Dec. 15, 1925. 1,565,539

J. C. WOODSON

ELECTRIC SPACE HEATER

Filed Oct. 27, 1923

Fig. 1.

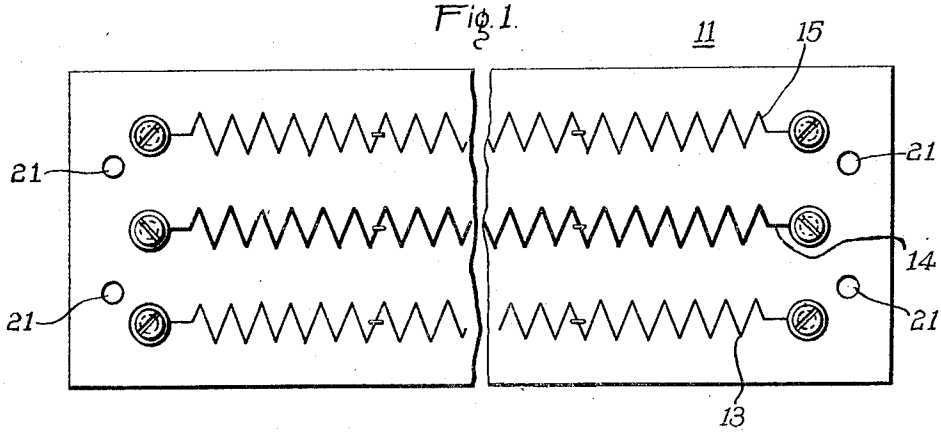


Fig. 2.

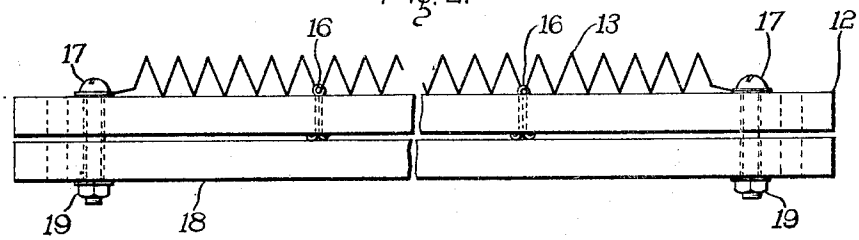


Fig. 3.

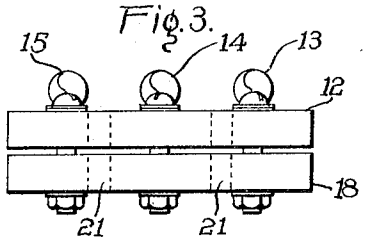
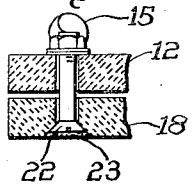


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ELECTRIC SPACE HEATER.

Application filed October 27, 1923. Serial No. 671,173.

To all whom it may concern:

Be it known that I, JAMES C. WOODSON, a citizen of the United States, and a resident of East Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric Space Heaters, of which the following is a specification.

My invention relates to electric heating means and particularly to electric space heaters.

The object of my invention is to provide a multi-heat heating unit wherein the heat distribution laterally of the unit shall be substantially the same for all conditions of operation.

In bread-baking ovens, it is highly desirable to employ heating elements that shall provide a substantially uniform distribution of heat over the oven surface available for baking processes under all conditions of operation, and the device embodying my invention is particularly applicable to such ovens wherein a plurality of heating units are energized in various combinations thereof.

In practicing my invention, I provide a relatively narrow and elongated resistor-supporting member upon which are mounted in spaced parallel-relation, three individual resistor members. The heating capacity of the intermediate resistor member is double that of either of the outer members. Suitable terminal means are provided for the individual resistor members.

In the single sheet of drawings,

Figure 1 is a top plan view of a heating unit embodying my invention,

Fig. 2 is a view, in side elevation thereof,

Fig. 3 is a view in end elevation thereof, and

Fig. 4 is a vertical view, in lateral section, of a modified form of terminal construction.

A heating unit 11 comprises a relatively narrow and elongated plane resistor-supporting plate or bar 12, of a suitable electric-insulating material, such as asbestos lumber. A plurality of individual resistor members 13, 14 and 15 are located in parallel-spaced relation on the plate 12 and extend longitudinally thereof, the distance therebetween being preferably substantially the same as the distance from the outer resistor members to the edge of the plate. The resistance of each of the resistor members 13 and 15 is substantially twice that of the resistor member 14, whereby the latter resistor member has twice the heating capacity of each of the outer resistor members.

The resistor members 13, 14 and 15 are in the shape of helically wound wire and I prefer to employ a helix of relatively large diameter as compared to the lateral width of the plate 12, for a purpose to be hereinafter described in detail.

Any suitable or desired means for securing the resistor members against the surface of the plate 12 may be employed and I have illustrated a plurality of metal members 16, of hair pin shape, the loop ends of which operatively engage the wire of the resistor members and which extend through suitable openings provided in the plate 12 and have their outer ends bent over against the other surface thereof, substantially as illustrated in Fig. 2 of the drawing.

