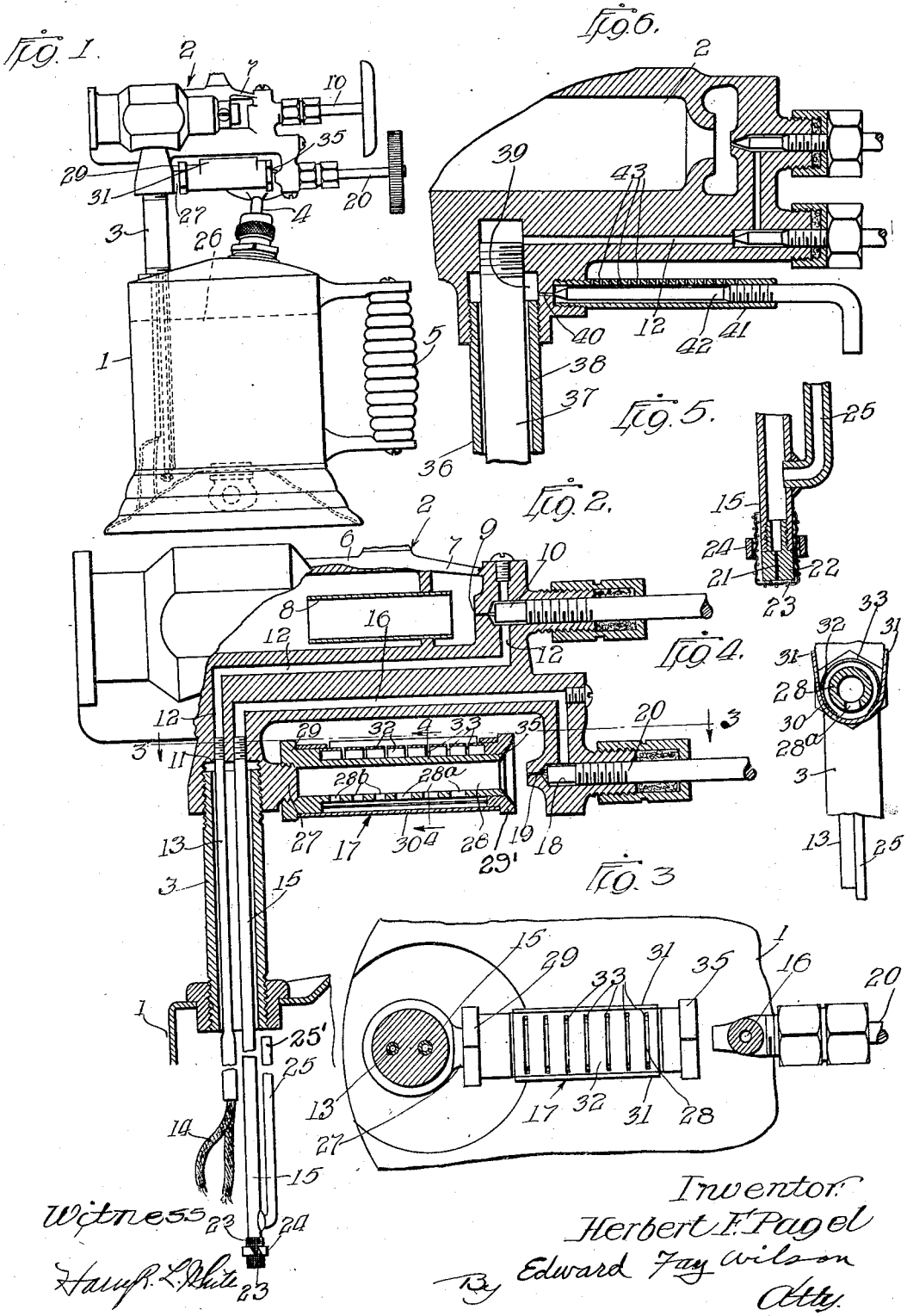
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PLUMBER'S HAND TORCH

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PLUMBER'S HAND TORCH

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This invention relates to improvements in plumbers' hand blow torches and has special reference to improved means for preliminarily heating the burner of the torch for starting the same into operation.

