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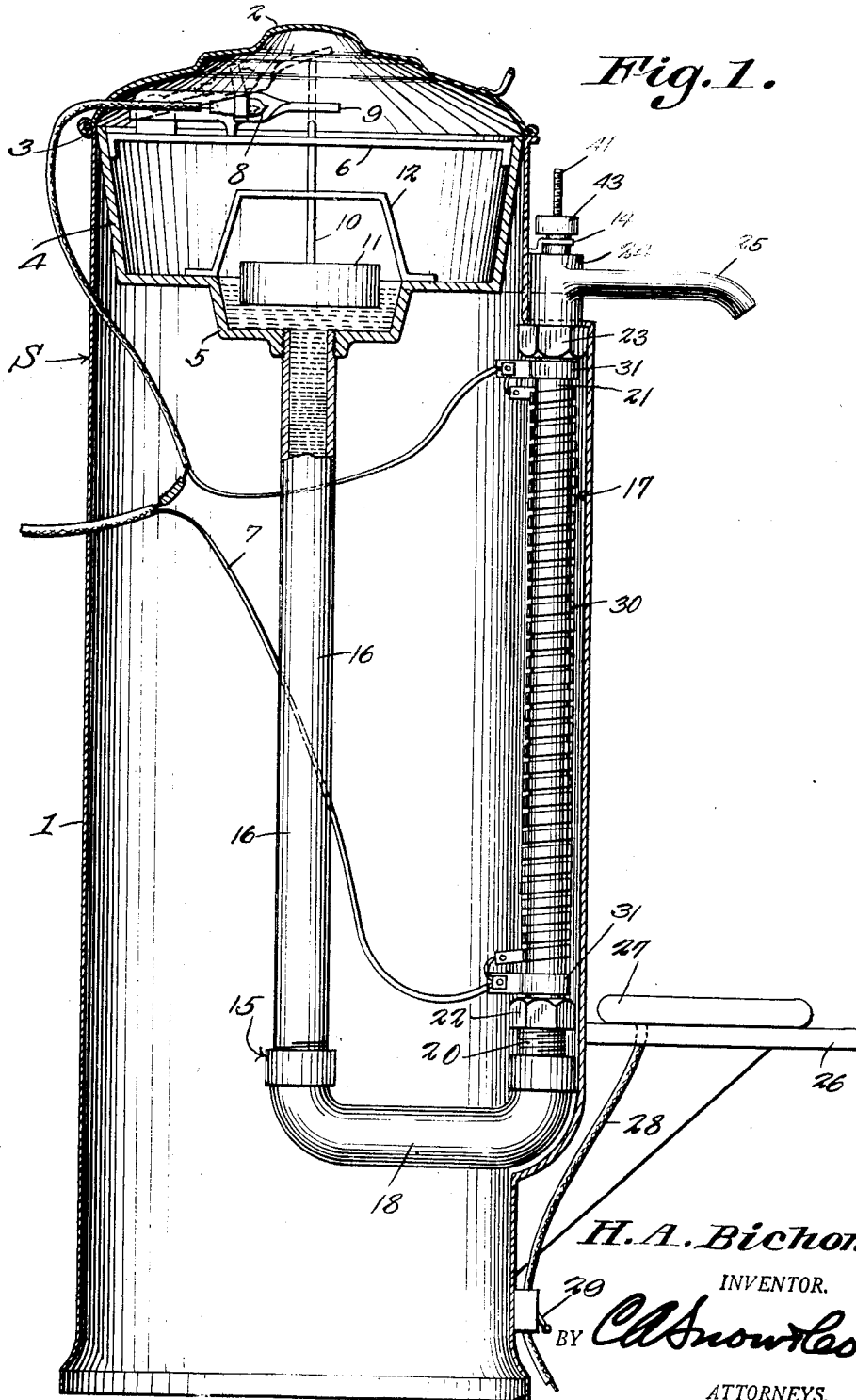
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2,218,868

HEATER FOR LIQUIDS

Filed March 16, 1939

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Fig. 2.

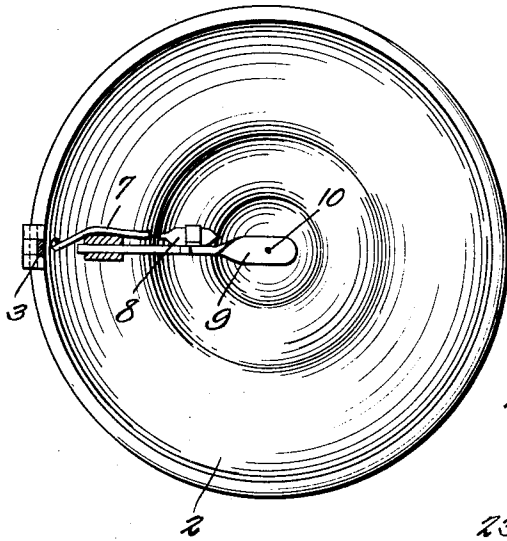


Fig. 4.

