

W. S. HADAWAY, JR.
RANGE.

APPLICATION FILED MAR. 9, 1914.

Patented Oct. 5, 1915.

3 SHEETS—SHEET 1.

1,155,480.

Fig. 1,

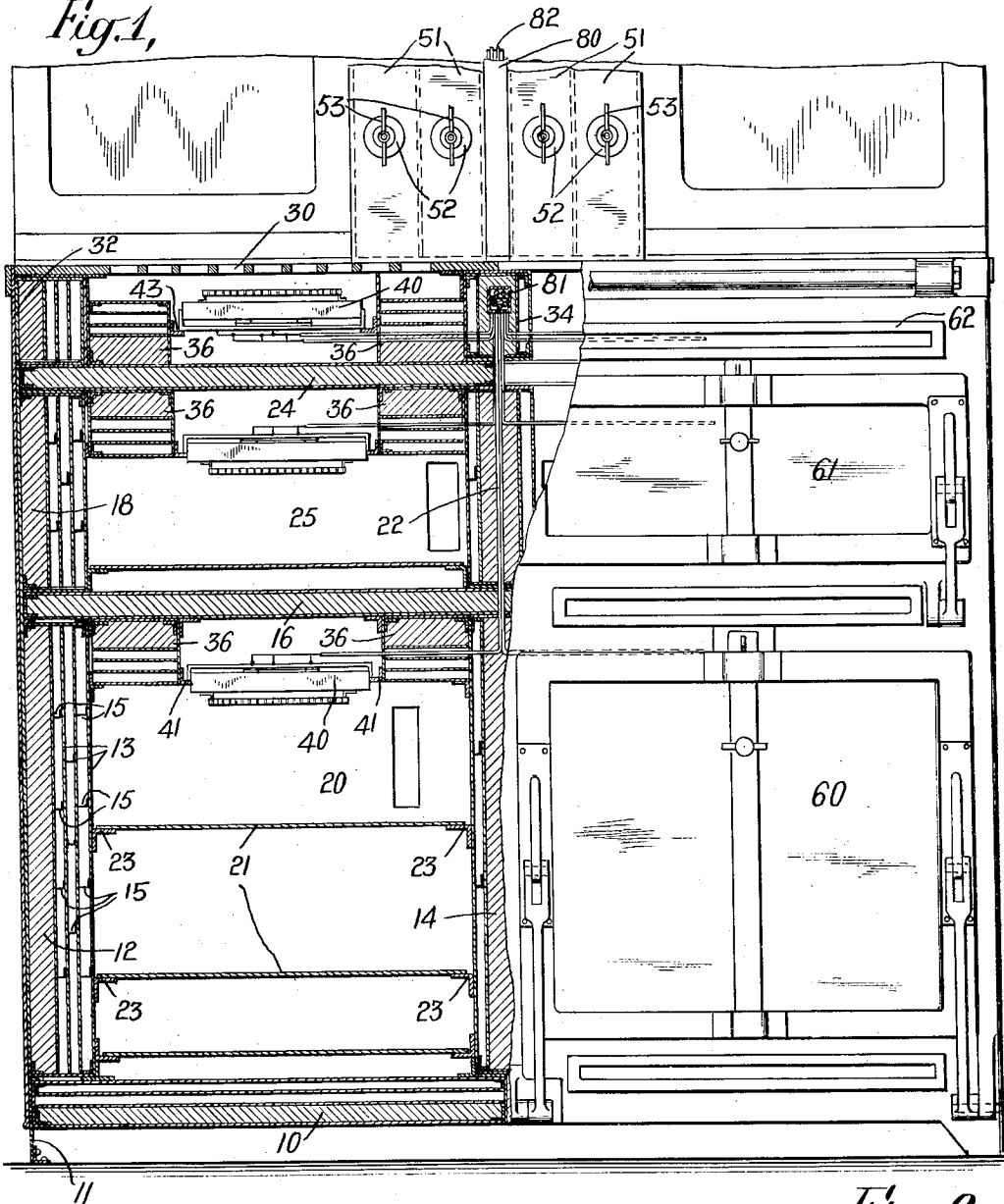


Fig. 7,

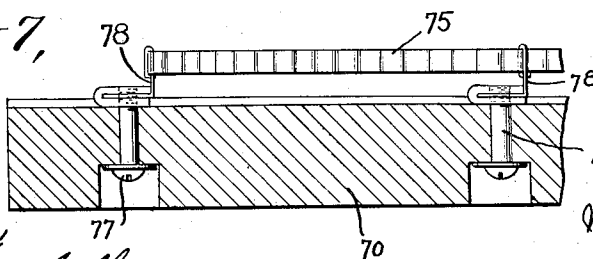
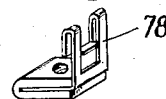


