

Oct. 10, 1944.

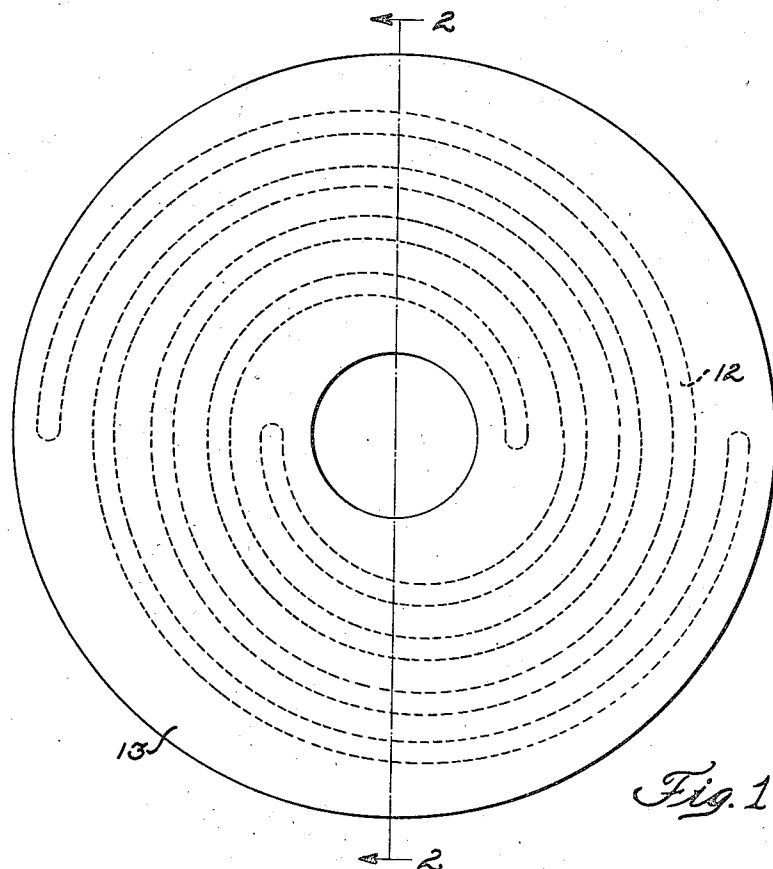
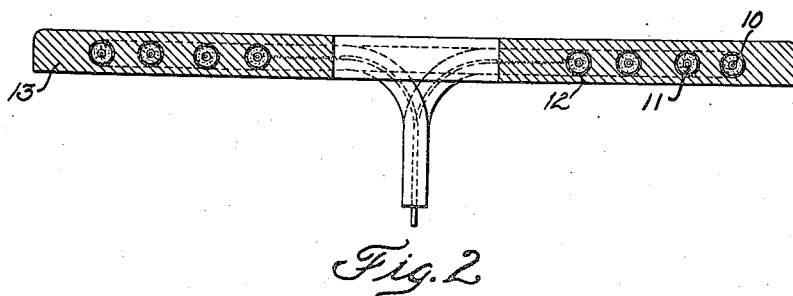
M. E. FRY

