

June 16, 1964

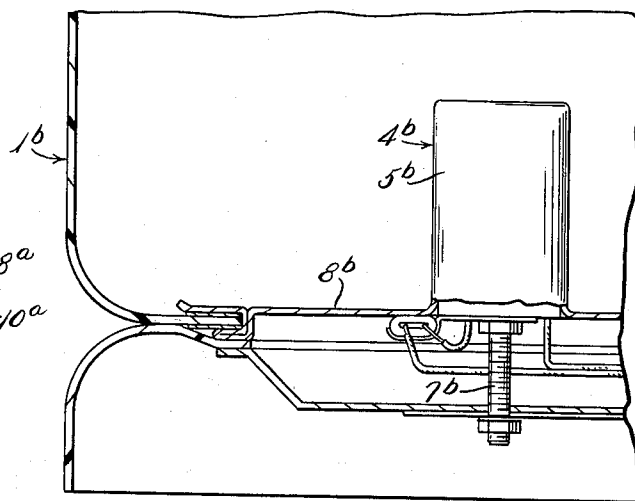
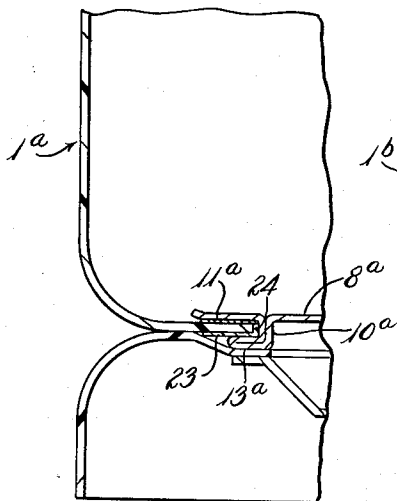
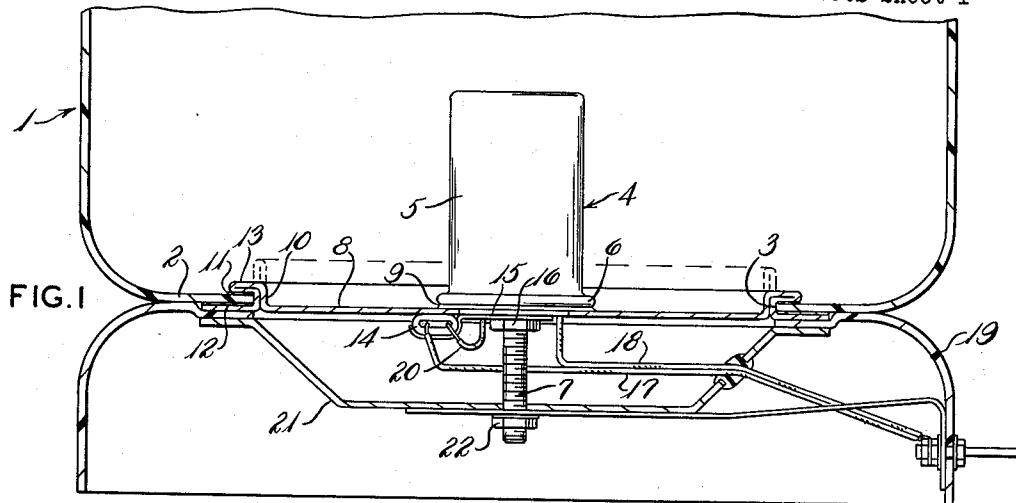
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3,137,786

