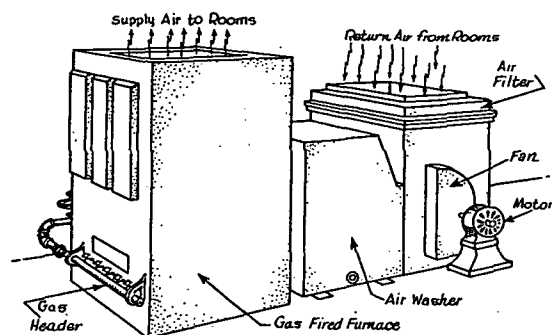


FIG. 18. GAS FIRED FURNACE UNIT

On the basis of this new code, air conditioners are to be classified primarily as *free delivery type* and *pressure type*, where delivery will be measured in cfm standard air at specified fan speed. Pressure type units will specify the delivery against various total fan static pressures. Cooling capacity will be expressed in total Btu per hour and this total will be subdivided into sensible heat cooling effect and dehumidification or latent heat effect. Cooling capacities will be given on entering air temperatures of 85 F, 50 per cent relative humidity with 40 F refrigerant temperature for comfort conditions and 45 F, 85 per cent relative humidity with 30 F refrigerant temperature for commercial applications.

The duty for heating surfaces will be specified in Btu per hour for 70 F entering air temperature based on two pounds gage steam pressure or 180 F entering water temperature with 20 F drop. Humidification will be specified in pounds of water evaporated per hour at 70 F and 30 per cent

relative humidity entering air conditions. The *Catalog Data Section* gives ratings of current models offered by leading manufacturers.

METHODS OF CALCULATING CAPACITIES

The methods of calculating heating and cooling loads for conditioning units are similar to those described under Chapters 7 and 8. Certain manufacturers have adopted simplified and approximate methods which through experience they have found applicable to unitary equipment. Such methods involve certain averaging approximations which are suitable for estimating purposes but many of which require rechecking on a more accurate basis before actual installations are made.

The greatest error in calculating cooling loads is apt to be introduced in the failure to appreciate the magnitude of the latent heat loads and the

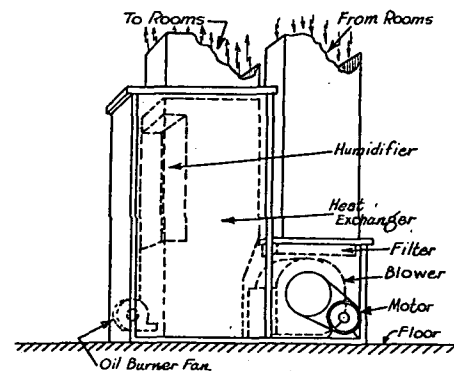


FIG. 19. OIL FIRED UNIT

relationship between the latent heat removal and the refrigerant temperature. It is extremely important that the proper balance be obtained between the refrigerant temperature, the conditioning unit surface and the conditions to be maintained within the occupied space. Unsatisfactory conditions often result through the attempt to apply unit conditioners with a source of refrigeration which gives too high a surface temperature. Such conditions may be obtained when well water of too high a temperature is used or when a direct expansion evaporator is connected to a refrigeration compressor of inadequate size. The high refrigerant temperature even though it may give adequate dry-bulb temperatures, due to over-size conditioning units, will not give proper humidity control due to its inability to furnish sufficient dehumidification.

The use of surface coolers with widely extended fins may lead to similar results since the large ratio of extended surfaces gives an average surface temperature considerably above the refrigerant temperature within the tubes. All these factors must be kept in mind when making the selection of equipment. It is furthermore vital that the calculation of a cooling load be based on an accurate survey before the selection of the equipment is made.

⁶Code prepared by Joint Committee of American Society of Refrigerating Engineers, AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Refrigerating Machinery Association, National Electric Manufacturers Association and Air Conditioning Manufacturers Association.