

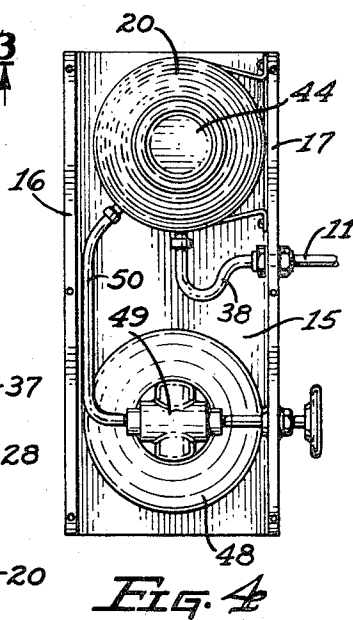
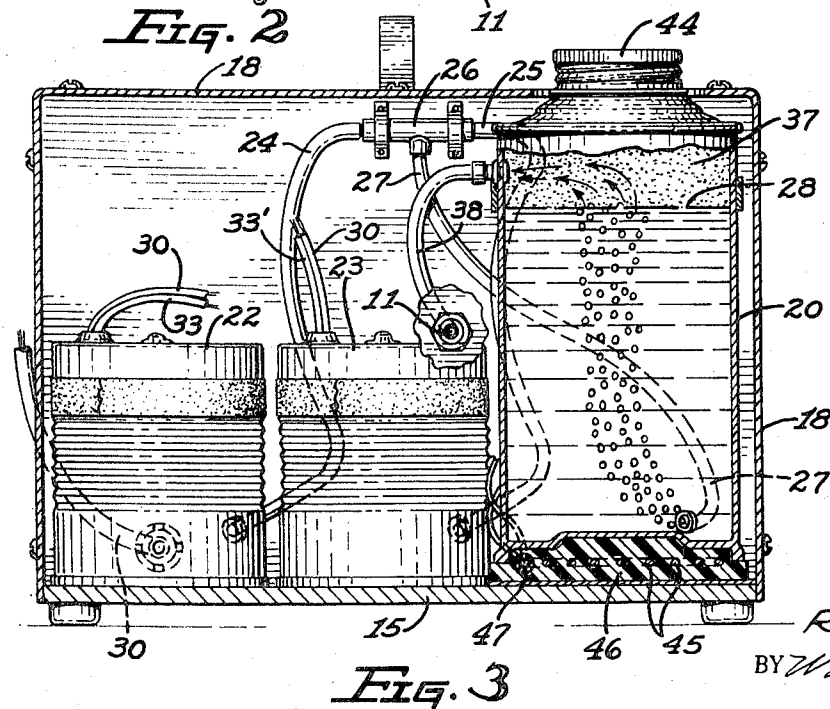
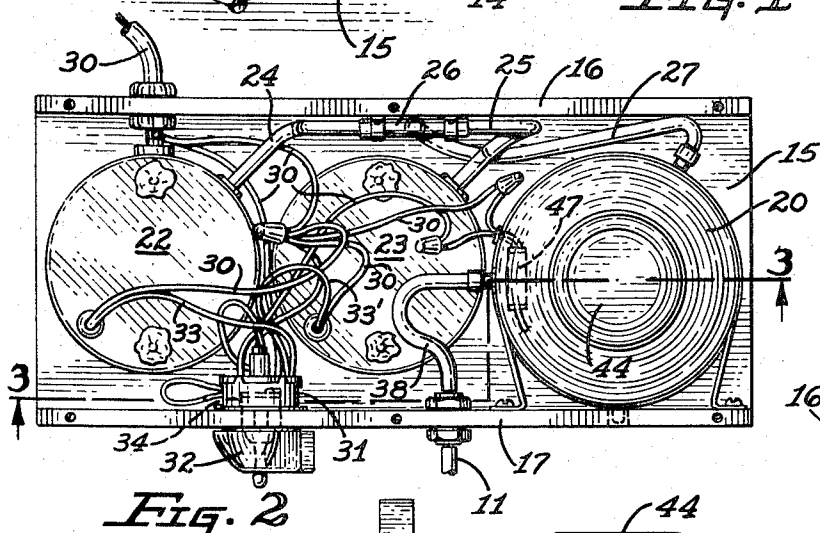
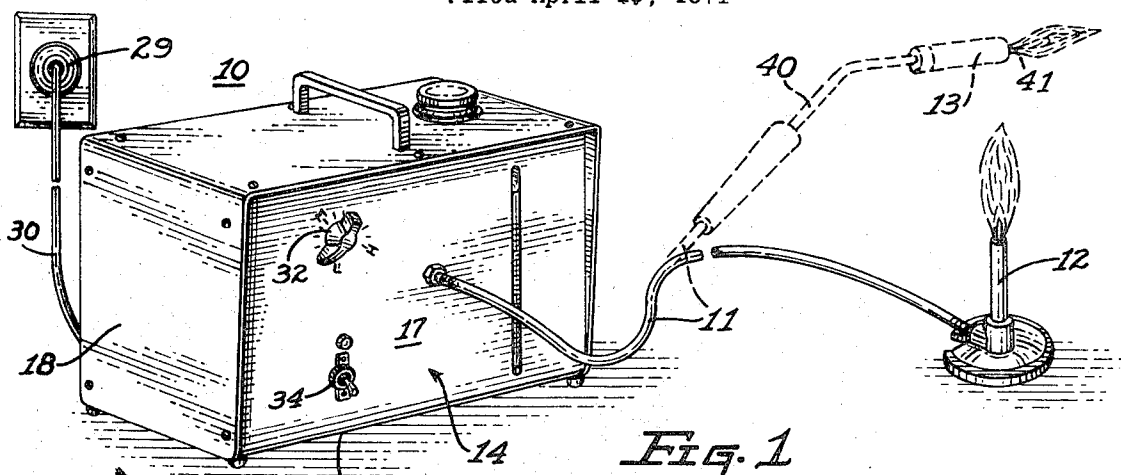
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APPARATUS AND METHOD FOR PRODUCING OXYGENATED GASEOUS FUELS

