

Jan. 4, 1944.

D. K. FERRIS

2,338,236

DOMESTIC APPLIANCE

Filed Jan. 30, 1941

2 Sheets-Sheet 1

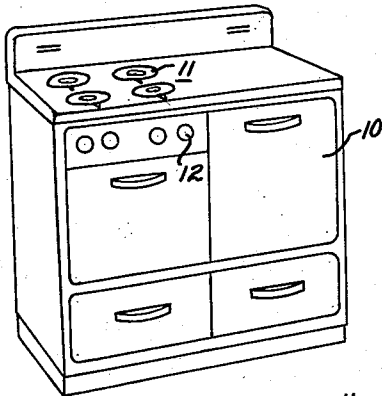


Fig. 1

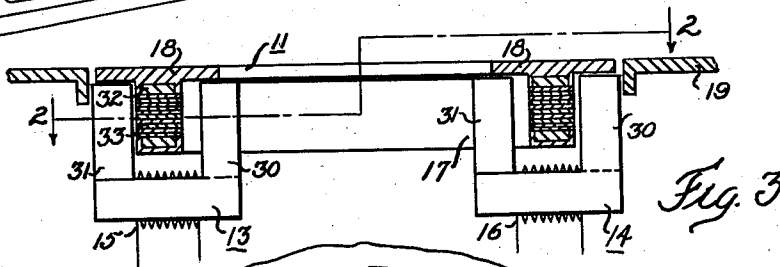


Fig. 3

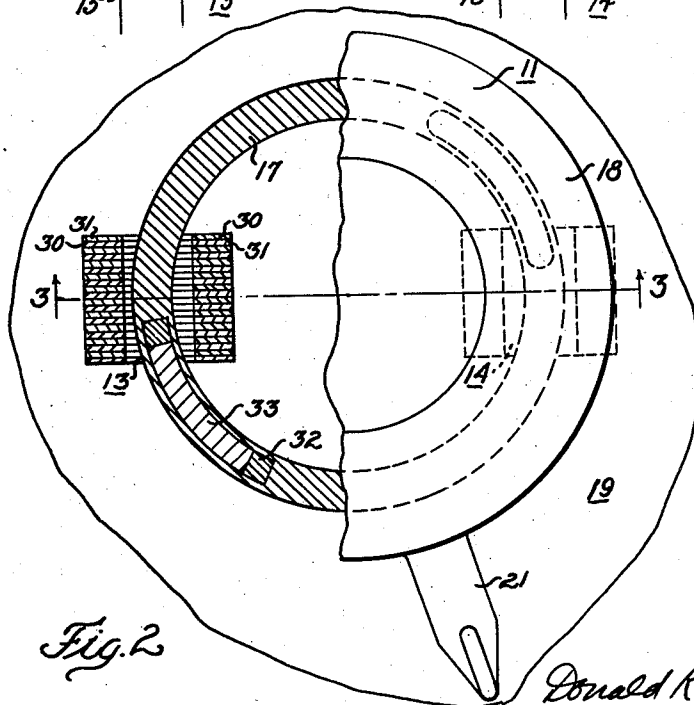


Fig. 2

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2 Sheets-Sheet 2

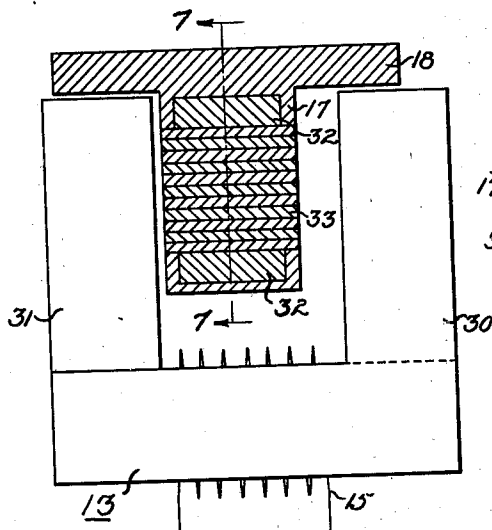


Fig. 4

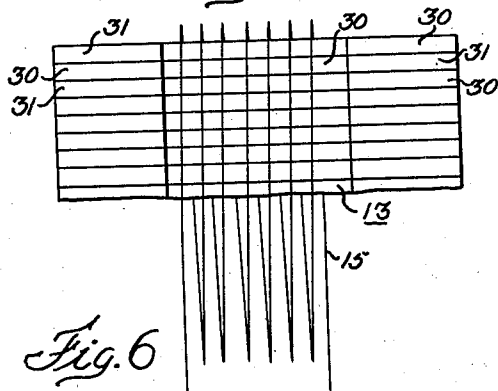


Fig. 6

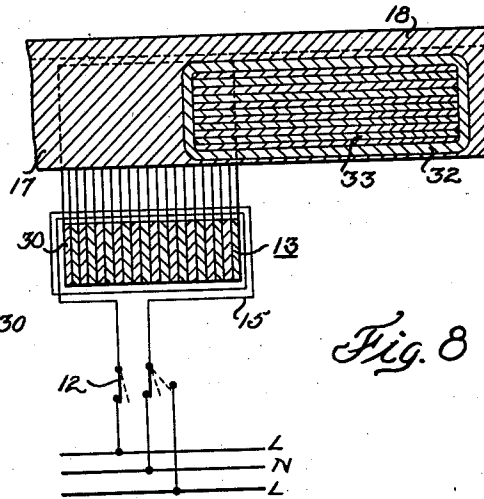


Fig. 8

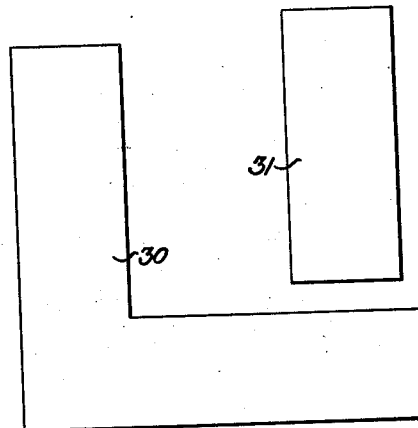


Fig. 5

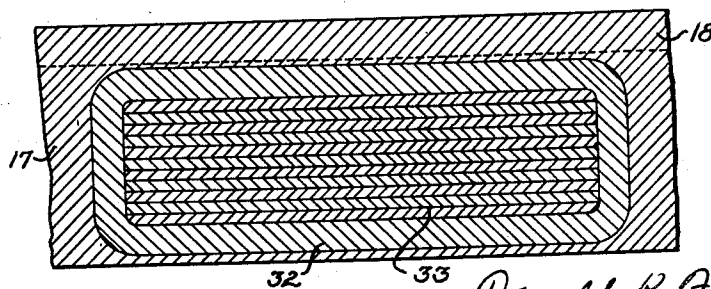


Fig. 1

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UNITED STATES PATENT OFFICE

2,338,236

DOMESTIC APPLIANCE

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Application January 30, 1941, Serial No. 376,674

15 Claims. (Cl. 219—37)

This invention relates to domestic appliances and more particularly to electric ranges.

An object of this invention is to provide a heating unit for electric ranges which utilizes induced currents for heating purposes, and in which the heating value of these currents may be modified to provide varying degrees of heat.

Another object of my invention is to provide a heating unit for a range, or the like, having gradually differing heat selections.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a view, in perspective, of an electric range utilizing my invention;

Fig. 2 is a top view, partly in section, of a heating unit embodying features of my invention, the view taken along the line 2—2 of Fig. 3;

Fig. 3 is a vertical cross-section of the unit shown in Fig. 2, the section being taken along the line 3—3 of Fig. 2, the windings 15 and 16 being shown diagrammatically;

Fig. 4 is an enlarged cross-section of a portion of Fig. 3;

Fig. 5 is a view showing portions of the magnetic core;

Fig. 6 is a top view of a portion of Fig. 4 with the rings 17 and 18 removed;

