

Feb. 18, 1964

D. C. BLANCHARD
WATER HEATING DEVICE

3,121,783

Filed March 29, 1961

2 Sheets-Sheet 1

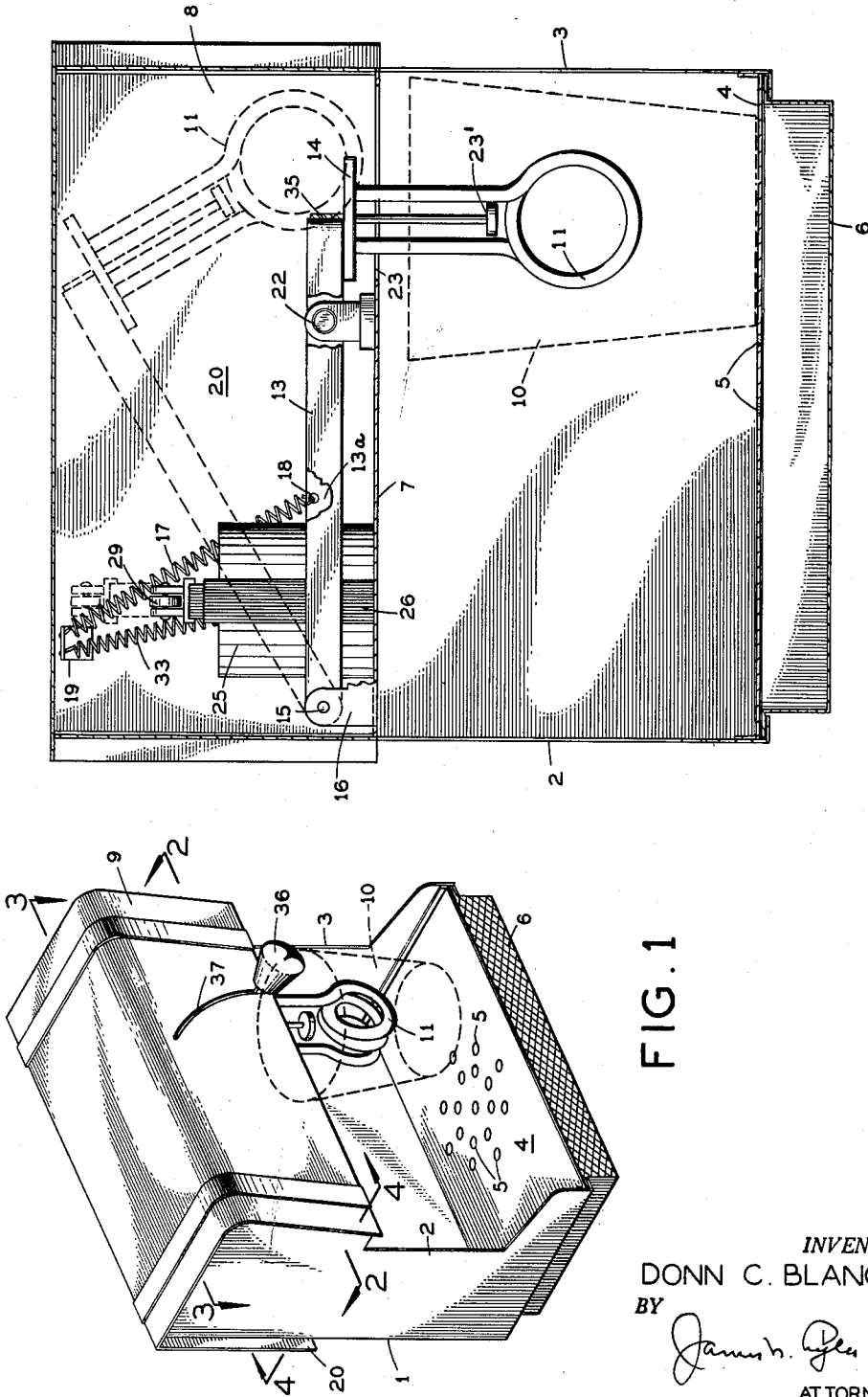


FIG. 1

FIG. 2

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FIG. 3

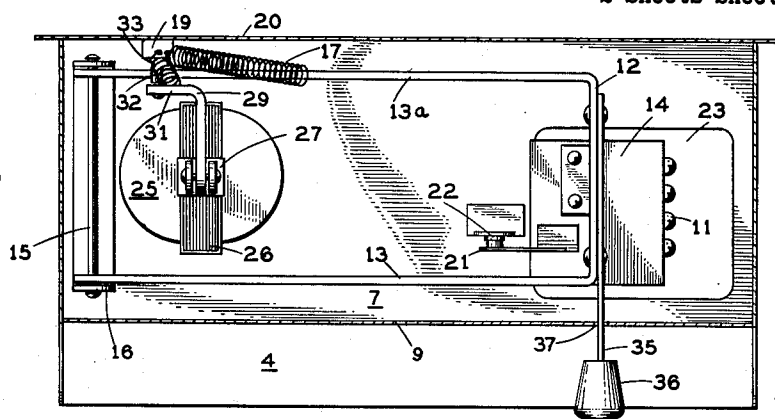
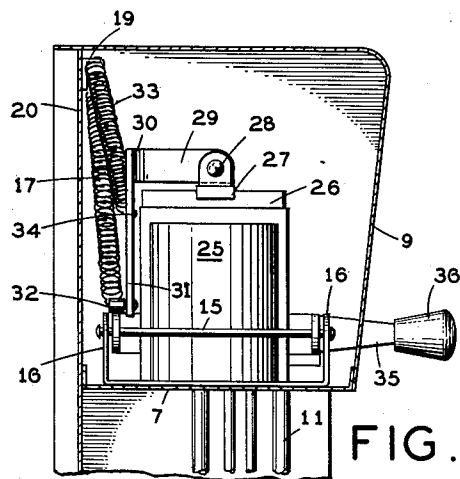


FIG. 4

FIG. 5

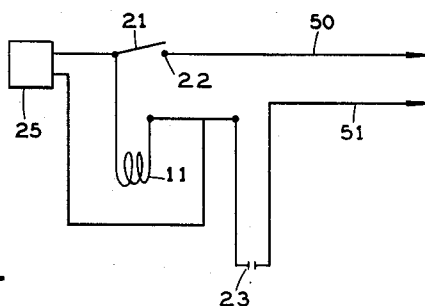
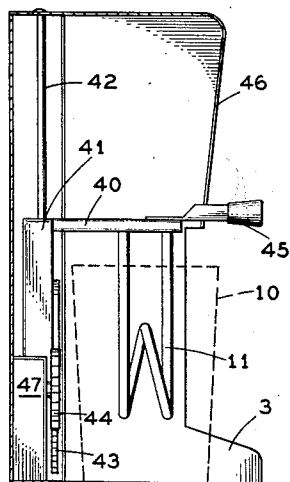


FIG. 6

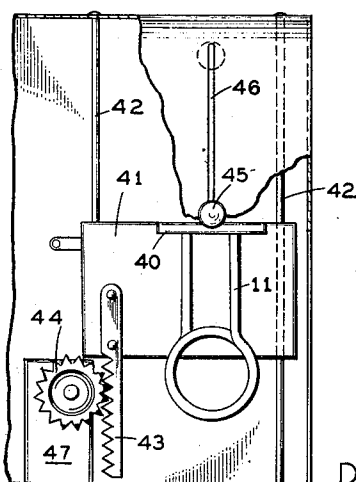


FIG. 7

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WATER HEATING DEVICE

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1 Claim. (Cl. 219-41)

This invention relates to heating devices for liquids such as water, coffee, milk or other fluids, and has particular reference to a type of device which can be mounted on a wall or other support and installed in motels, hotels, or in various other localities wherever it might be found desirable to heat a small quantity, such as a glass or cup full of water or other fluid.

It is an object of the invention to provide a device of this kind which can be easily operated; which will heat the liquid to a predetermined temperature or for a required period of time and then shut off, and which can be set in operation by the simple movement of a handle or lever.

More particularly, the invention contemplates the provision of a heating coil of the immersion type mounted so as to have a raising or lowering movement thereby bringing it either into or out of a glass or cup in which the liquid is contained, and of means by which the heating coil will be maintained within the liquid for a predetermined period of time or until a certain temperature of the liquid is reached, and then elevated out of the container simultaneously with the interruption of the electrical heating current to the heating coil.

With these and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claim appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

FIG. 1 is a perspective view of a liquid-heating device constructed in accordance with the invention;

FIG. 2 is a sectional view, taken substantially on the line 2-2 of FIG. 1, looking in the direction of the arrows;

FIG. 3 is a sectional view, taken substantially on the line 3-3 of FIG. 1, looking in the direction of the arrows;

FIG. 4 is a sectional view taken substantially on the line 4-4 of FIG. 1, looking in the direction of the arrows;

FIG. 5 is an electrical diagram disclosing the electrical circuit for the device;

FIG. 6 is an end view of a modified construction, and

FIG. 7 is a front view, with parts broken away, of a portion of the apparatus shown in FIG. 6.

