COOK TOP ASSEMBLY WITH DUAL POWER SOURCE

The invention relates to a gas cook top assembly that is capable of operating in off-grid applications where no electricity is available and that is also adaptable to operating in on-grid applications. The cook top is provided with a first control loop with a battery pack for powering the control valves for releasing gas to the gas burners and a spark ignition module for generating a spark to ignite the corresponding gas burner in an off-grid application. The cook top is also provided with a second control loop for delivering power from an on-grid AC power source to the control valves and spark ignition module. The second control loop may operate independently of the first control loop or may be connected in parallel with the first control loop, the second control loop receiving AC power through an AC-to-DC converter.
COOK TOP ASSEMBLY WITH DUAL POWER SOURCE

TECHNICAL FIELD

[0001] The present disclosure relates to a cook top assembly having a dual power source. More specifically, this disclosure relates to a gas cook top assembly that is capable of operating in off-grid applications where no electricity is available and that is also adaptable to operating in on-grid applications.

BACKGROUND

[0002] Propane gas appliances are known and commonly used in off-grid applications where electricity is not available. Propane gas appliances are well-suited for off-grid living in more rural and/or remote locations since they offer some of the conveniences of “on-grid living” by providing the common or typical appliances found in an “on-grid” home such as a refrigerator, a range and/or cook-top, freezer etc. in locations where electricity is not readily available. As urban sprawl continues in major urban centers, areas that are currently off-grid may one day become part of the grid as infrastructure associated with on-grid living expands farther away from city centers. Traditionally, off-grid appliances are only suited for use in off-grid applications. Therefore, even if on-grid electricity becomes available in a certain location or area that was once too remote or considered to be “off-grid”, any off-grid appliances that were already in place within the home or building would have to be replaced with new appliances which is not only costly, but is also non-environmentally friendly since perfectly functioning appliances are rendered obsolete and must be replaced.

[0003] Therefore, there is a need for appliances that are adaptable to the continually changing needs of communities as populations and urban sprawl continue to change the landscapes surrounding urban centers, and that are also adaptable to ever-changing consumer needs.

SUMMARY OF THE PRESENT DISCLOSURE

[0004] According to a first example embodiment of the present disclosure there is provided a gas cook top assembly comprising a cooking surface having a plurality of gas burners for receiving a gas supply from a gas source; a spark ignition module for igniting each of said gas burners; individual control valves for selectively operating each of the plurality of gas burners; a spark ignition control circuit for receiving electrical power from one of a first power source and a second power source and delivering the electrical power to said individual control valves and said spark ignition module; a first control loop electrically connected to said spark ignition circuit for delivering electrical power from said first power source to said spark ignition circuit; a second control loop electrically connected to said spark ignition circuit for delivering electrical power from said second power source; wherein said first power source is a DC power source from a battery pack and said second power source is an AC-to-DC power source; and wherein said first control loop is isolated from said second control loop.

[0005] According to another example embodiment of the present disclosure there is provided a gas cook top assembly, comprising a base plate having bottom surface, a peripheral sidewall defining an open interior space and an open top providing access to said interior space; a cover mounted on said base plate enclosing said interior space; a plurality of burner mountings formed in said cover; a plurality of gas burners arranged within said interior space of said base plate with one gas burner being associated with each of said burner openings; individual control valves operably coupled to said gas burners for selectively operating each of said gas burners; a spark ignition module for delivering an ignition spark to each of said gas burners; a spark ignition circuit operably connecting said individual control valves, said spark ignition module and said gas burners to a power source; a first control loop interconnecting said spark ignition circuit and said power source; a second control loop arranged in parallel to said first control loop and interconnecting said spark ignition circuit and said power source; said second control loop having a free end in the form of a first connector; wherein said first control loop is isolated from said second control loop and wherein said second control loop is operational when said first connector is operably coupled to said power source.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Reference will now be made, by way of example, to the accompanying drawings which show example embodiments of the present application, and in which:

[0008] FIG. 1 is a top perspective view of a cook top assembly in accordance with an exemplary embodiment of the present disclosed;

[0009] FIG. 2 is an exploded view of the cook top assembly of FIG. 1;

[0010] FIGS. 3A and 3B are schematic diagrams illustrating the operation of the dual-power source of the cook top assembly of FIG. 1; and

[0011] FIG. 4 is a schematic diagram illustrating the operation of the burners associated with the cook top assembly.

[0012] Similar reference numerals may have been used in different figures to denote similar components.

