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SWIMMING POOL FILTER AND HEATER DEVICE

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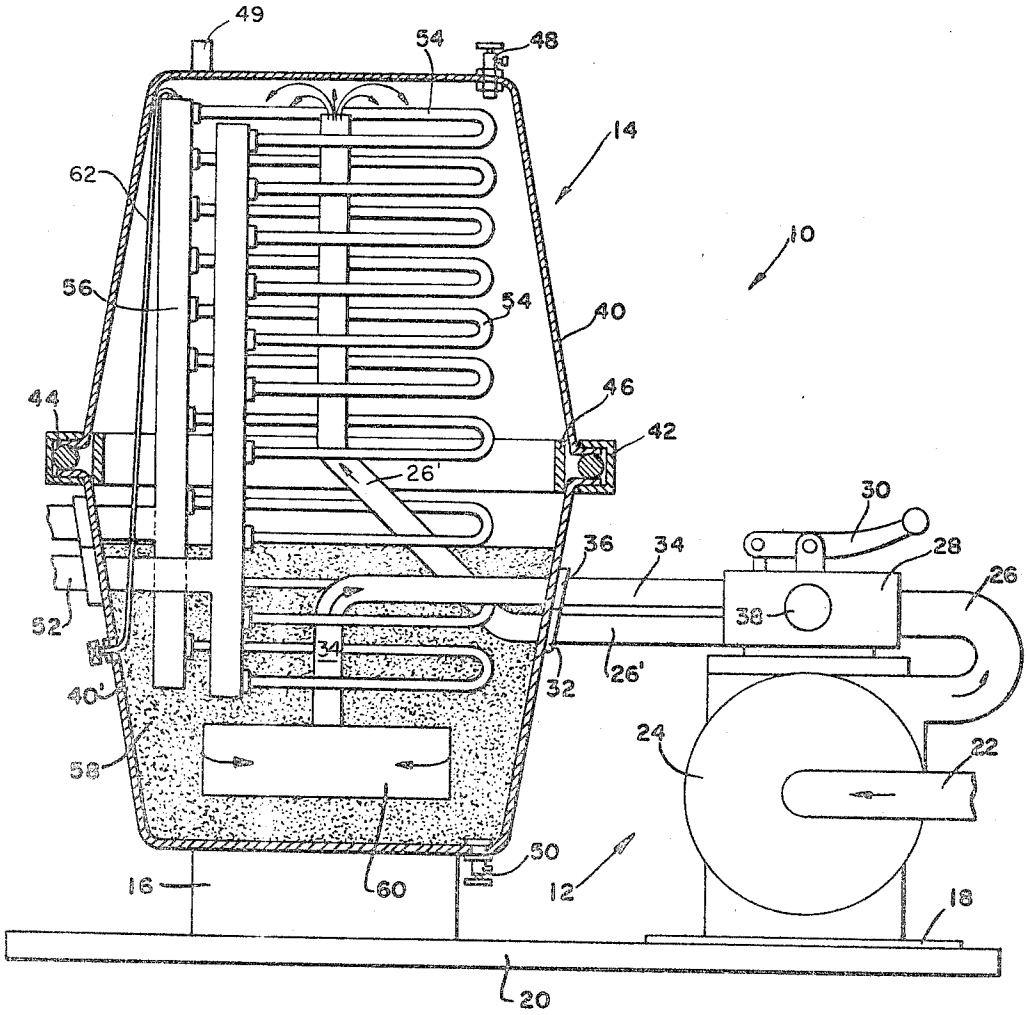


FIG. 1.

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SWIMMING POOL FILTER AND HEATER DEVICE

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ABSTRACT OF THE DISCLOSURE

A device is disclosed which combines filtering and heating functions for a swimming pool and includes a pump for forcing the swimming pool water into the top of a filter and heater unit, the water being forced downwardly past heating coils and then into a sand filter at the bottom of the filter and heater unit from whence the filtered water is passed back out through the device and back to the swimming pool.

The present invention relates to a swimming pool filter and heater device and, more particularly, to such a filter and heater device including a filter and heater unit in a single casing.

Systems are known which include devices for carrying out both the filtering and the heating of various liquids in certain environments. However, such prior art systems have, in general, involved separate devices for these functions or, alternatively, single devices carrying out both functions but which devices were relatively complex in nature. Accordingly, the need has existed, particularly for use in relatively inexpensive home swimming pools, of a single device which is capable of both heating the swimming pool water and filtering the same, which device is relatively simple and inexpensive in construction and manufacture, yet which device is capable of fully and adequately carrying out its intended function.

