July 11, 1944. G. L. CHEASLEY 2,353,146

AUTOMATIC HEATING SYSTEM

Filed Aug. 14, 1941 2 Sheets-Sheet 1

Fig. 1

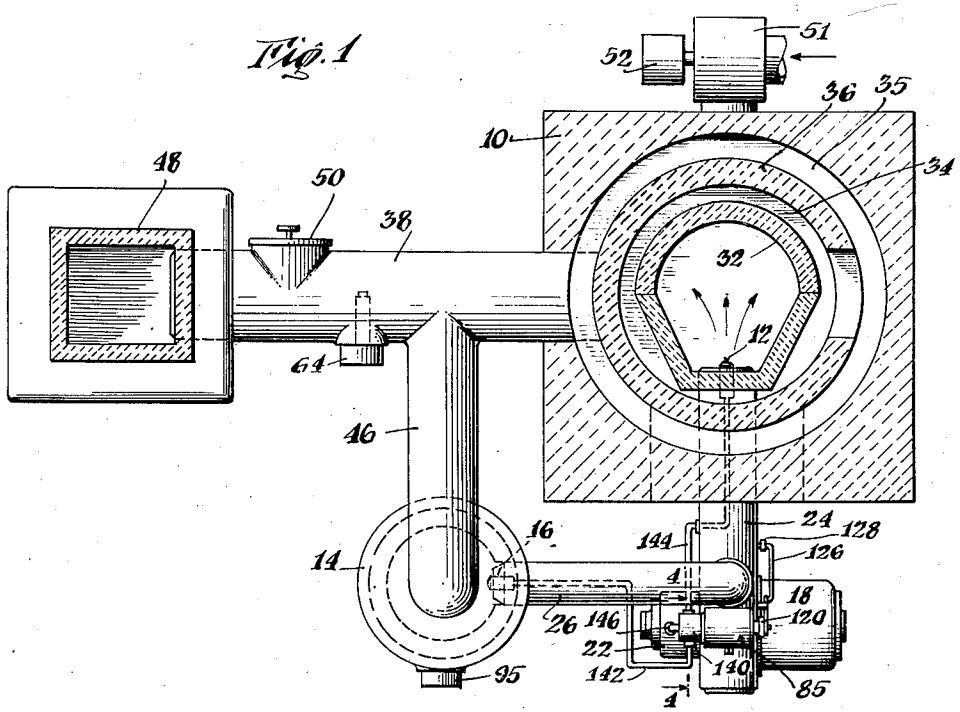
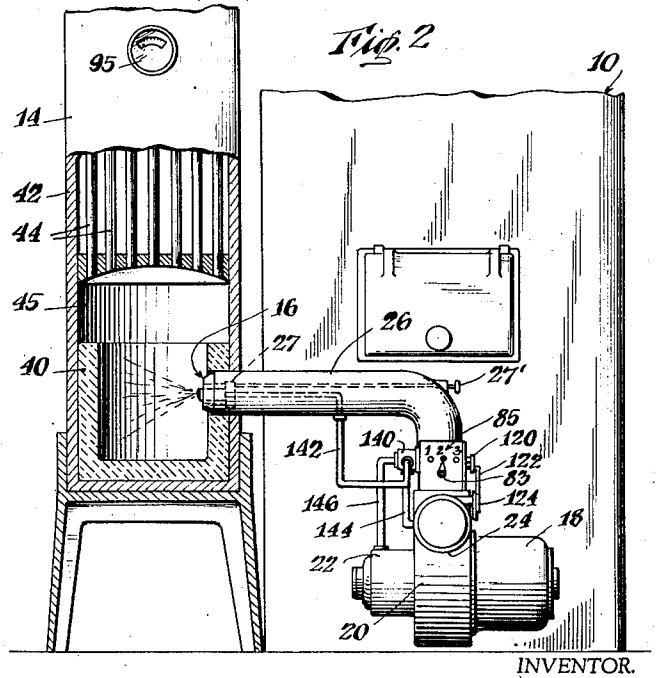


