

*Dew-point control* is particularly applicable where there are a number of different departments to be served from one central equipment, and where there is but little change in the moisture content of the air in the room due to moisture changes in the materials processed or due to excessive air leakage from outside.

Another system of control which is used considerably, especially where there is but one room to be controlled from one apparatus and where there may be considerable moisture change in the room itself due to local conditions, is to adjust the dew point at the apparatus, either continuously or intermittently, by means of a hygrostat placed in the room and so connected as to vary either the temperature or quantity of spray water used in the humidifier, or both. This system may be designated as *direct relative humidity control*.

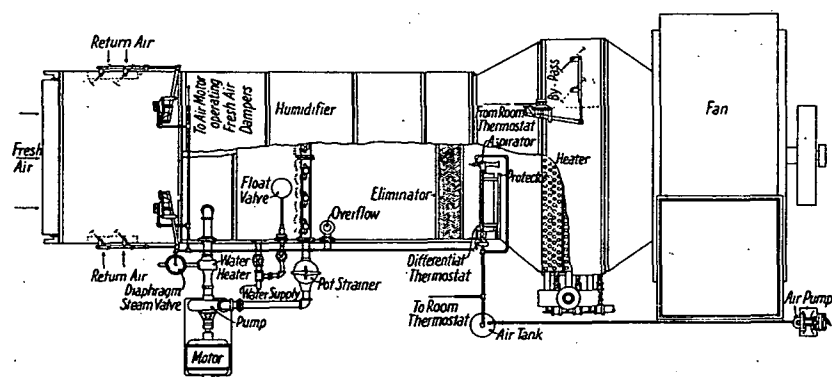


FIG. 7. PLAN OF HUMIDIFIER WITH HUMIDITY CONTROL

In direct humidity control installations the temperature and humidity are both under control during the heating season, and in the summer the humidity must be maintained constant, but the temperature must be allowed to rise in accordance with the increase of the wet-bulb temperature above the minimum desired. Temperature variations under mill conditions will be from 75 deg. to 90 deg. fahr. Such results are superior from the standpoint of comfort and well-being of the operators than those previously experienced without the control. Automatic humidity control has resulted greatly in increasing the effectiveness of the workers, but the provision of ventilation also has improved greatly the conditions in mills as to dust, lint, and odors. In the spinning of fine cotton yarns, automatic humidity control is of great value in producing an improved product as well as in bettering working conditions. The uniform air motion results in the lowering of the effective temperature with a consequent increase in comfort and efficiency of the workers at temperatures and humidities which are necessarily high because of the requirements of the product. The air motion results also in removing the heat directly and immediately from the point of production on the spinning frame, thus avoiding localized increase of temperature and

decrease of relative humidity. In other words, it permits the entire process to be subjected more nearly to the average room conditions.

Where large quantities of power are generated in a limited space and where a comparatively high relative humidity is required, it is often feasible and economical to use a combination of direct and indirect humidification. The indirect humidification provides the desired quantity of ventilation and cooling and the additional direct humidification provides for increase in humidity without interfering with the ventilation or the cooling effected by the indirect system.

In general, it may be stated that direct humidification is most satisfactory where high humidities are desired but where little cooling, ventilation or air motion is required. Therefore, the indirect system is most

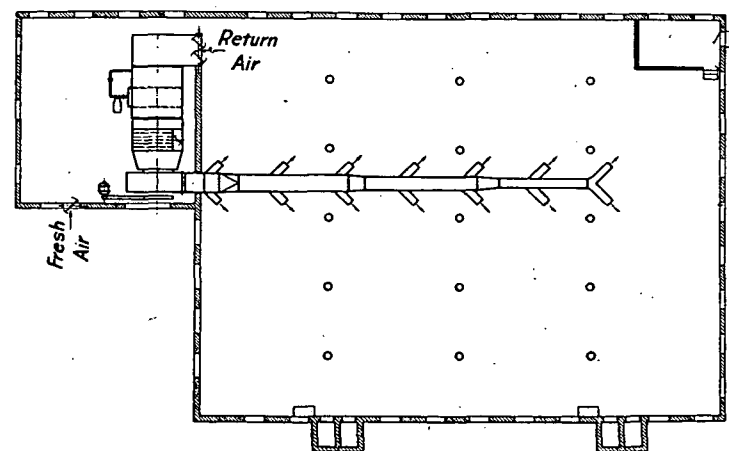


FIG. 8. GENERAL DESIGN OF A SYSTEM OF HUMIDIFICATION AND AIR CONDITIONING

applicable where either low or high relative humidities are desired with maximum cooling and ventilation effect. For conditions that require an unusually large amount of heat to be absorbed by ventilation, together with the maintenance of high humidities, it is oftentimes preferable to make use of the combination system of indirect and direct humidification. If the indirect system alone were used it would mean an unusually large volume of air to be handled, which might interfere, due to air motion, with production, even though it would result in greater cooling effect. If direct humidification alone were used, no ventilation would be obtained, with consequently higher room temperatures.

Inasmuch as cooling and humidification requirements in summer are much more severe than those in winter, an excess of humidifying and cooling capacity must be provided to meet extreme conditions and this requires automatic control if the best results are to be obtained. Such applications of humidity control may be considered standard practice today in the United States.