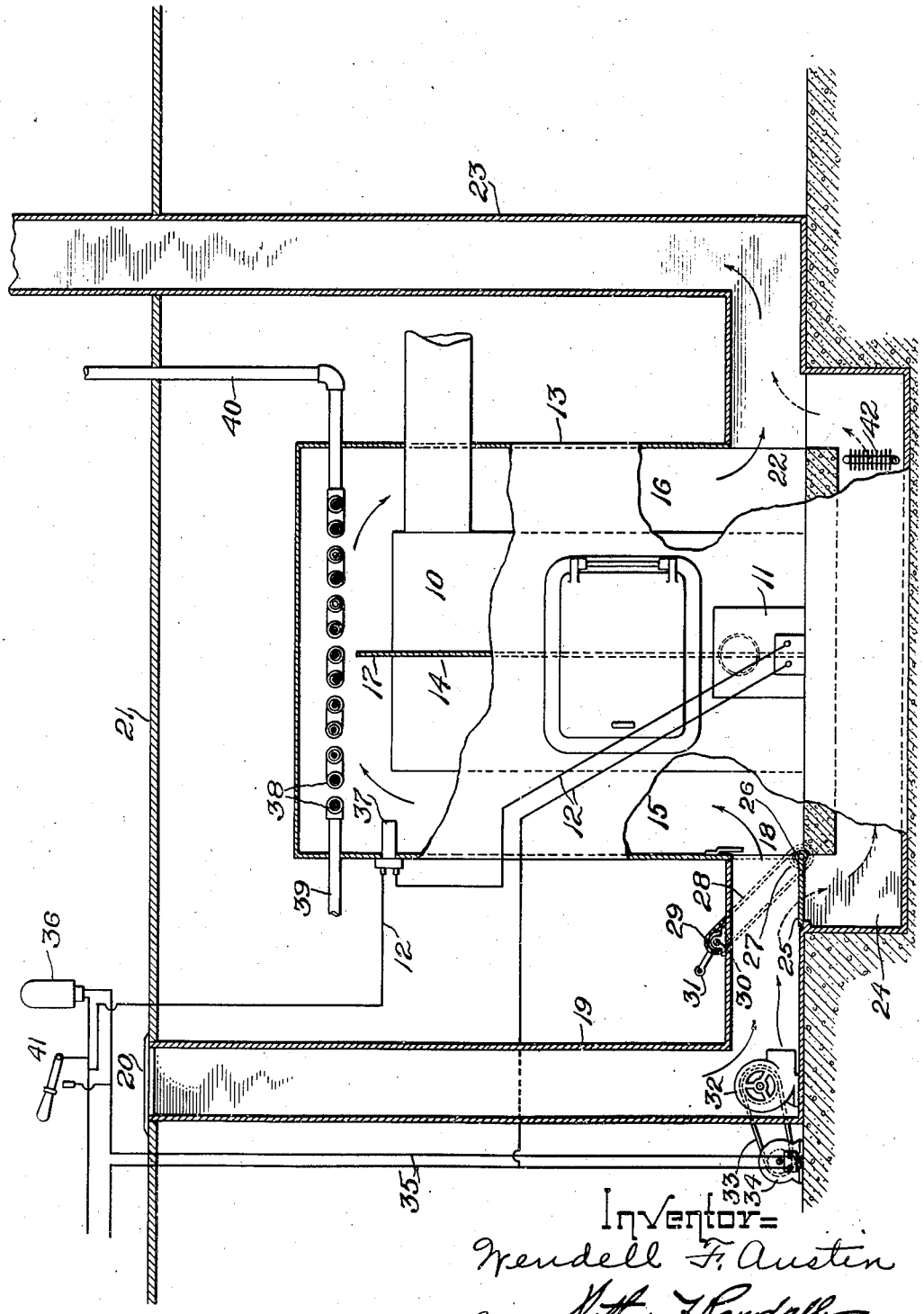
Aug. 20, 1940. W. F. AUSTIN 2,212,222

COMBINATION WATER AND AIR CONDITIONING APPARATUS

Filed June 13, 1938



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Patented Aug. 20, 1940 2,212,222

UNITED STATES PATENT OFFICE

2,212,222

COMBINATION WATER AND AIR CONDITIONING APPARATUS

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Application June 13, 1938, Serial No. 213,327

2 Claims. (Cl. 237—19)

This invention relates to a combination water and air conditioning apparatus for buildings, especially dwellings, and it has for its object to provide an apparatus of this kind comprising a single furnace or heater and by means of which apparatus heated air may be supplied to a building or compartment during cold weather and discontinued during warm weather, but which will furnish or supply hot water all the year around, if desired, or at least while the apparatus is in operation under either of those conditions.

