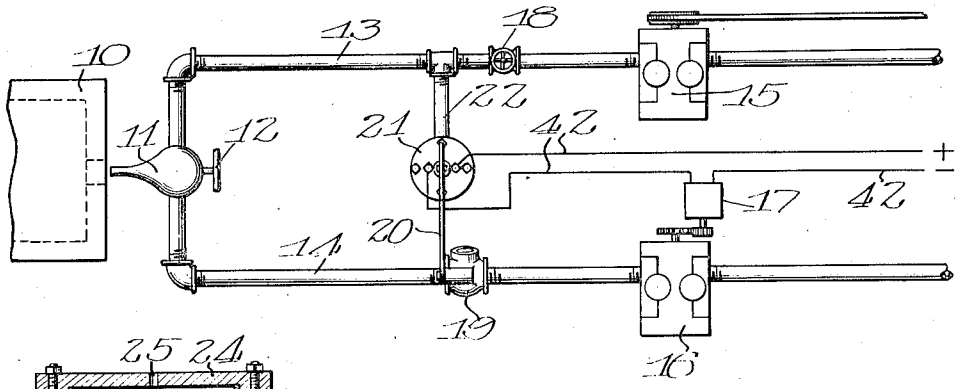
T. D. DE VILBISS.

CONTROLLING DEVICE FOR FUEL OIL SUPPLY.

APPLICATION FILED FEB. 14, 1912.

1,102,482. Patented July 7, 1914.

Fig. 1.



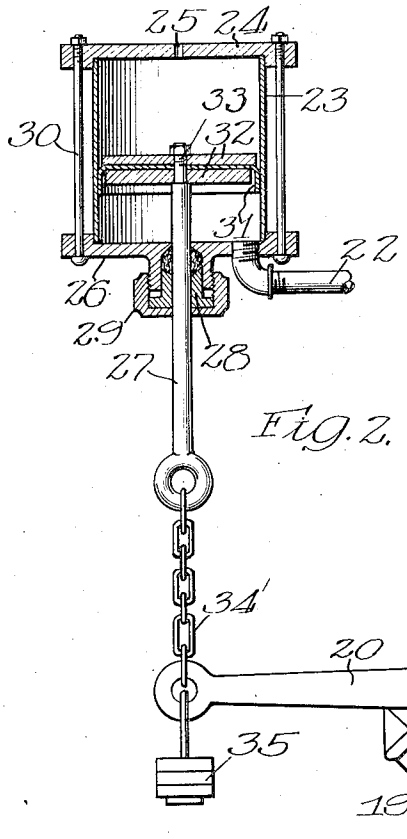
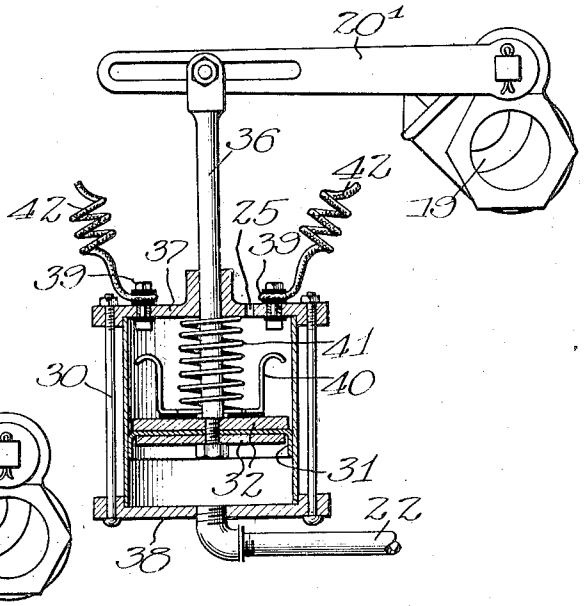


Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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CONTROLLING DEVICE FOR FUEL-OIL SUPPLY.

1,102,482. Specification of Letters Patent. Patented July 7, 1914.

Application filed February 14, 1912. Serial No. 677,586.

To all whom it may concern:

Be it known that I, THOMAS D. DE VILBISS, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Controlling Devices for Fuel-Oil Supply, of which the following is a specification.

This invention relates to a device for controlling the supply of fuel oil to heating furnaces and the like, and the primary object of the invention is to provide an improved apparatus to prevent the flow of oil from the discharge nozzle or burner unless it is properly mixed with air under pressure.

For the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts generally shown in the drawing and described in the specification, but more particularly pointed out in the appended claims.

In the drawing Figure 1 is a diagrammatic representation of a fuel oil supply system to which a device for controlling the supply of fuel oil is applied; Fig. 2 is a view partly in section of a controlling device constructed in accordance with the principles of the invention; Fig. 3 is a view partly in section of a device contructed in accordance with the principles of the invention and provided with means for automatically closing and breaking an electrical circuit.

