

R. WILLIAMS.
ELECTRIC RANGE.
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1,154,954.

Patented Sept. 28, 1915.

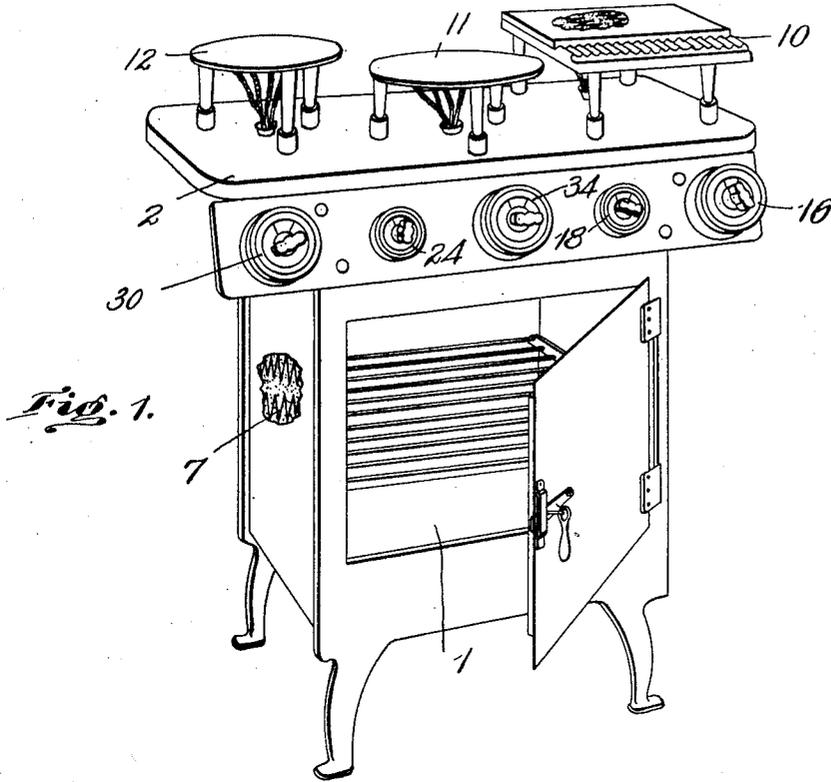


Fig. 2.

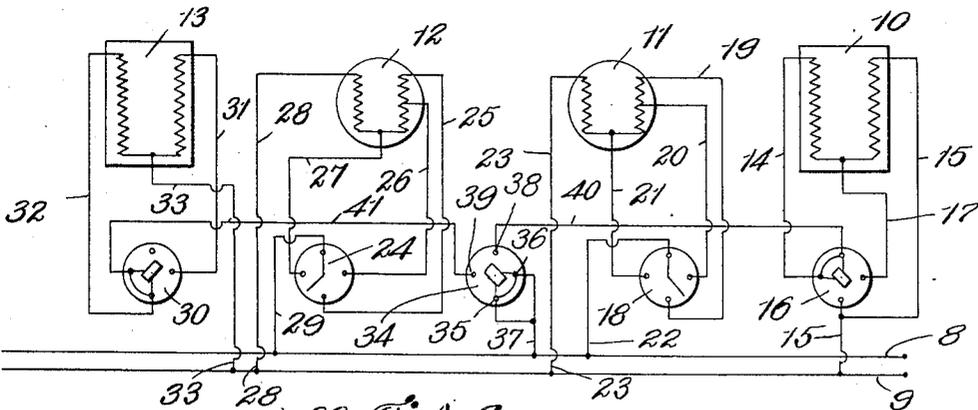
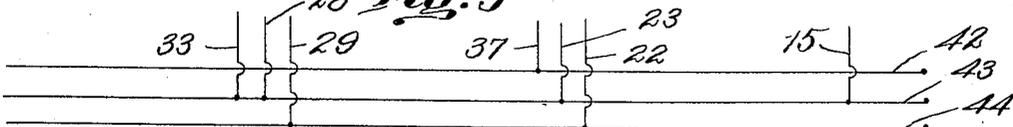


Fig. 3



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UNITED STATES PATENT OFFICE.

