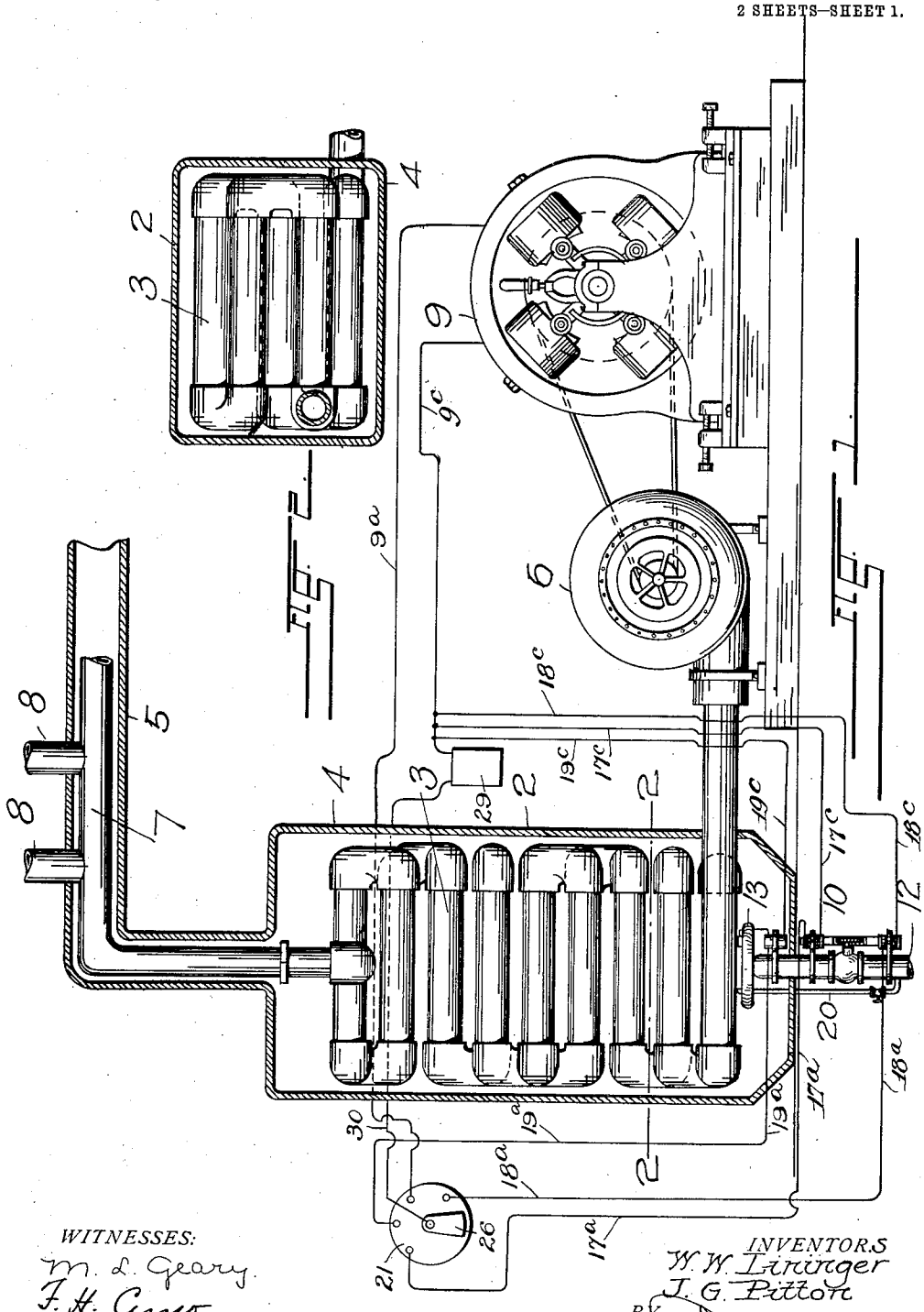
W. W. LININGER & J. G. PITTON.

HEATING FURNACE.

APPLICATION FILED MAR. 23, 1910.

