

control for ventilating systems. Thermostat *A* located in the outside air duct set just above freezing, controls a valve *C* on the first heating coil. This valve is either completely open or completely closed. The by-pass damper *B* and the other two valves *D* and *E* are controlled by a duct thermostat *F* located in the discharge duct from the fan. If the temperature of the air surrounding the thermostat *F* increases, the damper is moved to admit more cold air. Should this not reduce the temperature sufficiently, the valves on the heating coil will be closed gradually and in sequence until the correct temperature is reached. The opening or closing of the damper *B* and the valves *D* and *E* must be gradual or there will be a wide fluctuation in air temperature.

In ventilating systems it is customary to supply air to the ventilated spaces at an inlet temperature approximately equal to the temperature maintained in the rooms. The radiators therefore are designed to take

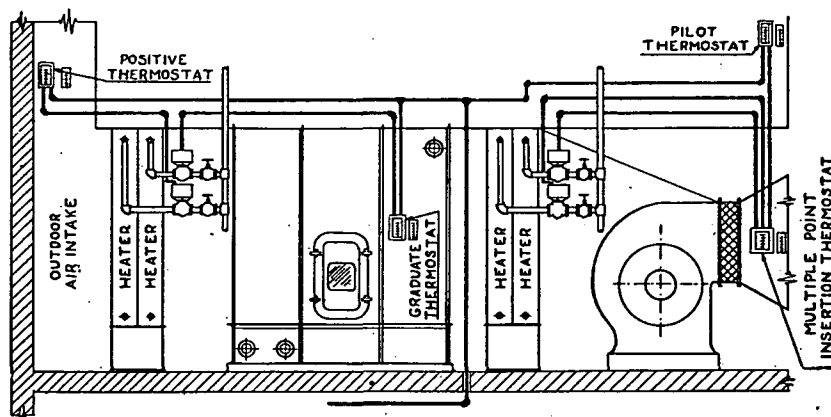


FIG. 10. USE OF PILOT THERMOSTAT ON VENTILATING SYSTEM WITH AIR WASHER

care of all the heat losses from the room. Hence, in order to maintain controlled room temperatures it is further necessary to use room thermostats governing control valves placed on the radiators. With this type of central fan system it is possible to ventilate a large number of rooms by means of one fan.

In some installations, such as in theaters or auditoriums, it is difficult to install sufficient direct heating surface to offset the heat losses from the room. Also there are installations where a short heat-up period is allowed before occupancy of the room, and it is advisable to use the entire heating capacity of the ventilating system for this purpose. Systems of this type have, in addition to the control described in Fig. 9, a pilot thermostat located in the room to be heated or in the path of air withdrawn from that room. This thermostat is set for the temperature required in the ventilated space and controls the supply of power to the thermostat *F* located in the fan discharge controlling the damper *B* and the heating units *D* and *E*.

When the temperature of the air in the room is below the setting of the pilot thermostat, the control is such that the by-pass damper *B* is closed and the valves on the heating coils are open. Thus the maximum heating capacity is available to bring the room temperature to the desired point. When the room temperature reaches the setting of the pilot thermostat, the control of the air temperature is returned to the thermostat *F* in the fan discharge. The fan discharge thermostat, therefore, serves as a minimum temperature control and prevents introduction of air at temperatures which would produce drafts or faulty air distribution. Accurate control of room temperature is accomplished in this manner, but the system can not well be used where more than one room is supplied with air from a single fan.

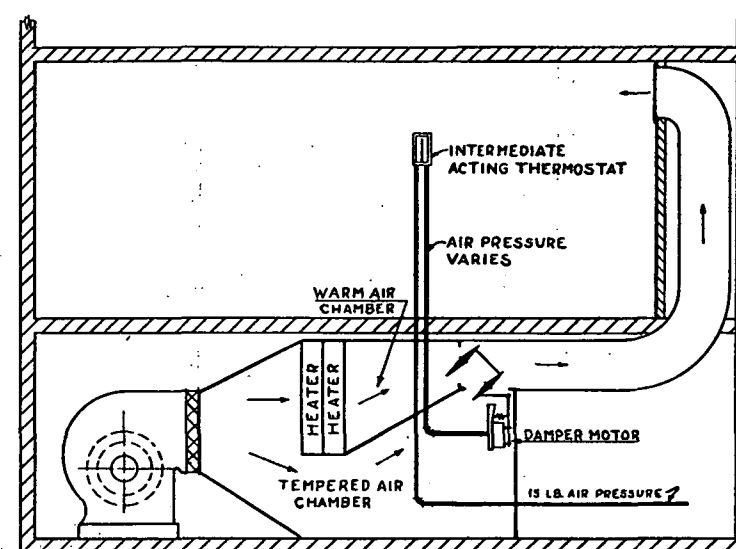


FIG. 11. CONTROL OF MIXING DAMPERS WITH INTERMEDIATE ACTING THERMOSTAT

In central fan systems, air washers are often used and in such cases, due to the effect of temperatures on humidity, additional control is required. Fig. 10 shows such an arrangement with control of the second tempering heating unit from the air washer temperature and with the usual control of the first tempering heating unit from the outside temperature. This permits the air to be kept cool while passing through the washer so that too much moisture will not be absorbed. Fig. 10 also shows control of the re-heating units from a duct thermostat in the fan discharge and the application of a pilot thermostat to a system of this sort.

Combined Systems. There are various central fan systems which are used for both heating and ventilating. They are usually arranged with tempering heating units, automatically controlled to provide a minimum temperature for ventilating only, and additional heating units to supply