It is, accordingly, an object of the present invention to overcome or alleviate the deficiencies of the prior art, such as indicated above.

It is another object of the present invention to provide for the heating and filtering of liquids in a simplified and economical manner.

It is another object of the present invention to provide a novel combination filter and heater device for swimming pool use, which device is relatively simple and inexpensive.

It is another object of the present invention to provide for a novel and improved filter and heater unit of generally compact construction which may be easily and simply hooked up with a swimming pool system for heating and for filtering of the swimming pool water.

It is another object of the present invention to provide a heater unit for home pool use which utilizes heat from the conventional home water heater.

These and other objects in the nature and advantages of the instant invention will be more apparent from the following detailed description taken in conjunction with the drawing wherein:

FIG. 1 is a vertical sectional view taken through a device in accordance with the present invention.

A device **10** in accordance with the present invention is shown in the drawing comprising generally a pump unit **12** and a filter and hetater unit **14**, the units **12** and **14** being operatively connected by suitable pipes or conduits, described below. The filter and heater unit **14** is supported by a suitable base **16** while the pump unit **12** is supported by a base **18**. In turn, each of these bases **16** and **18** may be attached to a common base **20**.

The pump unit **12** is provided with an inlet pipe **22** for direct attachment to the swimming pool or for attachment to a suitable pipe at the site of the pool, for passage of water from the pool to the pump. The pump unit **12** also includes a suitable water pump **24** which may be any of the conventionally used water pumps, such as a centrifugal pump.

Passing from the exit end of the pump **24** is a first conduit **26** which leads to a three-way valve **28**, such valve **28** being controlled by the valve handle **30**. Such a valve **28** may be of the conventional rotary valve type. It will be understood that such a valve is not essential, but does provide additional control in the use of the combination and heater device **10** in accordance with the present invention.

Downstream from the valve **28** the first conduit **26'** continues to the filter and heater unit **14** with which it is rigidly connected by a suitable joint **32**. A second conduit **34**, also rigidly connected to the filter and heater unit **14** at a joint **36**, passes from the filter and heater unit **14** to the valve **28** and then, normally during operation, to an exit port **38** which is for connection to a suitable pipe for passage of the heated and filtered water back to the swimming pool.

The filter and heater unit **14** comprises a generally water tight casing **40**, **40'** which is formed of the two generally frusto-conical (or cylindrical) cut-like halves **40** and **40'** which are clamped together by a suitable sealing clamp **42** between which is pinched an annular ring seal **44**, and which carries an annular shield **46** on the interior thereof. The upper portion **40** of the casing is provided with an air bleeder valve **48** and a pressure relief valve **49**, and the lower portion **40'** is provided with a drainage valve **50**. The generally cylindrical casing **40**, **40'** may be formed of any suitable material such as metal or fiber reinforced plastic.

The upper half **40** of the casing defines therewithin an upper portion in which most of the heating function of the device **10** is carried out. Here, the first conduit **26'** passes upwardly generally axially with the upper casing half **40** and terminates near the top thereof. A suitable heat exchanger is provided in such upper portion and extending downwardly into the lower portion of the filter and heater unit **14** for heating the water passing through and out of the first conduit **26'**, such heat exchanger including an inlet pipe **52** from a suitable boiler (e.g. the home hot water heater), a plurality of coiled heater tubes **54** which are generally annular to the first conduit **26'** and a return pipe **56**. The heater tubes **54** are preferably formed of copper, a good heat conductive metal, and the inlet and outlet pipes **52** and **56**, respectively, may also be formed of a metal, such as copper or plastic.

Preferably, the inlet and return pipes **52** and **56** are connected direcly with the home water heater or boiler (e.g. gas, oil or electric water heater). In this way it is not necessary to provide the home with any additional boiler or heater for the pool water, but the hot water from the home water heater or boiler may be used directly to heat the swimming pool water. Alternatively, hot air from the home furnace may be used in connection with the heat exchanger to heat the swimming pool water.