CONTAINER AND ELECTRICAL HEATER MEANS

Filed Oct. 25, 1962

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

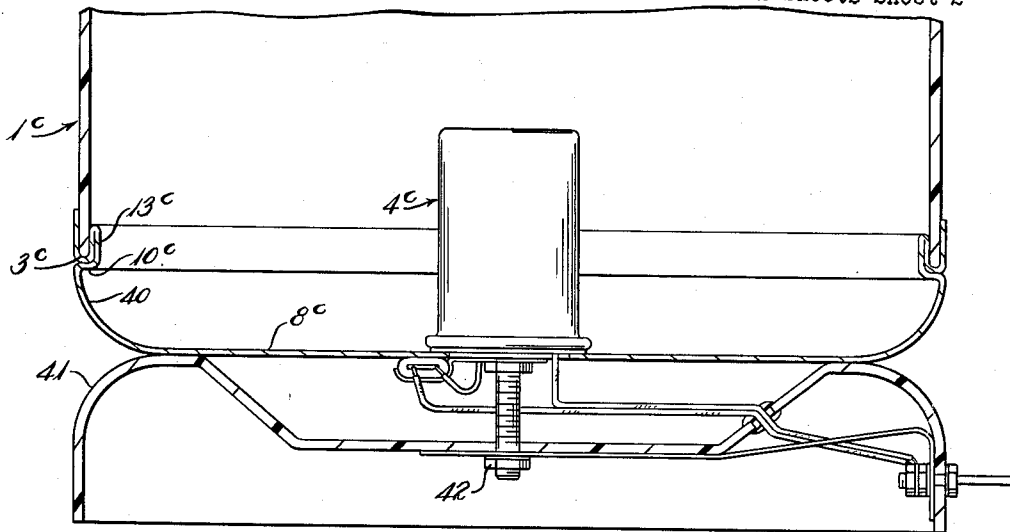


FIG. 4

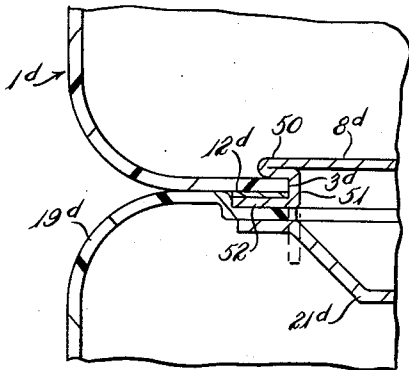


FIG. 5

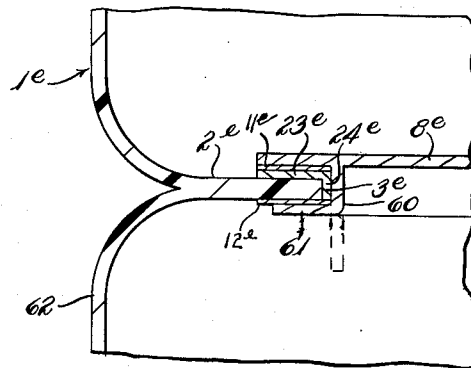


FIG. 6

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CONTAINER AND ELECTRICAL HEATER MEANS

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12 Claims. (Cl. 219-441)

The present invention relates to an improved container and electrical heater means therefor, and especially to a container that is adapted to be made from a suitable plastic material and which has an electrical resistance heater and electrical circuit control means associated therewith.

The present invention particularly relates to containers such as are used as percolators, for coffee brewing, and similar heating actions. These previous types of containers of this type have been made from metal, and have been relatively expensive. With competitive conditions in the industry, it is quite important that the cost of these containers and control means therefor, if possible, be reduced; if a satisfactory type of an attractive, durable container and electric heater and control means therefor can be provided.

The present invention has as its general object the provision of a novel and improved container unit of the type described and characterized by the use of one metal positioning plate at a base portion of the container for positioning a heater unit therein, which plate is secured to the container by an integral retaining flange formed therein.

Another object of the invention is to provide a container of the class described where the container can be made from any suitable plastic material, either thermoplastic or thermosetting, and where a stainless steel positioning plate, or other metal plate having low heat conductivity is provided in the container.

Another object of the invention is to use an integral double walled annular flange of a metal support plate in a plastic container to secure the plate to a hole or opening provided in the bottom portion of the container to seal the opening in the container and to use the metal support plate for securing heater means carried thereby in the container.

A further object of the invention is to complete a plastic container having an open lower end with a metal base plate that blends into the contour of the sides of the container and is secured to the open lower end of the container by an integral section of the base plate.

A further object of the invention is to provide a special combination between a metal base plate, an electric heater, a heater circuit control, and a plastic container, whereby a novel and attractive but durable construction is provided, which construction is sturdy and relatively economical, and has desirable operating characteristics.

The foregoing and other objects and advantages of the invention will be made more apparent as the specification proceeds.

Attention now is particularly directed to the accompanying drawings, where:

FIG. 1 is a fragmentary vertical section, with the heater means shown in elevation, of a combined container, electrical heater means and control embodying the principles of the invention;

FIG. 2 is a fragmentary vertical section of a modified container unit of the invention;

FIG. 3 is a fragmentary vertical section of a further modification of the container and associated means as shown in FIG. 1;

FIG. 4 is a fragmentary vertical section of a further modification of the novel container unit and associated

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means of the invention with the metal base plate extending up and forming a portion of the sides of the container;

FIG. 5 is a fragmentary vertical section of a modified container unit of the invention illustrating a modified construction of a metal support plate; and

FIG. 6 is a fragmentary vertical section of a further modified embodiment of the invention.

When referring to corresponding members shown in the drawings and referred to in the specification, corresponding numerals are used to facilitate comparison therebetween.