Referring to the embodiment of the apparatus as disclosed in FIGS. 1 to 4 inclusive, 1 indicates generally the housing of the device. The same includes spaced end walls shown respectively at 2 and 3, between which a horizontal supporting shelf 4 is located, the shelf constituting a rest for a drinking glass, a cup or other small receptacle containing the water, coffee, milk or other liquid to be heated. The shelf 4 is provided with a plurality of holes 5 through which any liquid that is spilled or which may drip from the heating coil may drain to be captured in a removable drawer 6 located below the shelf 4 and subsequently removed therefrom.

Provided in the housing 1 is a horizontal panel or partition 7 forming the floor of a chamber 8 in which parts of the apparatus are contained, the front and top of the chamber 8 being closed by a removable cover member 9.

The heating member 11, which is of the immersion type, may consist of a loop electrically heated in the conventional manner by house current as indicated by the

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wires 50 and 51 in FIG. 5. The heating coil 11 is supported on a plate 14 mounted on a cross member 12 of a pivoted U-shaped frame 13.

At the end of the frame 13 remote from the cross member 12 the legs of the frame are pivotally mounted on a cross rod 15 extending between the upstanding ends of a U-shaped bracket 16 mounted on the partition 7. A coil spring 17 has one end attached at 18 to the leg 13a of the frame 13 and has its other or upper end attached to a bracket 19 secured to the rear wall 20 of the housing. This arrangement is such that the coil spring 17 normally biases the frame 13 and the attached heating coil 11 upwardly and to the raised position substantially as shown in dotted lines in FIG. 2.

Mounted on the plate 14 is a switch contact finger 21 which, in the elevated position of the frame 13, is disposed remote from a switch contact member 22 that is mounted on the partition 7. When the frame 13 is in its raised position, shown in dotted lines in FIG. 2, the heating coil 11 will be elevated above an opening 23 in the partition 7, and will then be located within the chamber 8. When in such raised position, the switch finger 21 will be out of contact with the switch member 22 and as will be apparent from the circuit diagram shown in FIG. 5, current to the heating coil 11 will then be interrupted so that no heating current is applied to the coil 11 while it is in its raised position.

Carried by the heating coil 11 is a thermostatic switch 23' which is effective to interrupt the flow of current to the heating coil 11 when a required predetermined temperature of the liquid in the receptacle 10 is reached, and when the current is thus interrupted, the frame 13 and its attached heating coil 11 will be elevated by means of the spring 17.

Mounted on the horizontal partition 7 within the chamber 8 and between the leg portions of the frame 13, is a solenoid 25 having an armature 26, provided on its top with a bracket 27 in which a lateral arm on a lever 30 is pivotally mounted at 28. The arm 29 of the lever is formed with a downwardly extending arm 31, provided at its lower end with a roller 32 operative against the top of the leg 13a of the frame 13. Normally, or while circuit to the device is interrupted and the frame 13 and its attached heating coil 11 are in their elevated position as shown in dotted lines in FIG. 2, the lever 29 and the armature 26 will be held in a raised position, being biased thereto by means of a coil spring 33, having one end attached at 34 to the downwardly-depending leg 31 and having its opposite end attached to the bracket 19.

Secured to the cross member 12 of the frame 13 is a bar 35 constituting a handle and provided at its end with a knob 36 extending forwardly through a curved slot 37 in the front of the cover member 9 of the housing. When the handle 35 is moved downwardly by finger engagement with the knob 36, circuit to the heating coil 11 will be closed through the switch 21, 22. The solenoid 25 being incorporated in the circuit as clearly indicated in FIG. 5, will be energized and will exert a downward influence on the armature 26 drawing the same and the attached lever 30 downwardly and causing the roller 32 to retain the frame 13 in its lowered position and in which it will remain as long as the solenoid remains energized.

When the temperature of the water or other liquid in the glass or container 10 reaches the required predetermined temperature, the thermostatic switch will become effective to interrupt the circuit, thus causing the solenoid to become de-energized and allowing the springs 17 and 33 to become effective to raise the frame 13 and the attached heating coil 11 as well as the lever 30.