DESCRIPTION OF EXAMPLE EMBODIMENTS

[0013] Referring now to FIGS. 1 and 2, there is shown a cook top assembly 10 according to an example embodiment of the present disclosure. The cook top assembly 10 comprises a generally rectangular base plate 12 in the form of a shallow box having an open top 14. Accordingly, the base plate 12 has a bottom surface 13 and a peripheral side wall 15 extending upwardly from the bottom surface around the entire periphery of the bottom surface defining an open interior space 17. A separate cover panel 18 is provided typically having a plurality of generally circular burner openings or burner mountings 21 with burner covers or burner caps 19 placed over top of each of the openings. In the subject exemplary embodiment five separate burner openings or mountings 21 are provided however it will be understood that the cook top assembly may be provided with more or less individual burners depending upon the particular model and/or overall size of the cook top assembly 10. A cast-iron grate 20 is arranged over top of and is supported on the cover panel 18, the cast-iron grate 20 further defining the burner areas for placement of the cooking pots and/or pans, etc., the cover 18 and cast-iron grate 20 together defining the cook top or cooking surface on which the pots and pans, etc. are used. In the example embodiment illustrated in FIGS. 1 and 2, the cast-iron grate 20 is formed from three separate grate portions 20(1)-20(3), however it will be understood that the grate 20 may be formed as a unitary structure. A control panel 24...
extends across the front of the cook top having individual control knobs 26 arranged at spaced intervals along the control panel 24 for controlling/operating each of the cooking burners 19. The cook top assembly 10 is generally intended to be set or mounted within the counter-top of a kitchen work surface or may form the upper cooking surface of a freestanding range.

[0014] Referring now to FIGS. 3A, 3B and 4, there is shown a schematic diagram illustrating the operation of the dual-power source of the cook top assembly 10. In accordance with principles known in the art, a series of gas valves 30 are arranged within the base 12 of the cook top assembly 10, each of which is operably coupled to one of the control knobs 26. A gas manifold 32 supplies the cook top assembly 10 with a gas supply, whether it be a propane gas supply when used for an off-grid application or in an on-grid application where natural gas is not available, or a natural gas supply when used in an on-grid application where natural gas is available.

[0015] Gas valves 30 each have an inlet 33 in fluid communication with the gas manifold 32 and are connected to corresponding gas burners 35 associated with each of the burners 19 on the cooking surface via corresponding gas lines 37. Each gas valve 30 is also operably coupled to a corresponding one of the control knobs 26, the control knobs 26 opening the corresponding gas valve 30 associated with a particular burner 19 releasing gas to the gas burner 35 associated with the burner 19 through the corresponding gas line 37 and beginning the ignition sequence.

[0016] A spark ignition module 40 is arranged within the open interior space 17 of the base plate 12 and is mounted on the bottom surface 13 thereof, the spark ignition module being operably coupled to each of the gas burners 35 via a spark ignition circuit 39. The spark ignition module 40 requires electrical power in order to drive the spark ignition sequence required to ignite the gas burners 35. Accordingly, the spark ignition module 40 has a terminal end 41 for receiving electrical power from a power source and a series of spark ignition terminals 43 that are individually connected to each of the gas burners 35 for the respective burners 19 for the cooking surface. In off-grid applications where electrical AC power is not readily available, a battery pack 44 is provided for supplying the cook top assembly 10 with a source of DC power. The battery pack 44 is mounted within a battery pack housing or compartment 46 formed within or mounted within an opening 47 in the base plate 12 of the cook top assembly 10. Wiring from the battery pack 44 extends through the battery pack housing or compartment 46 into the inside area of the shallow box-like base plate 12 and is coupled to the terminal end 43 of the spark ignition module 40 and to the individual gas valves 30 and control knobs 26 forming a first control loop or battery control loop 48 interconnecting the battery pack 44 to the gas valves 30 and to the spark ignition circuit 39 of the spark ignition module 40. Accordingly, the battery pack 44 supplies DC power to the components of the cook top assembly 10 so that when the cook top assembly 10 is put into use, a user activates the control knob 26 associated with the desired burner 19 opening the corresponding gas valve 30 thereby releasing gas to the gas burner 35 with the spark ignition module 40 generating a spark to ignite the corresponding gas burner 35. When use of the burner 19 is no longer required, the control knob 26 is deactivated shutting off the gas supply through the valve 30 snuffing-out the gas burner 35.

[0017] A second control loop 50 branches off from the first control loop or battery control loop 48, the second control loop 50 having a first connector 52 adapted for receiving and forming an electrical connection with a corresponding or second connector 54 extending from an AC-to-DC adapter plug 56 that is supplied with the cook top assembly 10. Therefore, if the cook top assembly 10 is installed in a location having access to on-grid electricity, the AC-to-DC adapter plug 56 is coupled to the second control loop 50 by interconnecting the first and second connectors 52, 54 with the AC-to-DC adapter plug 56 being inserted into a conventional wall mounted plug socket or terminal. On-grid 110V AC power is delivered to the AC-to-DC adapter plug 56 through the plug socket or terminal and is stepped-down through the adapter plug 56 and converted into low voltage DC power, for instance 3V DC power. The DC power converted through the adapter 56 is transmitted through the second control loop 50 delivering electrical power to the spark ignition circuit 39 interconnecting and operably coupling the gas valves 30 and the spark ignition module 40.