Fig. 7 is a cross-section taken along the line 7—7 of Fig. 4, the section following the curve of rings 17 and 18; and

Fig. 8 is a diagrammatic wiring diagram for one heating unit.

The usual range is provided with top units for heating utensils. Ordinarily the top units are provided with resistance elements receiving current directly from the power lines. While it has been possible to select several degrees of heating value in such top units, there has always been a decided jump between values, with the result that one heating value may be too great and the next heating value too small for a particular need. The units embodying my invention are capable of producing heat in gradually varying degrees of heat, so that any desired heat output may be selected. In my invention the range 10 is provided with top units 11 located at the usual cooking top of the range and supplied by induced currents derived from alternating current of constant voltage from the usual supply lines. The construction is such that the amount of induced currents may be

varied gradually to provide a selection of gradually varying degrees of heat.

To this end, alternating current from the usual supply lines is supplied to switches 12 from which its flow may be manually controlled to the respective units 11 on the top of the range. A unit 11 may include one or more magnetic cores 13 and 14, having primary windings 15 and 16 having a relatively large number of turns under the control of a switch 12. The cores 13 and 14 preferably are U-shaped to receive a ring 17. The ring 17 may be formed integrally with a top ring 18, which forms the top of the heating unit and extends adjacent to the metal cooking top 19 of the range 10.

The ring 17 has been shown as applied to a top ring 18, separate from the cooking utensil. However, the ring 17 may be cast, or may be secured to, the bottom of a cooking utensil, so that the heat produced in the ring 17 may be conducted directly to the contents of the cooking utensil.

