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WET BULB THERMOSTAT CONTROL

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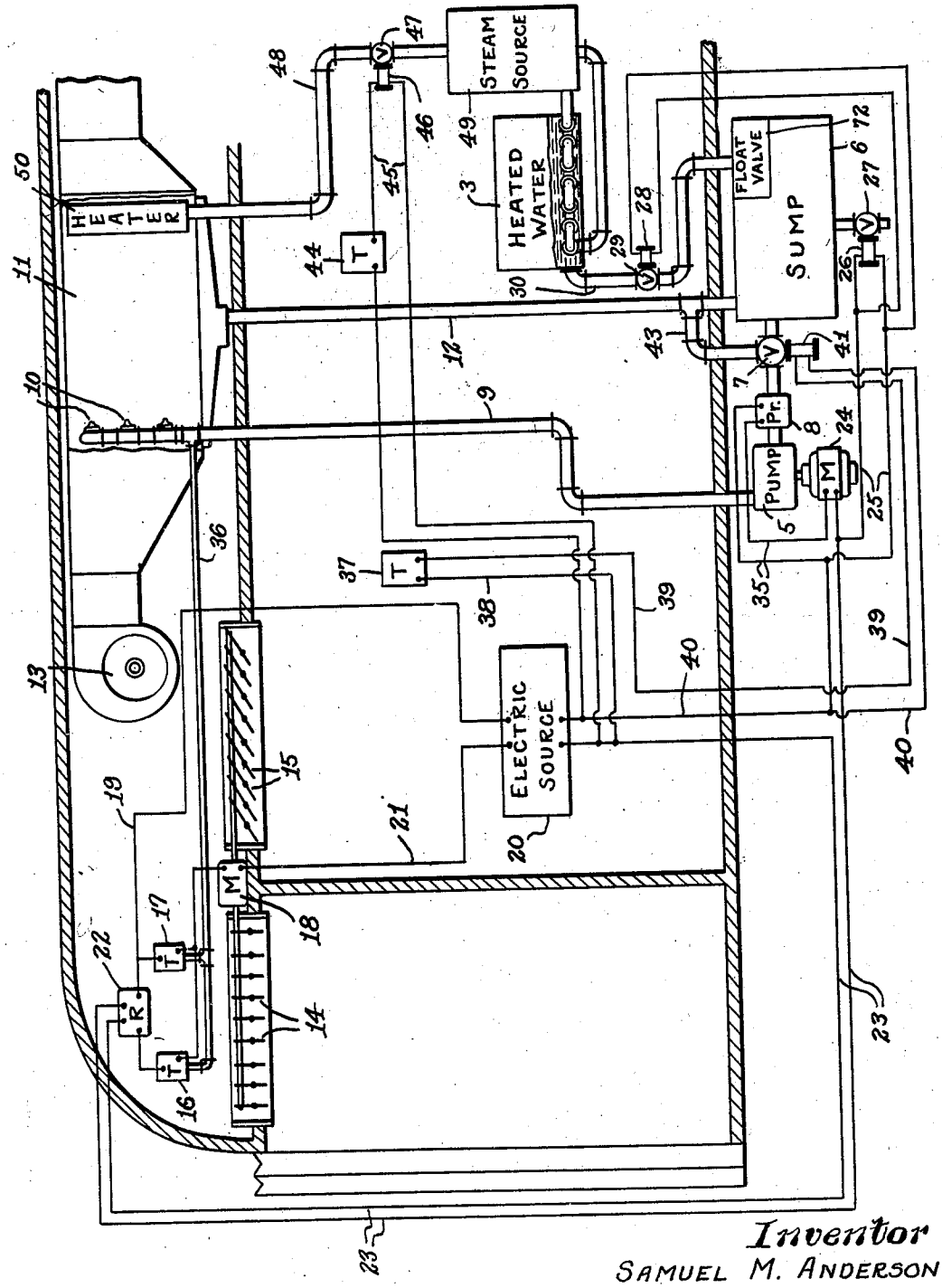

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WET BULB THERMOSTAT CONTROL

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2 Claims. (Cl. 236—44)

This invention relates to the conditioning of air for passenger vehicles and has for its general object the operation of an air conditioning system for passenger vehicles to condition all outdoor air whenever feasible from an economic standpoint.

In prior air conditioning systems for passenger vehicles, such for example, as railway passenger cars, it has been the practice to supply at all times 75% recirculated air and 25% fresh outdoor air for conditioning air supplied to the passenger space. Recirculated air not only contains harmful bacteria and carries odors but its quality despite all artificial conditioning cannot approximate that of temperature conditioned outdoor air.

According to this invention, 100% outdoor air is normally used with no recirculated air admitted except at extremely low outdoor temperatures and at extremely high outdoor wet bulb temperatures.

The invention will now be described with reference to the drawing which illustrates diagrammatically one embodiment of the invention applied to a railway passenger car.

