June 16, 1936. W. RIEDER 2,044,634

ELECTRIC LIQUID HEATER

Filed Oct. 24, 1935 2 Sheets-Sheet 1

Fig. 1.

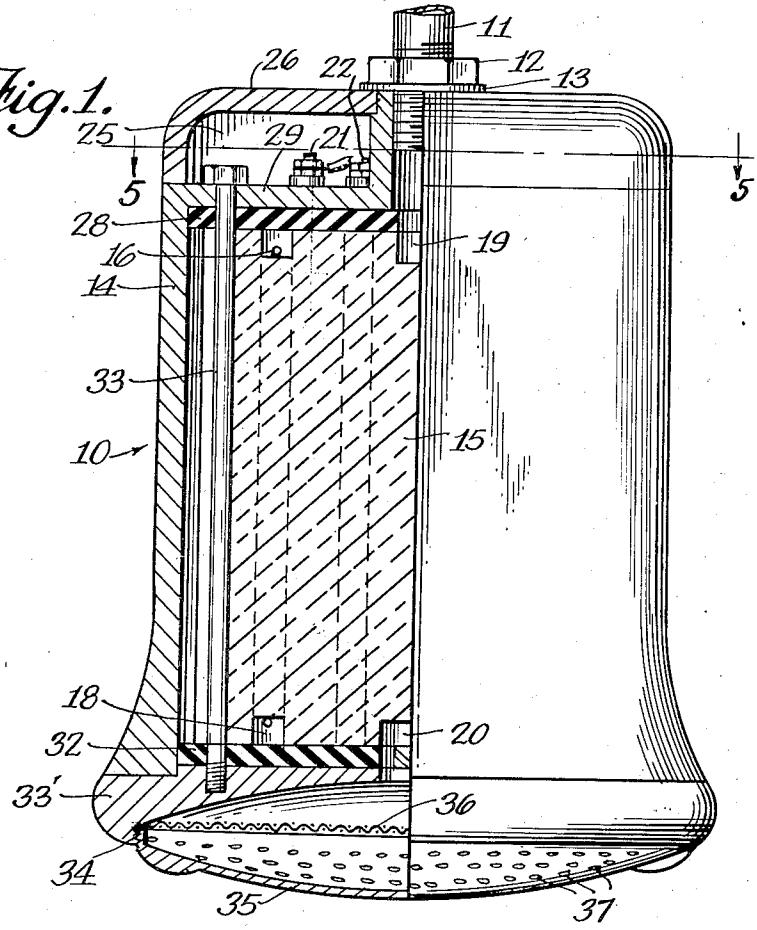
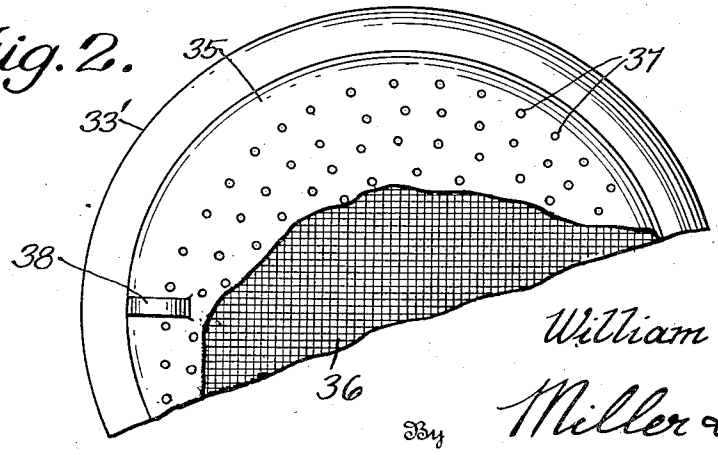


Fig. 2.



Inventor
William Rieder
By Miller & Miller
Attorneys

June 16, 1936. W. RIEDER 2,044,634

ELECTRIC LIQUID HEATER

Filed Oct. 24, 1935 2 Sheets-Sheet 2

Fig. 3.

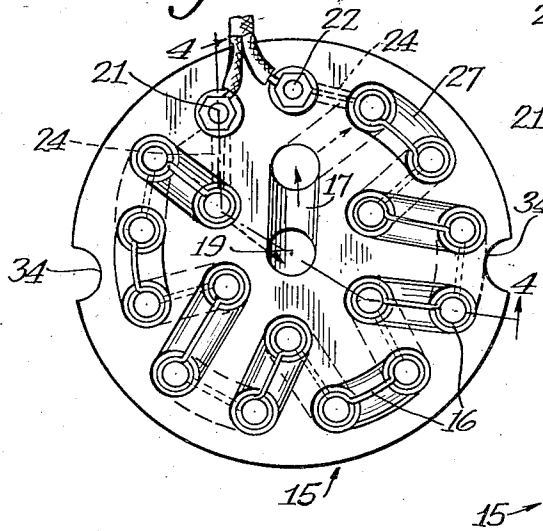


Fig. 4.

