Oct. 9, 1928. 1,686,855

S. M. HANSEN

PILOT FOR LIQUID FUEL-BURNING APPARATUS

Filed July 19, 1926 2 Sheets-Sheet 1

Fig. 1.

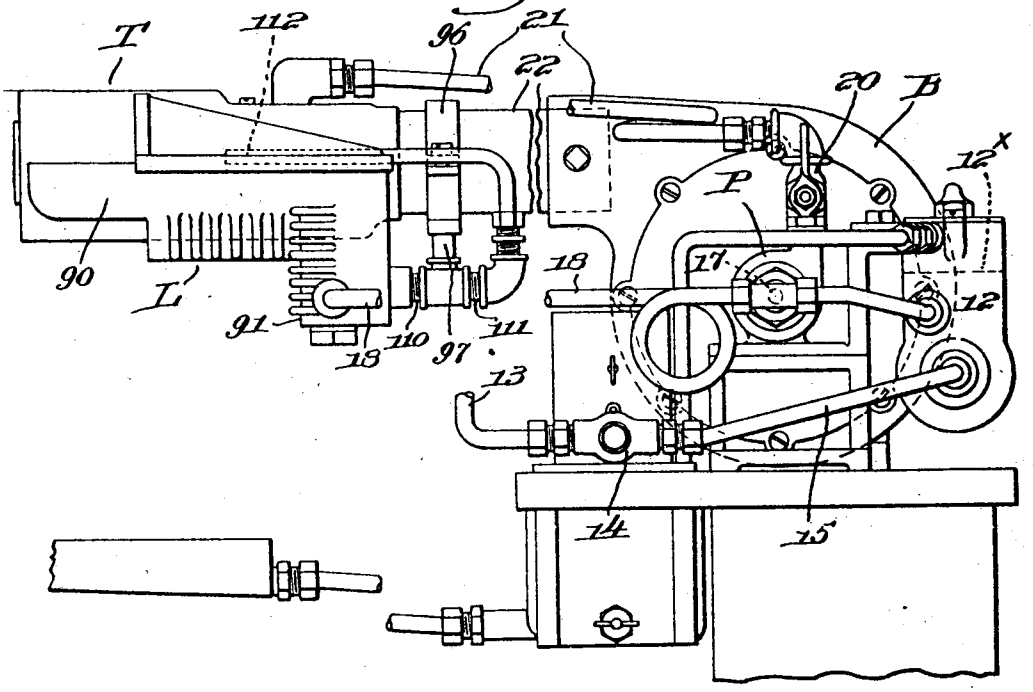
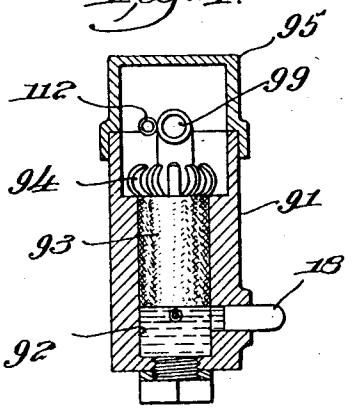



Fig. 4.




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Filed July 19, 1926 2 Sheets-Sheet 2

Fig. 2.

