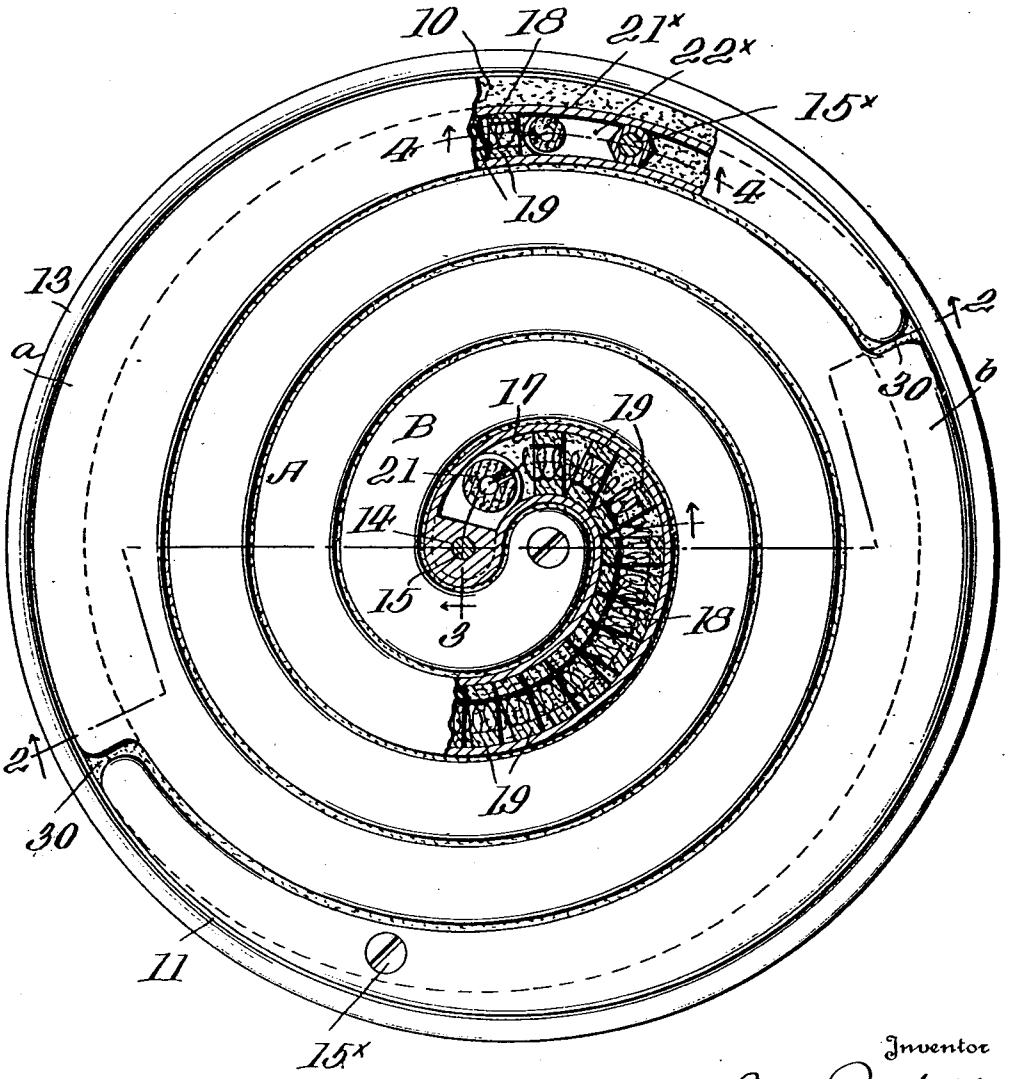
July 10, 1928. 1,677,005

L. REICHOLD

NONWARPING HOT PLATE

Filed Sept. 15, 1927 2 Sheets-Sheet 1

Fig. 1.



Inventor

Ludwig Reichold

By Sturtevant & Mason

Attorneys

July 10, 1928.

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2 Sheets-Sheet 2

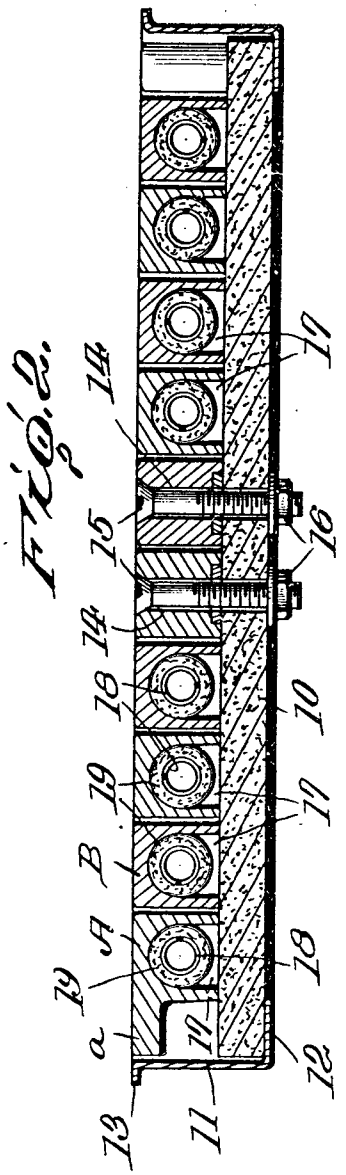


Fig. 2.