From the foregoing, the operation of the improved heating device will be apparent. A glass, cup or other relatively small container filled with the water or other

liquid to be heated, is rested upon the shelf 4 directly under the opening 23. The knob 36 is then grasped and pulled downwardly, thus causing the frame 13 to be swung downwardly on its pivot 15 and the heating coil 11 to be moved downwardly to enter the glass or cup. As the frame 13 is swung downwardly, the switch 21, 22 will close, and circuit to the heating coil 11 and to the solenoid will be closed. The closure of circuit to the solenoid will result in the arm 30 being maintained in its lowered position and the same will act to hold the frame 13 down and to maintain the heating coil 11 in the glass or cup 10. When the temperature of the liquid in the glass or cup 10 has been raised to a predetermined degree, the thermostatic switch 23', then immersed in the liquid, will act to interrupt the circuit, thus shutting off the flow of current to the heating coil as well as to the solenoid 25. The springs 17 and 33 then become effective to upwardly bias the lever 30 and the armature 26 to which it is attached, as well as raise the frame 13 to cause the heating coil to be elevated out of the glass or cup and raised to the position shown in dotted lines in FIG. 2, the coil being then housed in the chamber 8 and thus enclosed and protected from exposure and possible contamination.

In the embodiment of the invention shown in FIGS. 1 to 4 inclusive and just described, the frame 13 carrying the heating coil, has a pivotal movement required to bring it from its raised position to lowered position and vice versa. In the embodiment shown in FIGS. 6 and 7, the heating coil 11 is mounted to have a vertical linear movement, and may be operated by a mechanical timing means of known construction, such as is presently employed in toasters and other electrical appliances. In this embodiment of the invention, the heating coil 11 is mounted on a plate 40 extending forwardly from a casing 41 which is mounted for vertical sliding movement on guide rods 42. The casing 41 carries a toothed rack 43 engaging a pinion 44 which, when rotated by the descent of the casing 41 is operative to set the timing mechanism in operation. At the end of the elapsed period, the timing mechanism is effective to rotate the pinion 44 in the direction opposite to that in which it was rotated by the descent of the casing 41 and by its engagement with the rack 43, the casing 41 and its attached heating coil will be moved upwardly. A handle 45 extends from the plate 40 and extends through a slot 46 in the front wall of the casing 41.

The device may be small and compact and may be conveniently mounted upon a wall or other surface. While it is herein suggested that the device can be operated by merely pulling down a lever, it is apparent that it might easily be coin-controlled and the lever thus normally locked against downward movement until freed by the insertion of a coin.

Having thus described embodiments of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claim.

What I claim is:

A liquid heating device comprising, a housing having

a supporting shelf for supporting a container of liquid to be heated, a chamber located above the shelf, a U-shaped frame pivotally mounted within the chamber to be shiftable upwardly and downwardly, an electric immersion heater attached to the frame at its free end, the bottom wall of the chamber being provided with an aperture through which the heater is moved under the influence of the frame to a position where the heater projects below the bottom of the chamber for disposing the heater in a container of water, the frame when swung upwardly adapted to withdraw the heater from the container and dispose the heater wholly within the chamber, a solenoid supported upon the bottom of the chamber adjacent to the pivotal point of the frame, an electric circuit, said heater and said solenoid being connected in said circuit, the solenoid adapted to be energized when the frame is in a lowered position with the heater disposed within the container, a switch in said circuit carried within the chamber, such switch adapted to be closed on descent of the frame for energizing the heater and the solenoid, such switch adapted to be opened when the frame and the heater is elevated into the chamber, the heater carrying a thermostatic switch that is connected in said circuit and adapted to be opened for interrupting the circuit when a predetermined temperature of the liquid in the container is reached, the said thermostatic switch also interrupting the flow of current to the solenoid, an armature carried by the solenoid, whereby to be attracted thereby and held to the solenoid for such time as the solenoid is energized, an arm mounted on said armature, an extension carried by the arm and said extension being provided with a roller at its lower end, the roller adapted to engage upon one side of the frame and whereby to maintain the frame in a lowered position so long as the solenoid is energized and, spring means in said chamber effective to elevate the frame when the solenoid is de-energized and to withdraw the heater from the container, the shelf being provided with apertures in its upper surface and said apertures communicating with a movable drawer underlying the apertures for receiving any fluid that might be spilled upon the shelf, and means to activate said frame to a lower position wherein said heater is disposed within the container, said means including a handle carried by the frame and extending through an arcuate slot in the front wall of said chamber.

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