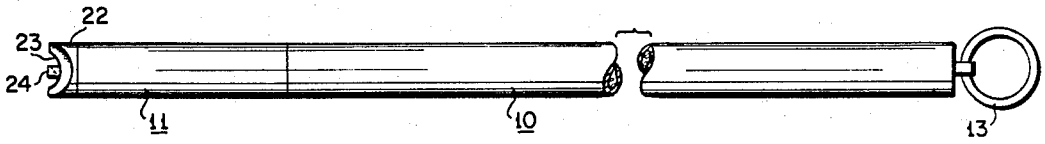
Oct. 7, 1969 R. S. PIFFATH ET AL 3,471,246

GAS FUELED TORCH

Filed Oct. 20, 1967

FIG. 1



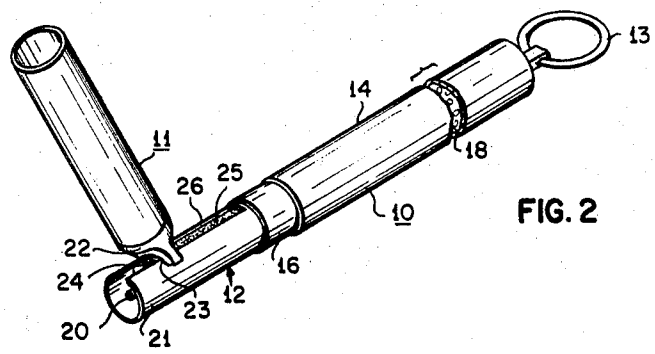


FIG. 2

FIG. 3

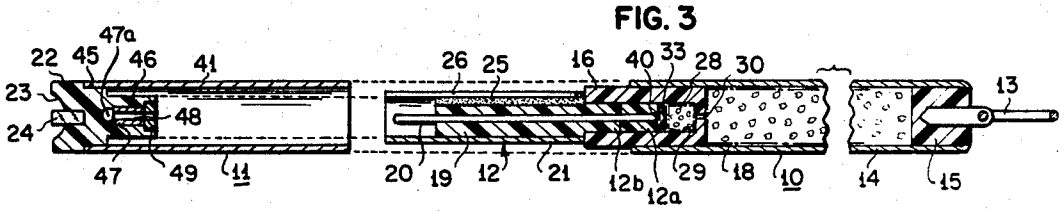
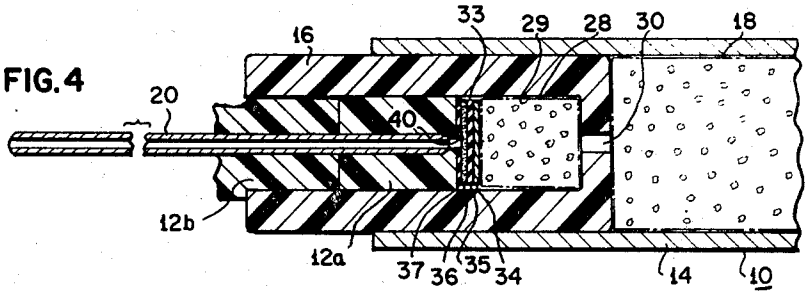


