The first requisite in any well-ordered heating system is a design which will give most nearly 100 per cent perfect heat. The second requisite, only slightly less in importance, is economy of operation.

Residence Heating Control

Automatic control of heat in residences is invariably accomplished by means of thermostats, and these devices are located in representative or key places; never, of course, on an outside wall or near a window, nor too close to radiators or in a drafty hallway. They should be located on a wall of the room which has the greatest number of hours of occupation, preferably the living room.

Fig. 5 illustrates a hot water heating system with thermostatic control. Thermostat No. 1 asks for heat and gets it unless thermostat No. 2

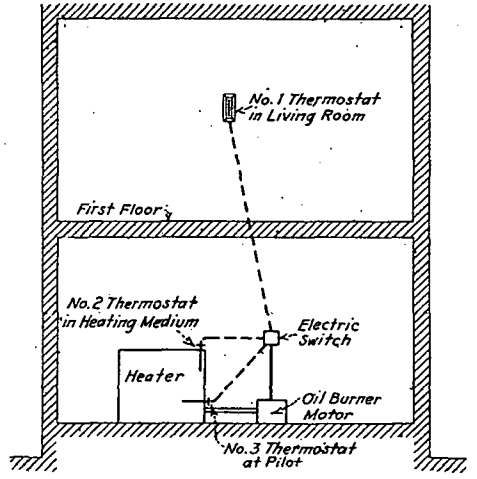

FIG. 5. TYPICAL ARRANGEMENT OF HOT WATER SYSTEM WITH THERMOSTATIC CONTROL

claiming the heating medium is already too hot, prevents it. Thermostat No. 3 will shut down everything regardless of No. 1 and No. 2, if once having been warm it gets cold, indicating that the pilot flame is out; or if following operation of the burner it does not get warm promptly, indicating that ignition has failed.

Fig. 6 illustrates a steam or vapor plant performing the dual service. Either the room thermostat or the tank thermostat may cause the opening of the valves in the mains which supply them and will start the fuel burner, but the burner will not stop unless both thermostats have closed their valves, or unless the steam pressure shall have reached that allowed by the pressurestat. This applies to an oil burner, gas burner or coal stoker. Safety controls, though not shown, should be used.

In the average residence one thermostat is usually sufficient, but as the home enlarges the desirability for added control-points, which means added refinements, increases.

The modern automatic fuel burner has made possible a marked advance in automatic heat control over the older *banked fire* furnaces and many practical combinations of automatic heat control now are available for use with oil, coal and gas burners, as well as with electric heating.

One fuel burner may do a double service or triple service, that is, it may heat the residence, the hot water for domestic service and the lodge or garage that may be located some distance from the residence. Interconnection of thermostats on the several services may be made so that the fuel burner will stop on *no demand* and start on *first demand* for heat.

For convenience and for complete freedom of attention by the resident, central station or district heat, purchased on a meter basis, just as electricity or water is bought, may be the most nearly ideal method of heating,

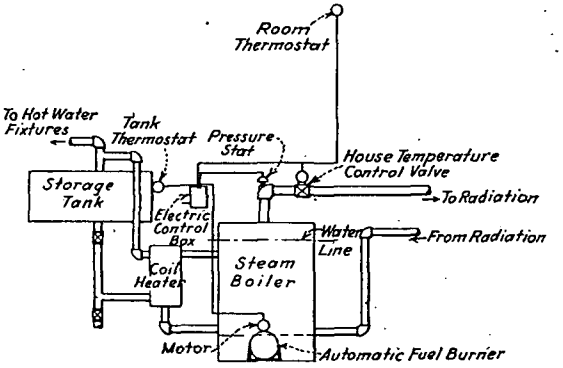

FIG. 6. TYPICAL ARRANGEMENT OF STEAM OR VAPOR SYSTEM WITH TWO THERMOSTATS CONTROLLING AUTOMATIC FUEL BURNER USED FOR HOUSE HEATING AND WATER HEATING

and since readiness for maximum service is practically a constant throughout the entire heating season, automatic control with district heating is not only desirable but is highly productive from a cost standpoint.

The tendency toward greater refinement in residence heating is sure to bring air conditioning more and more into use, and to meet this demand automatic control, that is, the thermostat, stands ready to do its share.

SCHOOL AND CHURCH HEATING

To make school houses and churches comfortable, under all conditions of occupancy, automatic control of temperatures and also of air volumes and in many instances the control of the condition of the air is necessary. Buildings occupied intermittently such as schools, require a heating system having considerable flexibility. Steam or vapor, hot water and warm air all may be used with success.

Where the air is to be taken in large volumes direct from the outside without regard to temperatures, steam usually is preferred to hot water as a heating medium. The heating surface both in tempering coils and direct radiators is materially less for steam and there is less possibility of freezing. Thermostatic control is employed on the direct radiation and