April 14, 1925. 1,533,094

R. J. BUEHLER

VALVE CONTROLLED OIL BURNER

Filed April 5, 1924 2 Sheets-Sheet 1

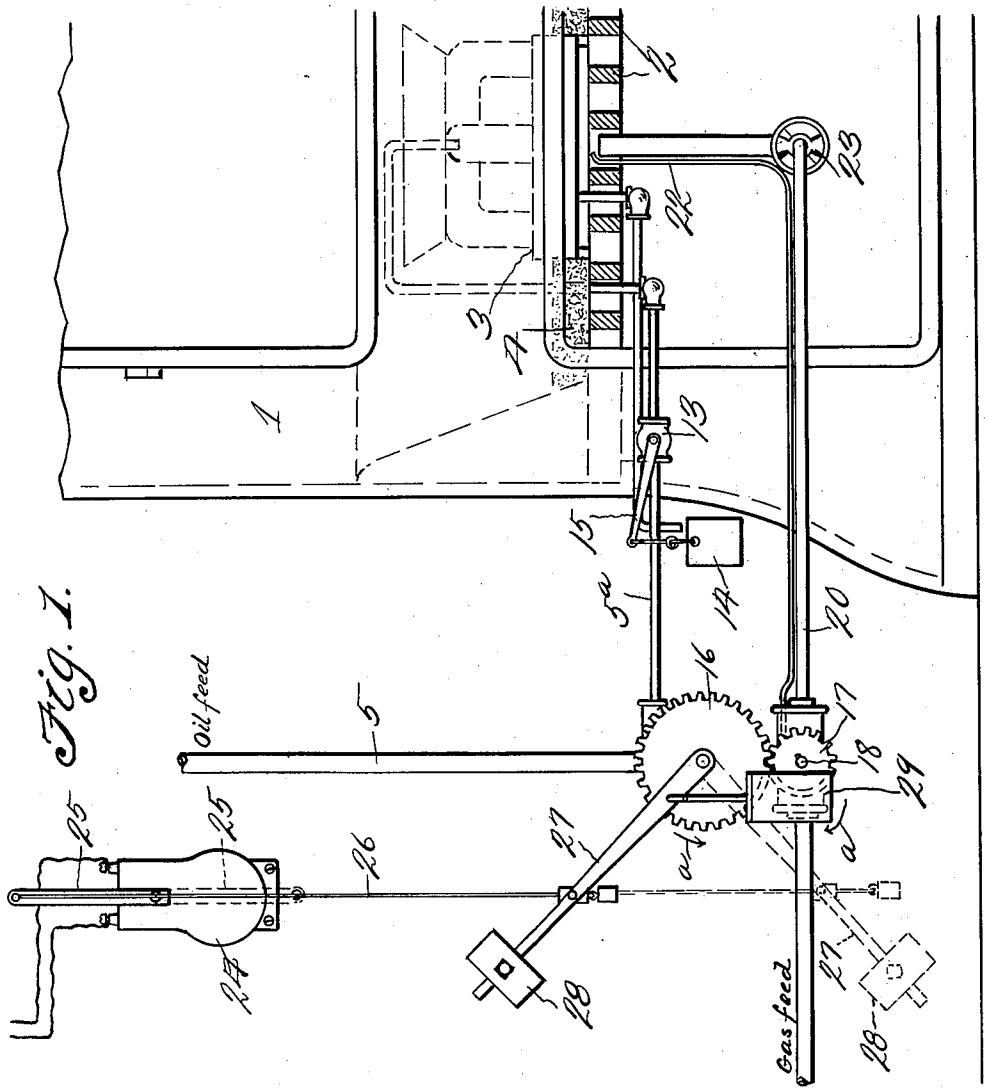


Fig. 1.

INVENTOR.
Randolph J. Buehler
BY George J. Utech
ATTORNEY.

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Fig. 2.

