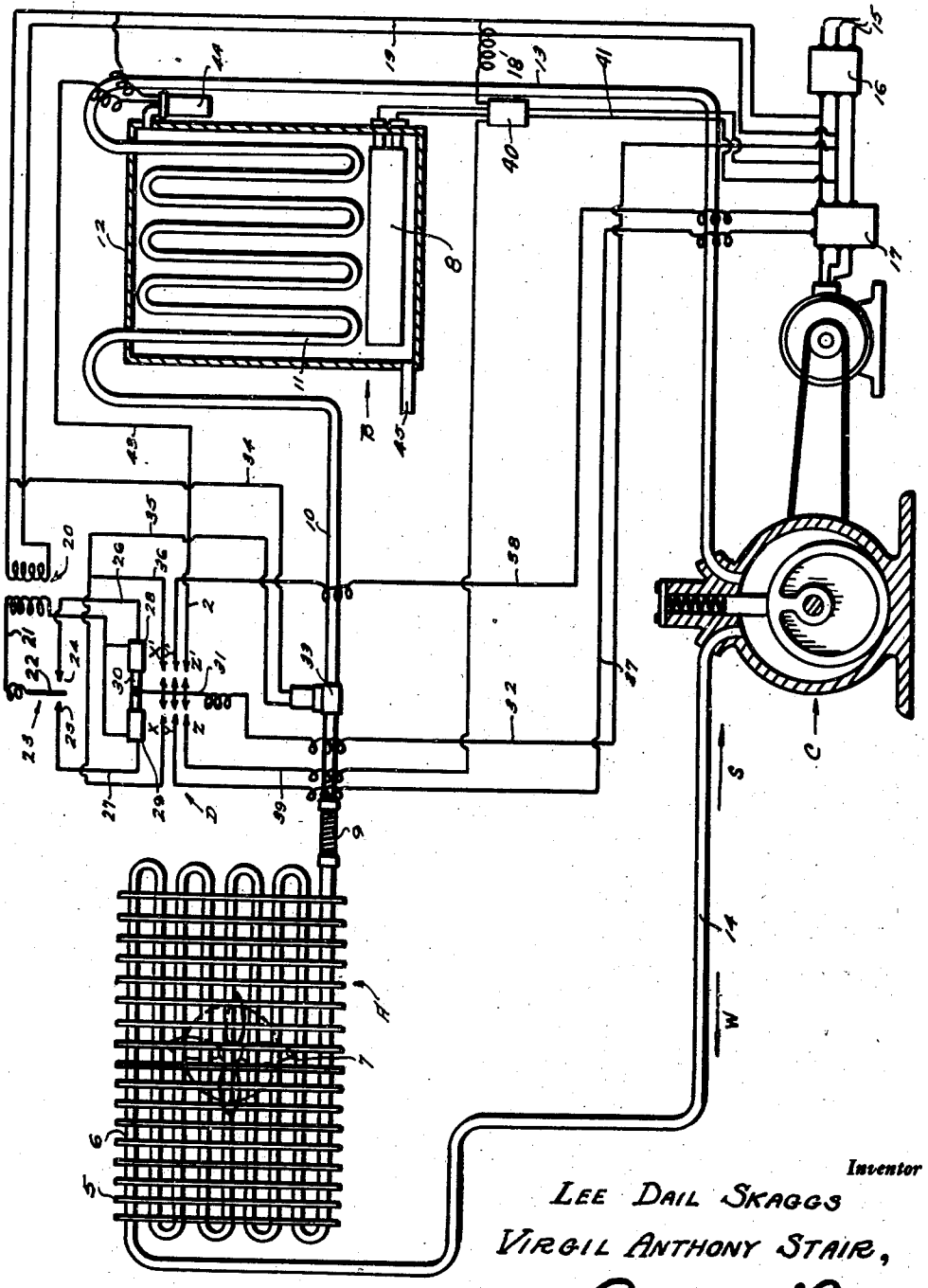
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TEMPERATURE CONTROL SYSTEM

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TEMPERATURE CONTROL SYSTEM

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1

This invention relates to new and useful improvements in temperature control systems for dwellings and other buildings.

The principal object of the present invention is to provide an air conditioner adapted to raise the temperature when needed as well as to lower the same under varying temperature conditions. More particularly, the system will automatically keep the temperature of a building constant the year around regardless of sudden changes in temperature. The apparatus acts as a summer air conditioner, cooling the air by refrigeration when the building temperature is above normal. When the temperature drops below normal the entire system goes into reverse action, thereby warming the air by the introduction of electric heat means.

Other important objects and advantages of the invention will become apparent to the reader of the following description.

In the drawing, the single view denotes the duplex system, the same being shown diagrammatically.

Referring to the drawing wherein like numerals designate like parts, it can be seen that the system includes broadly units A and B, a compressor C and switching means D.

The unit A is a conditioner which is made up of a plurality of fins 5 and a coil 6 having its various flights or convolutions passing therethrough, and in conjunction with this there is provided a fan 7.

The unit A during summer conditioning, acts as an evaporator, while the unit B acts as a condenser, thus carrying the heat from the conditioner or evaporator A to the condenser B, where it is cooled by the water in the tank.

In winter conditioning, the conditioner or unit A acts as an air-cooled condenser, discharging heat from the evaporator in the hot water tank B which is kept hot by the provision of an electric heater 8; said heater is arranged within the tank. The said electric heater when operated keeps the water in the tank B at the temperature of around 60° F. during the period when the tank is being used as an evaporator.

One end of the coil 6 is connected by a capillary tube 9 to a pipe 10 which connects to a coil 11 in a tank 12 which forms part of the unit B. The capillary tube 9 restricts the flow of the refrigerant in either direction and is, therefore, operative during both the winter and the summer cycle. From the other end of the coil 11 a pipe 13 extends to one side of the compressor C. The other side of the compressor C is connected by a pipe 14 to the other side of the coil 6 of the unit A.

