A hybrid spa heater is disclosed. In a particular embodiment, the hybrid spa heater includes a cavitation fitting, where the cavitation fitting includes a plurality of orifices adapted to use water pressure to force water through to increase water temperature. The hybrid spa heater also includes an electric heater in fluid communication with the cavitation fitting, where the electric heater is adapted to increase the water temperature when an electrical resistance is applied. In addition, the cavitation fitting includes a chamber in downstream fluid communication with the plurality of orifices and is adapted to create a fluid vortex within the cavitation fitting to increase the water temperature. The cavitation fitting includes internal threading to mate with external threading of a water pump housing to allow the cavitation fitting to be removed for inspection and cleaning.
RECIRCULATING WATER FROM A SPA USING A PUMP

DETERMINING WHETHER THE PUMP IS ON A LOW SPEED OR A HIGH SPEED

USING A CAVITATION FITTING IN FLUID COMMUNICATION WITH THE PUMP WHEN THE PUMP IS ON THE HIGH SPEED, WHEREIN THE CAVITATION FITTING IS CONFIGURED TO FORCE THE WATER TO FLOW THROUGH ORIFICES TO INCREASE A TEMPERATURE OF THE WATER

USING AN ELECTRIC HEATER IN FLUID COMMUNICATION WITH THE PUMP WHEN THE PUMP IS ON THE LOW SPEED OR HIGH SPEED TO INCREASE THE TEMPERATURE OF THE WATER, WHEREIN THE ELECTRIC HEATER INCLUDES AN ELECTRICAL HEATING ELEMENT TO GENERATE HEAT TO TRANSFER TO THE WATER

RECYCLING THE WATER TO THE SPA

FIG. 5
HYBRID SPA HEATER

I. CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/261,621 filed Nov. 16, 2009. The disclosure of the provisional application is incorporated herein by reference.

II. FIELD

[0002] The present disclosure is generally related to a hybrid spa heater.

III. DESCRIPTION OF RELATED ART

[0003] A typical spa or hot tub recirculates hot water using a pump and an electrical heater. The electrical heater includes a resistance type electrical element that is in contact with the water. The water is heated as it passes proximate to the electrical element. A thermostat is used to control the water heater. The pump controls the volume of water and velocity of water being forced out through the jets on the sides of the spa. A spa usually will have at least a high and low flow setting for the pump. Electrical heaters will work on either the high or low flow setting but are generally not energy efficient.

[0004] Another type of heater that may be used in heating the spa is called a friction heater. A friction heater generates heat using friction between two surfaces such as a rotating drum and liner. The water is heated that is contained adjacent to the liner. Yet another example includes a rotating drum housing having an external surface which engages a bore surface of the housing. An external surface of the housing includes a groove around it with copper tubing wound around the groove. The friction caused by the rotating drum relative to the groove generates heat in the housing which in turn heats the water flowing through the copper tubing. However, it is difficult to maintain contact between the two surfaces to generate sufficient heat through friction.

[0005] Accordingly, what is needed in the art is a hybrid spa heater that is energy efficient and reliable.

[0006] However, in view of the prior art at the time the present invention was made, it was not obvious to those of ordinary skill in the pertinent art how the identified needs could be fulfilled.

IV. SUMMARY

[0007] In a particular embodiment, a hybrid spa heater is disclosed. The hybrid spa heater includes a cavitation fitting, where the cavitation fitting includes a plurality of orifices adapted to use water pressure to force water through to increase water temperature. In addition, the cavitation fitting includes a chamber in downstream fluid communication with the plurality of orifices and is adapted to create a fluid vortex within the cavitation fitting to increase the water temperature. The plurality of orifices is disposed on a removable disc adapted to insert into the cavitation fitting upstream of the chamber. The hybrid spa heater also includes an electric heater in fluid communication with the cavitation fitting, where the electric heater is adapted to increase the water temperature when an electrical resistance is applied. The hybrid spa heater may include a water pump having an inlet port and an outlet port with the cavitation fitting in fluid communication with the outlet port of the water pump, where the water pump is adapted to increase an outlet water pressure to be greater than an inlet water pressure at the inlet port. A control module may be used to control the electric heater in response to a user selecting a desired water speed or temperature. The cavitation fitting includes internal threading to mate with external threading of a water pump housing to allow the cavitation fitting to be removed for inspection and cleaning.

[0008] In another particular embodiment, a method to heat spa water is disclosed. The method includes providing a cavitation fitting, where the cavitation fitting comprises a plurality of orifices adapted to use water pressure to force water through to increase water temperature. The method also includes increasing the water temperature when an electrical resistance is applied to an electric heater in fluid communication with the cavitation fitting, and creating a vortex within a chamber of the cavitation fitting downstream of the plurality of orifices to increase the water temperature. In addition, the method includes inserting a removable disc having the plurality of orifices into the cavitation fitting upstream of the chamber and increasing an outlet water pressure to be greater than an inlet water pressure of a water pump in fluid communication with the cavitation fitting. Further, the method includes controlling an electric heater in response to a user selecting a desired water speed or temperature and mating the cavitation fitting to a water pump housing to allow the cavitation fitting to be removed for inspection and cleaning.