To these ends I have provided an apparatus of the character described which may be constructed and operate as set forth in the following description, the several novel features of the invention being separately pointed out and defined in the claims at the close thereof.

The accompanying drawing illustrates, more or less diagrammatically, a combination water and air conditioning apparatus constructed in accordance with this invention.

The illustrating embodiment of my invention includes a heater or furnace 10 provided with an oil burner 11 whose blower and oil pump are operated, as usual, by an electric motor, not shown, arranged within a current-supplying circuit 12. This furnace 10 is disposed within a housing or casing 13 which is larger than, and spaced away from, the furnace to provide an air space between the two which is divided diametrically by a partition 14 to provide within said housing an inlet chamber 15 and an outlet chamber 16, the top of said partition terminating short of the top wall of housing 13 so as to leave a passage 17 connecting the upper ends of said two chambers.

Adjacent to the bottom of chamber 15 the housing 13 is made with an inlet opening 18 connected by a flue 19 with a register 20 incorporated in the first floor 21 of the building within which the apparatus is arranged.

Adjacent to the bottom of chamber 16 the housing 13 is made with an outlet opening 22 connected by a flue 23 with the interior of the building above the floor 21.

The two flues 19 and 23 are connected by a by-pass flue 24 and at the junction of flues 19 and 24 is provided a valve or damper 25 fixed on a rock-shaft 26. This rock-shaft carries a sprocket wheel 27 connected by a sprocket chain 28 with a sprocket wheel 29 fast on a shaft 30 supported in bearings provided upon the exterior of flue 19. The shaft 29 is provided with a crank-handle 31 by means of which it is manually turned in said bearings and when thus operated said shaft acts through the sprockets and chain to pivotally adjust the valve or damper 25 on the axis of shaft 26 so that it may be set either in a horizontal position as shown in the drawing where it shuts off communication between flues 19 and 24 and establishes communication between flue 19 and inlet chamber 15, or in a vertical position where it shuts off communication between flue 19 and inlet chamber 15 and establishes communication between flues 19 and 24.

Within the flue 19 is arranged a blower 32 whose shaft is connected by a belt 33 and suitable pulleys with the armature shaft of an electric motor 34 by which the blower is operated. As shown, the outlet of blower 32 is directed toward the inlet 18 of housing 13. Thus when inlet 18 is open and blower 32 is operating air is forced downwardly through flue 19 from above floor 21 and then laterally into inlet chamber 15; then upwardly through said chamber, over the top of partition 14 and thence downwardly through outlet chamber 16 and outlet 22 into flue 23 which returns it to the upper part of the building. During its passage through housing 13 the air is heated by the furnace 10.

The blower-driving motor 34 is arranged within a current-supplying circuit 35 in series with a room thermostat 36 of usual construction within the upper part of the building and this thermostat acts automatically to open the circuit 35 and stop blower 32 when the temperature within the upper part of the building rises to a predetermined degree. When the blower is thus stopped the movement of the air through housing 13 and flues 19 and 23 is also stopped.

A circuit-controlling thermostat 37 of usual construction is mounted in a wall of housing 13 and exposed to the air within the latter, and this thermostat 37 is arranged within the circuit 12 of burner 11 in series with the latter. Thus when the blower 32 is stopped as described and the temperature of the stationary air within the housing 13 rises to a predetermined degree, the thermostat 37 opens circuit 12 and stops the burner.

It will be clear that when the room temperature falls to a predetermined degree the thermostat 36 will again close circuit 35 and start blower 32, and also that when the temperature of the air within housing 13 falls to a predetermined degree the thermostat 37 will again close circuit 12 and start the burner.

Within the upper part of housing 13, above furnace 10 and partition 14, is arranged a pipe coil 38 constituting a manifold to one end of which water is supplied through a pipe 39 and whose opposite end has connected with it a hot water service pipe 40 leading upwardly into the upper part of the building where it may be connected with the usual hot water storage tank, not shown.

During cold weather the valve or damper 25 occupies the horizontal position shown in the drawing and blower 32 is operated to circulate the air through housing 13, flues 19 and 23, and the upper part of the building so long as the circuit 35 is closed at thermostat 36. When circuit 35

is opened automatically at thermostat 36 the flow of air through housing 13 is stopped and should the temperature of the air within housing 13 then rise to a predetermined point the thermostat 37 automatically opens circuit 12 and stops burner 11. When circuit 35 is closed again by thermostat 36 and the passage of air through housing 13 is resumed then thermostat 37 will respond to a fall of the temperature of the air within the housing and close the circuit 12 of burner 11.