A plurality of terminal members is provided for each of the resistor members and I have illustrated a machine screw 17 that extends through suitable openings in the plate 12. As the members 16 are in direct operative engagement with the resistor member, I prefer to employ a second plate 18 of asbestos lumber coextensive with and located closely adjacent to the plate 12. The screws 17 are made long enough to extend through the plate 18 and nuts 19 are located thereon in order to hold the two plates in close operative engagement. Any suitable or desired construction to permit of connecting the supply circuit conductors (not shown) to the terminal members may be provided, and as this forms no part of my invention, I have not deemed it advisable to further illustrate this.

Means for permitting of securing the heating unit 11 in its proper operative position within an oven structure may comprise a plurality of openings 21 adjacent to each end to permit of extending therethrough suitable machine screws (not shown).

If it it necessary that there be no live parts on the under side of the heating unit 11, I may employ the terminal construction illustrated in Fig. 4, in which a flathead machine screw 22 extends through the two

plates 12 and 18, the head of the screw being countersunk in the plate 18 and a mass 23 of a suitable electric-insulating cement, being employed to cover the head.

The heating unit hereinbefore described is intended to be employed in connection with a multi-heat switch that is adapted to connect the plurality of resistor members in series or in series-parallel relation relatively to each other.

These connections give what are usually termed "low", "intermediate", and "high" heat, when it is desired to obtain a low heat, resistor members 13 and 15 are connected in parallel-circuit relation relatively to each other and in series circuit relation relatively to resistor member 14. The value of the current traversing resistor members 13 and 15 respectively, is substantially one-half that traversing resistor member 14, and the heat distribution laterally of the heating unit will be such that a maximum value is obtained substantially over the intermediate heating unit 14.

The temperature of the heating units 13 and 15 will be somewhat lower and it will drop still further toward the edge of the unit when it is employed as a single heating unit.

When it is desired to obtain a medium or intermediate heat, we may energize either the intermediate resistor 14, or only the two outer resistors 13 and 15 which are then connected in parallel-circuit relation relatively to each other. In either case, we will obtain a substantially uniform distribution of heat laterally of the plate of the heating unit and if only the intermediate resistor 14 is energized, the temperature is maximum at or above the intermediate portion of the heating unit.

If the two outer resistor members are energized, the temperature will be lower over the intermediate portion, but the temperature over each of the outer heating units will be substantially the same and drop but little intermediate thereof laterally of the heating unit.

When it is desired to obtain a "high" heat, all three resistors are connected in parallel-circuit relation relatively to each other and as the resistance of the intermediate member is less than that of either of the outside members, a larger current will traverse the intermediate resistor and the temperature over this resistor will be higher than the temperature over either of the outer resistors but, again, a substantially symmetrical distribution of temperature laterally of the heating unit is obtained.

It is evident that when a single heating unit is employed, the temperature at the edges of the heating unit will be lower than over any portion intermediate thereof. However, when a plurality of such heating units are placed in side-by-side relation, the temperature over the side edges of the heating units will not be materially lower than over intermediate portions, by reason of the fact that heat radiation from the sides of the individual heating units is substantially prevented.

It is highly desirable, where large numbers of pans of dough are placed in the baking chamber of a bread baking oven, that the heat generation be such, whether low, intermediate, or high heats are employed, that the heat curve laterally of the individual heating units be not materially shifted, as this would result in uneven baking of the bread. Such a condition exists when only two individual resistor members are employed per heating unit, as only one of these is energized in the intermediate heating condition and it is evident that when only one resistor is energized, the heat distribution laterally of such a heating unit is very different than that which obtains in the low and the high heat conditions of operation when both resistor members are energized.

Various modifications and changes may be made herein without departing from the spirit and scope of the invention, and I desire therefore, that only such limitations shall be placed thereon as are imposed by the prior art or are set forth in the appended claims.

I claim as my invention:

1. A heating unit comprising an elongated, relatively narrow, plane supporting member, and a plurality of spaced and parallel-extending resistor members mounted on one surface of said supporting member, one of said resistor members having a heat capacity equal to that of the other resistors combined.

2. A heating unit comprising an elongated relatively narrow, plane supporting member, and a plurality of spaced and parallel-extending resistor members mounted on one surface of said supporting member, the intermediate resistor member having a heating capacity equal to that of the other resistor members combined.

3. A heating unit comprising an elongated, relatively narrow, plane supporting member, and a plurality of spaced and parallel-extending resistor members mounted on one surface of said supporting member, and adapted to be connected in various combinations relatively to each other, the resistance of the outer resistor members being less than that of the intermediate resistor member whereby substantially similar heat distribution is effected laterally of the supporting member in the various connections.

In testimony whereof, I have hereunto subscribed my name this 20th day of October 1923.

JAMES C. WOODSON.