1,001,656. Patented Aug. 29, 1911.

2 SHEETS—SHEET 1.



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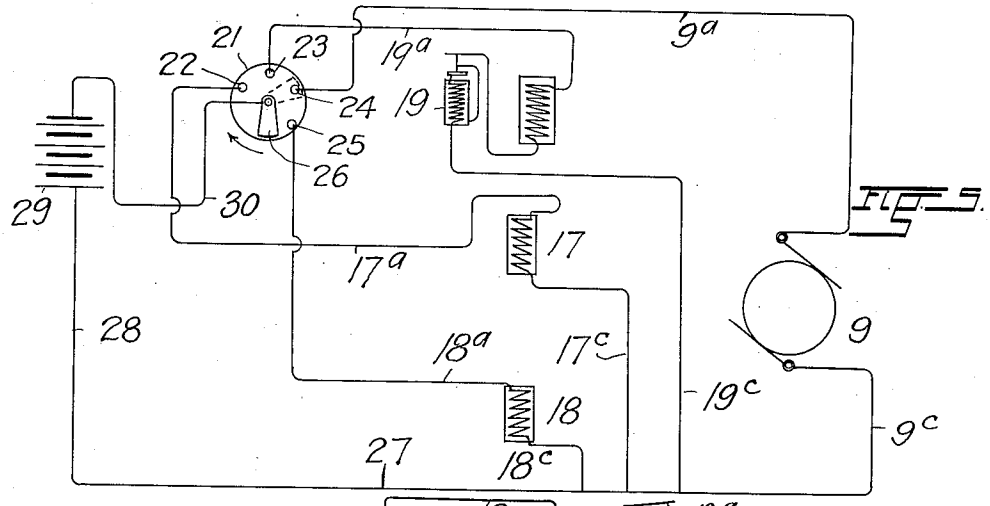


Fig. 5.

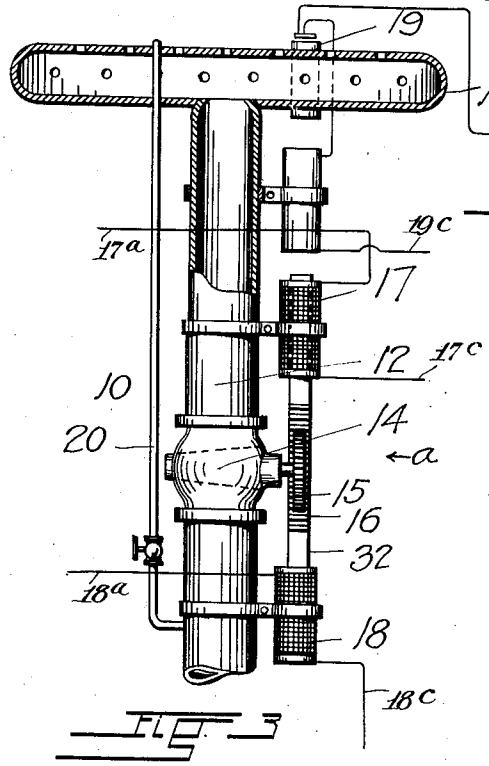
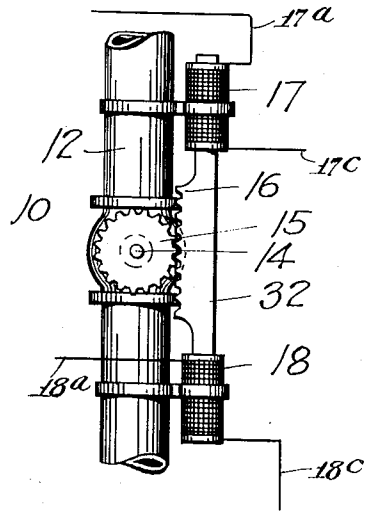


Fig. 3.

Fig. 4



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HEATING-FURNACE.

1,001,656. Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed March 23, 1910. Serial No. 551,101.

To all whom it may concern:

Be it known that we, WESLEY W. LININGER and JAMES G. PITTON, citizens of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Heating-Furnaces, of which the following is a specification.