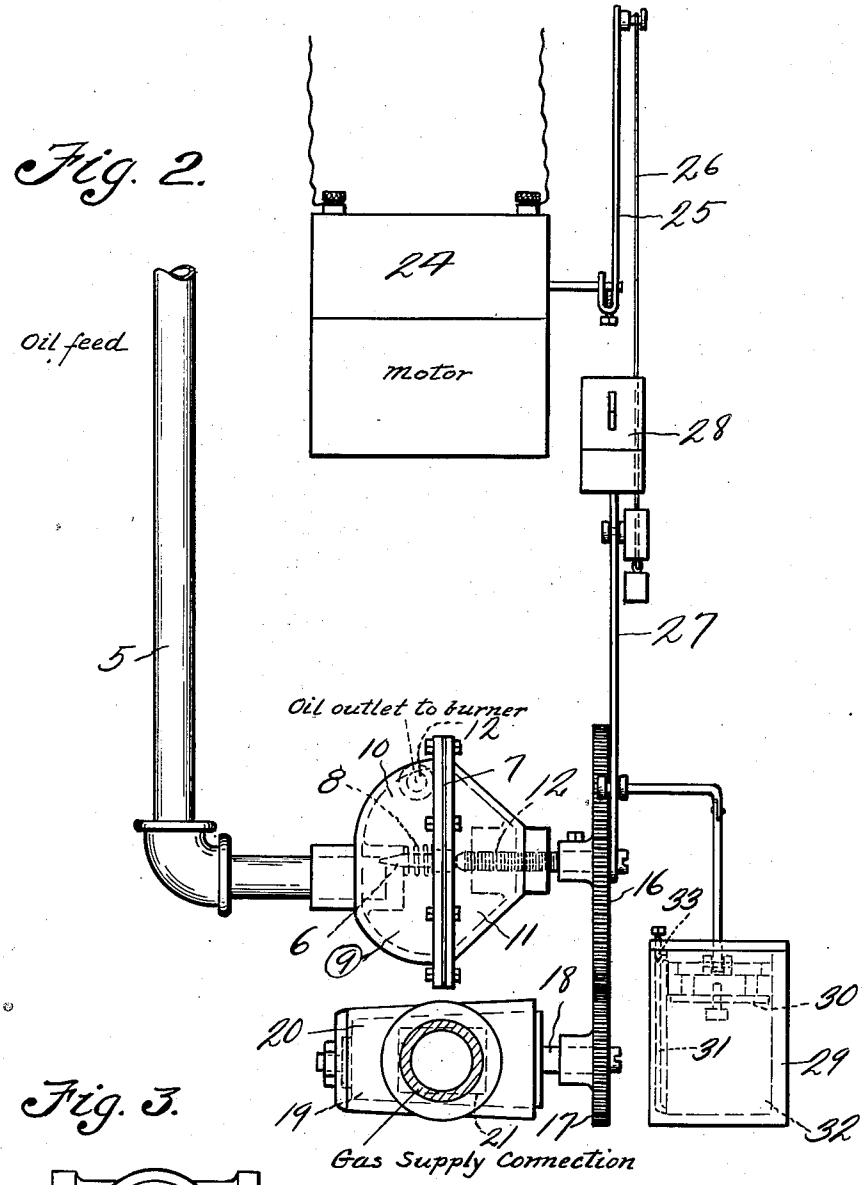
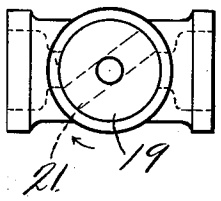


Fig. 3.



INVENTOR.

Randolph J. Buehler.

BY George J. Ottoch

ATTORNEY.

Patented Apr. 14, 1925. 1,533,094

UNITED STATES PATENT OFFICE.

RANDOLPH J. BUEHLER, OF SOUTH BEND, INDIANA.

VALVE-CONTROLLED OIL BURNER.

Application filed April 5, 1924. Serial No. 704,529.

To all whom it may concern:

Be it known that I, RANDOLPH J. BUEHLER, a citizen of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Valve-Controlled Oil Burners, of which the following is a specification.

The invention relates to oil burners of the type used in furnaces and the like, and has for its object to provide a device of this character which is controlled by a thermostatic motor in a manner whereby as the burner, immediately before the flow of oil is started, is preheated by a relatively large flow of gas ignited by a pilot light and preheated before the oil reaches the burner thereby insuring the quick ignition of the oil, which is gasified by the heated burner. Also to provide means whereby the flow of gas through the preheating pipe is cut off when the flow of oil through the oil supply pipe is at its maximum flow, thereby conserving gas.

