

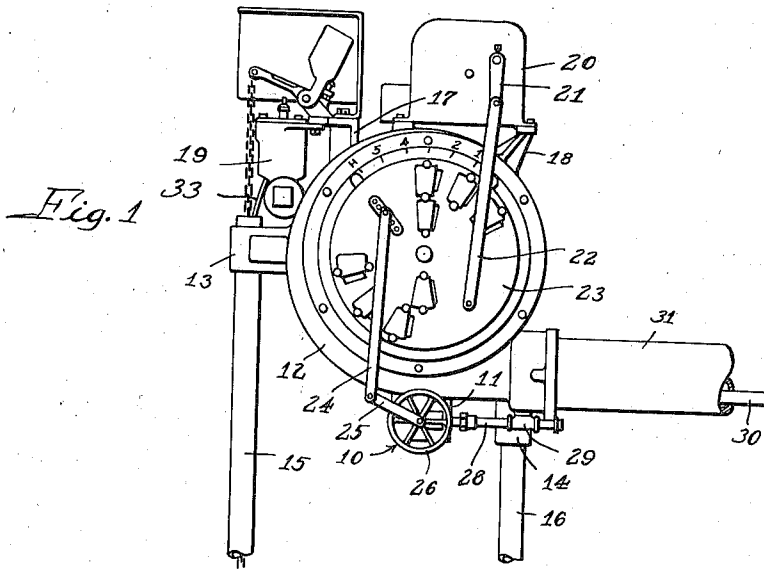
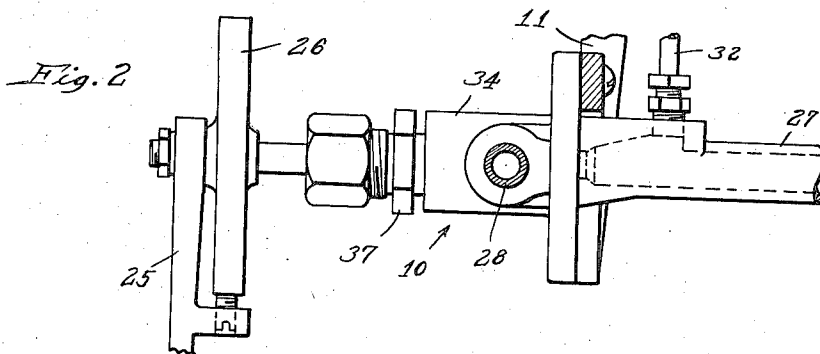
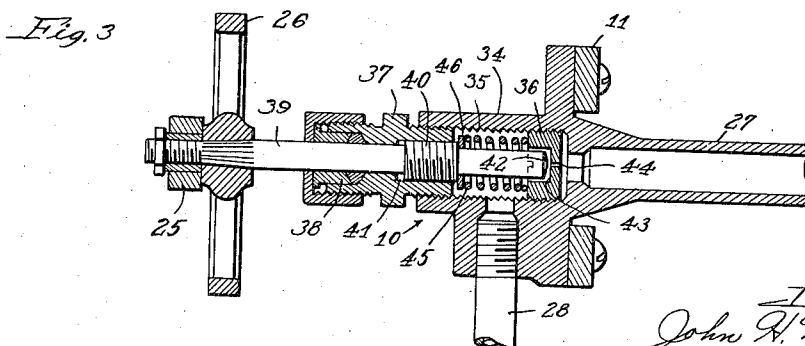
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CONTROL VALVE FOR OIL BURNERS

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## UNITED STATES PATENT OFFICE

2,079,025

## CONTROL VALVE FOR OIL BURNERS

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4 Claims. (Cl. 251-43)

This invention relates to liquid fuel or hydrocarbon burners, commonly known as oil burners, and is particularly concerned with an improved control valve for regulating the oil feed according to the heat demand.

The principal object of my invention is to provide a valve incorporating a removable screw threaded plug for the valve seat, the same having an orifice of a predetermined size for metering the oil in accordance with the size of the burner and the heat demand, the plug being interchangeable with other plugs having different sized orifices, each for a different sized burner, whereby to permit easily changing the valve to suit any particular sized burner, and avoid the necessity of keeping in stock as many different sized valves as there are sizes of burners.

