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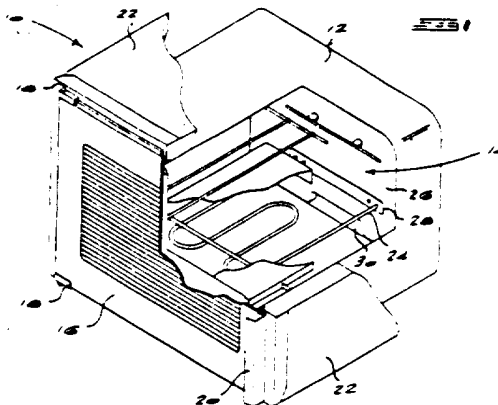
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(54) Title: OVEN WITH ELECTRICAL HEATING ELEMENT

(57) Abstract: An oven comprises a housing within which an oven compartment is defined. The oven compartment is divided into an upper compartment and a lower compartment by a generally horizontally disposed heating element. A reflector plate is located above the heating element, and a single door provides access to both compartments. Preferably the lower compartment is smaller than the upper compartment.

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(56) Documents cited: NONE



BACKGROUND TO THE INVENTION

THIS invention relates to an oven of the type which includes an oven compartment having a grill and a baking compartment.

Ovens of the aforementioned type are well known and generally have the grill located at the top of the oven compartment whilst baking and roasting is done towards the centre of the oven compartment. A pair of heating elements are provided for this type of arrangement. A grilling element is located at the top of the oven compartment and reflects heat downwardly for grilling purposes. A second heating element is located in the base of the oven compartment. Generally, during initial heating of the oven compartment, both elements are switched on for a predetermined period or until the temperature in the oven compartment reaches a predetermined level whereafter the grilling element is switched off and the oven temperature is maintained at the pre-set level by the lower element alone.

The arrangement is considered advantageous for various reasons including the fact that the central region of the oven compartment is free of heating elements and is therefore able to accommodate large items such as casserole dishes and the like. However, the large space is often wasted since, without an air circulation fan, it is normally only practicable to bake single items at any one time.

One disadvantage of the arrangement is, however, that the oven tends to be relatively costly to manufacture and operate. The two heating

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elements are themselves reasonably costly items and each needs to be independently wired and controlled. The two elements draw a relatively high current and accordingly such ovens need to be connected to a special high current power source.

SUMMARY OF THE INVENTION

According to the invention there is provided an oven comprising a housing, an oven compartment within the housing, a door for providing access to the oven compartment, a generally horizontally disposed heating element located within the oven compartment and dividing the oven compartment into upper and lower compartments, and a reflector plate located above the heating element.

The heating element is preferably located below the centre of the oven compartment and thus the lower compartment is smaller than the upper compartment. The lower compartment is adapted to be used as a grill and the upper compartment is adapted to be used for baking, roasting or the like.

The reflector plate may comprise a metal sheet configured to over-lie the heating element and be supported in spaced relationship to the heating element. The edges of the reflector plate may take the form of a downwardly extending lip so that the reflector plate is in the form of an inverted tray.

The electrical resistance of the heating element is preferably such that the element will draw no more than 1100 watts so that the oven and

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associated cooking plates can all simultaneously be switched on and connected to and operate from a conventional 16 amp domestic power socket. The oven preferably includes a thermostat and heating control means.

A further feature of the invention is to include a warming oven within the oven compartment, optionally with a heat shield located between the warming oven and the other compartments. A single door may be used to close off both the warming oven and the other compartments.

An embodiment of the invention is described in detail in the following passages of the specification which refer to the accompanying drawings. The drawings, however, are merely illustrative of how the invention might be put into effect, so that the specific form and arrangement of the various features shown is not to be understood as limiting on the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

- Figure 1** shows a part cutaway perspective view of an oven according to the invention;
- Figure 2** shows a sectional side view of the oven shown in Figure 1; and
- Figure 3** shows a perspective view of the stove incorporating an oven of the invention.

DETAILED DESCRIPTION

As shown in the drawings, an oven 10 includes a housing 12 which is hollow and defines an internal oven compartment 14. A glass door assembly 16 is connected to the front of the oven 10 and provides access to the oven compartment 14. The door 16 is hinged to the remainder of the housing by hinges indicated at numeral 18. A handle 20 is fitted to the door for opening and closing the door. Catch means (not shown) will hold the oven door closed in conventional fashion. Insulation 22 surrounds the oven compartment 14 to limit heat loss from the oven compartment 14.

