July 15, 1958 H. B. SMITH ET AL 2,843,719

BOTTLE WARMER

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Fig. 1.

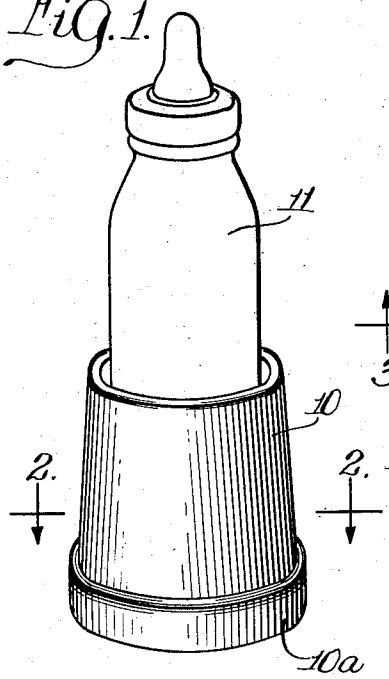


Fig. 2.

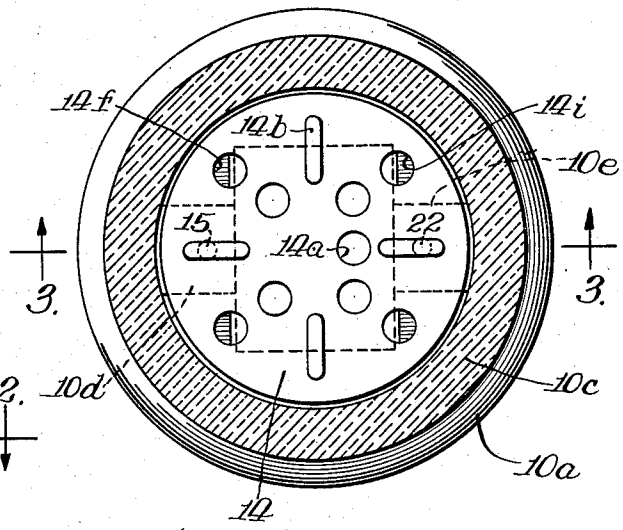
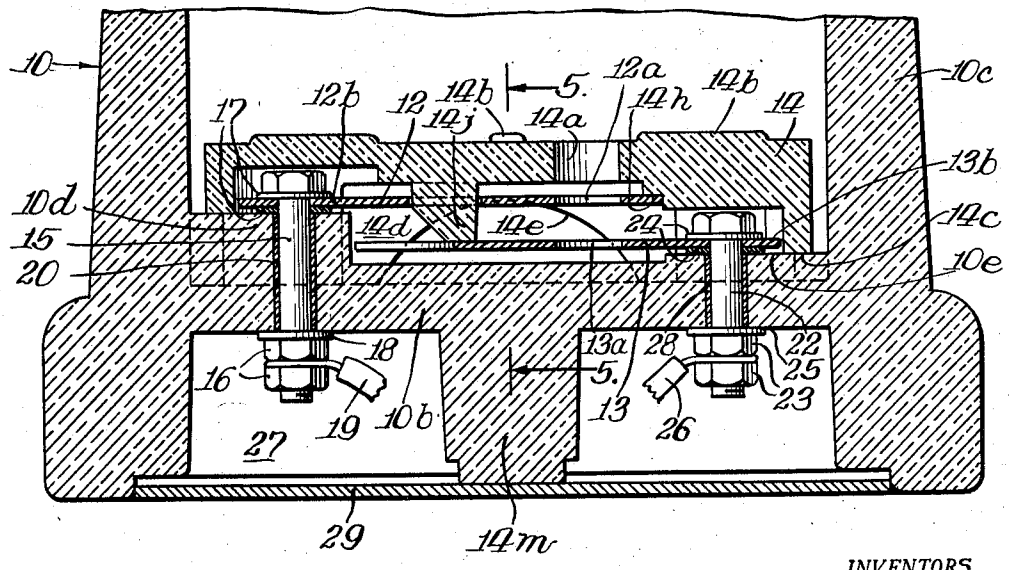


Fig. 3.



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Fig. 4.