2,359,983

DOMESTIC APPLIANCE

Filed Feb. 19, 1941

2 Sheets-Sheet 1



Millard E. Fry INVENTOR.
BY Spencer Hardman

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2 Sheets-Sheet 2

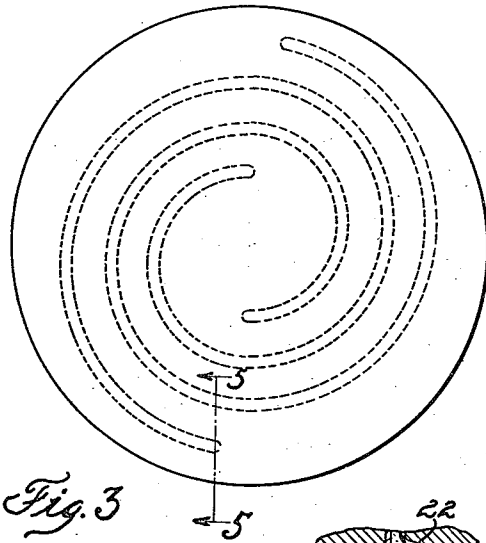
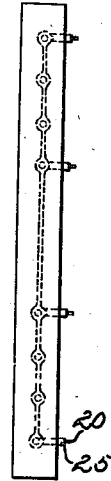
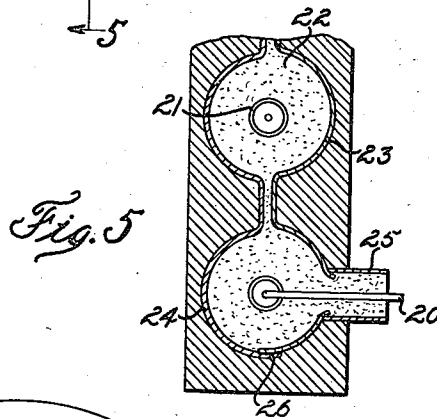
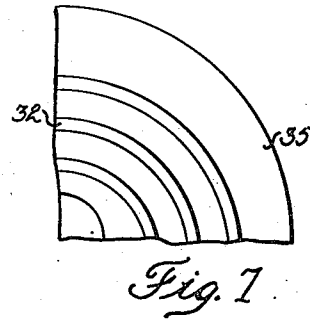
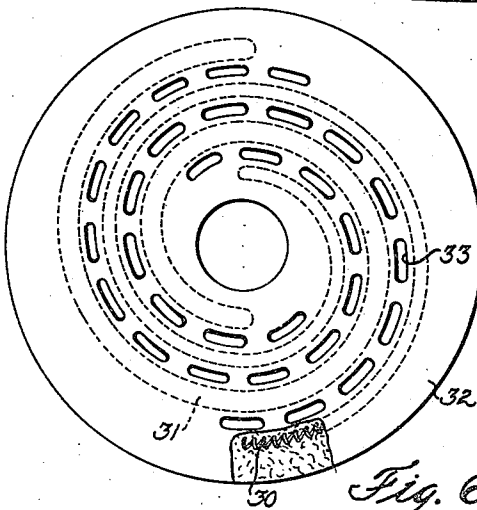
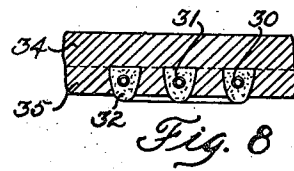
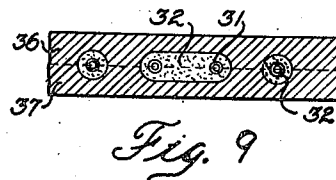


Fig. 6

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UNITED STATES PATENT OFFICE

2,359,983

DOMESTIC APPLIANCE

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Application February 19, 1941, Serial No. 379,650

1 Claim. (Cl. 219-37)

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

An object of this invention is to provide an improved top heating unit for electric ranges or the like in which the heating resistance is embedded in a disc of powdered and sintered metal.

Another object of this invention is to provide an improved method of manufacturing top heating units for electric ranges or the like.

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 top plan view of a heating unit embodying features of my invention;

Fig. 2 is a cross-section along the line 2-2 of Fig. 1;

Fig. 3 is a top view of a slightly modified heating unit;

Fig. 4 is a side view of Fig. 3;

Fig. 5 is an enlarged cross-sectional view taken along the line 5-5 of Fig. 3;

Fig. 6 is a top view of a modified form in a partially completed condition;

Fig. 7 is a bottom view of a completed unit of the modification shown in Fig. 6;

Fig. 8 is a cross-sectional view of a portion of the unit shown in Fig. 7; and

Fig. 9 is a view, somewhat similar to Fig. 8, but showing a modified form.

A top unit may be made in accordance with my invention by embedding a resistance element 10 within a tubular mass 11 of electrical insulating material. The insulating material may be any of the well-known insulating materials which may be encased in a sheath. This element and mass may be embedded in a tubular sheath of sheet metal 12 as disclosed in Abbott Patent No. 1,367,341, February 1, 1921, and the same may be further embedded in a disc 13 of powdered and sintered metal. If desired, the resistance element may be made in the form of a coiled resistance wire and the wire, insulating mass, and sheath may be arranged in the form of a flat spiral within the disc 13 of powdered metal made as hereinafter described with regard to Figs. 3, 4 and 5. In the form shown in Figs. 1 and 2, the resistance and encasing insulation and sheath may emerge from the bottom of the disc and extend downwardly as indicated in Fig. 2 for connection with control switches. If desired the sheath 12 may be omitted.