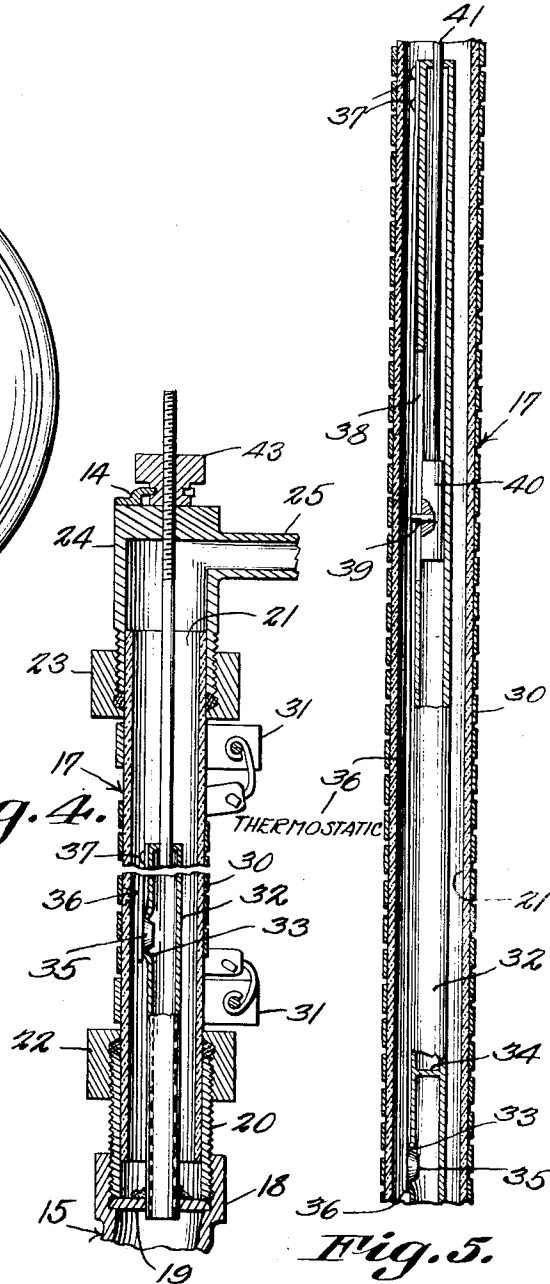


Fig. 3.

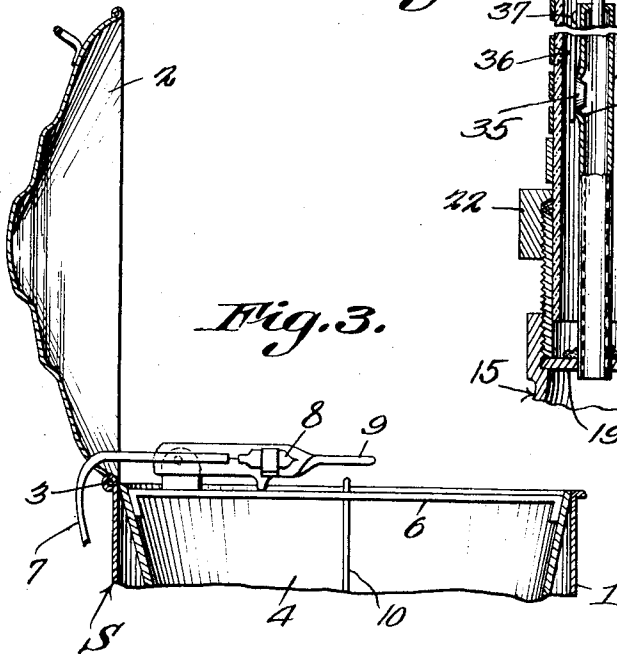


Fig. 5.

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UNITED STATES PATENT OFFICE

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HEATER FOR LIQUIDS

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Application March 16, 1939, Serial No. 262,251

2 Claims. (Cl. 219—38)

This invention aims to provide a heater for liquids, such as water used in making coffee, it being possible to put a given amount of water into the device and have that much water heated, due to a novel gravity flow mechanism. The invention aims to improve the heating mechanism and the means for opening and closing the heating circuit; to provide a novel and adjustable temperature-controlled valve regulating the flow of water and the temperature to which the water is heated; and, generally, to improve and to enhance the utility of devices of that type to which the invention appertains.

The preferred structure is shown in the drawings and described hereinafter, but a mechanic who abides by what is claimed, may make changes in the structure called for, without departing from the spirit of the invention.

