Sept. 21, 1926. 1,600,507

E. MARR

FEED VALVE MECHANISM FOR OIL BURNERS

Filed August 3, 1925

Fig. 1

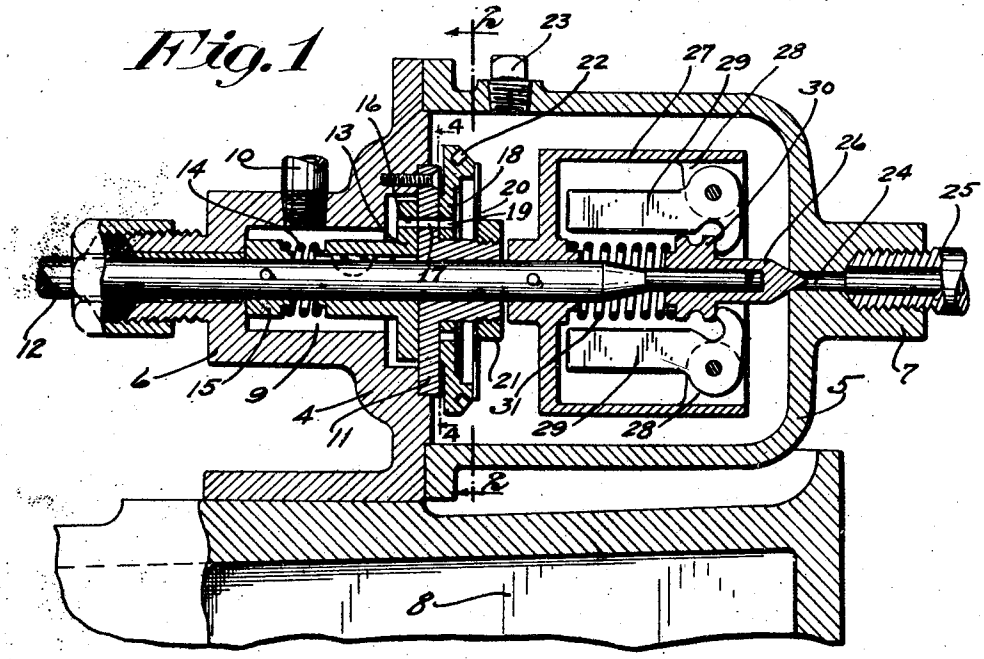
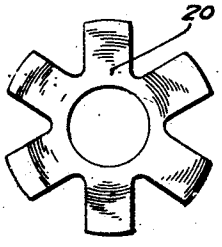


Fig. 3



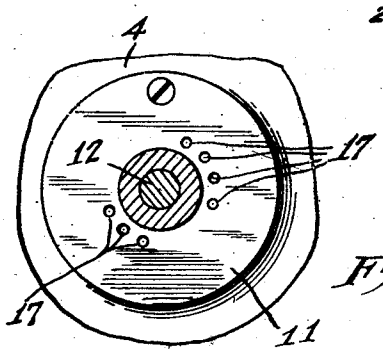
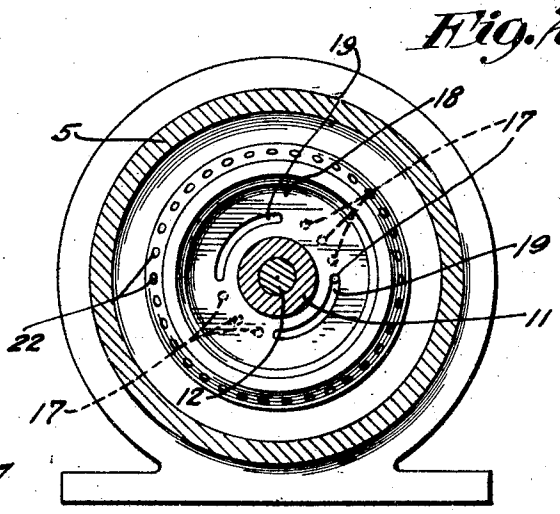


Fig. 4

Fig. 2



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UNITED STATES PATENT OFFICE.

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FEED-VALVE MECHANISM FOR OIL BURNERS.

Application filed August 3, 1925. Serial No. 47,776.

My invention provides an improved feed valve mechanism especially adapted for use in connection with oil burners wherein a fan or blower and an oil pump are used to produce forced feed of air and oil. Generally stated, the invention consists of the novel devices, combinations of devices and arrangement of parts hereinafter described and defined in the claims.

