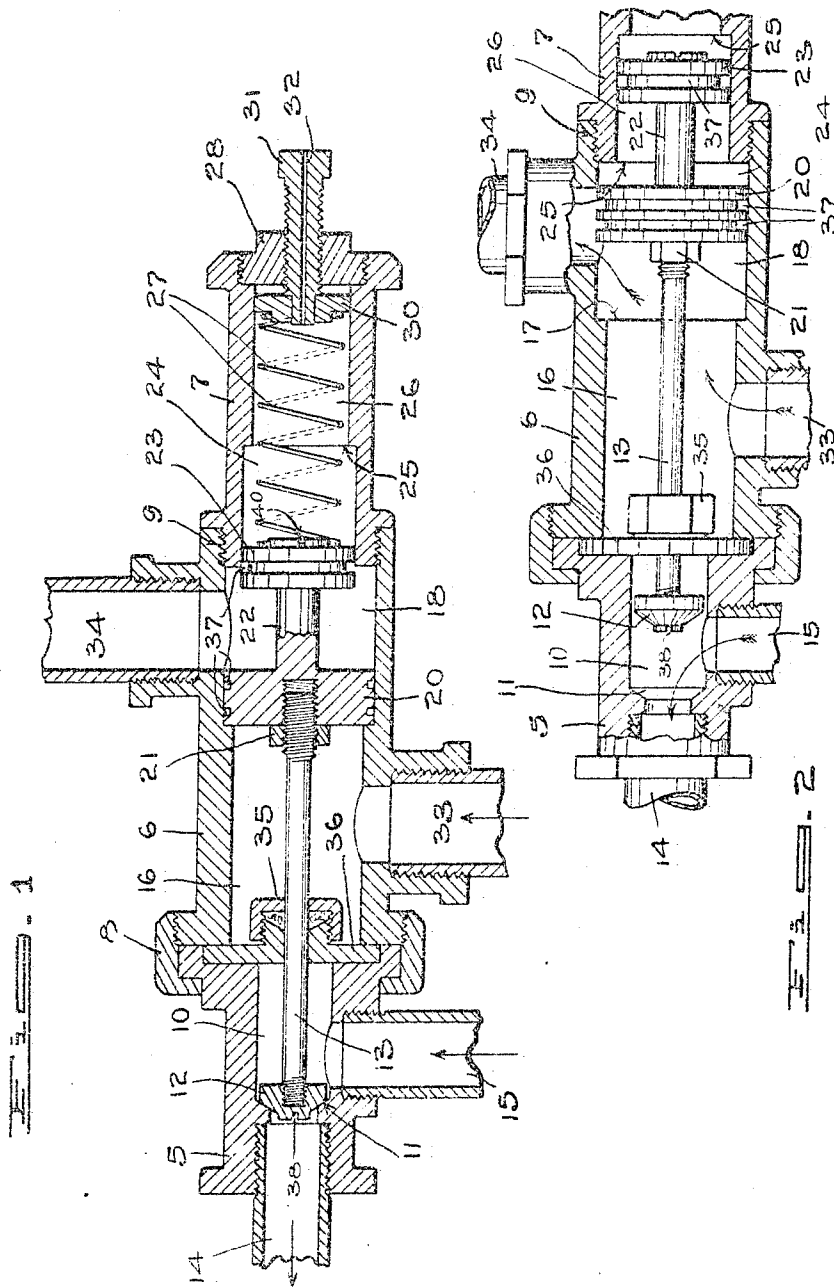


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 AUTOMATIC VALVE.
 APPLICATION FILED DEC. 17, 1917

1,287,258.

Patented Dec. 10, 1918.



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AUTOMATIC VALVE.

1,287,258.

Specification of Letters Patent. Patented Dec. 10, 1918.

Application filed December 17, 1917. Serial No. 207,475.

To all whom it may concern:

Be it known that I, EDWARD WILLIAM DISCHER, a citizen of the United States, and resident of Seattle, in the county of King and State of Washington, (whose post-office address is Stanley Apts.) have invented a new and useful Improvement in Automatic Valves, of which the following is a full and exact specification.

This invention relates to improvements in automatic valves and is in the nature of an improvement on the valve disclosed in my co-pending application Serial Number 160,874, filed April 7, 1917, Patent 1,257,070, Feb. 19, 1918.

The objects of the invention are to improve and render more reliable and efficient valves of this nature that are adapted to be connected with the fuel and air supply pipes of an oil burner and operated by variations in the pressure, of air within the air pipe to shut off the flow of oil when the air pressure within the air pipe is reduced below a predetermined minimum.

