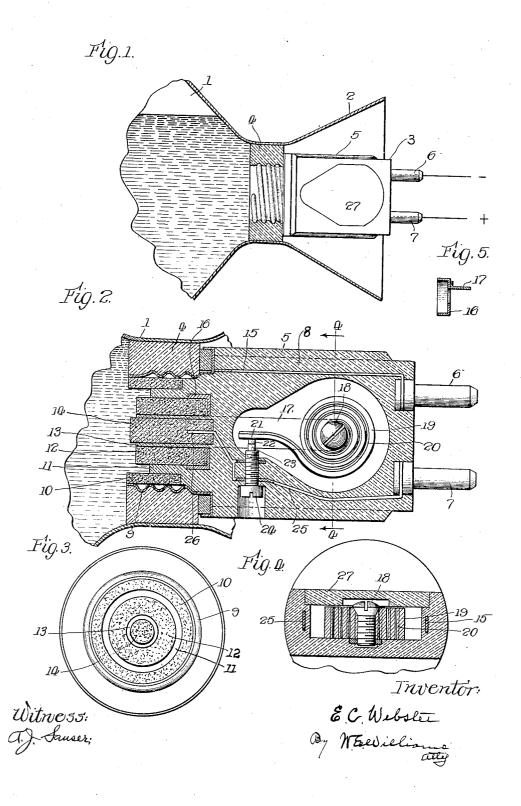
# E. C. WEBSTER. ELECTRIC STOPPER FOR FLUID CONTAINERS. APPLICATION FILED APR. 12, 1920.

1,400,646.

Patented Dec. 20, 1921.



## UNITED STATES PATENT OFFICE.

#### ERNEST CRESTON WEBSTER, OF CHICAGO, ILLINOIS.

#### ELECTRIC STOPPER FOR FLUID-CONTAINERS.

1,400,646.

Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed April 12, 1920. Serial No. 373,305.

 $To \ all \ whom \ it \ may \ concern:$ 

Be it known that I, ERNEST CRESTON Webster, a citizen of the United States, a resident of Chicago, in the county of Cook 5 and State of Illinois, have invented a new and useful Improvement in an Electric Stopper for Fluid-Containers, of which the following is a specification.

My invention relates to an electrical heat-10 ing element that is incorporated in the plug or stopper of a hot water bottle or other fluid containers for the purpose of heating the fluid contained within, for therapeutic

The object of my invention is to provide 15 a very simple means carried in the plug, automatically controlled, that will heat the water and at the same time automatically control the action of the electric heating

20 current.

The invention is set forth in the claims. Reference will be had to the accompanying drawings in which Figure 1 is a section through the nozzle of an ordinary rubber 25 hot water bottle.

Fig. 2 is an enlarged view through the plug itself.

Fig. 3 is a bottom plan view looking from the left of Fig. 1.

Fig. 4 is a section on line 4-4 of Fig. 2. Fig. 5 is a sectional detail of one of the

electrical connecting members.

In the drawing 1 indicates the ordinary rubber sack of a hot water bottle. 2 indi-35 cates the rubber flaring funnel of the bottle and 3 represents my plug. 4 represents the screw threaded inside collar of the bottle and 5 represents in general outline my heating element and plug. 6 indicates the nega-40 tive electrode terminal and 7 the positive terminal. These points are connected with any regular slip socket electrical connection to a source of electrical supply from the general current service line.

The body of my plug is made of a suitable insulating material normally employed for such purposes, but in this instance, I prefer to make it out of bakelite, indicated by 8. By this method of manufacture I mold 50 into the block which forms the plug the

metal parts, which are held in place by being molded into the body of the bakelite. which forms the stopper of the bottle is in- the contact point 22 away from the contact

dicated by 9, which screws into the collar 55 4 in making a closure for the bottle. On the inside of this screw threaded end 9 there is an annular carbon block 10 molded in place as indicated. For insulation from this annular carbon block 10 there is a portion 60 11 of bakelite and this section of bakelite has within it an annular carbon block 12 and it is provided on its inside with an annular insulation 13 of bakelite, and on the interior of this bakelite there is a central 65 cylindrical carbon block 14.

The annular block 10 is in electrical connection with the metallic threaded portion 9 and this in turn is connected through the copper bar 15 to the negative electrode 6.

The annular carbon block 12 is provided with a metallic cap 16 which is connected with a copper bar 17 to a central pivot pin or screw 18 which is in electrical connection with a thermostatic coil made of a soft 75 piece of metal 19 coiled upon a harder piece of metal 20 and finally terminates in an end 21 having a contact piece 22 engaging a secondary contact piece 23 which is in electrical connection by means of a screw 24 80 with a copper bar or band 25, which is in electrical connection with the electrode 7. This electrical bar 25 with its screw 24 is in electrical connection at 26 with the central cylindrical plug 14 at all times.

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Whenever the contact point 22 is in touch with the contact point 23, then the annular carbon plug 12 is also in electrical connection with the electrode 7, through the medium of the connection 25. This is the nor- 90 mal situation when the heating is desired. The electric current then travels from the annular carbon electrode 10 around through the water to the annular carbon piece 12 and in a lesser degree to the cylindrical car- 95 bon plug 14. As the fluid in the container heats up, owing to the travel of the electric current through the water across the nose of the inside end of the plug as above indicated, the temperature rises in the plug itself and 100 when this temperature reaches a desired regulated point, through the medium of the screw 24 the thermostat coil or bar indicated by 19 and 20, through the variation in the construction and expansion of the two met- 105 als out of which the said coil is made, springs The ordinary metal screw threaded end the end 21 away from the screw 24 carrying

point 23 and thus breaking the electrical circuit through the thermostatic coil and shutting off the current travel through the

annular plug or carbon block 12.