Fig. 8,



WITNESSES

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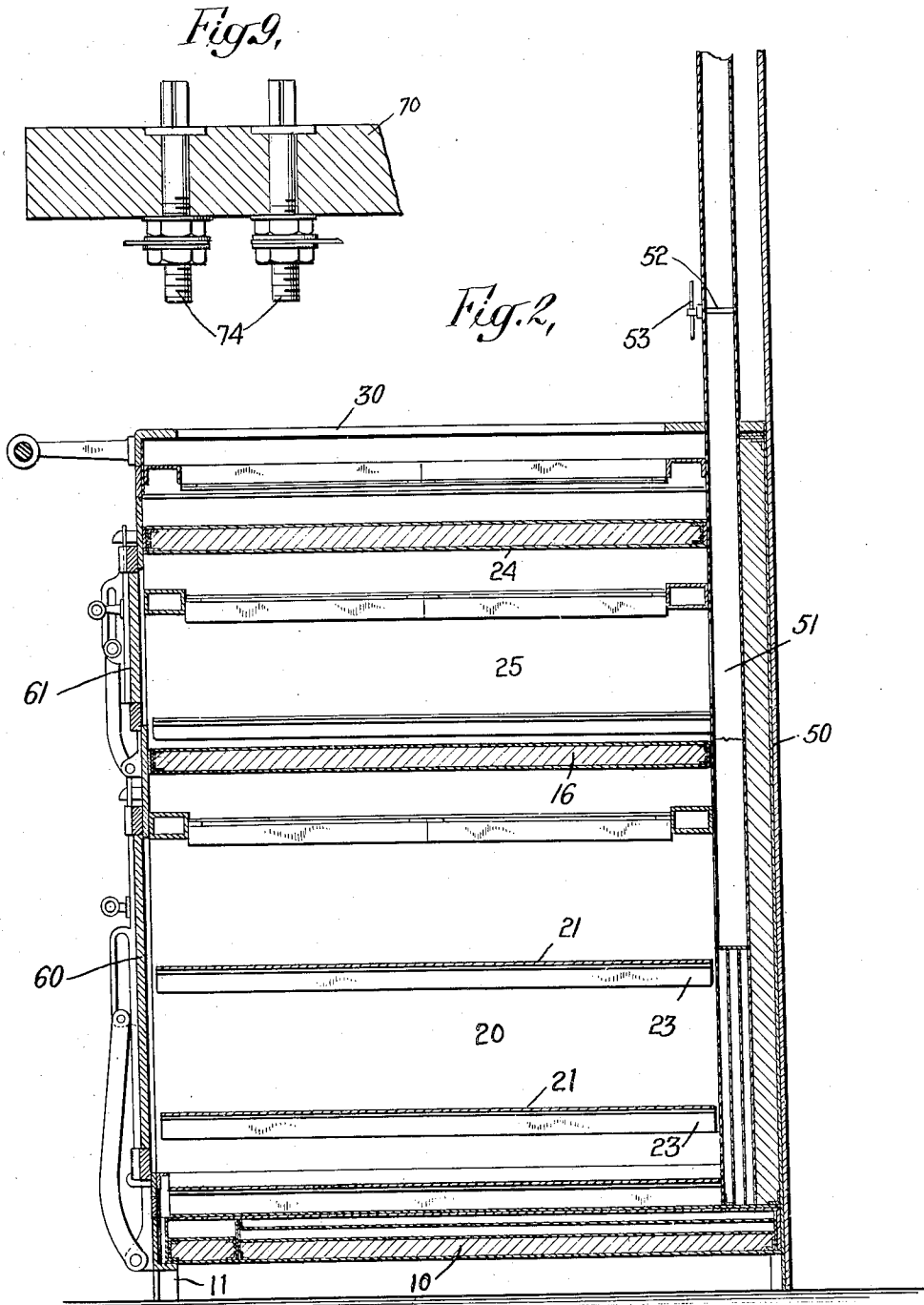
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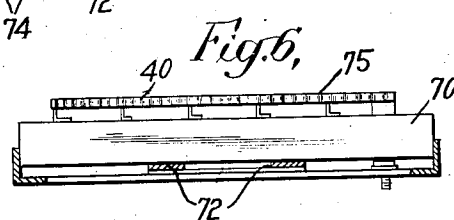
