May 19, 1970 R. E. LINCH 3,512,912

GAS TORCH

Filed Jan. 25, 1968

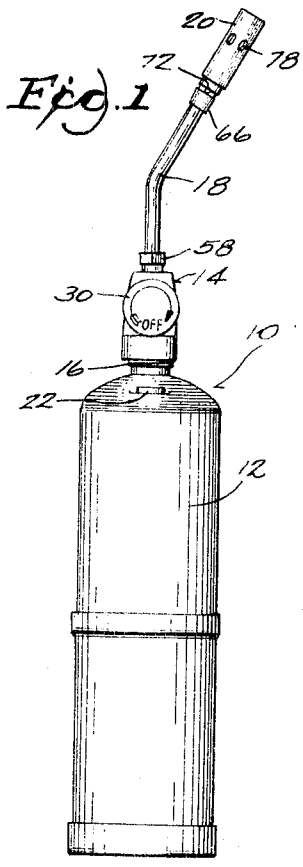


Fig. 1

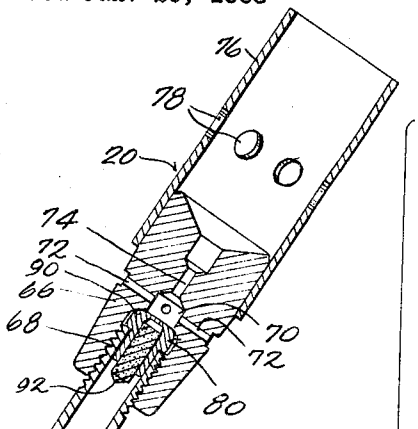


Fig. 2

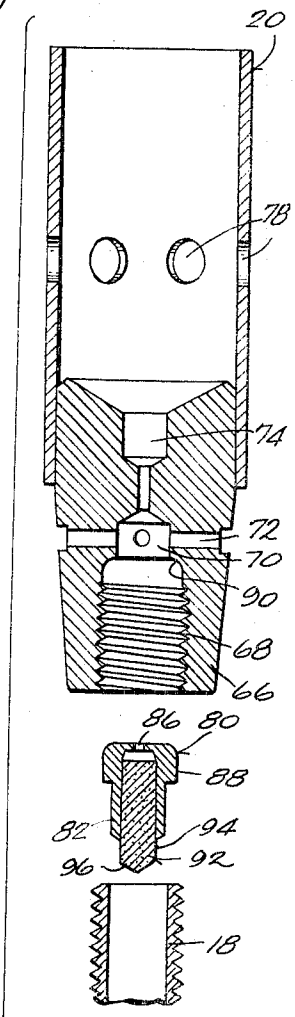


Fig. 3

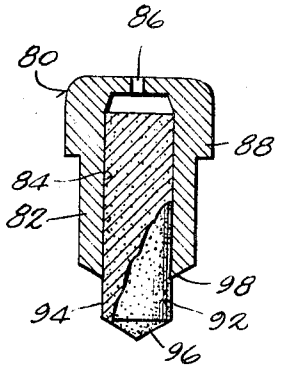
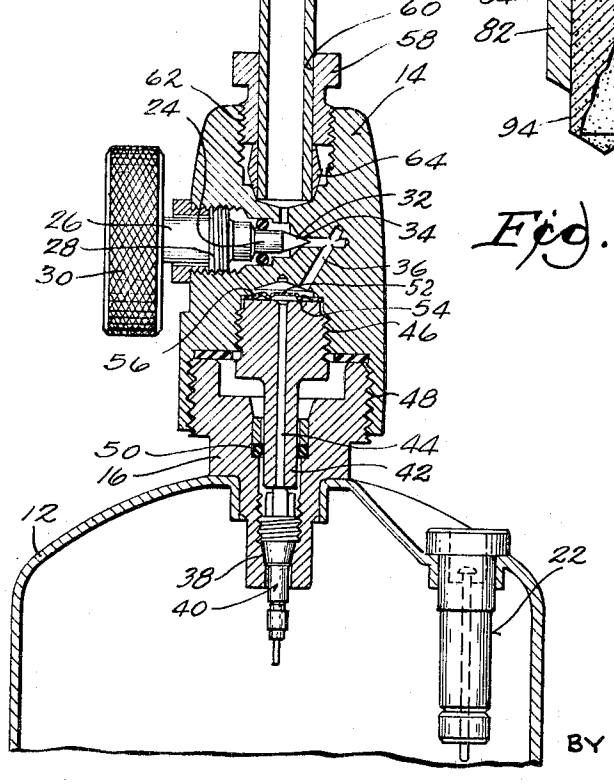


Fig. 4



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GAS TORCH

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ABSTRACT OF THE DISCLOSURE

A portable torch utilizing pressurized gas fuel and provided with a replacable orifice member having a self-contained filter element.

