May 31, 1927. 1,630,265

A. P. HOLDEN ET AL

OIL FEED CONTROL FOR OIL BURNERS

Filed Sept. 23, 1926 2 Sheets-Sheet 1

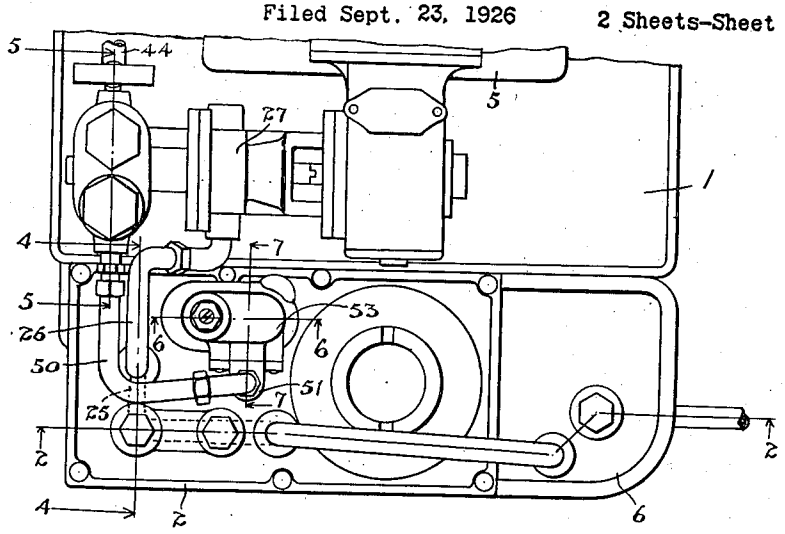


Fig. 1.

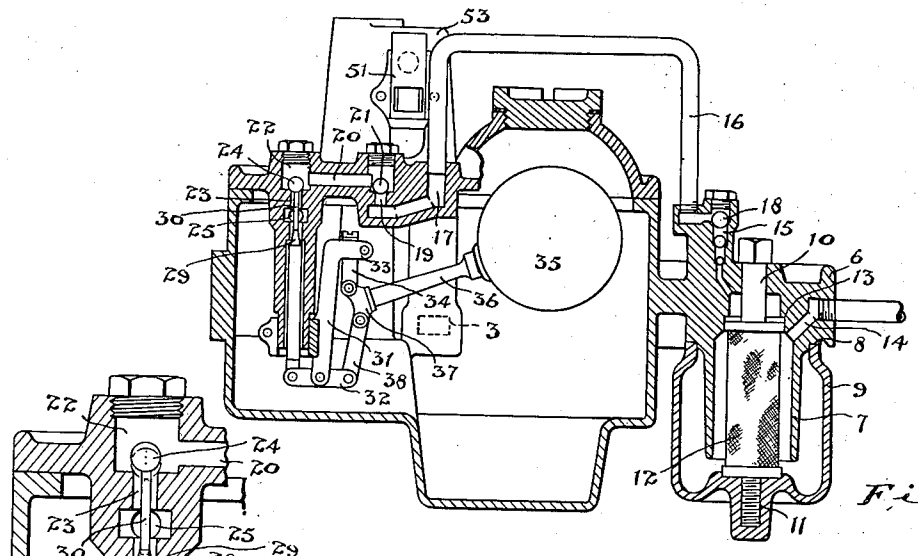


Fig. 2.

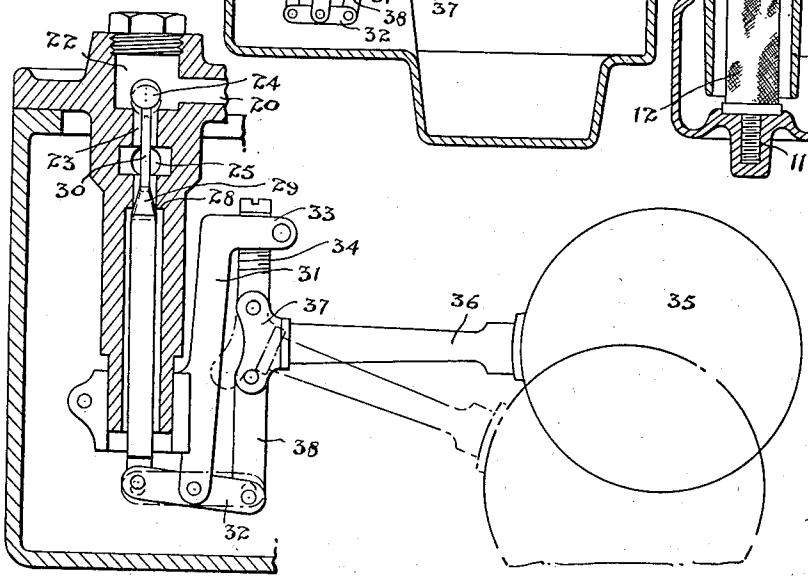


Fig. 3.