This invention relates to new and useful improvements in air-heating furnaces and it has for its object to provide an apparatus of simple construction by means of which the air required to heat the rooms in a building in which it is installed, is heated to the desired temperature in the minimum of time and with an expenditure of a comparatively small quantity of fuel.

A further object of the invention resides in the provision of a system of electrical devices through the instrumentality of which the calorific element by which the furnace is heated and the means employed to supply air to the furnace, may be controlled from one or more remote points.

An embodiment of our invention is shown in the accompanying drawings in the various views of which like parts are similarly designated and in which—

Figure 1, represents a partial sectional view of our improved furnace in association with the means for supplying heat and air thereto, Fig. 2, a transverse section taken along the line 2—2 Fig. 1, Fig. 3, an enlarged sectional elevation of the burner preferably employed in connection with the furnace, Fig. 4, a fragmentary elevation looking in the direction of the arrow *a* Fig. 3, and Fig. 5, a diagrammatic representation of the electrically connected controlling devices employed in the practice of our invention.

Referring to the drawings by numerical reference characters, let the numeral 2 designate the improved furnace which comprises a coiled conduit 3 surrounded by a shell or jacket 4 which at its upper end, connects with a flue 5 through which the gases of combustion are conveyed into the atmosphere.

The various convolutions which together constitute the coil 3, are composed of a plurality of parallel pipes connected by means of standard fittings and the pipes comprised in each convolution are disposed opposite to the spaces between those in the immediately preceding and succeeding ones so that the heat arising from a subjacent source is compelled to circulate around every part of the coil before it reaches the flue 5.

The coil 3 is connected at its lower extremity with a blower 6, through the instrumentality of which a current of air is continuously forced thereinto and its upper end terminates in a manifold 7 which is preferably disposed within the flue 5 and from which branch the pipes 8 through which the heated air is conducted to the various rooms of the building in which the furnace is installed.

The blower 6 is operatively associated with an electric motor 9, which by the means hereinafter to be described is connected with a convenient source of electricity such as an electric lighting system.

While the calorific element which is located in the lower portion of the shell 4 to supply the heat by which the air forced through the coil is brought to the desired temperature, may be of any suitable character, we preferably employ a burner for gaseous fuel, such as is designated by the numeral 10 in the drawings and which will now be described.

The device as shown in Figs. 3 and 4, comprises a preferably upright pipe 12 which connects at its upper extremity with an enlarged hollow, circular plate 13 which being provided with a multiplicity of apertures constitutes the burner proper.

A plug valve 14 serves to control the flow of fluid through the pipe into the burner, and its stem is provided with a gear wheel 15 which is operatively engaged by a rack 16 formed upon the longitudinally reciprocatory core 32 of two solenoids 17 and 18 which in the operation of our invention serve respectively, to open and close the valve when energized by the closing of the electric circuit in which they are located.

A spark coil 19 disposed in proximity to the apertures in the burner 13, is designed for the ignition of the gas at the initial point of the operation, and in addition to this igniting device, we provide a valve-controlled pilot- light 20 which connects with the pipe 12 below the valve 14.

The motor, the spark coil and the two solenoids which as hereinbefore explained, serve respectively to open and close the valve 14, are separately located in electric circuits with a switch 21, as diagrammatically represented in Fig. 5 of the drawings.

The switch 21 has four contacts 22, 23, 24 and 25 which being located in the path of its blade 26, are connected by means of conductors 17^a, 19^a, 9^a, and 18^a, respectively with the solenoid 17, the spark coil 19, the motor 9 and the solenoid 18. The opposite terminals of the above enumerated electrical devices connect separately by means of wires 17^c, 19^c, 9^c and 18^c with a ground wire 27, which by means of a conductor 28 connects with a source of electricity 29 whose opposite pole is connected with the switch-blade 26 by means of a wire 30.