In supplying fuel oil to furnaces, ranges and the like, for the purposes of heating and cooking, it is customary to employ air or steam under pressure for properly distributing the oil in the fire-box. If the air supply and the oil supply are separately controlled by valves, it sometimes happens that the air supply is cut off and the oil supply is not cut off, thereby admitting oil only to the furnace and resulting in an explosion and serious injury to persons and property.

This invention has for its object to provide means whereby it is impossible to admit oil to be burned unless the air is also supplied. The admission of oil is automatically controlled by the air pressure and the device is operative to open and close the oil supply means, and if desired, to start and stop a pump for the oil, in accordance with the air pressure supplied to the discharge nozzle or the burner.

In the accompanying drawing, the reference numeral 10 designates generally a fire-box of a furnace or range to which fuel oil is to be supplied by means of a nozzle 11. This nozzle may be of any desired or suitable construction, or may be in the form of a burner and is commonly provided with a hand wheel 12 to regulate the amount of oil and air which is discharged therefrom. The nozzle 11 is provided with an air supply pipe 13 leading to the source of air supply and a fuel supply pipe 14 leading to the source of fuel oil supply.

The reference number 15, designates a source of air supply, and it is understood that air may be supplied by a reservoir or a pump operated in any desired or suitable manner, such for example, as by means of a belt and pulley from a suitable source of power. It should also be understood that while the fluid under pressure is generally referred to in the specification as air, that steam or any other suitable fluid may be employed for a similar purpose.

Oil is supplied to the burner from an oil reservoir or tank or as shown in the present exemplification of the invention, by means of a pump 16. This pump may be operated in any desired or suitable manner, and in the present embodiment of the invention, is directly connected to an electric motor 17 which has suitable circuit connections to the positive and negative current supply means.

In the air supply pipe between the air pump 15 and the burner or nozzle 11 is a valve 18 for regulating the supply of air to the burner, and in the oil supply pipe 14 between the pump 16, and the burner, is a gate valve 19 of any desired or suitable structure. The gate valve is provided with an operating arm 20 which is connected to a fluid actuated device 21. This device 21 is connected to the air supply line 13 at a point between the valve 18 and the nozzle 11 by means of a pipe connection 22 so that air under pressure supplied to the nozzle 11 will also be supplied to the fluid actuated device 21.

When a tank or reservoir is used for supplying oil to the burner, a fluid actuated device similar to that shown by Fig. 2 may be employed, and when it is desired to em-

ploy a motor driven pump for supplying the oil to the burner, a fluid actuated device similar to that shown in Fig. 3 may be employed which is provided with means for closing an electrical circuit to motor 17.

In the fluid actuated device shown by Fig. 2 a cylinder 23 is provided with a top plate 24 in which there is an opening 25 with a bottom plate 26 through which the piston rod 27 extends provided with a packing gland 28 and a packing nut 29. The top and bottom pieces 24 and 26 are suitably secured together by means of the bolts 30 or any other suitable fastening devices. The piston for the cylinder is constructed in any desired or suitable manner, for example, as shown in Figs. 2 and 3, in which a flexible plunger disk 31 is compressed between the plates 32 and secured together by means of a nut 33 threaded upon the end of the piston rod 27. The pipe 22 is connected to the cylinder on the under side of the piston, so that the pressure from the air supply pipe will be directed into the cylinder to raise the piston. In the embodiment of the invention shown by Fig. 2, the piston rod 27 is connected to the arm 20 by means of flexible links or a chain 34; and the piston is returned to its lowermost position by means of the weight 35. By varying the weight 35, any desired pressure may be necessary in order to raise the arm 20 and thereby to open the gate valve 19. The opening 25 is to permit the free passage of air to and from the cylinder on the upper side of the piston, and if desired, may be restricted in size so as to permit a retardation of the movement of the piston in either direction.