A sinusoidal heating element 24 is mounted within the oven compartment 14. The heating element 24 is mounted to the back wall 26 of the housing by means of a bracket 28 so that the heating element 24 extends from the back wall 26 in cantilever fashion.

The heating element 24 is mounted generally horizontally as shown so that the oven compartment 14 is divided into an upper compartment 32 and a lower compartment 34. The lower compartment 34 will, in use, be a grill compartment and the upper compartment 32 will be a baking or roasting compartment. A wire rack 36 is mounted in the upper compartment 32 for supporting items to be baked or roasted thereon.

It will be noted that the heating element 24 is located below the centre line 38 of the oven compartment 14 so that the upper compartment 32 is of larger volume than the lower compartment 34.



A reflector plate 40 is located within the oven compartment and situated just above the heating element 24. The reflector plate 40 is in the form of an inverted tray having downwardly extending lips 42 extending around the periphery thereof. The reflector plate 40 can be supported on the heating element 24. The reflector plate 40 serves to reflect heat generated by the heating element 24 downwardly to thereby ensure that the lower compartment 34 acts satisfactorily as a grilling compartment. In addition, the reflector plate 40 serves to distribute heat generated by the heating element 24 more evenly in the upper compartment 32 so that the upper compartment 32 will in practise be at relatively equal temperature at all locations therein.

The door 16 is preferably a multiple component door having an inner heat shield 44 and a glass outer face 46. An air cavity 48 is defined between the shield 44 and the glass sheet 46, the cavity 48 serving an insulating function.

It will be appreciated that the single element 24 will draw less current compared to similar top and bottom heating elements used in ovens of this type heretofore. Thus, the heating element can be operated from a conventional domestic 16 amp power source. The single element 24 can be used for both baking and grilling, either independently or simultaneously. It is thus envisaged that the oven as described will be a relatively low cost oven but which will be able to be used in a multiplicity of cooking operations as has not been possible with single element cooking facilities heretofore.

The oven is provided with a thermostat 50 for controlling the



temperature within the oven compartment 14.

The oven 10 as described herein will generally be mounted within the support housing indicated at numeral 52. The support housing 52 may comprise, for example, a conventional stove unit with heating plates as shown in Figure 3 and a lower storage compartment located below the oven 10. Alternatively, the oven 10 can be a free standing unit which operates only as an oven/grill.

The stove unit 53 shown in Figure 3 incorporates the oven 10 and has two heating plates 54 and 56 mounted in the upper surface 58 thereof. A pair of pot rests 60 are also included in the upper surface 58. The heating plate 54 is a 1000 watt plate whilst the heating plate 56 is a 1500 watt plate. The stove unit 53 thus draws 3600 watts when the oven and both plates are operating. At 230 volts (which is generally standard for South African conditions) this means that the current drawn is less than 16 amps and accordingly the stove unit can be operated from a standard domestic power socket.

A warming oven could be incorporated into the oven, possibly just below the grill compartment. The door could be used to close off the baking and grill compartments, as well as the warming oven. The heating element would serve to heat the warming oven as well as the other oven compartments. If necessary, a heat shield could be located between the warming oven and the other compartments to that the optimum temperature gradient occurs across the different compartments.

Not shown in the drawings will be the control dials for controlling the



temperature of the oven compartment. These control dials will be of generally standard manufacture.

The efficiency of the oven is considerably enhanced by the central positioning of the heating element. Since the heating element is located some distance away from any wall of the oven compartment there is no direct heating of the wall by the heating element, that is, radiation heat from the element does not significantly heat up the wall. The wall is heated up only by the air within the oven. Thus, if the oven operates at a maximum temperature of say 250°C, the insulation in the wall will need to be able to withstand a temperature of only 250°C. In conventional ovens, where the element is located against a wall, direct heat radiation from the elements heats the wall to about 400°C and thus the insulation needs to be enhanced in the region of the element which adds considerably to the cost of the oven.

The efficiency of the centrally located element has been tested. It is found that energy loss through the oven walls with the centrally positioned element is about 350 watts/square meter against approximately 500 watts/square meter for conventional ovens. The reduced energy loss, of course, reduces the cost of running the oven.

