March 2, 1926. 1,575,211

A. KEMPSTON ET AL

ELECTRIC HEATER

Filed April 2, 1925

Fig. 1.

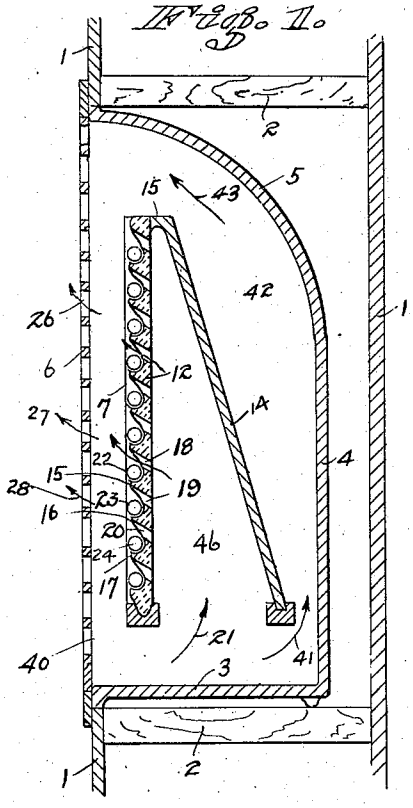


Fig. 2.

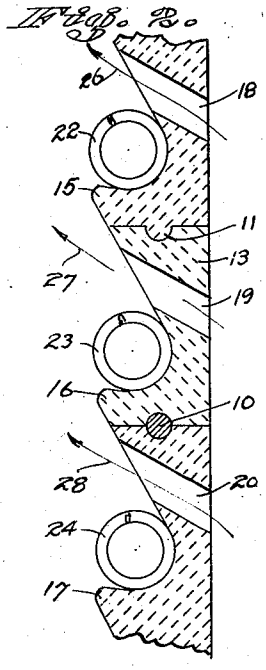


Fig. 3.

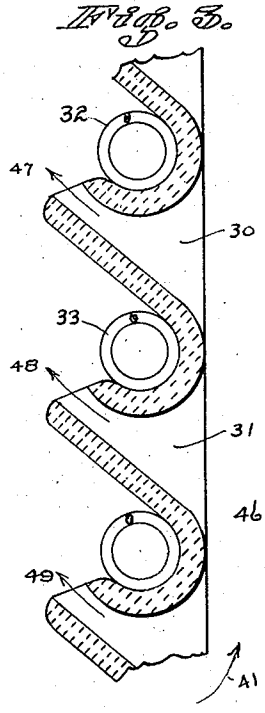


Fig. 4.

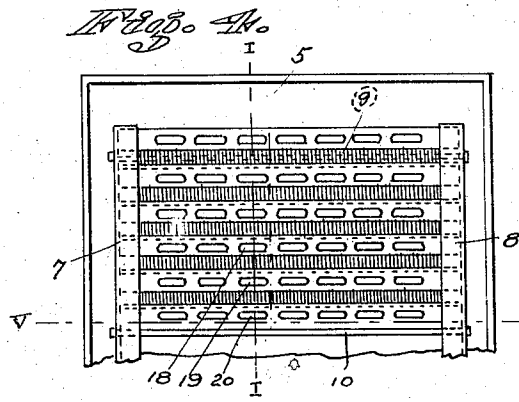
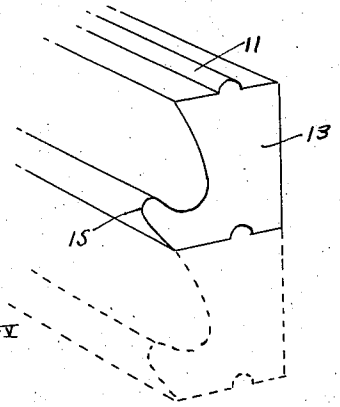


Fig. 5.



Fig. 6.



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UNITED STATES PATENT OFFICE.

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ELECTRIC HEATER.

Application filed April 2, 1925. Serial No. 20,036.

To all whom it may concern:

Be it known that we, ARTHUR KEMPSTON and GEORGE J. HENRY, citizens of the United States, residing at San Francisco, county of San Francisco, State of California, have invented new and useful Improvements in Electric Heaters, of which the following is a specification.

Our invention has for its object an electric heater especially adapted to the heating of rooms by convection as well as by radiation, either by positioning the heater in the wall or mounting it as a movable or stationary structure within the room.

A further object is a type of heater of the character described wherein electric heating resistances are employed mounted upon a refractory plate member and a large number of circulation passages are provided through the said member and adjacent the heating coils through which air is circulated and heated by intimate contact with the resistance element and the heated passage walls in the refractory member.

Another object is a heater of the character described with an air passage behind the refractory element and with a rear and forwardly directed diaphragm member forming one of the walls of said main passage and a plurality of openings or small passages through the refractory member, whereby the air flowing upward through the said main passage finds egress through a large number of relatively small passages in the refractory member and is highly heated during its travel.

A further object is a heater of the character described wherefrom there are discharged two distinct streams of heated air, one of said streams from the central and front being more highly heated and the second stream acting as a layer or strata of flowing relatively cooler air between the hot or front stream and the wall or rear portion of the heater. After leaving the heater these streams mingle together conveying large quantities of heated air into the room.

A further object is an electric heater of the character described wherein a maximum dissemination of convection heat is attained.

Other objects will appear from the drawings and specification which follow.