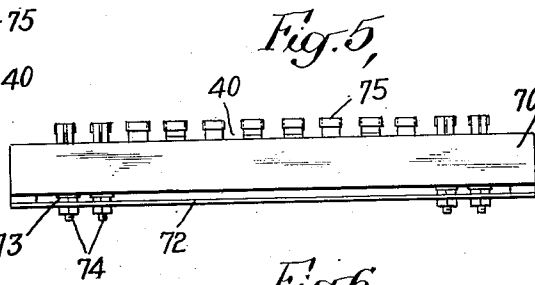
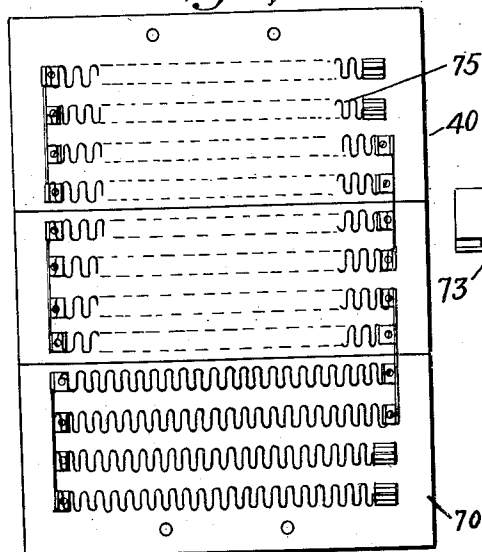
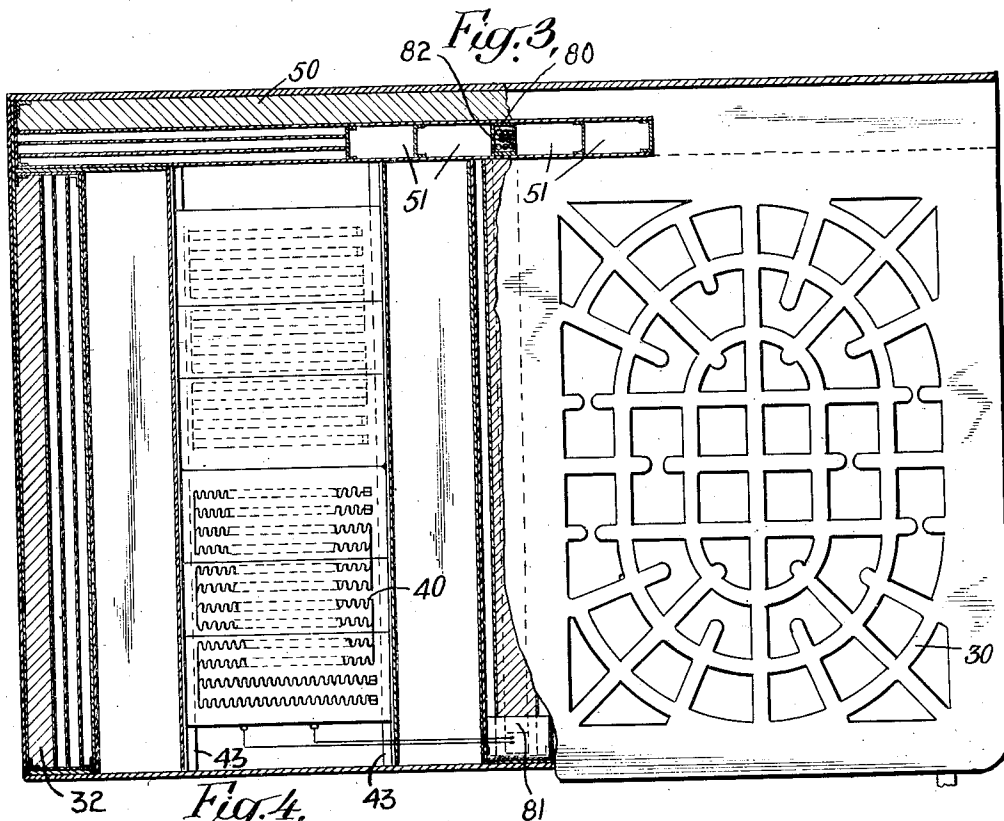
Patented Oct. 5, 1915.
3 SHEETS—SHEET 2.



