

(19)



(11)

EP 2 051 011 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

22.04.2009 Bulletin 2009/17

(51) Int Cl.:

F24C 7/08 (2006.01)(21) Application number: **07124076.6**(22) Date of filing: **27.12.2007**

(84) Designated Contracting States:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

Designated Extension States:

AL BA HR MK RS(30) Priority: **18.10.2007 TR 200707141**(71) Applicant: **Vestel Beyaz Eşya Sanayi Ve Ticaret A.S.****45030 Manisa (TR)**

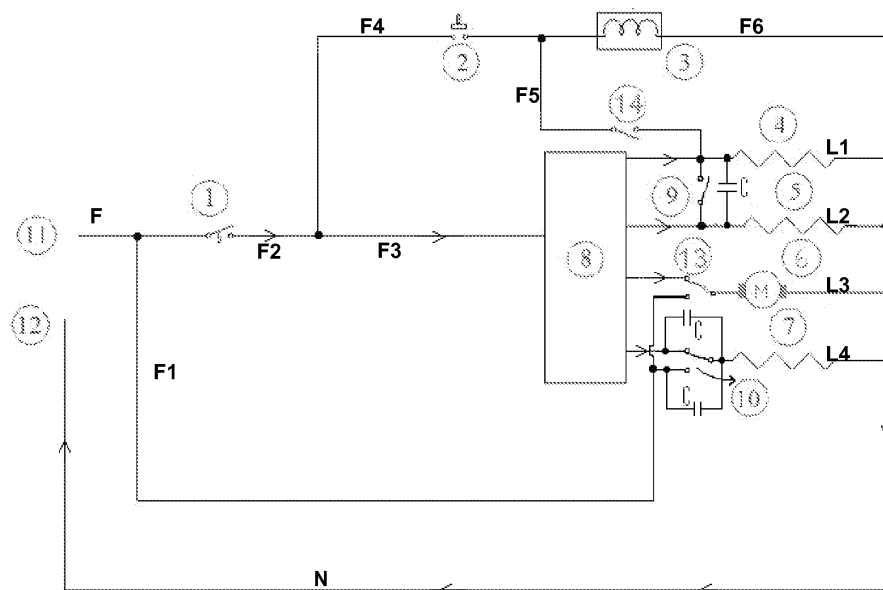
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(57) The subject preheating system comprises a thermostat (1) to measure the oven chamber's internal temperature, a button (2) used to initiate the swift heating operation, a selection switch (8) to allow a user select different cooking functions, heating elements such as upper and lower resistors (4, 7), the turbo resistor (5) etc.,

a relay coil (3), fan motor (6), capacitors, and circuit paths. In this system, the user selects a preferred cooking function via said selection switch (8). The cooking operation is initiated according to such selected cooking function by means of energizing the related heating elements. The preheating function is initiated by selecting some cooking functions and depressing said button (2).

**Figure – 1****EP 2 051 011 A2**

Description

Technical Field

[0001] The present invention relates to in-chamber preheating systems developed for cooking devices.

Prior Art

[0002] Ideal cooking temperatures for meals are achieved by means of preheating employed in cooking devices. Achieving such ideal temperatures by means of such preheating operations usually takes relatively longer time periods, resulting in undesirable circumstances for users. Preheating operations within the prior art developed with the purpose of providing solutions for such undesirable circumstances can be exemplified with the systems disclosed in published patent applications JP59231331, JP2136622, and JP3297086. Those preheating systems disclosed in such documents, however, are expensive with the microprocessor-controlled constructs and complex functions they possess. Therefore, the application of such systems to any types of cooking devices is costly and difficultly achieved.

Brief Description of Invention

[0003] The subject preheating system comprises a thermostat measuring the internal temperature of a relevant oven chamber, a button to initiate the swift heating operation, a function-selection switch to let the user chose different cooking functions, at least one heating element, a relay, fan motor, capacitors, and circuit paths. In the subject system, the temperature data retrieved from the thermostat is used as a control signal, in order to turn off the relay and finish the preheating operation. The opening and closing of relay contacts allows to energize some heaters and to increase the numbers of heating elements to conduct preheating. When the targeted temperature is achieved, the thermostat turns off the energy supply so that the relay is automatically turned off, and the heating operation is continued by means of the heating elements previously selected by the user. In this manner, it becomes possible to embody a simpler and relatively inexpensive system with conducting such preheating operations by means of the thermostat control only. A further advantage of the present invention is based on its applicability to many cooking devices by carrying out small modifications merely.

Object of Invention

[0004] The object of the present invention is to embody a swift preheating system for cooking devices.

[0005] Another object of the present invention is to embody a simple and inexpensive preheating system by means of only thermostat control in said system.

Description of Figures

[0006] An exemplary preheating system according to the present invention is illustrated in annexed figures as described below.

Figure 1. Illustrates the subject preheating system's circuit before the system is activated.

Figure 2. Illustrates the subject preheating system's circuit, while the system is active according to a selected heating function.

Figure 3. Illustrates the subject preheating system's circuit, while the system is active according to another selected heating function.

[0007] The parts in said figures are individually enumerated as following.