The lower portion of the filter and heater unit, defined by the casing half **40'** contains a suitable filter **58**, as well as the lower part of the heat exchanger. The filter merely comprises a granular filtering medium, such as sand or fine gravel. Imbedded within the sand filter, in addition to the lower part of the heat exchanger, is the terminal end of the second conduit **34** which has, preferably, at its end an inlet device **60** which may be either an additional pipe having two open ends or which may be a cylindrical port having a radially defined open-

ing. An air vent tube **62** extends through the lower casing half **40'** and extends to the top interior of the pipe manifold **56**.

While it is considered that the operation of the device will be apparent from its above description, its use will be, nevertheless, described below.

Water from a swimming pool passes through the pipe **22** to the pump **24** where it is driven through the first conduit **26**, through the three-way valve **28** and then continuing through the first conduit **26'** to the top part of the upper portion of the filter and heater unit **14** where it is discharged into the upper casing **40** as shown by the arrows. Hot liquid, such as hot water, from a suitable boiler is in the meantime passed through the pipe **52** then through the heating coils **54** and then back out through the pipe **56**. The arrangement of the first conduit **26'** passing up through the center of the heating coils **54** results in the water being pre-warmed while still in the first conduit **26'**; after such water is discharged into the upper casing half **40** from the terminal end of the first conduit **26'** it then comes into direct contact with the heating coils **54** where such water is then heated as it is driven downwardly through the casing half **40** by the newly emerging water.

As the water continues to be forced downwardly into the lower portion defined by the lower casing half **40'**, it is forced through the sand filter **58** and then into the inlet port **60** and through the second conduit **34**. After passing through the valve **28**, the heated and filtered water is then passed through the port **38** to a suitable pipe for passage back to the swimming pool. When not in operation, the motor **24** may be shut off and the valve handle **30** turned to a second position so that there is no communication between portions **26** and **26'** of the first conduit and so that there is also no communication between the second conduit **34** and the outlet port **38**.

When it is desired to clean the filter **58**, the handle **30** may be turned to a third position so that the first portion **26** of the first conduit is in communication with the second conduit **34** and so that the second portion **26'** of the first conduit is in communication with the outlet port **38**, in which case the flow of water will be in the direction opposite to that shown by the arrows, such flow resulting in the cleaning of the filter. Further, because of the highly simplified construction of the present filter and heater device **10**, the filter and heater unit **14** may be easily disassembled by removing the clamp **42**, removing the upper casing half **40**, whereby the filter **58** may be changed or any other repairs desired may be carried out. The compact nature of the device permits its installation in a relatively small space.

It will be understood that various changes may be made in the present construction, such as an electrical heating device may be used in place of the heating unit shown and the device may be provided with automatic controls.

The foregoing detailed description will so fully reveal the gist of the present invention by specific example that others can, by applying current and prior art knowledge, readily adapt the invention for various applications

and substitute various features from the prior art for use in connection with the generic and specific invention and, therefore, the resultant adaptations should and are intended to be comprehended within the meaning and range of equivalents of the following claims.

What is claimed is:

1. A combination filter and heater device for a swimming pool comprising

a pump unit for receiving water from the pool and forcing such water therefrom under pressure;

first conduit means passing from said pump unit into which the water from the pump is forced;

a filter and heater unit for receiving water from said first conduit, said filter and heater unit comprising a generally cylindrical water tight casing having an upper portion and a lower portion, said first conduit extending through said casing wall into the interior thereof and a portion passing upwardly generally axially of said casing and terminating near the top of said casing, further comprising a tubular heat exchanger in the upper portion of said casing the tubes of which generally annularly surround the portion of said first conduit which is generally axial to said casing, and a granular filter in the lower portion of said casing; and

second conduit means passing from within said granular filter and through said casing wall.

2. A device in accordance with claim **1** further comprising a valve unit located along said first conduit means between said pump and said casing.

3. A device in accordance with claim **2** wherein said second conduit means passes through said valve unit, said valve unit comprising a three-way valve for alternatively restricting flow, directing flow into said filter and heater unit through said first conduit for operation, or directing back flow into said filter and heater unit through said second conduit for cleaning.

4. A device in accordance with claim **1** wherein said generally cylindrical casing is formed of an upper half and a lower half releasably clamped together.

5. A device in accordance with claim **1** wherein said tubular heat exchanger is adapted to be connected to the home hot water heating means whereby hot water from the water heater passes through said heat exchanger to heat said pool water.

6. A device in accordance with claim **1** wherein said tubular heat exchanger extends into the lower portion of said casing.

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