A decorative torch produces a luminous flame and can be used on a patio or balcony as an aesthetically pleasing light and/or heat source. A filter received in a passage of a fuel tube minimizes acoustical noise generated by the flow of fuel from a pressurized fuel source. The fuel tube may omit any vents to enhance the luminous character of the flame and/or to reduce acoustical noise. Alternatively, a sleeve may be used to seal one or more vents. The sleeve may, or may not, be positionable on the fuel tube to adjust the number of vents sealed.
FIG. 2

FIG. 3

FIG. 4
FIG. 6
DECORATIVE TORCH FOR USE WITH PRESSURIZED FUEL SOURCE

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] This disclosure is generally related to decorative lighting, and more particularly to torches that burn a pressurized gas fuel to produce a luminous flame and can, for example, be used on a patio or balcony as an aesthetically pleasing source of light and/or heat.

[0003] 2. Description of the Related Art

[0004] Decorative lighting is a fast growing market segment of the home and outdoor furnishings industry. Decorative lighting may be used indoors such as in the living room or dining room, or may be used outdoors such as on a patio or in a backyard, to provide a desired ambiance. In the respect, decorative lighting is typically employed to provide an aesthetic, soft, golden (i.e., luminous) flame. In addition to a pleasing light, decorative lighting in some forms may also provide a source of heat or warmth.

[0005] Many forms of decorative lighting are known. Some forms of decorative lighting burn a solid fuel. For example, candles typically burn paraffin wax. Other forms of decorative lighting burn a liquid fuel. For example, Tiki style torches typically burn oil such as paraffin oil or citronella oil. Each of these suffer from drawbacks. For example, with respect to solid fuel decorative lighting, the flame tends to disappear from view as the fuel is consumed. An example of such is a candle, where as the wick at the center burns downward, the flame eventually disappears below a rim of the candle. Also for example, with respect to oil fuel decorative lighting, there is a potential for messy spills when filling a reservoir or when the reservoir is accidentally tipped over. The handling of messy oil is one of the greatest deterrents to the sales of such decorative lighting.

[0006] While not typically associated with decorative lighting, it is also known to burn a pressurized gas to provide lighting. Such an approach is typically found in the camping industry. For example, the camping industry sells lanterns. Lanterns typically burn propane which is supplied under pressure from a fuel bottle to a mantle. Many examples of such are available from COLEMAN®. The provision of fuel in a spill-proof fuel bottle is a clean and easy approach to providing fuel. However, as anyone who has used one will recognize, lanterns are not intended as decorative lighting. Lanterns are designed to be efficient, producing a lot of light for a given amount of fuel, which tends to be rather harsh. Lanterns also produce a substantial amount of noise. As such, lanterns employing a pressurized fuel source do not serve the functions of decorative lighting, failing to produce the desired ambiance associated with a luminous flame produced with little or no noise.

SUMMARY OF THE INVENTION

[0007] In one aspect, a device for producing a luminous flame from a pressurized fuel source comprises a burner including a plurality of apertures; a fuel tube, the fuel tube comprising a first end, a second end and a passage extending between the first and the second ends, the first end of the fuel tube connected to the burner, the passage of the fuel tube providing fluid communication between the second end thereof and the burner; a valve coupled to the second end of the fuel tube and selectively couplable to the pressurized fuel source, the valve selectively operable to control a flow of fuel from the pressurized fuel source to the burner via the fuel tube; and a filter closely received in the passage of the fuel tube to at least reduce an acoustical noise created when pressurized fuel is transferred from the pressurized fuel source to the burner via the valve and the fuel tube. The filter may be rolled or voluted, and may be made of fiberglass. A burner assembly and/or pressurized fuel source may be received in a shell, which may include a drain opening and/or a slot for providing external access to the valve. The device may also include a lid. The fuel tube may omit any vents, or a sleeve may be supplied to seal one or more vents. The sleeve may be positionable on the fuel tube to permit the selective sealing of any number of vents.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] In the drawings, identical reference numbers identify similar elements or acts. The sizes and relative positions of elements in the drawings are not necessarily drawn to scale. For example, the shapes of various elements and angles are not drawn to scale, and some of these elements are arbitrarily enlarged and positioned to improve drawing legibility. Further, the particular shapes of the elements as drawn, are not intended to convey any information regarding the actual shape of the particular elements, and have been solely selected for ease of recognition in the drawings.

[0009] FIG. 1 is a front, top isometric view of a decorative torch including a burner assembly recessed in a shell, the shell supported in a stand according to one illustrated embodiment.

[0010] FIG. 2 is a side, exploded view of a pressurized fuel source and the burner assembly of the decorative torch of FIG. 1, showing a burner, fuel tube, filter, and valve.

[0011] FIG. 3 is a top, plan view of the filter used in the fuel tube of FIG. 2.

[0012] FIG. 4 is a side, elevational view of a fuel tube and a sleeve according to another illustrated embodiment, where the fuel tube includes one or more vents and the sleeve is positionable on the fuel tube to seal one or more of the vents.

