

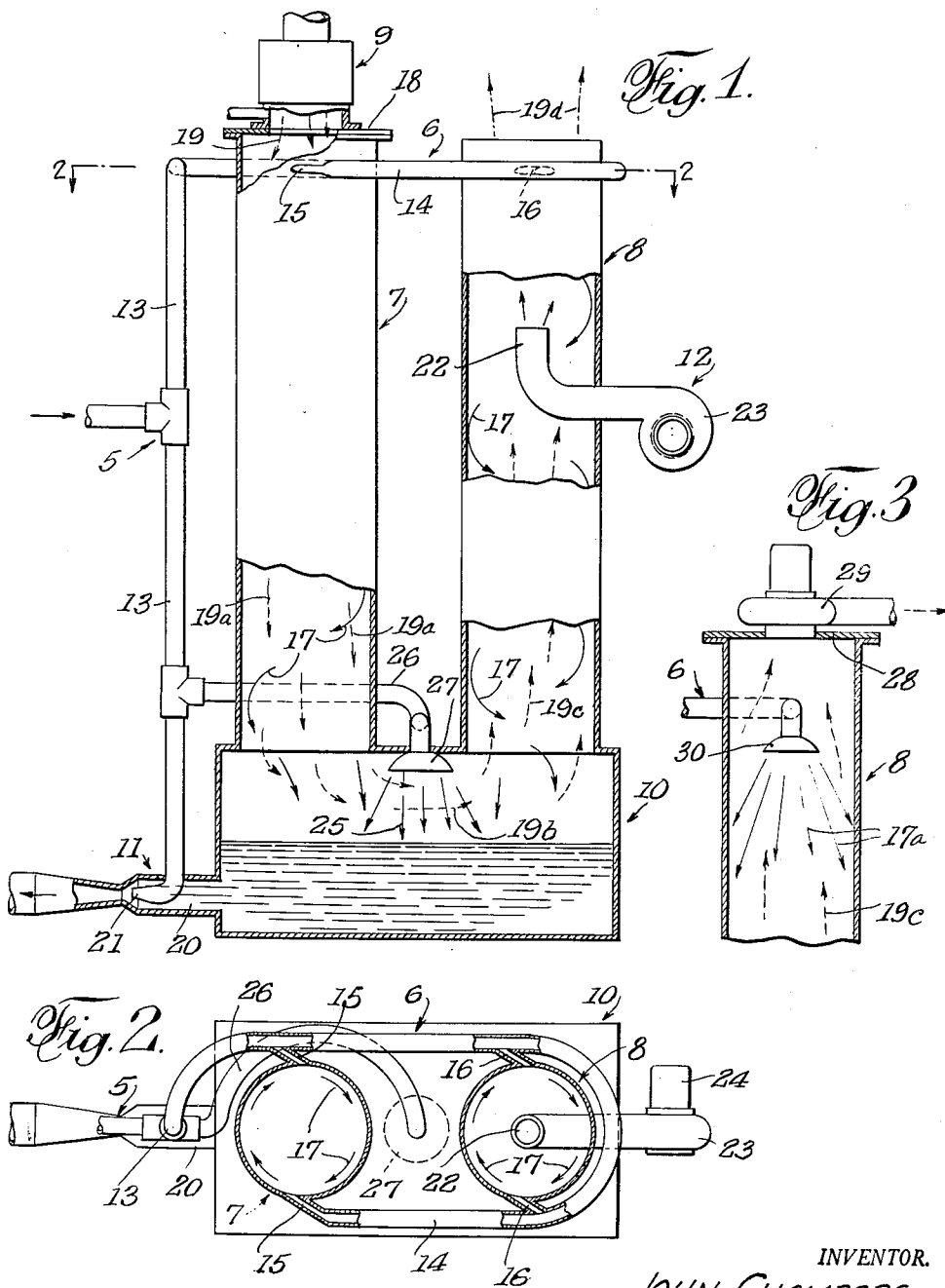
May 21, 1963

J. CHAMBERS

3,090,376

SWIMMING POOL HEATER

Filed June 24, 1957



INVENTOR.
 JOHN CHAMBERS
 BY *C. L. Stratton*
 ATTORNEY

1

3,090,376

SWIMMING POOL HEATER

John Chambers, 4262 Newton St., Torrance, Calif.

Filed June 24, 1957, Ser. No. 667,411

3 Claims. (Cl. 126—350)

This invention relates to a heater for the water of a swimming pool and has for an object to provide a continuously operating heater combining high efficiency with low cost of operation and installation.

Another object of the invention is to provide means to alternate the flow of water from the filter side of the pool so that said flow is either in the form of a spray, is in thin flow form, or both, directly heating the water while so attenuated, and returning the heated water to the pool.