The features of this valve that constitute the improvement over the valve disclosed in my prior application are; the means for adjusting the compression of the valve closing spring; the vent for admitting air to the spring chamber; the stops or seats for the air piston; the three part structure of the valve casing which facilitates assembling and enables the oil valve to be ground into its seat if it becomes worn so that it leaks oil and the means of adjustment between the oil valve and air piston.

In the type of oil burners commonly used in connection with furnaces the oil is sprayed into the combustion chamber of the furnace by means of air under pressure and the flame from the burner will go out or be extinguished if the pressure of the air drops below a certain minimum usually about three pounds. This air pressure is generally maintained by an air compressor which must run constantly in order to insure a steady flame.

If the air compressor should be stopped owing to an accident during the absence of an attendant and the air pressure drop below the minimum necessary to maintain the flame, such flame will be extinguished but the oil will continue to feed and will run

out into the hot fire box, and there be gasified, and perhaps produce an explosion that will start a destructive fire, or wreck the furnace in the basement of a building.

This valve is so designed that when the air pressure falls below a certain predetermined minimum the oil or fuel feed will be automatically shut off.

The invention consists in the novel construction, adaptation and combination of parts of an automatic valve as will be more clearly hereinafter described and claimed.

In the accompanying drawings Figure 1 is a view in longitudinal section of a valve constructed in accordance with this invention as it may appear when closed and Fig. 2 is a similar view showing the valve in an open position and showing certain portions in elevation and certain other portions broken away.

Referring to the drawings throughout which like reference numerals designate like parts the numerals 5, 6 and 7 designate the three parts of a valve casing, respectively.

The parts 5 and 6 are secured together by a union 8 and the part 7 is screwed into the end of the part 6 as indicated at 9.

The part 5 is provided with an axial chamber 10 and with a concentrically arranged seat 11 for the reception of a valve 12 that is screwed onto the end of a valve stem 13.

The part 5 is also provided with an axially alined oil outlet 14 and an oil inlet 15 that is disposed at right angles to the valve casing and communicates with the chamber 10 to the rear of the valve seat 11.

The section 6 is provided with a cylindrical bore 16 that is enlarged near the outer end thereof to form a shoulder 17 and provide a chamber 18 in which a cylindrical valve or air piston 20 may work.

The piston 20 is screwed onto the end of the valve stem 13 and is held in adjusted position with respect to the valve 12 by a lock nut 21.

The side of the piston 20 opposite the valve stem 13 is provided with an integral shank 22 upon the outer end of which is formed a piston 23 that is movable within a cylindrical chamber 24 in the casing section 7.

The diameter of the chamber 24 is abruptly reduced as at 25 to form a shoulder

that may serve as a stop for the piston 23 when the valve is open and such chamber communicates with a spring chamber 26 within which is disposed a spring 27 that bears against the piston 23.

The outer end of the spring chamber 26 is closed by a plug 28 that screws thereinto and the outer end of the spring 27 is supported by a disk 30 that is rotatably mounted on the end of a tap screw 31 that screws through the plug 28 whereby the disk 30 may be moved lengthwise within the spring chamber 26 by turning the screw to thereby vary the pressure of the spring 27.

The tap screw 31 is provided with an axially disposed vent opening 32 of small diameter to relieve any air pressure within the chambers 24 and 26 and prevent a partial vacuum from being formed therein and operating against the force of the spring 27 to prevent the closing of the valve when the air pressure is reduced.

The chamber 16 is provided with an air inlet 33 arranged at right angles thereto and the chamber 18 is provided with an air outlet 34 arranged at right angles thereto and offset with respect to the inlet 33.

The valve stem 13 is movable through a packing gland 35 in a partition wall 36 that is of disk like construction and interposed in suitable recesses between the abutting ends of the casing parts 5 and 6.

When the disk 36 is inserted and the union 8 is tightened a leak proof partition is formed that precludes the passage of air or oil between the chambers 10 and 16.

The pistons 20 and 23 are preferably recessed as at 37 so that they will not bear against their respective cylinder walls for so great a distance and thereby will offer less resistance to movement.

The valve 12 is preferably of smaller diameter than the chamber 10 so that oil may flow around the edges thereof when such valve is withdrawn past the oil inlet 15 as shown in Fig. 2 and so that the pressure of the oil will be the same on both sides of the valve 12 when the latter is in any except the fully closed position. When the valve 12 is entirely closed any pressure of oil within the chamber 10 will tend to close such valve more tightly.

The valve 12 may be provided in its front end with a suitable slot 38 for the reception of a screw driver that may be used in turning the valve onto or off of the stem 13.