Inventors.
Arthur P. Holden.
Philip Morgan.
Samuel R. Williams.
by H. J. Dennison
Atty.

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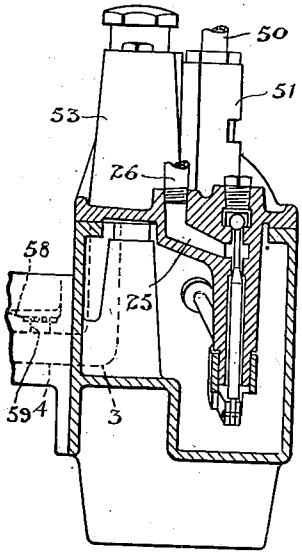


Fig. 4.

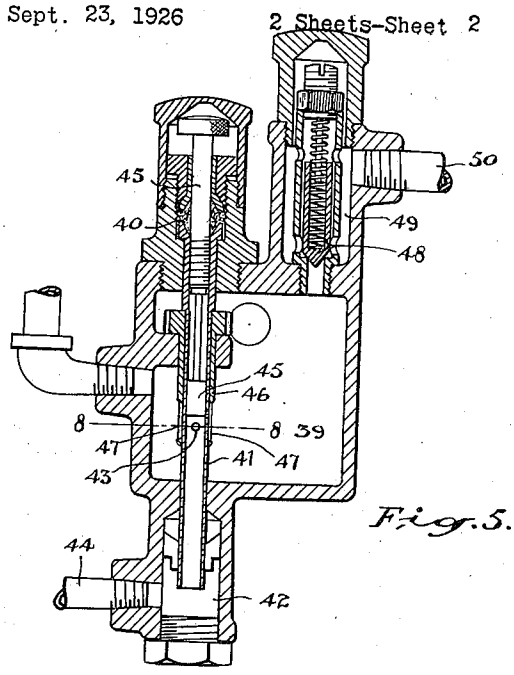


Fig. 5.

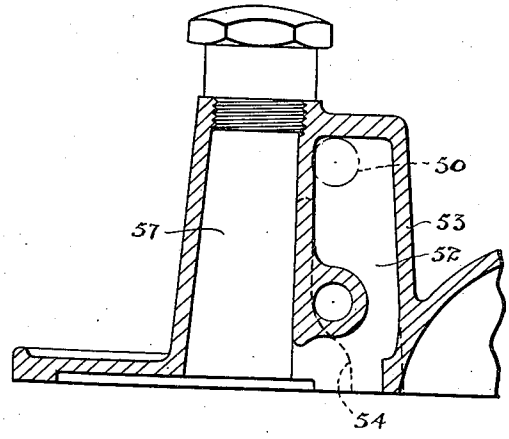


Fig. 6.

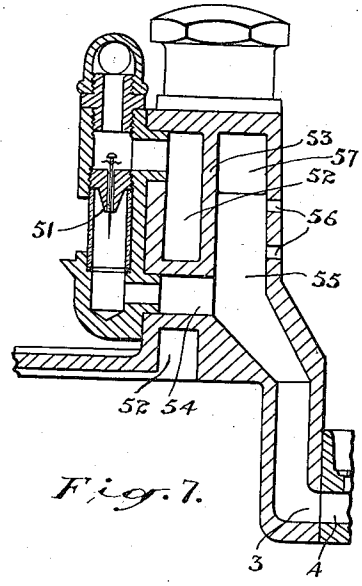


Fig. 7.

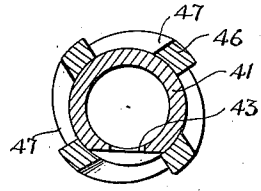


Fig. 8.

Inventors.
Arthur P. Holden.
Philip Morgan.
Samuel R. Williams.

by A. J. S. Dennison
atty.

Patented May 31, 1927. 1,630,265

UNITED STATES PATENT OFFICE.

ARTHUR P. HOLDEN, PHILIP MORGAN, AND SAMUEL ROLFE WILLIAMS, OF TORONTO, ONTARIO, CANADA.