[0018] In order to ensure that the DC power from the second control loop 50 does not flow through the battery pack 44 potentially damaging the battery pack 44 if the voltages of the battery pack 44 and the DC power from the AC-to-DC adapter plug 56, a diode 60 (or any other suitable component or device) is arranged in series with the battery pack 44 intermediate the positive terminal of the battery pack 44 and the connection to the series of gas valve 30. As electrical current through diodes 60 (or any other suitable component) is unidirectional, current from the second control loop 50 is prevented from flowing through the battery pack 44 since the resistance provided by the diode 60 forces the current through spark ignition circuit 39.

[0019] Accordingly, the cook top assembly 10 can be easily and conveniently adapted from operating completely off-grid using a propane gas supply and battery power provided through the battery pack 44 to being usable in an on-grid application by connecting the AC-to-DC adapter plug 56 to the spark ignition circuit 39 through the second control loop 50 thereby using electricity from the grid with either an independent propane gas supply or an “on-grid” natural gas supply. Similarly, in instances where the cook top assembly 10 is being used in an on-grid application and there is a power outage or an interruption in service from the grid, the cook top assembly 10 can be easily and conveniently converted to running off the battery power provided by the battery pack 44 by disconnecting the adapter plug 56 from the second control loop 50 allowing the first control loop 48 to power the spark ignition circuit 39 rendering the “on-grid” cook top assembly usable even in situations of service disruptions. Accordingly, the cook top assembly 10 is adaptable to various applications.

[0020] While a specific embodiment of the cook top assembly 10 has been described, it will be understood by persons skilled in the art that certain adaptations and modifications of the described embodiments can be made. Therefore, the above discussed embodiments are considered to be illustrative and not restrictive.

What is claimed is:

1. A gas cook top assembly comprising:
a cooking surface having a plurality of gas burners for receiving a gas supply from a gas source;
a spark ignition module for igniting each of said gas burners;
individual control valves for selectively operating each of the plurality of gas burners; a spark ignition control circuit for receiving electrical power from one of a first power source and a second power source and delivering the electrical power to said individual control valves and said spark ignition module; a first control loop electrically connected to said spark ignition circuit for delivering electrical power from said first power source; a second control loop electrically connected to said spark ignition circuit for delivering electrical power from said second power source; wherein said first power source is a DC power source from a battery pack and said second power source is an AC-to-DC power source; and wherein said first control loop is isolated from said second control loop.

2. The gas cook top assembly as claimed in claim 1, wherein said battery pack is arranged within said first control loop.

3. The gas cook top assembly as claimed in claim 2, further comprising a diode arranged in series with said battery pack; and wherein said second control loop is arranged in parallel with said first control loop, said diode providing a break in said first control loop when said second control loop is operational.

4. The gas cook top assembly as claimed in claim 3, further comprising: a first connector in connection with said second control loop; and an AC-to-DC adapter plug having a second connector for coupling with said first connector.

5. The gas cook top assembly as claimed in claim 1, wherein said gas supply is one of the following alternatives: propane gas or natural gas.

6. A gas cook top assembly, comprising: a base plate having bottom surface, a peripheral sidewall defining an open interior space and an open top providing access to said interior space; a cover mounted on said base plate enclosing said interior space; a plurality of burner mountings formed in said cover; a plurality of gas burners arranged within said interior space of said base plate with one gas burner being associated with each of said burner openings; individual control valves operably coupled to said gas burners for selectively operating each of said gas burners; a spark ignition module for delivering an ignition spark to each of said gas burners; a spark ignition circuit operably connecting said individual control valves, said spark ignition module and said gas burners to a power source; a first control loop interconnecting said spark ignition circuit and said power source; a second control loop arranged in parallel to said first control loop and interconnecting said spark ignition circuit and said power source, said second control loop having a free end in the form of a first connector; wherein said first control loop is isolated from said second control loop and wherein said second control loop is operational when said first connector is operably coupled to said power source.

7. The cook top assembly as claimed in claim 6, wherein said power source is a battery arranged within said first control loop.

8. The cook top assembly as claimed in claim 6, further comprising an AC-to-DC adapter plug having a second connector for coupling with said first connector; and a diode arranged in series with said battery pack in said first control loop for preventing power from said second control loop from running through said battery pack.

9. The cook top assembly as claimed in claim 6, wherein said cover is separate to and removably mounted to said base plate.

10. The cook top assembly as claimed in claim 6 wherein said cover is separate to said base plate and movable between a closed position sealing and/or enclosing said open interior space and a raised position providing access to said open interior space.

11. The cook top assembly as claimed in claim 6, wherein a battery-pack housing is fixed to said bottom surface of said base plate for receiving said battery pack, said battery pack housing extending into said open interior space.

12. The cook top assembly as claimed in claim 6, further comprising a gas manifold for delivering a gas supply to each of said gas burners when said gas burners are selectively operated, said gas supply being one of the following alternatives: propane gas or natural gas.