Fig. 2



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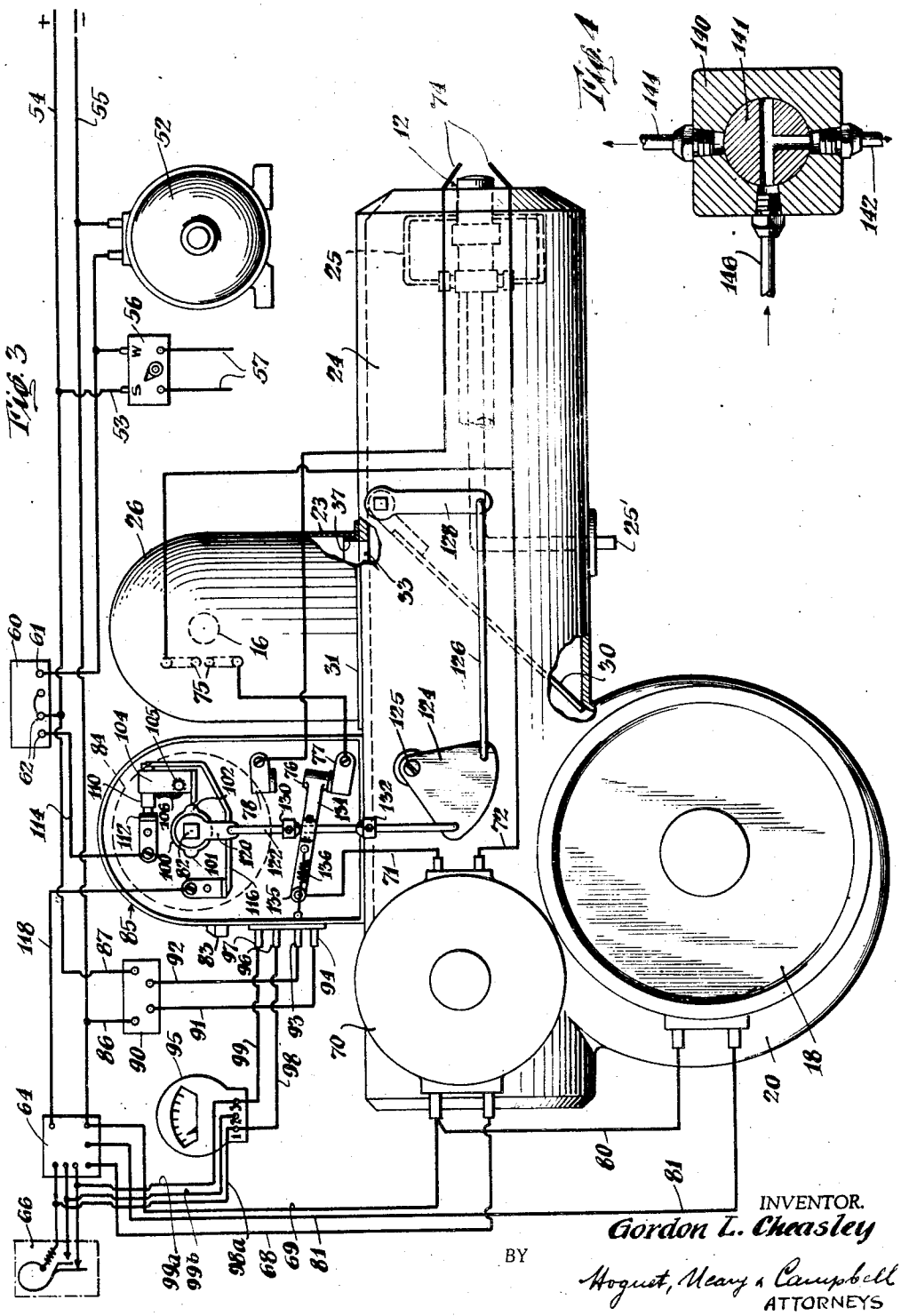


Fig. 3

Fig. 4

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AUTOMATIC HEATING SYSTEM

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21 Claims. (Cl. 237—2)

This invention relates to heating systems and more particularly to a combined air conditioning and hot water heating system having a common source of fuel and air supply and control means therefor.

Combined air conditioning and hot water heating systems have been proposed heretofore with the idea of using a single burner. An objection to this type of air and hot water heating system is that during the summer months an excessive amount of fuel is required to heat the larger furnace or heat exchange system by which the domestic hot water is provided. Other systems heretofore proposed include separate furnace and burner installations for the air heater and the hot water heater. The air heating system usually uses coal or oil as an economical fuel while the hot water heater may be provided with gas fuel. This type of installation requires a larger initial installation and equipment cost together with a higher fuel cost for the water heater.

One of the objects of the present invention, therefore, is to provide an air heating or conditioning and hot water heating system having low initial cost and economical fuel requirements.

Another object of the invention is to provide an air conditioning and hot water heating system in which the hot water heating may take place without any appreciable interference with the heating function of the air conditioning unit in winter operations and without affecting the temperature of air or other cooling fluid medium circulated through the air ducts of the unit in summer operations.

Still another object of the invention is to provide an air conditioning and hot water heating system having separate burners and a common fuel and air supply together with means to regulate the supply of fuel and air so that the hot water can be maintained at or near a predetermined temperature without any appreciable interference with the normal operation of the air heater.

A further object of the invention is to provide an air conditioning and hot water heating system with a common fuel and air supply together with a control and a common ignition transformer whereby the same motor, pump, blower and ignition transformer are used for each burner, and in which the capacity of these units need not be greater than that required by the larger of the burners installed, and thereby effect a great saving in parts.