In the modifications shown in Figs. 3, 4 and 5,

the resistance wire entering at 20 is helically wound, as indicated at 21. Electrical heat insulating material 22, similar to insulating material 11, is placed around the resistance wire. The electrical insulating material 22 is molded on a lower sheet metal sheath 23 which is stamped from the disc and has a spiral path or groove formed in the disc to receive the heat insulating material 22. This structure is placed in a furnace and dried to form a briquette. Thereafter a top sheath 24, having a groove symmetrical with respect to the first named groove, is placed over the briquette and is welded to sheath 23, as indicated at 26. This structure is embedded in powdered iron mixed with graphite in ratios from 3 to 1 to 6 to 1. The powdered iron and graphite is then pressed into the form of a disc, and the disc is thereafter sintered at about 2000° F. The disc thus formed is smooth and does not require any grinding in order to present an attractive surface.

The lower sheath 23 may have one or more downwardly extending tubular extensions 25 through which the resistance element or elements emerge at 20 and may be connected to proper switches and source of electrical energy.

Fig. 6 shows a modification in which a briquette of refractory material with a flat spiral helix embedded in it is first formed. This briquette is made of some refractory material, such as magnesium oxide with a clay binder, and the briquette is baked in an oven to harden it.

The briquette includes one or more resistance wires 30 and 31 helically wound in the form of flat spirals. These spirals are covered with the refractory material and clay binder 32 made in the form of a disc or plate with transverse openings 33.

The disc 32, with the resistance wires embedded therein is then laid on a disc-shaped layer of mixed powdered iron and graphite which later forms the upper layer 34 of Fig. 8 or upper layer 37 of Fig. 9. Thereafter the disc 32 is covered (or is partially covered) with another layer of powdered iron and graphite, a portion of which passes through openings 33. This later forms the lower layer 35 of Fig. 8 or the lower layer 37 of Fig. 9. This structure is then compressed and sintered to form a disc of powdered iron with the refractory material embedded therein.

Fig. 8 is a cross-section and Fig. 7 is a bottom view of the finished metal disc in which a part of the disc 32 protrudes from the bottom. This form is made in an inverted position by placing the disc 32 over a disc of powdered metal. There-

after the openings 33 are partially filled with powdered metal and the edge of disc 32 is partially covered with powdered metal. This structure is then compressed into a form having a cross-section similar to Fig. 8 in an inverted position. The structure is then sintered.

In Fig. 9, a modification somewhat similar to Figs. 8 and 7 is shown; but in Fig. 9 the disc 32 is completely covered with powdered metal before being compressed and sintered. This is made by placing disc 32 over a disc-shaped layer of powdered metal later to form layer 36 of Fig. 9. The disc 32 is then completely covered with another disc-shaped layer of powdered metal later to form layer 37 of Fig. 9. The powdered metal is then compressed and sintered as previously described to form a disc-shaped heating unit.

In the forms shown in Figs. 7, 8 and 9 the leads into the resistances 30 and 31 may emerge from the bottom of the finished disc. These leads may be formed by surrounding the resistance wire with insulating material and a sheet metal tube similar to 25 of Fig. 5.

In all of the modifications, where powdered metal is referred to, it is intended to indicate

that a mixture of powdered iron mixed with graphite in the ratios of from 3 to 1 to 6 to 1 may be used if desired. Where sintering is described in all of these forms, a temperature of 2000° F. may be used. Where insulating material is referred to, magnesium oxide with a clay binder may be used, this to be baked in a furnace into briquette form.

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 claim which follows.

What is claimed is as follows:

15 The method of manufacturing a heating element, which comprises distributing a resistor in conventional hotplate form; molding a generally radially continuous rigid disc-like insulating body, having transverse openings therethrough, around the resistor; covering at least one side of the body with a powdered metal mass extending at least a sufficient distance into the openings to effect a good mechanical bond therewith; compressing the mass; and sintering the mass.

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