Generally speaking, the present invention, as one important embodiment thereof, relates to the combination of a substantially rigid, hollow, molded plastic liquid receiving body having a side wall terminating in a bottom opening; a metal plate of greater size than the opening in the plastic body; means for securing the metal plate to the plastic body comprising an interlocked connection between peripheral portions on the metal plate and a peripheral portion of the plastic body surrounding the opening to seal the opening and directly secure the metal plate to the plastic body; an electric heater secured to a center portion of the metal plate in sealed relation thereto, the interlocked connection being radially spaced from the electric heater by a continuous intermediate portion of the metal plate; the electric heater being within but spacially and thermally insulated from the plastic body by the continuous portion of the metal plate, the continuous portion being of an area correlated with the wattage of the electric heater, the size of the metal plate and the material from which it is made, and the composition of the plastic body so as to prevent the transfer of excessive heat to the plastic body thereby preventing damage to the plastic body by any use thereof, said metal plate being in contact with the liquid in said plastic body; a thermostat positioned below the metal plate in operatively direct heat exchange relation thereto to be primarily controlled by the temperature thereof in normal operation of the appliance; circuit means connecting to the thermostat and electric heater and being connectable to a power supply; and base means for the plastic body operatively secured thereto.

Attention now is particularly directed to the details of the structure shown in the accompanying drawings, and a container is indicated as a whole by the numeral 1 in FIG. 1 of the drawings. This container 1 can be made of any suitable size and shape, and is made from a suitable thermoplastic material such as high density polyethylene, or a thermosetting plastic material, such as melamine.

The container 1 is shown as having a side wall terminating in a substantially flat base or bottom 2 with an aperture or opening 3 being formed in the bottom 2. A conventional electrical heater 4 of any suitable known construction is operatively positioned within the container 1 and such heater has a resistance coil provided therein. The heater 4 includes a metal enclosure, or can 5 which has a base flange or rib 6 formed at or adjacent to the base of this can 5 by suitable means. A stud 7 is suitably secured to the heater, or to the can 5 and extends axially downwardly therefrom.

In order to position the heater 4 within the container 1, but yet to thermally isolate and insulate such heater from the plastic material usually used to form the container 1, a generally flat metal plate 8 is provided and such metal plate 8 preferably is made from a material having a low rate of heat conductivity for metal, usually stainless steel. The can 5 of the heater 4 likewise can be made from the same metal as the plate 8 and in this instance, the base flange 6 of the can 5 is welded to

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the upper surface of the metal plate 8 adjacent a central aperture therein by conventional welding techniques, as indicated at 9.

It is an important feature of the invention that this metal plate 8 is secured or sealed in engagement with the aperture 3 provided in the bottom of the container 1, and to achieve this seal in the present invention, an integral, double walled annular flange 10 is formed in the metal plate 8 adjacent but spaced radially from the periphery thereof. Initially this flange 10 would be formed to extend axially of the container 1, as indicated in dotted lines in FIG. 1, and the flange 10 is of a diameter to be received snugly in the aperture 3. Suitable sealing cements and/or sealing gaskets indicated at 11 and 12 are provided on the upper surface of the container bottom 2 and on the lower surface thereof, respectively. These gaskets can be made from glass fibers or other suitable material. It is within the concept of the invention to reinforce the plastic container 1 with suitable material, such as glass fibers, adjacent the margins of the aperture 3.

After the metal plate has been assembled in the container 1, then suitable means are brought into engagement with the flange 10 and the upper surface of the metal plate 8 so as to spin, shape, or fold over the flange 10 to cause it to extend radially outwardly in the assembly and to provide an overhanging portion 13 therein extending generally parallel to the bottom 2 of the container. Such overhanging portion 13 compresses the container bottom 2 immediately adjacent the aperture 3 between the generally planar portion of the metal plate 8 and the overhanging portion 13 of the flange 10 whereby an effective, fluid tight seal is provided between the container and the metal plate to form the desired enclosure for heating action. It will be noted that the margins of the metal plate 8 extend radially beyond the outermost portion of the radially overhanging portion 13 of the flange 10 to distribute the compression stresses applied to the bottom of the container.

In order to complete the container 1 for use, a suitable electrical heat control member, such as a conventional thermostat 14, is operatively associated with the lower surface of the metal plate 8, and usually in good heat conductive engagement with both the metal plate and the can 5 of the heater 4. A metal clamp arm 15 is secured to the stud 7 and engages the thermostat 14 to position it in the specified manner. A nut 16 engages the stud 7 to secure the clamp arm and thermostat in operative association with the plate and heater can.

The electrical control circuit for the heater 4 is completed by means of power supply leads 17 and 18 that connect to conventional terminal prongs provided in a base 19 for the container 1. These leads connect to the thermostat 14 and to the heater, respectively, and a lead 20 extends from the thermostat to the heater to connect the thermostat and heater in a series circuit for control of the heating action in the container 1 by the thermostat 14. Obviously the thermostat 14 is calibrated in such a manner as to prevent excessive heating of the container 1, or its contents.

The base 19 for the container 1 is secured thereto, as by a positioning plate 21 affixed to the stud 7 by a lock nut 22.