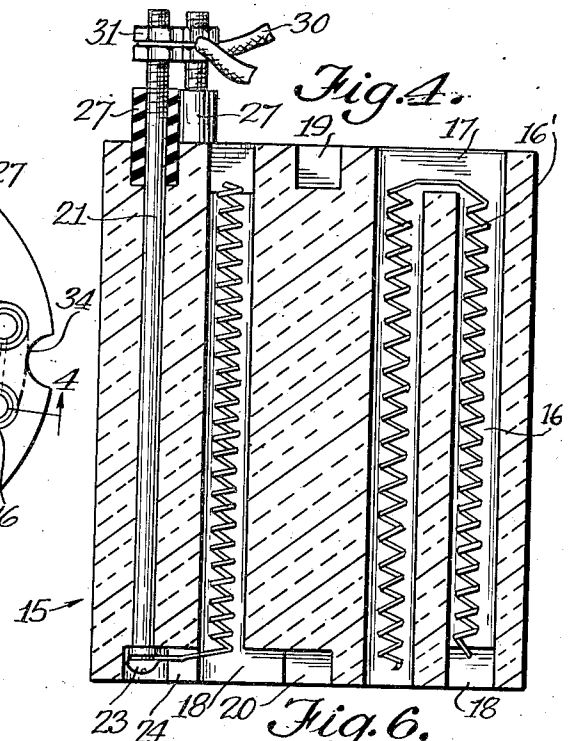


Fig. 5

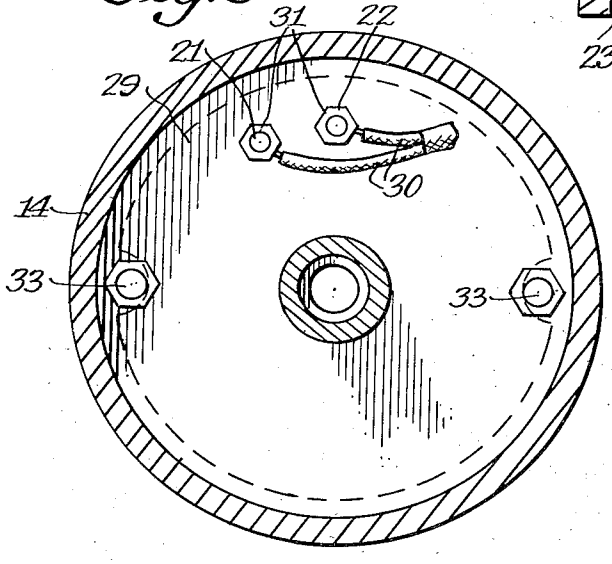
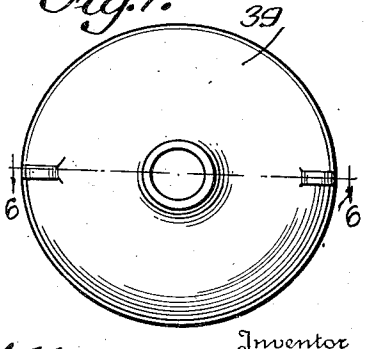


Fig. 6.



Fig. 7.



Inventor

William Rieder.

By Miller & Miller

Attorneys.

UNITED STATES PATENT OFFICE

2,044,634

ELECTRIC LIQUID HEATER

William Rieder, Lebanon, Ill.

Application October 24, 1935, Serial No. 46,577

7 Claims. (Cl. 219—39)

This invention relates to an electric liquid heater and has for an object to provide an improved electric heater especially intended for heating a liquid while it flows therethru in a continuous stream.

A further object of this invention is to provide an electric liquid heater and especially an electric water heater intended for use on a water faucet to be attached to the nozzle of the water faucet and likewise intended for use as a shower bath device for supplying a hot shower or spray either directly from the heater or thru a shower hose and attachment which may take the place of the spray plate of this invention.

A further advantage of this invention is that a channel which is electrically heated by a nichrome wire for a continuous passage of the water therethru, heating the water as it continues thru passage and yet in spite of the fact that a long passage is provided allowing the water to arrive at the desired temperature before it is discharged from the heater, yet the total size of the heater, that is the overall length of the heater unit, is less than one-fifteenth the overall added length of the passage through which the liquid or water passes as it is being heated.

As an additional feature of this invention there is provided a spray or shower plate and a shower hose attachment plate which will take the place of the spray plate and is interchangeable therewith for use whenever it is desired to use a shampoo or shower hose instead of receiving the shower spray directly from the heater.