An additional object of my invention is to provide a novel dual burner installation for two separate heaters having a common source of fuel and air supply; also a control for selectively determining to which of two burners the supply of fuel and air should be delivered.

I accomplish the foregoing and additional objects and features of my invention by providing two separate heat exchange units for the air heating system and the hot water heater, together with individual burners having in common an ignition transformer and a source of fuel and air supply including a motor driven pump and blower. The system is provided with the usual temperature and safety controls normally included in properly installed air heating or conditioning systems, together with an automatic control unit, including a motor and switch means controlling the motor operating circuit, which is responsive to a demand for heat to be supplied to the hot water heater to command the supply of fuel and air for the hot water heater. The demand for heat is evidenced by a change in current flow condition in an aquastat circuit, as, for example, by the closing of such circuit.

The command of the supply of fuel and air for the burner of the hot water heater is effected through actuation of a valve and a damper by the motor of the automatic control unit which is energized in response to the closing of a switch built into the control unit or the motor thereof, the switch in turn responding to a change in current flow conditions in the aquastat circuit, such as may be produced by the closing of such circuit, when the water temperature has dropped to a predetermined point. The valve and damper are returned to normal positions by the unit when the water is heated to a predetermined temperature as is evidenced by a second change in current flow in the aquastat circuit, such as may be produced by the opening of such circuit. The automatic control unit also controls the electric circuits to the ignition means of the two burners in accordance with the delivery of fuel and air thereto.

The dual burner installation is so constructed that the burners can be easily installed and the burner for the water heater disposed on that side of the air heater where it is most convenient to locate the hot water heater. The flue for the hot water heater is joined with the flue of the air heater at a point spaced from the heat exchange portions of the air heater so that no heat transfer to the air ducts of the air heater from the hot water heater is possible.

For a more complete understanding of the invention, reference will be had to the following

detailed description which is to be read in connection with the accompanying drawings, in which:

Fig. 1 is a sectional view in plan of the air conditioning and hot water heating system of my invention;

Fig. 2 is a view in vertical elevation with parts broken away to illustrate the details of the hot water heater;

Fig. 3 is a view in elevation of the burners as viewed from the right hand side of Fig. 2, with electrical connections and controls therefor shown diagrammatically; and

Fig. 4 is a sectional view of the three-way valve taken on line 4—4 of Fig. 1.

Referring to Figs. 1 and 2 of the drawings, I show for purposes of illustration a furnace 10. It will be understood that the furnace 10 may be of any desired type and may be used for generating steam or heating water or air and may be provided with any desired type of burner 12. For purposes of illustration, I show the furnace 10 as an air heating unit provided with a pressure atomizing gun type of oil burner. The water heater 14 is likewise provided with an oil burner 16 of the same type, although it may be of a smaller capacity.

Common to the two burners 12 and 16 are a motor 18, a blower 20, a fuel pump 22 and an ignition transformer 70. The air from the blower 20 is supplied through the tube 24 to the burner 12 and through a branch tube 26 to the burner 16. The flow of air to the burners is controlled by a damper 30 (Fig. 3), the operation of which will be hereinafter described, and individually adjustable air flow controls 25 and 27 in the burner tubes 24 and 26 respectively (Figs. 2 and 3). The controls 25 and 27 have manually actuatable means 25' and 27' by which they can be adjusted.

The tube 26 is universally mounted on the tube 24 so that the water heater 14 may be positioned at any one of a plurality of possible locations about the air heater 10. The mounting comprises an annular element 31 suitably secured about an opening 33 to the side of the tube 24. The element 31 is provided with an inwardly disposed annular flange 37 about which the vertical portion 23 of the tube 26 telescopes.

The hot air heater 10 comprises a fire box 32 surrounding by a double air jacket having an inner air space 34 and an outer air space 35. The combustion gases from the fire box 32 pass through a cylindrical jacket 36 interposed between the air spaces 34 and 35 before passage to the flue 38. The air heated in the spaces 34 and 35 is delivered through suitable ducts to the rooms or spaces to be heated.

The hot water heater 14 is shown for purposes of illustration as being of the fire tube type having a fire box 40 above which is provided a water tank 42 having a plurality of fire tubes 44 through which pass the combustion gases from the combustion chamber 45.

The products of combustion from the hot water heater 14 are conducted through a flue 46 to the flue 38. The flue 38 is connected with the usual chimney 48 and is provided with a suitable stack thermostat or other furnace control 64 between the connection for the flue 46 and the chimney whereby the control 64 can respond to the temperature conditions of the gases flowing from either the air heater 10 or the hot water heater 14.

Referring to Fig. 3 of the drawings, I have shown diagrammatically several controls 60, 64 and 66, which are normally used for hot air heaters and oil burners of the type illustrated. Since these controls are now conventional and may be purchased as units on the market, it is believed unnecessary to illustrate the details thereof.