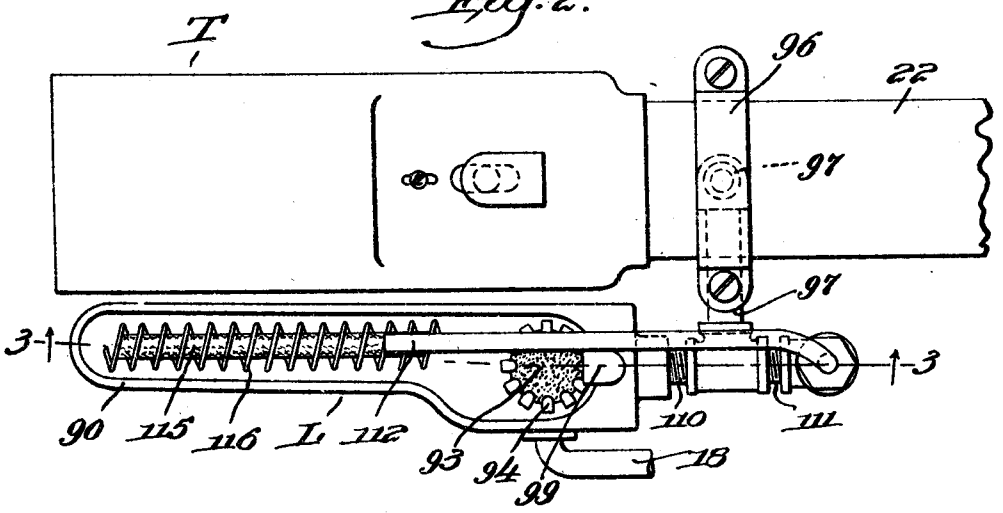
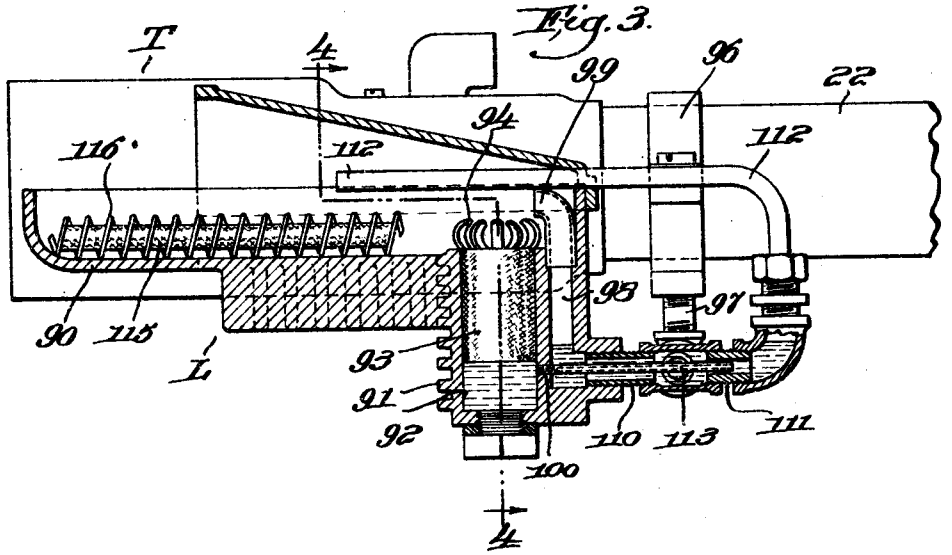



Fig. 3.




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# UNITED STATES PATENT OFFICE.

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## PILOT FOR LIQUID-FUEL-BURNING APPARATUS.

Application filed July 19, 1926. Serial No. 123,491.

This invention relates to liquid fuel burning apparatus, and more particularly to a pilot therefor.

It is an object of the invention to provide a pilot wherein a main pilot flame portion is arranged to continuously supply a moderately low burning flame which may be augmented by a charge of fuel automatically projected thereinto at the time of starting the burner into operation.

A further object of the invention is to provide an auxiliary pilot capable of producing an elongated flame normally extinguished but arranged to be lighted by means which the above augmented flame starts into operation.

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, partially broken away, of one form of liquid fuel burning apparatus having the invention applied thereto.

Figure 2 is an enlarged top plan view of a portion of a burner tip with the improved pilot attached, the cover of the pilot being removed.

Figure 3 is a section on the line 3—3 Figure 2.

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

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

Referring to the drawings,

The drawings herewith illustrate certain features contained in an application filed by me July 20, 1925, Ser. No. 44,777 and of which certain features of the present invention originally formed a part.

Generally, the burner to which the invention is herein applied consists in a suitably actuated blower B, fuel pump P, burner tip portion T, pilot L and fuel level regulator 12.

