J. M. TOBIAS.

RADIANT ELEMENT FOR GAS STOVES.

APPLICATION FILED MAY 2, 1921.

1,404,912. Patented Jan. 31, 1922.

2 SHEETS—SHEET 1.

FIG. I.

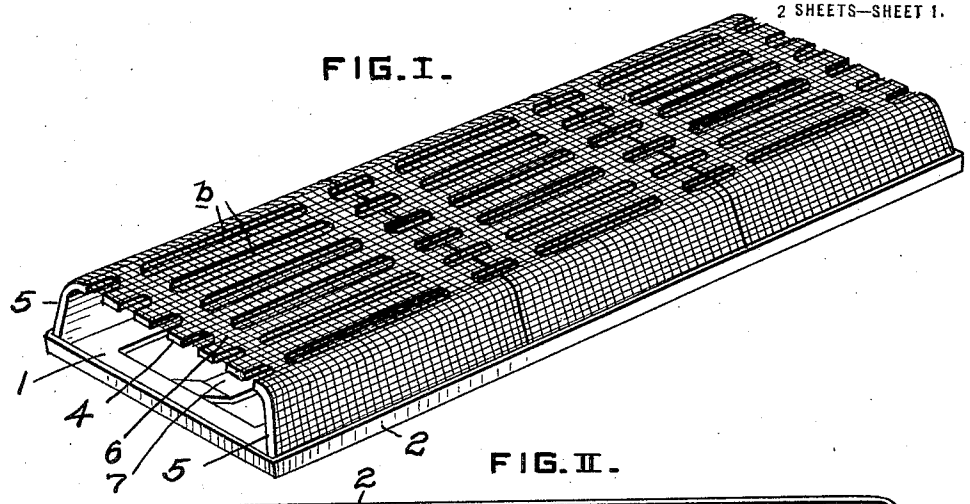


FIG. II.

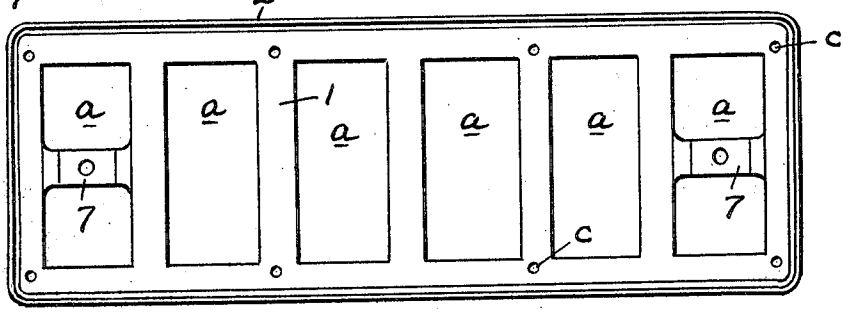


FIG. III.

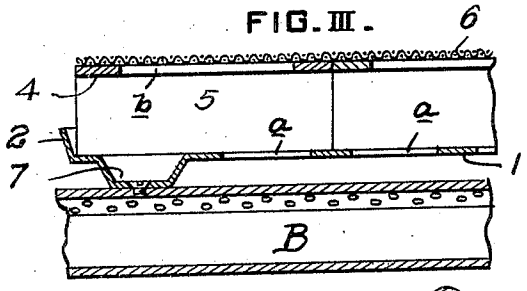


FIG. IV.

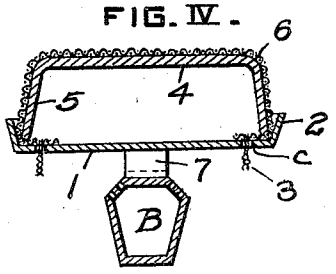
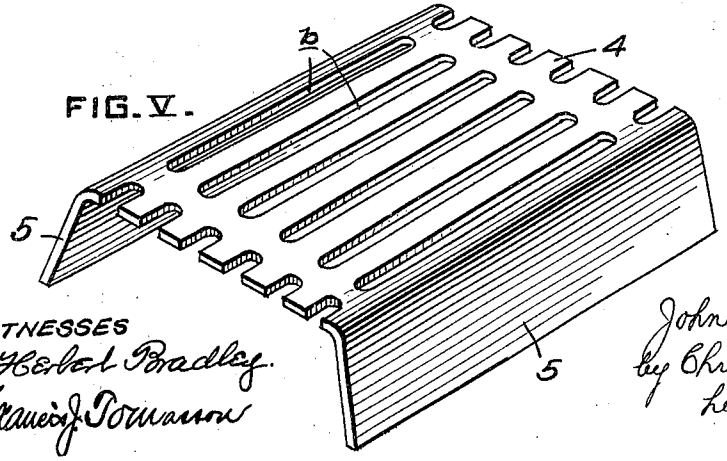