To produce a circulation of air through the air jacket spaces 34 and 35 of the hot air furnace and the room or rooms to be conditioned, I provide a fan 51 (Fig. 1) driven by a motor 52. The motor 52 is so connected in the electrical control circuit that it may be independently controlled for summer use in connection with an air cooling unit or for such purposes as causing circulation of filtered air through the rooms. For this purpose I provide a circuit connection 53 across the electric wires 54 and 55 which is controlled by a manual switch 56. Where an air cooling or dehumidifying apparatus is used during summer weather, suitable connections such as 57 are provided whereby the motor 52 can be automatically controlled in conjunction with such apparatus.

The system is provided with the usual high limit temperature and circulating fan control 60 through which the other burner controls are connected at 62. The high temperature limit switch (not shown) of the control 60 operates to cut off the burner 12 should the temperature of the air heater 10 exceed a predetermined value. Likewise, the energization of the motor 52 is controlled through the connection 61 in accordance with the temperature of the heater 10. The fan control feature of the control 60 causes circulation of air through the air heater 10 and the rooms to be heated when the temperature of the air within the dome of the heater reaches a predetermined degree. The stack control 64 provides the usual safety features such, for example, as shutting off the pump and blower motor 18 and opening the circuit to the high voltage transformer 70 should the fuel and air mixture fail to ignite upon the lapse of a predetermined interval following an attempt to start the burner. Connected to the stack control and controlled therethrough is a common type of room thermostat 66 which responds to room temperature to normally determine the starting and stopping of the main burner 12.

Leading from the stack control 64 are wires 68 and 69 which are connected to a high voltage transformer 70. The connections 71 and 72 on the high voltage side of the transformer 70 are connected to the ignition points 74 of the main burner 12 and the ignition points 75 of the burner 16. To control the energization of the points 74 and 75 I provide a snap action switch 76 which is adapted to engage one or the other of the stationary contacts 77, 78 to determine which of the two sets of points 74 and 75 are to be energized. The operation of the switch 76 in its cooperation with the burner controls will be described hereinafter.

A wire 80 extending from the wire 69 and a third wire 81 connected to the stack thermostat 64 are connected to the blower motor 18. By these connections it will be seen that the blower motor 18 and the ignition points 74, 75 are controlled through the thermostat controls 64 and 66, subject, of course, to the high temperature limit switch 62.

Interposed in the control system to the burners heretofore described is my novel automatic control unit for the operation of the dual burners. When heat is required for the hot water

heater the fuel and air supply will be diverted from the main burner 12 to the burner 16. A very short period of time is required to raise the temperature in the hot water boiler because of the heating capacity of the heater 14. A diversion of the fuel and air supply from the burner 12 during operation thereof does not affect appreciably the heating function of the heater 10 because of the residual heat accumulated in the walls of the heater after a short period of burner operation. This residual heat is normally sufficient to maintain a supply of heat for circulation by the fan driving motor 52 for the period during which the fuel and air supply is diverted. This is further apparent since, during normal operation of an air heater, the operation of the burner thereof in response to a continuous demand for heat is intermittent. The heat, for example, supplied by the burner 12 when it exceeds a predetermined amount actuates the high limit control switch 62 to cut off the burner 12 while the fan 51 is maintained in operation until a large part of the heat in the furnace is dissipated and the temperature reduced below a predetermined value. Thus a diversion of the fuel and air supply to the heater for the short intervals required by the hot water heater does not, in accordance with my invention, interfere materially with the heating function of the air heater 10.

Referring more particularly to Fig. 3 of the drawings, the novel control unit 85 comprises a motor 84 of known type which is provided with built in reduction gearing and switches. Since this type of motor is well known, the details thereof have not been illustrated and it is believed require no discussion other than that the motor is adapted to be energized, through the intermediary of built-in switch means, not shown, in response to the closing of a two-wire thermostat circuit to drive the shaft 82 thereof through 180° and then stop. The motor is also adapted to be energized again, through the intermediary of switch means, not shown, when the thermostat circuit opens, and thereupon drives the shaft 82 through another 180°. The motor is provided with a manual switch 83 which takes precedence over the thermostat connections, that is to say, the switch 83 (Figs. 2 and 3) when in vertical or No. 2 position connects the motor for automatic operation. When in No. 1 position it connects the motor the same as when the thermostat circuit is closed and when in No. 3 position it connects the motor the same as when the thermostat circuit is open.

The power for operating the motor 84 for my control unit 85 is supplied through the lead wires 54 and 55 which are in turn connected respectively to the wires 86 and 87. The wires 86 and 87 are connected through a low voltage transformer 90 and the wires 91 and 92 to the terminals 93, 94 of the motor 84.

