

June 21, 1932.

T. F. BAILY

1,864,334

METALLIC RESISTOR FOR ELECTRIC FURNACES

Filed March 10, 1927

2 Sheets-Sheet 1

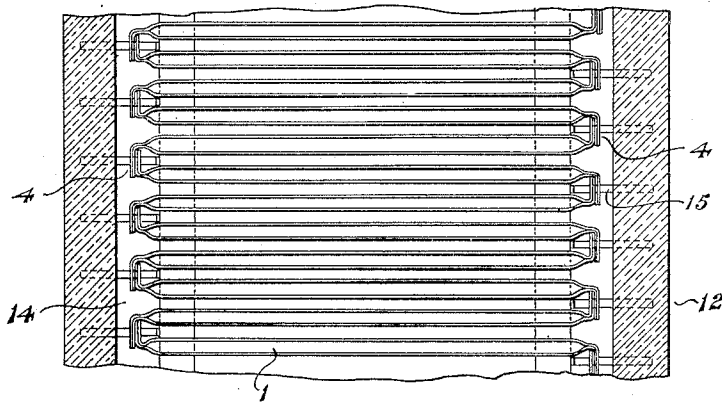


Fig. 2.

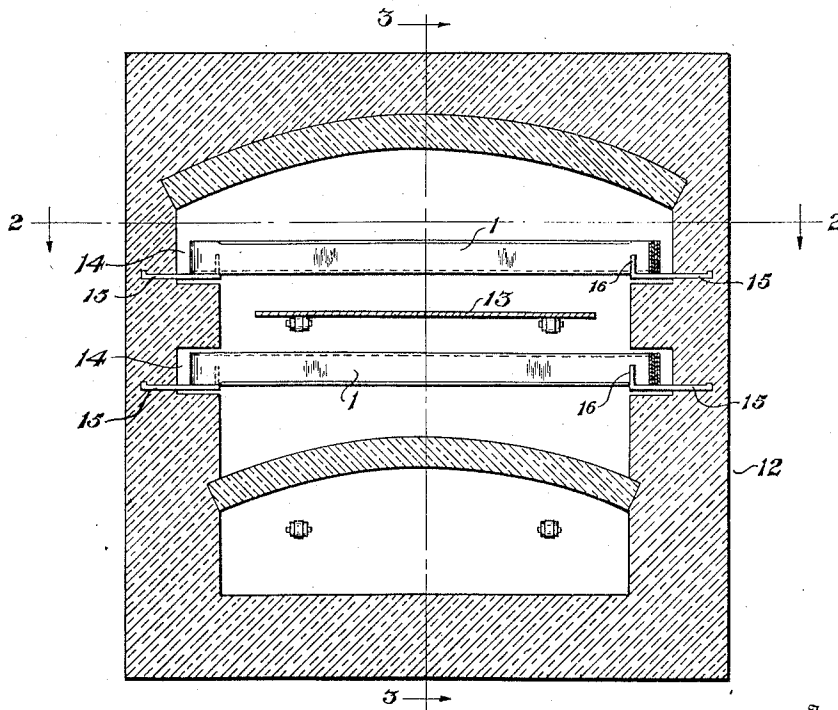


Fig. 1.

Inventor

T. F. Baily

334
Grease and Bond
Attorneys

June 21, 1932.