A further object of the invention is to provide means to impart draft to the heating means, thereby causing a movement of heating gases that is, at least in part, counter to the direction of movement of the water through the heater.

A still further object of the invention is to provide a pool water heater that provides at least two downward flows of water to be heated and introduces heated gases directly into said flows, in the direction of one water flow and counter to the direction of the other water flow.

A yet further object of the invention is to provide a heater as above in which the heated water from both flows is combined before the same is forced under pressure back into the pool from which taken.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawing merely shows and the following description merely describes, preferred embodiments of the present invention, which are given by way of illustration or example only.

In the drawing, like reference characters designate similar parts in the several views.

FIG. 1 is a partial elevational and partial sectional view of a pool water heater according to the present invention.

FIG. 2 is a cross-sectional view as taken on the plane of line 2—2 of FIG. 1.

FIG. 3 is a vertical sectional and fragmentary view of a modification.

The swimming pool heater that is illustrated comprises, generally, a water inlet 5, the same being the outlet of a pool from the pump and/or filter side thereof, means 6 creating an attenuated or spray flow of the inlet water, preferably vertical tubes 7 and 8 for receiving such flow, a source of heat 9 for the water flowing in the tubes, a sump 10 for collecting heated water exiting from the tubes, means 11 for returning the water from the sump to the pool, and means 12 for controlling the movement of the heated gases moving in the tubes 7 and 8.

The water inlet 5 is shown as a pipe that enters a riser 13. The means 6 comprises a generally horizontal extension 14 of said riser, the same partly encircling the tubes 7 and 8 (which are shown in side-by-side relationship), and a set of nozzles 15, entering tube 7, and nozzle 16, entering tube 8. As can be best seen from FIG. 2, said nozzles 15 and 16 comprise restrictions or flow-limiting orifices so directed as to introduce the water from inlet 5 into said tubes 7 and 8 in a swirling path. A tangential introduction, as shown, will impart to the water a swirling and downward path that is suggested by the whole arrows 17. Actually, the water describes a helical path that be-

2

comes steeper as gravity is effective. Because of the restriction of the nozzles, these two downward, spiraling flows effect an attenuation of the water while largely maintaining the same outwardly toward the walls of said tubes 7 and 8.

The tubes 7 and 8 are shown as vertically elongated and, in this instance, without inner obstruction, vanes or other parts. The mentioned spiraling flow simply follows the inner faces of the tubes and the same gravitationally falls therefrom into the sump 10.

The means 9 comprises a source of heat that may be in any desirable form and is here shown as applied to the upper end of tube 7. The latter is capped, as at 18, and the heater means 9 is carried by said cap. In any case, the means 9 discharges its heated gases in the direction of arrows 19 downwardly into the tube 7. How the heated air is moved with the burning gases from the heater 9 will be described in connection with the means 12.

The sump 10 is shown in the form of a tank or chest that receives the water flow from the tubes 7 and 8. The sump constitutes a support base for said tubes and is provided with an outlet 20 that is preferably laterally directed so as to connect with the means 11.

Said means 11 is shown as a liquid jet pump 21 that extends from riser 13 and produces a pressure on the heated water leaving the sump so as to force the same back to the pool against the head of water in said pool. In fact, any suitable pump means may be used for this purpose, the jet type of pump being quite economical and, therefore, preferred.

The means 12 moves the heating gases through the tubes 7 and 8. Ordinarily these gases tend to rise and, therefore, will resist downward movement in tube 7. However, by providing the means 12 with an air ejector 22 that is disposed within the tube 8 and directed to create an upward draft in said tube, the draft thus created is effective in tube 7 to draw the heating gases, first downwardly, as arrows 19a, then across the upper portion of the sump 10, as arrows 19b, and finally, upwardly in tube 8, as arrows 19c. Thus, both downward flows of pool water in said tubes are in direct heat exchange contact with the heated gases and the heating is extremely efficient because heat radiated by the heated gases is directly and immediately absorbed by the pool water. In one tube—tube 7—the water and the heated gases move downwardly together and achieve a long heat-exchanging engagement for that reason. In the tube 8, the flow of water is counter to the upward flow of gases, but, nevertheless, efficient because of the spiraling flow of the water.

The air introduced by the means 12 combines with the heated gases and exits from the upper open end of tube 8, as at 19d, the same comprising the products of combustion admixed with the ejector air.

The means 12 is shown as a centrifugal blower 23 that is driven as by a motor 24 and supplies the ejector 22. In a usual way, a regulating valve or damper may control the air-moving capacity of said blower and, therefore, the heated air-moving draft in the tubes 7 and 8.