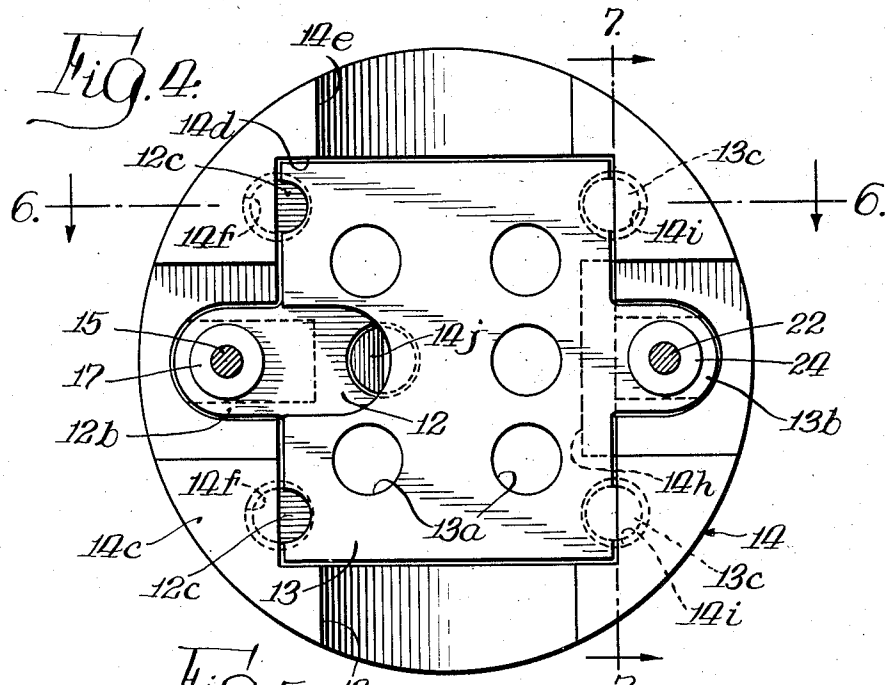


Fig. 5.

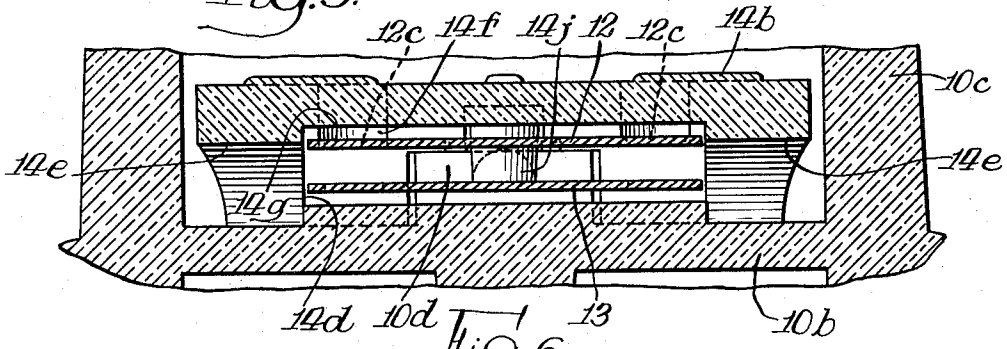


Fig. 6.

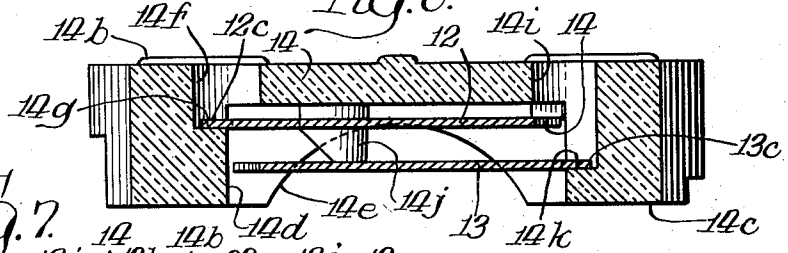
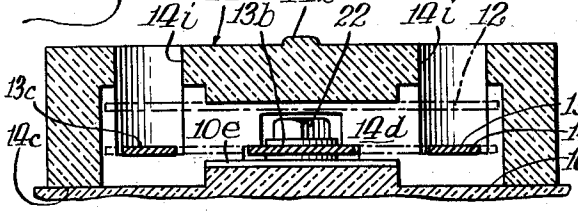


Fig. 7.



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BOTTLE WARMER

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Application January 12, 1956, Serial No. 558,796

5 Claims. (Cl. 219—40)

This invention relates to improvements in bottle warmers and other electrically heated devices wherein a body of water is heated by the passage of the electric current between spaced electrodes immersed in the water. By employing a measured quantity of water the device is given a definite time period of operation which is terminated by the evaporation of the water to dryness.