BACKGROUND

Portable pressurized gas fuel devices such as liquid propane torches adaptable for a variety of uses are well known in the art. In such devices, it is important that a proper flame be maintained while the device is operating on a supply of the pressurized fuel which is supplied to the burner head through a minute orifice. The burner orifice thus provided in the device may be of varying sizes dependent upon the type of work to be performed and the nature of the flame necessary for the performance of such work.

In these devices, it is customary to provide fuel flow and pressure regulating means so that the torch or appliance will operate properly in any position whether it be upright, tilted or inverted. For example, for the flow regulation, it is common practice to provide an adjustable needle valve or the like for use in establishing the desired torch or burner flame, and for pressure regulation, diverse types of metering valves and/or flow retarders interposed in the fuel line between the supply source and the needle valve have been proposed.

In addition, it is customary practice to filter the fuel in advance of the burner orifice in an effort to minimize or eliminate clogging of the minute orifice by any foreign particles which might be contained in the fuel. For this purpose, various types of filters formed of a variety of materials have been heretofore utilized.

However, these prior filter elements have generally been built into the torch or other fuel burning appliance in such a manner as to be relatively inaccessible. Accordingly, if they should become ineffective due to clogging or the like, they cannot be readily replaced by a novice, and the torch is therefore frequently discarded and replaced in its entirety. Also, in many instances, the type of filter materials used are relatively ineffective for the intended purpose, and foreign particles will still find their way to the burner orifice and result in clogging and fuel flow interference and improper functioning. In still other instances, the placement and design of the filter elements is such as to result in inefficiency, sometimes causing the user of the device to employ a burner nozzle which is not intended or suited for the particular job at hand.

SUMMARY

It is therefore an object of the present invention to provide an improved filter element for a propane burner or the like which is highly efficient in actual use and which is readily accessible for periodic cleaning and/or replacement.

Another object of this invention is to provide an improved filter element for a pressurized fuel burner which is built into and forms an integral part of the burner orifice member in a manner whereby maximum efficiency in burner operation is obtained.

Still another object of the invention is to provide a portable gas fuel burning device with an improved readily accessible and replaceable filtered orifice cartridge for the burner nozzle wherein the orifice is properly sized for a given job and the filter is positively positioned and retained relative to the orifice for maximum efficiency in intercepting foreign particles without interfering with the desired fuel flow through the orifice.

A further object of the present invention is to provide a replacable orifice-forming and filter-containing cartridge for the nozzle of a portable fuel burner which comprises, a cylindrical shell having an outer circumferential flange at one end thereof and a fuel orifice extending therethrough, and a sintered metal filter element secured within the shell and extending outwardly beyond the end thereof remote from the flanged end.

These and other objects and advantages of the invention will become apparent from the following detailed description.

THE DRAWING

A clear conception of the several features constituting the present invention, and of the construction and mode of operation of a typical propane hand torch embodying the improvements, may be had by referring to the drawing accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

FIG. 1 is an elevational view of a typical pressurized propane torch embodying the invention;

FIG. 2 is an enlarged fragmentary transverse section through the torch and burner assembly;

FIG. 3 is an enlarged exploded view, in section, through the burner nozzle; and

FIG. 4 is a further enlarged transverse section through one of the improved orifice-forming and filter-containing capsules embodied in the torch.

DETAILED DESCRIPTION

Referring now to the drawing, the pressurized gas fuel appliance shown therein as embodying the invention is a etypical liquid propane torch designated generally by the reference numeral **10**. The torch **10** is comprised generally of a cylinder **12** containing a supply of liquid fuel under pressure, a valve body **14** threaded to a cylindrical plug **16** carried by the cylinder **12**, and a tubular neck or supply pipe **18** secured to and extending outwardly from the valve body **14** and equipped with a nozzle **20** at its outer end. For relieving excess pressures in the cylinder **12**, a pressure relief valve **22** is provided.

