H. W. CHRISTIAN.

HEATER FOR WATER BOTTLES.

APPLICATION FILED MAY 18, 1908.

925,681.

Patented June 22, 1909.

Fig 1.

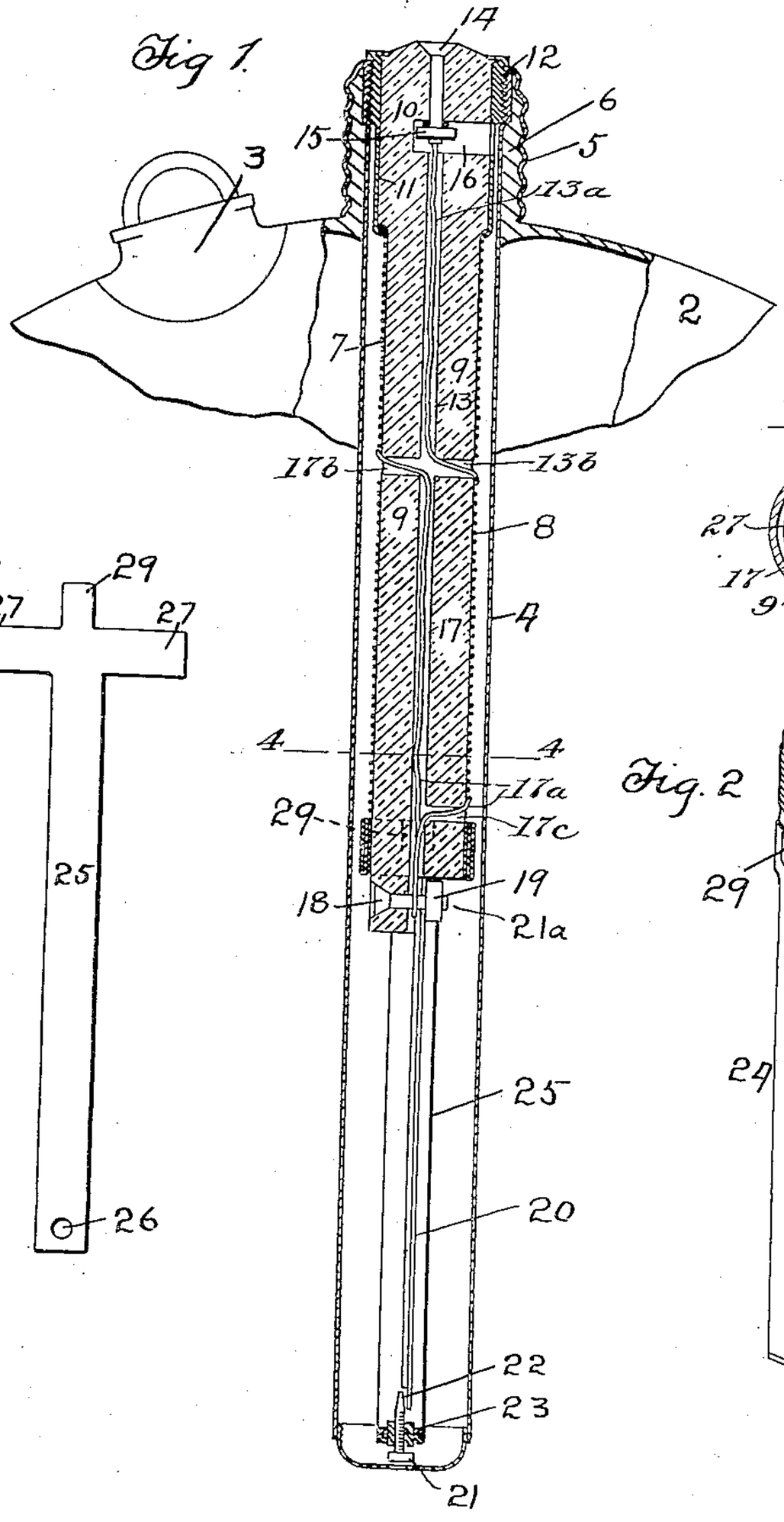


Fig. 3

Fig. 4.

