

## PATENTS EXAMINATION BOARD

Subject: The Drafting of Patent Specifications - Paper 2  
Date: November 2007  
Time: 09h00-13h00  
Duration: Four hours (Candidates requiring extra time are entitled to an additional two hours)  
Examiners: J D Whittaker (Tel: 012 676 1026)  
K Bredekamp  
Moderator: K E F Brown

---

Attached is an instruction from your client detailing an invention and prior art.

You are required to draft a full patent specification for your client's invention, taking into account the prior art. The full patent specification must include: (1) a background to the invention, (2) a summary of the invention, i.e. consistory clauses, (3) a brief description of the drawings, (4) a detailed description of the invention, (5) a set of patent claims, and (6) an abstract.

Marks will be allocated as follows:

- 50% of the marks will be allocated to the claims.
- 50% of the marks will be allocated to the rest of the specification.

In order to obtain a pass for this paper, candidates must obtain not less than 40% for each of these two sections.

Your client writes:

"We have invented a liquid fuel burner which may be used in devices such as stoves, geysers, heaters and the like, and which includes a new mechanism for delivering liquid fuel to a burner head.

Various different types of liquid fuel burners are known. In some of these devices, capillary action causes liquid fuel to be drawn onto a wick from where it is burned. In other applications, liquid fuel is pumped to a burner head under pressure. In the latter case, typically, the burner includes a reservoir for storing liquid fuel, a pipe connecting the reservoir to a burner head, and an air pump for applying air pressure to the liquid fuel in the reservoir so as to displace the fuel towards the burner head. With these types of burners, excessive pressure in the reservoir with overheating of the fuel can lead to rupturing of the reservoir, and the presence of air in the reservoir can lead to a sudden release of pressure, often with an explosive effect.

With our invention, pressurized liquid fuel can be supplied to a burner head in a relatively safe manner with a mechanism which is simple in construction, efficient and relatively easy to use.

Attached are two drawings of our liquid fuel burner. Figure 1 shows a perspective view of the burner, and Figure 2 shows a partial cross-sectional view of the burner.

The liquid fuel burner is in the form of a paraffin stove which includes a frame, a burner head mounted to the frame, a reservoir for containing paraffin, and a pump for pumping the paraffin from the reservoir to the burner head.

The frame includes four legs which are joined together at a base of the frame. The legs are formed from tubular steel sections so that the reservoir is formed within the hollow legs, and removable caps are provided for accessing the reservoir. As can be seen, the operatively upper ends of the legs are connected to a cooking vessel support for supporting pots, pans, and the like (not shown). The support typically comprises an outer ring, an inner ring, and four radial limbs extending between the outer and inner rings.

The pump includes a cylinder and a piston which are displaceable relative to one another. The piston is fixed to the frame and the cylinder is displaceable relative to the frame in the directions of the arrows A and B in Figure 2. The piston is seen to include a first port and a one-way inlet valve for allowing paraffin in the reservoir to be drawn into the cylinder, and a second port and a one-way outlet valve for allowing the paraffin to be pumped out of the cylinder to the burner head. A fuel line extends from the outlet valve to the burner head, and a regulator in the form of a valve in the fuel line allows for the adjustment of the paraffin supply to the burner head and hence the intensity of the flame at the burner head.

The pump includes a seal in the form of an elastomeric O-ring between the cylinder and the piston. Importantly, the pump also includes a mass in the form of a ring which extends around the cylinder, as shown. The ring has a weight sufficient to displace the cylinder in the direction of the arrow B so as to pump paraffin within the cylinder to the burner head under pressure.

The stove also includes a conventional dual shut-off device for controlling the flow of paraffin to or away from the burner head.

In practice, the reservoir is filled with paraffin by removing one of the removable caps and pouring paraffin into the reservoir. The removable cap is then replaced and the cylinder is manually displaced in the direction of the arrow A into the position illustrated in Figure 2. As the cylinder is displaced upwardly, paraffin is drawn into the cylinder through the first port and the inlet valve. With the cylinder in the Figure 2 position, the regulator is opened so as to allow paraffin to flow to the burner head. The cylinder is then released and the ring, by virtue

of its weight, applies a force to the cylinder, urging it in the direction of the arrow B. As the cylinder is displaced downwardly, it applies pressure to the paraffin within the cylinder, and the pressured paraffin is displaced towards the burner head where it is converted to vapour in a conventional fashion to fuel combustion and provide heat energy at the support. During cooking, the regulator is adjusted to provide the desired heat energy at the support, and once the cooking has been completed, the flame at the burner head is extinguished by closing the regulator.

