

this idea, there is now available a well-insulated radiator cover, carrying its own thermostat and shutters which will shut off the circulation of air and the radiation of heat without interfering with the circulation of the heating medium inside the radiator, and will control automatically the room temperature while also providing a more or less handsome radiator camouflage.

There are highly specialized applications of automatic heat control, and in connection with the type which uses independent power there has developed a great field of manual remote control for distant valves and dampers, both pneumatically and electrically.

There are also a number of instruments operating on different principles, which will indicate continuously and accurately the temperature conditions at remote points. Co-ordination between the temperature requirement and the fuel consumption is not always possible without some human interposition, and thus it is found that accurate arrangements for temperature indication are a necessary auxiliary to automatic heat control.

The occupants of a theater may be protected against overheating by one thermostat which controls dampers or valves so, that, when the room temperature reaches say 70 deg. cool air is introduced. If the theatre is crowded the temperature will pretty surely increase, even if large volumes of air are introduced, and the thermostat will call for cooler air. But if air of more than a few degrees, say 10 deg., cooler than the air in the room is introduced, no matter what that temperature may be, drafts will result. Therefore an additional thermostat may be placed in the air duct outside of the room, set to receive power only after the first thermostat has called for cool air, and preventing the entering air from becoming cooler than a point which can be tolerated by the occupants.

In large theaters which have artificial cooling, trouble has been experienced when the seats, particularly in the balcony, having a steep incline, are only partly occupied. The cool air provided for the seats which are unfortunately empty, being heavier, runs like so much water down the incline, striking the people in the lower occupied areas from behind, and making them uncomfortable. It has been found possible by the judicious installation of a sufficient number of thermostats, to control the temperature of the entering air in zones so as to compensate to a great extent for this peculiarity.

There is a large general office having tremendous floor areas distant from windows, and in which refrigeration has to be used for artificial cooling whenever the outside temperature is warmer than about 50 deg. There are a number of private offices having few occupants. The general open spaces, due to high intensity of occupation and many lights, require an entering air temperature so low in order to maintain comfort that the connecting and more or less open private offices get too cool. It happens that steam always is available, so that the thermostats in the private offices are permitted to turn on the steam as required, and the warmer the day, much to the surprise of the operators and to the comfort of the executives, the more steam there is in the private office radiators.

This experience suggests that when artificial cooling is provided via refrigerated water in an air washer, instead of drawing through in the

conventional manner, the supply fan should blow through the washer, with a by-pass around it, giving two temperatures of air even in summer, from which mixing dampers controlled by thermostats in the various rooms or departments may draw, as required to promote comfort in each.

Many refractory and even amusing cases might be cited wherein the thermostats have been located improperly. In hot water-storage tanks, for instance, thermostats have been condemned because they were inserted too close to the entering cold-water current, or were placed too near the heating coils. The thermostats invariably reflect truly the conditions which exist exactly where the thermostats are placed.

There are numerous cases, particularly in schools, where great buildings were regulated perhaps for years with much satisfaction, except for two rooms, one of which seemed always to be too hot, the other of which, "due to some bad or careless feature in the design," never received enough heat. Eventually a true diagnostician discovered that the thermostat in Room A was connected to the damper in Room B, and the thermostat in Room B was connected to the damper in Room A. Such a thing may happen very easily. Of course when heating the building first both rooms would take warm air until perhaps A having sunshine and a large number of occupants, arrived at 68 deg. first. The thermostat dutifully called for cool air and cool air came pouring into B. The thermostat in B, being thus cooled, continued to ask for warm air, delivering it in quantities to A, already overheated.

To militate against maladjustments in the connecting of the terminals, one progressive manufacturer, using electric motive power, covers his various wires and leads with insulation of different distinctive colors (same idea as Ford uses for ignition wiring).

An interesting combination where central station steam supply is used is that of a pressure regulator with an electric cut-off valve, the thermostat acting to vary the pressure gradually or to shut it all off, as requirements may indicate.

Automatic control is applied successfully to prevent scalding from baths, and is particularly desirable in institutions for children and in institutions for mental afflictions, as the thermostats will cause the mixing of the warm water with the cold to deliver any desired combination.

TESTS INDICATE VALUE OF AUTOMATIC HEAT CONTROL

There have been many tests to demonstrate the effect of automatic heat control. For instance, with an average outside temperature of 36 deg. it was found that with the usual sort of installation the thermostat would keep the heat shut off 21 hr. out of a possible 24, and that with an average outside temperature of 16 deg. the heat was on the radiator only a trifle more than 5 hr. per day.

The savings in fuel to be gained by automatic heat control are enormous. In many large institutions, such as universities, having central stations, high-grade supervision, meters, etc., the savings have been proved to equal one-half of the uncontrolled consumption.