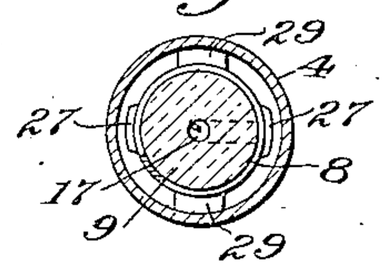
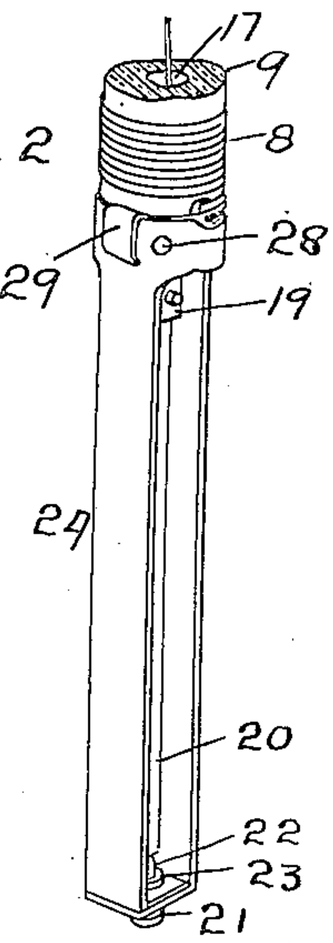


Fig. 2



Witnesses

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HEATER FOR WATER-BOTTLES.

No. 925,681. Specification of Letters Patent. Patented June 22, 1909

Application filed May 13, 1908. Serial No. 433,610.

To all whom it may concern:

Be it known that I, HERBERT W. CHRISTIAN, a citizen of the United States, of America, residing at Longbeach, in the county of Los Angeles, State of California, have invented a certain new and useful Heater for Water-Bottles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to means for heating fluid which may be contained in any suitable receptacle, but relates more particularly to means for heating such fluid as may be used in hot-water bottles or the like.

One object of the invention is to provide for such purpose, an effective heating means which is simple and inexpensive in construction and operation, also durable and convenient in use, and easily adjustable to obtain desired temperature conditions of the fluid.

Another object of the invention is to furnish a heating means the action of which is automatically controlled to keep the temperature of the heated fluid approximately at a predetermined value.

Still another object of the invention is to provide a construction in which the parts are readily accessible for renewal or repairs.

Other objects of the invention will be apparent from the following description of one form in which it may be embodied to adapt it for use in connection with hot-water bottles; reference being had to the accompanying drawings forming part hereof, in which,

Figure 1 is a longitudinal sectional view of the invention as applied to a hot-water bottle. Fig. 2 is a view in perspective of the thermostatic switch and associated parts. Fig. 3 is a view of the form of a stamping blank forming part of the above. Fig. 4 is a sectional view of the built-up device, taken on the dotted line 4 4 of Fig. 1.

Referring to the drawings, 2 designates a water bottle constructed of any suitable material, preferably rubber; which bottle may be provided with the stoppered aperture 3, to permit either introduction of fluid into the bottle or withdrawal of the same therefrom. Passing through an opening in the bottle and extending well into the interior thereof is a casing 4, which is open at the upper end and is preferably constructed of metal. This casing is secured to the bottle at the upper part thereof, by a water-tight joint.

When, as shown in Fig. 1 of the drawing, the casing is provided with the threaded depending annular flange 5, the neck of the bottle if of rubber may occupy the space 6 between the casing and the flange and be vulcanized to form a water-tight joint.