By referring to the drawings our invention will be made clear:

Fig. 1 is a vertical cross section through one form of heater as mounted in a conventional wall and employing our invention, and is a cross section of Fig. 4, on the line I, I thereof.

Fig. 2 is a detailed cross section of a portion of the refractory member showing portions of the resistance or heating coils in place.

Fig. 3 is an alternate form of refractory member.

Fig. 4 is a fragmentary front view of a portion of our heater of Fig. 1 with the grill work removed and with the refractory member and heating coils mounted thereon and showing the manner of assembling unit blocks which may be built up to form a refractory member of any required dimensions.

Fig. 5 is a section through Fig. 4 on the line V—V with the blocks removed to show the manner of tying together the supporting structure.

Fig. 6 is a perspective section of one of the blocks of which the refractory element 12 may be built up.

Throughout the figures similar numerals refer to identical parts.

Numeral 1—1—1 indicates conventional walls in which framing 2—2 has been introduced to receive a heater employing our invention.

The heater here shown comprises a casing having a bottom 3, a rear portion 4 a forwardly extending top portion 5 and a grill or open work front 6.

Within the casing are provided holding means as the channels 7, 8 in which the heating element and its refractory member are gripped as by the cross bolts 9, 10.

The refractory base may with advantage be made up of a plurality of similar block members provided with ribs or dowels for interlocking in alignment as shown at 11, or with recesses for the cross connecting bolts 10 which bolts then serve as dowels for the alignment of the blocks; or the walls of the channels 7, 8 and may be depended upon for this purpose, depending on the form of blocks selected.

Although we prefer to form the refractory element 12 of a plurality of such blocks as 13 the entire element may be molded as a single structure if preferred and one type of this latter form is shown in Fig. 3.

To the rear of the refractory member is provided the diaphragm 14 spaced widely apart from the refractory element 12 at the bottom, admitting an air passage 46 of considerable dimensions.

The upper portion of the diaphragm is bent over or tapers to and is connected at 15 with or may be molded solid with the refractory member 12 whereby the air passage 46 is closed at the top, constraining the air to flow through the small passages in the refractory member.

Through the refractory element, whether built up of unit blocks as shown in Fig. 6, or molded as a single structure, is provided a plurality of projecting ribs or shelves, several of which are shown at 15, 16, 17 respectively and with a similar plurality of openings 18, 19, 20 respectively, adjacent thereto, whereby the air is caused to flow upward in the direction of the arrow 21 and through the main passage and divides and flows through the smaller passages 18, 19, 20 and finds egress to the front of the heater, as indicated by the arrows 26, 27, 28.

The air which passes through the openings as 18, 19, 20 is preheated during its passage through 46 and more intensely heated during its passage through the smaller openings 18, 19 20, by the heated walls of these smaller passages. In practice the refractory member is retained red hot by the electric resistance coils as 22, 23, 24.

The appearance of the heater from the front when in operation is that of a glowing bank of coals through which a multiplicity of air passages as 18, 19, 20 discharge into the room large volumes of highly heated air as indicated by the arrows 26, 27, 28, thus heating the room by convection.

Referring particularly to Fig. 3, wherein an alternate form of refractory member is shown, the passageways 30, 31 discharge highly heated air flowing from the passageway 46 and directed in front of the resistance coils 32, 33 instead of over them or against them as in the case illustrated in Fig. 2. The flow of heated air through these smaller passages is indicated by the arrows 47, 48 and 49.

Either form of refractory member may be constructed of unit blocks and built up and doweled together or the entire structure with or without diaphragm 14 may be molded as a single entity.

Between the casing back 4 and the diaphragm 14 is a secondary air passage 42 for the purpose of preventing high heat reaching the wall 1.

Cold air entering the bottom of the heater in the direction of the arrow 40 is divided, some of it passing up in the direction of the arrow 21 and passage 46 and a second stream of relatively cold air passing in the direction of the arrow 41 through the passageway 42, and finding egress through the upper portions as shown by the arrow 43, and there mingles with the highly heated air coming through the refractory element as above described and is thus discharged into the room in large volumes.

It will thus be seen that the back form is protected from high heat while a maximum quantity of most highly heated air is secured from a given consumption of current acting through the resistance fragments some of which are shown in the drawings as at 22, 23, 24 and at 32 and 33.

Our invention is directed particularly to the refractory member and the air circulation passages, and we wish to be understood as claiming said invention whether embodied in a wall type of heater, or a floor type of heater not shown but well known and with various forms of electric heating resistances.

We claim:

1. In an electric heater, a refractory member adapted to carry an electric resistance and comprising a plurality of receiving shelves substantially parallel and spaced apart, a plurality of air ducts in said member adjacent said resistance whereby air passing through said ducts in highly heated.

2. In an electric heater, a refractory member adapted to carry an electric resistance and comprising a plurality of receiving shelves substantially parallel and spaced apart, a plurality of air ducts in said member adjacent said resistance whereby air passing through said ducts is highly heated, said ducts inclined upwardly from the rear to the front of said member.

3. An article of manufacture comprising a refractory member for an electric heater resistance as set forth in claim 1 wherein said member is built up of a plurality of superimposed blocks of refractory material, and binding means to hold said blocks in assembled formation.

4. An article of manufacture comprising a refractory member for an electric heater resistance as set forth in claim 2 wherein said member is built up of a plurality of superimposed blocks of refractory material, and binding means to hold said blocks in assembled formation.

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