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RANGE.

1,155,480.

Specification of Letters Patent.

Patented Oct. 5, 1915.

Application filed March 9, 1914. Serial No. 823,372.

To all whom it may concern:

Be it known that I, WILLIAM S. HADAWAY, Jr., a citizen of the United States of America, and a resident of New Rochelle, county of Westchester, and State of New York, have invented certain new and useful Improvements in Ranges, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to electrically heated stoves and ranges and to electric heaters therefor.

One object is to provide a range that shall be structurally simple and durable and comprise a plurality of relatively independent composite insulating bodies or slabs and suitable means for joining them to produce a unitary structure.

Another object is to provide a range having a plurality of similar receiving openings and guide members into which any one of a plurality of interchangeable heater units may be inserted.

Another object is to provide a range having interchangeable heater units that shall comprise a relatively massive support of heat absorbent material such as soapstone, and a heater element secured thereto but spaced at a short distance therefrom, whereby the element first may be raised to a high temperature upon the application of electric current and useful heat immediately radiated therefrom, then heat gradually imparted to the heat absorbent body until its temperature is high and it coöperates with and boosts the temperature of the heating element, and finally useful heat drawn gradually from the heat absorbent material after the electric energy is cut off.

Other objects and advantages of my invention will be set forth hereinafter, and in order that my invention may be thoroughly understood, I will proceed to describe the same in the following specification, and then point out the novel features thereof in appended claims.

Referring to the drawings: Figure 1 is a partially sectional front elevation of a range arranged and constructed in accordance with

my invention. A sectional elevation at right angles to that of Fig. 1 is shown in Fig. 2. Fig. 3 is a partially sectional plan view of the same range. The electric heater unit which forms a part of the range and which embodies my invention, is shown in plan view in Fig. 4, and in side and end elevations respectively in Figs. 5 and 6. Figs. 7, 8 and 9 are detail views showing the structure of the heater unit on a larger scale.

The range illustrated in the drawings comprises a plurality of sections which may be referred to as bricks or slabs and which are structurally complete and independent of each other, while they are similar to each other in construction they differ in their dimensions and make-up, depending upon their purpose and location in the range. This construction may of course be applied to a single range but its usefulness is particularly well illustrated by a double or two-part range such as that shown in Figs. 1, 2 and 3.

A pair of similar slabs 10 are supported at a short distance above the plane of the floor or deck, by means of a frame 11 and constitute the bottom of the range. A slab 12 is at each side of the range, and an intermediate slab 14 separates between the two parts of the range and is midway between the sides.

Horizontal slabs 16 are supported by the vertical slabs 12 and 14 and constitute a dividing wall between a pair of bake ovens 20 and broiling ovens 25. As a continuation of the side walls, slabs 18 are mounted on the slabs 16 at their outer edges and an intermediate slab 22 forms a continuation of the middle partition, slabs 24, which correspond to the slabs 16, being mounted on the vertical slabs 18 and 22.

A pair of grates 30 constitute the stove top and are supported by relatively small slabs 32 which form continuations of the sides, and an intermediate slab 34 which forms a continuation of the mid partition. Bricks or slabs 36 which are structurally similar to the slab 32, are located in the upper corners of both the baking and broiling ovens. A pair of them is located in the

lower corners of the relatively shallow space above the slab 24 and below the grate 30.

Each of the slabs 12 comprises a hollow rectangular sheet metal box which is packed
5 with mineral wool or other suitable insulating material, and a plurality of reflector plates 13 which are parallel to the sides of the box and are spaced from each other and from the box by a plurality of angle strips
10 15. These plates may be formed of any suitable material but I prefer to utilize an alloy comprising copper and known to the trade as bi-metal.

