Aug. 7, 1928. 1,680,010

E. D. BRAND

ELECTRIC ELEMENT

Filed July 14, 1925

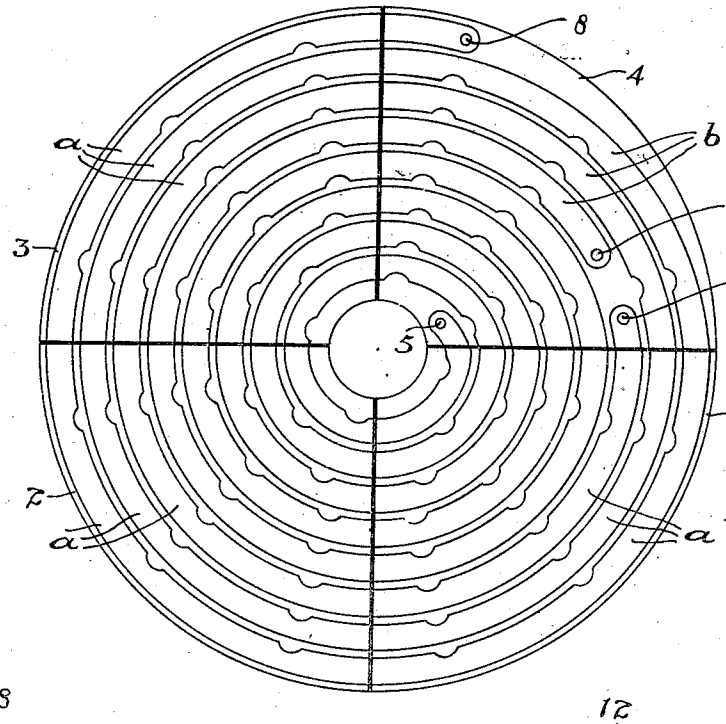


Fig. 1.

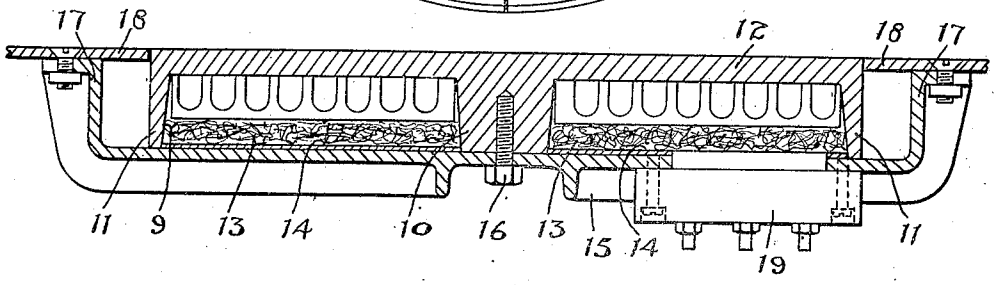


Fig. 2.

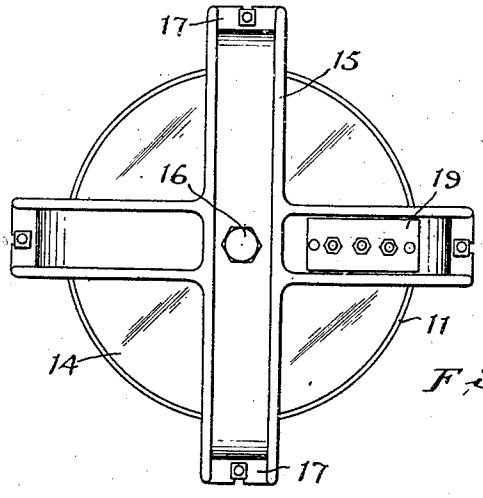


Fig. 3.

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Patented Aug. 7, 1928. 1,680,010

UNITED STATES PATENT OFFICE.

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ELECTRIC ELEMENT.

Application filed July 14, 1925, Serial No. 43,536, and in Canada May 4, 1925.

The principal objects of the invention are, to minimize the breakage of porcelain elements due to inequality in expansion and contraction, to reduce the cost of manufacture and to devise an element which will be extraordinarily rugged and will resist rough usage, and further to devise a structure which will obviate the short circuiting of the element.

The principal features of the invention consist in the novel construction of the grooved porcelain formed in a plurality of segments, and whereby a plurality of segments are of a uniform structure and a mating segment forms the grooves of the other segments into a spiral.

A still further important feature consists in the novel manner of enclosing the porcelain segments and electric elements contained within a cap-shaped iron cover, and a further feature consists in the novel structure of the support for the element within the stove and the arrangement of the terminal blocks.

In the drawings, Figure 1 is a plan view of the refractory element for containing the resistance member.

Figure 2 is a cross sectional view through the composite element.

Figure 3 is a reduced underside plan view of the heater element.

In the manufacture of grooved refractory plates for electric heater elements a very great amount of difficulty is encountered in the unequal shrinkage in the firing of same, causing a very high percentage of loss through breakage and in order to offset this condition it has been found necessary to very greatly increase the weight of material used.

This is extremely undesirable, because of the loss of time required in heating the refractory plate before the heating element commences to give off any substantial amount of heat.

The present invention accomplishes the very material reduction in the quantity of the refractory contained in the refractory plate, and further eliminates a very large amount of loss through breakage of the refractories after they have been fired.

The refractory plate which has hitherto been made in a single piece, is according to this invention made up of a plurality of segments.

The segments are preferably in the form of a quadrant of a circle and these segments are formed of two different members, that is to say, if the plate is divided into four parts the segments 1, 2 and 3 are all formed exactly alike and are interchangeable the one with the other having the grooves *a* formed concentrically.

The segment 4 differs from the segments 1, 2 and 3 in that the grooves *b* are formed eccentrically and in such a manner that the innermost grooves of the segments 1, 2 and 3 are connected with the second series by the innermost of the grooves *b* and so on each succeeding groove *b* connects a progressively outlying groove *b* in the other segments with an inner groove, so that in effect, the one eccentric segment forms an involutely grooved element so arranged that the groove 4 holding the electric element extends continuously from the inner end to the outer end. The segment 4 is provided with a terminal opening 5 at the inner end and with openings 6 and 7 in one of the intermediate grooves *b* and an opening 8 at the extreme outer end of the heater element groove. These openings pass through the plate, conducting the ends of the resistance wires out through to the terminals. It must be understood that the refractory plate may be made up of two or more segments if desired.

It will be quite readily understood that in making up the refractory element in sections, the refractory material in the sections may be made much thinner than when the element is made in one piece, as the smaller body will have very much less expansion and contraction.

Further, in the use of the element the segment will have free latitude to expand and contract in all directions.

This structure is very important in that it accomplishes an entirely novel result from a commercial constructional phase of the matter, obviating many expensive features and producing a much more reliable heater and at the same time dispensing with a great deal of loss of electrical energy and time, in that the plate will heat quicker than the ordinary single disc.

In the composite structure shown, the refractory plate is placed within the annular groove 9 arranged between the centre boss 10 and outer flange 11 of the cast iron plate 12 which forms the heater surface.

The grooved refractory element is arranged with the open side of the grooves against the underside of the plate and the heat of the resistance wires arranged in said grooves is transmitted directly to the cast iron plate.

An insulating packing 13 is arranged on the underside of the refractory plates and is covered by the sheet metal plate 14.

A spider frame 15 is secured to the underside of the boss 10 of the plate 12 by a fastening bolt 16. This frame is formed of a pair of intersecting channel members which engage the outer rim 11 of the plate 12 and have the upturned flanged ends 17 which are bolted to the stove top 18.

The porcelain terminal block 19 carrying the terminals for the resistance element arranged in the refractory member is secured to the underside of one of the cross arms of the frame 15 and effectively carries the terminals for the element.

An element such as described is extremely simple to assemble and owing to the important feature of being formed in segments, it costs less to construct and as previously described, it will heat much more rapidly and will be much more economical than the present forms of heating elements.

What I claim as my invention is:—

An electric heater element comprising a plurality of uniform segments molded separately from refractory material and each having common concentric registering grooves molded therein to receive a heating coil, and a separate molded segment having eccentric grooves molded therein adapted to be interposed between the former segments to connect the alternate concentric grooves thereof to produce a continuous spiral groove, and resistance elements arranged in said grooves and extending from block to block.

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