It must be clearly understood that the invention is not limited to ovens which can be operated from domestic power sockets. Indeed, with the advantages of efficiency mentioned above the centrally located heating element could be incorporated into much larger domestic ovens. It has been found that the invention works well in an oven which is 800mm high and 600mm wide and draws about 2200 watts. This size of oven

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advantageously includes a warming compartment in the bottom part of the oven compartment which is accessible by opening the main oven door.

It has also been found that a heat treated glass reflector plate operates effectively. A glass reflector plate with a heat reflective coating operates efficiently and has the advantage of being transparent so that the food in the grill compartment can be viewed through the plate whilst being cooked. The transparency thus allows for a visual assessment of the heat of the element, that is, a user assesses how hot the element is by the extent to which it glows.

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CLAIMS

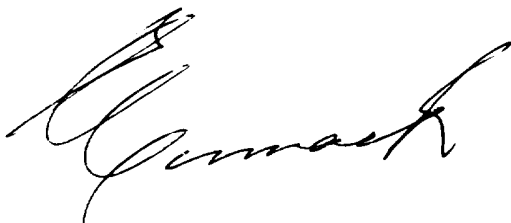
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heating element is adapted to draw no more than 1100 watts.

7. An oven according to any preceding claim which includes a thermostat and heating control means.
8. An oven according to any preceding claim which includes a warming oven within the oven compartment, located below the lower compartment, access to the warming oven being obtained through said door.
9. An oven substantially as hereinbefore described with reference to the drawings.

DATED THIS 19th DAY OF September 1994



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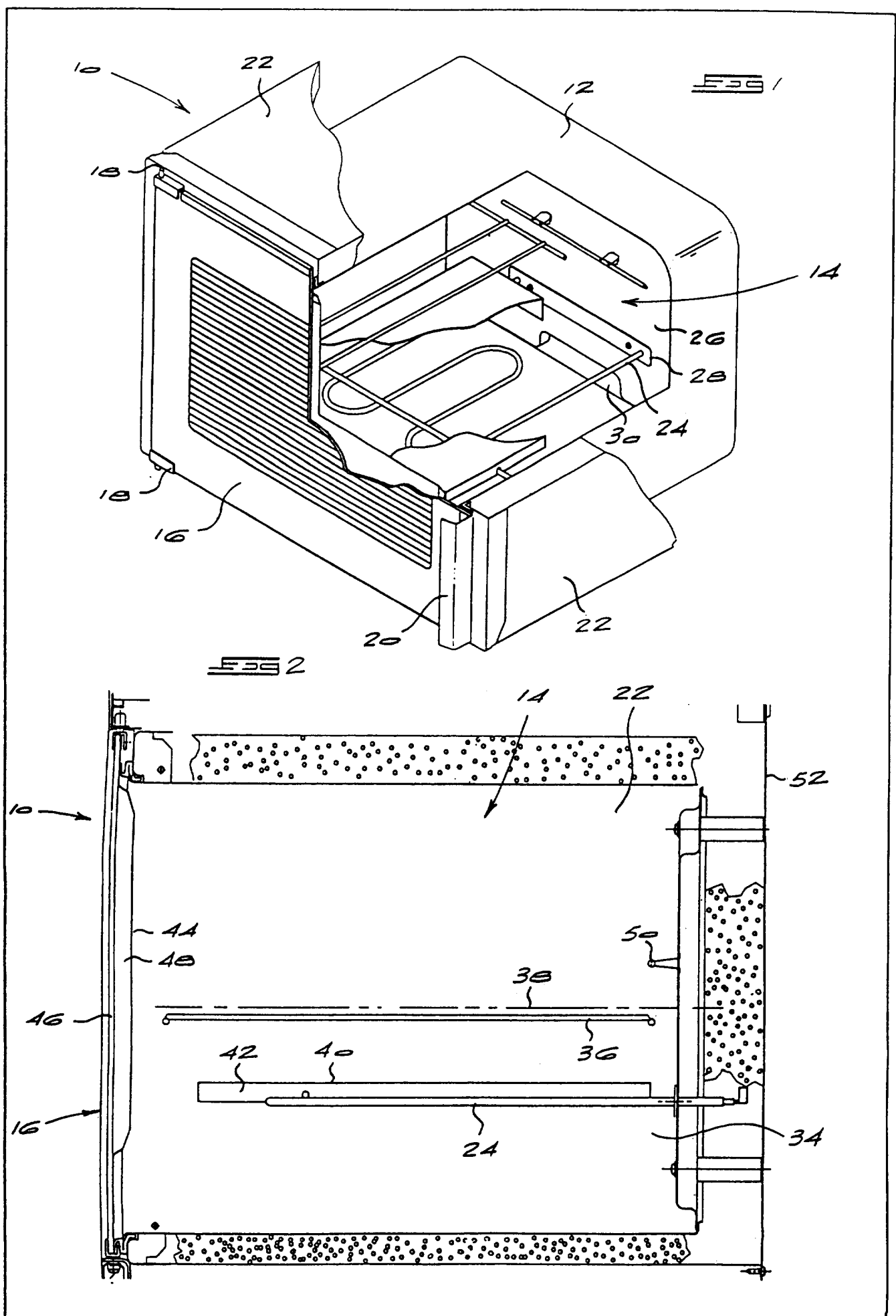


