R. KRAUS.

ELECTRIC RESISTER.

APPLICATION FILED JULY 14, 1910.

996,862. Patented July 4, 1911.

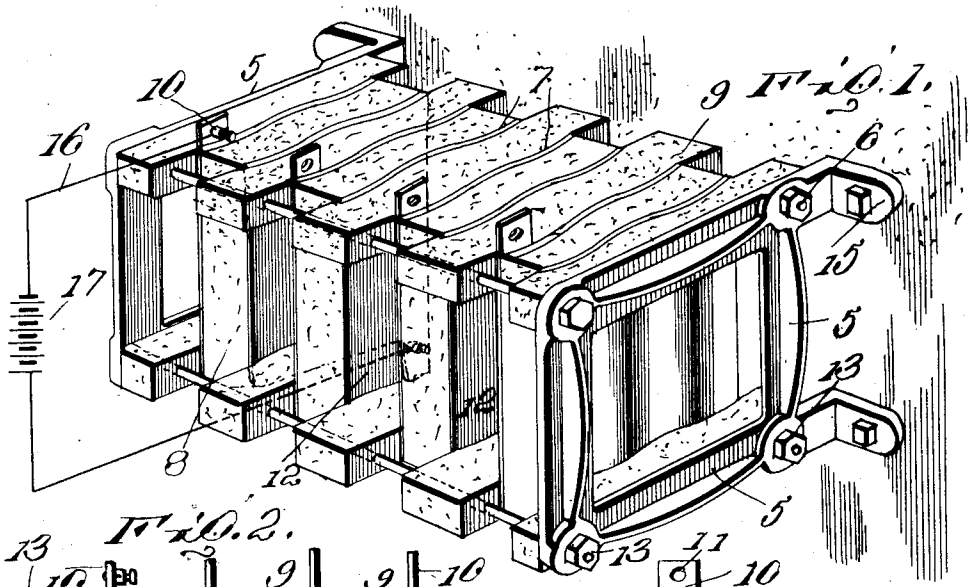

Fig. 1.

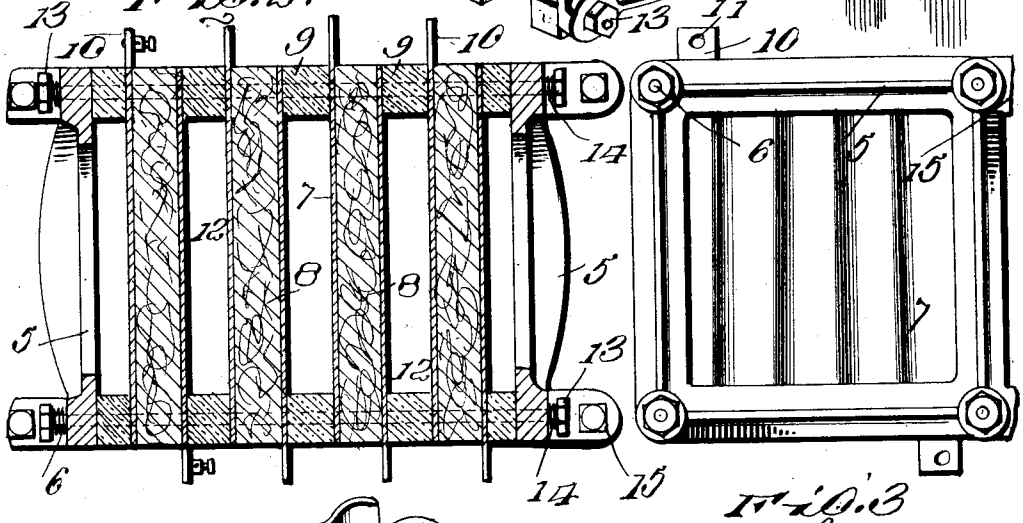

Fig. 2. Fig. 3.

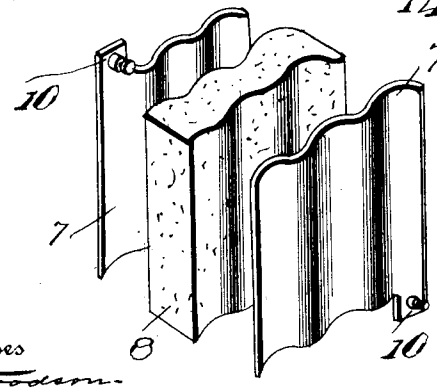

Fig. 4.

Witnesses

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ELECTRIC RESISTER.

996,862. Specification of Letters Patent. Patented July 4, 1911.

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To all whom it may concern:

Be it known that I, RUDOLF KRAUS, a subject of the Emperor of Austria-Hungary, residing at Hamilton, in Wentworth county, Province of Ontario, and Dominion of Canada, have invented certain new and useful Improvements in Electric Resisters, of which the following is a specification.

This invention relates to electric resisters of that general class especially designed for heating the interior of rooms and other inclosures.

The object of the invention is to provide an electric resister or heater including spaced conducting plates, between which are interposed resistance members of constant specific conductivity, thus to insure a uniform radiation of heat when the resister is connected in an energized circuit.

A further object is to increase the heat radiating surface of the resister by providing intermediate air passages or chambers between the several conducting plates.

A further object is to make the resistance plates in the form of compressed blocks or slabs of uniform density so as to present a hard unyielding surface which shall not be affected by the application of external pressure.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

For a full understanding of the invention and the merits thereof, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a perspective view of an electric resister or heater constructed in accordance with my invention; Fig. 2 is a vertical sectional view of the same; Fig. 3 is an end elevation; Fig. 4 is a perspective view of two of the conducting plates detached, showing the resistance element in position between the same.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The resister comprises spaced end members or frames 5, preferably rectangular in shape, as shown and provided with corner perforations for the reception of tie rods or bolts 6. Interposed between the end members 5 are a plurality of sets of spaced conducting plates 7 preferably formed of metal and corrugated vertically to assist in strengthening the same and also to present a roughened surface for contact with the resistance members 8. The resistance members 8 are preferably in the form of blocks or slabs, said resistance members being formed of a compound of asbestos and powdered metal or graphite, the compound being molded into proper shape and subjected to intense pressure so as to produce a body of uniform density having a constant specific conductivity.

