

advantages in compactness, lower first cost and maintenance expense, ease of defrosting, freedom from drip and the maintenance of sanitary conditions, as well as uniform temperature and humidity under variable load conditions. Cooling units by means of their positive air circulation prevent dead-air spots, frequently objectionable in this industry.

Typical cooling units are shown in Figs. 7 and 8. The former indicates a suspended type cooling unit which may be designed with or without a moisture eliminator. If high air velocities are maintained, an eliminator will be necessary to prevent the drops of moisture from being carried through with the air. The condensation that occurs is collected in a drip pan and removed from the system through a drain pipe. Fig. 8 indicates a typical floor-mounted unit of the housed fan type. The illustration shows a common form of distributing outlet designed to give low outlet velocities together with a controlled distribution. In process work, it is often important that direct air distribution does not impinge on the

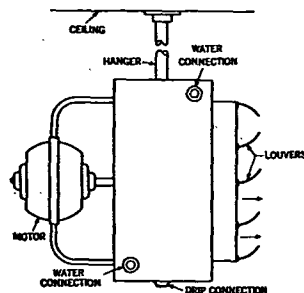


FIG. 7. CEILING TYPE COOLING UNIT

product. Cooling units are normally constructed of galvanized steel or non-ferrous material in order to reduce the corrosive effect of their constant wetted condition.

Cooling units are often called upon to operate in rooms where a temperature below freezing is maintained and low refrigerant temperatures are required. This results in the collection of frost on the heat transfer surface which in turn leads to a rapid loss in capacity and requires eventual defrosting. Such defrosting is accomplished by the following methods:

1. When the room is above freezing the source of refrigeration is cut off and the fan allowed to operate until the unit has defrosted.
2. A reversal of the refrigeration system may be provided and the so-called hot gas defrosting method used. This is accomplished by reversing the flow of the hot gas so that it is delivered directly from the compressor to the evaporator of the cooling unit. As soon as the ice and frost has been melted, the system is again returned to its normal cycle.
3. Where brine is used as a refrigerant, heated brine may be sent through the cooler to remove the ice.
4. When the room is at very low temperatures, warm air defrosting is sometimes used by providing for the admission and removal of warm air from outside the cooled space.
5. The surface may be sprayed with a strong brine solution:

In order to prevent the collection of frost in low temperature rooms where high latent heat loads are present, unit coolers equipped with a constant brine spray are frequently used. These are normally of the housed fan type similar to Fig. 9, but equipped with a pump for recirculating brine over the coil. It is, of course, necessary to strengthen the brine at intervals to maintain a non-freezing mixture.

Ratings of cooling units may be expressed in Btu per hour, or in tons of refrigeration and should specify the quantity, temperature and humidity of the air entering the unit with a stipulated refrigerant temperature

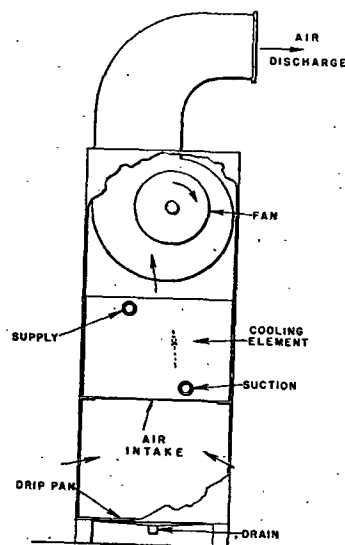


FIG. 8. SURFACE TYPE COOLING UNIT

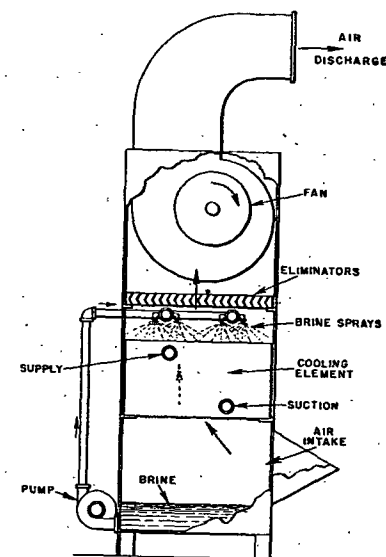


FIG. 9. BRINE SPRAY TYPE COOLING UNIT

within the coil. When chilled water or brine is used, the rate of circulation of the cooling media as well as its entering temperature must be given.

AIR CONDITIONING UNITS

Air conditioning with unit equipment has gained in popularity during the last few years and this type of apparatus now represents the bulk of the production of the industry. It is to be noted that some equipment does not fulfill all of the basic requirements of a true air conditioning unit. True air conditioning equipment involves not only the ability to alter temperature and humidity conditions within the conditioned space, but it must also be able to *control* these conditions.

The means for accomplishing these functions are outlined herewith: