June 5, 1928. 1,672,213

S. M. HANSEN

FUEL CUT-OFF MEANS FOR POWER OPERATED LIQUID FUEL BURNING APPARATUS

Original Filed July 20, 1925 2 Sheets-Sheet 1

Fig. 1.

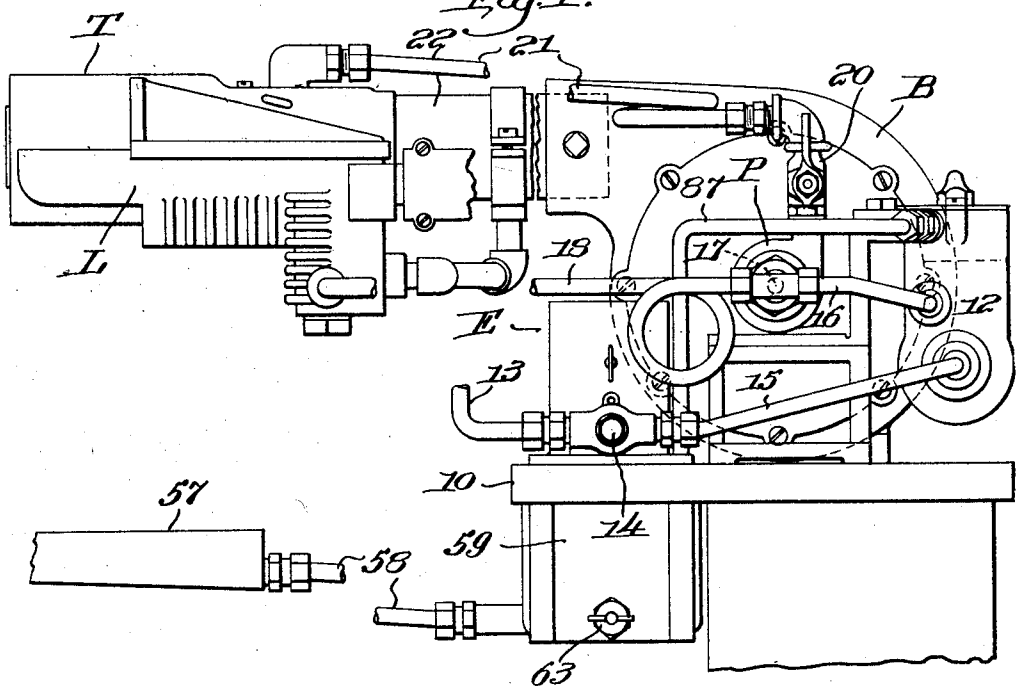
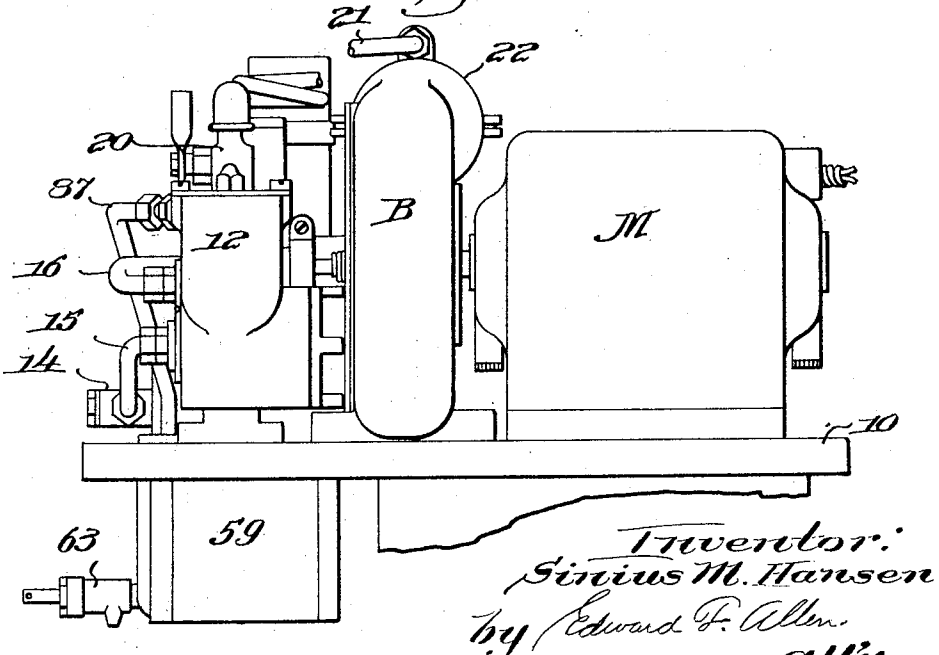


Fig. 2.



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Fig. 3.

