Oct. 11, 1955 L. LORENZETTI 2,720,581

ELECTRIC WATER HEATER

Filed Oct. 8, 1951 2 Sheets-Sheet 1

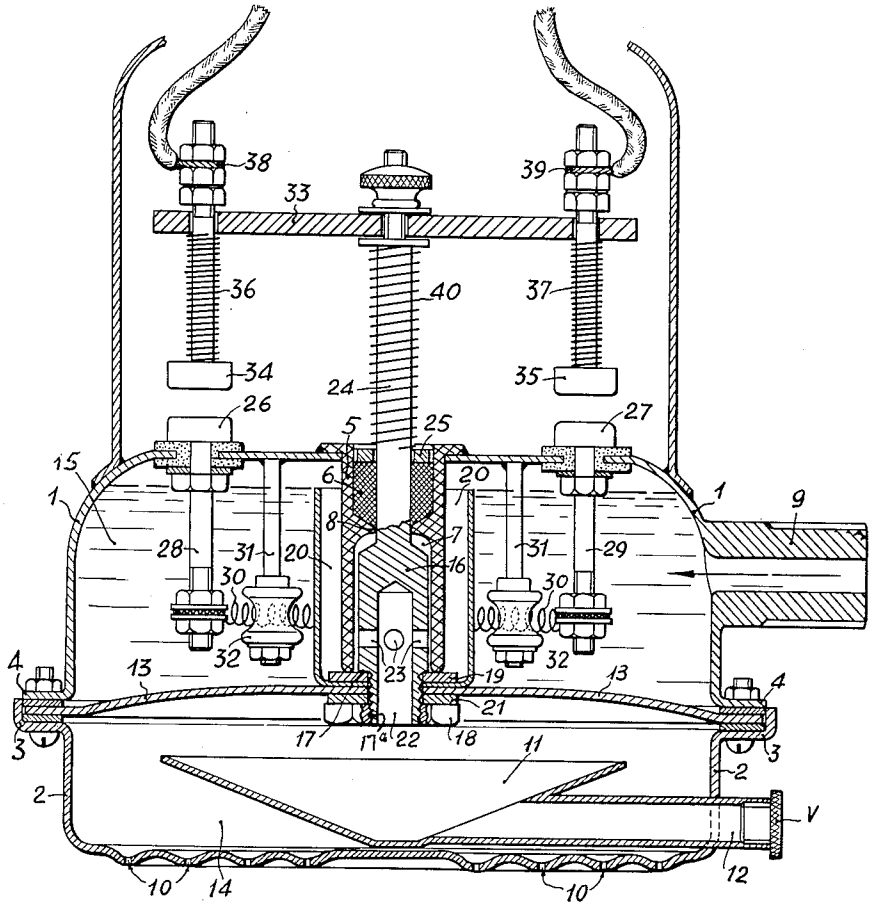


Fig. 1

INVENTOR

Lorenzo Lorenzetti

BY Stevens, Davis, Miller & Mosher

his ATTORNEYS

Oct. 11, 1955 L. LORENZETTI 2,720,581

ELECTRIC WATER HEATER

Filed Oct. 8, 1951 2 Sheets-Sheet 2

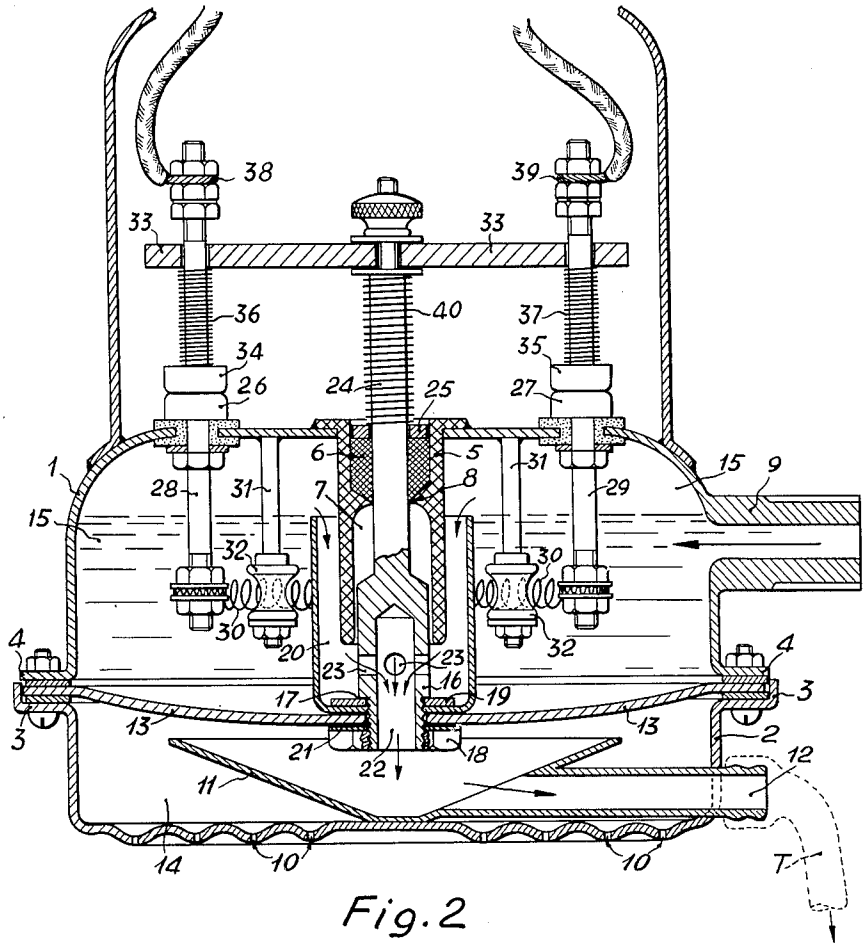


Fig. 2

INVENTOR

Lorenzo Lorenzetti

BY Stevens, Davis, Miller & Mosher

his ATTORNEYS

United States Patent Office 2,720,581 Patented Oct. 11, 1955

2,720,581

ELECTRIC WATER HEATER

Lorenzo Lorenzetti, Sao Paulo, Brazil

Application October 8, 1951, Serial No. 250,281

Claims priority, application Brazil July 2, 1951

7 Claims. (Cl. 219—39)

This invention relates to an electric heater particularly suitable, for shower, bath and similar washing units and has for its primary object to provide a water heater which automatically is set in operation when a quantity of water above a certain minimum value passes through it, this passage being intercepted if the quantity of water is less than the said minimum.

The drawings attached hereto illustrate an embodiment of this invention in which:

Fig. 1 is a vertical section of the device when at rest.

Fig. 2 is a vertical section of the appliance when operating.

Being particularly suitable for showers, this new apparatus consists of a main body or casing made up of two concave parts **1** and **2** superposed and united by means of flanges **3** and **4** so as to form a hollow casing.

The center of the concave piece **1** has attached to it a tubular piece **5** divided by the projection **8** into sections **6** and **7**: the part **1** is provided also with an input water side pipe **9**. The concave part **2** is provided at its bottom with a plurality of holes **10** for the water to go through. The part referred to by **2** is provided internally with a funnel **11**, which conveys the water out of the device, that is to say to the outlet **12** to which a flexible pipe T may be connected and said pipe in turn may be connected with another small shower or a valve. Outlet **12** may be closed by a plug V when water has to flow out through holes **10**.

Between the flanges **3** and **4** the edge of a diaphragm **13** is clamped, this membrane dividing the inner space, provided by the casing members or parts **1** and **2**, into two chambers **14** and **15**. At the center of the diaphragm **13** is attached a member **16** with an inner bore or passage **22** communicating with the side holes **23**, **23** and provided with a reduced threaded portion **17***a*, and a shoulder **17** against which, by means of a nut **18**, a washer **19**, the membrane **13** and the washer **21** are tightened.