When the air is shut off the several parts of the valve will occupy the positions shown in Fig. 1 but when air under pressure sufficient to overcome the compression of the spring is admitted through the air inlet 33 the piston valve 20 will be moved to the right into a position as shown in Fig. 2 thereby opening a passageway between the air inlet 33 and air outlet 34 and also mov-

ing the valve 12 to the right and opening a passageway between the oil inlet 15 and oil outlet 14.

When the air pressure falls below a predetermined minimum, the force of the spring 27 will be sufficient to move the valve parts back into the position shown in Fig. 1 and close the oil passageway.

The union 8 permits the member 5 to be secured to the member 6 in any relative angular position after the connections with the several inlet and outlet pipes have been made and also permits these two parts to be readily taken apart, thereby overcoming difficulties that would be encountered in positioning the oil inlet pipe 15 and air inlet pipe 33 if these two parts were screwed together like the parts 6 and 7.

Screwing the valve 12 onto the stem 13 enables the operator to remove the casing part 5 and valve 12 and then unscrew the casing section 7 and remove the pistons 20 and 23 and valve stem 13 for the purpose of tightening the lock nut 21 after the proper adjustment between the valve 12 and piston 20 has been made.

If the valve 12 becomes worn so that it leaks oil the casing section 7 may be removed and the valve 12 ground into the seat 11 by placing a screw driver or similar instrument in a groove 40 in the end of the piston 23 and turning the valves.

This adjustment of the piston 20 with respect to the valve 12 is necessary because of the necessity of the valve 12 firmly seating on the seat 11 at the same time that the piston 20 engages the shoulder 17.

When the valve pistons 20 and 23 are moved to the right as far as possible they will engage with the end of the member 7 and the shoulder 25 respectively and will effectively prevent the passage of any air into the spring chamber.

The vent opening 32 prevents an air pressure less or greater than atmospheric pressure from being present within the spring chamber for any continued period of time and thereby assures the reliable operation of the spring 27.

It is obvious that changes in the form of construction of the various parts of this device may be resorted to within the scope of the following claims.

What I claim and desire to protect by Letters Patent, is—

1. A valve of the class described comprising a casing having an internal recess divided into two cylindrical compartments by a partition wall, a valve stem slidable through said partition wall, a valve piston secured on each end of said valve stem, fuel inlet and outlet pipes connected with one of said compartments, air inlet and outlet pipes connected with the other of said compartments at points offset with respect to each

other, a spring to normally close said valve pistons and prevent the passage of fuel when the air pressure is low, and means for adjusting the pressure of said spring, said valve pistons being adapted to be moved into an open position by the pressure of said air when said pressure reaches a certain predetermined amount.

2. A valve of the class described comprising a casing having an internal recess divided into two compartments by a partition wall, a valve stem slidable through said partition, a valve secured to one end of said valve stem, a piston secured to the opposite end of said valve stem, means for adjusting the distance between said piston and said valve, a valve seat for said valve, a shoulder against which said piston engages when said valve is on said seat, fuel inlet and outlet pipes connected with one of said compartments, air inlet and outlet pipes connected with the other of said compartments at points offset with respect to each other, an adjustably supported spring to normally close said valve and prevent the passage of fuel when the air pressure is low, said valve being adapted to be moved into an open position by the pressure of air on said piston when the pressure reaches a predetermined pressure.

3. A valve of the class described comprising a three part valve casing having axially arranged valve chambers in each of said parts, a union connecting two of said casing parts, a disk interposed between said two parts to form a partition wall, said disk having a packing gland arranged centrally

thereof, a valve stem slidable through said partition wall, a valve removably secured on one end of said stem, a valve seat for said valve, fuel inlet and outlet means controlled by said valve, a piston adjustably secured on the other end of said valve stem, a shoulder with which said piston may be adjusted to engage when said valve is closed, a spring to normally hold said piston and said valve in a closed position, and air inlet and outlet means connected with said valve casing at points offset with respect to each other to move said piston and open said valve in response to the admission of air under pressure.

4. A valve of the class described comprising a casing, divided into two compartments by a partition wall, a valve stem slidable through said partition wall, a valve removably secured to one end of said stem, a valve seat for said valve, oil inlet and outlet means controlled by said valve, a piston removably secured on the opposite end of said valve stem, air inlet and outlet pipes connected with said casing at points offset with respect to each other, an auxiliary piston secured to said first named piston, a helical compression spring disposed in one end of said valve casing and adapted to exert a pressure against said auxiliary piston, means for adjusting the pressure of said spring, and means for establishing air communication between the chamber in the rear of said auxiliary piston and the atmosphere.

Signed at Seattle, Washington, this 3rd day of December, 1917.

EDWARD WILLIAM DISCHER.