The principal object of the present invention is to provide an improved liquid conductor heater of the type referred to, comprising a novel construction and arrangement of the spaced electrodes. A further object of the invention is to provide improved means for securing the electrodes in position in the vessel in which they are mounted. Another object of the invention is to provide novel means for securing the electrodes in the vessel in which they are located and at the same time securing in place above the electrodes an insulating plate adapted to support the bottle or other object to be heated. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawings in which one embodiment of the invention is illustrated.

In the drawings,

Figure 1 shows a perspective view of the bottle warmer of the present invention with a bottle mounted therein;

Fig. 2 shows a horizontal section taken on the line 2—2 of Fig. 1 above the electrodes and the insulating plate;

Fig. 3 shows an enlarged vertical section taken on the line 3—3 of Fig. 2, with the upper part of the vessel broken away;

Fig. 4 shows a bottom plan view of the electrodes and the insulating plate shown in Figs. 2 and 3;

Fig. 5 shows a vertical section taken on the line 5—5 of Fig. 3;

Fig. 6 shows a vertical section taken on the line 6—6 of Fig. 4; and

Fig. 7 shows a vertical section taken on the line 7—7 of Fig. 4.

As illustrated in the drawings, the invention comprises a vessel 10 formed of porcelain or other insulating material which has an enlarged base flange 10*a* adapted to rest upon a table or other support. In Fig. 1 there is shown a baby bottle 11 mounted in position within the vessel 10 so that its contents can be heated by the passage of an electric current between the spaced electrodes which are mounted in the bottom of the vessel.

The vessel 10 has a bottom wall 10*b* above which are mounted the spaced electrodes 12 and 13 which are in the form of flat metal plates extending horizontally with apertures 12*a* and 13*a* formed therein to permit the ready escape of bubbles created by the vaporization of the water which is placed in the vessel to immerse the electrodes. Above the electrodes there is mounted an insulating plate or disk 14 of circular form which has its outer margin spaced slightly from the upwardly extending annular wall 10*c* of the vessel. This insulating plate has formed therein a plurality of circular apertures 14*a* which are adapted to permit the escape of bubbles passing upwardly from the electrodes 12 and 13 and this plate is provided on its upper side with radially extending ribs 14*b* upon which the bottom of the bottle is adapted to rest, thus providing spaces between the top surface of the plate 14 and the bottom of the bottle through which bubbles may escape outwardly after passing upwardly through the apertures 14*a* in the plate.

The insulating plate 14 has its lower surface 14*c* resting on the bottom wall 10*b* of the vessel and it has a central cavity 14*d* into which the electrodes 12 and 13 project. The outer portion of the plate 14 is notched on its underside at diametrically opposite points to receive upwardly extending projections 10*d* and 10*e* which are formed on the upper side of the bottom wall 10*b* of the vessel. The outer wall of the plate 14 around the central cavity 14*d* is also provided with arcuate notches 14*e* extending upwardly from the bottom wall of the vessel to provide openings through which steam generated by the electrodes may pass out laterally from the chamber 14*d* and thence move upwardly at the sides of the plate 14.

The upper electrode 12 is clamped in position on the upper side of the projection 10*d* of the bottom wall of the vessel by means of a bolt 15 and nuts 16 which engage the lower threaded extremity thereof. The bolt passes through an aperture in a tongue 12*b* formed in the end of the electrode 12 and it is engaged on opposite sides of this tongue by washers 17. The lower end of the bolt 15 is engaged by a washer 18 which seats against the underside of the bottom wall 10*b*. The nuts 16 are adapted to clamp between them an electric conductor 19 which is connected to the source of electric current. The space around the bolt 15 in the aperture through which it extends in the bottom wall 10*b* is filled with lead 20 or other suitable sealing material to form a fluid-tight joint.

The upper electrode 12 is provided at its end, on opposite sides of the tongue 12*b*, with two other tongues 12*c* which extend horizontally endwise from the body of the plate and engage recesses 14*f* formed in the plate 14 and extending downwardly from the top surface thereof. The tongues 12*c* engage the bottom walls 14*g* of the recesses 14*f*, as shown particularly in Fig. 6, and when the nuts 16 are tightened on the bolts 15, the tongues 12*c* are held securely against the shoulders 14*g* and the electrode 12 is held rigidly in a horizontal position with the extremity thereof opposite the bolt 15 engaging the underside of a shoulder 14*h* on the plate 14.