ROGER WILLIAMS, OF BOGOTA, NEW JERSEY, ASSIGNOR TO SIMPLEX ELECTRIC HEATING COMPANY, OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

ELECTRIC RANGE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROGER WILLIAMS, a citizen of the United States, and resident of Bogota, county of Bergen, State of New Jersey, have invented an Improvement in Electric Ranges, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In electric ranges it is customary to provide a number of separate heaters for performing various operations either separately or simultaneously, such as an oven, a broiler, water heaters, etc. The electric service company is likewise required to furnish current (and hence wiring, transformers, and other accompanying apparatus) for the maximum capacity of the range. In practice I have found that with ranges suitable for families of ordinary size, the current required for the oven is usually not over one-third (and frequently less) of the total requirements of the range, while the broiler requires roughly a similar amount, and the other third (or slightly more) is required for the heaters using separate utensils (such as those for ordinary cooking). I have also found that in the average family, the broiler and the oven are seldom if ever both used at the same time, the oven operations being concluded before there is a demand for the use of a broiler. Accordingly, my present range is designed to restrict the maximum current capacity of the range to two-thirds of what its capacity would be if all the resistance in the range were brought into use at one time, the object of the invention being to insure that the maximum possible demand does not exceed said two-thirds of the total current capacity of the range. This I accomplish by taking advantage of the fact that the oven and the broiler are not required to be used together, and accordingly I accomplish my object by so arranging the circuits and introducing proper switch connections that, if the oven is turned on, no current can be supplied to the broiler, or if the broiler is required, no current can be supplied to the oven when the broiler is in service. By this arrangement, the cost of installation and transformer capacity and wiring is reduced and, in addition, the electric service company's maximum demand is lower for a given kind of service, and hence the user of the range gets a lower rate for the service

given. My invention is not necessarily limited to the precise parts mentioned, *e. g.*, the oven and the broiler, but resides more broadly in insuring that one heater or one group of heaters shall be necessarily cut off when other heaters are put in service. In other words, instead of the broiler and oven working in the relation which has been described, (for illustration to make my invention clear) the invention resides and is practicable in having the automatic service arrangement applied to affect either the group of heaters or the broiler or any other heater or group of heaters, one or the other only being on and the other off.

In the accompanying drawings, in which I have illustrated a preferred embodiment of my invention, Figure 1 is a perspective view of my electric heater; and Figs. 2 and 3 are diagrammatic views of the wiring therefor, Fig. 2 showing the wiring for a two-wire system, and Fig. 3 being a fragmentary view thereof as applied to a three-wire system.

It will be understood that the general form, size, arrangement and material of the range will vary according to the preference of the manufacturer and user, a typical range being herein shown comprising an oven base 1 and a top 2 having an outlet or other connection 3 (only conventionally shown without presenting the well known details) for a broiler, 10, and other outlets or connections 4, 5 for other heaters, 11, 12, such for instance, as a connection for heating water or frying; or any other usual provision of an electric range. At 7 I have indicated the heating resistance also conventionally, as this may assume various forms and arrangements.

Referring now more particularly to Fig. 2, it will be seen that the current is shown as derived from the line or bus wires 8, 9 for heating the broiler 10, stove heaters 11, 12 and oven 13, conventionally indicated as containing usual heating resistance, a fragmentary sectional view of the oven being also indicated at 7 in Fig. 1. From the opposite ends of the broiler are resistance conductors 14, 15, the former leading to the control switch 16 for the broiler, and the latter being tapped to the service supply wire 9. An intermediate wire 17 connects a portion of the resistance with the control switch 16. An adjacent control switch 18 is pro-

vided for the stove heater 11 and connected by wires 19, 20 and 21 to the different points in the resistance of said stove heater and by a wire 22 to the service wire 8, the circuit being completed from the stove resistance 11 to the wire 9 by a conductor 23. So likewise the stove heater 12 is provided with a control switch 24, the resistance of said stove heater and said switch having circuit connections the same as the other stove heater, etc., viz., wires 25, 26, 27, 28, and 29. The oven 13 has likewise a control switch 30 connected to the opposite ends of the resistance by wires 31, 32 and from an intermediate point of said resistance by a wire 33 to the service wire 9. At some suitable point, preferably between the switches 18 and 24 I locate the control switch for preventing the oven and broiler from using current at the same time, herein shown as a cross-over switch 34 having contacts 35, 36 connected to the supply wire 8 by a branched conductor 37 and contacts 38, 39, the former being connected by a wire 40 to the control switch 16 of the broiler, and the latter by a wire 41 to the control switch 30 of the oven.

In Fig. 3 I have shown the connections necessary for a three-wire system for the special control switch to prevent the oven and broiler from using current at the same time, the bus wires to the line being indicated at 42, 43, 44, the wire 15 being connected to the wire 43, and the conductor 22 being connected to the wire 44, the conductor 23 to the wire 43 and the conductor 37 to the wire 42, while the conductor 29 is connected to the wire 44, the conductor 28 to the wire 43, and the conductor 33 to the wire 42, the wiring being in all other respects the same as in Fig. 2.

