Sept. 21, 1965 H. W. ANDERSEN 3,207,133

SWIMMING POOL HEATER

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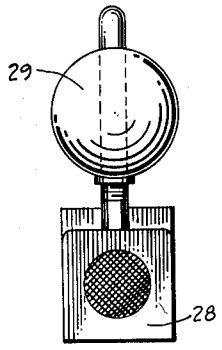


FIG.-7

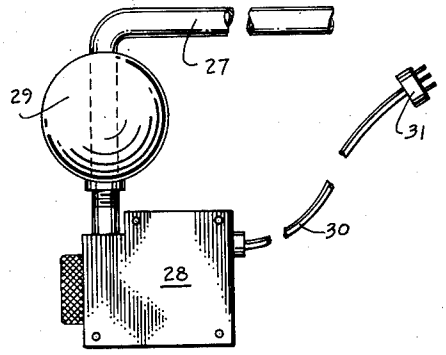


FIG.-8

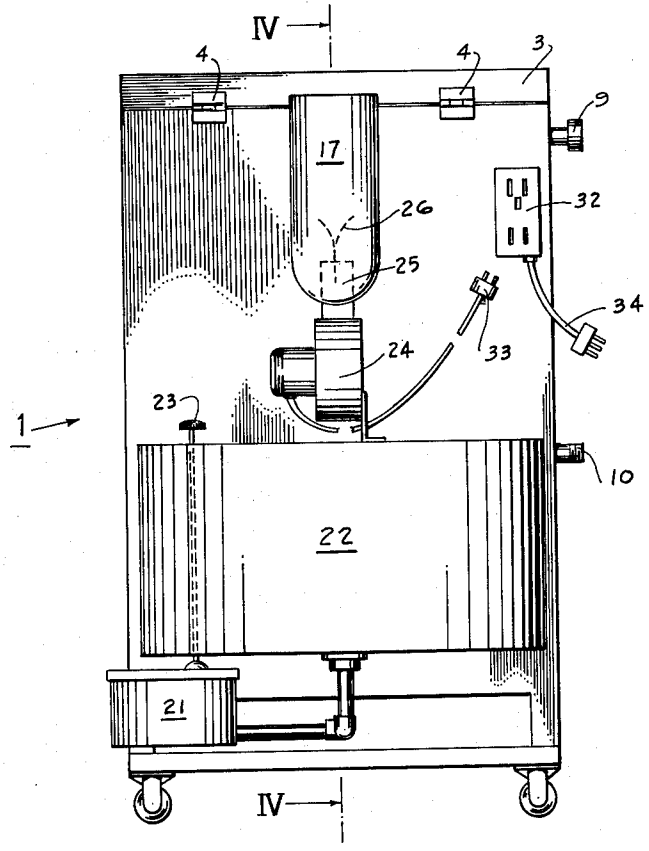


FIG.-1

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SWIMMING POOL HEATER

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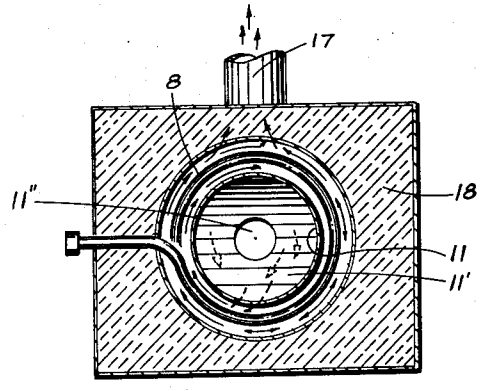