In the drawings:

Fig. 1 shows in vertical section, a device constructed in accordance with the invention, many parts remaining in elevation;

Fig. 2 is a transverse section, the view being, in substance, a bottom plan of the lid and of parts associated with it;

Fig. 3 is a fragmental longitudinal section wherein the lid is shown open;

Fig. 4 is a longitudinal section showing one arm of the water conduit, parts being broken away;

Fig. 5 is a longitudinal section showing parts that are broken away in Fig. 4.

In this specification, the structure first will be described, then the operation will be considered broadly, and, finally, important characteristic features will be brought out.

The device includes a support S, constructed as desired, but generally including a tubular body 1, to the upper end of which a lid 2 is hinged as shown at 3. In the upper end of the body 1, a water tank 4 is located, the bottom of the tank having a reduced, depending bowl 5. The ends of a bridge 6 are secured to the tank 4. An electrical heating circuit 7 is provided, and in it, a switch 8 is interposed. The switch 8, which is carried by the bridge 6, may be of the mercury type or otherwise. It includes, preferably, an arm 9 pivotally mounted for vertical swinging movement between the bridge 6 and the lid 2.

The free end of the switch arm 9 is disposed in the path of a vertically movable stem 10, secured to a float 11 located in the bowl 5, the stem being mounted for reciprocation in the bridge 6, and in a guide 12 secured to the bottom of the tank 4 and extended across the bowl 5.

The numeral 15 designates, generally, a U-shaped water conduit disposed within the tubular body 1. The conduit 15 includes a first arm 16, connected to the bottom of the bowl 5 and in

communication with the bowl. The water conduit 15 includes a second arm 17, which is a composite structure, to be described in detail hereinafter. The lower end of the second arm 17 of the conduit 15 is connected to the lower end of the first arm 16 by a bend 18.

Figure 4 shows that a partition 19 is seated in the bend 18, where the second arm 17 of the water conduit is joined to the bend. The second arm of the conduit 15 comprises a nipple 20, threaded into the bend 18, and holding the partition 19 seated. The lower end of a tube 21, preferably made of insulating material, extends into the nipple 20, and a gland 22, threaded on the nipple, makes an hermetic joint between the nipple and the tube. A gland 23 makes an hermetic joint between the upper end of the tube 21 and the butt 24 of a lateral spout 25, projecting outwardly through the body 1, the upper end of the tube 21 being received in the butt of the spout. A forked journalling bracket 14 is secured to the upper end of the spout-butt 24.

The depending end of the spout 25 is located above a shelf 26, carried by the body 1 of the support S, the shelf being adapted to support a receptacle, (not shown), into which the heated water ultimately finds its way. Should it be desired to keep small quantities of water warm, after the water has been heated, this may be done through the instrumentality of one or more supplemental heaters 27 on the shelf 26, the supplemental heaters being electrically operated, as indicated at 28, and being under the control of a switch 29 on the tubular body 1 of the support S.

The tube 21 is surrounded by an electrical heater, which may be made as desired. The heater may include a length of resistance material 30, wound spirally about the tube 21. The tube 21 has been specified as being made of insulating material, but that is not necessary. The point involved is, that the resistance strip 30 should be properly insulated in some suitable manner. The resistance strip 30 is interposed in the heating circuit 7 by means of connecting clamps 31 on the tube 21.

Figure 4 shows that a nozzle 32, open at its lower end and closed at its upper end, is secured watertight in the partition 19 of the bend 18, the nozzle being located within the tube 21. The nozzle 32 has a transverse partition 34, and below the partition, the nozzle is supplied with a side port 33, opening into the tube 21.

The port 33 is under the control of a valve 35, mounted on the lower end of a tongue 36, responsive to temperature changes and disposed within the tube 21 and secured at its upper end to the nozzle 32, as shown at 37. Above the partition 34, the nozzle 32 is supplied with an elongated slot 38, wherein is received slidably, a transverse

pin 39 on a head or slide 40, mounted for reciprocation in the nozzle 32. The pin 39 bears against the tongue 36 which carries the valve 35. Since the pin 39 is received in the slot 38 of the nozzle 32, the head or slide 40 is constrained to a right line movement in the upper part of the nozzle 32. The slide 40 is secured to an operating rod 41, mounted to reciprocate in the butt 24 of the nozzle 25. The operating rod 41 is threaded into an adjusting nut 43, held for rotation by the jouralling bracket 14, on the spout-butt 24.

A quantity of water is poured into the tank 4, and the float 11 rises. The float stem 10, cooperating with the switch arm 9, closes the heating circuit 7, and the heater 30 is put into operation. The water flows from the tank 4 into the bowl 5, through the arm 16 of the water conduit 15, upwardly through the nozzle 32, out of the port 33 in the nozzle, into the tube 21, and out through the spout 25. When the supply of water in the tank 4 has been depleted, the float 11 moves downwardly, the float stem 10 recedes, and the switch 8 opens the heating circuit 7, the heater 30 being put out of commission.