T. F. BAILY

1,864,334

METALLIC RESISTOR FOR ELECTRIC FURNACES

Filed March 10, 1927

2 Sheets-Sheet 2

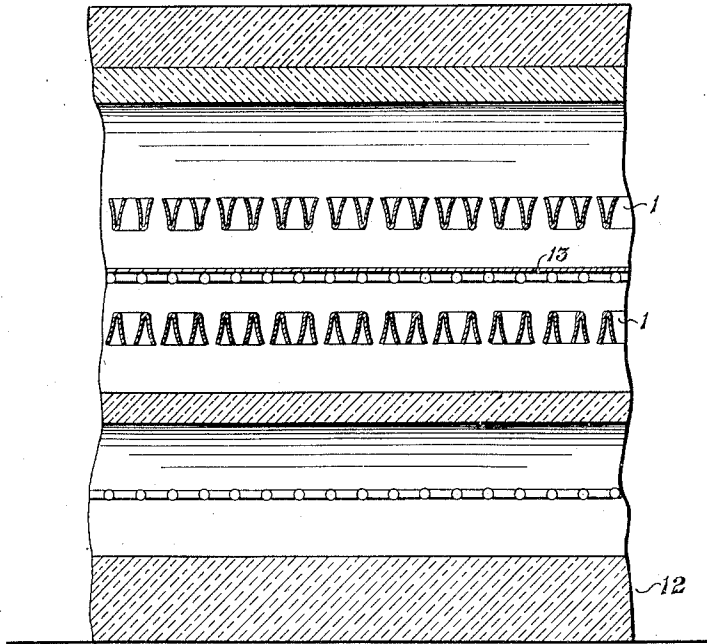


Fig. 3

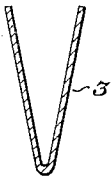


Fig. 4

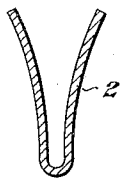


Fig. 5

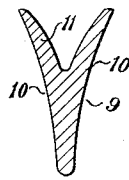


Fig. 6

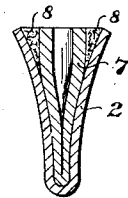


Fig. 8

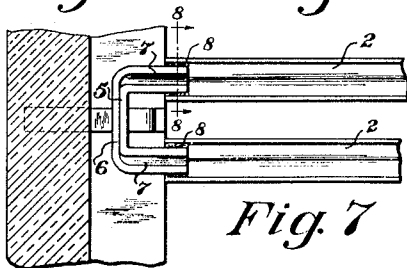


Fig. 7

Inventor

T. F. Baily

By

Freest and Bond

Attorneys

UNITED STATES PATENT OFFICE

THADDEUS F. BAILY, OF ALLIANCE, OHIO, ASSIGNOR TO THE ELECTRIC FURNACE COMPANY, OF SALEM, OHIO, A CORPORATION OF OHIO

METALLIC RESISTOR FOR ELECTRIC FURNACES

Application filed March 10, 1927. Serial No. 174,357.

The invention relates to resistor grids to be used in heating electric furnaces and the like, and more particularly to a substantially V-shaped, metallic resistor grid.

5 In the past various forms of metallic resistors have been used in the form of wire; ribbon and cast grids. In all such resistors, however, the cross sectional shape is such that a solid portion of the resistor, equal in width to the widest portion thereof, is faced toward the furnace wall. With such cross sectional shapes, it will be seen that a considerable portion of the heat which radiates from the resistor is thus directed toward the furnace wall.

15 The object of the present invention is to provide a resistor grid of substantially V-shaped or Y-shaped cross section, the apex of the V being directed to one side of the plane of the grid so as to face the material to be heated while the open side of the V is faced toward the furnace wall, thus minimizing the amount of heat radiated directly against the furnace wall and increasing the efficiency of the resistor grid.

25 An embodiment of the invention is illustrated in the accompanying drawings, in which

30 Figure 1 is a transverse vertical sectional view through a continuous sheet furnace provided with the improved resistors;

Fig. 2, a fragmentary plan sectional view on the line 2—2, Fig. 1;

35 Fig. 3, a fragmentary longitudinal sectional view on the line 3—3, Fig. 1;

Fig. 4, a transverse sectional view through one form of the resistor, showing the same formed from a plate or heavy sheet;

40 Fig. 5, a similar view showing another formation of the resistor;

Fig. 6, a cross sectional view through a cast form of the resistor;

45 Fig. 7, a fragmentary plan view showing one form of end connection for the resistor, and

Fig. 8, an enlarged section on the line 8—8, Fig. 7.

50 Similar numerals refer to similar parts throughout the drawings.

The invention consists primarily in the

provision of a sinuous metallic resistor formed of a plurality of spaced parallel bars 1, of suitable heat resisting alloy, which may be connected together at alternate ends to provide a continuous resistor grid.

55 The cross sectional shape of these straight bars is substantially V-shape, and the bars may be formed from heavy sheets or plates or rolled shapes, of heat resisting alloy and the sides slightly concaved as best shown at 2 in Figs. 5 and 8, or if desired, the sides may be substantially straight as shown at 3 in Fig. 4.

60 In the form of the invention where the resistor is made of heavy sheets of plates or rolled shapes, each straight bar may be formed separately and the bars connected at alternate ends by suitable means such as illustrated in Fig. 2, in which the end portion of each bar is flattened and bent at a right angle to the bar as indicated at 4, these flattened end portions being welded together at their longitudinal edges.

65 If desired, a separate connecting member may be provided, as shown in Figs. 7 and 8, in which the substantially U-shaped connecting member 5 is used to connect adjacent ends of the bars together.

70 This connecting member has the flattened central portion 6 and the substantially V-shaped legs 7 which extend into the open ends of the straight bars 2, being welded thereto at the upper edges as indicated at 8.