An aquastat 95 which is associated with the water heater 14 (Figs. 1, 2 and 3), is provided with terminals 1, 2 and 3, 1 and 3 of which are connected by the wires 98 and 99 to the terminals 96, 97 of a switch (not shown) which closes the energizing circuit of the motor 84. The terminals 1, 2 and 3 are connected by wires 98*a*, 99*a* and 99*b* respectively to the usual three control connections between the room thermostat 66 and the stack control 64. These connections provide parallel control of the blower motor 18 by the thermostat 66 and aquastat 95. The change of current flow condition in circuit connections 98, 99 from no current flow to current flow condition produced by the closing of the aquastat contacts, and from current flow to no current flow condition by the opening of such contacts, determines the operation of motor 84. In either case, the motor 84 is energized for operation through a 180° turn, the energization of the motor being effected through the intermediary of the built-in switch means which responds to the change of current flow condition in circuit connections 98, 99.

Mounted on the shaft 82 is a cam 100 which is provided with diametrically disposed raised portions 101 and 102. Associated with the cam 100 is a switch arm 104 which is pivoted at 105 and biased by a spring 106 to engage the surface of the cam 100. While the arm 104 is engaged by the raised portion 101 or 102, the movable contact 110 on the arm 104 is adapted to engage a stationary contact 112. The engagement of the contacts 110 and 112 completes a circuit from the high temperature limit switch connection 62 through a wire 114, contacts 110, 112, a flexible connection 116 and a wire 118 to the stack control 64. The opening of the contacts 110, 112 interrupts the circuits to the stack control 64 and thereby the circuits to the burner motor 18 and the high voltage transformer 70.

The interruption of the circuit to the blower motor 18 by the initial operation of the shaft 82 deenergizes the motor 18 until the cam 100 has revolved through 180°. During this movement a crank arm 120 carried by the shaft is moved from one position to another position diametrically opposite thereto. The crank arm 120 is connected to a rod 122 which in turn is connected to one corner of sector 124 which is pivoted at a second corner 125. A third corner of the sector is pivotally connected to a rod 126 which in turn is connected to the arm 128 of the damper 30.

The connecting rod 122 is provided with a pair of adjustable lugs 130 and 132 which are adapted to engage the movable arm 134 of the switch 76. The arm 134 is pivoted at 135 and is provided with a spring 136 which causes the arm 134 to have a snap action. Thus, as the shaft 82 moves from one position to another, such as moving the crank arm 120 from the downwardly extending position to an upwardly extending position, the damper 30 is moved from a lower position indicated in broken lines (Fig. 3) to a horizontal position closing off the air supply to the tube 26. During this movement of the shaft 82 the lug 132 on the rod 122 is adapted to engage the switch arm 134 and when it has moved past the horizontal the spring 136 will snap the arm upwardly for engagement with the stationary contact 78. This operation breaks the engaged relation of contact 76, 77 of the circuit to the ignition points 75 and closes contacts 76, 78 of the circuit to the ignition points 74.

The movement of the shaft 82 also controls the fuel supply to the burners 12 and 16. In the operation just described a three-way valve 140, the stem 141 of which is connected to the shaft 82 (Figs. 1, 2 and 4), is actuated to close the delivery connection 142 to the burner 16 and open the connection 144 to the burner 12. The third connection 146 communicates with the discharge side of the pump 22.

To summarize the operation of the dual burners it may be assumed that the system is under winter operations. Since the illustration in Fig. 3 is shown for hot water heating, it will be assumed that the hot water aquastat 95 has called

for heat and the burner 16 is now in operation. When the aquastat contacts are opened in response to a rise in water temperature, the motor 84 will be energized to drive the shaft 82 through 180° whereby the cam portion 102 will permit the switch arm 104 (Fig. 3) to move clockwise under the tension of the spring 106 to disengage contacts 110, 112. The disengagement of these contacts deenergizes the burner motor 18 thereby discontinuing the supply of fuel and air. The continued operation of the motor 84 raises the crank arm 120 causing the switch contacts 76, 77 to disengage and before the motor 84 is deenergized to cause the contacts 76, 78 to close due to the toggle action of the spring 136. This switch operation interrupts the ignition circuit to the ignition points 75 and completes the circuit to the ignition points 74 preparatory to the initiation of the main burner 12. The raising of the crank arm 120 to the upper position moves the damper 30 from the position shown in Fig. 3 to a position closing the communication from the blower 20 to the tube 26. The valve stem 141 being revolved 180° closes the connection 142 and opens the connection 144. At the end of the operation of the motor 84 the cam portion 101 is adapted to move the arm 104 counter-clockwise and effect the reengagement of the switch contacts 110, 112. By the reengagement of these contacts the control circuit through the stack control 64 is conditioned for reenergization of the blower motor 18. Should the room thermostat 66 call for additional heat the motor 18 and the ignition points 74 will then be energized, whereby the burner 12 will assume operation. Should the room thermostat 66 not be in a position to call for heat when the control motor 84 returns the controls to their normal connections, the system will remain idle until either the room thermostat 66 or the aquastat 95 is actuated.