FIG. 4



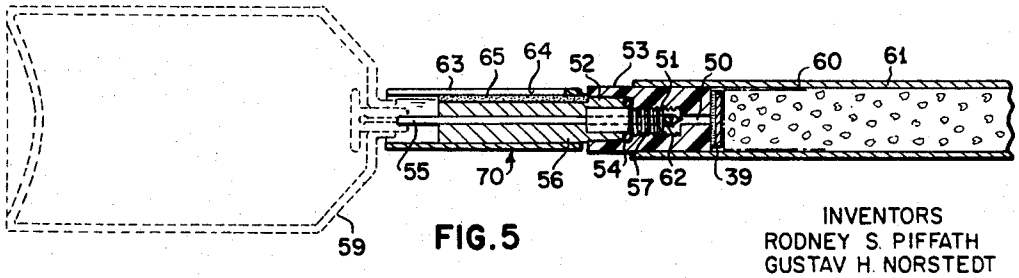


FIG. 5

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GAS FUELED TORCH

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U.S. Cl. 431—150 6 Claims

ABSTRACT OF THE DISCLOSURE

A torch formed of a tubular fuel tank with a burner head on one end thereof. The burner head is provided with an elongated tube. Enclosed within the fuel tank below the burner head is a free-floating disc-shaped fuel metering mechanism which restricts the rate at which high pressure gas escapes from the tank to the burner tube. When it is necessary to refuel the torch, high pressure gas is introduced down the same elongated tube previously used as the burner tube and flows in a reverse direction past the free-floating disc-shaped metering mechanism into the fuel tank. A strip of sparking metal is secured along the burner head. A striker blade is provided on the cap of a cover provided for the burner end of the torch such that upon removal of the cover, the striker blade can be manually moved along the sparking metal to ignite the burner.

This invention relates to pressurized gas fueled torches and more particularly is an economically constructed torch in which improved simplified means is provided for the operation and handling thereof.

It is highly desirable to provide easily handled, gas fueled torches with built-in igniting mechanisms. Such torches have many uses such as for starting fires in fireplaces or for lighting candles provided on tables in restaurants or other like establishments. In such latter uses, for example, the candles are often held in glass "chimney-type" housings requiring that the burner head end of the torch be inserted well down into the opening of the housing to light the candle. In such instances, it is obviously desirable for the torches to be of a well balanced, slender design, and very light in weight so as to facilitate delicate handling.

When using such torches, it is necessary to refuel them with pressurized gas fuel from time to time. In the past it has been the usual practice to provide a spring loaded opening into the fuel chamber of the torch for the purpose of refueling the unit. The present invention provides simplified means in a torch for the purpose of refueling by utilizing and adapting the same parts and communicating path in the torch for this purpose that are provided in the torch for the purpose of metering the fuel for burning. This not only eliminates the requirement of special parts for refueling purposes but avoids the problem of requiring the removing from an opening on the fuel tank of a small screw or a tightly fitting cap which can be easily misplaced or overlooked in the process.

Another consideration in providing such torches is the design of the ignition mechanism for igniting the burner thereof. The conventional sparking wheel and flint is not only relatively costly when economical designs are being considered, but the shapes of these parts do not readily fit into the concept of a slender, well balanced delicate design for a torch. The present invention provides for only a strip of sparking metal to be provided along the burner head of the torch. A striker blade is then provided on the cap of the tubular cover for the torch such that when the cover is removed from the torch in preparation for use, the cover serves as a holder for manually moving the striker blade along the strip of sparking metal so as to throw sparks onto the burner to ignite the fuel.

Briefly, the present invention provides a torch body comprising a tubular fuel tank having one end closed and provided with a burner head on the other end thereof. The burner head is provided with an elongated tube for the passage of gas fuel. The tube is positioned in alignment with an orifice provided on the top of the fuel tank. Enclosed within the fuel tank below the burner head is a free-floating disc-shaped fuel metering mechanism. This mechanism includes an impervious disc with a filter on the face thereof. This disc-shaped mechanism rests with its impervious surface on a support of polyether open-celled foam positioned within the fuel tank. Ignition means in the form of a strip of sparking metal is secured along the burner head. A striker blade is provided on the cap of the cover provided for the burner end of the torch such that upon the removal of the cover in preparation for use of the torch, the striker blade can be manually moved along the sparking metal to ignite the burner.

When the torch is to be used and the tubular cover has been removed from the burner head end of the torch body, pressure from inside the gas fueled tank forces the filter face on the free-floating disc metering mechanism up against the top end of the fuel tank thus restricting the gas escape rate in a direction through the orifice and up the elongated tube in the burner head such that the gas can be ignited for burning to produce the desired size flame. When it is necessary to refuel the torch, gas fuel is introduced from a pressurized commercial storage container having an outlet which fits over the end of the tube in the burner head. The gas is passed down the same elongated tube previously used as the burner tube but in a reverse direction and down through the orifice past the filter face of the disc metering mechanism and into the fuel tank. The greater pressure of the fuel being introduced into the torch forces the free-floating disc-shaped metering mechanism resting on the support of polyether foam away from the orifice opening so as to facilitate the refueling process.