The flame emanating from the nozzle **20** is adjusted by means of an adjustment valve **24** housed in the valve body **14** located between the cylinder or supply tank **12** and the nozzle **20**. The typical flame adjustment valve shown herein is in the form of a needle valve having a stem **26** threaded as at **28** into the valve body **14** and provided with an adjustment knob **30**. The flow of fuel from the supply tank **12** to the nozzle **20** may accordingly be regulated by manipulating the adjustment knob **30**. An O-ring seal or the like embraces the needle valve **26**.

Thus, by turning the knob **30** in one direction, the nose portion **32** of the needle will be seated against the seat **34** to close the passageway **36** and shut off the supply of fuel from the supply tank **12** to the nozzle **20**. By turning the knob **30** in the opposite direction, pressurized fuel will flow from the cylinder or supply tank **12** through the passageway **36** and into the burner tube **18** to the nozzle unit **20**. The flame issuing from the nozzle **20**, upon igniting the fuel delivered from the nozzle, may then be adjusted by rotating the knob **30** to the desired extent.

Referring particularly to FIG. 2 of the drawing, the valve body unit **14** is illustrated as being screw threaded

upon the cylindrical plug **16** which has a central bore **38** extending therethrough. The bore **38** in the plug **16** is adapted to receive a valve unit **40** which is in the nature of the customary tire valve. This valve unit **40** is spring controlled so as to remain closed prior to insertion of the stem portion **42** of the valve body unit **14** within the bore **38** of the cylindrical plug **16**. Accordingly, the pressurized fuel supply cylinder or tank remains sealed until the burner valve and nozzle assembly is applied thereto, and these tanks **12** may therefore be sold and/or merchandised as separate disposable units. Upon insertion of the stem **42** of the valve body unit **14** within the bore **38** of the cylindrical plug **16**, the tire valve **40** is opened to thereby allow pressurized gas fuel to flow from the cylinder **12**.

The stem **42** is provided with a bore **44** extending longitudinally therethrough, and the valve body unit **14** is threaded, as at **46**, for receiving the stem **42**. The valve body unit **14** containing the stem **42** is also provided with threads **48** for reception by the plug **16**, and the stem **42** may be suitably sealed as at **50**. Gas from the tank **12** is accordingly conducted past the valve **40** through passageway **44** of the stem **42** and then through passageway **36** past the needle valve **26** to the tube **18** and burner nozzle **20** as will hereinafter more fully appear.

In devices of this type, it is also customary to provide some type of valve means or pressure regulator for insuring a constant uniform flow of fuel from the tank to the burner nozzle regardless of the position of the torch or other appliance. One such device is shown and described in detail in U.S. Pat No. 3,190,496 dated June 22, 1965 to John Weiland, Jr. et al., and, for purposes of illustration, such pressure regulating or gas metering device is also shown as being utilized in the present instance. Briefly, this device is in the nature of a metering diaphragm valve **52** spanning the upper or inner end of the passageway **44** of the stem **42**. The diaphragm **52** is formed with an annular detent **54** and one or more apertures **56** located outwardly beyond the annular detent **54**. Upon demand and with the needle valve **24** open, the pressurized gas passing through the passageway **44** acts upon the diaphragm **52** to raise the annular detent **54** from its normally seated position on the upper end of the stem **42** whereupon the gas is free to flow through the aperture or apertures **56** into the passageway **36** and past the needle control valve.

One end of the tube **18** is secured to the valve body **14** as by means of a plug **58** having a central bore **60** for receiving the tube **18**, the plug **58** being externally threaded as at **62** for reception in the valve body **14** and the end of the tube **18** beyond the plug **58** being formed with a spherical abutment **64** preventing displacement of the plug from the tube while also providing a seat within the valve body. The nozzle assemblage **20** consists generally of a body **66** screw threaded as at **68** to the outer end of the tube **18** and having an air and gas mixing chamber **70** formed therein. The mixing chamber **70** formed in the body **66** communicates with the ambient atmosphere through a plurality of radial passageways **72** and has an axially extending passageway **74** through which the gas and air mixture is conducted to the interior of a cylindrical shield **76** secured to the body **66** in a suitable manner as by brazing or the like, the shield functioning to confine the flame emanating from the burner nozzle and, in some instances, also being provided with wall apertures **78** for admitting additional oxygen to the flame.