[0013] FIG. 5 is a side, elevational view of a shell and a lid of the decorative torch of FIG. 1, where the lid is removed from the shell.

[0014] FIG. 6 is a front, top isometric view of the decorative torch of FIG. 1 in operation.

DETAILED DESCRIPTION OF THE INVENTION

[0015] In the following description, certain specific details are set forth in order to provide a thorough understanding of various embodiments of the invention. However, one skilled in the art will understand that the invention may be practiced without these details. In other instances, well-known structures associated with valves, burners and/or pressurized gas containers or delivery systems are not shown or described in detail to avoid unnecessarily obscuring descriptions of the embodiments of the invention.

[0016] Unless the context requires otherwise, throughout the specification and claims which follow, the word "com-
prise’ and variations thereof, such as, “comprises” and “comprising” are to be construed in an open, inclusive sense, that is as “including, but not limited to.” In addition, the term “luminous,” and variations thereof as used herein, refers to a flame that produces visible light principally in at least the yellow or orange portions of visible light range the electromagnetic spectrum.

[0017] The headings provided herein are for convenience only and do not interpret the scope or meaning of the claimed invention.

[0018] FIG. 1 shows a decorative torch 10 supported in a stand 12 according to one illustrated embodiment. The stand 12 can take a variety of forms, for example a wrought iron decorative stand, a bracket extending from a patio or fireplace, and one or more wires extending from a support location.

[0019] The decorative torch 10 may include a shell 14 and a burner assembly 16. Where provided, the shell 14 is sized and dimensioned to receive and support the burner assembly 16 therein.

[0020] The stand 12 and/or shell 14 may alternatively take the form of a fireplace, such as an outdoor fireplace.

[0021] FIG. 2 shows a fuel container 20 and the components of the burner assembly 16.

[0022] The fuel container 20 can be a standard container, like the type used for camping or hiking as long as the container 20 is capable of holding white gas, kerosene, propane, butane, or another similar fuel. In one embodiment, the fuel container 20 is a COLEMAN® propane fuel bottle having a volume of 16.4 ounces, with the fuel under pressure. Such fuel containers 20 may be made of a variety of materials, most often formed from a metal such as aluminum or a composite such as carbon graphite.

[0023] The burner assembly 16 may comprise a valve 22, a filter 24, a fuel tube 26, and a burner 28.

[0024] The valve 22 is an adjustable valve and is selectively coupleable at one end to the fuel container 20. In the illustrated embodiment, the valve 22 is manually adjustable with a handle and stem 23. However, the valve 22 may be coupled to other adjustment means such as a solenoid, cams, a pawl and ratchet mechanism, or other similar device. In an alternate embodiment, the valve 22 is an electronically modulated valve that is automatically adjustable via a control system. In yet another embodiment, the valve 22 includes an electronic shut-off mechanism for rapidly stopping the flow of fuel and/or preventing flame propagation into the valve 22.

[0025] The fuel tube 26 has a first end 26a connected to the burner 28 and a second end 26b coupled to the valve 22. The fuel tube 26 forms a passage 26c (FIG. 4) open at the first and second ends 26a, 26b for fluidly transporting fuel between the valve 22 and the burner 28. In the embodiment illustrated in FIG. 2, the fuel tube 26 has no vents intermediate the first and second ends 26a, 26b. This prevents air from mixing with the fuel in the fuel tube 26. When using pressurized fuel, for example in lanterns or Bunsen burners, it is common to mix air into the fuel before the resulting fuel/air mixture reaches the burner 28 in order to achieve high efficiency. Such high efficiency is typically associated with a colorless, blue or green flame. A colorless, blue or green flame is considered to be less aesthetically appealing than a yellow or orange flame. The introduction of air may also contribute to production of acoustical noise, thus omitting the vent may reduce such noise.

[0026] The filter 24 is closely received in passage 26c of the fuel tube 26. The filter 24 may minimize or eliminate the acoustical noise, typically experienced as a hissing sound, that is commonly associated with known pressurized gas devices (e.g., lanterns, Bunsen burners, camp stoves, etc.). Referring to FIG. 3, the filter 24 may take the form of a voluted (i.e., rolled) filter, and may be made from a variety of materials, for example fiberglass.

[0027] Referring again to FIG. 2, the burner 28 includes a plurality of apertures 28a that allow the fuel to exit. The apertures 28a act as jets, ensuring that fuel flows from the burner assembly 16 at a sufficiently high rate and/or pressure such that the flame or combustion does not move into the burner assembly 16. Thus, the burner 28 provides a surface on which the combustion or flame originates or is concentrated.

[0028] FIG. 4 shows another embodiment of the fuel tube 26 having a one or more vents 30 located between the first and the second ends 26a, 26b. A sleeve 32 slidably fits onto the fuel tube 26 and can be positioned with respect to the vents 30 to limit or prohibit air from entering the passage 26c and mixing with fuel. The sleeve 32 may be position to seal some, none or all of the of the vents 30. In addition, the fuel tube 26 may include a stop 34 such as a flange or pin, to support the sleeve 32 when the sleeve 32 is in its fully downward position. The inner surface of the sleeve 32 may have grooves (not shown) at an upper end and at a lower end sized to receive respective O-rings (not shown) to provide a seal with the fuel tube 26. The seal may prevent the escape of fuel vapors and/or prevent air from entering the passage 26c of the fuel tube 26 through the ends of the sleeve 32 during operation of the decorative torch 10.