FIG. 2 of the drawings shows a modified container 1a of the invention which has a metal support plate 8a provided therein, as in the other embodiment of the invention. However, in this instance, a metal washer 23 is provided intermediate an overhanging portion 13a of a flange 10a of the metal plate and the adjacent surface of the container 1a. Such metal washer 23 has a cylindrical portion, or flange 24 that extends axially of the aperture formed in the bottom of this container 1a to a point immediately adjacent the sealing material, or gasket 11a carried by the upper surface of the bottom portion of the container 1a. Hence, the cylindrical portion 24 limits the compression of the container 1a between the overhang-

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ing portion 13a of the flange 10a and the remainder of the support plate 8a, but yet a desired compressive sealing engagement is obtained between the bottom portion of this container and the support plate 8a.

A further modified container 1b is shown in FIG. 3 of the drawings. In this instance, an electric heater 4b is provided where a metal can 5b thereof has a metal plate 8b formed integrally with the metal can 5b whereby the separate assembly of the electric heater to the metal support plate is avoided. Again, a positioning stud 7b extends from the heater 4b to position other members in operative association with the can 5b in this embodiment of the invention. Preferably this support plate 8b and can 5b would be formed from a low heat conductive material, such as stainless steel, and the support plate is secured to the container as previously described.

A further modification of the invention is shown in FIG. 4 where in this instance a larger aperture or opening is provided in the base portion of the container. Thus a container 1c is shown that has an open lower end or aperture 3c formed in the side walls of the container. A metal support plate 8c has an electric heater 4c suitably secured thereto and in this instance the metal plate 8c is of cup shape and has a vertically upwardly extending marginal portion 40 provided thereon. This marginal portion 40 of the metal plate 8c is contoured complementary in size to the lower end of the container 1c and it has an annular flange 10c provided in the marginal portion 40 and initially extending radially inwardly of the metal plate and container assembly. After the container 1c and the metal plate 8c have been brought into operative association, the flange 10c is folded or turned to provide an overhanging portion 13c for securing the lower margins of the side walls of the container to the metal plate to complete the enclosure. The container 1c, when completed, has a sealed joint between an integral, vertically extending flange 100 having a pair of spaced walls therein between which the lower open end of the container 1c is received.

Any suitable base 41 is provided for the container 1c and suitably secured thereto as by a lock nut 42 engaging the heater stud.

Attention now is particularly directed to the details of the modified improved container and electrical heater means of the invention as shown in FIG. 5. In this instance, a suitable plastic container 1d is shown that has a side wall terminating in an aperture 3d formed in the base or bottom portion of the container. The container also includes a metal support plate 8d that preferably is made from stainless steel or other material of low heat conductivity, and this support plate 8d has a peripheral section 50 which is doubled back upon the support plate 8d. The support plate 8d normally is substantially flat and lies in and defines a plane with the doubled section 50 including a portion lying in the plane of the support plate 8d and with another portion, usually the lower portion of this doubled section 50, lying underneath and at least substantially parallel to the plane of the support plate 8d. The doubled section 50, as initially formed, includes a substantially cylindrical flange 51 which, when assembled in the container 1 in the manner shown, extends downwardly from the plane defined by the support plate 8d. The initial position of this flange 51 is partially indicated in dotted lines in FIG. 5, and in the ultimate positioning of the metal support plate 8d and container 1d in assembled relationship, an end section 52 of the flange 51 has been suitably rolled, turned, or otherwise bent outwardly in the container assembly so as to be turned over into good compressive engagement with the bottom portion of the container 1d in the section thereof lying immediately adjacent the aperture 3d. Any suitable gaskets, or sealing cements or means, such as a gasket 12d, is shown compressed between the end section 52 of the flange and the lower surface of the container 1d in its base or bottom section. A further gasket, or seal means can be associated with the upper surface of the container adjacent the aper-

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ture 3d, if desired. This unit of the invention also includes a removable support or base 19d that is secured to the remainder of the container, as by a lower support plate 21d that is attached to the plate 8d or means carried thereby in a manner similar to that shown in the other figures of the drawings.

A further modification of the invention, illustrated in FIG. 6, illustrates a suitable plastic container 1e of any desired shape, which in this instance is shown as having a support base 62 operatively secured thereto by being formed integrally therewith as a single unit. The container 1e has a bottom 2e, which normally would be substantially flat and lie in and define a plane, which base 2e has an aperture 3e formed therein. Again, a metal support plate 8e is provided for filling, or sealing the aperture 8e provided in the base or bottom 2e of the container and for operatively positioning a suitable heater in the container 1e for heating action. The plate 8e, formed from low heat conductivity material, is originally provided with an integral downwardly extending cylindrical flange 60 that is adjacent but spaced radially from the margins of the support plate 8e, as indicated in the drawings. Such downwardly extending flange 60 has a flange end 61 formed thereon that is suitably rolled, turned, spun, or folded outwardly in the container unit 1e to take the position illustrated in the drawings. In such position, the flange end 61 is formed to have good compressive engagement of the portion of the container bottom 2e immediately adjacent the aperture 3e. Any suitable gaskets 11e and 12e are shown in association with the adjacent surfaces of the support plate 8e and the flange end 61. It may be desired to provide a metal spacer ring, or washer 23e, that has a cylindrical portion or flange 24e formed thereon and extending axially of the aperture 3e, between the plate 8e and the flange end 61 to prevent undesirable compression of the container bottom 2e.