[0009] Other aspects, advantages, and features of the present disclosure will become apparent after review of the entire application, including the following sections: Brief Description of the Drawings and Detailed Description.

V. BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a perspective view of a particular embodiment of a hybrid spa heater;

[0011] FIG. 2 is a cross-sectional view of a cavitation fitting of the hybrid spa heater;

[0012] FIG. 3 is a top view of a disc used within the cavitation fitting illustrated in FIG. 2;

[0013] FIG. 4 is a diagram of the hybrid spa heater and flow path recirculating water to the spa; and

[0014] FIG. 5 is a method of heating water using a hybrid spa heater.

VI. DETAILED DESCRIPTION

[0015] A first particular illustrative embodiment of a hybrid spa heater is disclosed in FIG. 1 and generally designated 100. A water pump 102 is in fluid communication with a cavitation fitting 104. The cavitation fitting is secured to the outlet port of the pump 104. The cavitation fitting 104 is in fluid communication with the spa as shown in FIG. 1. An electric heater 106 is in fluid communication with the inlet port of the pump 102. Water from the spa flows to the electric heater 106 to the inlet port (suction) of the pump 102, through the impeller of the pump 102, to the cavitation fitting 104 and back to the spa or other treatment processes.

[0016] For example, in operation water is recirculated from the spa using the pump 102. When the spa (i.e., pump 102) is on low speed, the water is heated using the electric heater 106. The electric heater 106 includes an electrical heating element that transfers heat to the water. When the pump 102 is on high speed, the cavitation fitting 104 heats the water and the electric heater 106 is turned off in one embodiment. In another embodiment, the electric heater 106 works in conjunction with the cavitation fitting 104 to heat the water until
the electric heater 106 is no longer required to heat (or maintain) the water to a desired temperature and the cavitation fitting 104 does the heating. This makes the hybrid spa heater 100 increasingly energy efficient.

[0017] The pump 102 may be a centrifugal pump, which includes an impeller rotating within a case. Water enters the impeller in the center portion, flows outwardly, and is discharged around the entire circumference into a casing. The water receives in increase in both pressure and absolute velocity from flowing through the rotating impeller. As a large part of the energy of the water leaving the impeller is kinetic, the absolute velocity is reduced to transform the velocity head into a pressure head at the outlet port of the pump 102. An axial flow pump may also be used with the hybrid spa heater 100.

[0018] A cross sectional view of the cavitation fitting 104 is illustrated in FIG. 2. The outlet port 212 of the water pump housing may include external threading to mate with internal threading 210 of a lower portion of the cavitation fitting 104. This allows the cavitation fitting 104 to be easily removed for inspection and cleaning to increase the heating efficiency. In addition, the cavitation fitting 104 includes a chamber 208 in downstream fluid communication with a plurality of orifices within the cavitation fitting 104, which the orifices are adapted to create a fluid vortex within the cavitation fitting 104 to increase the water temperature. Alternatively, the cavitation fitting 104 may use channels, sections, conduits, or any combination thereof, that are adapted to generate heat.

[0019] Referring now to FIG. 3, the plurality of orifices may be disposed on a removable disc 202 adapted to insert into the cavitation fitting 104 upstream of the chamber 208. The number of orifices 302 and configuration may vary depending on the size and rating of the pump 102 and a particular specific application.

[0020] The typical flow path of the water circulated with the hybrid spa heater is illustrated in FIG. 4. For example, the spa 110 holds most of the water. The water flows into the spa 110 using jets. A control panel 108 is used to adjust the temperature and speed of the water, for example high or low flow. Pumps are customarily rated in gallons per minute. The pump 102 uses suction to remove water from the spa 110 and circulate the water flow to the electric heater 106. The electric heater 106 may be used to transfer heat to the water under certain conditions. The electric heater 106 uses a resistive heating element to generate heat. The hybrid spa heater 100 determines when to use the electric heater 106 depending on several factors. For example, the factors may include the energy efficiency desired by a user (e.g., how long to heat the water), the flow rate of the water, and/or the desired temperature of the water, and any combination thereof. The water then flows through the impeller of the pump 102 which increases the pressure of the water as the water is pumped to the cavitation fitting 104 secured to the outlet port 212 of the pump 102. The cavitation fitting 104 may force the water at high pressure through small openings, channels, sections, conduits, orifices, or any combination thereof, to generate heat. If the water is not at a sufficient velocity or pressure, then the cavitation fitting 104 may not be as effective. The cavitation fitting 104 requires a high flow and/or pressure to generate heat. No other water heater uses a combination of a cavitation fitting 104 and electric heater 106 that is dependent on these types of factors.