It is evident that the combination of the
15 insulating packing and the series of spaced reflecting plates, is particularly advantageous for the purpose of preventing the transfer of heat from the interior of the oven to the outside air through the range walls and the absorption of heat in the walls. Each of
20 the slabs 18, 32 and 36 corresponds in construction to the above described slab 12, and the slabs 10 only differ from the slab 12 in the thickness of insulating packing and the
25 number of reflector plates.

The slabs 14, 22 and 34 are similar to each other in structure and comprise an intermediate section of packing with a reflector plate on each side.

30 It is evident that the number of reflector plates used and the dimensions of any of the slabs, and the arrangement of its parts, will depend upon the location of the slab in the range.

35 Within the bake oven 20, removable shelves 21 are supported in the usual manner, by means of angle strips 23.

In the bake oven between the slabs 36 is removably mounted a heater unit 40, angle
40 strips 41 being mounted on the inner edges of the slabs to constitute guideways for the unit. The same arrangement exists in the broiling oven as that just described in connection with the bake oven. The slabs 36
45 which are located immediately below the grate at the top of the stove, are provided with guide strips 43 which are also adapted for the purpose of supporting a heater unit, but are located near the middle of the adjacent edges of the slabs.
50

Special attention is directed to the fact that the slabs 36 are spaced apart by equal distances so that interchangeable heater units may be employed and utilized either
55 for heating the bake oven, in the broiler, or for heating the stove top.

The back of the range is composed of a single slab 50 which is similar to the slab 12 except that it is provided with a plurality
60 of flues 51 which are arranged to ventilate the baking and broiling ovens. As shown in Fig. 1, each of these flues is provided with a damper 52 controlled in the usual manner by a handle 53.

65 The front of the stove is closed by a series

of doors 60, 61 and 62. Each of the doors consists essentially of a slab which is constructed along the lines of the slab 12.

With special reference to Figs. 4 to 9 inclusive, the structure of the heater unit
70 which I prefer to employ, forms the subject matter of a divisional application Serial No. 839,672 filed May 20, 1914, and comprises a slab or board 70 of heat absorbing material, such as for example, soap-stone. The slab
75 or board may be built up of a plurality of sections as shown in Figs. 4 and 5, the sections being tied together by metal rods or bars 72 which are spaced from the slabs by washers 73 and are secured to them by
80 through-bolts 74. As more fully explained, the heads of these bolts form supports for resistance conductors 75 which are supported in parallelism with one surface of the slab or board from which they are spaced at
85 a short distance. The through-bolts are shown on a larger scale in Fig. 9.

The resistance conductor 75 is preferably in the form of a zigzag ribbon which is supported at its respective ends by the
90 through-bolts. At a plurality of intermediate points in its length it is supported by clips 78 which are fastened to the plate or board by the screws 77. The arrangement of the resistance ribbon resembles that of my
95 copending application Serial No. 791,935 filed September 26, 1912, except that the support shown in the aforesaid application was composed of sheet metal and is in the form of a cylinder.
100

I am aware that soap-stone bodies have been used in connection with resistance units but hitherto the conductor has either been wound upon and in contact with the soap-stone or has been embedded in it. The
105 heater unit of my present invention is materially different from the structures of this kind and possesses unique and particularly advantageous characteristics which have been outlined in the stated objects of my invention and will now be discussed more in detail.
110

Considering first the resistance unit as used in the bake-oven 20 (see Fig. 1) when electric energy is supplied to the heating
115 conductor, it is instantly raised to a high temperature at which a large proportion of its heat is transferred from it by radiation. This heat radiates in all directions and hence more than half of it is immediately of
120 service for cooking or in heating the oven. The remainder of the heat radiated is very gradually absorbed by the soap-stone or other heat absorbing body or slab, adjacent to which the heating conductor is mounted
125 and by which it is supported. If, according to prior practice, the conductor had been placed in contact with the heat absorbing body practically all the heat generated in the conductor would have been trans-
130

ferred to the soap-stone body until its temperature was materially increased and by reason of its mass considerable time would have been consumed necessarily.

