


FIG. 1. CENTRAL SYSTEM FOR WINTER AIR CONDITIONING

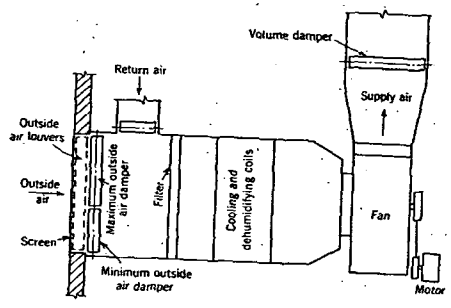


FIG. 2. CENTRAL SYSTEM FOR SUMMER AIR CONDITIONING

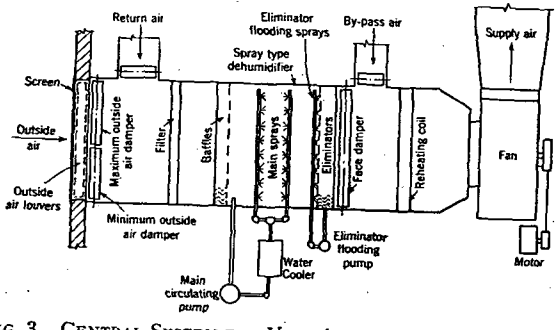


FIG. 3. CENTRAL SYSTEM FOR YEAR 'ROUND AIR CONDITIONING





and by further omissions will become a simple ventilating system. On the other hand, with the inclusion of a dehumidifier with its source of cooling, the system can become a year 'round air conditioning system. The three major types of systems are:

1. *Winter Air Conditioning Systems.* The function is to ventilate, heat and humidify in winter the spaces under consideration, and provide the desired degree of air motion and air cleanliness. The equipment required normally consists of a preheater, filters, humidifying sprays or air washer, reheater, fan, distributing ducts, and the necessary manual or automatic means of control. See Fig. 1.
2. *Summer Air Conditioning Systems.* The function is to ventilate, cool and dehumidify the spaces under consideration and to provide the desired degree of air motion and cleanliness. The normal complement of equipment includes filters, dehumidifier with its source of cooling, reheaters or by-pass if required, fan, distributing ducts, and the necessary manual or automatic means of control. See Fig. 2.
3. *Year 'Round Air Conditioning Systems.* The function is to ventilate, heat and humidify in winter and cool and dehumidify in summer the spaces under consideration, and to provide the desired degree of air motion and cleanliness. The equipment usually comprises preheater, filters, spray or surface dehumidifier, reheaters and by-pass if required, fan, system of distributing ducts, and necessary means of manual or automatic control. See Fig. 3.

Items of equipment in the foregoing may, of course, be replaced with others fulfilling the same purpose. As an example, an absorption type dehydrator with an aftercooler may replace a dehumidifier.

## Modifications

All of the general types of central systems may be modified in various ways. These modifications do not affect the functions of the system. In general, these consist of changes in or additions to the normal complement of equipment, or variations in arrangement and design of equipment and distributing ductwork in order to provide better control of conditions, greater flexibility, or improve the overall economy and performance of the system. Some of these are applicable to certain systems only, while others are applicable to all types. The most commonly encountered modifications are:

1. Zoning.
   - *a.* Separate equipment.
   - *b.* Reheating or recooling. (See Figs. 4 and 5).
   - *c.* Multiple fans with individual by-pass or reheat. (See Figs. 6 and 7).
   - *d.* Volume control. (See Fig. 8).
   - *e.* Dual duct system. (See Fig. 9).
2. Induction units. (Low pressure type). (See Fig. 10).
3. Induction units. (High pressure type). (See Fig. 11).
4. Evaporative cooling.
5. Precooling.
6. Sensible cooling with dry coils.
7. The run-around system.

There are many other possible modifications and the special requirements of some installations may warrant consideration of these, but space limitations prevent a discussion of all. The modifications mentioned are discussed further in this chapter.