From the foregoing description it will be evident that neither the broiler nor oven can be used without first making connection with the source of current through the control switch 34; and this cannot be adjusted to such a position that it will permit both of them to be used at the same time. When it is desired to use the broiler, the switch 34 is turned so as to connect the contacts 36 and 38, and when the oven is to be used it is turned so as to disconnect these contacts and connect the contacts 35 and 39. When this switch 34 is turned so as to connect the contacts 36 and 38, the switch 16 then being in the position shown in Fig. 2, the heating circuit of the broiler includes the wires 9, 15, 14, 40 and 37, thereby supplying maximum heat to the broiler. By turning the switch 16 over to the right one contact, the broiler is supplied with minimum heat through the wires 17, 15, and 40 and 37. If now it is desired to use the oven, the switch 34 must first be turned so as to connect the conductor 41 with the wire 8 through the wire 37, *i. e.* the switch must be turned so as

to join the contacts 35 and 39. This operates to disconnect the broiler. In other words, my invention renders it impossible for a careless servant to run the range at its maximum capacity at any time, because the heater or group represented by 10 cannot possibly be connected for service at the same time as the heater or group represented by 13. On the other hand, the heaters 11 and 12 which together are shown as having about the same or slightly more resistance or heating capacity than either of the heaters 10 and 13, may be run independently of each other and independently of the heaters 10 and 13, or with either of the latter, but not with both of the latter. Viewing Fig. 1 the convenience of the switches is apparent. For using either of the stove heaters, the regulating switches 18 and 24 are used, but before either of the other heaters of the range can be brought into operation, the central switch 34 must first be turned, and then the amount of heat desired for the selected other heater is regulated by the end regulating switch 16 or 30, as the case may be. The practical advantage of my invention as an improvement in electric ranges will be evident to those who have experienced the difficulties and objections to these ranges. One of the serious objections has heretofore been the cost of service. It has heretofore been necessary (not only by the requirements of good practice, but by the requirements of law and the underwriters' rules) to provide transformer capacity and the necessary supply wires for the entire heating capacity or maximum demand possible in accordance with the amount of resistance contained in the range, and hence the service company has been obliged to make a relatively high rate to cover this large cost of installation and transformer capacity and wiring, etc. By my invention, the heating capacity, *i. e.* the number of heaters, their arrangement and amount of heating resistance, remain the same, and yet the maximum possible demand upon the service company is reduced to, say, about two-thirds of the total current capacity of the range. This is accomplished by providing those heaters whose use is not required together and which individually require more current than the more frequently used stove heaters, with means for automatically cutting out one when the other is cut into service. By this arrangement the service company's maximum demand is lower for this kind of service and it is thereby enabled to make a lower rate because it can supply more ranges in a given area for a given amount of revenue, with less investment for transmission lines, generator capacity, and transformer capacity. This is accomplished without inconveniencing the user, because, as already stated, in a range which I will assume has a

maximum demand of three thousand watts, about one thousand watts is required for a properly proportioned oven, an equal amount for the broiler, the remainder being divided
5 between the electric heaters used with utensils, and I have found that almost invariably the oven and broiler are never used together. In operations of cooking, a large percentage of the work is done in the oven,—the baking
10 of bread, pastry, potatoes, etc., and the roasting of meats, etc., while stewing, boiling, and broiling are the operations carried on outside of the oven. In preparing a meal, the oven operations mentioned are nearly al-
15 ways concluded in the earlier stages of the preparation of the meal, and the broiler is not brought into use until almost the last moment. But the heating of water, and the stewing, and boiling operations are more or
20 less continuous throughout the preparation of the meal. Hence, I have found it entirely practical to restrict the maximum demand on the range to approximately two-

thirds of its total current capacity, while yet affording the user the practically free normal use of all the usual heaters for the entire current capacity of the range. 25

Having described my invention, what I claim as new and desire to secure by Letters Patent is: 30

An electric range having a plurality of separate electric heaters, and service connections for supplying current to said respective heaters, including means for automatically cutting off the current from certain of said heaters when the current is
35 turned on to other of said heaters, whereby the maximum demand on the range is limited to less than its total current capacity.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses. 40

ROGER WILLIAMS.

Witnesses:

CLYDE A. FLINT,
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