Heretofore, the usual method has been to provide a drip pan below the burner, into which a small quantity of the liquid fuel is run, which is then ignited and heats the burner. Such practice is fraught with many possibilities of accident or danger. By means of my present invention, I am enabled to eliminate these dangerous possibilities while, at the same time providing very efficient and simple means for starting the burner.

Such torches consist of a reservoir for containing the liquid fuel, a burner mounted upon the reservoir, and an air pump for placing the fuel under pressure for forcing it up to the burner.

The reservoir is not full of the fuel, the upper part being left free of fuel for containing the air for producing the pressure. As this air is in contact with the volatile fuel, it is carburetted air and in condition to burn. While this carburetted air could be used alone for preliminarily heating the burner, I usually prefer, for reasons to be explained, to use this air in combination with a proportion of the liquid fuel to supply a richer gaseous mixture for heating the burner, providing a simple auxiliary burner beneath the main burner in which this mixture is burned in the starting process.

The invention will be readily understood by reference to the accompanying drawings forming part of this specification and in which:—

Fig. 1 is a side elevation of a plumber's hand torch embodying the invention in one form;

Fig. 2 is a fragmentary vertical section through the main and auxiliary burners;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary detail vertical section on the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary vertical section of the lower end of the auxiliary burner feed pipe; and

Fig. 6 is a section similar to Fig. 2 and showing a slightly modified form of the invention.

In said drawings, 1 illustrates the reservoir of the torch. A self-generating burner 2 is mounted above the reservoir, a connecting pipe 3 being screwed into the top of the reservoir, and the burner 2 is screwed onto the pipe. A hand pump 4 is provided, carried by the reservoir, for placing the contained fuel under pressure. Usually the torch is provided with a handle 5 for manipulating same, the torch being portable in form.

The burner 2 consists mainly of a cylindrical shell 6 open at its forward end and closed at its rear end by an end wall 7 through which is projected a centrally arranged tube 8. An outlet opening 9 for the fuel is centrally arranged beyond the outer end of the tube 8, and a needle valve 10 is provided for controlling said outlet.

The burner is provided with a screw threaded opening 11 in its lower side near its forward end for receiving the upper end of the connecting pipe 3, and a fuel feed passage 12 leads from the bottom of this opening through the bottom wall of the burner to the needle valve 10. A small feed tube 13 is screwed tightly into the lower end of the passage 12 and extends down through the pipe 3 and ends near the bottom of the reservoir wicking 14 being carried by the tube 13 so that even though the fuel does not rise to the lower end of the tube, the fuel will be fed to same. A second tube 15 extends down through the pipe 3 and ends close to the bottom of the reservoir. This second tube is screwed into the lower end of a second feed passage 16 which extends through the wall of the burner beneath the passage 12.

Beneath the main burner 2 is arranged an auxiliary or starting burner 17 which extends horizontally below the passages 16 and 12. The passage 16 leads to a valve chamber 18 which feeds the fuel to a small exit opening 19 arranged centrally in line with the auxiliary burner 17. This exit opening 19 is controlled by a hand operable needle valve 20. The opposite end of the passage 16 en-

ters the pipe opening 11, and the small feed tube 15 is connected with same. Means are provided for causing a rich mixture of air and fuel or rather carburetted air and fuel to flow through the passage 16 to the auxiliary burner 17 whenever the valve 20 is opened. This means consists in providing a very small needle-like feed opening 21 leading into the bottom of the feed tube 15 through a plug or cap 22 which closes the lower end of the tube. The outer end of the feed opening 21 is protected by a very fine wire mesh guard 23 held over the cap 22 by a clamping ring 24.