As will be understood, the temperature of the fluid in the bottle may be governed by controlling the radiation of heat from the casing to the liquid. To supply the necessary heat in the casing and to regulate the amount thereof, a built-up device fitting in the casing, and comprising a heating coil associated with a thermostatic switch, is preferably employed. The heating coil may be wound on any suitable core 9 of insulating material, such as porcelain and, in order to obtain better regulation of heat generation by the coil, it may be divided into two parts or coils 7 and 8, each of a suitable number of turns. As shown, the upper coil 7 and the lower coil 8 are each connected with the thermostatic switch which in this instance is arranged to establish, under predetermined conditions, a shunt circuit with respect to the coil 7. The head 10 of the core is preferably of increased diameter and has fitted thereto a metal sleeve 11 which is partly threaded as at 12, to screw into the top of the casing when the heating device is positioned therein. Interiorly of the core 9 are provided longitudinal ducts 13 and 17 which communicate with transverse ducts 13^b and 17^b. One end 13^a of the coil 8 leads through the ducts 13^b and 13 in the core 9 and may be connected to the contact pin 14 in the head 10 by means of the nut 15 in the recess 16 in the core. The other end 17^a, leads through the transverse duct 17^c near the bottom of core 9 to the duct 17, thence to the lower end of the core where it passes around bolt 18 and is clamped by means of the nut 19 in the cutaway portion 21^a of the core. The end of the wire is then led upward through duct 17 to a point above the top of coil 8, where it passes outward through duct 17^b and is wound around core 9 to form coil 7. The upper end of coil 7 is secured to sleeve 11.

The movable element 20 of a thermostatic switch may be carried by the bolt 18 and also clamped in position by the nut 19, and may be of any suitable or approved construction. For instance, it may consist of a bar com-

posed of two metals having different degrees of expansion under the same temperature; say copper for the left hand part of the bar, and steel for the right hand part of the bar. The lower end of the movable element 20 is normally in contact with the contact-pin 21 of the thermostatic switch. The contact-pin 21 screws in the metal bushing 23 and has its end 22 tapered for a purpose hereinafter mentioned. Attached to the core 9 and carrying the bushing 23 is the member 24, which is preferably made up of two similar stampings 25 of sheet metal; the form of the stampings in blank being shown in Fig. 3.

In the making up of the member 24 the ends of arms 27 of the two stampings are lock-seamed together, thereby forming a ring adapted to fit over the lower end of core 9. The lower ends of the stampings are bent at right angles to bring into registry holes 26 into which bushing 23 may be pressed. The member 24 may be secured to core 9 by forming one or more indents 28 fitting in corresponding depressions in the core.

The extensions 29 at the top of the stampings are bent outwardly and downwardly so as to contact closely with the interior wall of the casing and also serve to hold the built-up device steady in the casing.

The construction embodying the invention having been described, its operation will now be explained. Assuming that the bottle contains the necessary liquid, which may be initially heated, and that the built-up device is adjusted in the casing; then, in order to generate heat in the casing, the user may screw the socket of a drop-light on the shell 5 and obtain current from the lighting circuit for the purpose. So long as the thermostatic switch is closed, the coil 7 will be short-circuited, and current may pass from contact-pin 14, to lead 13^a, through heating coil 8, across the switch by means of lead 17^a to extensions 29 of the member 24, thence to the casing and shell 5. When the temperature in the casing has risen to such a degree that the switch is actuated to open the circuit which has been traced, the current passes from the contact-pin 14, to lead 13^a, through coil 8, to terminal bolt 18, by lead 17^a thence through the lead from terminal bolt 18 to coil 7, through coil 7 to metal sleeve 11, thence to the casing and shell 5. Since no arcing occurs when the thermostatic switch opens, platinum contacts may be dispensed with.

From the foregoing it will be seen that while the thermostatic switch is closed, increased current flows in the heating coil 8 to generate heat in the casing; and that when the switch opens, a decreased current passes through both heating coils, in consequence of which the heat generated in the casing is correspondingly lessened; the resistance of the coil 7 being so adjusted, in view of the possibility of the bottle not being filled to full capacity, that only such an amount of electrical energy is consumed as is nearly sufficient to generate the heat necessary to keep the temperature of the fluid constant at the prearranged temperature. Also it will now be understood that the object in tapering the contact pin 21, is to permit adjustment of the contact pressure between it and the movable element of the switch, so that the switch may be set to open or close when the temperature in the casing reaches prearranged values.

