Another method of summer air conditioning is that in which the air is passed over a dehydrating agent, and then the dry-bulb temperature is lowered to the proper level. This latter step is usually accomplished by means of water, and the water temperature need not be as low as is required for dehumidification by condensation.

For the common method of dehumidifying the air by cooling it below the dew-point, either the air is conducted through a low temperature

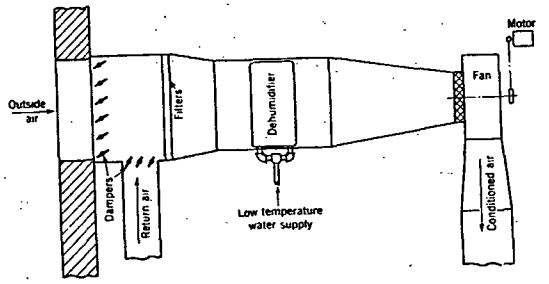


FIG. 1. SIMPLE DEHUMIDIFYING APPARATUS

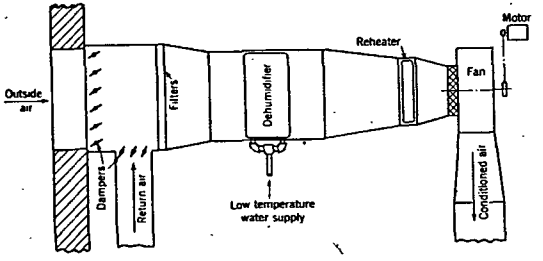


FIG. 2. DEHUMIDIFYING EQUIPMENT WITH REHEATER

liquid spray, or it is directed over surface coils through which cold water or evaporating refrigerant is circulated. The same principle governs the operation of both spray and surface type dehumidifiers, viz.: *The dew-point temperature of the air leaving the dehumidifier should be such that when the air is raised to room conditions it will have absorbed the latent heat load of the rooms.*

The arrangement of a simple summer air conditioning plant is shown in Fig. 1. The plant may be designed to condition 100 per cent outside air, 100 per cent return air, or a mixture of outside and return air. If the

system is intended solely for summer conditioning, the apparatus will consist essentially of a dehumidifier of spray or surface type, filters, fan and motor, duct work for outside air, return air and conditioned air supply, air inlets and outlets and suitable controls. For the spray unit or for water coils a pump will be required, and some form of cooling equipment must be installed unless a supply of sufficiently low temperature natural water is available. In many cases a reheater will be necessary, as described in the next paragraph. Frequently a central air conditioning system is designed for year-round service. This means that properly sized heaters and humidifiers, with their respective controls, must be added. With few exceptions, systems designed to meet summer capacity requirements will have ample capacity for winter and intermediate season conditioning.

In lowering the dew-point temperature to enable the air to carry off the latent heat load, the dry-bulb temperature may be lowered excessively. The air must then be reheated before being delivered to the rooms.

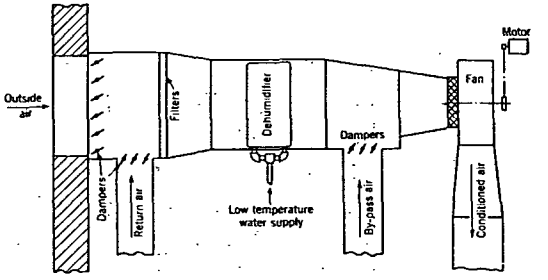


FIG. 3. SUMMER DEHUMIDIFYING EQUIPMENT WITH BY-PASS

Fig. 2 shows a central plant conditioner with a surface reheater added. The reheater may be installed in the fan inlet chamber as shown, or in the fan discharge duct, depending on apparatus space and other design conditions. The use of surface coils, of improved air distribution systems in the rooms, and of smaller refrigeration units with automatic control, are all tending to make the use of reheaters less essential.

Another method for raising the dry-bulb temperature of the conditioned air supplied to the rooms, is to by-pass some of the return air[1] so that it enters on the downstream side of the dehumidifier, as shown in Fig. 3. This method of reheating the air may be more economical in operation than using a surface reheater where such a reheater cannot be supplied with waste heat.

In some cases the main supply fan delivers the dehumidified air to several other fans rather than to the conditioned space directly. These booster fan units may be arranged to deliver a mixture of conditioned air

[1]Patents exist covering the use of the by-pass for cooling and dehumidifying systems.