Just above the lower end of the feed tube 15, a branch feed pipe 25 is connected which leads up to the top of the reservoir above what might be termed the normal liquid level indicated at 26, Fig. 1. The upper end 25′ of the feed tube 25 is open, and the carburetted air in the upper part of the reservoir is free to enter same. Also, the liquid in the reservoir can enter the lower end of the feed tube 15 through the feed opening 21, which is adapted to project a very fine needle-like stream of the liquid fuel centrally up through the feed tube 15 when the valve 20 is opened to feed fuel to the auxiliary burner. When this occurs, the carburetted air enters the lower end of the feed tube 15 through the feed pipe 26 and mixes with the stream of fuel entering through the opening 21, thoroughly mixing with same, thus enriching the carburetted air, which then passes on through the feed passage 16 to the outlet 19.

The auxiliary burner 17 which I have provided is very efficient. It is cylindrical in form and is mounted at one end on a threaded projection 27 at the base of the main burner just above the connection with the pipe 3. This auxiliary burner consists of a central tubular member 28 ending at one end in a head 29, the tube being internally threaded at this end for mounting on the projection 27. The opposite end of the tube is open, and the feed opening 19 is adapted to project the fuel centrally into the open end of the tube. Surrounding the tube 28 and mounted on the head 29 at one end and on a removable head 29′ at the opposite end is a cylindrical shell 30. The upper side of this shell 30 is opened up and is formed to provide upwardly projecting side guide walls 31.

A second cylindrical shell 32 is arranged within the first shell 30 and closes the opening produced when the shell 30 is opened up to form the walls 31. This second shell is provided with a plurality of narrow burner slots or openings 33 extending across same and adapted to project flames against the lower part of the main burner containing the feed passages 12 and 16. The inner tube 28 is closed except for a series of feed openings 28^a and 28^b extending along the lower side thereof. The openings 28^a, which are nearer to the open end of the tube 28, are slightly larger than the openings 28^b at the other end. This is for the purpose of effecting an even distribution of the fuel the whole length of the auxiliary burner.

The exit end of the feed opening 19 is spaced from the entrance end of the auxiliary burner, and this end of the burner is flared, as shown at 35. This assists in the addition of air to the fuel. As the mixture of air and fuel passes through the auxiliary burner, it is thoroughly mixed by being forced to pass downwardly through the openings 28^a—28^b, then around the tube 28 and out through the narrow burner slots 33. By these frequent changes of direction of flow and the consequent baffling of direct flow, any fluid particles of the fuel are broken up at least into very small or infinitesimal drops, the air and fuel is thoroughly mixed, and the carburetted air issues from the slots 33 in condition to burn with high efficiency. The flames from the slots 33 are impinged directly against the part of the burner frame containing the feed passage 16 to the auxiliary burner, and the almost instantaneous effect is to thoroughly gasify or dry the fuel flowing to the auxiliary burner. The next effect is to raise the temperature of the liquid fuel in the feed passage 12, which leads to the main burner, to the point where the fuel issues from the fuel feed opening 9 in gaseous form.

This is then ignited, and within a very short time the burner is heated from the flame produced by the fuel which escapes through the main feed opening 9 to the point where it will properly gasify the fuel flowing to the main burner. When this occurs, the auxiliary burner can be shut off.

In starting the burner by the use of the auxiliary burner, and while the auxiliary burner is cold, the carburetted fuel entering the auxiliary burner through the controlled outlet 19, condenses within the auxiliary burner and liquid fuel accumulates in same. This accumulation of liquid fuel gradually vaporizes and passes off as the auxiliary burner becomes heated.

In Fig. 6, I have shown a form of the invention which, while not quite as efficient as the form already described, is effective for the purpose intended.