Interposed between the several conducting plates 7 are transverse spacing strips 9 formed of gutta-percha, porcelain or other non-conducting material, said spacing members having their intermediate portions corrugated for engagement with the corrugated faces of the conducting plates 7 and their opposite ends perforated to permit the passage of the tie bolts 6.

One end of each conducting plate 7 is provided with a vertical ear 10 preferably disposed at the corner thereof and provided with a perforation 11 to permit the attachment of one terminal of an energized circuit.

The conducting plates 7 and resistance members 8 are preferably of the same width and both terminate short of the tie rods 6, the several conducting plates being spaced apart to produce intermediate air chambers or passages 12, thus to expose the conducting plates and increase the heat radiating surface of the resister.

The opposite ends of the tie rods 6 are threaded for engagement with suitable nuts 13 by means of which the several parts may be securely clamped in assembled position. If desired, coil springs 14 may be interposed between the nuts 13 and the adjacent end frames or members 5 in order to insure uniform pressure on all of the resistance elements when the nuts are adjusted on said tie rods. The end frames or members 5 are preferably formed with laterally extending lugs 15 having perforations formed therein for the reception of screws or similar fastening devices, by means of which the resis-

ter may be secured to a wall or other support.

It will here be noted that the ears 10 of the conducting plates are disposed above and below the body of the resister and arranged in staggered relation so that one or more of the resistance members 8 may be connected either in parallel or in series with an energized circuit. In the present instance, the first resistance member 8 is connected in an energized circuit 16 including a battery 17, one terminal of the wire being connected to the upper ear of one of the conducting plates of the first set and the other terminal thereof connected to the lower ear of the second conducting plate of said set.

By connecting one or more of the resistance elements in the circuit 16, the heat units may be increased or decreased at will.

The powdered graphite or metal is not only embedded in the body of the resistance members, but also covers the exterior faces thereof so as to present a good contact surface for the conducting plates 7.

While it is preferred to make the conducting plates 7 corrugated, it will of course be understood that these plates may be smooth and unobstructed throughout their entire length and height, and that in some cases, the ears 11 of the plates may be all disposed at the top of the resister or at the bottom thereof as may be found desirable or necessary to produce the best results. It will also be understood that by lengthening the tie rods and inserting additional resistance members, the size of the heater may be increased at will.

Having thus described the invention, what is claimed as new is:

1. An electric heater including a plurality of conducting plates arranged in groups, a resistance member of constant specific conductivity interposed between the plates of each group, spacing members formed of non-conducting material separating one group from an adjacent group, and means for yieldably supporting the parts in assembled position.

2. An electric heater including a plurality of corrugated conducting plates arranged in groups, resistance member of constant specific conductivity interposed between the plates of each group, spacing members formed of non-conducting material separating one group of plates from an adjacent group, means for clamping the several parts in assembled position, some of the plates being provided with means for connection with an energized circuit.

3. An electric heater including a plurality of sets of spaced conductors arranged in pairs, a resistance member of constant specific conductivity interposed between the conductors of each pair, spacing members formed of non-conducting material interposed between and separating each pair of conductors from an adjacent pair and some of said conductors being provided with means for connection with an energized circuit.

4. An electric heater including spaced end frames, a plurality of sets of spaced conducting plates arranged in groups between the end frames, a resistance member interposed between the plates of each group, spacing members formed of non-conducting material separating one group from an adjacent group, and the rods piercing the end frames for holding the several parts in assembled position.

5. An electric heater including spaced end frames, a plurality of sets of conducting plates arranged between the end frames, resistance members formed of compressed material interposed between the conducting plates, spacing members formed of insulating material interposed between the several sets of conducting plates, and tie rods extending through the end plates and piercing the adjacent ends of the spacing members for holding the several parts in assembled position.

6. An electric heater including end frames having means for attachment to a support, a plurality of spaced sets of conducting plates arranged between the end frames and provided with vertically disposed ears arranged in staggered relation for connection with the terminals of an energized circuit, resistance members of constant specific conductivity interposed between the conducting plates, and means extending through the end frames for clamping the several parts in assembled position.

7. An electric heater including end frames, a plurality of spaced sets of conducting plates arranged between the end frames, resistance members interposed between the conducting plates, an energized circuit connected with some of the plates, tie rods extending through the end frames clamping nuts threaded on the ends of the tie rods, and springs interposed between the clamping nuts and end frames.

8. An electric heater including spaced end frames, a plurality of sets of conducting plates arranged between the end frames, resistance members formed of compressed material interposed between the conducting plates and each having a non-yielding surface, spacing members bearing against the conducting plates of each set, and rods extending through the end frames and spacing members for clamping the several parts in assembled position.

9. An electric heater including a plurality of sets of vertically corrugated plates arranged in pairs, the plates of each pair being spaced from each other and from the plates of an adjacent pair to produce an in-

termediate air chamber, a correspondingly corrugated resistance member interposed between the plates of each pair, spacing members formed of non-conducting material disposed in said air chambers, and means piercing the spacing members for clamping the several parts in assembled position.

In testimony whereof, I affix my signature in presence of two witnesses.

RUDOLF KRAUS. [L. S.]

Witnesses:
WM. F. ROBINSON,
RICHARD BUTLER.