It should be noted that, once the ring on the pump has initially been lifted, the pump acts automatically to supply liquid fuel to the burner head.

The ring may be arranged to locate below the center of gravity of the stove so that if the stove is accidentally tipped to one side, the weight of the ring serves to automatically right the stove. Alternatively, additional weight may be provided in the piston or elsewhere on the frame to effect self-righting of the stove.

You should also know that the mass which applies a force to the cylinder to effect displacement of the cylinder in the direction of the arrow B may be integral with the cylinder or attached to the cylinder. Also, instead of a piston and cylinder arrangement in which the piston is fixed to the frame and the cylinder is displaceable relative to this frame, the liquid fuel burner may include a cylinder which is fixed relative to the frame and a displaceable piston.

We have recently become aware of US 2,180,183 which relates to liquid fuel burners, and a copy of this patent is attached for your reference.

Please prepare a patent specification for our invention."

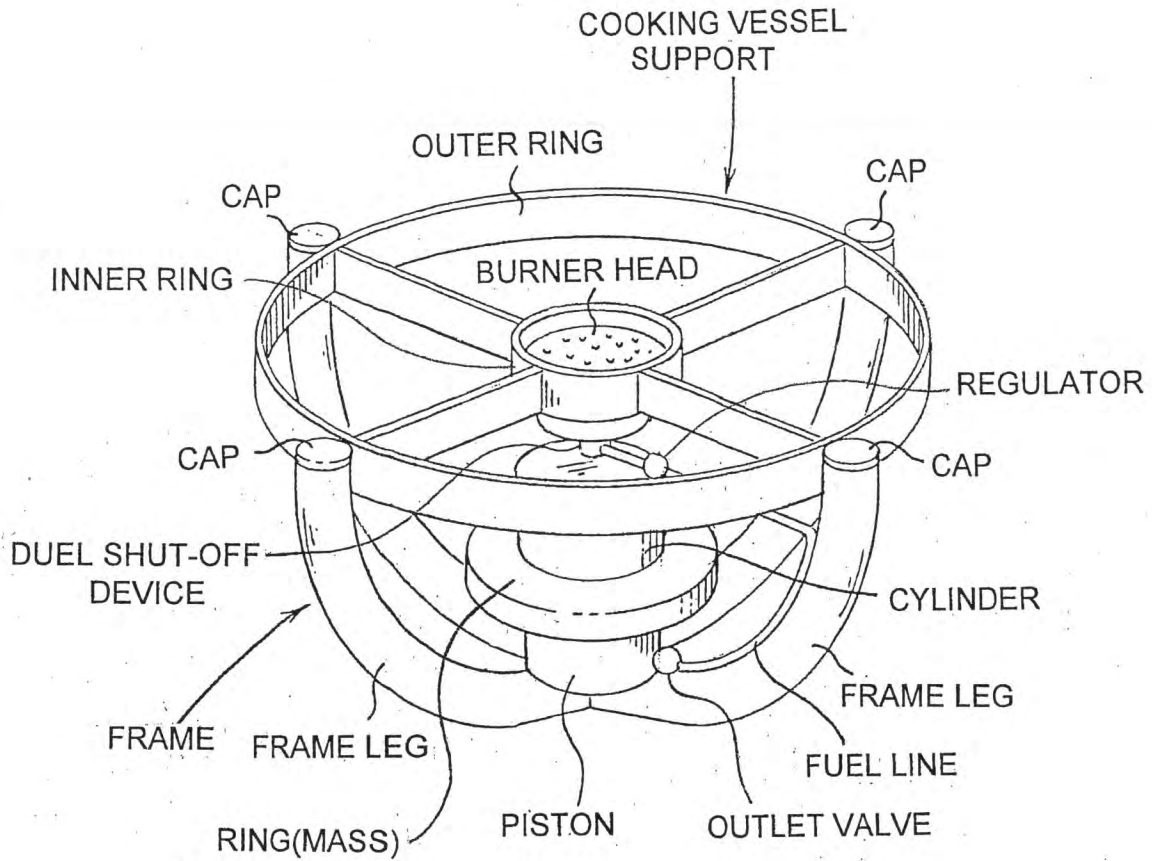


Fig.1

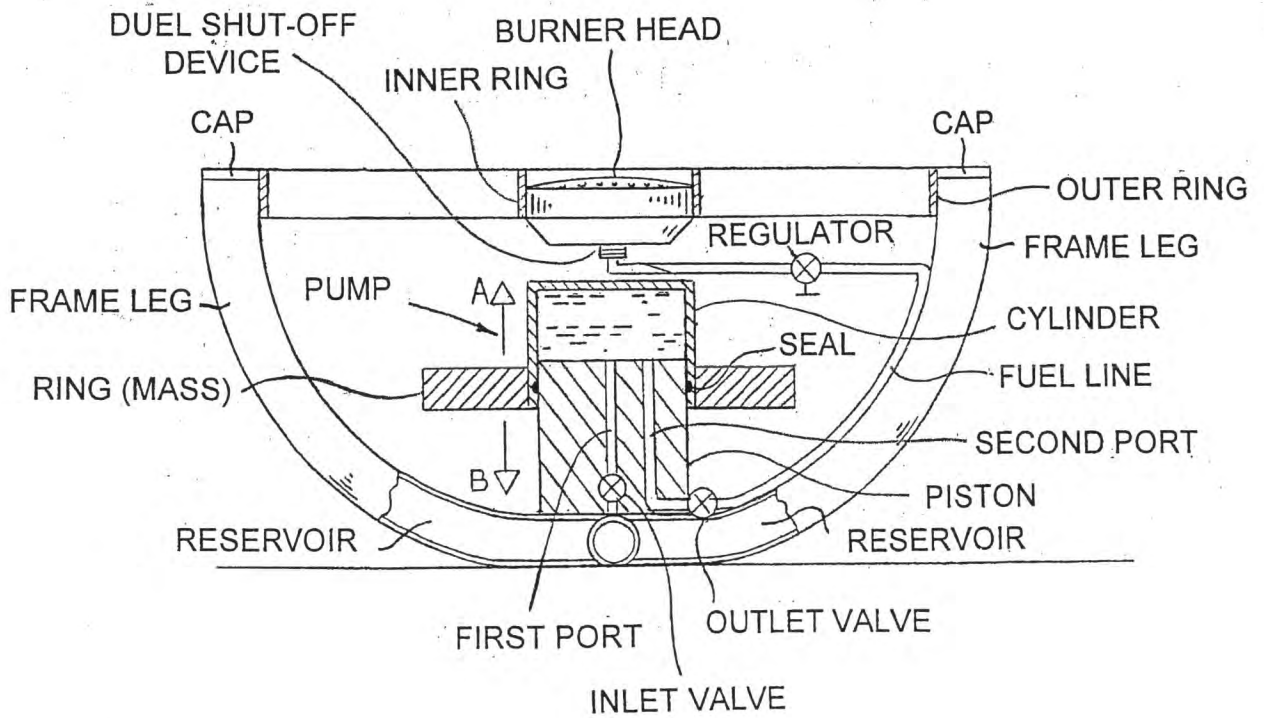


Fig.2

Patented Nov. 14, 1939

2,180,183

# UNITED STATES PATENT OFFICE

2,180,183

## LIQUID FUEL BURNER

William G. Walling, South Hingham, Mass., assignor of one-half to Ralph N. Doble, Hingham, Mass.

Application January 26, 1938, Serial No. 186,991

6 Claims. (Cl. 158—36)

This invention relates to a liquid fuel burner and particularly to a liquid fuel burner for use in stoves, ranges, water heaters and other heating appliances.

5 The invention has for an object to provide a novel and improved construction of liquid fuel burner in which provision is made for regulating the flow of the liquid, such as oil, at a rate commensurate with the consumption of the oil  
10 while in operation and also for priming the burner or burners independently of said regulation so as to provide a unitary oil feed regulating and priming unit.

15 A further object of the invention is to provide a novel combined regulating and priming unit which may be interchanged with the regulating fitting of existing burners to enable conversion to be made at minimum expense.