In providing improved container and electrical heater means in accordance with the principles of the invention, any suitable type of control circuits may be provided for this electrical heater. Thus any known type of thermostats, fuses, and equivalent means may be used in the electrical control circuit. Such thermostats and/or fuses, or equivalent members would be positioned in good heat conductive contact with at least the metal support plates used in the containers. The thermostats used preferably are of the periodic, or pulsing swing type, principle. Thus, such thermostats would be designed, for example, to cut off at 185° F. after coffee has been brewed in the container, and then such thermostats would pulse "on" and "off" repetitively and would maintain a steady or holding temperature, such as about 185° F. thereafter, for the contents of the container, by the use of heaters of known construction and usually having two separate heating coils therein, one of relatively low wattage for the heat maintenance action alone. The thermostats also function as safety devices to cut off current to the heater in the event that power is supplied to the heater in the container and the container runs dry, or is coupled to a power circuit accidentally with no liquid contents being provided in the container.

It will be realized that the support plates 8 or equivalent provided in the container of the invention may in any desired instance have the heaters used in association therewith either fixedly connected thereto, or with the support plate being formed integrally with the heater can, specifically as shown in FIG. 3 hereof. The support plates 8, or equivalent members in the other embodiments of the invention, form heat barrier plates in the container units of the invention. Likewise, the spacer gaskets or rings equivalent to the members 23 and 23e disclosed herein can be used in any embodiment of the invention, as desired. FIGS. 1 and 2 well illustrate how the flange means provided for securing the support plates to the container can extend in either direction from the general plane of the support plates, so as to engage the container

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and form the desired enclosure therewith. Likewise, the securing flange, as shown in FIG. 4, may be provided both on the inner surface of the container, as shown, or the flange, in this instance, could be a single walled thickness flange, as shown in FIGS. 5 and 6, for engaging the container to secure the metal support plate thereto.

Any suitable sealing means and/or adhesives or cements may be used at any of the connections of metal to metal, or plastic to metal in the containers of the invention.

It should be noted that in some instances it may be necessary to make the metal support plates of the invention from conventional metallic materials, such as aluminum, which do not have the desired low rate of heat conductivity, as does the stainless steel and equivalent materials. However, some benefits from the invention still can be realized from the construction of the invention even without the desirable low heat conductivity in the metal support plate. Additional, or thicker gasket means might be required to help insulate the metal support plate from the plastic container in such instances, or the plastic container may be made from more heat resistant material to provide a useful, desirable structure.

It also should be noted that the electric heater means used in the units of the invention may not have a support stud extending downwardly therefrom, as electric heaters have been made with a threaded base portion upon the metal enclosure for the heater at the lower end thereof, and then the electric heater, for example, could be secured to a metal support plate by a lock nut engaging the threaded lower end of the can. The can of the heater would have an annular flange thereon at the upper end of this threaded section on the can to be drawn against the upper surface of the support plate to aid in securing the can in position. The invention contemplates use of any type of electric heaters in the containers of the invention. If a downwardly extending stud is provided on the heater, it can be secured to the heater enclosure, or can in any known manner.

The various rolling, turning, folding, spinning, or shaping actions disclosed for engaging a portion of the flange or channel of the metal plates with the containers can be generally referred to as metal forming action.

It will be obvious that the area of the continuous portion of the metal plate spacing the heater unit from the channel section of the metal plate and hence from the plastic container is not of a particular size but that such area depends upon the wattage of the heater, the material from which the plate is made, and the composition of the plastic container so as to provide the desired thermal barrier action in the metal plate.

It will be realized that the container of the invention can be used for any desired heating action, such as for brewing coffee, or for making tea, chocolate, or the like. The thermostats provided in the containers provide a very effective safety control means wherein whereby excessive heating of the container and its contents are avoided, even though the power be supplied to the container, inadvertently, when the container is empty.

The terms "vertically" and "horizontally," when used in the specification and claims are used for reference only, and the container is assumed to be positioned on a vertical axis for such designation of directions.

It also will be realized that any suitable type of a base may be used on the containers of the invention, and may even be omitted in some instances.

The flange means on the metal plate or disc 8, or equivalent means in the containers of the invention, form groove means to engage tongue portions of the plastic container.

The containers of the invention can be made of any suitable size and shape by any known molding or shaping process, and the components of the base portions thereof can be assembled thereto from the bottom, or top, as is preferred. The containers will be very attractive in design

and will have a lengthy service life. Hence it is believed that the objects of the invention have been achieved.