The member **16** fastened at the center of the diaphragm slides telescopically and with a certain clearance into the inside of the tubular piece **5** so that when it moves downwards the holes **23** project out of the tubular piece **5** in such a manner so as to make both the chambers **14** and **15** directly communicating as shown in Fig. 2, but when the member **16** is in the upper position, the holes **23** enter the tubular piece **5** preventing communication between both the chambers **14** and **15**, as shown in Fig. 1.

The member **16** is provided with a reduced extension or rod **24** which after passing through the inner projecting portion **8** and the tubular chamber **6**, acting as a stuffing-box, projects from said piece through the washer **25**.

Over the concave part or casing member **1** are set up two electric contacts **26** and **27** electrically insulated and provided with extensions **28** and **29** running into the inside of the apparatus. Said extensions are connected with the terminals of the resistance **30**, the studs **31** with the insulators **32** cooperating in supporting and fixing the position of the electric resistance **30**.

On top of the rod **24** is fastened a plate **33** which holds two electric contacts **34** and **35** provided with springs **36** and **37**, having at the upper ends the terminals **38** and **39** to which the lead-in wires of the electric current are connected.

The contacts **34** and **35** are located with a certain clearance above the contacts **26** and **27** so that when the plate **33** is depressed said contacts are mutually pressed together giving rise to a perfect electric contact. The cylindrical cup-shaped member **20** is for the purpose of maintaining enough water in the casing, and at a level sufficiently high so that the electric resistance **30** always dips into the water.

The offset spring **40** pushes the rod **24** upwards balancing the weight of all the assembly fixed to the rod—this assembly comprising the plate **33**, piece **16**, membrane **13**, the parts attached to them and in addition the water inside the casing—till the water approaches the bottom portion of the tubular member **5**.