Referring now to the embodiment of the fluid actuating device shown by Fig. 3, it will be seen that the construction of the cylinder and piston may be similar to that already described, the piston rod 36 however, extending through the top plate 37 of the cylinder, and the bottom plate 38 being provided only with the threaded opening to receive the pipe 22. The top plate 37 is provided with electrical terminals 39 suitably insulated therefrom and extending through the plate on the under side thereof. A connector 40 is suitably secured to the piston, insulated therefrom and is adapted to make connection between the terminals 39 when the piston is in raised position. A coil spring 41 is provided which surrounds the rod 36 and tends to press the piston in its lowermost position against the action of the fluid admitted by the pipe 22. When the piston is raised in the cylinder so that the connector 40 makes connection between the contacts 39, an energizing circuit is closed to the motor 17 by means of the wires 42. The piston rod 36 is connected to the arm 20' of the gate valve 19, so that this valve may be opened and closed in accordance with the position of the piston in the cylinder. With this fluid actuated device it is evident that the oil supplied to the burner is positively and automatically controlled by the air supply. It is impossible to supply oil to the burner unless the air pressure is of sufficient strength to raise the piston in the cylinder, and in the event that the device shown by Fig. 3 is employed, it is impossible to supply oil to the burner until the gate valve is entirely open, whereupon the energizing circuit to the motor will be closed. It is also evident that if the air pressure fails at any time or becomes reduced to a pressure below a predetermined value, the piston will fall in the cylinder causing the gate valve to be closed. With the device shown in Fig. 3, as soon as the piston falls a slight distance in the cylinder, the connection with the terminals 39 will be broken, thereby causing the motor to be stopped. With this construction it is evident that the motor 17 which operates the oil pump is started after the gate valve is opened in starting, and is stopped before the gate valve is closed when the supply of oil is to be cut off. From this, it is evident that the control of the oil supply is entirely automatic and that it is impossible to supply oil to the burner when there is no air under pressure supplied to the burner.

While I have thus described the preferred embodiment of the invention, it is evident that others skilled in the art to which this relates may make various changes in the construction, combination and arrangement of the several parts without departing from the spirit and scope of the invention.

What I claim is:

1. In a device for controlling oil supply to burners, the combination with air pressure supply means, of an oil pump having connection with the burner, a valve in the air supply line, an electric motor with circuit connections for operating the oil pump, and means dependent upon the air pressure supplied to the burner through the valve to close the circuit to the motor.

2. In a device for controlling oil supply to burners, the combination with air pressure supply means, of an oil pump having connection with the burner, a valve in the air supply line, a second valve in the oil supply connection, an electric motor having circuit connections and effective to operate the pump, and a device having connection with and dependent for operation upon the air pressure admitted by the valve and effective when actuated to open the second said valve and to close the motor circuit connection.

3. In a device for controlling oil supply to burners, the combination with air pres-

sure supply means, of an oil pump having connection with the burner, a valve in the air supply line, a second valve in the oil supply connection, an electric motor having circuit connections and effective to operate the pump, and a fluid actuated device having connection with the air supply means and operative when the air is supplied to the burner through the air valve first to open the second said valve and then to close the circuit connection to the motor.

4. In a device for controlling oil supply to burners, the combination with air pressure supply means, of an oil pump having connection with the burner, a valve in the air supply line, a valve in the oil supply connection, an electric motor having circuit connections and effective to operate the pump, a device having connection with and dependent for operation upon the air pressure through the valve in the air supply line and effective when actuated to open the valve controlling the oil supply and to close the motor circuit connection, and means to restore the said device to its unoperated position after actuation when the air pressure is reduced.

5. In a device for controlling oil supply to burners, the combination with air pressure supply means, of an oil pump having connection with the burner, a valve in the air supply line, a valve in the oil supply connection, an electric motor having circuit connections and effective to operate the oil pump, and a fluid actuated device comprising a cylinder having connection at one end with the air supply line between the air valve and the burner, a piston reciprocable in said cylinder, a rod attached to the piston and having connection with the oil supply valve to open and close the valve, electrical contacts in the cylinder for the circuit connections, and a conductor bar connected to the piston and effective when the piston is moved to join the said contacts and to close an energizing circuit to the motor.

6. In a device for controlling oil supply to burners, the combination with air pressure supply means, of an oil pump having connection with the burner, a valve in the air supply line, a valve in the oil supply connection, an electric motor having circuit connections and effective to operate the pump, a fluid actuated device comprising a cylinder having connection at one end with the air supply line between the air valve and the burner, a piston reciprocable in said cylinder, a rod attached to the piston and having connection with the oil valve to open and close the valve, electrical contacts for the circuit connections extending through the cylinder and spaced apart at one end thereof, a bar connected to the piston and effective when the piston is moved to join the said contacts and to close an energizing circuit to the motor, and a spring operative to return the piston after actuation when the air pressure is reduced.

7. In a device for controlling the oil supply to burners, the combination with air pressure supply means having connection with the burner, of an oil pump having connection with the burner, a valve in the air supply pipe, a valve in the oil supply pipe, an electric motor for the oil pump, a fluid pressure device comprising a cylinder connected at one end to the air pressure supply line between the air valve and the burner and having a piston movable therein and connected to the oil valve, electric contacts in the cylinder at the end opposite the air inlet, conductors connecting said contacts to the motor, and a conductor carried by the piston to connect the contacts when the piston is moved to the end of the cylinder by the air pressure therein, the said oil valve being opened by the piston before the motor circuit is closed and being closed after the motor circuit is opened.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 19th day of December A. D. 1911.

THOMAS D. DE VILBISS.

Witnesses:
J. W. BURROWS,
C. M. SMITH.