20 With these general objects in view and such others as may hereinafter appear, the invention consists in the novel construction of the liquid fuel burner, in the combined regulating and priming unit, and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the  
25 claims at the end of this specification.

In the drawing illustrating the preferred embodiment of the invention, Fig. 1 is a plan view of an oil burner embodying the present invention;  
30 Fig. 2 is a front elevation of the same; Fig. 3 is a cross section taken on the line 3—3 of Fig. 1; Fig. 4 is a cross section taken on the line 4—4 of Fig. 1, and Fig. 5 is a sectional plane view of a portion of the priming unit shown in Fig. 1.

35 In general, the present invention contemplates a liquid fuel burner having the usual feed regulating unit including the individual needle valves for regulating the flow of the liquid fuel, such as oil, to each burner section and in which a  
40 priming unit is also incorporated to form a combined regulating and priming unit to thereby enable such unit to be interchangeable with the standard fitting used on the range oil burners on the market today.

45 In practice, in the operation of the usual oil burner commonly used in kitchen ranges, it is necessary to open the needle valves and leave them open for a period of from five to seven minutes to prime the burner sections before the  
50 latter can be properly ignited. As is well known, the needle valves in this type of oil burner for regulating the flow of the oil to the burner sections are usually throttled to the rate at which the fuel is consumed by the burner and this  
55 period of time is necessary in order to permit

a sufficient amount of oil to flow into the burner sections before the same can be properly ignited.

Provision is made in the present oil feed regulating and priming unit for by-passing a quantity of the fuel beyond the needle valves and for pumping a priming charge of fuel directly  
5 into the burner sections. The priming unit includes a pump which is arranged to draw a quantity of the oil from the main reservoir and to discharge the oil thus withdrawn directly  
10 into the burner sections, thus eliminating the time interval usually necessary to wait for the liquid to flow through the needle valves.

Referring now to the drawing, the present invention is herein illustrated as embodied in an  
15 oil burner having an inlet pipe 10 leading from a reservoir, not shown, into a feed regulating unit 12. In the normal operation of the oil burner, the fuel is permitted to pass through the passageway 14 and through the needle valves  
20 16, 18 into the conduits 20, 22 respectively, leading to the individual burner sections 24, 26. As herein illustrated, provision is made for withdrawing a charge of the fuel from the passageway 14 and for by-passing the fuel thus with-  
25 drawn directly into a burner section. The priming unit is preferably included in and is integral with the regulating unit 12 and as herein shown, includes a pump having a cylindrical  
30 section 28 set into a portion of the regulating unit and a plunger 30 slidingly fitted within the cylinder 28. The cylinder is enclosed at its upper end by a cap 32, which is provided with an opening through which the plunger rod 34  
35 is slidingly fitted. A handle 36 is provided on the upper end of the plunger rod and the lower end of the plunger comprises the usual leather piston member 38 having a metal backing member 40 and a securing nut 42.

When the plunger 30 is raised, the fuel is  
40 arranged to be drawn into the body of the pump through an inlet 44 leading from the passageway 14 and past the ball check valve 46, normally operative to seal the opening. A stop member  
45 48 prevents the ball from being drawn out of its repository 50. When the plunger is lowered the fuel is arranged to pass through an outlet 52 leading from the bottom of the pump, which directs the liquid into a passageway 54 and  
50 through a horizontally arranged spring pressed ball check valve 56. The liquid flowing past the valve 56 is forced through a passageway 58 to a valve member 60 which is arranged to permit the fuel to pass to either of the burner sections  
55 24, 26. As herein illustrated, see Fig. 5, when



the valve member 60 is turned 45 degrees in a counterclockwise direction, the oil may pass through the passageway 52 and into the conduit 22 leading to the burner section 26. When the valve is turned 45 degrees in a clockwise direction from the position illustrated in Fig. 1, the oil passes through the passageway 64 and into the conduit 20 leading to the burner section 24. As clearly shown in Figs. 4 and 5 the two way valve member 60 comprises a cylindrical body portion 65 having opposed cut out areas 63, 73 which are arranged to connect the passageway 58 with either of the passageways 62, 64. when the valve is opened.