The performance of this said type of shower is as follows: The outlet **12** of the device is connected with the water flexible tube T, both the leads of the electric main being linked up with the terminals **38** and **39**, the control tap of the inlet of the water, is open.

Upon giving way to the circulation of the water, this latter will enter the inner space **15**, then pressure of the water acting on the diaphragm **13** will overcome the balancing effect of the offset spring **40**, the membrane being compelled to lower to the position shown in Fig. 2.

The member **16** will go down similarly with all the assembly fitted on it, causing the chambers **14** and **15** to communicate with one another by means of the holes **22** and **23**. The top contacts **34** and **35** will be strongly pressed against the bottom contacts so as to close the electric circuit which will heat the water.

As the water overflows the edge of the cylindrical cup **20** and through the holes **22** and **23**, it will fall down upon the funnel **11** which in turn conveys the water to the flexible piping T. If the outlet **12** is closed (as shown in Fig. 1) the water will spill away from the funnel **11** and run out of the douche sprayer through the holes **10**.

As shown in the drawings the electric resistance is always immersed in the water, inasmuch as this latter to run out has to flow over the edges of the cylindrical cup **20**.

On closing the water passage the pressure of the water will decrease so as to be equal to the weight of water over the diaphragm, and the offset spring **40** will operate so as that the assembly will come back to the position as shown in the Fig. 1.

As will be observed when there is a passage of a small quantity of water the membrane **13** will begin to move downwards, and if the said quantity be only that which goes through the clearance between the member **16** and the tubular lower section **7** and then through the holes **23** and **22**, said quantity will be not sufficient to make the diaphragm move further downwards so to close the electric contacts of the circuit. However, upon increasing the flow of water, a moment will arrive in which the position is such that the contacts will close, thus allowing the passage of the electric current, the volume increase of water being a minimum. Under these circumstances the flowing water is reckoned to reach the maximum temperature as soon as possible, without having the electric resistance damaged or burnt.

Should the flow of water increase, then the membrane will lower more and more, and the water will flow easily through the holes **23** and **22**. Insofar as the heat supplied by the electric resistance has always the same value, by altering the flow of water it will be possible to reach the temperature which is wished without incurring the hazard of burning the electric resistance.

It is obvious from the foregoing that the water heater

disclosed herein is capable of operating quickly, efficiently and automatically and with absolute safety.

What I claim is:

1. An electric water heater comprising a vertically disposed casing, a flexible diaphragm mounted transversely in the casing and dividing it into an upper and a lower chamber, inlet means for cold water communicating with the upper chamber, outlet means for hot water communicating with the lower chamber, electric heating means disposed in the upper chamber, valve means positioned in the upper chamber and carried by the diaphragm and operated in response to an increase of water in the upper chamber and consequent downward flexing of the diaphragm under such pressure for establishing communication between the upper and the lower chamber, switch means actuated by the diaphragm in response to the downward movement of the diaphragm under the increase of water in the upper chamber and means yieldingly holding said diaphragm against movement in response to such increase of water.

2. The combination of claim 1, wherein said casing has outlet openings formed in the portion defining the bottom wall of the lower chamber, a water collector in said lower chamber above the said outlet openings and underlying the valve means and in communication with the outlet means.

3. An electric water heater comprising a vertically disposed casing, a flexible diaphragm mounted transversely in the casing and dividing the casing into an upper and a lower chamber, inlet means for cold water communicating with the upper chamber, outlet means for hot water communicating with the lower chamber, electric heating elements mounted in the upper chamber, valve means in said upper chamber carried by the diaphragm and actuated by the downward movement of the diaphragm in response to an increase in water pressure in the upper

chamber to establish fluid communication between the upper and lower chambers, electric contacts for said heating elements positioned exteriorly of the casing and moved by the diaphragm in response to such increased water pressure in the upper chamber into engagement with the heating elements, and resilient means yieldingly retaining said diaphragm against downward movement in response to such increased water pressure.

4. The combination of claim 3, wherein said valve means includes a body mounted on the diaphragm and having an axial passage communicating through the diaphragm with the lower chamber, said body having radial ports communicating with the passage and adapted to communicate with the upper chamber, a fixed member carried by the casing and positioned in the upper chamber concentric to the body and adapted to close off the ports.

5. The combination of claim 4, wherein a cup-shaped member is mounted at one end on the diaphragm and positioned in the upper chamber, said cup-shaped member having an opposing open end and being disposed around said fixed member.

6. The combination of claim 4, wherein said body slidably extends through the upper chamber and through the casing and said resilient means is coiled on the body exteriorly of the casing, and an arm on said body, said resilient means bearing against the casing and the arm.

7. The combination of claim 6, wherein said contacts are slidably carried by the arm and are provided with springs to retain them in their outward positions.

References Cited in the file of this patent

UNITED STATES PATENTS

1,920,284	Wells	Aug. 1, 1933
1,952,107	Wilson	Mar. 27, 1934
2,036,117	Cante	Mar. 31, 1936