FIG. V.



WITNESSES

J. Herbert Bradley.

Francis J. Dowdall

INVENTOR

John M. Tobias

by Christy and Christy

his attorneys

J. M. TOBIAS.

RADIANT ELEMENT FOR GAS STOVES.

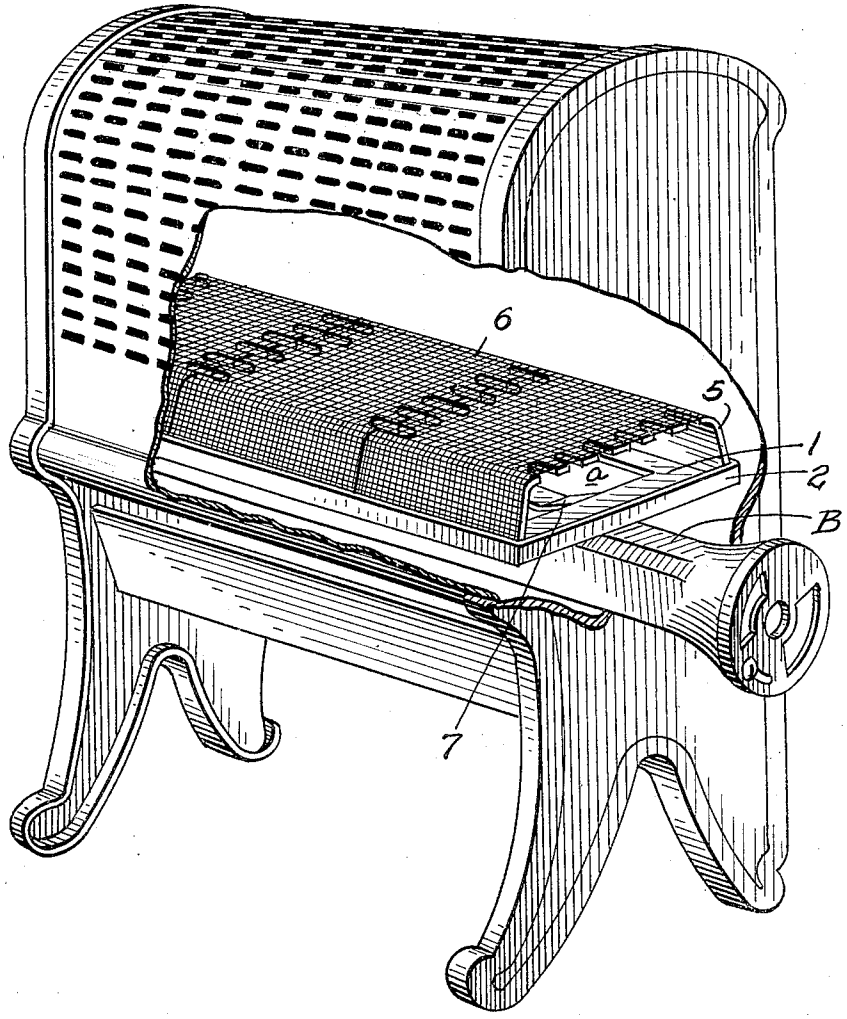
APPLICATION FILED MAY 2, 1921.

1,404,912.

Patented Jan. 31, 1922.

2 SHEETS—SHEET 2.

FIG. VI.



INVENTOR

John M. Tobias
by Christy and Christy
his attorneys

WITNESSES

J. Herbert Bradley.

Francis J. Donaldson

UNITED STATES PATENT OFFICE.