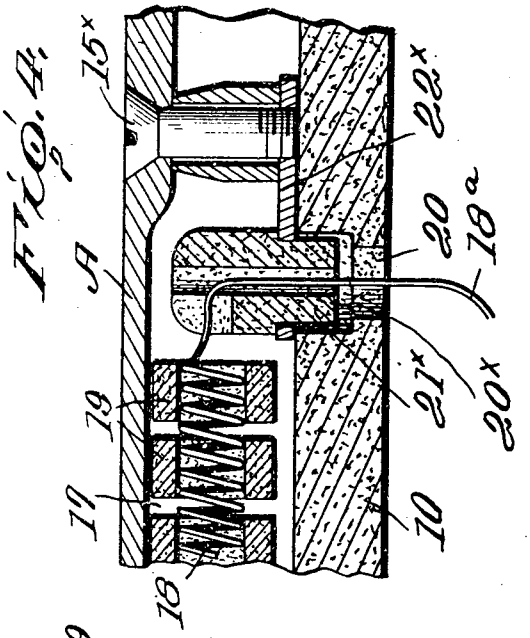


Fig. 4.

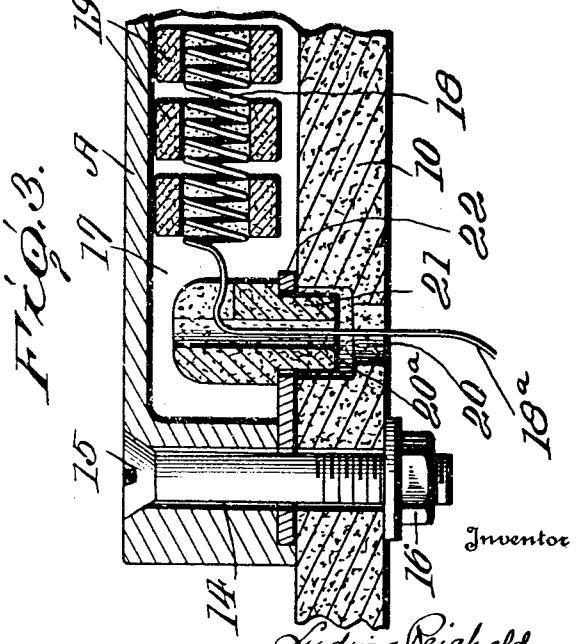


Fig. 3.

Inventor

Ludwig Reichold,

By Sturtevant & Mason

Attorneys

Patented July 10, 1928. 1,677,005

UNITED STATES PATENT OFFICE.

LUDWIG REICHOLD, OF WINSTED, CONNECTICUT, ASSIGNOR TO THE FITZGERALD MANUFACTURING COMPANY, OF TORRINGTON, CONNECTICUT, A CORPORATION OF CONNECTICUT.

NONWARPING HOT PLATE.

Application filed September 15, 1927. Serial No. 219,670.

This invention relates to improvements in electrical hot plates for stoves and similar devices.

It has heretofore been proposed to construct hot plates in various manners: and even to provide hot plates in which the heating wires are run spirally from the center of the plate to the periphery: and are protected by heavy metal members which absorb and distribute the heat.

In such devices, however, no adequate provision was made for expansion as a result of differential heating, and as a result the plate would warp or buckle in service, and thus present a very uneven surface to support a vessel to be heated.

According to the present invention a structure of this type is provided which is competent to expand and contract without distortion or warping out of plane.

Other features of the present invention are the provision of improved mounting means for the ends of the wires, and for insulating the wires from the metal members: and in general in the simplification of the construction of such devices.

With these and other objects in view as will appear in the course of the following specification and claims, one illustrative form of construction is shown on the accompanying drawings, in which:

Figure 1 is a plan view of a heater plate according to the present invention, with parts broken away to show the arrangement of the coils within the metal members.

Fig. 2 is a vertical diametral section through the plate, substantially on line 2—2 of Fig. 1.

Fig. 3 is a detail section substantially on line 3—3 of Fig. 1.

Fig. 4 is a sectional view on line 4—4 of Fig. 1.

According to the present invention, the metal heat absorbing and protecting members for the resistance wires are formed as individual spirals which are individually supported on a base plate, so that the spirals are competent of movement independently of each other according to the heating at any point along the length of either of them. It will be understood that when two wires are employed, at times a single one is used for maintaining a low heating: in which case only one member receives heat to a high degree, while the other is heated substantially by radiation from the first: which with the usual plate would involve a considerable warping and distortion: while with the present structure either spiral may expand and contract independently of the other.