The lower electrode 13 is formed and mounted substantially like the upper electrode 12 but is located at a lower level. It is provided at one end with a horizontally projecting tongue 13*b* which is apertured for engagement by a bolt 22 which extends downwardly through an aperture in the bottom wall 10*b* of the vessel with its lower end engaged by nuts 23. A pair of washers 24 are engaged by the bolt 22 on opposite sides of the electrode 13 and this bolt also engages a washer 25 which seats against the lower surface of the wall 10*b* above the nuts 23. These nuts are adapted to clamp between them an electric conductor 26 which is adapted to be connected to the terminal of the electric circuit opposite to that to which the conductor 19 is connected. These conductors are adapted to be brought into the space 27 beneath the bottom wall 10*b* through a suitable aperture formed in the base flange 10*a* of the vessel 10.

The lower electrode **13** is provided with two projecting tongues **13***c* located on opposite sides of the tongue **13***b* and adapted to extend into recesses **14***i* which extend downwardly from the top surface of the insulating plate **14**. When the nuts **23** are tightened, the electrode **13** is held securely in a horizontal position in spaced relation to the top surface of the wall **10***b* of the vessel and the projecting portion of this electrode then bears against a lug **14***j* which extends downwardly from the underside of the plate **14**. At the same time, the tongues **13***c* bear against the shoulders **14***k* at the lower ends of the recesses **14***i*. In this way, the two electrodes are rigidly supported in parallel relationship and they also interlock with the insulating plate **14** so that this plate is thereby held in fixed position within the vessel. In order to provide a fluid-tight joint, the space around the bolt **22** in the aperture through which it extends in the lower wall **14***b* is filled with lead or other sealing material **28**. The chamber **27** beneath the bottom wall **10***b* of the vessel is normally closed by a metal plate **29** which bears against a lug **14***m* extending downwardly from the bottom wall of the vessel and this plate is secured to the lug **14***m* or to another part of the vessel by a suitable rivet or the like.

From the foregoing description it will be apparent that there has been provided a novel form of liquid conductor heater adapted for use in warming bottles and the like wherein spaced electrodes are secured in place in a simple and novel manner by means which also serves to secure in position the insulating plate or disk upon which the bottle is adapted to rest. For purposes of cleaning and repair the plate **29** may be readily removed and then, after removing the nuts **16** and **23**, the insulating plate **14** and the electrodes **12** and **13** may be readily removed through the top of the vessel.

Although one form of the invention has been shown and described by way of illustration it will be understood that the invention is not limited and may be constructed in various other embodiments which come within the scope of the appended claims.

We claim:

1. A liquid conductor heater comprising, an insulating vessel having a bottom wall, a pair of spaced electrodes extending parallel to each other above said bottom wall, each of said electrodes having a tongue projecting from one end thereof, terminal posts extending through said bottom wall and connected to said posts, and an insulating plate mounted above said electrodes and having recesses therein, said electrodes having other tongues projecting therefrom to interlock with said recesses.

2. A liquid conductor heater comprising, an insulating vessel having a bottom wall, a pair of spaced electrodes extending parallel to each other in said vessel adjacent said bottom wall, said electrodes having oppositely directed tongues projecting therefrom, said bottom wall having parts on which said tongues rest at different elevations spaced from each other and from said bottom wall, and terminal posts extending through said bottom wall and connected to said posts.

3. A liquid conductor heater comprising, an insulating vessel having a bottom wall, a pair of spaced electrodes extending parallel to each other in said vessel adjacent said bottom wall, said electrodes having oppositely directed tongues projecting therefrom, said bottom wall having parts on which said tongues rest at different elevations spaced from each other and from said bottom wall, terminal posts extending through said bottom wall and connected to said posts, and an insulating plate located above and interlocked with said electrodes.

4. A liquid conductor heater comprising, an insulating vessel having a bottom wall, a pair of spaced electrodes extending parallel to each other in said vessel adjacent said bottom wall, said electrodes having oppositely directed tongues projecting therefrom, said bottom wall having parts on which said tongues rest at different elevations spaced from each other and from said bottom wall, terminal posts extending through said bottom wall and connected to said posts, and an insulating plate extending over said electrodes and resting on said bottom wall, said plate being secured to said electrodes.

5. A liquid conductor heater comprising, an insulating vessel having a bottom wall, a pair of spaced electrodes extending parallel to each other above said bottom wall, each of said electrodes having a tongue projecting from one end thereof, terminal posts extending through said bottom wall and connected to said posts, and an insulating plate mounted over said electrodes, said plate having parts which bear upon the upper sides of said electrodes, the upper electrode having an aperture therein through which one of said parts extends to the bottom electrode.

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