It is to be noted that while the construction shown and described is such as will permit of the use of a lamp-socket of the Edison type to obtain current from the lighting circuit, a modified construction to permit the use of a socket not of the Edison type will readily occur to those skilled in the art.

While the construction of one form in which the invention may be embodied to adapt it for use in connection with a hot-water bottle has been specifically described, it is evident that it may be employed in other relations and that various changes and modifications may be made without departing from the scope and principle of the invention.

I claim:

1. The combination with a water bottle, of a metallic casing arranged therein, a built-up device removably fitted in said casing, said device comprising a heating coil and an adjustable thermostatic switch arranged to short-circuit a part of said coil until a prearranged temperature is reached.

2. The combination with a water bottle, of a metallic casing arranged therein, a built-up device removably fitted in said casing, said device comprising a core of insulating material, a heating coil on said core, a thermostatic switch carried by said core, said switch electrically connected with parts of said coil and with said casing under predetermined conditions, and means disposed at the head of said core for electrically connecting said coil with a source of energy.

3. The combination with a water bottle, of a metallic casing arranged therein, and a built-up device fitting in said casing, said device comprising means for electrically heating fluid contained in said bottle, and a thermostatic switch for automatically controlling said heating means to keep the temperature of the fluid approximately at a prearranged value.

4. The combination with a water bottle, of a metallic casing arranged therein, and a built-up device fitting in said casing, said device comprising means for electrically heating fluid contained in said bottle, a thermostatic switch for controlling said heating means to keep the temperature of the fluid approximately at a pre-arranged value, and means for adjusting said thermostatic switch.

5. The combination with a water bottle,

of a casing extending therein, a built-up device removably fitted in said casing, said device comprising a heating coil and means for short-circuiting a portion of said coil until a prearranged temperature is reached.

6. The combination with a water bottle, of a casing extending therein, a built-up device fitting in said casing, said device comprising a heating coil and adjustable means for short-circuiting a portion of said coil until a pre-arranged temperature is reached.

7. The combination with a water bottle, of a metallic casing extending therein, a built-up device removably fitted in said casing, said device comprising a heating coil and a thermostatic switch short-circuiting a portion of said coil until a prearranged temperature is reached.

8. The combination with a water bottle, of a casing extending therein, a built-up device removably fitted in said casing, said device comprising a heating coil and an adjustable thermostatic switch short-circuiting a portion of said coil until a prearranged temperature is reached.

9. The combination with an instrumentality to be heated, of a built-up device removably inclosed therein, said device comprising a heating coil and a thermostatic switch short-circuiting a portion of said coil until a prearranged temperature is reached.

10. The combination with an instrumentality to be heated, of a built-up device removably inclosed therein, said device comprising a heating coil and an adjustable thermostatic switch short-circuiting a portion of said coil until a prearranged temperature is reached.

11. The combination with a water bottle, of a metallic casing arranged therein, a built-up device fitting in said casing arranged and adapted for connecting with a single source of electrical energy, said device comprising a heating coil and means automatically controlling the electrical energy in said coil to keep the temperature of the water approximately at a pre-arranged value.

12. A built-up device comprising a core of insulating material, metallic parts carried on said core, a heating coil on said core, said coil having ends thereof connected with said metallic parts, a member on said core provided with means adapted to contact with the interior wall of a casing, and a movable element of a thermostatic switch carried by said core and associated with said coil and said member.

13. A built-up device comprising a core of insulating material, metallic parts carried on said core, a heating coil on said core, said coil having ends thereof connected with said metallic parts, a member on said core provided with means adapted to contact with the interior wall of a casing, and a movable element of a thermostatic switch carried by said core and adjustably associated with said coil and said member.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses at Longbeach county of Los Angeles, State of California, this 9th day of May A. D. 1908.

HERBERT W. CHRISTIAN.

Witnesses:

SUSAN L. CHRISTIAN,

ALEXANDER H. LIDDERS.