April 19, 1949. H. BORGHESAN 2,467,519

HEATING AND COOLING PLANT

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Fig.1.

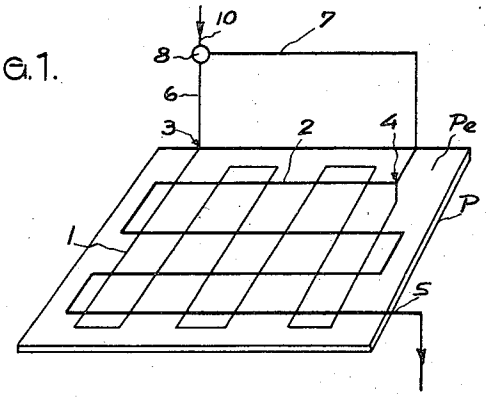


Fig.2.

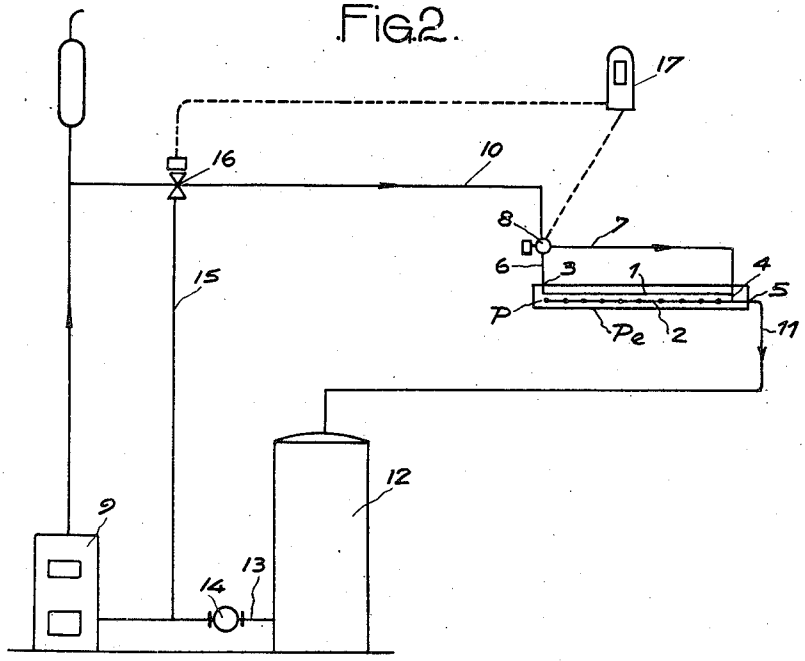
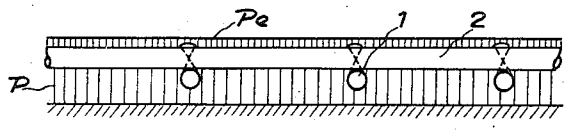


Fig.3.



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HEATING AND COOLING PLANT

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3 Claims. (Cl. 257—2)

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This invention relates to a heating or cooling plant constituted by radiating panels containing two heat exchange coils placed one above the other and in series, the beginning of the lower coil and the point common to both coils of each panel being connected through a three-way valve, or its equivalent, to the discharge point of a water temperature regulating device such as a boiler (or the refrigerator, according to the case), the entrance of the said boiler or refrigerator being connected through a pump to an accumulator for the cooled (or heated) water which is fed by the discharge of the upper coils of all panels, provision being made for a by-pass conduit allowing to put the boiler, or the refrigerator, out of the circuit feeding the aforesaid three-way valve, the said conduit being controlled by a thermostatic control which acts also on the said valve, in such manner that, in the case of a high (or low) temperature peak, the supply of hot (or cold) water to the entrance of the first coil is closed, the point common to both coils being supplied with cooled (or warmed) water coming from the said accumulator, and inversely in case of a low (or high) temperature peak.

This heating or cooling plant comprising radiating panels has less inertia than the known systems, since the radiating panels respond rapidly to the thermostatic regulating device, so that the differences of the temperature with respect to the prescribed value are of short duration, the comfort is increased, as well as the efficiency of the plant, in such manner that the expense of fuel is not higher than in ordinary installations comprising radiators, with respect to which the advantage of greater comfort is wholly obtained.

The annexed drawing shows by way of example an embodiment of the heating plant according to this invention, this plant being also adapted for operation, inversely, as a refrigerating plant.

Fig. 1 represents schematically, in perspective, a radiating panel which is shown separately.