However, the current continues to remain through the electrode 14 being connected across through the fluid to the annular carbon block 10. But this amount is relatively slight but is sufficient to keep the circuit 10 closed and thus prevent arcing across the points 22 and 23 as the contacts are broken at those points through the movement of the coiled thermostatic parts 19 and 20.

When a limited amount of fluid is used 15 the temperature of the fluid in the container continues to rise further through the travel of the current through the water from the block 14 to the block 10, then gas or vapor is generated within the bottle itself and this 20 cuts down the travel of the current as the gas is replaced by the water and thus automatically breaks the circuit entirely.

When the temperature falls again the thermostat coil brings in contact again the 25 points 22 and 23 and the vapor in the fluid container condenses and the fluid again makes the connection across the carbon contact blocks and the heating is renewed and so on, and the fluid container becomes its 30 own regulator to keep the predetermined temperature of the water at all times.

The thermostat coil as indicated by 19 and 20 is made in the usual manner of making instruments of this kind, having metals 35 of different degrees of expansion so that as the temperature changes there is a bend takes place in a manner well known in in-

struments of this kind.

The object of this particular arrangement 40 of electrical heating elements with a thermostat control of the current passing through the electrodes is to provide, first; a rapid heating capacity for the heating stopper and second, a slow generation of heat ap-45 proximating, in heat generation, the amount of heat being radiated, thereby, maintaining a constant temperature of the fluid container without the too frequent separation of contact points 22 and 23.

The arrangement whereby some current is still allowed to flow after the contact points 22 and 23 are separated, serves to prevent the arcing and consequent destruction of the points caused by arcing.

The cavity in which this coil is placed is covered by any suitable inclosure block or container as indicated by 27, making a complete smooth plug having the general utility of an ordinary stopper for an ordinary rub-60 ber water bottle.

The heating is performed by what may be termed a water arc, which is an economical

conversion of electricity into heat, confined in the manner shown in this case. The in-. 65 tensity of the heat generated may be increased by the addition of a little common salt or washing soda, or other material, to the fluid, which in the case of water increases the conductivity of the water within the container.

What I claim is:-

1. The combination with a container for liquid to be heated, of a stopper carrying at its inner end primarily insulated heating electrodes adapted to be connected by the 75 liquid, a main circuit and a branch circuit both leading to said electrodes, and means whereby heat exceeding a predetermined limit automatically interrupts one of the circuits.

2. The combination with a container for liquid to be heated, of a stopper having inwardly exposed heating electrodes to be connected by the liquid, a thermostat arranged to receive heat from said electrodes and 85 adapted to lessen without interrupting the heating current, automatically, when the temperature of the container exceeds a pre-

determined limit.

3. In a device of the class described, a 90 screw threaded stopper for a bottle provided with an annular conducting nose or nozzle adapted to come in contact with the fluid, and forming a part of the electric circuit through the fluid in the bottle; in com- 95 bination with two other contact points exposed to the action of the fluid, insulated from each other, connected to the same conductor and adapted to be connected by fluid in the bottle, one of the said two elec- 100 trical contacts continuously being connected with its electrical conductor and the other one intermittently connected through the medium of a thermostat under the influence of the heat generated within the bottle.

4. In a device of the class described, a stopper for a fluid container having elec-trodes located therein and insulated from each other and exposed to the fluid within the bottle, whereby the latter makes the 110 electrical connection across between the electrodes; in combination with a thermostat adapted to open and close an electric circuit and said thermostat located in connection with the plug and acted upon by the heat 115 generated in the bottle.

5. The combination with a liquid container and a stopper therefor having at its inner end primarily insulated heating electrodes adapted to be connected by liquid to 120 be heated in the container, of a thermostatic device acted upon by heat generated at said electrodes and controlling the maximum of the current while the current continues.

6. In a device of the class described, a 125 heating element for a fluid container in the form of a plug secured into the fluid container in combination with a thermostatic bar in the form of a coil located within the plug or stopper and adapted to open and 130

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container.

7. In a device of the class described, a 5 stopper for a fluid container, electric contacts and electrodes mounted within the stopper having contact points exposed to the liquid within the bottle whereby the latter serves as a part of the electric circuit con-10 nection; in combination with a thermostatic control for making and breaking the electric heating circuit and said thermostatic control located within the body of the stopper and adapted to be acted upon by the 15 heat generated in the bottle; and means adapted to vary the adjustment of the temperature at which the thermostat controls the electric circuit.

8. In a device of the class described, a 20 plug for a fluid container having an outer sleeve-like ring serving as a part of the heating unit; in combination with an inner analogous ring insulated from the first ring and having an exposed end adapted

close an electric heating circuit under the to come in contact with the fluid in the bot- 25 influence of the heat generated in the fluid tle and connected with the other pole of the electric circuit whereby the fluid within the bottle may close the circuit by forming the electrical connection between the two said annular conductors.

9. In a device of the class described, an annular conducting member located near the periphery of the internal end of the plug; in combination with a central cylindrical block and an annular block encircling the 35 said cylindrical block and both blocks connected to the same pole of the electric circuit, but one of the said blocks being permanently connected and the other intermittently connected to the said same poles.

Signed at Chicago, in the county of Cook and State of Illinois, this 31st day of March,

### ERNEST CRESTON WEBSTER.

 ${f Witnesses}$  :

B. J. BERNHARD, F. ZOBEL.