Another important object consists in the special forming of the valve with respect to the seat so as to enable fine regulation, also the provision in connection with the screw threaded adjustment for the valve of a spring for taking up play in the threads to insure accurate regulation throughout the range of adjustment which the valve affords.

This application is a division of my copending application Serial No. 651,083, filed January 11, 1933.

The invention will be better understood in the following detailed description as reference is made to the accompanying drawing, wherein—

Figure 1 is a side view of an oil burner apparatus suitable for application to a heater or furnace for a home, the control valve of my invention being shown as an assembled part of the apparatus;

Fig. 2 is a side view of the valve on a larger scale, and

Fig. 3 is a longitudinal section thereof.

The same reference numerals are applied to corresponding parts in the three views.

The valve of my invention is indicated generally by the reference numeral 10 as mounted on a lug 11 projecting downwardly from and cast integral with the housing 12 of a centrifugal fan. This housing, as described in the parent application, also has integral projections 13 and 14 provided thereon for support of the housing on legs or posts 15 and 16, and has still other integral projections 17 and 18 for support of a float valve 19 and regulator 20, respectively. The latter has a rotatable crank arm 21 connected by means of a link 22 with a shutter plate 23 rotatably adjustable on the side of the housing 12 for regulating the amount of air delivered by the fan in

said housing. The shutter plate forms the subject matter of my Patent No. 1,797,293. Another link 24 provides connection between the shutter plate and a lever arm 25 fixed to the hand wheel 26 of the control valve 10, so that the control valve is opened wider and wider at each step toward wider and wider opening of the shutter. In such automatic controls, the room thermostat causes the regulator 20 to operate so as to adjust the size of the flame and constantly balance the heat loss of the building and thus maintain a very even temperature.

The oil passing through the valve 10 flows usually by gravity through a filter, not shown, and then into the bottom of the float valve 19 which maintains a constant level of fuel with respect to the valve 10 so as to insure an even pressure and consequently an even flame free from pulsations or surges. The oil flows from the float valve 19 by gravity through a solenoid valve, not shown, and into the neck 27 of the control valve 10. The solenoid valve is kept open by energization of its coil by the same current that operates the motor for driving the fan in housing 12. The motor does not appear in Fig. 1, it being on the opposite side of the housing from the shutter plate 23. If the current for the motor is interrupted, a main valve in the solenoid valve is closed and the oil is by-passed through a secondary valve therein, adjusted to reduce the flow to approximately one-third of the maximum capacity of the burner, so as to maintain a reduced flame using natural draft, which flame will be sufficient to keep the house warm until the normal feed and forced draft is resumed. Now, the adjustment of the valve 10 regulates the oil feed, and the oil flows by gravity from the valve through pipe 28 to a connection 29 communicating with a pipe 30 extending lengthwise inside the air tube 31. The tube 31 communicates with a fire-pot, not shown, and the pipe 30 has a discharge elbow, not shown, at its remote end for discharging the oil in a fine stream into the fire-pot. It is therefore clear that the burner has simple gravity feed regulated in accordance with heat demand by the valve 10, and the solenoid valve utilized in connection therewith is for changing from a normal oil feed, while the motor is running to furnish a forced air draft, to a restricted feed for a low carry-over flame when the current for the motor is interrupted by reason of a temporary shut down of the electric service for the home. In passing, attention may be called to the tube 32 extending upwardly from the neck 27. This tube has communication at its upper end with the overflow

tube 33 that communicates with the float chamber 19 just below its cover and well above the normal fuel level. The purpose of the connection between 32 and 33 is to permit venting air from the oil line ahead of the valve 10 so that no air bubbles will occur in the oil feed through pipe 30 to the fire-pot and disturb the evenness or continuity of the stream of oil discharged into the fire-pot.