JOHN M. TOBIAS, OF PITTSBURGH, PENNSYLVANIA.

RADIANT ELEMENT FOR GAS STOVES.

1,404,912. Specification of Letters Patent. Patented Jan. 31, 1922.

Application filed May 2, 1921. Serial No. 466,305.

To all whom it may concern:

Be it known that I, JOHN M. TOBIAS, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Radiant Elements for Gas Stoves, of which improvements the following is a specification.

My invention relates to improvements in the radiant element employed in domestic gas stoves.

There is a common type of domestic heater—and it is with this type that I now am concerned—which includes in its structure a gas burner, a radiant element arranged to be played upon by the flame from the burner, and a reticulated or open-work casing inclosing the whole. In service the radiant element becomes heated to redness or incandescence, after the manner of the mantle of the familiar Welsbach burner, and the heat and light rays emitted from the radiant element penetrate the casing, affording the desired heating effect. And, since the radiant element is visible through the openings in the casing, the heater in service is pleasing to sight.

My present invention concerns improvements in the construction of the radiant element. It is common to make this element of metal. Manifestly, however, there would be certain advantages in making the radiant element of such refractory material as kaolin.

There are certain difficulties and disadvantages which attend the use of a radiant element formed of such material as kaolin, when compared with an element formed of metal. For one thing, an article of kaolin, being made of a paste and baked in a kiln, is incapable of being made minutely accurate in dimension; in the second place, kaolin element once made is not capable of being readily cut and shaped, as is a metal article; and, in the third place, when it comes to stoves of larger sizes, the kaolin element, if it is to be self sustaining, must be made of such thickness as to require relatively large amounts of heat to bring it to incandescence and to radiant condition. Inasmuch as one of the attractive features of these domestic stoves is that, immediately on lighting, their radiant elements glow and throw off heat, it would be detrimental to their service and it would militate against their ready sale in competition, if their radiant elements should be slow in coming to radiant condition, after the flame of the burner had been lighted.

One thing more requires to be said: In a heater employing the typical Bunsen burner, with vertically rising burner tube, the flame rising vertically from the orifice, it is common to place above the orifice of the burner a chimney or mantle-like reticulated radiant element, formed perhaps of metal, perhaps of kaolin; but, in a heater having a horizontally-extending burner provided with a number of flame emitting orifices, (a type now common) such a chimney or mantle is not applicable.

My invention is illustrated in the accompanying drawings. It consists of a radiant element applicable to a burner of considerable horizontal extent wherein the superior utility of kaolin or like material is made available, and at the same time the radiant element may be made for service in a heater of any desired dimensions and still be "instantaneous" in its response to the lighting of the burner; furthermore the radiant element is not fragile to the degree that a self-sustaining kaolin element is fragile, but may be packed and shipped and handled and applied with reasonable safety against breakage. Finally, the radiant element of my invention may be fitted to its place in the heater as easily and effectively as an all-metal radiant element.

Figure I is a view in perspective of an assembled radiant element embodying my invention, ready to be introduced into a heater; Fig. II is a plan view of the frame from above—the frame member of the radiant element—the refractory grid being removed; Fig. III is a view in vertical longitudinal and medial section through the radiant element applied to a burner; Fig. IV is a view in vertical and transverse section; Fig. V is a view in perspective of a refractory unit detached; and Figure VI is a view in perspective of a stove having an assembled radiant element in place. In this figure a part of the shell of the stove is broken away to afford complete illustration.

The radiant element is made up of two chief parts as components, the frame part and the refractory part, together with means for securing the refractory part in position.

The frame part is shown in plan in Fig.

II; it is made conveniently of cast metal; for a heater of ordinary proportions, of a type now in general use, this frame member will be essentially rectangular in shape, as is indicated in Fig. II. In the drawings it bears the reference numeral 1. It is provided with a marginal upwardly extending flange 2. The medial web of this rectangular frame is ported, as indicated at *a*, *a*, in Fig. II, to permit the free play of the burner flame upward through the frame and upon the radiant element.