The pilot in the present instance is made up of a pan-like portion 90 having a depending portion 91 bored as at 92 to form a receptacle or well in which is inserted a plug wick 93 of such length as to leave a space at the bottom of the well for a supply of oil or liquid fuel.

Preferably the wick 93 is surrounded by a series of ribbon-like members 94 which extend upwardly and beyond the flame surface of the wick, and are inwardly curved, and of such distance apart as to partly confine the pilot flame within them whereby they function as bafflers to protect the flame from being extinguished yet at the proper time permit tongues thereof to be forced between them when the burner fuel is to be ignited.

Along side the well or reservoir 92 is a passage 98 at the upper end of which is a curved pipe 99 while at the lower end is a threaded nipple 110 between which and the nipple 111 is a T fitting having a pipe 97, leading therefrom to a clamp-like member 96 secured to the pipe 22 into which said pipe 97 taps.

Leading from the nipple 111 by suitable connections thereto is an open ended pipe 112 of comparatively small internal diameter which serves as a burner for an elongated or pencil-like pilot flame.

Tapped into a hole 100 of the portion 91 is a small pipe or tube 113 through which fuel passes from the reservoir 92 and about which a further explanation will be given.

The pipe 22 leads from the outlet of the blower B and conducts air therefrom to the burner tip portion T in which is or may be located any usual or suitable device to prepare fuel and air for rapid combustion.

The fuel for the burner tip and pilot is contained in any suitable tank not shown, and preferably has a gravity flow through pipe 13 valve 14, and pipe 15 to a fuel level regulator 12 from which a pipe 16 leads to a T fitting having one branch 17 leading to the pump P, and another branch or pipe 18 leading to the reservoir 92 to feed the wick 93, and, thence through the pipe or tube 113 provide the charges of fuel to be expelled by the air blast when the burner is put in operation.

The fuel level regulator 12 is arranged to maintain a level of fuel approximating the dotted line $12^x$, see Figure 1, and therefore the fuel which passes from the pipe 113 will assume the same level in the passage 98, and elbow 114, and filling the nipples 110 and 111, prior to starting up the burner, thus providing a charge of fuel of considerable size to be injected into the low burning pilot flame of wick 93 as will be explained.

As an aid in lighting the auxiliary pilot formed at the end of the pipe 112, and which affords an elongated or pencil-like flame, a wick 115 is provided, and arranged to be

threaded through a coiled spring 116, and placed in the pan 90 with one end in close proximity to the wick 93 and directly under the opening in the end of the pipe 112.

The spring 116 tends to maintain the shape and position of the wick 115 as well a serving as an anchor therefor, and removing it from contact with the pan 90 to prevent it from being scorched in the event that the said pan should become overheated.

When it is desired to start the burner, the blower B will be set in motion by any usual or suitable motor not shown, and immediately a blast of air will be directed through the pipe 22 to the burner tip portion, and the pump P will begin to deliver fuel thereto.

As the air reaches the pipe 97 its pressure will be such as to enter the said pipe and force the fuel in the T fitting two ways, a portion being forced to the left, see Figure 3, through the nipple 110, passage 98, and out through the end of the curved pipe 99 over the flame of the wick 93.

Another portion of the fuel will be forced to the right and through and out of the end of the pipe 112 to fall on the wick 115, and in each instance the charge of fuel expelled through its respective pipe is followed by a column of air so long as the blower is in operation.

The fuel expelled through pipe 99 will become ignited as it passes over the flame of the wick 93, but as it is not finely broken up into spray or even globules it will fall on the wick 115 and in its ignited state will in turn ignite the fuel of the said wick 115 which was received from the pipe 112.

The blast of air passing from the pipe 97 to the left and out through the curved pipe 99 will force all the fuel in the nipple 110, and passage 98 ahead of it, and thereafter no more fuel will pass that way until the blower has been shut down and a new charge of fuel has accumulated preparatory to again starting the burner into operation.

The blast of air passing from the said pipe 97 to the right however, first forces the charge of fuel ahead of it through the said pipe 112 and thereafter in passing the end of the pipe or tube 113 it draws fuel therefrom and continues to do so so long as the blower is in operation.