The control valve 10, as best appears in Fig. 3, has the hollow body 34 thereof formed integral with the neck 27 and internally threaded substantially its full length, as indicated at 35, for the entry of a screw plug 36 into the inner end and a closure plug 37 into the outer end. The latter has a stuffing box 38 formed thereon through which the stem 39 of the valve 10 extends. The stem 39 has an enlarged screw threaded portion 40 threading in a bore 41 in the plug 37 whereby to adjust the nearly flat, slightly conical end 42 of the stem with respect to the flat seat 43 provided on the screw plug 36, to regulate the amount of oil delivered to the burner through the orifice 44. The plug 36 is screwed into place and is interchangeable with any one of a number of other plugs having different sized orifices. The thought is to provide one plug with a certain sized orifice for one particular sized burner having a certain fuel consumption, and other plugs with other sized orifices for the other sized burners. In that way, it is a simple matter to insert the plug for whatever sized burner is being installed and there is no need for keeping in stock as many different sized valves as there are burners. The nearly flat, slightly conical form of the end of the valve stem insures accuracy in the regulation of the oil flow to such an extent that the oil delivery to the firepot is exactly proportional to the angularity of adjustment of the lever arm 25 fixed to the hand wheel 26, as shown in Fig. 1. In order to insure this accuracy of regulation of oil flow and eliminate the inaccuracy due to play being developed at the threads 40, I provide the coiled compression spring 45 acting between a washer 46 abutting the inner end of the enlarged threaded portion 40 of the stem and the plug 36. This keeps the stem under a certain end thrust away from the valve seat so that there is no end play to affect the regulation of oil flow.

I claim:

1. In a valve of the character described, a housing having a longitudinal bore, means at the inner end thereof providing a flat valve seat and a restricted orifice therein, a closure plug in the open end of said bore in spaced relation to the valve seat, a valve stem threadedly received in the closure plug having a cylindrical valve portion extending into proximity with the valve seat, said portion being of large diameter in relation to said orifice and having a bluntly conical end for cooperation with the orifice and seat to regulate flow through the orifice from an inlet on one side thereof to an outlet on the other side, the threaded portion of said stem being enlarged and projecting into the housing from said closure plug,

and a coiled compression spring surrounding the valve portion and bearing at one end adjacent the valve seat and exerting pressure at the other end against the enlarged threaded portion, for the purpose described.

2. In a valve for regulating oil flow to an oil burner, the combination of a casing having a longitudinal bore provided therein, an outlet opening at one end of said bore and an inlet opening intermediate the ends of said bore, a plug entered in the bore to the end thereof adjacent the outlet opening and having a flat valve seat thereon and a restricted central orifice therein, a closure plug entered in the other end of said bore in longitudinally spaced relation to the first plug, a valve stem extending longitudinally in the bore through the closure plug to the first plug and having an enlarged cylindrical threaded portion threadedly engaged in the closure plug and projecting from the inner end thereof, the inner end of the valve stem being of large diameter in relation to the orifice in the first plug and having a bluntly conical end for cooperation with said orifice and seat to regulate flow through the orifice from the inlet to the outlet, a washer surrounding the valve stem and engaging the inner end of the enlarged threaded portion, and a coiled compression spring surrounding the valve stem and bearing at one end on the washer and at the other end on the first-mentioned plug, for the purpose described.

3. In a valve of the character described, a housing having a longitudinal bore, means at the inner end thereof providing a flat valve seat and an orifice therein, a closure plug in the open end of said bore in spaced relation to the valve seat, a valve stem threadedly received in the closure plug having a cylindrical valve portion extending into proximity with the valve seat, the threaded portion of said stem being enlarged and projecting into the housing from said closure plug, and a coiled compression spring surrounding the valve portion and bearing at one end adjacent the valve seat and exerting pressure at the other end against the enlarged threaded portion.

4. In a valve for regulating oil flow to an oil burner, the combination of a casing having a longitudinal bore provided therein, an outlet opening at one end of said bore and an inlet opening intermediate the ends of said bore, a plug entered in the bore at the end thereof adjacent the outlet opening and having a flat valve seat thereon and a central orifice therein, a closure plug entered in the other end of said bore in longitudinally spaced relation to the first plug, a valve stem extending longitudinally in the bore through the closure plug to the first plug and having an enlarged cylindrical threaded portion threadedly engaged in the closure plug and projecting from the inner end thereof, a washer surrounding the valve stem and engaging the inner end of the enlarged threaded portion, and a coiled compression spring surrounding the valve stem and bearing at one end on the washer and at the other end on the first-mentioned plug.

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