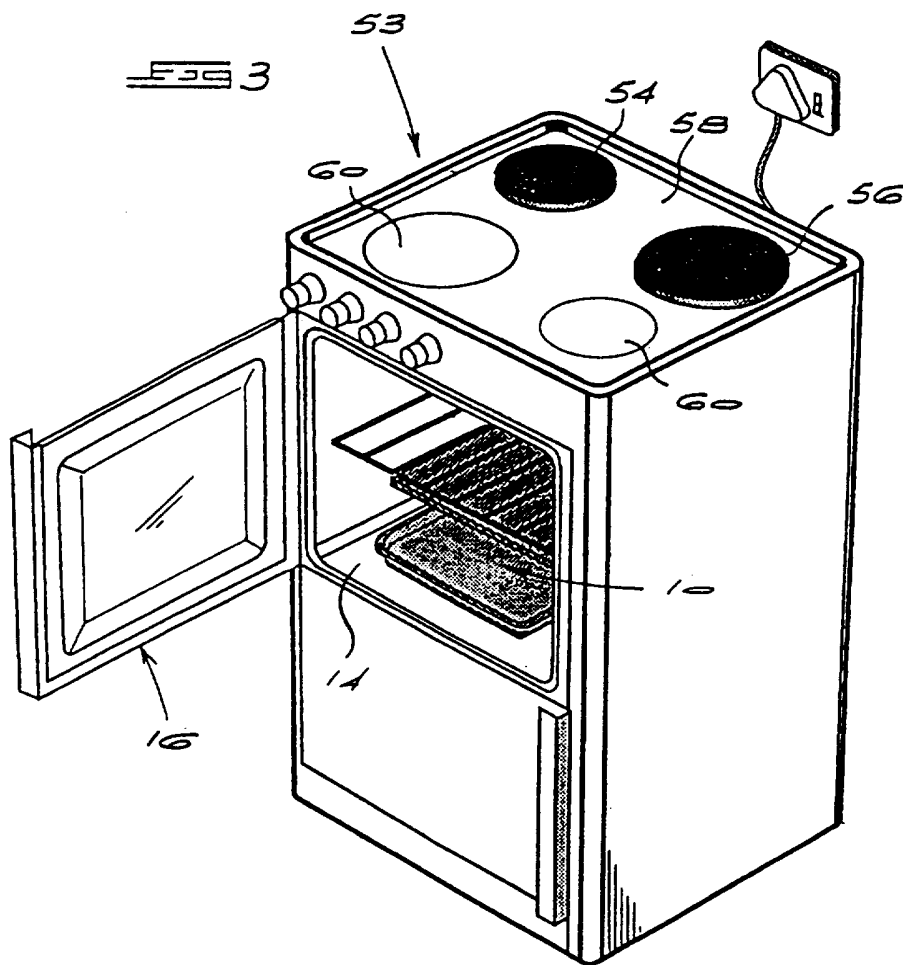
ABSTRACT

An oven comprises a housing within which an oven compartment is defined. The oven compartment is divided into an upper compartment and a lower compartment by a generally horizontally disposed heating element. A reflector plate is located above the heating element, and a single door provides access to both compartments. Preferably the lower compartment is smaller than the upper compartment.

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