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APPARATUS AND METHOD FOR PRODUCING OXYGENATED GASEOUS FUELS

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4 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus and method for producing oxygenated gaseous fuel wherein ambient air or oxygen is bubbled through a volatile liquid fuel entraining the fuel and conveying it to a combustor where it burns the vaporized fuel.

BACKGROUND OF THE INVENTION

This invention relates to a method and apparatus for producing oxygenated gaseous fuel for torch or burner use.

FIELD OF THE INVENTION

This invention is directed to a method of producing combustible torch or burner fuel having a homogeneous mixture wherein air or oxygen passing through a liquid fuel performs the function of entraining, vaporizing and oxygenating the fuel.

DESCRIPTION OF THE PRIOR ART

Heretofore a great variety of methods and apparatus have been utilized for presenting oxygenated fuel in a torch or burner flame area. Most of these methods and apparatus utilize air or oxygen conducted through a mixing valve or chamber in close proximity to the combustion area of the apparatus where it is mixed with a gaseous fuel. Some of the prior art apparatus utilize gaseous fuels derived from solid pellets while others utilize gaseous fuels from pressurized storage tanks. Most of these prior art devices used for producing an oxygenated fuel mixture are complicated and expensive, utilizing relatively expensive fuels.

SUMMARY OF THE INVENTION

In accordance with the invention claimed an improved method and apparatus is provided for oxygenating a volatile liquid fuel for producing a high temperature torch or burner flame.

Compressed ambient air is introduced into a body of volatile liquid fuel bubbling therethrough to the upper surface thereof, entraining vapors of the liquid as it moves therethrough. This action produces an oxygenated gaseous fuel which may be conveyed through a suitable conduit to a torch or burner.