With the foregoing and other objects in view, as will hereinafter become apparent, this invention comprises the constructions, combinations, and arrangements of parts, hereinafter set forth, claimed, and shown on the accompanying drawings.

In the drawings,

Figure 1 is an elevational view partly in section of the liquid heater of this invention attached to the end of a faucet nozzle or water pipe.

Figure 2 is a bottom plan view partly broken away of Figure 1.

Figure 3 is a top plan view of the heater core and heating element.

Figure 4 is a sectional view on line 4—4 of Figure 3.

Figure 5 is a sectional view on line 5—5 of Figure 1.

Figure 6 is a sectional view of a shower hose attachment taken on a slightly smaller scale, being on line 6—6 of Figure 7, and,

Figure 7 is a bottom plan view of the shower hose attachment of Figure 6.

There is shown at 10 electric liquid heater of this invention attached to a water pipe 11 and held securely thereto by means of the lock nut 12 and washer 13. This heater 10 includes a shell 14 containing the heater core 15 shown more in detail in Figures 3 and 4. This heating core 15 will be made of any suitable insulating material including ceramic materials as well as compositional matter, such as phenolic condensation products, some of which are commercially known as bakelite, or any other suitable insulating material which can be molded and drilled to the shape and form desired.

A plurality of vertical passages 16 are drilled or molded thru the core 15. Connecting grooves 17 and 18 are formed at the top and bottom of the core 15 between the passages 16. The grooves 17 and 18 are so located that a continuous channel is formed commencing at the inlet 19 and ending at the outlet 20.

A pair of electrodes 21 and 22 have their heads 23 counter-sunk in grooves 24 at the bottom of the core and extend thru the core to a covered chamber 25 formed on top of the shell 14 by the top cover 26. Cylindrical insulating washers 27 are partly counter-sunk into the core 15 as shown in Figure 4, the insulating washer 27 extending up thru the insulating rubber washer 28 and the top wall 29 of the shell 14. Electric wires 30 are connected by nuts 31 to the upper threaded end of the electrodes 21 and 22 and thereby provide an electrical current which may pass along the nichrome heating wire 16' extending thru the channel formed in the core 15. Another and similar rubber insulating washer 32 is placed at the bottom of the core 15 and the core is then held within the shell 14 by means of the bolts 33 extending in a semi-cylindrical groove 34 along the sides of the core 15 and thru the top wall 29 of shell 14 into the bottom cover 33.

The inlet passage 19 of the core 15 continues thru the upper rubber washer 28 and the top cover 29 of shell 14 and is connected to the water pipe 11. The outlet passage 20 likewise extends thru the bottom rubber insulating washer 32 in the bottom cover 33. This bottom cover 33 is provided with an internally threaded flange 34 for receiving a shower face 35 threaded therein, this shower face 35 also serving as a holding means for holding a screen 36 to clean the water

as it passes from the outlet 20 to the shower perforations or spray 37 extending thru outlet 20 to the shower plate 35.

A suitable gasket being also supplied if desired about the contact edges of the shower plate 35 and the bottom cover 33, bosses 38 make it easy to quickly remove and replace the shower plate 35 for cleaning the screen 36 and also for substituting a hose attachment 39 shown in Figures 6 and 7. The hose attachment 39 is provided with a nozzle 40 suitable for receiving the end of a shower or shampoo hose when it is not desired to use the shower spray directly from the heater unit of this invention.

Thus the heater unit of this invention 10 may be placed on a water pipe 11 so as to provide an overhead shower or spray enabling the user to stand directly beneath this practically instantaneous hot water heater shower bath. At other times the user may desire to use the water from a shower hose or a shampoo hose and thus control the direction of the water and in this case he may merely remove the shower plate 35 by means of the bosses 38 and substitute the hose attachment 39 by means of the bosses 41, the hose attachment 39 being of the same size and thread as the shower plate 35.

It will be observed particularly from Figure 3 that the first downward passage connected to the inlet 19 by the first groove 17 does not have any portion of the heating wire 16' extending therethru, the heating wire 16' being connected to the first upward passage and then continuing thru the channel formed by the succession of the passages and grooves and terminating at the other anode 21. As a result of this construction there is less likelihood of any of the water short circuiting the anodes because of the fact that the anodes are thus thoroughly protected from each other by the material of the core as well as the rubber washers 28 and 32 at the top and bottom of the core and the insulating cylindrical washer 27.

In operation the water enters from the pipe 11, continues thru the channel formed in the core being in continuous contact with the nichrome heating wire 16' in the channel until it reaches the outlet 20, is then discharged thru the bottom cover into the bottom chamber thru the bottom screen and either the shower plate or hose attachment connected thereto for use. The water will be heated in its long passage thru the channel formed by the various connected passages and will be discharged from the outlet at the desired heated temperature, according to the amount of current that is passing along the nichrome heating wire 16.