In the operation of the device, when it is desired to start the oil burner, the needle valves 16, 18 are closed and the plunger 30 is then raised to draw in the priming charge. The valve member 60 is then opened to permit the passage of the fuel upon the down stroke of the plunger to whichever burner section it is desired to prime. The operation may be repeated to prime the remaining burner section whereupon the valve member 60 is closed and the burner may be lighted and controlled by the usual needle valves 16, 18.

From the description thus far and by reference to the drawing, it will be observed that the present invention provides a convenient method of priming the burner sections and the present combined regulating and priming unit may be used to replace the standard fittings now in use on this type of oil burner, thus enabling existing burners to be converted at minimum expense. It will be apparent that any suitable means may be employed to regulate the volume of the priming charge, such as by an adjusting collar, not shown, mounted upon the plunger rod 34 within the piston chamber to limit the upward stroke of the piston. It will also be apparent that the construction of the two way valve 60 may be modified to permit the fuel to pass to both burners at once if desired.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a liquid fuel burner of the character described, in combination, a source of fuel supply, a burner, a conduit leading from the source of supply to said burner, a regulating device including a needle valve in said conduit for controlling the flow of the fuel to the burner and a priming device formed integrally with said regulating device disposed between said source of supply and said needle valve and means adapted to withdraw the liquid directly from the source of supply and to by-pass the liquid around said needle valve and directly to the burner.

2. The combination in a liquid fuel burner

of the character described having means for regulating the flow of fuel from a source to the burner, of a priming device formed integrally with the regulating means disposed between the source and said regulating means and means adapted to withdraw fuel directly from the source of supply and to by-pass the liquid directly to the burner.

3. In a liquid fuel burner of the character described, in combination, means for regulating the flow of fuel from a source to a burner including a needle valve adapted to permit the fuel to flow at a rate commensurate with the normal oil consumption when the burner is in operation, and means integral with said regulating means for delivering a priming charge to said burner, said priming means being disposed between the source and said needle valve and means adapted to withdraw fuel directly from the source of supply and to by-pass the liquid around said needle valve directly to said burner.

4. In an oil burner of the character described, in combination, fuel feed regulating means including a plurality of needle valves adapted to control the flow of fuel from a source to a plurality of burners and priming means disposed between said source and said needle valves and means adapted to withdraw fuel directly from the source of supply and to by-pass the liquid around said needle valve and to force a charge of liquid directly into a selected one of said burners, said priming means being integral with said regulating means and adapted to be readily interchangeable with a standard fuel feed regulating unit.

5. The combination in a liquid fuel burner of the character described having means for regulating the flow of fuel from a source to the burner, of a priming device formed integrally with the regulating means disposed between the source of supply and said regulating means and means adapted to withdraw fuel directly from the source of supply and to by-pass the liquid directly to the burner, said priming and regulating means being interchangeable with the standard fuel feed regulating unit of existing burners.

6. In a liquid fuel burner of the character described, in combination, a source of supply, a regulating device including a needle valve for controlling the flow of the fuel to the burner and a priming device formed integrally with said regulating device and disposed between said source and said needle valve and adapted to by-pass the liquid around said needle valve and directly to the burner, said priming means including a by-pass conduit and a manually operated pump adapted to withdraw a predetermined charge of fuel directly from the source of supply when the piston is raised and to force said charge through said by-pass conduit directly to said burner when the piston is lowered.

WILLIAM G. WALLING.

Nov. 14, 1939.