The invention disclosed and claimed may be used to accomplish a great variety of metal fusion operations when used in conjunction with a torch. The use of controlled ambient air and wood alcohol vapor as oxygenated gaseous fuel in a torch makes it possible to perform silver soldering operations or a variety of other important welding functions quickly and economically with a small hand-controlled device.

Additionally the invention may be used to produce an oxygenated gaseous fuel which can be efficiently used in various types of burners such as the well known Bunsen burners and small burners for cooking purposes or the like.

It is, therefore, one object of this invention to provide a simple and economical method and apparatus for producing and burning oxygenated gaseous fuel.

Another object of this invention is to provide an apparatus for entraining and oxygenating a volatile liquid fuel under temperature controlled conditions.

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A still further object of this invention is to provide a small compact apparatus for producing oxygenated combustible vapor from inexpensive liquid fuels.

Further objects and advantages of the invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

BRIEF DESCRIPTION OF THE DRAWING

The present invention may be more readily described by reference to the accompanying drawing in which:

FIG. 1 is a front perspective view of an apparatus for producing and properly burning an oxygenated gaseous fuel in accordance with the present invention;

FIG. 2 is a top view of FIG. 1 with the cover removed; FIG. 3 is a cross-sectional view of FIG. 2 taken along the line 3-3; and

FIG. 4 is a modification of the structure shown in FIGS. 1-3 wherein a container of oxygen under pressure is used in place of the air pumps of FIGS. 1-3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring more particularly to the drawing by characters of reference, FIG. 1 illustrates an apparatus 10 for producing an oxygenated gaseous fuel for conveyance through a suitable conduit 11 to a burner 12 or torch 13.

The apparatus 10 as shown in FIGS 1-3 is housed in a container 14 comprising a base 15, side walls 16 and 17 and cover 18. The cover 18 is of a U-shaped configuration fitting over the edges of side walls 16 and 17 and closing the ends of the container, as shown.

A fuel tank 20 is mounted within container 14 on base 15 adjacent a source of air under pressure.

This air under pressure may comprise, for example, one or more small A.C. solenoid operated compressors 22 and 23, each delivering ambient air under pressure to fuel tank 20 through conduits 24 and 25 which are connected through a T-fitting 26 with one end of a conduit 27. The other end of conduit 27 is connected through the side of tank 20 near its base to its interior, as shown, for bubbling air through the liquid fuel 28 in tank 20.

Each solenoid operated compressor is connected to an A-C source of electric power 29 through suitable electrical conductors 30.

Since the top of tank 20 fits loosely through an opening in cover 18, sufficient air passes into the apparatus to furnish compressors 22 and 23 with ambient air. These compressors may be the conventional alternating current solenoid operated pumps used to supply air into aquariums or the like.

Side wall 18 carries on its inner surface a rheostat 31 which is provided with an external control knob 32. This rheostat is electrically coupled to the A-C solenoid of each of the compressors by means of electrical conductors 33, 33'. The rheostat is then connected through a switch 34 to the electrical conductors 30 and to the 110-volt A-C outlet 29 in the usual way, well known in the art. A fuse (not shown) may be inserted in this connection if so desired.

As shown in FIG. 3, when the solenoid operated compressors 22 and 23 are energized they pump air under pressure through conduit 27 to the bottom of tank 20 where the ambient air is caused to bubble upwardly through fuel 28 so as to entrain vapors of the volatile liquid fuel in the air to provide an oxygenated gaseous fuel in an upper portion 37 of the tank above the liquid level 28.

Tank 20 is provided with an outlet conduit 38 to which flexible conduit 11 is connected. Conduit 11 extends to a

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combustor such as burner 12 or torch 13 as shown in FIG. 1.