It has been a difficult matter to provide a satisfactory oil or fluid fuel feeding device for oil burners of the above indicated type, for the reason that the oil should be fed in a very small continuous stream requiring, with old arrangements, such an extremely small oil feed passage that such passage would be clogged up by the very small impurities contained in the oil or fluid fuel. If larger feed passages be provided and left constantly open, then the supply of oil could not be cut down to the required small flow. I have, however, provided a valve mechanism wherein relatively large ports may be used and these ports brought into registration intermittently and for only a portion of the time, but in such rapid succession that the flow of oil to the burner, for all intents and purposes, would be substantially continuous.

A second feature of the invention resides in the provision of a governor-controlled choke valve in the fuel or oil feed passage, the governor being driven by the same motor that drives the fan or blower and arranged to open the choke valve when the motor is in action, and to close the choke valve when the motor and the blower are idle or stopped.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a vertical section taken axially through the improved feed valve mechanism;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a detail in elevation, showing a spring washer used in connection with the feed valve; and

Fig. 4 is a detail in section on the line 4—4 of Fig. 1, some parts being broken away.

The governor and the valve mechanism are located within a housing shown as made up of a head casting 4 and a horizontally disposed cup-shaped shell 5. Said members 4 and 5 are provided with axially aligned projecting bearing hubs 6 and 7, respectively. As shown in Fig. 1, the flanged base of the head 4 is secured to a casting or support 8, the nature of which, for the purpose of this case, need not be considered. The bearing hub 6 is made hollow to afford an oil-receiving chamber 9, and the oil under pressure is fed into this chamber 9 through an oil pipe 10. Rigidly secured to the inner face of the head plate 4 is a disc-like valve seat 11 provided with a hub that is axially aligned with the hub 6. A motor or power-driven shaft 12, which, in practice, will be arranged to be rotated when the fan or blower (not shown) of the burner is in action, is extended through and journaled in the hub 6 and in the hub of the valve seat 11. Keyed to rotate with the shaft 12 but capable of slight axial movement is a rotary disc-like feed valve 13, the face of which works in close contact against the face of the fixed valve seat 11. In the arrangement shown, the valve 13 is pressed against its seat by a coiled spring 14 placed around the shaft 12 and reacting against the hub of said valve and against a collar 15 fixed to said shaft. The valve 13 is provided with a port 16 offset from its axis and arranged to register in succession with circumferentially spaced ports 17 formed in the valve seat 11. These ports 17 may vary in number, but, as shown, they are located in substantially diametrically opposite groups, the one group consisting of three ports and the other of four ports. Working against the inner face of the valve seat 11 is a rotatively adjustable port cut-off plate 18 of annular form, rotatively mounted on the hub of said valve seat and, as shown, provided with diametrically opposite segmental slots 19. As shown, the cut-off plate 18 is frictionally pressed against the valve seat 11 by a spider-like spring washer 20 that is seated against a nut 21 threaded on the hub of said valve seat. Thus, the rotatively adjustable port cut-off plate 18 will be frictionally held in any position in which set. To facilitate rotary adjustments of said plate 18, it is shown as provided with a notched rim 22 that may be reached by a pointed tool inserted through an opening normally closed by a plug 23 applied to the shell 5. In the adjustment shown in Fig. 2, only one of the

ports 17 is opened by the cut-off plate, but by progressive adjustments of said cut-off plate, any number of the seven ports 17, in the arrangement illustrated, may be opened up. Under rotation of the shaft 12, the port 16 of the feed valve 13 will register in succession with all of the seven ports 17, but such registration will be effective to feed oil only through such of the ports 17 as are opened by the cut-off plate 18. This, as is evident, affords means for greatly varying the feed of oil. The rate of the oil feed will not be varied to any perceptible extent per minute or any other unit of time by the varying speed of the shaft 12, for if the speed of said shaft be doubled, the interval of time during which the ports will register will be reduced to one-half, but the number of port registrations per minute or unit of time will be doubled. Hence, the rate of the oil feed may be very accurately controlled by adjustments of the cut-off plate. When only one port of the valve seat is opened by the cut-off plate, there will be a very small or slow feed of the oil or fluid fuel, even when the fuel feed ports of the valve mechanism are made as large as one-eighth of an inch or more in diameter and, as is evident, ports of such size will not be clogged by any impurities found in oil or fluid fuel.