In the accompanying drawings a base plate 10 preferably of refractory insulating material is provided of sufficient thickness to resist distortion under the weight of a superimposed load. This base plate is protected by a peripheral skirt 11 having an inturned flange 12 forming a ledge to support the base member 10: and being provided at its top usually with an out-turned flange 13, by which the hot plate is supported on the stove top.

Mounted on this base plate are two spiral elements A and B (Fig. 1) which are identical in shape, and are preferably formed of cast iron and provided with a peripheral flange *a*, *b*, respectively, of circular outer shape so that the single hot plate is of circular outline, and fills the space in the stove top or other device. These two members are of lesser dimension along a radial line than the gap between the several parts, so that there is usually a slight space existent between them, although this is not essential for the purpose of the present invention.

At the inner end of each spiral is an aperture 14 to receive a securing bolt 15 having a countersunk head so that the top of the finished spirals constituting the hot plate is flat. This bolt 15 passes through the insulating base member 10 and has its nut 16 therebelow to hold the center of the respective spiral fixedly to the base plate 10.

Each of the spirals is formed with a channel 17 in its bottom, as shown in the sectional view of Fig. 2, to receive the heating wire 18 which is held insulated from the metal of the spiral by the successive beads 19. It will be noted that in the preferred form of invention the heating wire 18 is of itself a helix which is wound spirally, so that there is an increased length of wire over that which might be provided by having a simple spiral.

Adjacent the hole for the bolt 15 of each spiral, a further aperture 20 is provided in the base plate 10 through which the terminal end 18ª of the respective conductor may be led. The upper end of the hole 20, adjacent the spiral, is enlarged to provide a

cavity 20^a which receives the lower end of a hollow insulating bottom 21 which extends through a metal spacer member 22 held in position by the bolt 15 (Fig. 3). The bottom 21 is cut away at one side so that the resistance wire 18 passes immediately from its central hollow into the series of beads 19.

A similar arrangement including the spacer plate 22^x is provided at the outer end of each spiral, with the bottom 21^x: but in this case it is preferred to have the screw 15^x merely receive the spacer 22^x, and be free entirely of the base plate 10, so that the outer end of the spiral is free to move back and forth along its own spiral line or in a radial direction.

In operation, after current is turned on, and flows through the heating wires, the metal spirals A, B are brought to the required temperature. The respective spirals are thus heated, and expanded. Since their central points are fixed by the bolts 15, they tend to extend in length, i. e., to increase the length of the spiral, since the respective members guide each other: and as a result the diameter of the device increases slightly. It will be noted that a small gap 30 is left between the end of each of the spirals A, B and the respective adjacent peripheral flange *b*, *a*, but that in view of the movement of the two spirals in the same direction, the expansion movement is not limited to this amount. It will also be noted that since the free end of the spiral is unsecured, there is substantially no limits to the movement, except that it is preferred to provide a slot 20^x in the base plate so that the lower end of the bottom 21^x is free to move. It will be noted that after the spiral extends, the helically wound wire will yield easily: while being maintained in separation by the refractory beads.

If a single one of the heating wires is in use, its respective element can expand substantially independently of the other element, while the heating effect is substantially uniform on a vessel placed on the hot plate. Further, if both elements are in use beneath a kettle or the like, the heating effect at the center is usually much greater than at the periphery, in consequence of the loss of heat at the periphery: whereas this differential heating would cause a differential expansion with the ordinary hot plate, so that substantially the center is too big for the periphery and would tend to buckle; with the ordinary heater with the present device the spirals expand and the device maintains a flat top.

It is apparent that the invention is not limited solely to the form shown in the drawings and described herein, but that it may be modified in many ways within the scope of the claims.

What is claimed as new is:

1. In a hot plate, a metal heat transmitting and vessel supporting member comprising a single spiral having a passage formed therein to receive the heating wire, and means to support said spiral at one end only, so that the spiral may expand in the direction of its length under the influence of heating.

2. In an electric hot plate, a heat transmitting and vessel supporting member comprising a pair of interleaved spirals supported solely at one end of each, each of said spirals having a passage for an electric heating wire, said spirals being competent to expand along the length of the spiral independently one of another when heated.

3. In an electric hot plate, a base member, a spiral heat transmitting member attached at its inner end to said base plate and being free at its outer end, an electric heating wire mounted in a passage in said spiral member, said spiral being adapted to expand when heated independently of said base plate.

4. In an electric hot plate, a base member, a spiral heat transmitting member mounted thereon, said member having a passage for the reception of the electric heating wire, a bolt passing through said member, an insulating bead to support the terminal end of the heating wire and having a downwardly directed passage therein, said base plate having a passage substantially in alinement with said first passage, and a clip member held by said bolt to support said bead in position.

In testimony whereof, I affix my signature.

L. REICHOLD.