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 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 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 polymer 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 up 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 polymer 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 disc-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 the 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 discs 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 the embodiment 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 slide-fit on the exposed portion of plug 16. A plastic cap 22 is fixed on the outer 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 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 the tip of the outer necked 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. Referring to 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 made 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 head 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 12a and 12b. Plastic post 12a is a retainer for the lower end of tube 20 while post 12b 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 assembly 12, extends through 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 47a 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 26 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 in position and bottom of retainer post 12a 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 taken out, 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 refill the oil tank 51, it is merely rotated to open up the orifice to facilitate 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 described it will be apparent that there is provided therein a device of the character described possessing the particular features of advantage before enumerated as desirable, which while obviously is susceptible 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 shown and described 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 impervious disc therein having a micron 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 central 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 torque 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 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 impervious disc therein having a micron 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.

6. 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 for supporting said check valve upon the column 60 of polyester foam positioned within tank 61. The diaphragm 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 slide hole 52 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 is positioned within a shield 63 which is provided with a slot 64 for a strip of sparking metal 66 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.
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.

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EDWARD J. MICHAEL, Primary Examiner

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