It is to be noted that by rotating the nut 43, the rod 41 and slide 40 can be adjusted vertically. The pin 39 is adjusted upwardly and downwardly, longitudinally of the tongue 36, and in this way, the position of the valve 35 with respect to the port 33 is adjusted, to regulate the speed with which the water flows. If the valve 35 is widely opened, water will flow rapidly, and will not be heated to so high a degree as would be the case if the valve 35 were not so widely opened, the water, then, being compelled to remain a longer time within the field of operation of the heater 30.

Especial attention is directed to the fact that whatever the amount of water placed in the tank 4, that same amount of water, properly heated, runs out of the spout 25, and the tank is emptied. That is true, because the bottom of the bore of the spout 25 is a very little below the upper surface of the bottom of the tank 4, but not low enough to drain the bowl 5. The spout 25 is in a fixed position and the water proceeds by a gravity flow, from the tank 4 to the spout 25. No controlling valves are necessary to regulate the amount of heated water delivered from the spout 25. If a given quantity of water is cast into the tank 4, that amount of water, having been heated, comes out of the spout 25. The electrical heater 30 is in operation only long enough to heat the quantity of water that has been put in the tank 4, because, when the water in the tank 4 is depleted, the float 11 moves downwardly into the bowl 5, and the switch 8 is opened. The device, therefore, is highly economical in operation, so far as use of electrical current is concerned. The purpose of the bowl 5, primarily, is to let the float 11 down below the level of the bottom of the tank 4. The float 11 does not ride wholly on the surface of the water, but is partly submerged. This causes the bottom of the float 11 to reach the bottom of the tank 4 before the water level is at that point. Therefore, the bowl 5 is provided, to receive the float 11. The bowl 5 provides the tolerance necessary to make certain that the switch 8 will open the circuit 7. Because the tank 4 is drained completely, there will be no dripping at the spout 25 when the device is not in operation. It will not promote best results to have the bot-

tom of the bore of the spout 25 appreciably lower than the upper surface of the bottom of the tank because then there would be a drip from the spout after the shutting-off of the heat. If the bottom of the bore of the spout 25 were higher than the upper surface of the bottom of the tank 4, water would stand in the tank, and the float 11 might not operate to open the switch 8. It is a simple but patentable matter of construction to locate the spout 25 properly with respect to the bottom of the tank 4, but a much more complicated affair to set the spout 25 with no particular regard to the bottom of the tank 4, and then adjust the switch 8 and the stem of the float 11 in such a way that the switch will respond properly to the movements of the float.

Since the bowl 5 of the water-container 4—5 is of much smaller cross section than the tank 4, and only a little larger than the float 11, the change in water level is in greater proportion to the water evacuated after the water level is below the upper end of the bowl. This permits positive operation of the switch 8, with only a small amount of water either entering or leaving the tank 4.

In conclusion, attention again is directed to the fact that the spout 25 and the bottom of the tank 4 are in the same fixed horizontal plane. The amount of heated water that runs out of the spout 25 is the same as the amount of water poured into the tank 4. The electrical heater 30 is inoperative until water is poured into the tank 4, and the operation of the heater ceases when the water has run out of the tank 4 and partly out of the bowl 5.

What is claimed is:

1. A device for heating a predetermined quantity of liquid, including a water container comprising a tank having a reduced bowl in its bottom, a U-shaped liquid conduit comprising a first arm connected to the bottom of the bowl, and a second arm having a lateral discharge spout, the bottom of the bore of the spout being a little below the upper surface of the bottom of the tank and appreciably higher than the upper surface of the bottom of the bowl, to drain the tank by gravity an electrical liquid-heater operatively associated with the conduit, an electrical circuit wherein the heater is interposed, a switch interposed in the circuit, a float in the bowl and operatively associated with the switch, and a thermostatically operated valve controlling the flow of liquid through the conduit and responsive to temperature changes in the liquid flowing through the conduit.

2. A heater for liquids, comprising a substantially vertical tube provided near its lower, inlet end with a partition, and with a lateral outlet located above the partition, means for supplying liquid to the lower end of the tube, below the partition, a nozzle within the tube and having a side port opening into the tube and located below the partition, the nozzle having a slot disposed above the partition and the port, a temperature-responsive strip, anchored at its upper end to the nozzle, a valve carried by the strip and controlling the port, a slide mounted to reciprocate in the nozzle and in the top of the tube and having a lateral projection extended through the slot and engaged slidably with the tongue, means for operating the slide from a place above the tube and the nozzle, and means for heating the tube.

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