In one preferred embodiment of the present invention, the metering mechanism is formed of a flat thin disc of porous material (micron filter) sandwiched between similarly shaped thin discs of impervious material. This disc shaped sandwich assembly rests on a plug of polyether foam which fills a small chamber provided on the upper end of the main fuel tank and in communication therewith by a small opening. The disk-shaped assembly is positioned in the small chamber with a slight cylindrical clearance. When so positioned, a small orifice in the center of the upper disc of the sandwich is aligned with the orifice output of the fuel tank which communicates with the elongated tube passing through the burner head. Upon removal of the cover of the torch, in preparation for use thereof, pressurized fuel in the fuel tank escapes past the clearance provided for the discs and is fed edgewise into the porous center disc of the cylindrical sandwich and through hte orifice to the tube in the burner. Upon refueling, pressurized fuel is introduced down this same elongated tube in the reverse direction and passes out through the orifice to the small opening in the center of the upper disc into the porous disc and then edgewise outwardly of the porous disc and via the clearance of the discs into the fuel tank. During refueling, the pressure of the incoming gas forces the free-floating disc assembly down against the supporting plug of polyether foam thereby permitting gas to also pass around the disc sandwich so as to increase the rate of refueling.

Accordingly, one of the objects of this invention is to

provide a gas fueled torch which can be economically constructed and which is well balanced and very light in weight.

Another object of this invention is to provide a gas fueled torch which employs the same parts for both filling the torch with fuel and for metering the fuel for burning.

Another object of this invention is to provide a novel built-in mechanism on a torch for use in igniting the burner thereof.

Another object of this invention is to provide a novel, simplified, sandwich-type metering and refueling mechanism for a gas fueled torch.

The specific nature of the invention as well as other objects, advantages and features thereof will become apparent from the following description of the preferred embodiments in conjunction with the accompanying drawings in which:

FIG. 1 is an illustration of a torch constructed according to the present invention;

FIG. 2 shows a perspective view of the torch with the cover removed from the burner head and with the parts of the ignition mechanism on the cover and the head in cooperating engagement for producing sparks to ignite the burner;

FIG. 3 is a cross sectional view of one embodiment of the torch of the present invention;

FIG. 4 is an enlarged view of the metering system of the embodiment of FIG. 3; and

FIG. 5 is a cross sectional view of another embodiment of a torch of the present invention.

Reference will first be made to FIGS. 1 and 2 showing an external view of the torch of the present invention. The torch comprises a body **10** with a removable cover **11** positioned on one end thereof and with a ring **13** attached on the other end thereof by which the torch can be hung in some convenient place of storage when not in use. The body **10** includes a fuel tank **14** for butane fuel at a pressure of about 35 to 45 p.s.i. and a burner head assembly **12**. The fuel tank **14** is formed of a length of aluminum tubing with the end thereof attached to ring **13** closed off, and with a plastic hollow top plug **16** secured on the opposite end thereof. Plug **16** encloses a fuel metering mechanism (FIG. 4) and provides a support for the burner head assembly **12**. The burner head assembly **12** comprises a cylindrical metal shield **21** which houses an elongated small-diameter tube **20** through which gaseous butane fuel for the torch passes. The shield **21** is provided with a slot **26** running along its length. Positioned in alignment and within the slot **26** is a strip of ferro-cerium sparking metal **25**. The cover **11** for the torch is formed of a short length of aluminum tubing having the same diameter as the tube for the fuel tank **14**. During storage, the cover **11** extends over the burner head assembly **12** of the torch such that its lower inner portion has a tight slideable fit on the exposed portion of plug **16**. A plastic cap **22** is fixed on the otuer end of cover **11**. Cap **22** is provided with a concave surface **23** with a hard stainless-steel striker blade **24** extending outward from the center thereof. As shown in FIG. 2, when the cover **11** is removed from the body **10**, in preparation for use of the torch, the cap **22** end of the cover **11** can be positioned with its striker blade **24** in slot **26** on the burner head assembly **12**. When in this position the curved outer surface **23** on the cap **22** helps to position and to guide the striker blade for manual movement along the slot **26** to throw sparks in the region of the tip of the elongated tube **20** for igniting the gas issuing therefrom.

