

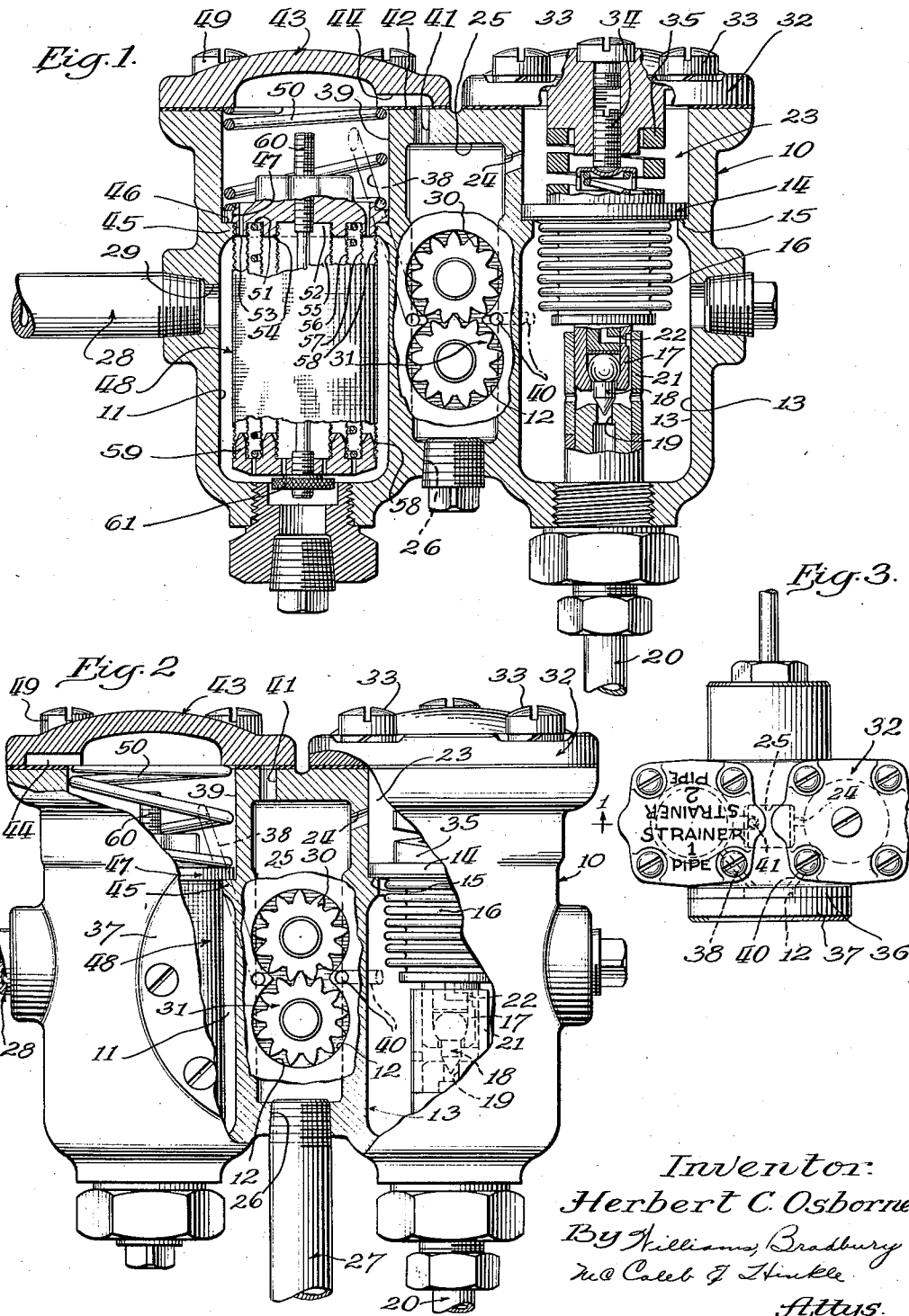
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FUEL SUPPLY UNIT FOR OIL BURNERS

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FUEL SUPPLY UNIT FOR OIL BURNERS

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The present invention relates to fuel supply units for oil burners, and is a continuation in part of my prior application Ser. No. 118,794, filed January 2, 1937, on Fuel supply units for oil burners.