Torch 13 is provided with a hollow tubular handle 40 having an aperture 41 through which the oxygenated gaseous fuel produced in tank 20 is ignited to produce flame 42. If desired a torch tip (not shown) may be added to torch 13 to surround aperture 14 to direct the oxygenated gaseous fuel in a given direction from the handle.

As shown in FIGS. 1-3, tank 20 is provided with a screw threaded removable filler cap 44 having a sealing gasket. This cap provides a means for filling the tank with suitable fuel from time to time as required.

In order to control the temperature of the fuel in tank 20 so as to offset the evaporative cooling effect on the fuel which takes place inside of the tank, a suitable tank heater is provided. As shown in FIG. 3, one way for controlling the temperature of the volatile fuel is to mount a heating element 45 below the fuel tank. This heating element may be embedded in a heat transmitting material such as plastic or rubber 46 which is molded into a shape to fit the bottom of the fuel tank. A suitable bimetal thermostatic switch 47 is connected in series with the heating element 45 and is located in proximity thereto in order to cyclically connect and disconnect the heating element to the source of power 29. By heating the volatile fuel a more constant and uniform evaporation rate is maintained, thereby assuring constant flame conditions.

The volatile liquid fuel may preferably be wood alcohol; however, any other suitable volatile hydrocarbon fuel may be utilized. White gasoline, for example, has also proven to be an effective fuel.

FIG. 4 illustrates a modification of the structure shown in FIGS. 1-3 wherein the solenoid operated compressors 22 and 23 are replaced by a container 48 of liquid or compressed gaseous oxygen which is transmitted through a valve 49 and conduit 50 to fuel tank 20. Oxygen in place of compressed or ambient air under pressure will result in a hotter flame when used to oxygenate a volatile fuel.

In accordance with the method of the present invention any supply of air or oxygen under pressure may be conducted in a suitable manner to a lower interior portion of a body of volatile liquid fuel so that air or oxygen may bubble upwardly through the liquid fuel to vaporize and entrain some of the volatile fuel vapors in the air or oxygen to provide an oxygenated gaseous fuel which may be transmitted through a conduit to a combustor such as a torch or burner.

Although but two embodiments of the present invention have been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. A self contained portable apparatus for producing oxygenated gaseous alcohol in a closed system comprising: a built in source of air under pressure, said source of air under pressure comprising a pump disposed to receive and compress ambient air, an alternating current solenoid motor and associated rheostat for energizing said pump,

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a tank for containing liquid alcohol,

a first conduit means for connecting said source of air under pressure to the interior of said tank at a point below the normal liquid alcohol level whereby said air under pressure will bubble upwardly through the liquid alcohol entraining volatile alcohol vapors as it passes therethrough to produce oxygenated vaporized alcohol in said tank about the liquid level of the alcohol,

an outlet in said tank above the normal liquid level in said tank,

a second conduit means for conveying only said oxygenated vaporized alcohol from above said alcohol level to a combustor,

a heater disposed adjacent said tank for keeping said alcohol at a predetermined temperature to counteract the cooling effect of evaporation of said alcohol, and

a thermostat connected to said heater for regulating its heating effect.

2. The apparatus set forth in claim 1 wherein said source of oxygen comprises a tank of air under pressure.

3. The apparatus set forth in claim 1 in further combination with a combustor attached to the free end of said second conduit means.

4. A self contained portable apparatus for producing oxygenated gaseous alcohol in a closed system comprising: a built in source of air under pressure, said source of air under pressure comprising a pump disposed to receive and compress ambient air, a tank for containing liquid alcohol,

a first conduit means for connecting said source of gas under pressure to the interior of said tank at a point below the normal liquid alcohol level whereby said gas under pressure will bubble upwardly through the liquid alcohol entraining volatile alcohol vapors as it passes therethrough to produce oxygenated vaporized alcohol in said tank above the liquid level of the alcohol,

an outlet in said tank above the normal liquid level in said tank, and

a second conduit means for conveying only said oxygenated vaporized alcohol from above said alcohol level to a combustor.

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