[0029] As mentioned, the amount of air mixed into the fuel tube 26 during operation determines the luminosity of the flame of the decorative torch 10. Closing the vents 30 at the base of the fuel tube 26 forces the burner 28 to use oxygen from the space adjacent to the burner 28, which in turn produces a lower temperature, more visible or luminous flame. One reason for the luminous flame is that this type of combustion process creates residual carbon that is heated in the flame, and which produces the yellow or orange color of the luminous flame. In contrast, allowing the ambient air to mix with the fuel in the passage 26c of the fuel tube 26 produces a cleaner, hotter flame at the burner 28 which is typically considered highly desirable. Higher temperatures and efficient operation are often associated with a colorless, blue or green flames.

[0030] FIG. 5 illustrates the shell 14 of the decorative torch 10. The shell 14 comprises an upper region that is open to receive the burner assembly 16 therein and a lower region, which includes a drainage opening 36. The drainage opening 36 is sized to permit water, moisture, or some other liquid substance that may otherwise accumulate in the shell 14 to adequately drain. In addition, the shell 14 can include a slot 38 to receive a portion of a valve 22, for example, the handle and stem 23. Hence, the slot 38 makes the valve handle accessible to a user to manually adjust the decorative torch 10. Additionally, a lid 18 is sized to cover the shell 14. The
lid 18 helps to keep the burner assembly 16 dry and clean when the decorative torch 10 is not in use.

[0031] FIG. 6 illustrates the decorative torch 10 in operation with a luminous flame 40. The shell 14 holds the burner assembly 16 and is supported by a stand 12.

[0032] Although specific embodiments of and examples for the decorative torch are described herein for illustrative purposes, various equivalent modifications can be made without departing from the spirit and scope of the disclosure, as will be recognized by those skilled in the relevant art. The teachings can apply to any type of torch utilizing a variety of combustible gas fuel sources. Additionally, any method described above may include additional steps, omit some steps, and perform some steps in a different order than illustrated and/or otherwise described.

[0033] The various embodiments described above can be combined to provide further embodiments. All of the above U.S. patents, patent applications and publications referred to in this specification are incorporated herein by reference. Aspects of the embodiments can be modified, if necessary, to employ devices, features, and concepts of the various patents, applications and publications to provide yet further embodiments.

[0034] These and other changes can be made to those of light in the above detailed description. In general, in the following claims, the terms used should not be construed to limit the invention to the specific embodiments disclosed in the specification and the claims, but should be construed to include all torches and decorative light sources that operate in accordance with the claims. Accordingly, the invention is not limited by the disclosure, but instead its scope is to be determined entirely by the following claims.

1. A device for producing a luminous flame from a pressurized fuel source, the device comprising:
   a burner including a plurality of apertures;
   a fuel tube, the fuel tube comprising a first end, a second end and a passage extending between the first and the second ends, the first end of the fuel tube connected to the burner, the passage of the fuel tube providing fluid communication between the second end thereof and the burner;
   a valve coupled to the second end of the fuel tube and selectively coupleable to the pressurized fuel source, the valve selectively operable to control a flow of fuel from the pressurized fuel source to the burner via the fuel tube; and
   a filter closely received in the passage of the fuel tube to at least reduce an acoustic noise created when pressurized fuel is transferred from the pressurized fuel source to the burner via the valve and the fuel tube.

2. The device of claim 1 wherein the filter is voluted.
3. The device of claim 1 wherein the filter is fiberglass.
4. The device of claim 1, further comprising:
   a lid sized to cover at least the burner.
5. The device of claim 1, further comprising:
   a shell having an interior sized to receive the burner, the fuel tube, and the pressurized fuel source therein.
6. The device of claim 5 wherein the valve is adjustable from a location exterior to the shell.
7. The device of claim 5 wherein the shell forms a drain opening proximate a bottom thereof.
8. The device of claim 5 wherein the shell forms a slot.
9. The device of claim 8 wherein a user operable portion of the valve extends through the slot in the shell.
10. The device of claim 1 wherein the fuel tube has no vents formed therein between the first and the second ends.
11. The device of claim 1 wherein the fuel tube has a number of vents formed therein, the vents extending into the passage, and further comprising:
    a sleeve closely received about a portion of the fuel tube to seal at least one vent.
12. The device of claim 1 wherein the fuel tube has a number of vents formed therein, the vents extending into the passage, and further comprising:
    a sleeve closely received about a portion of the fuel tube to seal at least one vent, and slidingly positionable on the fuel tube to seal a selectable number of the vents.
13. The device of claim 12, further comprising:
    a stop proximate the second end of the fuel tube and extending from the fuel to retain the sleeve on the fuel tube.

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