The switch 21 may be of any suitable construction to be operated either manually or in connection with a mechanical or time-controlled appliance, and while in the drawings but one switch has been shown, it will be understood that by a simple system of obvious electrical connections, a plurality of switches may be installed to control the electrical devices included in our invention from different parts of the building in which it is installed.

In the operation of our invention, a current of air is by means of the blower 6, continuously forced through the coil 3 which is heated through the instrumentality of the subjacent burner 10. As the pipes of which the coil is composed are of small diameter, the air passing through its several convolutions, is quickly heated to a temperature adequate to heat the various rooms into which the pipes 8 which branch from the manifold 7, open.

To put the furnace in operation from a remote point, the switch blade 26 which is normally in the position shown in the drawings, is slowly moved in the direction of the arrow to successively engage the several contacts. When it passes the contact 22, the solenoid 17 is energized and the core 32 being in consequence drawn upwardly, opens the valve 14 to admit gas into the burner 13, and the subsequent engagement of the blade 26 with the contact 23, closes the circuit of the coil 19 to produce a spark by which the gas is ignited. The blade is now moved to the contact 24 of the motor circuit and remains in this position (shown in broken lines in Fig. 5) until it is desired to diminish and subsequently discontinue the supply of heated air, when it is moved away from the contact 24 to open the motor circuit and is brought in engagement with the contact 25 to energize the solenoid 18 which draws the core 32 downwardly to its original position and in consequence closes the supply-valve 14.

Instead of igniting the gas escaping from the burner by means of the spark-coil, a small flame may be continuously maintained at the end of the pilot light 20, by opening the valve by which the flow of gas is controlled.

While we have shown and described our invention in the best form now known to us, we wish it understood that modifications in the construction and arrangement of the several parts and electrical connections comprised therein may be resorted to without departing from its spirit and that the means employed for heating the air forced through the spiral conduit, may be designed for the consumption of fuel other than coal- or oil-gas.

Having thus described our invention what we claim and desire to secure by Letters Patent is:—

1. A heating furnace comprising in combination, a conduit, a conduit connection at one end thereof, a contrivance for forcing air into its opposite end, an electric motor to actuate said contrivance, a burner for gaseous fuel, disposed to heat the said conduit, a valve for controlling the supply of fuel to said burner, an electrical device associated with said valve to open and close the same, and a switch electrically connected with the said motor and the said device whereby they may be successively energized.

2. A heating furnace comprising in combination, a conduit, a conduit connection at one end thereof, a contrivance for forcing air into its opposite end, an electric motor to actuate said contrivance a burner for gaseous fuel, disposed to heat the said conduit, a valve for controlling the supply of fuel to said burner, a mechanism for opening and closing said valve, solenoids whose cores are connected with said mechanism to move it in opposite directions, and a switch in electric circuits with said motor and said solenoids whereby they may be energized successively.

3. A heating furnace comprising in combination, a conduit, a conduit connection at one end thereof, a contrivance for forcing air into its opposite end, an electric motor to actuate said contrivance, a burner for gaseous fuel, disposed to heat the said conduit, a valve for controlling the supply of fuel to said burner, a spark coil for igniting the gas escaping from the burner, an electrical device for opening and closing said valve, and a switch in separate electric circuits with said motor said device and said spark coil whereby they may be successively energized.

4. In combination, a conduit having a distributing connection at one end thereof, an electrically driven contrivance for forcing air into its opposite end, a burner for fluid fuel disposed to heat said conduit, an electric device for controlling the supply of fuel to said burner, and circuit breaking means adapted to successively actuate said contrivance and said device from a point remote from the furnace.

5. In combination, a conduit having a

distributing connection at one end thereof, an electrically driven contrivance for forcing air into its opposite end, a burner for fluid fuel disposed to heat said conduit, an electric device for controlling the supply of fuel to said burner, electrically operated means for igniting the fuel at said burner, and a circuit breaking means adapted to successively actuate said contrivance, said device and said ignition means from a point remote from the furnace.

In testimony whereof we have affixed our signatures in presence of two witnesses.

WESLEY W. LININGER.
JAMES G. PITTON.

Witnesses:
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M. L. GEARY.