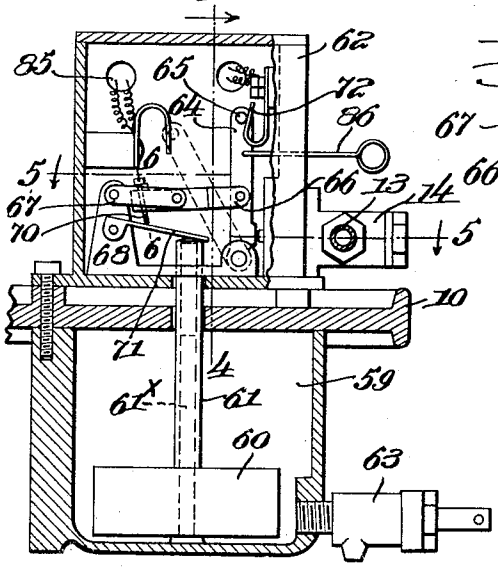


Fig. 4.

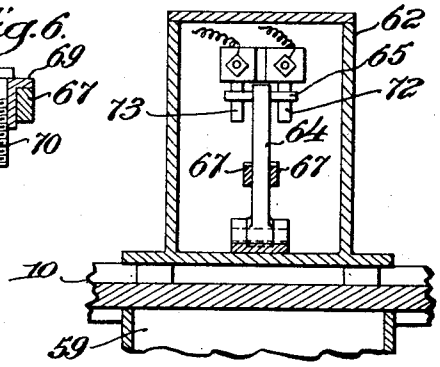


Fig. 6.

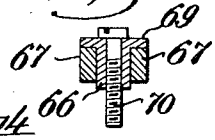


Fig. 5.

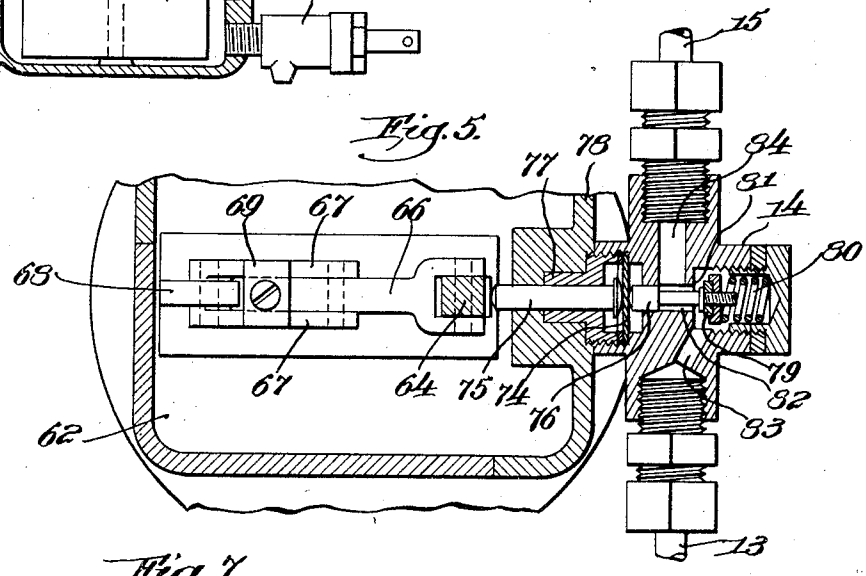
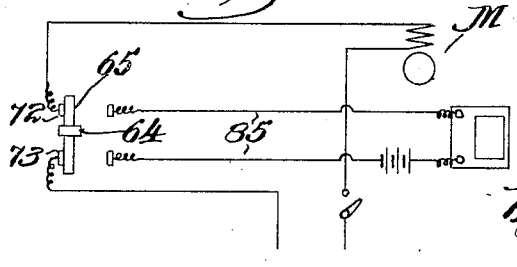


Fig. 7.



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Patented June 5, 1928. 1,672,213

UNITED STATES PATENT OFFICE.

SINIUS M. HANSEN, OF LYNN, MASSACHUSETTS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO A T OIL BURNER CO., OF LYNN, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

FUEL CUT-OFF MEANS FOR POWER-OPERATED LIQUID-FUEL-BURNING APPARATUS.

Original application filed July 20, 1925, Serial No. 44,777. Divided and this application filed July 19, 1926. Serial No. 123,489.

This invention relates to fuel cut-off means for power operated liquid fuel burning apparatus.

The primary object of the invention is to prevent a dangerous accumulation of unignited fuel in the fire pot due to such causes as the dripping of fuel from the burner tip, or the expulsion thereof from the tip in instances wherein the pilot has failed to ignite it, and unless the fuel supply was cut off, a dangerous situation would result, particularly if the burner was subsequently lighted when a large quantity of fuel had accumulated in the fire box.