From the foregoing description it will be clear that when the aquastat contacts are closed in response to a lowering of the hot water temperature, the control unit 85 will respond to disconnect the control circuit to the motor 18 and the transformer 70, change the positions of the fuel valve 140 and the damper 30 to direct fuel and air to the burner 16, and reconnect the control circuit to the motor 18 and the transformer 70.

Where the term "air conditioning and hot water heating system" is used in this specification and the appended claims, it is to be understood as including, besides those systems wherein air is merely heated and then circulated through a dwelling or other space, systems wherein air or another fluid medium is either humidified or dehumidified along with heating or cooling of such fluid prior to its introduction into the space to be affected thereby.

While I have shown and described but one embodiment of my invention, I recognize that many embodiments and modifications thereof are possible without departing from the spirit thereof. It should therefore be understood that the form of the invention herein illustrated and described is intended to be illustrative only and not as limiting the scope thereof.

I claim:

1. In an air conditioning and hot water heating system for supplying heat to a dwelling or other space to be heated and also supplying hot water as needed, a fluid heater and a hot water heater each having its own burner, means common to the heaters to supply fuel and air to the burners thereof, means responsive to the temperature of the space the atmosphere of which is to be heated to normally control the supply of fuel and air to the burner of the fluid heater, and means responsive to a drop below a predetermined value in the temperature of the water heated by the hot water heater to command the supply of fuel and air for the burner of the hot water heater to the exclusion of said fluid heater.

2. In an air conditioning and hot water heating system for supplying heat to a dwelling or other space to be heated and also supplying hot water as needed, a fluid heater and a hot water heater each having its own burner, a pump and a blower common to the two burners, a motor to drive said pump and said blower, a valve and a damper to determine to which of the burners the fuel and air is supplied, means responsive to the temperature of the space the atmosphere of which is to be heated to normally control the operation of said motor to supply fuel and air to the burner of the fluid heater, and means responsive to a drop below a predetermined value in the temperature of the water heated by the hot water heater to position the valve and damper so as to direct the supply of fuel and air to the burner of the hot water heater to the exclusion of said fluid heater.

3. In an air conditioning and hot water heating system for supplying heat to a dwelling or other space to be heated and also supplying hot water as needed, a fluid heater and a hot water heater each having its own burner, electrical ignition points for each burner, a motor, a pump and a blower common to said burners and driven by said motor, a valve and a damper to determine to which of the burners the fuel and air is to be supplied, means responsive to the temperature of the space the atmosphere of which is to be conditioned to normally control the energization of the ignition points of the burner of the fluid heater, and to control said motor to supply fuel and air to said burner, and means responsive to a drop in the temperature below a predetermined value of the water of the hot water heater to connect the ignition points thereof for energization and to position the valve and the damper so as to direct the supply of fuel and air to the burner of the hot water heater to the exclusion of said fluid heater.

4. In an air conditioning and hot water heating system, a fluid heater and a hot water heater each having its own burner, a motor, a pump and blower common to said burners and driven by said motor, a valve and a damper to determine to which of the burners the fuel and air is supplied, means responsive to the temperature of the space the atmosphere of which is to be conditioned to normally control the operation of said motor to supply fuel and air to the burner of the fluid heater, means responsive to a drop below a predetermined value in the temperature of the water heated by the hot water heater to position the valve and the damper so as to direct the supply of fuel and air to the burner of the hot water heater to the exclusion of said fluid heater, a switch to control said motor, and means to hold said switch open during the changing of the valve and damper positions.

5. In an air conditioning and hot water heating system, a fluid heater and a hot water heater each having its own burner, electrical ignition points for each burner, a motor, a pump and a blower common to and driven by said motor, a valve and a damper to determine to which of the burners the fuel and air is supplied, means re-

sponsive to the temperature of the space the atmosphere of which is to be conditioned to normally control the energization of the ignition points of the burner of the fluid heater and to control the operation of said motor to supply fuel and air to said burner, means responsive to a drop below a predetermined value in the temperature of the water heated by the hot water heater to connect the ignition points of the burner therefor for energization and to position the valve and damper so as to direct the supply of fuel and air to the burner of the hot water heater to the exclusion of said fluid heater, a switch to control said motor, and means to hold said switch open during the changing of the valve and damper positions.

6. In an air conditioning and hot water heating system, a fluid heater and a hot water heater each having its own burner, a source of fuel and air supply common to said burners, an air tube for each burner, a damper to selectively control the flow of air through said tubes, means to normally maintain the damper in position to direct air only through the tube associated with the burner of the fluid heater, and means responsive to a drop below a predetermined value in the temperature of the water of the hot water heater to move said damper to a position to divert substantially all of the supply of air through the tube associated with the burner of the hot water heater.

