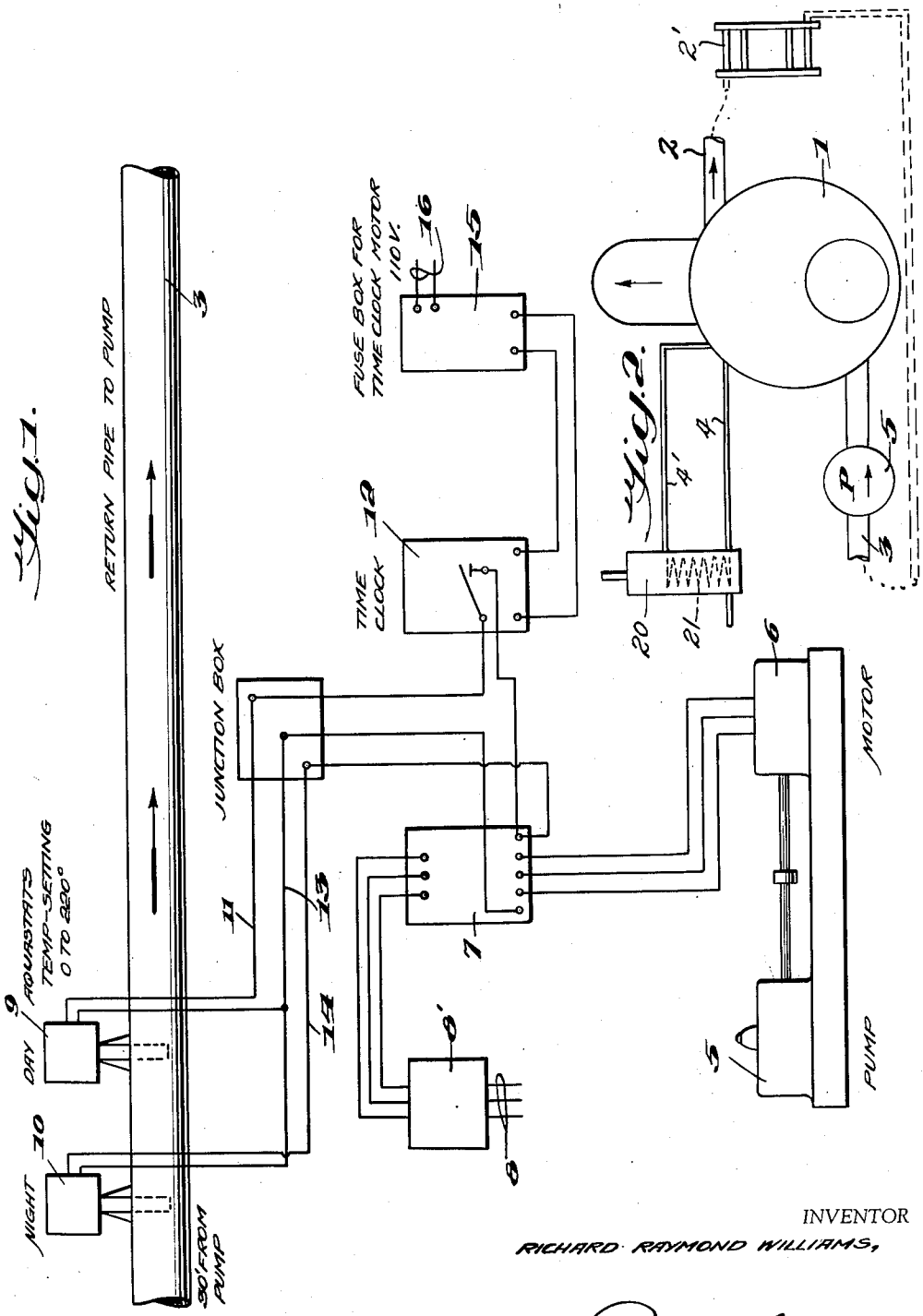
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TEMPERATURE CONTROL FOR HEATING SYSTEMS

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TEMPERATURE CONTROL FOR HEATING SYSTEMS

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This invention relates to improvements in temperature controls for heating systems of the character used particularly for heating large buildings such as apartment units by a hot water heating system.

In such heating systems as used heretofore, in order to provide the proper type of control for both day and night heating of a multiplicity of units, an elaborate control system has been necessary, frequently requiring the use of separate boilers for both daytime and night operation. Even then a separate domestic hot water system usually was required.

One object of this invention is to simplify and improve the heating of the room heating systems of the type described, especially the control of temperature thereof, to provide for both day and night controls by the same boiler and for supplying hot water to the system.

Another object of this invention is to provide for day and night operation of the room heating system supplied by a single boiler which may be maintained sufficiently hot also to supply domestic hot water to the apartment units supplied thereby.

Still another object of this invention is to utilize the return pipe for the hot water heating system as the source of control for the system whereby a uniformity of temperature will be maintained therein more effectively and completely than would be possible otherwise.

Another object of this invention is to provide a temperature control system for a hot water heating system which may be constructed at low cost and installed in present domestic hot water heating systems without requiring material modification thereof.

These objects may be accomplished according to one embodiment of this invention by connecting the control system with the return pipe for the hot water line to respond to the temperature therein for controlling the pump that forces the water through the system. One or more thermostats are provided, preferably separate thermostats for day and night operation, which in turn control the pump according to the temperature of the water in the return pipe. This will give a uniform temperature in all parts of the building and it will serve also to allow the same boiler to be used for both day and night operation, as well as for heating hot water in the domestic hot water supply. Moreover, it serves to provide a uniform temperature in the boiler which may be maintained relatively high at all times.

This embodiment of the invention is illustrated in the accompanying drawings, in which:

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Fig. 1 is a diagrammatic view of the electrical control system, and

Fig. 2 is a diagrammatic view illustrating the pump and boiler unit connected in heating and hot water systems.