OIL-FEED CONTROL FOR OIL BURNERS.

Application filed September 23, 1926. Serial No. 137,358.

The principal objects of the invention are to eliminate the possibility of siphoning oil from the oil container in the event of an unforseen accident breaking the oil line from the supply to the burner, and to obviate the necessity of returning surplus oil discharged from the pump back to the reservoir.

A further object is to provide an apparatus which will pump from the container only the amount of oil required for use.

The principal feature of the invention consists in the novel construction and arrangement of parts, whereby the supply of oil to the oil pump feeding the burner and lubricating the mechanism is controlled by a float controlled valve interposed in the feed line to the pump.

A further important feature consists in the novel construction of the means for regulating the quantity of oil fed to the burner and in the novel construction of the strainer for straining the oil flowing to the pump.

In the accompanying drawings, Figure 1 is a plan view of an assembly of the present structure of oil feed control.

Figure 2 is a vertical longitudinal sectional view through the line 2—2 of Figure 1.

Figure 3 is an enlarged detail sectional elevational view showing the valve and toggle mechanism in different positions.

Figure 4 is a vertical longitudinal sectional view through the line 4—4 of Figure 1.

Figure 5 is a vertical longitudinal sectional view on the line 5—5 of Figure 1 on an enlarged scale.

Figure 6 is an enlarged vertical sectional detail on the line 6—6 of Figure 1.

Figure 7 is an enlarged vertical sectional detail on the line 7—7 of Figure 1.

Figure 8 is an enlarged horizontal section through the line 8—8 of Figure 5.

In the operation of oil burners used in household heating where intermittent service is required, many difficulties are met with that are not found where a constant demand is required. Further, the insurance requirements in respect to the use of oil burners are such as are to demand that if an apparatus fails in its function, it must fail "safe," that is, it must fail so that an overplus of oil cannot be discharged into the furnace to create an explosion.

The present invention has been devised to meet this requirement and in the arrangement herein shown the tray 1 of the stand upon which the air pump and its operating motor are mounted, has secured at one side thereof a casing 2 which is of substantially rectangular form having an opening 3 in one side thereof which communicates with a passage 4 in the tray structure which leads to the inlet of the rotary blower 5.

At one end of the casing 2 is arranged a flanged extension 6 which has a centrally arranged cylindrical apron 7 which is surrounded at the top by a circular seat 8 and a cup 9 having its upper edge fitted in a ground joint to said seat, extends around and below the apron.

A bolt 10 extends through a central opening downwardly axially of the apron 7 and engages a threaded hole 11 in a boss in the bottom of the cup and holds the cup tightly in place.

A strainer basket 12 is fitted between the bottom of the cup 9 and a seat 13 at the inner side of the apron 7.

A passage 14 which is connected by a suitable pipe to the oil supply tank leads to the space between the apron and the strainer basket.

A passage 15 leads upwardly from above the seat 13 to the pipe 16 which connects with a passage 17 formed in the top of the casing 2.

A plurality of ball checks 18, each seating individually are arranged in the passage 15 to ensure against any return flow of the oil.

The strainer, cup and apron formed as shown effectively separate any sediment from the oil and retain it so that it may be easily removed and the cup 9 which provides an air lock above the bottom of the apron has a capacity sufficient to hold all the oil contained at any one time in the device after the pump has been stopped, consequently the strainer may be very easily cleaned without any oil being spilled around. The provision of the air lock prevents any leakage of oil through the ground joint at the top of the cup.

The passage 17 in the top of the casing connects at its inner end through a vertical passage 19 with a horizontal passage 20 and a ball check valve 21 is arranged at the top of the passage 19, allowing the inflow and checking return.

The passage 20 connects with a chamber 22 having a vertical orifice 23 leading from the bottom thereof closed by a ball check 24.

The orifice 23 is enlarged midway of its depth and connects with a horizontal passage 25 which extends at right angles therefrom and is connected to a pipe 26 which leads to the intake of the oil pump 27.

The lower end of the vertical orifice 23 is enlarged and the shoulder 28 therein forms a seat for a tapered valve 29 which is movable vertically therein and has a reduced extension finger 30 which is adapted to project through the upper end of the orifice 23 to engage and lift the ball check 24 from its seat upon the tapered portion thereof being moved into engagement with the shoulder 28.

A bracket 31 having a collar clamped to the lower end of the tubular extension surrounding the vertical orifice 23 forms a pivot support for a rocker bar 32, one end of which is pivotally connected to the lower end of the valve 29.