7. In an air conditioning and hot water heating system, a fluid heater and a hot water heater each having its own burner, a valve to determine to which of the burners fuel will be supplied, a blower, an air tube for each burner, a damper to selectively control the flow of air through said tubes, means to normally maintain the damper in position to direct air through the tube associated with the burner of the fluid heater, and means responsive to a drop below a predetermined value in the temperature of the water of the hot water heater to position said valve and said damper to direct the flow of fuel and air to the burner of the hot water heater to the exclusion of said fluid heater.

8. In an air conditioning and hot water heating system, a burner to provide heat for space heating purposes, another burner for a hot water heater, a valve to determine to which of the burners fuel will be supplied, electrical ignition points for each burner, a switch to control selectively the energization of said points, a source of air supply, an air tube for each burner, a damper to selectively direct air through said tubes, means normally to maintain the damper in position to direct air through the tube associated with the burner for space heating purposes, and means responsive to a drop below a predetermined value in the temperature of the water of the hot water heater to move said switch, valve and damper so as to connect the ignition points of the burner of the hot water heater for energization and to direct the flow of fuel and air thereto to the exclusion of said space heating burner.

9. In an air conditioning and hot water heating system for supplying heat to a dwelling or other space to be heated and also supplying hot water as needed, a fluid heater and a hot water heater each having its own burner, means common to the heaters to supply fuel and air to the burners thereof, means responsive to the temperature of the space the atmosphere of which is to be heated to normally control the supply of fuel and air to the burner of the fluid heater, a circulation blower motor for the fluid heater, means responsive to the temperature in said fluid heater to control said blower motor, and means responsive to a drop below a predetermined value in the temperature of the water heated by the hot water heater to command for a short interval and to the exclusion of the fluid heater the supply of fuel and air for the burner of the hot water heater, and said fluid heater having a residual heat capacity such as to normally maintain said blower motor in operation for at least a substantial portion of the usual interval during which fuel and air are diverted to the burner of the water heater and such diversion interrupts the operation of the fluid heater.

10. In an air conditioning and hot water heating system for supplying heat to a dwelling or other space to be heated and also supplying hot water as needed, a fluid heater and a hot water heater each having its own burner, means common to the heaters to supply fuel and air to the burners thereof, means responsive to the temperature of the space the atmosphere of which is to be heated to normally control the supply of fuel and air to the burner of the fluid heater, a circulation blower motor for the fluid heater, means responsive to the temperature in said fluid heater to control said blower motor, separate means to control the blower motor during hot weather, and means responsive to a drop below a predetermined value in the temperature of the water heated by the hot water heater to command for a short interval and to the exclusion of the fluid heater the supply of fuel and air for the burner of the hot water heater, and said fluid heater having a residual heat capacity such as to normally maintain said blower motor in operation for at least a substantial portion of the usual interval during which fuel and air are diverted to the burner of the water heater and such diversion interrupts the operation of the fluid heater.

11. A pair of burners, the first of said burners being adapted to supply heat for short periods and the second of said burners to normally supply heat for longer periods, a common source of fuel and air supply for said burners, a valve and a damper to control the flow of fuel and air to one or the other of said burners, a motor, and means responsive to a demand for heat from said first burner to energize said motor to move the damper and valve to positions for directing fuel and air to said first burner, and responsive to a satisfaction of said demand to again energize said motor to move the damper and valve to positions for directing fuel and air to said second burner.

12. A pair of burners, the first of said burners being adapted to supply heat for short periods and the second of said burners to normally supply heat for longer periods, a common source of fuel and air supply for said burners, a valve and a damper to control the flow of fuel and air to one or the other of said burners, electrical ignition points for each burner, a switch to control selectively the energization of said points, means including a motor adapted when energized to move said valve and said damper to change the fuel and air supply from one burner to the other burner, means actuated by said motor during energization thereof to disconnect the ignition points of said one burner and connect for energization the ignition points of said other burner, and means responsive to a demand

for heat from said first burner to energize said motor to move the damper and valve to positions for directing fuel and air to said first burner, and responsive to a satisfaction of said demand to again energize said motor to move the damper and valve to positions for directing fuel and air to said second burner.

13. A pair of burners, the first of said burners being adapted to supply heat for short periods and the second of said burners to normally supply heat for longer periods, a motor, a pump and a blower driven by said motor to supply fuel and air from a common source to said burners, a valve and a damper to control selectively the flow of fuel and air respectively, a second motor, means responsive to a demand for heat from said first burner to energize said second motor to move said valve and said damper from positions directing fuel and air to said second burner to positions for directing the fuel and air to said first burner, and means to insure deenergization of said first mentioned motor during the changing of the valve and damper positions.

14. A pair of burners, a blower arranged as a common source of forced air supply to supply air for said burners, an air tube to conduct air to one of said burners, another air tube to conduct air to the other of said burners, and a universal connection for one of said tubes whereby one of the burners may be located at any one of a plurality of positions with respect to the other of said burners.