It is customary practice to provide means forming a restricted orifice between the mixing body **66** and the fuel supply tube **18** within the area of the burner nozzle. It is also common practice in some instances to provide a filter in advance of the burner orifice for trapping any foreign particles which might be contained in the fuel. In some instances, this filter is located between the tube **18** and the valve body **14**, and in other instances it has been proposed to locate the filter within the medial portion of the tube **18**.

However, in the present instance, an orifice-forming and filter-containing capsule or cartridge **80** has been provided. This cartridge **80** comprises a cylindrical body or shell **82** having a central cavity **84** open at one end of the body, the other end of the body being substantially closed but provided with a central restricted orifice **86** communicating the interior of the shell **82** with the mixing chamber **70**. The end of the shell **82** surrounding the orifice **86** is provided with an enlarged head **88** providing a circumferential flange engageable with the end of the tube **18** and seated as at **90** in the body **66** about the mixing chamber **70** formed therein. A cylindrical body or pellet **92** is held captive in the chamber **84**, and the cylindrical body **92** is in the nature of a sintered metal filter element preferably of about 20 microns. This filter element **92** extends into the cavity or chamber **84** but terminates short of the end wall which contains the restricive orifice **86**, the filter element **92** being sized so that it extends outwardly beyond the opposite end of the shell **82** as at **94** and being tapered as at **96** at the extending end thereof. In order to positively retain the filter element **92** in proper position within the recess or cavity **84** of the shell **82**, the end **98** of the shell wall may be crimped or bent upwardly to peripherally grip the filter element.

The orifice-forming and filter-containing capsule of the present invention thus provides an integral unit which is conveniently accessible upon removal of the nozzle body **66** from the tube **18** in an obvious manner. The tapering end **94** of the sintered metal filter element **92** provides an extensive area for the combustible gases admitted to the tube **18**, and the chamber **100** formed between the inner end of the filter **92** and the adjacent end wall of the shell **82** permits free passage of gas through the full diameter of the filter element to the orifice **86**, thus insuring that the full capacity of the filter element is utilized.

From the foregoing detailed description, it is apparent that a variety of filter and orifice-containing cartridges **80** may be made available to the user of the torch, and depending upon the work to be performed by the torch, the proper cartridge may be selected. To remove the cartridge **80**, it is only necessary to unscrew the burner head **66** and remove the same from the tube **18**. The cartridge **80** may then be freely removed from the end of the tube and may be replaced by the cartridge having the desired orifice. The cartridge is properly secured in position by seating the flange-forming head **88** on the end of the tube and then firmly screwing the nozzle assemblage **20** back onto the tube whereupon the portion **90** of the cartridge is seated against the adjacent surface of the burner body **66** around the mixing chamber **70**. The improved devices have gone into actual commercial use and have proven highly satisfactory and extremely efficient.

I claim:

1. A portable gas fuel device comprising, a container for pressurized fuel, a valve body receivable by said container and having a fuel passage therethrough communicable with the interior of said container, valve means adapted to be manipulated to open and close the fuel passage, a burner tube extending from said valve body in communication with the fuel passage, a burner nozzle removably secured to the end of said burner tube remote from said valve body, and a cylindrical member containing a filter element and having a burner orifice in one end thereof communicating with said nozzle and said burner tube by way of said filter element, said filter element being sized and retained by said cylindrical member so as to project freely therefrom into said burner tube remote from said nozzle, the end of said filter element located in the burner nozzle terminating a spaced distance from the cylinder member end containing the orifice to provide an open unobstructed chamber between the

filter element and the orifice containing end, said cylindrical filter containing member having a head surrounding the orifice and providing a flange seated on the end of the burner tube between said tube end and the burner nozzle, whereby said cylindrical member is retained in position by said burner nozzle.

2. A portable gas fuel device according to claim 1, wherein the filter element is a sintered metal pellet medially clamped against displacement within the cylindrical member.

3. A portable gas fuel device according to claim 1, wherein the projecting end of the filter element is axially tapered.

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U.S. Cl. X.R.

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