FIG. 3 shows a cross sectional view of the preferred embodiment of the present invention with the cover **11** pulled off of the burner head assembly end of the body **10**. As shown, fuel tank **14** is closed off on the lower end by a bottom plug **15** and is provided on the other end with a hollow plastic top plug **16**. Top plug **16** has a chamber **29** formed throughout most of its length which chamber connects by way of a small opening **30** provided on the lower end thereof with the interior of fuel tank **14**. A column of polyether foam **18** is positioned in the tank **14**. Referring to the enlarged view of the metering mechanism **33** in FIG. 4, a small plug **28** of polyether foam is positioned in the lower end of chamber **29** above the opening **30**. Resting on the plug **28** is a metal disc **34** supporting the metering mechanism **33**. This mechanism is in the form of a sandwich construction which includes a porous micron filter disc **36** with an impervious rubber disc **35** provided on one side thereof, and an impervious rubber washer **37** provided on the other side thereof. Disc **35** and washer **37** are formed of Viton which is a type of synthetic rubber that will not become gummy or in any way be affected by the butane fuel. The sandwich so formed is provided with a slight radial clearance within the inside circular wall of fuel chamber **29** such that gas escaping from the fuel tank **14** can travel around the edge of the lower disc **35** of the sandwich and then proceed inwardly edgewise through the micron filter disc **36** toward the center of the sandwich such that the orifice **40** formed in the upper washer **37** is in alignment with the tube **20** extending through the burner assembly **12**. It should be noted that the metering mechanism **33** is free floating in that no spring is provided for holding it in position. It rests on the plug **28** of polyether foam and gas pressure from the tank holds it in position against the underside of the orifice **40** leading out of the fuel tank **14**.

The burner head assembly **12** is shown in FIG. 3 to be retained within the hollow top plug **16** by cylindrically shaped plastic posts **12***a* and **12***b*. Plastic post **12***a* is a retainer for the lower end of tube **20** while post **12***b* is the integral lower portion of a plastic cylindrical member **19** through the center of which the tube **20** extends. The shield **21** for the burner head fits over the cylindrical member **19**. The shield is provided with slot **26** extending along the length thereof. The strip of sparking metal **25** is secured to the plastic member **19** such that it extends along the slot to within a short distance below the end of tube **20**.

The cover **11** for the torch is comprised of a short aluminum tube **41** which is capable of covering burner head assembly **12** with the lower inner portion thereof having a snug fit on the outer exposed portion of the top plug **16**. The cap **22** on the outer end of the cover **11** is made of plastic and is formed with a first reduced diameter **45** which is securely fitted within the end of cover tube **41**. The lower end of the cap **22** is provided with a still further reduced diameter **46** on which the outer end of shield **21** of the burner head assembly **12** is seated when the cover **11** is in position on the torch body **10**. The lower end of the cap **22** is provided with a small resilient elastomeric bushing **47** retained by a plastic insert **49**. The inner diameter **48** of bushing **47** is adapted to receive the end of the tube **20** when the cover **11** is firmly seated on the torch body **10**. When so seated, the high pressure gas in the opening **47***a* deforms the bushing **47**, for sealing the end of tube **20**. The concave outer surface **23** of the cap **22** is provided with a slot on the lower end thereof in which the striker blade **24** is cemented. As shown in FIG. 2, this blade **24** has a width which enables it to be fitted into the slot **26** of the shield **21** and manually moved along the slot in engagement with the sparking metal **25** so as to throw sparks at the end of the tube **20** for igniting the fuel discharging therefrom.