A further object is to provide gear connections between the oil supply valve and the gas supply valve, controlled by a thermostatically controlled motor, and forming means whereby the gas supply valve will be rapidly opened and the oil supply valve slowly opened, thereby allowing gas to reach the burner, before the oil, for preheating purposes, and at the same time form means whereby when the oil supply valve is open to its maximum position, the gas supply valve will be closed.

A further object is to provide a weighted lever for rotating the gear connections, which weighted lever is controlled by a thermostatically controlled motor, having a flexible connection therewith, and a dash pot connection with said lever and having adjustable means for controlling the speed of movement of the lever, thereby allowing the timing of the operation of the valve.

A further object is to provide the oil pipe with a cutoff valve having a lever to which a bucket is suspended, and into which bucket overflow of oil at the burner will be discharged by a pipe, thereby insuring the cutting off the supply of oil in case of overflow.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawing, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawing:—

Figure 1 is a front elevation of a conventional form of furnace, showing the device applied thereto.

Figure 2 is a side elevation of the valve controlling mechanism.

Figure 3 is a front elevation of the gas controlling valve.

Referring to the drawing, the numeral 1 designates a conventional form of furnace, and 2 the grate bars thereof. Disposed on the grate bars 2 is a burner 3, which may be of any construction, and surrounding the burner and disposed on the upper sides of the grate bars 2 is a sealing material 4, which prevents the passage of air through the grate bars except through the burner 3.

Oil is fed to the burner 3 through an oil supply pipe 5, which may lead to any suitable gravity oil tank, and which pipe is provided with a diaphragm carried valve 6 carried by the diaphragm 7, which diaphragm normally tends to unseat the valve 6 under the influence of the coiled spring 8, and is disposed within the diaphragm casing 9. The casing 9 is divided into compartments 10 and 11, and the oil passes through the compartment 10 to one side of the diaphragm 7, and through the outlet 12 at the same side of the diaphragm, and into the pipe 5^a, therefore it will be seen that the oil will not come into contact with the threaded diaphragm controlling screw 12, consequently the screw cannot be clogged or gummed, incident to the flow of oil. The pipe 5^a is provided with a valve 13, which is normally open, and which valve is closed in case of overflow of the burner 3 by means of the weight of oil discharged into the bucket 14, depending from the lever 15 of the valve, thereby obviating danger of fire incident to the overflow of the burner. Secured to the outer end of the screw 12 is a large gear 16, which gear meshes with a smaller gear 17 carried by the stem 18 of a plug valve 19, therefore it will be seen that the plug valve 19 will be simultaneously rotated in its casing 20 with the rotation of the screw 12 and the gear 16 car-

ried thereby. However it will be seen that during the rotation of the gears 16 and 17 in the direction of the arrows *a*, the plug valve 19 will rotate relatively fast, and consequently its port 21 will be rapidly moved to open position in comparison with the relatively slow unseating of the oil valve 6, therefore a full flow of gas will be supplied to the burner through the gas supply pipe 20 (the discharge end of which forms a preheating burner), before oil will reach the burner through the oil feed pipes 5 and 5ª, consequently the burner will be thoroughly preheated when the oil is discharged thereon, and will quickly gasify. As the large gear 16 continues to rotate in the direction of the arrow *a* for opening the valve 6 to its maximum open position, the plug valve 19 will be in closed position, thereby shutting off the excessive flow of gas to the gas pipe 20 for preheating purposes. The device is provided with a pilot light pipe 22, which will ignite the gas which flows through the pipe 20. The gas supply pipe 20 is preferably provided with an air and gas mixer 23, which may be regulated for supplying the proper amount of air to the gas, for obtaining the maximum heating efficiency thereof.