During warm weather the valve or damper 25 is placed in a vertical position where it closes inlet 18 and opens by-pass 24. Thus when blower 32 is operating a current of air circulates continuously from flue 19 through by-pass 24 to flue 23, through the upper part of the building and back to flue 19 again, so that occupants of the building are subjected to the cooling effects of the same. In order to maintain the blower 32 continuously in operation during warm weather I may provide a switch 41 which is left open during cold weather and closed during warm weather. This switch is arranged in a shunt circuit connected with circuit 35 and when closed it short circuits the thermostat 36 and maintains said circuit 35 closed continuously.

While the apparatus is thus operating during warm weather the still air trapped within housing 13 may be heated by furnace 10 and transmit its heat to manifold 38. Thus the apparatus may be employed to supply hot water to the building the year around without interfering with the cooling effects produced in the upper part of the building during warm weather by the current of circulating unheated air.

If desired, a cooling unit 42 may be installed within the by-pass flue 24.

The floor 21, as will be clear, is the floor of a compartment within the building with which my new apparatus is associated.

From the above description it should be clear that the main idea of my invention is to provide a hot air heating furnace including a jacket or housing surrounding a heater and having arranged within the housing and adjacent to the top thereof a manifold with which are connected a water supplying pipe and a service pipe, said furnace having damper or valve mechanism for controlling the movement of the air through the jacket or housing, and one adjustment of said damper mechanism providing for delivery of heated air from the interior of said housing and another adjustment of said damper mechanism preventing the delivery of heated air from said housing thereby causing a body of air to dwell within the latter to heat the manifold. This provides an economical all the year around hot water service and at the same time the apparatus may be adjusted to cause or prevent the delivery of heated air. Also, when adjusted to prevent the delivery of heated air a body of said air is trapped or caused to dwell within the housing to heat the manifold.

Herein I have illustrated my invention as embodied in a forced circulation system or apparatus, but by modification within the scope of the appended claims it will be clear to those skilled in this art that the invention may be embodied in gravity or other types of heating apparatus.

What I claim is:

1. In a heating system, a furnace; a casing inclosing said furnace and having inlet and outlet openings adjacent to the bottom thereof, said casing being spaced away from the top and sides of said furnace to provide an air space between said two elements; a flue connecting the inlet opening with a compartment that is to be air-conditioned; a second flue connecting the outlet opening with said compartment; a by-pass flue whereof one end is connected with said first-mentioned flue and the opposite end is connected with said second flue; a blower for forcing air through said flues and casing; valve mechanism controlling the discharge of air from said first-mentioned flue, said mechanism being adjustable so that it can be set to effect the discharge of air through said inlet opening into said casing to the exclusion of said by-pass flue or through said by-pass flue to the exclusion of said inlet opening and casing; a vertical partition within said casing dividing the interior of the latter so as to provide the same with an inlet chamber with which said inlet opening communicates and with an outlet chamber with which said outlet opening communicates and so as to direct the air upwardly from said inlet opening, across the top of the furnace and thence downwardly to said outlet opening when said valve mechanism is set to effect the discharge of air through said inlet opening; a water-holding manifold within the upper portion of said casing and disposed above said partition and furnace in the path of the air which passes across the top of the latter; a conduit through which water is supplied to said manifold, and a conduit through which water is delivered from said manifold.

2. The combination with a building structure having a compartment, of a furnace; a casing inclosing said furnace and having inlet and outlet openings adjacent to the bottom thereof, said casing being spaced away from the top and sides of said furnace to provide an air space between said two elements; a flue connecting the inlet opening with said compartment; a second flue connecting the outlet opening with said compartment; a by-pass flue whereof one end is connected with said first-mentioned flue and the opposite end communicates with said compartment; a blower for forcing air through said flues and casing; valve mechanism controlling the discharge of air from said first-mentioned flue, said mechanism being adjustable so that it can be set to effect the discharge of air through said inlet opening and casing to the exclusion of said by-pass flue or alternatively through said by-pass flue to the exclusion of said inlet opening and casing; a vertical partition within said casing dividing the interior of the latter so as to provide the same with an inlet chamber with which said inlet opening communicates and with an outlet chamber with which said outlet opening communicates and so as to direct the air upwardly from said inlet opening, across the top of the furnace and thence downwardly to said outlet opening when said valve mechanism is set to effect the discharge of air through said inlet opening; a water-holding manifold within the upper portion of said casing and disposed above said partition and furnace in the path of the air which passes across the top of the latter; a conduit through which water is supplied to said manifold, and a conduit through which water is delivered from said manifold.

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