

to be encountered to a temperature above freezing. This outer layer should be controlled by a thermostat on the cold side set to shut off steam when the outside temperature gets warmer than around 34 deg., and set to keep steam turned on when the outside temperature becomes cooler than 34 deg. There should be an additional layer of tempering heater, controlled by an additional thermostat in the duct beyond the fan discharge after mixing of the strata of air shall have been accomplished by the fan. This thermostat should be set to control the temperature at the desired degree for cooling the building, such as will give an average temperature at the delivery opening of say 65 deg., or if this causes drafts, at a slightly higher temperature.

If there is no vacuum system of steam circulation, it is decidedly likely that any attempt to control the temperature by opening and closing

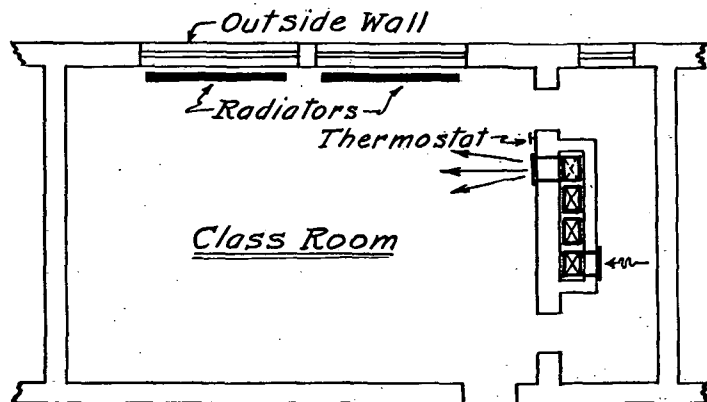


FIG. 3. PLAN OF CLASS-ROOM IN AN ELEMENTARY SCHOOL, SHOWING LOCATION OF THERMOSTAT

steam and return valves will result unfavorably, due to freezing of the radiation and sudden temperature fluctuations in the rooms, as tempering heaters are immediately responsive and flash hot or freeze solid with great rapidity. Where no vacuum system is available it will be wiser to control the tempering heaters by means of dampers, preferably of the interlocked double type operating in a slow or intermediate manner and reducing positively the air volume through the heaters as they increase the air volume through the by-pass around the heaters. Under this condition no diaphragm valves will be placed on the tempering heater supply and return connections.

Air Washers

The air washer should invariably be placed between an outer tempering heater capable of warming the air above a freezing temperature, preferably controlled by an outside thermostat, and an inner tempering heater capable of warming the conditioned air to the desired delivery temperature and controlled by a thermostat in the duct on the discharge side of the fan. It is never advisable to use a by-pass damper around a

tempering heater in front of an air washer, since the cold air might cause freezing.

Control of humidity is possible by adjustment of the temperature of the air as it meets the water, and in greater refinement, by control with an additional thermostat, of the water temperature, cooler for lower relative humidity, possibly from a refrigerated supply; and warmer for a higher relative humidity, possibly from a heated supply.

Room Temperatures

The room temperatures are controlled by individual thermostats, operating valves on the radiators, and mixing dampers in the flues, as

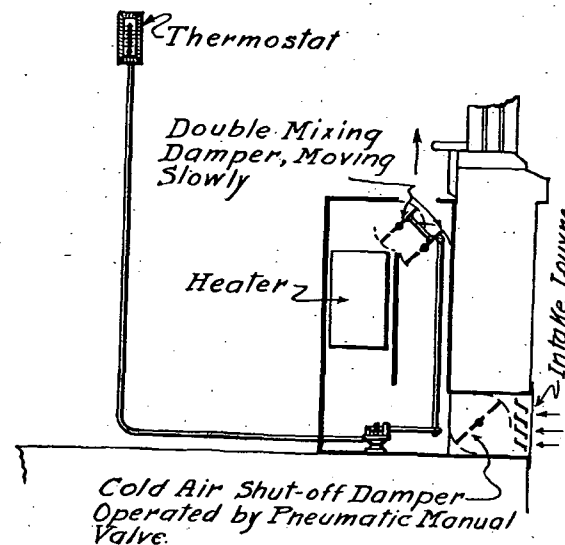


FIG. 4. DIAGRAM OF A METHOD OF CONTROL FOR A UNIT VENTILATOR

may be necessary. If a vacuum system of steam circulation is installed, the room thermostats should be intermediate or slow moving, while if steam circulation is by single-pipe or any kind of gravity system, the radiator valves should be operated quickly from full open to full closed. It is important that the mixing dampers in any case shall be moved slowly and held in intermediate positions.

If there is any room which has a separate supply fan and heating equipment, such as an auditorium or gymnasium heated by warm air and without radiation, as is often convenient and desirable, it is advisable to provide against cold drafts by a variation in the above arrangement, as follows:

Suppose that there is a fan drawing through a heater composed of five layers, and delivering air directly to an auditorium, or to a picture theatre. The thermostat in the room ordinarily will strive to keep the room cool. If there are many occupants and many