Fig. 2 is a schematical elevational view of the entire plant.

Fig. 3 is a vertical partial section of a radiating panel.

As shown on the drawing, the radiating panels P employed in the plant contain two tubular coils 1 and 2, the second being placed above the first, that is to say nearer to the emitting surface Pe. 3 is the entrance of the lower coil, 4 is the point common to both coils and constituting the entrance of the second one, and 5 is the discharge end of the latter.

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The points 3 and 4 of all panels are connected to two main conduits 6 and 7 leading to two entrances of a three-way valve 8 the third entrance of which is connected by a pipe 10 to the boiler 9 of the plant. All discharge points 5 are connected to a pipe 11 which leads to a cooled water accumulator 12, which is in its turn connected to the boiler 9 by a pipe 13, a pump 14 being interposed. Between the pipe 10 and a point of the pipe 13 between the pump and the boiler is connected a by-pass conduit 15. A motor-controlled valve 16 is mounted at the junction of conduit 15 and pipe 10, this valve being actuated by a device controlled by a thermostat 17, which controls at the same time the valve 8.

The plant operates as follows: When the temperature in the rooms to be heated tends to increase above the prescribed temperature, the thermostat 17, which is placed in a test room, acts upon the motor-controlled valve 16 which puts out of circuit the generator 9 and opens the circulation through the by-pass 15. At the same moment, the valve 8 is put into such a position that the coil 2 is fed with cooled water, while the normal feeding of the coil 1 is arrested. The fluid flowing through the arrangement is then at a low temperature, i. e. at the temperature of the returning fluid, and exerts a refrigerating action until the balance is restored in the heated rooms.

It is to be noted that the cooling action is brought about only by the upper coil 2 which is very near to the emitting surface, so that the bulk of materials to be cooled is reduced to the upper layers of the panels and does not extend through the entire mass of the same, procuring thus a quick and efficient cooling action.

When the temperature in the rooms tends to descend below the allowed limit, the thermostat, acting inversely, reestablishes the normal heating cycle.

The device as described may of course be used, by an inverse operation, to the cooling of rooms or other spaces during the hot season, the boiler being replaced by a cold generator and the accumulator receiving the water which has been warmed by its cooling action.

What I claim is:

1. A heating plant comprising a boiler, a radiating panel, two heat exchange coils placed in said panel, one above the other and mounted in series, a three-way valve connecting the beginning of the lower coil and the point common to both coils of said panel to the discharge point of the said boiler, an accumulator for the cooled water connected with the discharge end of the

upper coil in said panel and connected also to the entrance of said boiler, a by-pass conduit connecting the entrance to the discharge point of the said boiler, a by-pass valve in said by-pass conduit, and thermostatically controlled means adapted, when the temperature rises above a predetermined value, to open the said by-pass valve so as to put the boiler out of circuit, and simultaneously to put the said three-way valve into a position where the supply of hot water to the first coil is closed and the point common to both coils is fed with cooled water from the said accumulator, and inversely when the temperature falls below a predetermined value.

2. A cooling plant comprising a refrigerator, a refrigerating panel, two heat exchange coils placed in said panel, one above the other and mounted in series, a three-way valve connecting the beginning of the lower coil and the point common to both coils of said panel to the discharge point of said refrigerator, an accumulator for the warmed water connected to the discharge end of the upper coil of said panel and connected also to the entrance of the said refrigerator, a by-pass conduit connecting the entrance to the discharge point of said refrigerator, a by-pass valve in said by-pass conduit, and thermostatically controlled means adapted, when the temperature falls below a predetermined value, to open said by-pass valve so as to put the refrigerator out of circuit, and simultaneously to put the said three-way valve into a position where the supply of cold water to the first coil is closed and the point common to both

coils is fed with warmed water from the said accumulator, and inversely when the temperature rises above a predetermined value.

3. A temperature regulating system comprising a water temperature regulating device, a heat exchange panel, two heat exchange coils in said panel, one coil above the other and mounted in series, a three-way valve connecting the beginning of the lower coil and the common connection of both coils of said panel to the discharge of said device, an accumulator for the water connected with the discharge end of the upper coil in said panel and connected also to the entrance of said device, a by-pass conduit connecting the entrance to the discharge of said device, a by-pass valve in said by-pass conduit, and thermostatically controlled means for regulating said by-pass valve, and simultaneously for adjusting said three-way valve to selectively supply the temperature regulated water to the first coil or to the common connection of both coils depending upon the change in the temperature.

HENRI BORGHESAN.

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