Adjustment of the heat produced within the ring 17 may be secured by providing certain portions of the ring 17 with different induced current capacity. In addition, the top unit may be provided with a handle 21 for moving the unit about its vertical central axis thereof, so as to place different parts of the ring 17 across the magnetic fields of the cores 13 and 14. In this manner the ring 17 may be so placed that portions of the ring having a capacity of relatively great induced current are placed across the magnetic field or the ring 17 may be turned so that portions of the ring having a less capacity for induced currents are across the magnetic field. In this manner the intensity of the heat produced within the ring 17 may be gradually varied.

If the ring 17 is made integral with a cooking utensil, the utensil may be turned about its vertical axis so as to place different parts of its ring 17 across the magnetic fields in the same manner that the ring 18 is so changed. If desired, the cooking utensil may be provided with a handle for lifting it, and this handle may be used for turning the vessel to the desired place. When cooking utensils are to be provided with their individual heating rings, the range top may be marked to indicate the place over which the handle is to be located in order to obtain the desired degree of heat. For example, the words "high" and "low" may be placed on the stove to indicate where the handle 21 is to be located,

or to indicate where the utensil handle is to be located.

Details of the construction of the ring 17 and the heating magnets are shown more clearly in Figs. 4 and 5. The heating magnet cores are preferably made of iron laminations of the shape shown in Fig. 5. One set of laminations is L-shaped as indicated at 30 while the other set of laminations may be rectangular as indicated at 31. The magnetic core is made of two L-shaped sections of laminations. Each section is made by assembling alternate laminations 30 and 31 with the laminations 31 placed between the vertical portions of laminations 30. A winding 15 (or 16) may be placed around the horizontal portion of one of the sections thus assembled. The various laminations may be bolted together in any approved manner. Thereafter the two complementary assemblies may be dovetailed into each other, the horizontal portions of laminations 30 of one set dovetailing with the horizontal portions of the laminations 30 of the other set.

The ring 17 preferably is made of aluminum or 18-8 stainless steel or any other non-magnetic metal. A plurality of copper coils 32, together with laminated iron cores 33 within the coils 32, are cast in the ring 17. The coils 32 may have one or a relatively small number of turns. When an alternating current is passed through the coil 15 (or 16), it induces low voltage high ampere current in the coils 32 and heats the same, thus providing heat for cooking purposes.

The coils 32 extend for some distance around the circumference of ring 17, as indicated in Figs. 2 and 7. By turning the ring 17, using handle 21, the coils 32 may be moved more or less into or from the magnetic flux created in the cores 13 and 14. As a result, the heat intensity created in the coils 32 may be varied gradually in this manner.

It is to be noted that the magnetic lines between the poles of the magnetic cores may pass through the coil 32 and laminated core 33 completely or only partially, depending on the rotation of the ring 17 about the vertical axis. This enables the intensity of the induced currents to be varied by turning the ring 17. The number of magnetic cores around the circumference of the ring 17 may be one or more, and a larger number than the two (shown in Fig. 2) may be used in order to distribute the heat more evenly around the circumference of the heating unit. Where words such as "ring," "circumference," etc., are used they are not to be construed strictly as implying perfect circles. Any shape utilizing the advantages of my invention come within the purview of these words.

By this construction it is possible to vary gradually the intensity of heat imparted to the heating unit as distinguished from the step by step graduations necessary with resistance units commonly used.

The switches 12 may be used to connect the primary windings 15 and 16 with any type of alternating current. If desired the switches 12 may be constructed selectively to connect the windings 15 and 16 across lines of different voltages. Thus in one position of the switches 12, the primary windings may be placed across 110 volts, in another position across 220 volts and in a third position the windings may be disconnected entirely from the source of power. Thus the switch 12 may connect the primary winding across the lines L-N, or L-L, or open the circuit, as indicated in Fig. 8.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. An electric heating unit comprising a plurality of U-shaped magnetic cores and primary windings circumferentially arranged with their poles on opposite sides of a circumferential zone, a heating ring in said zone with varying capacities for induced current along its circumference, and means for turning said heating ring to place different portions of its circumference between said poles.

2. A heating unit for an electric range comprising a plurality of U-shaped magnetic cores and primary windings circumferentially arranged with their poles on opposite sides of a circumferential zone, a heating ring in said zone with rings of conducting material and of a relatively small number of turns along its circumference, and means for turning said heating ring to place more or less of said rings of conducting material between said poles.

3. A heating unit for an electric range comprising a plurality of U-shaped magnetic cores and primary windings circumferentially arranged with their poles on opposite sides of a circumferential zone, a heating ring in said zone with varying capacities for induced current along its circumference, a flat supporting ring along the edge of said heating ring, and means for turning said heating ring to place different portions of its circumference between said poles.