While several complete embodiments of the invention have been disclosed herein, it will be appreciated that modification of these particular embodiments of the invention may be resorted to without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

1. In combination in a portable electric appliance, a substantially rigid plastic container having a side wall terminating in a bottom aperture, an electrical heater unit, a metal plate of greater size than said aperture having a continuous peripheral channel section of generally U-shape cross section provided thereon, said heater unit being secured to a center portion of said metal plate in sealed engagement therewith, said channel section being radially spaced from said heater unit by a continuous intermediate portion of said metal plate, said metal plate being secured to said plastic container to close said aperture by a portion of said plastic container wall surrounding said aperture that is compressively secured between opposed walls of said channel section by a metal forming operation on at least one of the walls defining said channel section to seal said aperture and position said heater unit within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater unit, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said plastic container by any use thereof; said metal plate being in contact with the liquid in said container,
 - a thermostat positioned below and in substantially direct heat exchange relation to said metal plate to be primarily controlled by the temperature of said metal plate in normal operation of the appliance,
 - circuit means connecting to said thermostat and said heater unit and being connectable to a power supply, and
 - base means for said plastic container operatively secured thereto.
2. In combination in an electric liquid heating appliance,
 - a substantially rigid thermoplastic plastic container having a side wall terminating in a bottom aperture, an electrical heater unit,
 - a metal plate of greater size than said aperture having a continuous peripheral channel section of generally U-shape cross section provided thereon, said heater unit being secured to a center portion of said metal plate in sealed engagement therewith, said channel section being radially spaced from said heater unit by a continuous intermediate portion of said metal plate, said metal plate being secured to said plastic container to close said aperture by a portion of said plastic container wall surrounding said aperture that is compressively secured between opposed walls of said channel section by a metal forming operation on at least one of the walls defining said channel section to seal said aperture and position said heater unit within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater unit, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing

- damage to said plastic container by any use thereof; any part of said portion of said plastic container that is softened by excessive or abnormal heat flow therefrom said metal plate resolidifying in situ when heat flow thereto terminates; said metal plate being in contact with the liquid in said container,
- a thermostat positioned below said metal plate and in operatively direct heat exchange relation to said metal plate to be primarily controlled by the temperature of said metal plate in normal operation of the appliance,
 - circuit means connecting to said thermostat and said heater unit and being connectable to a power supply, and
 - base means for said plastic container operatively secured thereto.
3. In combination in a portable electric appliance, a substantially rigid plastic container having a side wall terminating in a bottom aperture, an electrical heater means, a metal plate of greater size than said aperture having a continuous generally horizontally positioned radially outwardly open peripheral channel section of generally U-shape cross section formed therein and having an offset center portion, said heater means being operatively associated with said offset portion of said metal plate and in heat exchange relation therewith, said channel section being radially spaced from said heater means by a continuous intermediate portion of said metal plate, said metal plate being secured to said plastic container to close said aperture by a portion of said plastic container wall surrounding said aperture that is compressively secured between opposed walls of said channel section by a metal forming operation on at least one of the walls defining said channel section to seal said aperture and position said heater means within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater means, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said plastic container by any use thereof; said metal plate being in contact with the liquid in said container,
 - a thermostat positioned below said metal plate and in operatively direct heat exchange relation to said metal plate to be primarily controlled by the temperature of said metal plate in normal operation of the appliance,
 - circuit means connecting to said thermostat and said heater means and being connectable to a power supply, and
 - base means for said plastic container operatively secured thereto.
4. In combination in a portable electric appliance, a substantially rigid plastic container having a bottom opening extending over a substantial portion thereof, an electrical heater means, a metal plate of greater size than said aperture having a continuous peripheral flange formed therein, said flange being spaced radially inwardly a short distance from the periphery of said plate and being connected to said plate by a doubled back edge section formed on said plate, said flange having a first portion extending substantially vertically for a distance and a second portion extending substantially radially outwardly, said first and second portions and said edge section defining a channel, said metal plate being secured to said container to close said opening by a portion of said container surrounding said opening being compressively engaged in said channel be-

tween said doubled back edge section and said second portion by a metal forming operation on said second portion, said heater means being secured to a center portion of said metal plate in sealed engagement therewith, said flange being radially spaced from said heater means by a continuous portion of said metal plate,

said metal plate sealing said aperture and positioning said heater means within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater means, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said plastic container by any use thereof; said metal plate being in contact with liquid in said container and being made from a material having a low rate of heat conductivity,

a thermostat positioned below said metal plate and in operatively direct heat exchange relation to said metal plate to be primarily controlled by the temperature of said metal plate in normal operation of the appliance,

circuit means connecting to said thermostat and said heater means and being connectable to a power supply, and

base means for said plastic container operatively secured thereto.