It is an object of the invention to catch the dripping or expelled unignited fuel and conduct it away from the fire box and to utilize it as a means to initiate the actuation of means to cut off the fuel supply and simultaneously stop the motive power.

It is a further object of the invention to so arrange the fuel supply means as to be under the control of a cut-off of simple yet efficient and durable construction mechanically operated by means which simultaneously effects an electrical circuit in which a motor is located, and a circuit in which an alarm is located.

Another object of the invention is to provide means to cut off the fuel supply, and simultaneously stop the motor in the event that the fuel level regulator overflows.

It is also an object of the invention to so arrange the fuel supply cut-off means that once having been operated it cannot be reset to open the fuel line until such time as the cause of its operation has been noted and removed.

Other objects of the invention will be fully understood from a description of the drawings and the claims hereinafter given.

Of the drawings:

Figure 1 represents a side elevation of one form of oil burner having the invention applied thereto, certain portions being broken away.

Figure 2 is an elevation of the burner looking toward the left, Figure 1.

Figure 3 is a view of the fuel supply cut-off means looking toward the right Figure 1, the covers thereof being broken away for clearness.

Figure 4 is a section on the line 4—4 Figure 3.

Figure 5 is a section on the line 5—5 Figure 3.

Figure 6 is an enlarged view in section taken on the line 6—6 Figure 3.

Figure 7 is a diagram of the motor and alarm circuits.

Like characters represent like parts throughout the several figures of the drawing.

Referring to the drawings:

The drawings herewith illustrate the invention as applied to a liquid fuel burner such as shown and described in an application filed by me July 20, 1925, Ser. No. 44,777 and of which the present invention was originally a part.

Generally speaking the burner shown consists in a motor M, a blower B, a pump P, a burner tip of preferably, but not necessarily, the turbine type T, a pilot L, and fuel supply cut-off means F, each of which is supported directly or indirectly on a base 10.

The fuel tank or container, not shown, is preferably so situated as to feed the fuel level regulator 12, of well known construction, by gravity through the pipe 13, valve 14, and pipe 15, the said regulator having a float controlled needle valve, not shown, arranged to maintain a substantially uniform level of fuel therein, so that a uniform head or pressure of fuel is maintained from which the pump P draws its supply.

Leading from the regulator 12 is a pipe 16 connecting with a T fitting, one branch of which 17 leads to the pump P, and another branch 18 leads to a pilot L which may be of any usual or suitable construction or arrangement.

From the pump outlet a pipe leads, having a valve fitting 20 arranged to control the flow of fuel through the pipe 21 to the burner tip T.

In the present instance the burner tip T is located at the end of a pipe 22 which leads from the blower B and may be of any usual or suitable construction or arrangement.

Below the burner T is a drip pan 51, see Figure 1, arranged to catch unignited fuel

expelled from the burner or any dripping therefrom, and lead it to the chamber 59 through a pipe 58.

The chamber 59 has mounted therein a float 60 having a hollow stem 61 upwardly extended therefrom, and through a hole in the base 10, and a hole in the bottom of a switch box 62, said float being guided by a rod 61^{x} fast at its lower end to the bottom of the chamber 59 as plainly seen in Figure 3 of the drawings.

At one side, and near the bottom of said chamber 59, is a valve or spigot 63 arranged to drain said chamber when occasion requires.

The switch box 62 has bearings therein for the pivot of a lever 64 at the upper end of which is a rod 65 suitably insulated from said lever, and arranged to make or break the electrical circuit in which the motor M is located.

Pivoter to the lever 64 is a bar or rod 66 having in turn links 67 pivoted to it, said links being also pivoted to the upright 68, and in conjunction with the bar 66, forming a toggle the movement of which is limited by the washer 69 in one direction, said washer being secured to the bar 66 by a screw 70 which extends below the bar for another purpose to be presently described.

Pivoted to the upright 68 is a lever 71, the free end of which is arranged to be normally in contact with the stem 61, and adjacent its pivot in light contact with the end of the screw 70, so that fuel entering the chamber 59 will cause the float 60 to rise, and the stem 61 thereof to force the lever 71, and the screw 70 upwardly causing the toggle to break, and withdraw the rod 65 from the spring contact points 72 and 73 thus opening the circuit and stopping the motor M.

The arrangement of the burner in general is such that stoppage of the motor would be sufficient to stop the feed of fuel to the burner tip, but as a matter of safety it is deemed best to provide means to cut off the fuel supply simultaneously with the breaking of the electrical circuit, the mechanism for which will now be described.

The valve fitting 14 previously briefly referred to and into which the supply pipe 13 leads, and from which the pipe 15 leads to the fuel level regulator 12, has provision therein for the diaphragm 74, see Figure 5 of the drawings, against which the headed ends of the plungers 75 and 76 abut when the burner is in operation.