15. A pair of burners, the first of said burners being arranged to supply heat for short periods and the second of said burners to normally supply heat for longer periods, a common source of air supply for the burners, including branched tubes, a damper adapted for movement to two different positions to direct the flow of air through one or the other of said tubes, a control including a motor adapted to rotate its shaft a predetermined amount each time the motor is energized, means operatively to connect said damper to said motor shaft whereby said damper is moved from one to the other of said positions whenever the motor is energized, and means responsive to a demand for heat from said first burner to energize said motor to move the damper to a position for directing the flow of air to said first burner, and responsive to a satisfaction of said demand to again energize said motor to move the damper to a position for directing the flow of air to said second burner.

16. In a heating system comprising two heaters each having a burner, means to normally control the supply of fuel and air for delivery to one of the burners, means having preference over the first mentioned means to control the supply of fuel and air for delivery to the other of the burners, a main flue, a branch flue for each heater communicating with said main flue, temperature responsive means associated with said main flue, and safety control means associated with said main flue and operable after the temperature reading of said temperature responsive means has remained below a predetermined value for a predetermined interval of time to cut off delivery of fuel and air to both of said burners.

17. In an air conditioning and hot water heating system for supplying heat to a dwelling or other space to be heated and also supplying hot water as needed, a fluid heater and a hot water heater each having its own burner, a pump and a blower common to the two burners, a motor to drive said pump and said blower, a valve and a damper to determine to which of the burners the fuel and air are supplied, means responsive to the temperature of the space the atmosphere of which is to be heated to normally control the operation of said motor to supply fuel and air to the burner of the fluid heater, second means having preference over the first mentioned means and responsive to a drop below a predetermined value in the temperature of the water heated by the hot water heater to position the valve and damper so as to direct the supply of fuel and air to the burner of the hot water heater, and means responsive to the operation of said second means to energize said motor.

18. A control unit for controlling the fuel supply for a heating system having two burners, the first burner to provide heat for short periods of demand and the second burner normally to provide heat for longer periods, and a common source of fuel for said burners; said control unit comprising a valve to control the flow of fuel to said burners, said valve being positioned normally to deliver fuel to said second burner, a motor to control said valve, and means responsive to a demand for heat from said first burner to energize momentarily said motor to move said valve to a position to deliver fuel to said first burner to the exclusion of said second burner, and responsive to a satisfaction of said demand to energize momentarily said motor to return said valve to the first mentioned position.

19. A control unit for controlling the ignition for a heating system having two burners, the first burner to provide heat for short periods of demand and the second burner normally to provide heat for longer periods, and each burner having an individual ignition device; said control unit comprising first and second stationary contacts, the first contact for connection to the ignition device of the first burner and the second contact for connection to the ignition device of the second burner, a movable contact, an arm for the movable contact, a pivot for said arm, a toggle to move said arm with a snap action toward one of said stationary contacts when the arm is moved a predetermined distance from the other of said stationary contacts, a motor to control said arm, and means responsive to a demand for heat from said first burner to energize momentarily the motor to move said arm to effect closure of said movable contact with said first contact, and responsive to a satisfaction of said demand to energize said motor to return the said arm to effect engagement of said movable contact with said second contact.

20. A control unit for controlling the fuel supply and the ignition for a heating system having two burners, the first burner to provide heat for short periods and the second burner normally to provide heat for longer periods, a common source of fuel for said burners, and an individual ignition device for each burner; said control unit comprising a valve to control the flow of fuel to said burners, said valve being positioned normally to deliver fuel to said second burner, first and second stationary contacts, the first contact for connection to the ignition device of the first burner and the second contact for connection to the ignition device of the second burner, a movable contact normally engaging said second contact, a motor to control said valve and said movable contact, and means re-

sponsive to a demand for heat from said first burner to energize the motor to move said movable contact to engage said first contact and to move said valve to a position to deliver fuel to said first burner to the exclusion of said second burner, and responsive to a satisfaction of said demand to energize momentarily said motor to return said movable contact and said valve to their normal positions.

21. A control unit for controlling the fuel supply, the ignition and the air supply for a heating system having two burners, the first burner to provide heat for short periods and the second burner normally to provide heat for longer periods, common sources of fuel and air for said burners, and an individual ignition device for each of said burners; said control unit comprising a valve to control the flow of fuel to said burners, said valve being normally in a position to deliver fuel to said second burner, a first contact for connection to the ignition device of said first burner, a second contact for connection to the ignition device of the second burner, a movable contact normally engaging said second contact, a damper normally in a position to direct a supply of air to said second burner, a motor to control the valve, the movable contact and the damper, and means responsive to a demand for heat from said first burner to energize momentarily the motor to move said valve to a position to deliver fuel to said first burner, to move said movable contact to engage said first contact, and to move said damper to a position to direct the supply of air to said first burner, and responsive to a satisfaction of said demand to energize said motor to return said valve, said movable contact and said damper to their normal positions.

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