[0021] A particular method of heating water with a hybrid spa heater is disclosed in FIG. 5 and generally designated 400. Water from a spa is recirculated using a pump, at 402. The hybrid spa heater determines, at 404, whether the pump is on a low speed (flow) or high speed. A cavitation fitting that is in fluid communication with the pump is used, at 406, when the pump is on high speed to increase a temperature of the water. The cavitation fitting is configured to force the water to flow though small openings, channels, sections, conduits, orifices, or any combination thereof, to generate heat. Continuing to 408, an electric heater is in fluid communication with the pump when the pump is on low speed or high speed to increase the temperature of the water. The electric heater includes an electrical heating element to generate heat to transfer to the water. The water is then recirculated, at 410, back to the spa.

[0022] The illustrations of the embodiments described herein are intended to provide a general understanding of the structure of the various embodiments. The illustrations are not intended to serve as a complete description of all of the elements and features of apparatus and systems that utilize the structures or methods described herein. Many other embodiments may be apparent to those of skill in the art upon reviewing the disclosure. Other embodiments may be utilized and derived from the disclosure, such that structural and logical substitutions and changes may be made without departing from the scope of the disclosure. Accordingly, the disclosure and the figures are to be regarded as illustrative rather than restrictive.

[0023] One or more embodiments of the disclosure may be referred to herein, individually and/or collectively, by the term "invention" merely for convenience and without intending to voluntarily limit the scope of this application to any particular invention or inventive concept. Moreover, although specific embodiments have been illustrated and described herein, it should be appreciated that any subsequent arrangement designed to achieve the same or similar purpose may be substituted for the specific embodiments shown. This disclosure is intended to cover any and all subsequent adaptations or variations of various embodiments. Combinations of the above embodiments, and other embodiments not specifically described herein, will be apparent to those of skill in the art upon reviewing the description. Thus, the present disclosure is not intended to be limited to the embodiments shown herein but is to be accorded the widest scope possible consistent with the principles and novel features as defined by the following claims.

What is claimed is:

1. A hybrid spa heater, the heater comprising:
   a cavitation fitting, wherein the cavitation fitting comprises a plurality of orifices adapted to use water pressure to force water therethrough to increase water temperature;
   and
   an electric heater in fluid communication with the cavitation fitting, wherein the electric heater is adapted to increase the water temperature when an electrical resistance is applied.

2. The hybrid spa heater of claim 1, the cavitation fitting further comprising a chamber in downstream fluid communication with the plurality of orifices and adapted to create a fluid vortex within the cavitation fitting to increase the water temperature.

3. The hybrid spa heater of claim 2, wherein the plurality of orifices is disposed on a removable disc adapted to insert into the cavitation fitting upstream of the chamber.
4. The hybrid spa heater of claim 3, further comprising a water pump having an inlet port and an outlet port, the cavitation fitting in fluid communication with the outlet port of the water pump, wherein the water pump is adapted to increase an outlet water pressure to be greater than an inlet water pressure at the inlet port.

5. The hybrid spa heater of claim 4, further comprising a control module that controls the electric heater in response to a user selecting a desired water speed or temperature.

6. The hybrid spa heater of claim 5, wherein the cavitation fitting further comprises internal threading to mate with external threading of a water pump housing to allow the cavitation fitting to be removed for inspection and cleaning.

7. The hybrid spa heater of claim 6, wherein the water pump is a centrifugal pump.

8. The hybrid spa heater of claim 7, the water pump further comprising a variable speed motor.

9. The hybrid spa heater of claim 8, wherein the cavitation fitting is a polyvinyl chloride material.

10. The hybrid spa heater of claim 9, wherein the plurality of orifices are sized to increase a velocity of water through the cavitation fitting.

11. A method of heating water for a spa, the method comprising:
    providing a cavitation fitting, wherein the cavitation fitting comprises a plurality of orifices adapted to use water pressure to force water therethrough to increase water temperature; and
    increasing the water temperature when an electrical resistance is applied to an electric heater in fluid communication with the cavitation fitting.

12. The method of claim 11, further comprising creating a vortex within a chamber of the cavitation fitting downstream of the plurality of orifices to increase the water temperature.

13. The method of claim 12, further comprising inserting a removable disc having the plurality of orifices into the cavitation fitting upstream of the chamber.

14. The method of claim 13, further comprising increasing an outlet water pressure to be greater than an inlet water pressure of a water pump in fluid communication with the cavitation fitting.

15. The method of claim 14, further comprising controlling an electric heater in response to a user selecting a desired water speed or temperature.

16. The method of claim 15, further comprising mating the cavitation fitting to a water pump housing to allow the cavitation fitting to be removed for inspection and cleaning.

17. The method of claim 16, wherein the water pump is a centrifugal pump.

18. The method of claim 17, further comprising adjusting a speed of a motor for the pump to correspondingly adjust the outlet water pressure.

* * * * *