5. In combination in a portable electric appliance, a substantially rigid plastic container having an opening extending over a portion of the bottom area thereof, an electrical heater means,

a peripherally flanged metal plate of greater size than said aperture, said flange being continuous and at least having portions spaced radially inwardly a short distance from the periphery of said plate, said flange having a first portion extending substantially vertically for a distance and a second portion extending radially outwardly, said portions together with adjacent parts of said plate defining a channel, said metal plate being secured to said container to close said opening by means of the portion of said container surrounding said opening being compressively engaged in said channel by a metal forming operation on said second portion of said flange, said heater means being secured to a center portion of said metal plate in sealed engagement therewith, said flange being radially spaced from said heater means by a continuous portion of said metal plate, said second portion of said flange extending vertically when said plastic container and metal plate are initially assembled and being engaged with said plastic container by a metal forming operation on said second portion,

said metal plate sealing said aperture and positioning said heater means within but thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater unit, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said plastic container by any use thereof; said metal plate being in contact with liquid in said container,

a thermostat positioned in substantially direct heat exchange relation to said metal plate and said heater means to be primarily controlled by the temperatures thereof,

circuit means connecting to said thermostat and said

heater means and being connectable to a power supply, and

base means for said plastic container operatively secured thereto.

6. In combination in a portable electric appliance, a substantially rigid plastic container having a bottom section with an aperture therein, an electrical heater means,

a metal plate of greater size than said aperture having a continuous peripheral channel section of generally U-shape cross section provided thereon and being substantially horizontally positioned with a radially facing initially open channel mouth, said heater means being operatively secured to a center portion of said metal plate, said channel section being radially spaced from said heater unit by a continuous intermediate portion of said metal plate,

said metal plate being secured to said plastic container to close said aperture by a portion of said plastic container surrounding said aperture that is directly and compressively secured between opposed walls of said channel section by a metal forming operation on at least one of the walls defining said channel section to seal said aperture and position said heater means within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater unit, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said plastic container by any use thereof; said metal plate being in contact with the liquid in said container.

a thermostat positioned below said metal plate and in substantially direct heat exchange relation to said metal plate to be controlled at least in part by heat supply therefrom in normal operation of the appliance,

circuit means connecting to said thermostat and said heater means and being connectable to a power supply, and

base means for said plastic container operatively secured thereto.

7. In combination in an electric liquid heating appliance,

a substantially rigid plastic container having a bottom wall with an aperture therein,

an electrical heater unit,

a metal plate of greater size than said aperture having a continuous peripheral channel section of generally U-shape cross section formed therein which channel section is generally horizontally positioned and has a radially outwardly facing open mouth, said heater unit being secured to a center portion of said metal plate in sealed engagement therewith, said channel section being radially spaced from said heater unit by a continuous portion of said metal plate,

said metal plate being secured to said plastic container to close said aperture by a portion of said plastic container surrounding the aperture that is compressively secured between opposed walls of said channel section by a metal forming operation on at least one of the walls defining said channel section to seal said aperture and position said heater unit within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater unit, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said

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plastic container by any use thereof; said metal plate being in contact with the liquid in said container,
 a thermostat positioned below said metal plate and in operatively direct heat exchange relation to said metal plate,
 circuit means connecting to said thermostat and said heater unit and being connectable to a power supply, and
 integral plastic base means for said plastic container formed as a unit therewith and extending downwardly from said metal plate to support said plastic container.

8. In combination in a portable electric appliance,
 a substantially rigid plastic container having a bottom wall terminating in an aperture extending over a substantial portion thereof,
 an electrical heater means,
 a metal plate of greater size than said aperture having a continuous double walled peripheral flange formed therein secured to said container to close said aperture, said flange being spaced radially inwardly a short distance from the periphery of said plate, said flange having a first portion extending substantially vertically for a distance and a second portion extending radially outwardly and compressively operatively engaging and forcing said container bottom against an adjacent section of said plate to secure said metal plate to said container bottom wall, said heater means being secured to a center portion of said metal plate in sealed engagement therewith, said flange being radially spaced from said heater means by a continuous intermediate portion of said metal plate, said second flange portion extending vertically when said plastic container and metal plate are initially assembled, said plastic container being compressively secured between said metal plate and said flange by a metal forming operation on said second flange portion to seal said aperture and position said heater unit within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater unit, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said plastic container by any use thereof; said metal plate being in contact with the liquid in said container,
 a thermostat positioned in operatively direct heat exchange relation to said metal plate and said heater means to be primarily controlled by the temperature thereof,
 circuit means connecting to said thermostat and said heater unit and being connectable to a power supply,
 base means for said plastic container, and
 means operatively securing said base means to said plastic container.