5 As soon as the proportion of radiated heat which is absorbed in the soap-stone has heated the soap-stone to a temperature which approaches that of the radiant heater, the soap-stone itself begins to radiate heat
10 and to very closely cooperate with the heating conductor inasmuch as it permits the same electrical energy in the conductor to produce a very much higher temperature. In other words, the soap-stone when once it
15 has acquired a certain temperature, acts as a booster to raise the temperature of the heating conductor. This action may be continued until the heat stored in the soap-stone is sufficient to complete the baking or cooking operation which is being done in the
20 oven. Electric current may then be cut off from the conductor and heat gradually given up by the soap-stone to the oven.

From the foregoing description of the
25 characteristics of the heater unit in operation, it is evident that the same unit is adapted for use in the bake-oven, in the broiler, and for heating the stove top. I believe that in this particular, the heater of
30 my present invention differs from all those previously produced and the advantages of such an arrangement are obvious; for example,—in the range illustrated there are six units employed for the entire stove and
35 while the units are used for varying purposes they are structurally identical and interchangeable.

Where a plurality of ranges are used in a single installation as for example in the
40 equipment of a battle-ship, the fact that all the units are identical and interchangeable and that consequently only a few spare units need be carried, is of extreme importance.

A vertical conduit 80, through which terminal leads 82 extend, is grouped with the
45 flues 51 and is centrally located so that it is opposite the mid partition of the range and connects with a horizontal conduit 81 therein.

50 The connections to the units 40 are made at the front of the range as shown in Fig. 3, and are all carried in the same conduits and extend upwardly through the conduit 80 to a switchboard (not shown) which may be
55 supported on the back upper extension of the range.

My invention is of course not restricted to the specific structures illustrated and I intend that only such limitations be imposed
60 as are indicated in appended claims.

What I claim is:

1. A range comprising a plurality of complete independent composite heat-insulating
65 slabs arranged to produce a baking oven or inclosure and a stove top recess each having

a channel space, interchangeable heater units removably supported in said channel spaces and comprising a slab of heat absorbing material and a radiant heater associated therewith, said heater units being adapted
70 to be mounted with the slab of heat absorbing material either above or below the radiant heater.

2. A range comprising a baking oven, a broiling compartment and a stove top grate,
75 a pair of spaced insulating blocks below the top grate and correspondingly spaced pairs of insulating blocks at the top of the baking oven and the broiling compartment, guide members secured to the adjacent surfaces of
80 said insulating blocks, and interchangeable heater units mounted in the spaces between the blocks and supported by said guide members.

3. A range comprising a baking oven, a
85 broiling compartment and a stove top grate, a pair of spaced insulating blocks below the top grate and correspondingly spaced pairs of insulating blocks at the top of the baking
90 oven and the broiling compartment, guide members secured to the adjacent surfaces of said insulating blocks, and interchangeable heater units mounted in the spaces between the blocks and supported by said guide
95 members, each of the heater units comprising a slab of heat absorbing material and a radiant heater conductor supported by the slab and spaced from a surface thereof.

4. A range comprising a baking oven, a
100 broiling compartment and a stove top grate, a pair of spaced insulating blocks below the top grate and correspondingly spaced pairs of insulating blocks at the top of the baking
105 oven and the broiling compartment, guide members secured to the adjacent surfaces of said insulating blocks, and interchangeable heater units mounted in the spaces between the blocks and supported by said guide
110 members, each of the heater units comprising a slab of heat absorbing material and a radiant heater conductor supported by the slab and spaced from a surface thereof, heater units being adapted to be inserted in
115 the baking oven and the broiling compartment with the radiant heater conductor suspended below its bottom surface and a heating unit for the top grate being supported with radiant heater above the slab and below the grating.

5. A range comprising an oven and a
120 stove top grate, a pair of spaced insulating blocks below the top grate and a correspondingly spaced pair of insulating blocks at the top of the oven, guide members secured to the adjacent surfaces of said insulating
125 blocks, and interchangeable heater units mounted in the spaces between the blocks and supported by said guide members.

6. A range comprising a baking oven and a broiling compartment, correspondingly
130

spaced pairs of insulating blocks at the top of the baking oven and the broiling compartment, guide members secured to the adjacent surfaces of said insulating blocks and
5 interchangeable heater units mounted in the spaces between the blocks and supported by said guide members.

In witness whereof, I have hereunto set my hand in the presence of two subscribing witnesses, this 5th day of March, 1914.

WILLIAM S. HADAWAY, JR.

Witnesses:

R. J. DEARBORN,
F. GRAVES.