The device is controlled by means of a thermostatically controlled motor 24, which is of a type common in use wherein the rotated arm 25, carried thereby makes a turn of one hundred and eighty degrees, and which arm is provided with a flexible connection 26 with a weight lever 27 carried by the screw 12 and gear 16, and where said arm makes a movement of one hundred and eighty degrees the lever 27 is released and moves downwardly under the influence of its weight 28, and which lever in its movement moves the valves 6 and 19 as set forth above. The valves then remain in operated position, that is the oil valve 6 in open position and the plug valve 19, which supplies the gas, in closed position, until the circuit of the thermostatically controlled motor 24 is closed, and which motor returns to original position, which closes the valve 6 and also the gas supply valve 19. The above operation continues under the control of the thermostatically controlled motor 24. Disposed adjacent the weight lever 27, and supported in any suitable manner is a dash pot 29, in which dash pot a piston 30 is slidably mounted, and is adapted to act against the fluid, for instance oil. The dash pot 29 is provided with a bipass 31, through which oil is forced from one end of the chamber 32 of the dash pot during the reciprocation of the piston 30, therefore it will be seen that the period of time, during the operation of the lever 27 may be controlled. The dash pot 29 is provided with a valve 33, which extends into the bipass 31, and by means of said valve, the time necessary for the oil to pass from one end of the chamber 32 to the other may be regulated, and consequently the device may have its periods of operation varied as to time.

From the above it will be seen that a valve controlled oil and gas supply means is provided for an oil burner, which is automatically controlled through a thermostatically controlled motor in a manner whereby the burner will be preheated by gas before oil reaches the same, thereby insuring rapid ignition of the oil, and a maximum efficiency of combustion. It will also be seen that the flow of gas will be automatically cut off when the flow of oil is at its maximum.

The invention having been set forth what is claimed as new and useful is:—

1. The combination with an oil burner, a preheating burner, an oil supply pipe for said oil burner, a gas supply pipe for said preheating burner, a valve carried by the oil supply pipe, a valve carried by the gas supply pipe, of controlling means for said valves whereby a flow of gas to the preheating burner will be supplied before a flow of oil is supplied to the oil burner, and means whereby when a maximum supply of oil is supplied to the oil burner the supply of gas to the preheating burner will be stopped.

2. The combination with an oil burner, a preheating burner, an oil supply pipe for said oil burner, a gas supply pipe for said preheating burner, a valve carried by the oil supply pipe, a valve carried by the gas supply pipe, of means controlling said valves, whereby the gas supply pipe valve will be rapidly opened during the slow opening of the oil supply valve, thereby supplying a maximum amount of gas to the preheating burner before the oil is at its maximum flow, and means whereby when the oil supply valve is in its maximum open position, the gas supply valve is in closed position.

3. The combination with an oil burner, a preheating burner, an oil supply pipe for said oil burner, a gas supply pipe for said preheating burner, a valve carried by the gas supply pipe, a valve carried by the oil supply pipe, gear connections between said valves whereby the gas supply pipe valve will rapidly open in relation to the oil supply pipe valve and will be closed when the oil supply valve is in maximum open position.

4. The combination with an oil burner, a preheating burner, an oil supply pipe for said oil burner, a gas supply pipe for said preheating burner, a valve carried by the gas supply pipe, a valve carried by the oil supply pipe, gear connections between said valves whereby the gas supply valve will be rapidly opened in relation to the oil supply valve, and will be closed when the oil sup-

ply valve is in maximum open position, and means for varying the time of operation of the valves.

5. The combination with an oil burner, a preheating burner, an oil supply pipe for said oil burner, a gas supply pipe for said preheating burner, a valve carried by the gas supply pipe, a valve carried by the oil supply pipe, gear connections between said valves and forming means whereby the gas supply pipe will be in maximum open position before the oil supply pipe valve is in maximum open position, and will be closed when the oil supply valve is in maximum open position, a lever cooperating with one of the valves and a weight carried by said lever.

6. The combination with adjacent gas and oil supply valves for a preheating burner and an oil burner, of means for simultaneously rotating said valves whereby the oil supply valve will have a delayed action, thereby allowing a full supply of gas to the preheating burner and preheating said oil burner before a supply of oil reaches the oil burner.

7. The combination with adjacent gas and oil supply valves for a preheating burner and an oil burner, of means for simultaneously operating said valves, whereby the oil supply valve will have a delayed action in relation to the gas supply valve, thereby allowing a supply of gas to the preheating burner before a supply of oil to the oil burner, and means for varying the time of operation of the valve.

In testimony whereof I affix my signature.

RANDOLPH J. BUEHLER.