FIG.-3

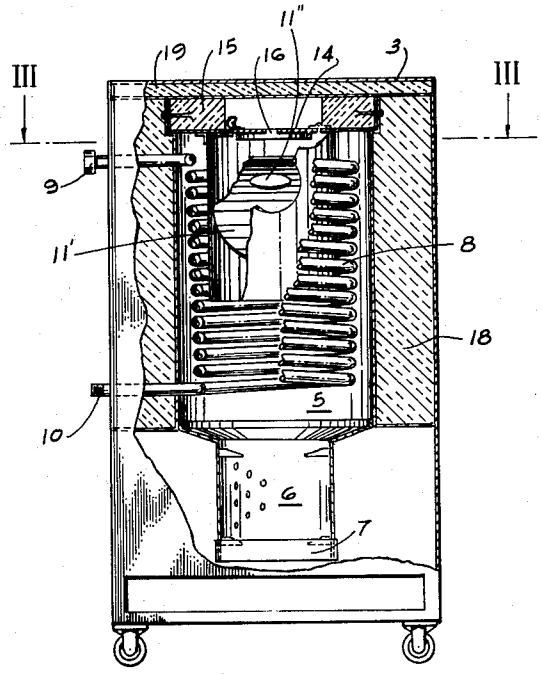


FIG.-2

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SWIMMING POOL HEATER

Filed Aug. 27, 1962 3 Sheets-Sheet 3

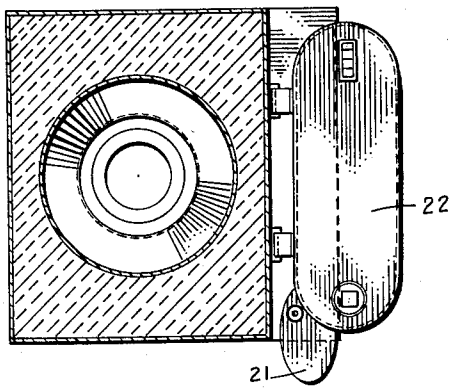


FIG.-5

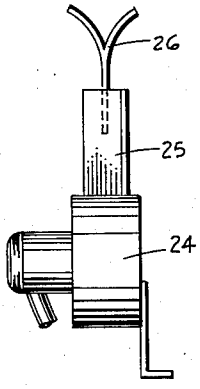


FIG.-6

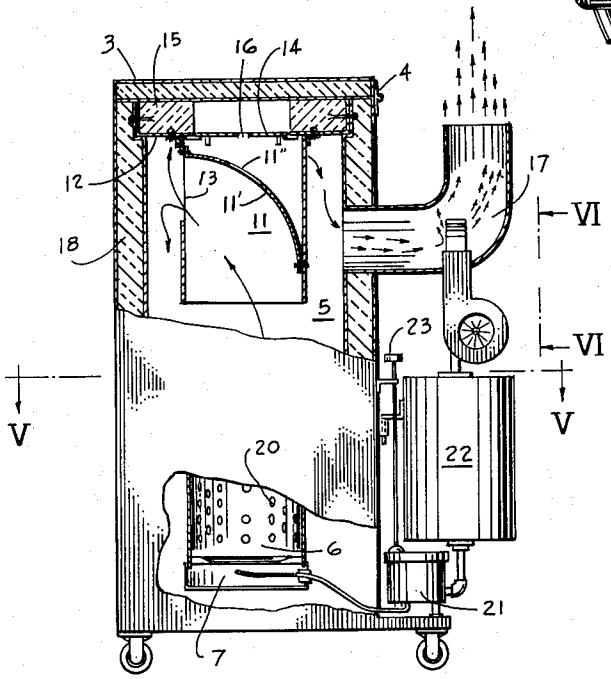


FIG.-4

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United States Patent Office 3,207,133 Patented Sept. 21, 1965

3,207,133

SWIMMING POOL HEATER

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Filed Aug. 27, 1962, Ser. No. 219,406
4 Claims. (Cl. 122—250)

This invention relates to a swimming pool heater, and particularly an oil burning heater of low cost and high efficiency.

It is an object of the invention to provide such a heater which is adapted for poolside use and which can readily be moved out of the way when it is not needed.

It is a further object to provide such a heater which is of simple construction, using parts which require only slight modification and adaptation in a new and effective combination.

It is another object to provide such a heater which operates very quietly, having only small motors with low electric current consumption, and a combustion chamber and stack arrangement designed for efficient burning of the fuel (particularly kerosene) with a minimum of sound.

It is a further object to provide certain improvements in the form, construction and arrangement of the several parts whereby the above-named and other objects may effectively be attained.