The pump 5 draws water from the chilled water sump 6 through the three-way valve 7 and pressurestat 8 and supplies it through the pipe 9 to the spray nozzles 10 in the overhead air conditioning unit 11. Water returned from the spray is drained back through the pipe 12 into the chilled water sump 6.

The blower 13 draws outdoor air through the dampers 14 and recirculated air through the dampers 15 and supplies it into the unit 11.

The wet bulb thermostats 16 and 17 are exposed to the outdoor air. Thermostat 17 has its contacts in the circuit including the damper motor 18, the wires 19 and 21 and the electric source 20 and acts when the wet bulb temperature is at or below say 70° F., to cause the motor 18 to adjust the fresh air dampers 14 to full open position and to close the recirculated air dampers 15.

The thermostat 16 is connected through the relay 22 to the above described damper motor control circuit and acts when the outdoor temperature drops to 32° F., to cause the motor 18 to adjust the fresh and recirculated air dampers to say 25% outdoor and 75% recirculated air. The thermostat 17 also makes this adjustment when the outdoor wet bulb temperature is above 70° F.

The two thermostats 16 and 17 cooperate to provide 100% outdoor air when the outdoor wet bulb temperature is between 70° F. and 32° F., and to provide partial recirculation when the outdoor temperature is above 70° F. and below 32° F. This arrangement provides 100% outdoor air when conditions are such that too great a load on the heating or cooling systems are not required.

When the thermostat 16 acts at 32° F., the relay 22 is actuated to open contacts in the circuits including the wires 23, the electric source 20, the pump motor 24, the wires 35 and pressurestat 8, and solenoid 26, causing the motor 24 to become deenergized to stop the pump 5, and causing the solenoid 26 to open the valve 27 to drain the water from the sump 6 to prevent its freezing.

The solenoid 28 is connected in shunt to the solenoid 26 and the two solenoids and the motor 24 are energized when the outdoor temperature again rises above 32° F. by the closing of the contacts of the relay 22 and the completion of the last mentioned circuits. The solenoid 26 then closes the valve 27, the motor 24 starts the pump 5 and simultaneously the solenoid 28 acts to open the valve 29 in the pipe 30 connecting the heated water source 31 and the float valve 32 in the sump 6, to supply heated water to the sump.

The pressurestat 8 acts when no water is in the pump suction line to open the energizing circuit of the motor 24 to prevent the pump from operating.

The thermostats 16 and 17 which may be of any well known type are preferably provided with drip collecting funnels as illustrated and described in the application, Serial No. 231,457, filed September 24, 1938 by C. W. Peterson. They are supplied with water through the pipes 36 and 9 from the pump 5 and when the pump is shut down, act as dry bulb thermostats due to the absence of water from the evaporator surfaces. The internal diameter of the pipe 36 is preferably constructed so that the volume of water supplied through it to the thermostats 16 and 17 is that which would be expected to be evaporated therein.

The car thermostat 37 has its contacts connected in the circuit including the wires 38, 39 and 40, the solenoid 41 and the electric source 20 and acts at say 72° F. to actuate the solenoid 41 to adjust the 3-way valve 7 so that the pump draws water through the bypass pipe 43 in recirculation instead of drawing water from the sump 6. If the car temperature rises above 72° F., the thermostat 37 adjusts the solenoid 41 and valve 7 so that the pump water is drawn from the chilled water sump 6.

If the car temperature continues to fall after

the thermostat 37 has opened the bypass around the chilled water supply, the auxiliary thermostat 44 is actuated at say 68° F. to close the circuit including the wires 45, the solenoid 46 and the electric source 20, causing the solenoid 46 to open the valve 47 in the pipe 48 between the steam source 49 and the air heater 50.

It is seen that this invention not only provides an air conditioning system utilizing all outdoor air except beyond extreme temperature limits, but provides safety features preventing damage to equipment and avoiding discomfort to passengers.

While one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the exact apparatus and arrangement of apparatus illustrated since modifications thereof may be suggested by those skilled in the art without departure from the substance of the invention.

What is claimed is:

1. An air conditioning system comprising an air conditioner, means for supplying outdoor and recirculated air into said conditioner, means including a tank exposed to outdoor air for supplying water to said conditioner, means including a valve for draining the water from said tank, and means including an outdoor thermostat for adjusting said first mentioned means for decreasing the proportion of outdoor air and for opening said valve for draining said tank when the outdoor air approaches the water freezing temperature.

2. An air conditioning system comprising an air conditioner, means for supplying outdoor air and recirculated air into said conditioner, a wet bulb thermostat exposed to the outdoor air entering said conditioner, means including a tank exposed to outdoor air for supplying water to said conditioner and to said thermostat, means including a valve for draining the water from said tank, and means including said thermostat for adjusting said first mentioned means for decreasing the proportion of outdoor air and for opening said valve for draining said tank when the outdoor air approaches the water freezing temperature.

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