The plunger 75 is slidingly mounted in a plug 77 and extends through the wall 78 of the switch box 62 and contacts with the lever 64, while the plunger 76 having the valve 79 thereon is under the influence of a spring 80 which constantly tends to force the valve 79 onto its seat 81 to close the passage 82 between the inlet passage 83, and the outlet passage 84.

When the float 60 rises, and the toggle is broken, the spring 80 forces the plunger 76 to the left closing the passage 82, and through the diaphragm 74, and plunger 75 forces the lever 64 into the dotted line position shown in Figure 3 of the drawings, breaking the motor circuit, and in this instance closing an alarm circuit as indicated at 85, thus simultaneously breaking the motor circuit, cutting off the fuel supply, and by an alarm of one sort or another indicating that fact.

The lever 64 has a link 86 connected thereto which extends through the wall 78, and serves as a resetting device for the toggle when it has been broken to stop the operation of the burner.

So long as there is sufficient fuel or liquid in the chamber 59 to cause the float 60 to break the toggle, the said toggle cannot be reset, and consequently the burner must remain inactive until such time as the chamber 59 is emptied for which purpose the valve or spigot 63 is employed.

In the event that the fuel level regulator 12 should flood, an overflow pipe 87 is provided which leads into the chamber 59, and the fuel or liquid is directed thereto which causes the float 60 to rise to actuate the fuel supply cut-off means as above explained.

Having described the invention I claim:

1. A liquid fuel burning apparatus comprising a motor; a blower; a pump; a pilot; a burner tip portion; a main fuel supply means; cut-off means for said fuel supply means; a drip catcher located below said tip portion and pilot; a reservoir arranged to collect drip from said catcher; a float in said reservoir; a stem upwardly extending from said float; a member arranged to co-act with said stem to break a toggle; a toggle arranged to be broken through the agency of said stem and member; a member arranged to be operated upon the breaking of said toggle to thereby release said cut-off means to cut off said fuel supply; and means to drain said reservoir.

2. A liquid fuel burning apparatus comprising a motor; a blower; a pump; a burner tip portion; a pilot; a circuit in which said motor is located; a main fuel supply means; cut-off means for said fuel supply means; a drip catcher located below said tip portion and pilot; a reservoir arranged to receive drip from said catcher; a float in said reservoir; a stem upwardly extending from said float; a lever arranged to co-act with said stem to break a toggle; a toggle; a member arranged to be operated upon the breaking of said toggle to thereby release said cut-off means to cut off said fuel supply; electrical contacts in said circuit; means carried by said member to engage said contacts and to

disengage therefrom upon the breaking of said toggle whereby the motive power for said blower and pump is shut down.

3. A liquid fuel burning apparatus comprising a motor; a blower; a pump; a burner tip portion; a pilot; a main fuel supply means; a main fuel supply cut-off means; a fuel level regulator; an overflow means for said regulator; a drip catcher located below said tip portion and said pilot; a reservoir; means to direct drip from said catcher to said reservoir; means to direct overflow from said regulator to said reservoir; a float in said reservoir arranged to initiate the operation of said cut-off means upon a predetermined level of fuel in said reservoir; said means including a toggle and a spring pressed lever; means to drain said reservoir; and means to reset said cut-off means after the operation thereof.

4. A liquid fuel burning apparatus comprising a motor; a blower; a pump; a burner tip portion; a main fuel supply means; a fuel level regulator; a drip catcher; a reservoir into which said drip catcher discharges; a float within said reservoir arranged to initiate the operation of a main fuel cut-off means; means operable by said float to release said cut-off means, said float operated means including a toggle and a spring pressed lever; a main fuel supply cut-off means comprising a valve and a spring; and means intermediate said lever and said spring including a diaphragm and a plunger arranged to complete the breaking of said toggle when started by said float; means to drain said reservoir; and means to reset said cut-off means after the operation thereof.

5. A liquid fuel burning apparatus comprising a motor; a blower; a pump; a burner tip portion; a main fuel supply means; a fuel level regulator; a drip catcher; a reservoir into which said catcher discharges; a float within said reservoir arranged to initiate the operation of a main fuel cut-off means; means operable by said float to release said cut-off means; said float operated means including a toggle and a spring pressed lever; a main fuel supply cut-off means comprising a valve and a spring; means intermediate said lever and said spring arranged to complete the breaking of said toggle when started by said float; an electric circuit in which said motor is located; contacts in said circuit; and means carried by said lever arranged to engage said contacts to close the circuit and to simultaneously disengage therefrom upon the breaking of said toggle.

Signed by me at Lynn, Massachusetts, this 21st day of May, 1926.

SINIUS M. HANSEN.