A practical embodiment of the invention is shown in the accompanying drawings, wherein:

FIG. 1 represents a rear elevation of the heater, showing the flue, blower, fuel tank and fuel flow regulator;

FIG. 2 represents a front elevation, parts being broken away to show the interior and parts being in section;

FIG. 3 represents a horizontal section taken on the line III—III of FIG. 2;

FIG. 4 represents a vertical section taken on the line IV—IV of FIG. 1, parts being shown in elevation;

FIG. 5 represents a horizontal section taken on the line V—V of FIG. 4;

FIG. 6 represents a detail elevation of the blower unit and deflector as viewed from the line VI—VI of FIG. 4.

FIG. 7 represents an end elevation of a typical float and pump assembly, and

FIG. 8 represents a side elevation of the float and pump assembly.

Referring to the drawings, the heater comprises a rectangular box-like casing **1** of metal having a base **2** and a lid **3**, hinged as indicated at **4**. Within the casing is mounted a combustion chamber having a large cylindrical upper portion **5** and a smaller coaxially disposed lower portion **6**, at the bottom of which is a simple pot-type kerosene burner **7**. Within the upper portion **5** and slightly spaced from the wall thereof is a water coil **8** of copper tubing with its inlet connection **9** near the top of the casing and its outlet connection **10** somewhat below the middle thereof. A cylindrical flame deflector **11** is fixed to the bottom of an inner filler member **12** (forming the top of the combustion chamber **5**) and extends downwardly within at least the upper ⅔ of the coil **8**, the deflector having an open bottom and a draft opening **13** near its top. It is desirable also to provide a curved baffle **11'** extending across the deflector **11** from a point near the bottom on one side to a point just above the draft opening **13** on the other side, the baffle **11'** having a central open **11''** in the middle below the door **14**.

The member **12** is in the form of a tray adapted to be removably secured across the top of the chamber **5**, provided with an upwardly opening small hinged door **14** and with insulation **15** filling the space around the door. A pep-hole **16** is formed in the door **14**, for observation of the interior without opening the door.

The flue **17** connects with the combustion chamber **5** somewhat below the top thereof and at a point diametrically opposite the opening **13** in the deflector, the flue extending horizontally outward through the rear wall of the casing and then turning upward for a short distance (FIGS. 1 and 4) while still terminating at a level no higher than the top of the casing.

The space between the upper combustion chamber **5** and the casing is filled with insulating material **18** to prevent loss of heat. The casing lid **3** is also filled with insulation **19** and may be opened to permit removal of the filler member **12** and flame deflector **11** in order to gain access to the heating coil, as for cleaning or inspection.

The lower or "fire-box" portion **6** of the combustion chamber is provided with lateral perforations **20** providing a supply of air to support combustion of the fuel which is fed to the burner **7** at the bottom from a flow regulator **21** outside the casing at the rear. The fuel (kerosene) is supplied to the flow regulator from a tank **22** (having a capacity of about 5 gallons, for instance) and the rate of flow is regulated by adjustment of a handle **23**, located at a convenient height but acting on the flow regulator.

A draft-inducing blower **24** is associated with the flue **17**, the blower outlet **25** extending vertically into the flue at the beginning of its upward turn (FIG. 4) and being provided, preferably, with an air deflector **26** having a Y-shaped profile (FIG. 6) which spreads the flow of air from the blower and creates a venturi effect.

When use for heating the water in a swimming pool, the heater unit described above has its inlet connection **9** connected by a hose **27** to a small submersible pump **28** arranged to be supported near the surface of the pool by an attached float **29**. A waterproof electrical connection for the pump motor is provided by the cable **30**, having a plug **31** adapted to plug into the double socket **32** on the heater casing. The motor of the blower **24** is likewise provided with a cord and plug (**33**) designed to be plugged into the same double socket, to which current is supplied through a cable **34**, preferably of 3-wire type, from any convenient outlet. In order to return heated water to the pool, a hose (not shown) is attached to the outlet connection **10** and the free end of the hose placed so that water will flow into the pool.