Oil fed into the chamber 9 and through the ports of the valve mechanism just above described will enter the interior of the shell 5, and for the discharge thereof from said shell, the hub of said shell is provided with an axial discharge port 24 connected to an oil delivery pipe 25. Mounted on the reduced inner end of the shaft 12 for slight axial movements is a needle valve 26. Secured to the shaft 12 within the shell 5 is a cup-shaped governor head 27 provided with internal lugs 28 to which are pivoted governor levers 29, the short inwardly projecting ends of which engage a shoulder 30 on the needle valve 26. A coiled spring 31, placed around the shaft 12, acts against the hub of the head 27 and against the valve 26 and causes said valve to close said port 24 when the shaft 12 is at rest. When the shaft 12 is rotated at the proper speed to operate the fan or blower, centrifugal force, acting on the head ends of the levers 29, will overcome the spring 31 and move the needle valve 26 in a position to open the port 24 for maximum feeding capacity, so that the flow of oil will then be regulated entirely by the feed valve mechanism already clearly described. The obvious purpose of this governor-actuated choke valve 26 is to positively cut off the flow or feed of the oil or fluid fuel whenever the motor and, hence, the fan or blower are stopped. This positively prevents flooding of a burner when the motor of the burner installation is stopped.

What I claim is:—

1. In a device of the kind described, a relatively fixed valve seat, a rotary valve cooperating therewith, said seat and valve having eccentrically located ports arranged to be intermittently brought into registration under rotation of said valve, and motor-actuated means for rotating said valve.

2. A device of the kind described comprising a valve seat and a cooperating rotary valve, said valve and seat having flat engaging faces and formed with eccentrically located ports adapted to be brought into registration under rotation of said valve, the number of ports in one of the said members being greater than the number of ports in the other member, and motor-actuated means for rotating said valve.

3. A device of the kind described comprising a valve seat and a cooperating rotary valve, said valve and seat having flat engaging faces and formed with eccentrically located ports adapted to be brought into registration under rotation of said valve, the number of ports in said valve seat being greater than the number of ports in said valve, and motor-actuated means for rotating said valve.

4. The structure defined in claim 2 in further combination with means for closing more or less of said ports to vary the flow.

5. A device of the kind described comprising a valve seat and a cooperating rotary valve, said valve and seat having flat engaging faces and formed with eccentrically located ports adapted to be brought into registration under rotation of said valve, the number of ports in said valve seat being greater than the number of ports in said valve, and an adjustable port cut-off plate movable to open and close more or less of the ports of said valve seat.

6. In a device of the kind described, the combination with a relatively fixed valve seat, of a rotary valve working on one side of said valve seat, and a choke plate rotatively adjustable on the other side of said valve seat, said valve seat, valve and cut-off plate having ports and said cut-off plate being adjustable to vary the flow through said ports when in registration.

7. The structure defined in claim 6 in further combination with a spring device for frictionally holding said cut-off plate where set.

8. A fluid kow feed device comprising a relatively fixed disc-like valve seat, a disc-like rotary valve, and a rotatively adjustable cut-off-plate, said valve seat being between said valve and cut-off plate, said three elements having cooperating ports, and said cut-off plate being adjustable to vary the flow-conducting capacity of said ports when in registration.

9. The combination with a container hav-

ing inlet and discharge ports for the circulation of a fluid therethrough, of a shaft extended into said container, a valve and a valve seat in said container having cooperating ports for controlling the flow of fluid from the intake to the discharge port of said container, said valve being driven by said shaft, a choke valve normally closing the discharge passage from said container, and a centrifugal governor driven by said shaft and operative on said choke valve to cause the same to open to said discharge port when said shaft is rotated.

10. The combination with a container having inlet and discharge ports for the circulation of fluid therethrough, a feed valve and a valve seat having co-operating ports controlling the extent of flow through said container, a choke valve for cutting off and releasing the flow through said container, a governor for actuating said choke valve, and means for simultaneously driving said governor and feed valve.

11. The combination with a container having inlet and discharge ports for the circulation of fluid therethrough, a feed valve and a valve seat, said valve and seat having co-operating eccentrically located ports controlling the extent of flow through said container but movable to release the flow, a centrifugal governor operative at a predetermined speed to move said choke valve to an open position, and means for simultaneously rotating said governor and valve.

12. The combination with a container having inlet and discharge ports for the circulation of fluid therethrough, driven flow-controlling means primarily controlling the flow through said container when in action, a choke valve for cutting off and releasing the flow though said container, a governor for actuating said choke valve, and means for simultaneously driving said governor and flow-controlling means.

In testimony whereof I affix my signature.

EARL MARR.