W. G. WALLING  
LIQUID FUEL BURNER

2,180,183

Filed Jan. 26, 1938

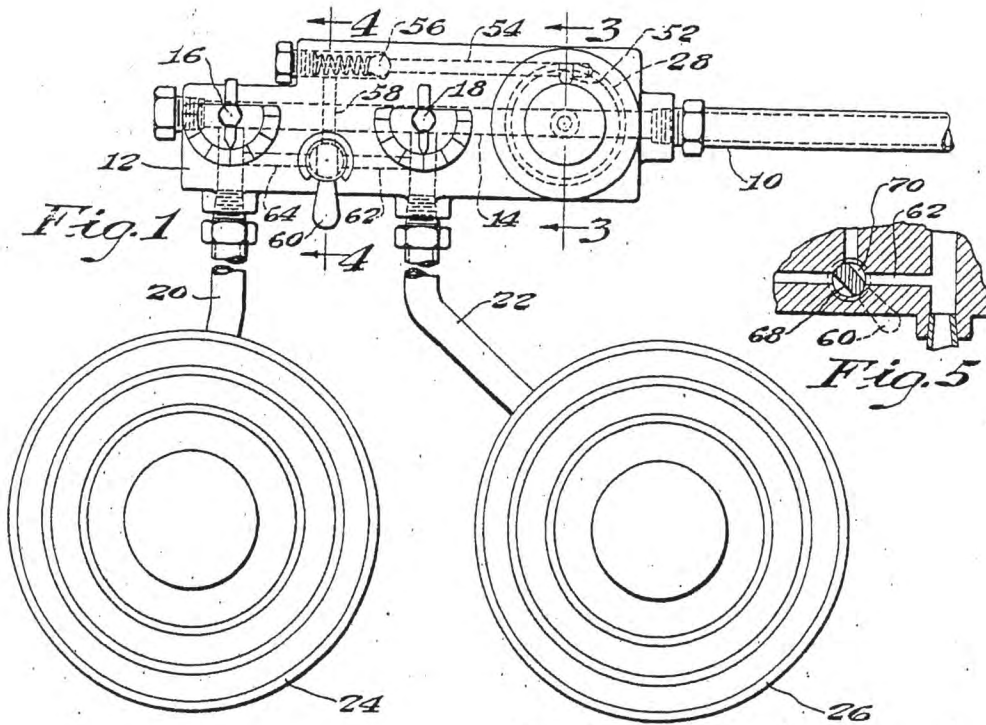


Fig. 1

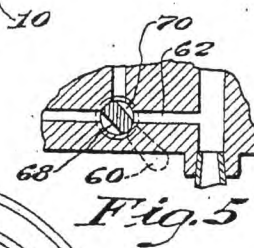


Fig. 5

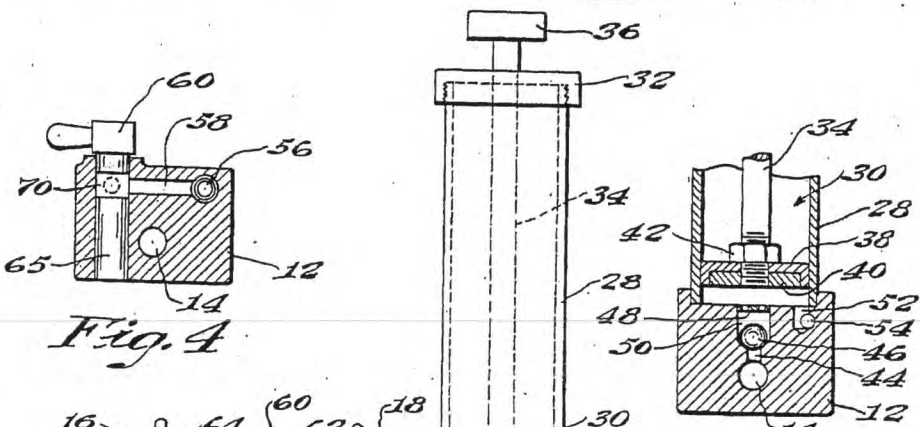


Fig. 3

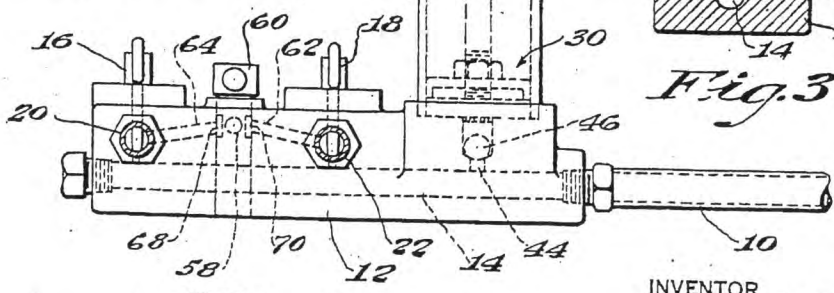


Fig. 2

INVENTOR  
*William G. Walling*  
 BY *J. Stanley Churchill*  
 ATTORNEY