The first charge of fuel expelled from the pipe 112 will be ignited by the flame arising from the wick 115, and as it is unbroken it too will fall on the said wick 115, and the following continuous charge of mixed air and fuel being expelled from the said pipe 112 will be ignited by the said flame, the small diameter of the said pipe and the air pressure therein will cause said pipe to emit an elongated or pencil-like flame which will more than reach the burner tip end from which a vaporous mixture of fuel and air is being expelled for consumption; the air flow from pipes 99 and 112 serves to blow the flame from pan 90 toward the fuel issuing from burner tube T, this flame from pan 90 thus constituting an elongate auxiliary pilot frame.

Having described the invention I claim:

1. A pilot for liquid fuel burning apparatus comprising a main pilot; means to feed fuel to said main pilot; means to inject a charge of fuel into the flame of said main pilot when said apparatus is to be put into operation; and an auxiliary pilot arranged to provide an elongated flame and to be ignited upon the injection of fuel into said main pilot.

2. A pilot for liquid fuel burning apparatus comprising a main pilot; means to feed fuel to said main pilot; means to inject a charge of fuel into the flame of said main pilot when said apparatus is to be put into operation; an auxiliary pilot; and means to aid the main pilot in lighting said auxiliary pilot.

3. A pilot for liquid fuel burning apparatus comprising a main pilot; means to feed fuel to said main pilot; an auxiliary pilot arranged to provide an elongated flame, and to be lighted upon the injection of a charge of fuel into the flame of said main pilot; means to simultaneously inject a charge of fuel into the flame of said main pilot, and eject a charge of fuel for said auxiliary pilot, and thereafter provide an air draft over said main pilot flame, and provide a combustible mixture for said auxiliary pilot.

4. A pilot for liquid fuel burning apparatus comprising a main pilot; means to feed fuel to said main pilot; an auxiliary pilot arranged to provide an elongated flame and to be lighted upon the injection of a charge of fuel into the flame of the main pilot; means to inject a charge of fuel into the flame of said main pilot, and eject a charge of fuel from said auxiliary pilot, and thereafter provide an air draft over said main pilot flame, and provide a combustible mixture of air and fuel for said auxiliary pilot; and means to catch said ejected charge so that it will be ignited by the flame of said main pilot.

5. A liquid fuel burning apparatus comprising a burner tip, a main duct for supplying air to the burner tip, an auxiliary burner permanently to support combustion spaced from the burner tip and adjoining the main duct, a connection from said main duct to supply an auxiliary stream of air above the auxiliary burner toward the burner tip, and a pilot flame area between said auxiliary burner and the burner tip, whereby the auxiliary air blast will project the flame toward the pilot flame area, and means to supply fuel to said pilot flame area to support temporary combustion in said pilot flame area.

6. A liquid fuel burning apparatus comprising a burner tip, a main duct for supplying air to the burner tip, an auxiliary burner

permanently to support combustion spaced from the burner tip and adjoining the main duct, a connection from said main duct to supply an auxiliary blast of air above the auxiliary burner toward the burner tip, and a pilot flame area between said auxiliary burner and the burner tip, whereby the auxiliary air blast will project the flame toward the pilot flame area, and means to supply fuel to said pilot flame area, said means including a fuel well beneath the auxiliary burner, and a pipe extending from said well into the region of the auxiliary air blast.

7. A liquid fuel burning apparatus comprising a burner tip, a main duct for supplying air to the burner tip, an auxiliary burner permanently to support combustion spaced from the burner tip and adjoining the main duct, a connection from said main duct to supply an auxiliary stream of air above the auxiliary burner toward the burner tip, and a pilot flame area between said auxiliary burner and the burner tip, whereby the auxiliary air blast will project the flame toward the pilot flame area, and means to supply fuel to said pilot flame area, said means including a branch of the auxiliary air connection, and a fuel supply pipe extending into said branch, said branch terminating above the pilot flame area.

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

SINIUS M. HANSEN.