Fig. I shows this particular radiant element to comprise three duplicate units of refractory material, Fig. V shows one such unit detached. It is indicated generally by the reference numeral 4. It is essentially rectangular, with opposite marginal depending flanges 5. It is provided throughout its main or web portion with openings *b*, and these openings it will be understood make it essentially a grid. As has been said, this component is made of refractory material, such as kaolin, and it is the essential heat-radiating member, corresponding to the mantle of a Welsbach burner. This kaolin unit is so proportioned that, when applied to the frame with its marginal flanges extending downward, these flanges will engage the frame immediately within the marginal flanges 2 of the frame. Fig. I, showing a plurality of these kaolin units combined in a single radiant element, serves to illustrate the point noted above, that the radiant element as a whole may be built of relatively large overall dimensions, deriving strength from its metal frame, the assembled kaolin units being individually of smaller dimensions and of relatively light weight, insufficient in this respect to be self-sustaining, and by virtue of their lightness in weight possessing the "instantaneous" property of becoming incandescent immediately on the lighting of the burner.

Means for securing the kaolin unit or units in place in the metal frame are such as will afford the desired security without interfering unduly with the play of the flame upon the kaolin or causing interference with its intended functioning. The means which I preferably employ are wires passing over the upper and arched surfaces of the kaolin unit or units, passing beneath the marginal flanges of the kaolin unit or units and secured to the frame. Conveniently this securing means takes the form of a web of wire netting 6. Fig. IV serves to illustrate how the margins of such a web of wire netting, passing beneath the flanged edges of the kaolin unit or units, may be secured to the frame 1 by tie wires 3. These tie wires are thrust through holes *c* in frame 1, and then made secure.

The radiant element so built up is, as compared with a unit composed solely of self-sustaining kaolin, strong to endure shipment. A self-sustained kaolin element is fragile. The frangibility of the kaolin unit of my improved radiant element is, relatively speaking, an inconsiderable quantity.

The wire web constituting the means by which preferably the kaolin unit or units are secured in their frame, while it is, as has now been sufficiently indicated, primarily the securing means, is also in some degree a radiant element too, and adds its radiant properties to the radiant properties of the kaolin. This web of wire netting may be made of such particular kind of wire as will be particularly resistant to destruction by flame; for example, it may be made of chrome steel.

Suitable means of securing the radiant element in place are indicated in Figs. II, III, and IV. Bosses 7 extending downward from frame 1 engage a suitably disposed surface of the burner B, and to the burner the frame is secured by set screws, as indicated.

It will be understood that the radiant element of my invention is readily applicable to many forms of heaters. All that is needed is that the radiant element shall be so positioned as to be played upon or submitted to the hot gases of the flame of the burner.

I claim as my invention:

1. The combination, with the shell or casing of a gas stove, of a compound radiant element, adapted to be assembled as a self-sustaining structure and when assembled to be applied to and removed from such shell or casing, such radiant element including a frame which consists of a horizontally extending web with a medial opening, a perforated refractory unit of arched form resting at its opposite edges upon said frame and arching over the opening therein, and securing means overlying said refractory unit and secured at opposite sides to said frame, substantially as described.

2. The combination, with the shell or casing of a gas stove, of a compound radiant element, adapted to be assembled as a self-sustaining structure and when assembled to be applied to and removed from such shell or casing, such radiant element consisting of a horizontally extending ported frame plate, a plurality of refractory units of arched form borne by said frame plate, resting along opposite edges upon said plate and arching over the ported portion thereof, and securing means overlying said refractory units and secured to said frame plate, substantially as described.

3. In a domestic heater the combination of a burner, a ported plate borne by said burner and extending horizontally at an interval above said burner, and a refractory unit of arched form resting along its opposite edges upon said plate and arched above the ported portion thereof, substantially as described.

4. A radiant element for a gas stove con-

sisting of a metallic frame ported medially and provided with flanged margins, a grid of refractory material with marginal flanges turned aside from the general plane of the grid, said grid being assembled with said frame with its marginal flanges resting upon said frame within the flanged margins thereof, and a retaining web of wire netting overlying said grid, its margins passing beneath the flanged margins of said grid where they rest upon said frame, the margins of said netting being secured to said frame, substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN M. TOBIAS.

Witnesses:
BAYARD H. CHRISTY,
FRANCIS J. TOMASSON.