tinction to the generally accepted term of a field fabricated central station system. The manufacturer of the unit is responsible for the output and performance of the unit under rated conditions, whereas the contractor installing the complete unitary system is normally held responsible for the complete performance of the system.

Unit equipment justifies its existence due to the following features:

1. Lower cost per unit capacity. Standardized design and volume production makes possible low cost factory assembly thereby eliminating individual design and handling of every part for each installation.

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.

This chapter will limit itself in general to a description and discussion of the funtions and construction of the units themselves indicating the accessory features necessary to complete unitary systems.

SUB-DIVISION OF UNITARY EQUIPMENT

For descriptive purposes unitary equipment is sub-divided on a purely functional basis. The following definitions are included in the previously referred to code[2].

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

2. A *Cooling Unit* is a specific air treating combination consisting of means for air circulation and cooling within prescribed temperature limits.

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

4. A *Dehumidifying Unit* removes water from and circulates air in a space to be dehumidified.

5. An *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 maintaining temperature and humidity within prescribed limits.

6. A *Cooling 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 cooling and maintaining humidity within prescribed limits.

7. 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.

8. A *Self-Contained Air Conditioning or Cooling Unit* is one in which a condensing unit is combined in the same cabinet with the other functional elements.

[2]Loc. Cit. Note 1.

9. 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.

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

There has grown up in the industry definite branches, in which the engineering and application of the equipment vary quite widely. Thus common acceptance recognizes the following groups of the unitary equipment defined above.

1. *Unit Heaters* consisting of an encased heating surface through which air is forced by means of a fan or blower, located either in or closely adjacent to the heated space, and normally employed only for industrial and commercial applications.

2. *Unit Ventilators* which are similar in principle to unit heaters but are designed to use outside air with or without provision for recirculation of the air. While unit heaters are largely used for commercial and industrial applications, unit ventilators are intended primarily for school, offices and semi-commercial applications.

3. *Cooling Units* which are similar to unit heaters except that a cooling medium is used in place of a heating medium and provision is made to collect and remove the condensate. Cooling units are normally applied to the cooling of products for their preservation or processing (commercial air conditioning) and air conditioning units are used for cooling for comfort.

4. *Air Conditioning Units* which consist of equipment to provide control of heating with humidifying or cooling with dehumidifying, coupled with air circulation; all compactly housed in a single casing.

5. *Miscellaneous Unit Equipment and Accessories* such as filtering equipment, attic fans, humidifying units and special controls.

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 heaters to equip them with directional outlets or adjustable louvers. While unit heaters were first applied to industrial heating, the constant development and improvement of this equipment both as to appearance and quietness has broadened its field of application until today unit heaters are available for fields extending from large factory spaces to recreation rooms, churches, and offices.

While unit heaters are designed primarily to handle all recirculated air, they may be installed to handle either partial or total outdoor air. Compared with the older method of heating by means of 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 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.