75 If desired, the entire resistor may be cast in a single piece bent upon itself to form a grid including a plurality of parallel straight bars connected at alternate ends by curved portions, each straight bar of the resistor being of substantially the cross sectional shape shown at 9 in Fig. 6, and having the concave sides 10 and the V-shaped recess 11 in its rear or outer side.

80 It will be noted that the effect of concaving or depressing the sides 10 of the V-section is to reduce the thickness and consequently the mass of metal at the junction of the side walls of the V; with the result that there is less difference in the thickness of the metal at the junction of the walls, as compared with the thickness of the walls them-

selves and of the elongated apex of the V.

A substantial uniformity in the thickness of the section is very important in the casting of the metals usually employed for resistance grids; because the shrinkage of such metals, when cooling from the molten state, is large, and tends to produce shrinkage cavities in any portion of the casting which cools at a much slower rate than the other portion.

The exact contour of the side walls 10 of the V, will depend largely upon the angle of divergence, and the extent to which the apex is elongated from a true V to what might well be called a Y-section, as shown in Fig. 6; but in any event, there should be maintained a substantial uniformity in the thickness of the metal.

In applying the resistors to a continuous sheet furnace such as illustrated generally at 12 in Figs. 1 to 3 inclusive, one of the resistors may be located adjacent to and upon each side of the path of the sheets 13, the apex of each straight bar of each resistor facing toward the sheets as best shown in Fig. 3.

Grooves 14 may be formed in the side walls of the furnace to receive the connecting portions of the resistors, and hooks or hangers 15 are preferably located in the side walls of the furnace and extend into said grooves to support the resistors.

As best shown in Fig. 2, the connector portion 4 of the resistors rest upon the hangers 15, the hangers extending between the adjacent straight bars 1 of the resistor.

This provides for sliding movement of the resistor upon the hangers to accommodate expansion and contraction of the resistors and at the same time the turned up portion 16 of the hanger keeps the straight bars of the resistor properly spaced.

From the above description and the illustration in the accompanying drawings, it will be seen that a hollow V-shaped resistor is provided in which the apex of the resistor faces toward the work while the open side of the resistor is faced toward the adjacent furnace wall, thus disposing the greater portion of the cross section of the resistor toward the work.

It will also be seen that the cross sectional shape of the resistor is such that the depth is considerably greater than the width, and the depth of its side walls is many times greater than the thickness thereof.

It will be noted that the resistor is of such section and so disposed with reference to the work that substantially all of the resistor section is beyond the line of its base and facing the work; and because the side walls are inclined at a substantial angle from the axis of the V, all of the direct radiation from the grid is in a direction toward one side of the plane of the grid.

I claim:

1. A metallic resistor of substantially V-shaped cross section, having sides of less thickness than their depth and an elongated apex, and having the side faces depressed to decrease the difference in the thickness of the metal in the sides and in the elongated apex, as compared with the metal at the junction thereof.

2. A metallic resistor of substantially V-shaped cross section having an elongated apex, and having the side faces depressed to decrease the difference in the thickness of the metal in the sides and in the elongated apex, as compared with the junction thereof.

3. A sinuous metallic resistor grid of open V-shaped cross section, the side walls being inclined at a substantial angle from the axis of the V and their depth being many times greater than the thickness thereof, the apex of the V being directed to one side of the plane of the grid.

4. A sinuous metallic resistor grid of open V-shaped cross section, having its sides deeper than the width of its base, and the side walls being inclined at a substantial angle from the axis of the V and their depth being many times the thickness thereof, the apex of the V being directed to one side of the plane of the grid.

5. A sinuous metallic resistor grid of open V-shaped cross section, having its sides concaved, and the side walls being inclined at a substantial angle from the axis of the V and their depth being many times the thickness thereof, the apex of the V being directed to one side of the plane of the grid.

6. A metallic resistor grid including a straight bar of substantially Y cross sectional shape.

7. A metallic resistor grid including a straight bar of substantially Y cross sectional shape, each rib of the grid being tapered toward its outer edge.

8. A metallic resistor grid formed of a bar of Y cross sectional shape bent upon itself to provide a plurality of parallel portions connected at alternate ends by curved portions.

9. A metallic resistor grid including a plurality of straight bars of Y cross sectional shape connected at their ends to produce a sinuous grid.

10. A sinuous metallic resistor grid having a substantially Y cross sectional shape.

In testimony that I claim the above, I have hereunto subscribed my name.

THADDEUS F. BAILY.