In this modified form, the carburetted air from the top of the reservoir is used directly. The main burner, as in the form described, is mounted on a tube 36 which in turn is mounted in the top of the reservoir. A central fuel feed tube 37 extends down through the support tube 36 to a point close to the bottom of the reservoir. The feed tube 37 is smaller in external diameter than the internal diameter of the support tube, providing an annular space 38 between them. This space 38 communicates at its lower end with the top of the reservoir and at its upper end with a

chamber 39. From the chamber 39 a small feed passage 40 leads out and is adapted to deliver the carburetted air within a burner tube 41 which is mounted on the base of the main burner and projects beneath the main fuel feed passage 12 of the main burner. The passage 40 is controlled by a valve 42, and the burner tube 41 has a series of small holes 43 in its upper side through which the carburetted air can escape and cause flames to be projected against the main burner to gasify the fuel in the feed passage 12. This form is a very simple means of making use of the carburetted air in the upper part of the reservoir for starting the main burner into operation.

As many modifications of the invention will readily suggest themselves to one skilled in the art, I do not limit or confine the invention to the specific details of construction herein described.

I claim:

1. An auxiliary burner for use in heating the main burner of a plumber's torch, said auxiliary burner consisting of an inner tube open at one end to receive the fuel, the tube provided with a row of graduated fuel feed openings along its lower side, a shell surrounding said tube and provided with burner openings along its upper side, and guide walls on the auxiliary burner, extending up above the burner openings as and for the purpose specified.

2. In a device of the kind described, a liquid fuel tank, means for placing the fuel under pressure, a burner mounted on the tank, means connecting the burner with the tank below the normal liquid level therein, including a fuel passage in the lower wall of the burner, an open container for liquid fuel below said passage, and means for directing liquid fuel from said tank into said open container, and a valve for controlling the flow of fuel into said open container.

3. In a device of the kind described, a liquid fuel tank, means for maintaining the fuel under pressure, a burner fuel feed means connecting the burner with the tank, an open topped liquid fuel container below the burner, a valve for controlling the flow of fuel to said burner, means for feeding liquid fuel from the tank to said open topped liquid fuel container for use in heating the burner for starting same into operation, and a second valve for controlling the quantity of fuel fed to said open topped container.

4. In a device of the kind described having a liquid fuel reservoir, means for maintaining an inflammable gas in the upper part of the reservoir, a main burner mounted on the reservoir, means for feeding liquid fuel from the reservoir to the main burner, including a fuel passage in the lower wall of the main burner, an auxiliary burner arranged below said passage, means for feeding combined liquid and gaseous fuel from the reservoir to the auxiliary burner including a second fuel passage in the lower wall of the main burner, a fuel jet producing orifice being provided for discharging fuel from said second passage into the auxiliary burner.

5. In a device of the kind described having a liquid fuel reservoir, means for placing the fuel therein under pressure, a main burner mounted on the reservoir, a fuel feed passage for the burner extending through the lower wall of the main burner, an auxiliary burner beneath the main burner adapted to heat the fuel in said fuel feed passage for starting the main burner into operation, a second fuel feed passage in the lower wall of the main burner, means for discharging fuel from said second passage to the auxiliary burner, a fuel feed conduit leading from the lower part of the reservoir to said second feed passage, and a branch passage leading from a point adjacent to the lower end of said fuel feed conduit to the upper part of the reservoir.

6. In a device of the kind described having a liquid fuel reservoir, means for placing the fuel therein under pressure, a main burner mounted on the reservoir, a fuel feed passage for the main burner extending through the lower wall of the burner, an auxiliary burner beneath the main burner adapted to heat the fuel in said fuel feed passage for starting the burner into operation, a second feed passage in the lower wall of the main burner, means for discharging fuel from said second feed passage in jet form into the auxiliary burner, and means for feeding a mixture of gaseous fuel from the upper part of the reservoir and liquid fuel from the lower part of the reservoir to said second feed passage as and for the purpose described.

In witness that I claim the foregoing as my invention, I affix my signature this 4th day of January, 1929.

HERBERT F. PAGEL.