Improved efficiency of the present heater may result from the provision as part of the means 6 of a water spray 25 across the flow of heated gases at the arrows 19b. To this end, the riser 13 may be provided with a branch pipe 26, the latter extending to a spray head or nozzle 27 that produces the spray 25 within the sump 10.

Either or both of the water flows in tubes 7 and 8 may comprise sprays similar to spray 25. While such a spray in tube 7 may introduce a spray head into the path of the flow of heated gases and is not preferred, the same may be advantageously incorporated in tube 8, as can be seen from FIG. 3. In such case, the tube 8 is provided with a closure or capping plate 28 and the same mounts an exhaust fan 29 which serves the same purpose as blower

3

23 and nozzle 22. By modifying the means 6 to comprise a spray head 30 instead of nozzles 16, a downward water flow 17a through which the heated gases (arrows 19c) pass, is obtained and water vapor in the gases is condensed. Such attenuated flow will effect a heat exchange with the heating gases much in the same way as the earlier-described form. Moreover, the introduction of water by a spray head from the mass to be heated lowers the dew point temperature of the gases below the dew point temperature resulting from water vapor formed therein as a product of combustion. The dew point temperature of the water from the spray head, being at saturation, cannot exceed the temperature of the sprayed water.

While the foregoing has illustrated and described what are now contemplated to be the best modes of carrying out my invention, the constructions are of course, subject to modification without departing from the spirit and scope of the invention. It is, therefore, not desired to restrict the invention to the particular forms of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A heater for swimming pool water comprising, a water inlet, side by side generally vertical tubes, means to introduce water spirally from said inlet into said tubes so that flow in the tubes is attenuated and is in a downward direction in both tubes, one of said tubes having a cap at the upper end thereof containing a gas heater with a discharge into said tube, means to cause a flow of the exhaust from said gas heater downward in said tube and upward in the other to generate heat in contact with the flows of water for heating the latter, and means to draw the heated water back toward a pool after the same leaves the tubes.

2. A swimming pool heater comprising an upwardly directed heat flow path, a downwardly directed heat flow path in communication therewith, a heat source mounted in the top of said downwardly directed heat flow path for directing heated air downwardly therein, air exhaust means for directing said heated air upwardly in said upwardly directed heat flow path, means for projecting swimming pool water around the periphery of said downwardly directed path in direct contact with said heated air to be heated thereby, means for returning water thus heated to the swimming pool, means for spraying unheated water to be heated into the top of said upwardly directed heat flow path in direct contact with heated gases rising in said path, said sprayed water cooling said rising heated gases below its dew point, and means for returning said sprayed water to the swimming pool.

3. A heater including a supply conduit adapted to be connected to a water outlet and a discharge conduit, said heater being interposed between said supply conduit and

4

said discharge conduit, said heater including first and second substantially upright passageways and a small container forming a sump, said passageways having lower ends connected to and discharging downwardly into said sump, said first passageway being closed at the upper end thereof and a gas burner mounted therein for discharging a downwardly-directed flame into the upper end of said passageway, said second passageway constituting an outlet stack for the products of combustion of the gas burner and having an outlet at the upper end thereof, draft inducing means supported by the outlet stack for impelling the products of combustion through the passageways toward said outlet and to draw the flame from said gas burner toward the center and away from the side walls of said first passageway, openings connected to said supply conduit and discharging into said passageways adjacent upper ends thereof, said openings introducing cold water to be heated into said first passageway tangentially along the inner walls thereof to attenuate the water flow, and unheated water into said second passageway across its cross sectional area to reduce the temperature of heater exhaust therein below its condensation temperature, water passing downwardly through the passageways being heated by a direct contact with the downwardly-directed flame in said first passageway and with the products of combustion from said heater passing through said second passageway, said sump having an outlet connected to said discharge conduit, and jet pump means in said outlet for maintaining the water level within the sump below the level of the open lower ends of the passageways to permit the products of combustion to pass through the upper part of the sump from the lower end of the first passageway to the lower end of the second passageway, said jet pump having a heater bypass connection from said supply conduit to said discharge conduit whereby unheated water from said supply conduit and said bypass connection draws heated water from said sump into said discharge conduit.

References Cited in the file of this patent

UNITED STATES PATENTS

1,527,740	Lipshitz	Feb. 24, 1925
2,249,202	Glenn	July 15, 1941
2,327,039	Heath	Aug. 17, 1943
2,543,835	Dewey	Mar. 6, 1951
2,677,368	Janecek	May 4, 1954
2,696,275	Pring	Dec. 7, 1954
2,884,197	Whittell	Apr. 28, 1959

FOREIGN PATENTS

2,704	Great Britain	Feb. 4, 1884
345,387	France	Nov. 29, 1904