The upper jaw-shaped end 33 of the bracket 31 carries and adjustable pivot 34 in the form of a screw.

A ball float 35 is provided with an arm 36 which has a double jaw end 37, one jaw of which is pivoted on the lower end of the screw 34 and the other of which is pivotally connected to a link 38 and the other end of said link is pivotally connected to the free end of the rocker bar 32.

The movement of the float up or down upon the pivot on the end of the screw 34 lifts upwardly upon the link 38 or depresses it to correspondingly move the valve 29 downwardly away from the seat 28 opening communication between the interior of the casing 2 and the horizontal passage 25 leading to the oil pump and simultaneously closing the upper end of the vertical orifice by allowing the ball check to drop to its seat or moving the valve 29 upwardly to close against the seat 28 and shut off communication between the oil pump and the interior of the casing 2 but lifting the ball check 24 from its seat, thereby establishing communication between the pump and the oil supply through the strainer.

This piece of mechanism forms the principal part of the invention.

It will be seen that as the float moves downwardly from the position illustrated in the drawings, the link 38 will be depressed until the centre of the pivotal connection between the jaw end of the arm 36 and the link is in line between the pivot on the screw 34 and the pivotal connection of the link with the rocker bar 32 and as the float continues to drop the toggle formed by the link and float arm passes the dead centre and then lifts upwardly on the link.

From this description it will be understood that when oil flows into the casing 2 to raise the float to a certain predetermined level the feed to the pump will be automatically transferred from the oil line direct to the interior of the casing by the closing of the valve 24 and the opening of the tapered valve 29. The pump then draws its supply from the casing and the float immediately lowers and as it lowers the toggle action raises the valve 29 gradually shutting off the suction therefrom but automatically opening the oil line from the main supply. If for any reason the main supply should fail and the float continue to fall, it will automatically transfer the suction end of the pump to the casing and if the failure continues, the supply will of course be exhausted from the casing 2 and eventually the burner will cease to function.

Upon the re-establishment of the main supply, the oil will first flow to the chamber 2 until it rises therein to operate the float. It will be readily understood that if for any cause the float should fail, the oil will be exhausted from the float chamber and the burner will cease functioning, consequently the device fails "safe" under all conditions and the siphoning of the oil from the main supply is rendered impossible.

The flow of oil from the discharge of the pump is directed into a chamber 39. Within this chamber and supported in the gland 40 secured in the top thereof is a fixed tubular spindle 41 which extends down through the chamber 39 into a chamber 42.

The spindle is provided with a hole 43 intermediate of its length through which the oil may flow from the chamber 39 and passing through the spindle it flows to the chamber 42, from whence it flows through the pipe 44 to the burner nozzle.

The flow of the oil through the hole 43 is governed by a threaded spindle 45 within the fixed spindle 41.

The spindle 45 may be adjusted vertically within the spindle 41 to accurately regulate the size of the opening through the hole 43.

A sleeve 46 rotatably encircles the spindle 41 and is driven from the spindle of the oil pump. This sleeve extends over the hole 43 and is cut away to form a plurality of ports 47, which as the sleeve rotates continuously pass over the hole 43 and keep the opening clear of any accumulation of dirt by breaking up any thick oil that might have any tendency to clog the passage.

The oil flowing to the chamber 39 from the pump, which cannot pass through the feed to the burner, lifts the spring loaded

valve 48 in the chamber 49 communicating with the chamber 39 and flows through a pipe 50 to the top of the regulated sight feed oiler 51 and the oil which is not allowed to pass through the oiler flows into a recess 52 in the top of the extension 53 on the top of the cover of the casing 2 and is directed therefrom into the interior of the casing 2.

The lower end of the oiler connects with a passage 54 which leads to the bottom of a recess 55 in the other side of the extension 53 of the casing top and this passage is connected with the passage 4 in the tray 1 to the intake of the blower 5 by the opening 3.

A plurality of air holes 56 are arranged in the side wall of the recess 55 and air is drawn through these holes into the passage by the suction of the blower and this together with the oil fed into this passage from the oiler is drawn into the blower, the oil serving to lubricate same.

The upper end of the recess 55 connects with a chamber 57 in the extension 53 which also connects with the recess 52 from the top of the oiler so that any fumes or vapor arising from the oil within the casing 2 will be drawn off and directed to the blower which feeds air to the burner nozzle.