The present application also relates to improvements over the United States Patent No. 2,051,301, issued August 18, 1936, to A. C. Kleckner and Harrison E. Fellows, relating to Fuel supply units for oil burners and the like.

In the Kleckner and Fellows patent the fuel supply unit is of the type comprising a strainer, a fuel pump, and a regulator valve combined in a single housing and adapted to be used both for a one pipe burner supply system and a two-pipe burner supply system.

The devices of the prior art exemplified by the Kleckner and Fellows patent comprise units which are provided with conduits that are built in the housing of the unit and provided with selective means whereby certain conduits may be used or shut off by means of a plug inside the housing.

Thus it is not necessary to have any external pipes to arrange the fuel supply unit for a one pipe oil burner system or a two pipe oil burner system.

One of the disadvantages of the prior art devices is that it is impossible to tell from the external appearance of the fuel supply unit in what way its conduits have been arranged by means of internal plugs. Much trouble has been caused by oil burner manufacturers and purchasers of such fuel units forgetting to arrange the plugs which control the selective conduits in the proper manner, and this is brought about by the fact that the screw plug which controls the selective conduits is located inside of the unit in such a place that only one who has a very intimate knowledge of the arrangement of the conduits or who follows instructions explicitly would secure the desired results.

One of the objects of the invention is the provision of an improved fuel supply unit which is adapted to be used for a one pipe or two pipe fuel supply system and which is provided with external means for clearly indicating for which system it is arranged.

Another object is the provision of an improved fuel supply unit which is provided with a novel strainer structure by means of which the unit may be adapted for a one pipe or two pipe system and by means of which the strainers are made more accessible and capable of cleaning and repair with greater facility.

Another object is the provision of an improved fuel supply unit provided with built-in conduits and adapted to be used for a one pipe or two pipe fuel supply system which has its conduit selective devices arranged on the outside of the unit where they are open for inspection so that the user of the unit can tell at all times which way the conduits are arranged or connected without taking the unit apart.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawing, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the single sheet of drawings accompanying this specification:

Fig. 1 is a vertical sectional view, taken on a plane indicated by the lines 1—1 of Fig. 3, with the parts arranged for a one pipe liquid fuel supply system;

Fig. 2 is a similar view, partially broken away, showing the internal mechanism and parts arranged for a two pipe fuel supply system;

Fig. 3 is a top plan view of the fuel supply unit constructed according to the present invention, showing the means for indicating the arrangement of the conduits at any time.

Referring to the drawing, 10 indicates in its entirety the fuel unit housing, which is preferably provided with a chamber 11 for the strainer, a pump chamber 12, and a regulator valve chamber 13.

The regulator valve chamber is provided with a partition member 14, resting upon an annular seat 15, and supporting one end of a pressure responsive bellows 16. The pressure responsive bellows 16 carries at its lower end a piston valve 17, which also supports a needle valve 18, and the needle valve is adapted to control a burner outlet 19.

The pipe connection 20 leads to the oil burner nozzle. The piston 17 is slidably mounted in a cylindrical member 21 and is formed with a conduit 22 leading from the exterior of the piston to the interior of the bellows. The conduit 22 is in communication through the bellows with the chamber 23 above the partition 14, which communicates through the conduit 24 with a by-pass chamber 25.

The by-pass chamber 25, shown in dotted lines in Fig. 3, is in communication with an outlet 26, which may be plugged up, as shown in Fig. 1, or used with a fuel return pipe 27 leading back to the fuel tank.

Fuel supply units of the type described are in-

stalled by some manufacturers with a single fuel pipe 28 leading from the tank to the strainer inlet 29 and, although the pump gears 30 and 31 are adapted to pump an excess of liquid fuel over that required by the burner, the excess in such case is returned to the by-pass conduit, and from there placed in communication with the inlet to the pump by the present unit.

Other oil burner manufacturers provide units of this type with a fuel return pipe 27 (Fig. 2), which leads back to the fuel supply tank. Thus, in the installations as exemplified by Fig. 2, there are two pipes leading to the tank. The system of Fig. 1 is thus called a one-pipe system, and that of Fig. 2 a two-pipe system.