9. In combination in a portable electric appliance,
 a substantially rigid plastic container having a bottom portion terminating in a bottom aperture,
 an electrical heater unit,
 a metal plate of greater size than said aperture having a continuous peripheral generally horizontally positioned radially outwardly open channel section of generally U-shape in section formed therein, said heater unit being secured to a center portion of said metal plate in sealed engagement therewith, said metal plate and channel section being formed of a single metal sheet, said channel section being radially spaced from said heater unit by a continuous intermediate portion of said metal plate,
 said metal plate being secured to said plastic container to close said aperture by a portion of said plastic con-

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tainer surrounding said aperture that is compressively secured between opposed walls of said channel section to seal said aperture and position said heater unit within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said heater unit, the size of said metal plate and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said plastic container by any use thereof; said metal plate being in contact with the liquid in said container,
 a thermostat positioned below said metal plate and in operatively direct heat exchange relation to said metal plate to be primarily controlled by the temperature of said metal plate in normal operation of the appliance,
 circuit means connecting to said thermostat and said heater unit and being connectable to a power supply, and
 plastic base means for said plastic container formed as a unit therewith.

10. In combination in a portable electric appliance,
 a substantially rigid plastic container having a bottom portion terminating in a bottom aperture,
 an electrical heater unit,
 a metal plate means of greater size than said aperture having a continuous, peripheral, horizontally positioned, radially outwardly open, channel section means provided thereon, said heater unit being secured to a center portion of said metal plate means in sealed engagement therewith, said channel section means being formed initially to have a single downwardly extending wall having a portion capable of being bent horizontally to define a wall of said channel section means, said channel section means being radially spaced from said heater unit by a continuous intermediate portion of said metal plate means, said metal plate means being secured to said plastic container to close said aperture by a portion of said plastic container surrounding said aperture that is compressively secured between opposed portions of said channel section means by a metal forming operation on said portion of said wall to seal said aperture and position said heater unit within but spacially and thermally insulated from said plastic container by said continuous portion of said metal plate means, said continuous portion being of an area correlated with the wattage of said heater unit, the size of said metal plate means and the material from which it is made, and the composition of said plastic container so as to prevent the transfer of excessive heat to said plastic container thereby preventing damage to said plastic container by any use thereof; said metal plate means being in contact with the liquid in said plastic container,
 a thermostat positioned below said metal plate means and in operatively direct heat exchange relation to said metal plate means to be controlled at least in part by the temperature of said metal plate means in normal operation of the appliance,
 circuit means connecting to said thermostat and said heater unit and being connectable to a power supply, and
 base means for said plastic container operatively secured thereto.

11. A small portable electric apparatus, such as a coffee maker, for heating liquids including
 a substantially rigid hollow liquid receiving body having a substantially vertical axis, said body being of molded plastic possessing resistance to the conduc-

tion of heat, said body having a side wall terminating in a bottom opening,
 a metal plate of greater size than said opening,
 means for securing said metal plate to said body comprising an interlocked connection between peripheral portions on said metal plate and a peripheral portion of said body surrounding said opening to seal the opening and directly secure said metal plate to said body,
 an electric heater secured to a center portion of said metal plate in sealed relation thereto, said interlocked connection being radially spaced from said electric heater by a continuous intermediate portion of said metal plate,
 said electric heater being within but spacially and thermally insulated from said plastic body by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said electric heater, the size of said metal plate and the material from which it is made, and the composition of said plastic body so as to prevent the transfer of excessive heat to said plastic body thereby preventing damage to said plastic body by any use thereof; said metal plate being in contact with the liquid in said plastic body,
 a thermostat positioned below said metal plate in operatively direct heat exchange relation thereto to be primarily controlled by the temperature thereof in normal operation of the appliance,
 circuit means connecting to said thermostat and electric heater and being connectable to a power supply, and
 base means for said plastic body operatively secured thereto.
 12. A small portable electric apparatus, such as a coffee maker, for heating liquids including
 a substantially rigid hollow liquid receiving body having a substantially vertical axis, the body being of molded plastic and having a side wall terminating in a bottom opening,
 a metal plate of greater size than said opening,
 interlocking means including endless tongue and groove portions formed on a peripheral portion of said metal plate and said body surrounding the opening to seal the opening in said body and secure said metal plate to said body, said interlocking means comprising a tongue on one of said body and said metal

plate and a groove on the other of said body and said metal plate,
 an electric heater secured to a center portion of said metal plate in sealed relation thereto, said interlocking means being radially spaced from said electric heater by a continuous intermediate portion of said metal plate,
 said electric heater being within but spacially and thermally insulated from said plastic body by said continuous portion of said metal plate, said continuous portion being of an area correlated with the wattage of said electric heater, the size of said metal plate and the material from which it is made, and the composition of said plastic body so as to prevent the transfer of excessive heat to said plastic body thereby preventing damage to said plastic body by any use thereof; said metal plate being in contact with the liquid in said plastic body,
 a thermostat positioned below said metal plate and electric heater in operatively direct heat exchange relation thereto to be primarily controlled by the temperatures thereof in normal operation of the appliance,
 circuit means connecting to said thermostat and electric heater and being connectable to a power supply, and
 base means for said plastic body operatively secured thereto.

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