It is an important feature in devices of this nature that they be kept free of any accumulation of oil therearound for safety purposes and the tray 1 is provided with a depression 58 Fig. 4, which communicates with the duct 59 connecting with the air duct from the chamber 55 so that any oil dripping from the oil pump or its surrounding parts will be drawn into the machine and disposed of.

The device is very compact and extremely simple in its operation but it forms a very important advancement in the art of burning oil.

In practice the float in the chamber remains in a position of balance, the pump taking its supply alternately from the main supply or from the casing and there is no return of oil to the main reservoir.

The supply pipe from the main reservoir may be carried over head out of all danger from breakage and the whole apparatus is rendered extremely safe and also very positive in its function of supplying oil to the burner in a regulated quantity and the features of adjustment are very accurate, consequently the minimum amount of oil to produce the desired results is used and the supply being so uniformly regulated the fire produced will be very steady.

What we claim as our invention is:—

1. In an oil feed control for oil burners, the combination with an oil supply and a pump and means for regulating the flow of oil from the pump to the burner, of a reservoir adapted to receive the excess discharge from the pump, an oil passage connected with the main supply and leading to the intake of the oil pump, a free check valve in said passage adapted to close the inflow of oil to the pump, a passage connected with the passage to the pump and leading into the reservoir, a valve separate from said check valve adapted to close the passage from the reservoir to the pump and concurrently open the check valve and adapted to permit the closing of the check valve upon being opened, and float controlled means for operating the latter valve.

2. In an oil feed control for oil burners, the combination with an oil supply and a pump and means for regulating the flow of oil from the pump to the burner, of a reservoir adapted to receive the excess discharge from the pump, an oil passage connected with the main supply and leading to the intake of the oil pump, a check valve in said passage adapted to close the inflow of oil to the pump, a passage connected with the passage to the pump and leading into the reservoir, a valve adapted to close the passage from the reservoir to the pump and concurrently open the check valve and adapted to close the check valve upon being opened, a float pivotally mounted within said reservoir, and a toggle connection between said float and said latter valve adapted to open the valve to the reservoir upon the raising of the float or upon an excess depression thereof.

3. In an oil feed control for oil burners, the combination with an oil supply and a pump and means for regulating the flow of oil from the pump to the burner, of a reservoir adapted to receive the excess discharge from the pump, an oil passage connected with the main supply and leading to the intake of the oil pump, a check valve in said passage adapted to close the inflow of oil to the pump, a passage connected with the passage to the pump and leading into the reservoir, a valve adapted to close the passage from the reservoir to the pump and concurrently open the check valve and adapted to close the check valve upon being opened, a rocker member pivoted intermediate of its length and pivotally connected to the valve which operates the check valve, a link pivotally connected to the other end of the rocker member, an arm carrying a float pivotally connected to said link, and a fixed pivot supporting said float arm, said float arm being adapted to swing said link either side of the dead centre line and to open the valve controlling communication between the oil pump and the reservoir.

4. An oil feed control for oil burners, comprising an oil pump, a reservoir connected with the inlet to the pump, a feed pipe leading from an oil supply and connected with the connection of the pump to the reservoir,

automatic valve controlled means for regulating the flow of oil to the pump either from the reservoir or from the main supply, a chamber connected with the discharge from the pump, means for regulating the flow of oil from said chamber to the oil burner, a spring loaded valve adapted to release the surplus oil fed by the pump to said chamber, a pipe leading from said spring loaded valve controlled exit, a drip oil feed connected to said pipe having an overflow leading to said reservoir, a passage leading from the drip oil feed, an air duct connected with said drip oil feed passage, and a pressure blower connected with said air duct and receiving lubrication from the oil fed through the drip feed.

5. An oil feed control for oil burners, comprising an oil pump, a reservoir connected with the inlet to the pump, a feed pipe leading from an oil supply and connected with the connection of the pump to the reservoir, automatic valve controlled means for regulating the flow of oil to the pump either from the reservoir or from the main supply, a chamber connected with the discharge from the pump, means for regulating the flow of oil from said chamber to the oil burner, a spring loaded valve adapted to release the surplus oil fed by the pump to said chamber, a closed extension on the cover of said oil reservoir having a passage communicating with the interior of the reservoir and a passage open to the atmosphere, an oil passage communicating with the air passage, a duct leading from the spring loaded overflow, and a drip outlet connected with said pipe directing a regulated quantity of oil into the passage communicating with the air passage and the remainder into the passage leading to the interior of the reservoir.

ARTHUR P. HOLDEN.
PHILIP MORGAN.
SAMUEL ROLFE WILLIAMS.