The chamber 23 of the regulator valve is provided with a cover 32, which is secured in place by a plurality of screw bolts 33, and which has a centrally located adjustment screw 34 for engaging a spring located in the bellows. The cover 32 also engages a heavy coil spring 35, the opposite end of which engages the partition 14, and the coil spring 35 has its ends formed with parallel planes for engaging the cover 32 and partition 14.

The spring 35 is heavy enough to withstand the ordinary pressures which are placed upon the bellows 16 and the partition 14, and it is slightly larger than the space in which it is compressed in Fig. 1, but when the cover 32 is secured in place, the spring 35 secures the partition 14 in the position of Fig. 1. By merely removing the cover 32, the partition 14 is released, and it may be removed with its bellows by merely lifting out the spring 35 and the partition 14. Thus the parts of the regulator valve are immediately accessible and removable when the cover has been removed.

The fuel supply unit has its pump gear chambers 12 formed at one end of the pump by means of a plurality of plates 36, 37, the latter of which is a cover plate for the pump, and the inlet to the pump comprises a conduit 38 extending from the upper chamber 39 of the strainer housing 11 to one side of the pump gears 30, 31.

The pump outlet comprises a conduit 40 extending from a point on the opposite side of the gears 30, 31 to the valve chamber 13. The by-pass chamber 25 has a conduit 41 extending upward and out of the top surface 42 of the unit housing at that point, in position to be engaged and closed by the cover 43 of the strainer, as shown in Fig. 2, or to be in registry with a groove or conduit 44 formed in the lower side of the cover 43 when the cover is in the position of Fig. 1.

The strainer housing 11 comprises a substantially cylindrical portion which is formed with a lower cylindrical chamber, an inwardly extending annular flange 45, having an upper annular shoulder 46, and with the upper chamber 39. The two chambers are separated by a partition 47 which fits against the shoulder 46 in the chamber 39 and carries the strainer unit 48.

The upper end of the strainer housing is provided with the flat seating surface 42 for engaging the lower flat side of the cover 43, and the cover may be secured in place by a plurality of screws 49 passing through the cover and threaded into the body of the unit.

Gaskets may be interposed between cover 43 and the housing and between cover 32 and the housing. The partition 47, like the partition 14, is secured in place by means of a spring, in this case the spring 50, which is a helical spring, having its end coils flattened so that they have plane parallel surfaces.

The spring 50 is compressed by the cover 43, when the cover engages its seat, and thus spring 50 forces the partition 47 against the annular shoulder 46 and effectively secures the strainer unit in place.

It is only necessary to remove the cover 43 and release the spring 50 to also gain access to the strainer unit which is carried by the partition 47.

The partition 47 is formed on its lower side with a plurality of annular grooves 51, 52 and annular ribs 53, 54. Cylindrical screen units 55, 56, 57, and 58 are mounted, engaging the inside and outside of the ribs 53, 54, and are similarly mounted on a similar plug 59 at the bottom of the strainer unit 48. There are apertures in the plug 59 between the strainers 56 and 57 and leading to the inside of the strainer 58, whereas in the partition 47 there may be apertures in the partition from the spaces between the strainers 55 and 56 and 57 and 58, leading to the chamber 39. A threaded rod 60 is threaded into a threaded bore in the partition 47 and has its lower end extending through the plug 59 and engaged by a knurled nut 61, which clamps the strainers 55-58 between the members 47 and 59.

Thus the fuel passing through the strainers enters through the pipe 28 and passes through at least one of the screens to the chamber 39 above the partition 47. The cover 43 is preferably provided with indicia on the top, such as "strainer one-pipe" and "strainer two-pipe", located at opposite sides, and intended to be read with reference to the front side of the pump.

Thus, when the cover is as shown in Fig. 1 and Fig. 3, with the conduit 44 in registry with the conduit 41, reading from the pump side or front of the unit, the unit is arranged with its strainer for a one pipe system.

If the cover of Fig. 3 were turned around, with the words "strainer two pipe" toward the bottom, in Fig. 3, it would be in the position of Fig. 2 and arranged for the two pipe system.