In operation, with the pump and float unit (FIGS. 6 and 7) in the pool water and hoses connected to the inlet **9** and outlet **10**, the pump unit plug **31** is inserted into the electric outlet **32** and the blower cord plug **33** is likewise plugged in. The power supply cable **34** is connected to a source of 110 volts A.C. electricity, making sure that the heater and pump are grounded either by use of the 3-wire cable or otherwise.

When the water is flowing, fuel is permitted to flow at a controlled rate to the burner **7** and is ignited from the top, as by opening the trap door **14** and dropping a piece of lighted paper into the burner **7**. After the heater warms up, the rate of fuel supply can be adjusted to the most efficient point for smoke-free operation. The blower and pump motors are very quiet so that the heater can be left running all night, when the pool is not in use, without causing any annoyance. The heat transfer is so effective that the exhaust from the flue is merely warm; in a typical embodiment an input of 50,000 B.t.u.'s can give an output of approximately 37,000 B.t.u.'s and twelve hours of operation will increase the water temperature of a 20,000 gallon pool, for instance, by three degrees when the average air temperature is about equal to water temperature.

During certain stages of operation there may be a tendency for moisture to condense on the heating coil and drop back into the burner, causing erratic combustion

or even puttting out the fire. It has been found that these adverse effects can be eliminated by shaping the coil in a slightly tapered form with its diameter decreasing progressively from top to bottom, as shown in FIG. 2. This arrangement causes moisture dropping from any given turn of the coil to fall outside the center of the next lower turn, this controlled cause of flow enabling the moisture to be re-evaporated without interfering with the flame.

While the heater has been described as adapted for use with its own floating pump to recirculate water already in a pool, it can also be connected to a hose from any other water source and used to heat the water, as when a pool is being filled initially or when additional, heated, water is needed or desired.

It will be understood that various changes may be made in the form, construction and arrangement of the several parts without departing from the spirit and scope of the invention, and hence I do not intend to be limited to the details shown or described herein except as the same are included in the claims or may be required by disclosures of the prior art.

What I claim is:

1. A portable swimming pool recirculating water heater designed and adapted for raising the temperature of the water in the pool comprising, a casing provided with a burner in its lower portion and a combustion chamber thereabove, a water circulating coil within said casing positioned above the burner and having an inlet for receiving water from the pool and an outlet for returning heated water to the pool, a flue for the combustion chamber fitted in the side of the casing and extending horizontally outward and vertically upward, a motor driven draft-inducing blower positioned exterioraly of the casing with its outlet projecting into the horizontal portion of the flue below the vertical portion thereof and directed upwardly toward said latter portion, and deflector means at the outlet of said blower for deflecting the discharge of the latter to create a venturi effect and thereby aid in inducing the flow of combustion products through said flue.

2. The combination as defined in claim **1** wherein said deflector means comprises a deflector plate having a generally Y-shaped profile for spreading the flow of air from the blower.

3. The combination as set forth in claim **1** wherein said deflector means is mounted in said blower outlet.

4. A portable swimming pool recirculating water heater designed and adapted for raising the temperature of the water in the pool comprising, a casing provided with a burner in its lower portion and a combustion chamber thereabove, a water circulating coil within said casing positioned above the burner and having an inlet for receiving water from the pool and an outlet for returning heated water to the pool, a generally cylindrical flame deflector positioned within said coil and having a bottom opening and a lateral opening near the top thereof, said flame deflector being spaced from said casing to form an annular space therebetween, a sloping baffle extending across the inside of said flame deflector from a point near the bottom of the latter on one side thereof to a point on the opposite side thereof above said lateral opening to thereby deflect combustion gases to the lateral opening and thence into said annular space, a flue for the combustion chamber communicating with said annular space and extending horizontally outward and vertically upward, a motor driven draft-inducing blower positioned exteriorly of the casing with its outlet projecting into the horizontal portion of the flue below the vertical protion thereof and directed upwardly towards said latter portion, and means at the outlet of said blower creating a venturi effect to aid in inducing the flow of combustion products through said flue.

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