Referring first to Fig. 2, I have illustrated a conventional form of boiler designated by the numeral 1, being of the hot water heating type adapted for use in a hot water heating system such as may be employed in a multiplicity of apartment units. An outlet pipe is shown at 2 to supply hot water to the respective radiators 2' of the multiple apartment units and the return pipe is shown at 3, leading back to the boiler 1 from the radiator system.

The boiler 1 may be adapted, if desired, to supply heat by a pipe 4 to a tank or other domestic hot water supply tank 20 having a coil 21 therein, which coil 21 is connected by the pipe 4 and by a return pipe 4' with the boiler 1, said tank 20 being connected in the usual way with the hot water system of the apartment units.

The return pipe 3 is provided with a pump 5 therein for forcing the water back to the boiler 1 under pressure. This pump 5 is operated by a motor 6, usually an electric motor. The motor 6 is controlled by a starter unit 7 including a relay switch, connected with a power control switch 8 adapted for connection with a power line 8, usually of 220 v.

Day and night thermostats are shown at 9 and 10, respectively, which are in the form of "Aquastats," responding to the temperature of the water in the return pipe 3 with which these thermostats are connected. Such thermostats are well known and usually may be adjusted individually to different settings from 0° to 220°.

One side of the "day" thermostat 9 is shown as connected through a line 11 to a time controlled switch 12, while the opposite side of the thermostat 9 is connected through a line 13, leading to the relay switch in the starter control unit 7. The line 13 is common to both thermostats 9 and 10, as shown in Fig. 1. The opposite side of the thermostat 10 is connected through a line 14 directly with the starter control unit 7.

The time control switch 12 is connected with a fuse box generally indicated at 15, which in turn is supplied with a source of electric current such as 110 v., generally indicated at 16.

The pump 5 will circulate hot water through the heating system and to the boiler 1 when this pump is operated by the energizing of the motor 6. The pump is located in the return pipe of the hot water system, and the latter is utilized also as the source of control for the operation of the

pump by the connection of the "day" and "night" thermostats in the return pipe 3, which latter are utilized for controlling the operation of the pump to maintain the temperature of the heating system which thereby maintains an even temperature in the system at all times and enabling the temperature in the boiler 1 to be maintained at a maximum point so that the same boiler may be used for heating the hot water supply coil 4 of the domestic hot water system.

This temperature control may be used for any number of different apartment units and yet all of these may be heated and controlled in connection with a single boiler for both day and night operation as well as the supply of domestic hot water. At the same time, only two thermostats are required which may be set manually or controlled by the time clock 12, as desired. Where the latter is used, only one setting is all that is required for a heating season.

Where this temperature control is installed in place of any other control system, the only change needed is to balance the heating system which may be done by anyone having some knowledge of heating systems, and the installation of the necessary units, as here described. The installation cost is very low relatively due to the simplicity of the system.

This temperature control has been proven to effect a very substantial saving in fuel consumption as a result of the utilization of the return pipe for controlling the temperature of the hot water heating system. At the same time, it does not require a separate boiler for night operation, but one boiler may be used for both day and night operation as well as for domestic hot water supply.

While the invention has been illustrated and described in one embodiment, it is recognized that variations and changes may be made therein without departing from the invention as set forth in the claims.

I claim:

1. In a water heating system including a water heating boiler and a water circulating room heating system connected therewith including a return pipe extending to the boiler, the combination with a pump connected in the return pipe for forcing the water therethrough to the boiler, of separate day and night thermostatic controls connected with the return pipe and responsive to the temperature of the return water therein and respectively controlling the action of the pump, and a time control connected with the thermostatic controls for controlling the connection thereof with the pump selectively.

2. In a water heating system including a water heating boiler and a water circulating room heating system connected therewith including a return pipe extending to the boiler, the combination with a pump connected in the return pipe for forcing the water therethrough to the boiler and having an electric motor for operating said pump, of a starting switch connected with the motor for connecting a source of power therewith, day and night thermostatic controls connected with the return pipe and respectively connected with the starter switch for controlling the latter in response to temperature conditions of the water in the return pipe, and a time control switch for selectively connecting the thermostatic controls with the starter switch.

3. In a water heating system, the combination with a water heating boiler and a water circulating room heating system connected therewith including a return pipe extending from the room heating system to the boiler, of a pump connected in the return pipe for forcing the water to the boiler, separate day and night thermostatic controls having time controlled means connected therewith and connected with the pump and responsive to the temperature of the water in the return pipe for controlling the water circulating room heating system.

4. In a water heating system, the combination with a water heating boiler and a water circulating room heating system connected therewith including a return pipe extending from the room heating system to the boiler, of a pump connected in the return pipe for forcing the water to the boiler, separate day and night "Aquastats" in heat exchange relation with the return pipe, and time controlled means for connecting said "Aquastats" with the pump and controlling the water circulating room heating system.

5. In a water heating system, the combination with a water heating boiler and a water circulating room heating system connected therewith including a return pipe extending from the room heating system to the boiler, of a pump connected in the return pipe for forcing the water to the boiler, electric power means for operating said pump, control means for the electric power means including separate day and night "Aquastats" in the return pipe, and time controlled means connecting the "Aquastats" respectively with the electric power means.

6. In a water heating system, the combination with a water heating boiler and a water circulating room heating system connected therewith including a return pipe extending from the room heating system to the boiler, of a pump connected in the return pipe for forcing the water to the boiler, separate day and night thermostatic controls having time controlled means connected therewith and connected with the pump and responsive to the temperature of the water in the return pipe for controlling the water circulating room heating system, and domestic hot water heating means connected with the boiler and heated thereby.

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