2

Numeral 15 denotes the current supply line having a fuse block 16 therein. This supply line extends to a motor reverse control 17.

From the supply line 15 conductors 18, 19 extend to the primary of a stop-down transformer 20. The secondary of the transformer 20 has one side connected by a jumper 21 to a thermal element 22 of a room thermostat 23, the thermal element 22 being operative between contacts 24, 25 which are connected by jumpers 26, 27, respectively, to solenoids 28, 29. The solenoids 28, 29 operate an armature 30 to which is connected a carrier 31 on which are three bridge members. The carrier 31 is connected by a conductor 32 to the main line.

In the pipe 10 between the units A, B is an electro solenoid control valve 33 which has one side connected by a jumper 34 to the conductor 19, while the other side is connected by a conductor 35 to contact X which is on the other side of the corresponding bridge member from a contact X', the latter being connected by a jumper 36 to the same jumper 35. Valve 33 is therefore only open when the compressor has been switched in and is running. It prevents flooding of coil A when the installation is not running.

Extending from the motor reverse control 17 is a conductor 37 which connects to a contact Y which is on the other side of the corresponding bridge member from a contact Y' which is connected by a conductor 38 also to the motor reverse control 17. There is a third bridge member on the carrier 31 and at one side of this is a contact Z which is connected by a jumper 39 to a high voltage switch 40 for the heater 8, current being supplied to this switch by way of conductors 41 from the current supply line 15. The other side of the high voltage switch 40 is connected by a conductor 42 to the conductor 19. The opposite contact Z' of the switch mechanism D is connected by a conductor 43 to an electric solenoid switch control 44, the opposite side of this switch being connected to the conductor 19.

A cold water inlet pipe 45 is provided for the water tank 12. The solenoid valve 44 on the water tank 12 controls the cold water circulation for summer conditioning. This valve in cold weather cuts off the cold water circulation from the tank 12 so that the electric heater can raise the temperature and heat water in the tank 12. With coil 11 heating, while the electric heater is cut off, the control and solenoid valve 44 at the top of the tank opens to allow cool water to circulate through tank B for cooling coil 11. When the cycle is reversed the coil 11 starts to cool the

water in the tank and then the circulation of water through tank B is cut off by the said solenoid valve, while the electric heater is switched in to keep the water at a temperature of approximately 60° F.

Referring now to the drawing and particularly to the pipe 14, it can be seen that the arrow pointing to the right designates direction of refrigerant in the system with the compressor C running counter-clockwise affording summer time conditioning. The arrow pointing toward the left indicates direction of the refrigerant with the compressor running clockwise affording winter time conditioning.

In the operation of the system, assume that contact 25 of the thermostat 23 is engaged by the element 22, this results in the closing of switches X, Y and Z. When the correct temperature is reached, the contact 25 is disengaged, letting the switch contacts X, Y and Z move back to neutral position. If the temperature requires lowering, engagement of the element 22 of the thermostat 23 with the contact 24 causes the switch contacts X', Y' and Z' to be engaged by the carrier 31, and when the correct temperature is reached, the contact 24 is disengaged, thus permitting the contacts X', Y' and Z' to be disengaged.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention, what is claimed as new is:

1. An air conditioning system for reversible operation, one of said operations involving heating and the other cooling of the air to be conditioned, comprising a system provided with an air exposed fluid conducting coil, capable of acting as an evaporator in warm weather and as an air cooled condenser in cold weather, a tank system provided with means for circulating a fluid through said tank and further provided with a fluid conducting coil embedded in the fluid circulating through said tank, an electric heater within said tank, electrically controlled means for controlling said heater, electrically controlled means for controlling the circulation through the tank, a double fluid connection between the air exposed coil of the evaporator-condenser system and the coil of the tank system embedded in the tank fluid, an electrically controlled valve and a restriction inserted into one of said connections, a reversible compressor inserted into the other connection, a motor for driving said compressor, a reversing switch for said motor, means for supplying said motor with electric current, means associated with the supply of current to the motor in either direction for controlling the valve in the aforesaid connection between the coils and means associated with the reversing switch controlling the direction of rotation of the motor for controlling the aforesaid electric heater controlling means and circulation controlling means.

2. An air conditioning system for reversible operation, one of said operations involving heating and the other cooling of the air to be conditioned, comprising a system provided with an air exposed fluid conducting coil, capable of acting as an evaporator in warm weather and as an air cooled condenser in cold weather, a tank system, provided with means for circulating a fluid through said tank and further provided with a fluid conducting coil embedded in the fluid circulating through said tank, an electric heater within said tank, electrically controlled means for controlling said heater, electrically controlled means for controlling the circulation through the tank, a double fluid connection between the air exposed coil of the evaporator-condenser system and the coil of the tank system embedded in the tank fluid, an electrically controlled valve and a restrictor inserted into one of said connections, a reversible compressor inserted into the other connection, a motor for driving said compressor, a reversing switch for said motor, means for supplying said motor with electric current, a thermostatically controlled switch with a movable armature adapted to occupy two positions to make connections in both positions, contacts controlling the heater of the tank closed in one of these positions, contacts controlling the circulation of a cold fluid through the tank closed in the other position and contacts in both positions of the switch for controlling the valve inserted into the connection between the air exposed coils and the tank enclosed coils.

3. In an air conditioning system as specified in claim 2, a thermostatic switch adapted to control two circuits, a solenoid in each circuit, means for moving an armature in one of two positions by the energization of one of said circuits and connections with the reversing switch of the driving motor of the compressor, controlled by the contacts of said armature.

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