4. A heating unit comprising a plurality of U-shaped magnetic cores and primary windings circumferentially arranged with their poles on opposite sides of a circumferential zone, a heating ring in said zone with rings of conducting material along its circumference, and means for turning said heating ring to place more or less of said rings of conducting material between said poles.

5. A heating unit for an electric range comprising a plurality of U-shaped magnetic cores and primary windings circumferentially arranged with their poles on opposite sides of a circumferential zone, a heating ring in said zone with varying capacities for induced current along its circumference, means for turning said heating ring to place different portions of its circumference between said poles, and switch means adapted selectively to connect said primary windings to different sources of alternating current.

6. A heating unit for an electric range comprising a U-shaped magnetic core and primary winding arranged with their magnetic poles on opposite sides of a circumferential zone, a heating ring in said zone with varying capacities for induced current along its circumference, and means for turning said heating ring to place different portions of its circumference between said poles.

7. A heating unit adapted to be placed adjacent the cooking top of an electric range comprising a U-shaped magnetic core and primary winding adapted to be arranged below said cooking top with their magnetic poles on opposite sides of a circumferential zone, a plate to be heated adapted to rest along the upper face of said cooking top with a depending heating ring in said zone with varying capacities for induced current along the circumference, and means for

turning said heating ring to place different portions of its circumference between said poles

8. A heating unit adapted to be placed adjacent the cooking top of an electric range comprising a plurality of U-shaped magnetic cores and primary windings adapted to be arranged below said cooking top with their magnetic poles on opposite sides of a circumferential zone, a plate to be heated adapted to rest along the upper face of said cooking top with a depending heating ring in said zone with varying capacities for induced current along its circumference, and means for turning said heating ring to place different portions of its circumference between said poles.

9. A heating unit adapted to be placed adjacent the cooking top of an electric range comprising a plurality of U-shaped magnetic cores and primary windings adapted to be arranged below said cooking top circumferentially arranged with their poles on opposite sides of a circumferential zone, a plate to be heated adapted to rest along the upper face of said cooking top with a depending heating ring in said zone with rings of conducting material and of a relatively small number of turns along its circumference, and means for turning said ring to place more or less of said rings of conducting material between said poles.

10. An electric heating unit comprising a transformer with a primary winding and a magnetic core structure, a rotatable ring containing in a limited portion thereof the secondary circuit of said transformer structure, said primary winding and magnetic core structure being localized with respect to said ring to provide a localized magnetic field, said rotatable ring being rotatable with respect to said primary winding to vary the relationship between the primary winding and the secondary circuit so as to vary the intensity of the heat produced within the ring, said ring being provided with a surface for supporting in good thermal contact a cooking utensil.

11. An electric heating unit comprising a transformer with a primary winding, a magnetic core structure and a secondary circuit member forming a part of the unit structure, said secondary circuit member being formed to present a surface for supporting and making good thermal surface contact with cooking utensils, and means for laterally moving portions of the secondary circuit member relative to the primary winding for varying the intensity of heat produced in the secondary circuit member, said pri-

mary winding and magnetic core structure being localized with respect to said secondary member to provide a localized magnetic field, a limited portion of said secondary member being provided with a local secondary circuit so as to vary the intensity of the heat produced in the secondary member according to relative positions of the localized magnetic field and the local secondary circuit.

12. An electric heating unit comprising a transformer including a plurality of primary windings and magnetic core structures arranged in a plurality of separate zones to provide a plurality of localized magnetic fields, a rotatable secondary circuit member having a plurality of local secondary circuits each located in a different zone, and means for turning said secondary circuit member to place said secondary circuits in various relationships to said localized magnetic fields.

13. A heating unit comprising a magnetic core and primary winding arranged with their magnetic poles on opposite sides of a circumferential zone, a heating ring in said zone having sections of various capacities for induced current along its circumference, and means for producing relative movement between said core and said heating ring to place different portions of its circumference between said poles so as to vary the heating of said ring.

14. A heating unit for an electric range comprising a magnetic core and primary winding arranged with their magnetic poles on opposite sides of a circumferential zone, a heating ring in said zone having sections of various capacities for induced current along its circumference, and means for producing relative movement between said core and said heating ring to place different portions of its circumference between said poles so as to vary the heating of said ring.

15. An electric hot plate heating unit comprising a transformer including a plurality of primary windings and magnetic core structures arranged in a plurality of separate zones to provide a plurality of localized magnetic fields, a heating element in the form of a laterally movable secondary circuit member having a plurality of local secondary circuits each located in a different zone, and means for laterally moving said secondary circuit member to place said secondary circuits in various current inducing relationships to said localized magnetic field so as to vary the heat generated in said heating element by said induced current.

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