Another type of solid dehydrating equipment uses two complete sets of stationary adsorbing beds, arranged so that one set is dehydrating the air while the other set is being activated. With the dampers in the position shown in Fig. 5, air to be dried flows through one set of beds and is dehydrated, while activation air is heated and circulated through the other set. After activation is complete, the beds are cooled by shutting

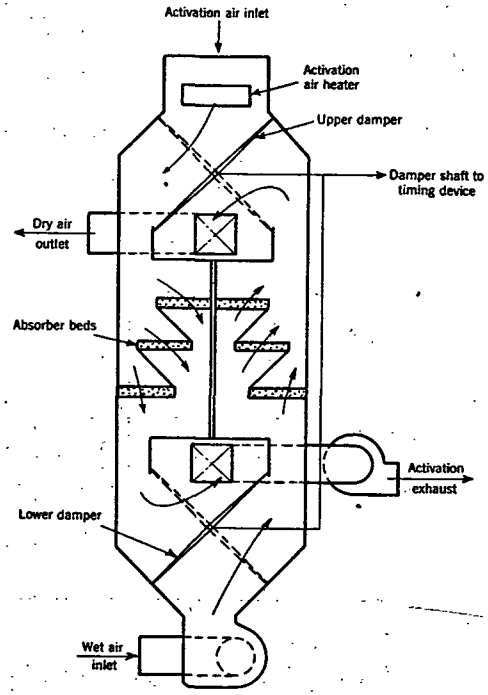


FIG. 5. SOLID ADSORBENT DEHYDRATOR—STATIONARY BED TYPE

off the activation air heaters and allowing unheated air to circulate through them.

After the beds which are dehydrating have adsorbed moisture to a degree which begins to impair performance, a timer-controller causes the dampers to rotate to the opposite side. Thus the beds which on the previous cycle were adsorbing have activation air circulated through them, and vice versa. Activation air is heated in the same manner as with continuous equipment.

LIQUID DEHYDRATING METHODS

One type of system utilizing liquid dehydrating agents includes an external interchanger having essential parts consisting of a dehydration

contactor, a solution concentrator, a solution heater and a solution cooler, all as shown in Fig. 6. The dehydrator contactor is located in the wet air stream. The air to be conditioned is brought into contact with an aqueous brine solution having a vapor pressure below that of the entering air, resulting in a transfer of moisture (latent heat). As previously described, this results in a conversion of latent heat to sensible heat which raises the solution temperature and consequently the air temperature. The temperature change of the air being processed by the liquid dehydrator is determined by the cooling water temperature and the amount of moisture removed in the equipment. Control of leaving air tempera-

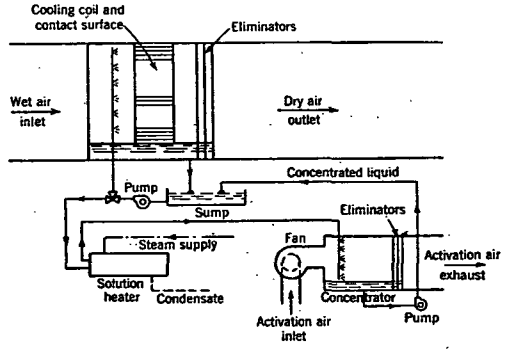


FIG. 6. LIQUID ADSORBENT DEHYDRATOR IN WHICH SOLUTION COOLER AND CONTACTOR ARE COMBINED

ture is obtained by precooling the absorbent solution in a suitable surface cooler, by tap, well or artificially chilled water.

The excess water of condensation, which dilutes the brine, is removed in the solution concentrator. This is a low pressure steam heat exchanger which over-concentrates a portion of the weak liquor and returns it to the main brine reservoir for re-pumping. The concentrator operates in the manner of an evaporative condenser, whereby moisture is evaporated from the brine, by the heating coils, into a stream of regeneration air taken from and rejected to the outside atmosphere. Low pressure steam is normally used for heating the brine. When it is desirable or necessary to use gas or electricity, an auxiliary low pressure steam boiler is usually added to the equipment. Concentrators operating on a simple boiler principle have not as yet been commercially practical.

It should be noted that the solution concentration phase is the reverse of the dehydration process. During concentration the aqueous vapor pressure of the solution is greater than that of the surrounding air, while during dehydration, the reverse is the case. Utilization of this principle permits winter humidification, by heating (instead of cooling) the solution pumped to the contactor. Water is thereby evaporated into, instead of