As previously mentioned, the disc assembly of the metering mechanism **33** is free floating. The disc assembly rests on the plug of polyether foam **28** and is thus lightly held with the orifice **40** of washer **37** against the opening of the tube **20**. When the fuel tank **14** is filled with gas, the fuel pressure exerted on the bottom of the metal disc **34** holds the disc assembly tightly against the bottom of retainer post **12***a* such that gas can only escape through the micron filter disc **36** on its way to the burner tube **20**.

When it is necessary to refuel the torch, the present invention provides for instant refill of fuel, i.e., no screws have to be removed to gain access to openings into the fuel tank **14**. A commercial storage container **59** of pressurized butane fuel, of the type as indicated in outline in FIG. 5, is positioned against the end of burner assembly **12**. When in this position the valve of the container **59** opens permitting pressurized gas to travel down the tube **20** and through the orifice **40** of Viton washer **37** and outward to the edges of the micron filter **36** and via the clearance of disc **35** to the tank **14**. If the pressure of the container **59** is sufficiently large, the sandwich construction of discs **33** can be forced down so as to permit some gas to escape over the surface of washer **37** and around the clearance of the discs into the fuel tank **14**.

Reference will next be made to FIG. 5 showing a cross sectional view of the second embodiment of the present invention. The cover **11** for this embodiment is not shown since it is similar to the cover for the embodiment of FIG. 3. This torch differs from the previously described unit by providing a variable metering mechanism for the fuel such that different length flames can be provided by the burner. Thus as shown, this fuel tank **61** is provided with a top plug **53** of plastic which is inserted in the upper end of the fuel tank **61**. As shown, the upper end of the fuel tank is provided with a check valve in the form of a filter-faced metal disc **39** which rests upon the column **60** of polyether foam positioned within tank **61**. The dissc **39** is provided with a clearance within the circular wall of the tank **61**. The pressure from the inside of the fuel tank **61** forces the filter face of disc **39** up against the bottom of the top plug **53** reducing the gas escape rate to a reasonable flow through a small passageway **50** provided at the lower end of the plug **53**. Passageway **50** communicates with an enlarged opening **51** which is provided with screw threads. The outer portion of the plug **53** has a still larger opening **52** on the shoulder of which an O ring **54** is positioned. In the burner head assembly **70** for this embodiment, the elongated tube **55** is retained within a hollow cylindrical member **56** and extends into a hollow screw **57** on the end thereof. Screw **57** fits into threaded opening **51**. A side hole **62** is provided on the lower end of the screw **57** so as to communicate with the hollow center thereof in which tube **55** is secured. The tip of screw **57** is tapered to seat into the small passageway **50** provided in the lower end of the top plug **53**. The lower end of cylindrical member **56** seats against the O ring **54** to prevent leakage of the fuel past the threads of screw **57**. The cylindrical member **55** is positioned within a shield **63** which is provided with a slot **64** for a strip of sparking metal **65** of the same type previously described for the embodiment of FIG. 3. It can be seen that the ignition means provided for the embodiment of FIG. 5 is the same as that described for that in FIG. 3. By rotating the head assembly **70** screw **57** is moved in threaded opening **51** relative to the small passageway **50** such as to vary the size of the orifice through which the fuel passes.

As in the embodiment of FIG. 3, the filter faced metal disc **39** is free floating. When the cover of the torch is removed from the burner head assembly **70**, the pressure from inside the fuel tank **61** presses the disc **39** up against the bottom surface of top plug **53** reducing the gas escape rate through the small passageway **50** to a flow that is further controlled by the rotation of assembly **70** which advances or withdraws the end of screw **57** relative to the passageway **50** so as to vary the orifice through which the fuel can escape. When it is desired to refuel the tank **61**, the assembly **70** is preferably rotated to open up the orifice to facilitates flow of pressurized butane fuel from the storage container **59** through passageway **50**. The high pressure gas forces the disc **39** down thus opening up the passageway from the gas over the filter face of the disc **39**. It should be noted that the open cell column of polyether foam **60** acts to stabilize the distribution of fuel in the fuel tank **61**, thus helping to regulate the rate at which the fuel escapes to the burner.