The novel features and the operation of this device will be apparent from the foregoing description. While the device has been shown and the structure described in detail, it is obvious that this invention is not to be considered limited to the exact form disclosed and that changes may be made therein within the scope of what is claimed without departing from the spirit of the invention.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. An electric liquid heater comprising a shell, an insulation core within said shell, a tortuous continuous channel extending thru said core within said shell, said channel comprising a plurality of vertical passages extending through said insulation core and a plurality of grooves at the top and bottom of said core connecting said passages together in a continuous channel, insulation washer means at the top and bottom of said core closing said grooves to form parts of said continuous channel, a bottom cover holding said core and insulation washer means in said shell, a liquid inlet and outlet to said channel extending thru said insulation washer means and said bottom cover and an electric heating element in said channel heating the liquid as it passes therethru from inlet to the outlet.

2. An electric liquid heater comprising a shell, an insulation core within said shell, a tortuous continuous channel extending thru said core within said shell, said channel comprising a plurality of vertical passages extending through said insulation core and a plurality of grooves at the top and bottom of said core connecting said passages together in a continuous channel, insulation washer means at the top and bottom of said core closing said grooves to form parts of said continuous channel, a bottom cover holding said core and insulation washer means in said shell, a liquid inlet and outlet to said channel extending thru said insulation washer means and said bottom cover and an electric heating element in said channel heating the liquid as it passes therethru from inlet to the outlet, and a shower plate attachable to said bottom cover.

3. An electric liquid heater comprising a shell, an insulation core within said shell, a tortuous continuous channel extending thru said core within said shell, said channel comprising a plurality of vertical passages extending through said insulation core and a plurality of grooves at the top and bottom of said core connecting said passages together in a continuous channel, insulation washer means at the top and bottom of said core closing said grooves to form parts of said continuous channel, a bottom cover holding said core and insulation washer means in said shell, a liquid inlet and outlet to said channel extending thru said insulation washer means and said bottom cover and an electric heating element in said channel heating the liquid as it passes therethru from inlet to the outlet, and a shower hose attaching plate attachable to said bottom cover.

4. A shower water electric heater comprising a cylindrical shell, a core of insulation material in said shell, a continuous tortuous channel extending thru said core, said channel comprising a plurality of vertical passages and a plurality of grooves at the top and bottom of said core connecting said passages together in a continuous channel, rubber washer means at the top and bottom of said core closing said grooves at the top and bottom of said core to form parts of said continuous channel and a bottom cover for holding said core and rubber washers in said shell.

5. A shower water electric heater comprising a cylindrical shell, a core of insulation material in said shell, a continuous tortuous channel extending thru said core, said channel comprising a plurality of vertical passages and a plurality of grooves at the top and bottom of said core connecting said passages together in a continuous channel, rubber washer means at the top and bottom of said core closing said grooves at the top and bottom of said core to form parts of said continuous channel and a bottom cover for holding said core and rubber washers in said shell, and bolt means extending thru the top wall of said shell along semi-cylindrical grooves formed in the side of said core and into said bottom cover to hold said core, washers and shell in assembled position.

6. A shower water electric heater comprising a cylindrical shell, a core of insulation material in said shell, a continuous tortuous channel extending thru said core, said channel comprising a plurality of vertical passages and a plurality of grooves at the top and bottom of said core connecting said passages together in a continuous channel, rubber washer means at the top and bottom of said core closing said grooves at the top and bottom of said core to form parts of said continuous channel and a bottom cover for holding said core and rubber washers in said shell, and bolt means extending thru the top wall of said shell along semi-cylindrical grooves formed in the side of said core and into said bottom cover to hold said core, washers and shell in assembled position, a pair of anodes extending thru the top cover of said shell and to said core at the bottom thereof, and a heating element connected to said anodes only at the bottom of the core extending thru the length of the continuous channel formed therethru.

7. A shower water electric heater comprising a cylindrical shell, a core of insulation material in said shell, a continuous tortuous channel extending thru said core, said channel comprising a plurality of vertical passages and a plurality of grooves at the top and bottom of said core connecting said passages together in a continuous channel, rubber washer means at the top and bottom of said core closing said grooves at the top and bottom of said core to form parts of said continuous channel and a bottom cover for holding said core and rubber washers in said shell, and bolt means extending thru the top wall of said shell along semi-cylindrical grooves formed in the side of said core and into said bottom cover to hold said core, washers and shell in assembled position, a pair of anodes extending thru the top cover of said shell and to said core at the bottom thereof, and a heating element connected to said anodes only at the bottom of the core extending thru the length of the continuous channel formed therethru, said bottom cover having an internally threaded flange and adapted to receive a correspondingly threaded shower plate or shower hose attachment plate therein.

WILLIAM RIEDER.