The operation of the present fuel unit is as follows: When the oil burner is started, the pump gears 30, 31 are driven by the electric motor of the oil burner, and, assuming that they are primed, liquid fuel will be drawn in through the strainer and discharged into the regulator valve chamber, the course of the fuel being as follows:

Fuel comes in at the pipe 28 and passes through the strainer unit 48 into the chamber 39, thence through conduit 38 to the pump gears 30, 31. The pump gears 30, 31 carry the liquid fuel between their teeth around the outside of the pump chamber 12 and to the conduit 40, where the liquid fuel is discharged, because the space between the teeth is taken up by the engagement of the teeth.

The liquid fuel is discharged through conduit 40 into the pressure chamber 13 of the regulator valve, and pressure is built up in the chamber 13, reacting against the bellows 16 and piston 17. When the pressure in the valve reaches a predetermined amount, the needle valve 18 opens the port 19, and the bellows continues to move until the port 22 is opened, after which any excess of fuel over that required for the burner and supply through the pipe 20 is by-passed through the conduit 22, bellows 16, chamber 23, and conduit 24, to the chamber 25.

In a two pipe system, as shown in Fig. 2, the pipe 27 carries this excess of fuel back to the tank, but in a one pipe system, as shown in Fig. 1, the conduit 41 is in communication with con-

duit 44 to the chamber 39 of the strainer, which is, of course, in communication through conduit 38 with the intake of the pump.

The present arrangements may be installed in either a one stage or two stage fuel pump unit, the two types appearing the same in elevation in Figs. 1 and 2 because the gears are carried by the same shafts. The difference between these units lies in the fact that the low pressure stage delivers fuel into the by-pass chamber 25, and the high pressure stage takes fuel from the chamber 25 and discharges into the valve chamber 13, the conduits also appearing alike in elevation, as shown in Figs. 1 and 2.

It will thus be observed that I have invented an improved fuel supply unit, by means of which an oil burner may be installed according to a one pipe or a two pipe system. My fuel supply unit structure will eliminate any mistakes as to the arrangement of the conduits because the change or selection of conduits is accomplished by the arrangement of the cover of the strainer unit, which bears indicia clearly indicating whether it is arranged for a one pipe or a two pipe system, on the exterior of the cover.

The present fuel unit will eliminate complaints which were caused in the past by improper installation due to the location of the conduit selecting arrangements on the interior, by means of a plug, and is a very important improvement. Furthermore, the structure of the strainer is readily accessible for cleaning and repair, and upon removal of the strainer housing cover the strainer unit itself is immediately released and readily accessible.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a fuel supply unit, the combination of a pump with a housing provided with a strainer

chamber and with a by-pass chamber, a by-pass and pressure regulating valve, said pump feeding liquid fuel from the strainer chamber to an outlet and to the by-pass chamber under the control of said regulating valve, said housing having an annular shoulder in said strainer chamber, with a partition engaging said annular shoulder, said partition supporting a strainer unit, a spring engaging said partition, and a cover plate for said strainer housing, said cover plate engaging and compressing said spring to secure said strainer unit partition in said housing, said cover plate also being provided with a conduit groove communicating with the strainer chamber and with a flat seating surface, and with said by-pass chamber having a conduit adapted to be closed by said seating surface or to be opened by registry with said groove, said cover plate being rotatably adjustable to control said by-pass conduit.

2. In a fuel supply unit, the combination of a pump with a housing provided with a strainer chamber and with a by-pass chamber, a by-pass and pressure regulating valve, said pump feeding liquid fuel from the strainer chamber to an outlet and to the by-pass chamber under the control of said regulating valve, said housing having an annular shoulder in said strainer chamber, with a partition engaging said annular shoulder, said partition supporting a strainer unit, a spring engaging said partition, and a cover plate for said strainer housing, said cover plate engaging and compressing said spring to secure said strainer unit partition in said housing, said cover plate also being provided with a conduit groove communicating with the strainer chamber, and with a flat seating surface, and with said by-pass chamber having a conduit adapted to be closed by said seating surface or to be opened by registry with said groove, said cover plate being rotatably adjustable to control said by-pass conduit, and said cover plate being provided with indicia for indicating the proper rotative position of the cover for a one-pipe or a two-pipe fuel system corresponding to the registry or non-registry of said groove and said latter conduit.

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