From the above description it will be apparent that thereis thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is suceptible of modification in its form, proportions, detail, construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

It is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is, therefore, claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

What is claimed **is:**

1. A gas fueled torch unit comprising: a tubular fuel tank having an opening at one end and a closing at the other end; a plug fitted on the open end of said tank, said plug provided with an axial bore having a passageway communicating with said tank; a free-floating fuel metering mechanism in said fuel tank; said metering mechanism including an impervious disc having a micron filter on the face thereof and provided in said fuel tank with a small radial clearance; a cellular filling in said fuel tank for supporting said metering mechanism with the filter face of said disc adjacent said passageway; a burner-filler tube securely held in the axial bore of said plug in line with said passageway; and a cover for said burner-filler tube; whereby gas for burning escapes from the pressurized fuel tank edgewise radially inward through the micron filter face of the disc and through said passageway to said burner-filler tube, and pressurized gas for refueling the torch unit is introduced down said burner-filler tube through said passageway and past said metering mechanism into said fuel tank.

2. A gas fueled torch unit comprising: a tubular fuel tank having an opening at one end and a closing at the other end; a plug fitted on the open end of said tank, said plug provided with an axial bore having a passageway communicating with said tank; a free floating fuel metering mechanism in said fuel tank, said metering mechanism comprising a disc sandwich construction of a micron filter between a lower impervious thin disc and an upper impervious thin disc provided with a center orifice; said disc sandwich being provided in said tank with a small radial clearance; a cellular filling in said fuel tank for supporting said metering mechanism adjacent said passageway; a burner-filler tube securely held in the axial bore of said plug in line with said passageway; and a cover for said burner-filler tube; whereby gas for burning escapes from the tank edgewise inwardly through the micron filter and out through the center orifice of the upper disc and through said passageway to said burner-filler tube, and pressurized gas for refueling the torch unit is introduced down said burner-filler tube through said passageway and past said metering mechanism into said fuel tank.

3. Apparatus is accordance with claim **2** wherein said cover has a rubber bushing retained in an opening provided on the inside end thereof, the end portion of the burner-filler tube extends into said bushing when the cover is on the torch unit, and said inside opening in which said bushing is retained is shaped to permit high pressure gas to deform the bushing to seal the burner-filler tube.

4. Apparatus in accordance with claim **3** wherein the fuel used in the torch unit is butane gas at a pressure of 35 to 45 p.s.i.

5. A gas fueled torch unit comprising: a tubular fuel tank having an opening at one end and a closing at the other end; a plug fitted on the open end of said tank; said plug provided with an axial bore having a passageway on the lower end thereof communicating with said tank; a free-floating metering mechanism within said tank; a

burner head assembly including an elongated burner tube, a cylindrical member surrounding said burner tube, a sparking metal strip secured along the length of said cylindrical member, and a cylindrical shield surrounding said cylindrical member, said cylindrical shield provided with a slot which is aligned with said strip of sparking metal; said burner head assembly positioned is said axial bore of said plug with the elongated tube positioned for receiving gas metered through said passageway; a removable cylindrical cover for said torch extending over said shield with its lower end having a slip fit over said plug; a cap on the upper end of said cover; said cap provided with a concave surface conforming with the curvature of said shield; and a striker blade held within the concave surface of said cap; whereby when the cover is removed from the torch the concave surface of said cap is used to position the striker blade for movement along the slot of said shield in contact with said sparking metal to create sparks for igniting the fuel passing through the burner tube.

6. Apparatus in accordance with claim 5 wherein the axial bore of said plug is provided with threads; the lower

end of said cylindrical member in said burner head assembly is provided with a screw which is mounted in said threads; and said screw has a side aperture which communicates with the burner tube in said cylindrical member; whereby rotation of said burner head assembly advances or withdraws the screw relative to the passageway to thereby further control the fuel escape rate to the burner tube.

References Cited

UNITED STATES PATENTS

1,379,213	5/1921	Rauch	431—129
2,107,546	2/1938	Purdy et al.	431—127 X
3,174,310	3/1965	Genoud	431—142 X
3,277,674	10/1966	Klein	431—131 X

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U.S. Cl. X.R.

431—273