Thermostat (1)
 Button (2)
 Relay coil (3)
 Upper resistor (4)
 Turbo resistor (5)
 Fan motor (6)
 Lower resistor (7)
 Selection switch (8)
 Normally-open contact of relay (9)
 Relay contact (10)
 Phase (11)
 Neutral (12)
 Relay contact (13)
 Normally-open contact of relay (14)
 Capacitor (C)
 Main supply line (F)
 Primary line (F1)
 Secondary line (F2)
 Supply line of selection switch (F3)
 Initiating button line (F4)
 Relay contact line (F5)
 Relay coil line (F6)
 Upper resistor supply line (L1)
 Turbo resistor supply line (L2)
 Fan motor supply line (L3)
 Lower resistor supply line (L4)
 Neutral line (N)

Description of Invention

[0008] Components particularly of household ovens such as lamps, turbo heaters, fan motors, other heaters, etc. are selected by users individually or in combination according to cooking programs they prefer. Among such selected components, the heating groups fulfill the normal cooking and preheating functions. The subject preheating system realizes a simpler and swifter heating process by making use of such heating groups.

[0009] Figures 1 to 3 show circuit diagrams illustrating the subject preheating system and the operation manner

of said system. This preheating system comprises a thermostat (1) to adjust the oven chamber's internal temperature, a button (2) to initiate the swift heating operation, a selection switch (8) to let a user chose different cooking functions, at least one heating element (upper and lower resistors (4, 7) and the turbo resistor (5) are used here as the heating elements), a relay coil (3), fan motor (6), capacitors, and circuit paths.

[0010] In the subject preheating system, the user selects a preferred cooking function via said selection switch (8). The cooking operation is initiated according to such selected cooking function by means of energizing the related heating elements. Turning back to the preheating function, it is initiated by selecting the desired cooking functions and depressing said button (2). The swift preheating function can be carried out in cooking operations where the heating elements such as the upper resistor (4), turbo resistor (5), fan motor (6), lower resistor (7), etc. provided within the oven's chamber are used. Additionally, the manufacturer can determine as to which heating elements are involved in such preheating functions. In the subject preheating system, even if cooking functions which are not associated with preheating are selected and said button (2) is depressed, this function shall not operate.

[0011] In the diagram shown in Figure 1, the system is electrified from phase (11) and neutral (12) points. The system's main supply line (F) connected to phase (11) is split into two paths, as the first and second lines (F1 and F2 respectively). The primary line (F1) is not associated normally to any element. According to a selection made by means of the switch (8), it becomes associated with the fan motor (7) and/or a resistor [the lower resistor (7)] for instance. On the other hand, a thermostat

(1) is provided on the secondary line (F2). Said secondary line (F2) is split into two, as the selection switch supply line (F3) and the line (F4) with the initiation button (2). This line (F4) is split into the line (F6) with the relay (3), and into the line (F5) with the normally-open contact of relay (14).

[0012] At the output of the selection switch (8), multiple outputs are provided to energize the heating groups. The groups include for example the upper resistor supply line (L1), turbo resistor supply line (L2), fan motor supply line (L3), and the lower resistor supply line (L4). The outputs of these lines (L1, L2, L3, L4) and the relay line (F6) are coupled together for connection to the neutral line (N). On the other part, the relay contact line (F5) is connected to the upper resistor line (L1) and the upper resistor line (L1) and the turbo resistor line (L2) are connected to each other with the relay's normally-open contact (9), standing before the resistors (4,5), and a capacitor (C) in parallel to said contact. The relay contact (13) on the fan motor line (L3) is positioned so as to connect together the switch (8) and the motor (6). The other position of said contact (13) connects the primary line (F1) directly to the motor

(6), while it shuts off the connection of said line (F1) with the switch (8). Another relay contact (10) is provided on the lower resistor line (L4), said component (10) normally connecting the switch (8) to the lower resistor (7). The other position of said contact (10) connects the lower resistor (7) to the primary line (F1), while it shuts off the connection of said resistor (7) with the switch (8). In both positions of the relay contact (10), one each capacitors (C) are provided, which are connected in parallel to the contact (10). The functions of capacitors (C) in the system is to avoid any arc formation on contacts connected to the relay coil (3), while such contacts are opened/closed.

[0013] As indicated above, when the user wishes to carry out a swift preheating operation, he/she selects the cooking function by means of the selection switch (8) and depresses the initiation button (2). In this case, current is passed through the relay coil (3) and the contacts (9, 10, 13, 14) associated with the relay (3) are driven. The normal position of the relay contacts is the position given in the diagram of Figure 1 where swift preheating is not initiated. When current is passed through the relay coil (3), the normally-open contacts (9, 14) closes the circuit, while other contacts (10, 13) switch to their counter positions.

[0014] In this system, unless the swift preheating button (2) is depressed, current is passed only through the resistors involved in the cooking option selected by the user. After the initiation button (2) is depressed, current is passed through the relay contact (3) and other resistors to provide swift preheating are also energized, besides those resistors before the button (2) is depressed. In this manner, all heating resistors (4, 5, 7) and fan motor (6) are turned on to heat the oven until the temperature set by the user by means of the thermostat (1) is reached. The thermostat (1) turns off when the targeted temperature is achieved. In this manner, the contacts (9, 10, 13, 14) in connection with the relay (3) resume their former positions, when no current is passed through the relay contact (3). Thus the system continues the cooking operation by means of the resistor selected by the user. Even if the thermostat (1) becomes turned on again after the system completes the preheating phase, the oven will not conduct a second preheating operation. It is because when the thermostat (1) turns on for the second time, no current will pass through the relay (3) coil since the button (2) will not be depressed again, thus the contacts (9, 10, 13, 14) will not change their position. Therefore no second preheating is performed.

[0015] The user sets the thermostat (1) to a temperature whereat he/she wishes to conduct the cooking operation. The user selects one of the aforesaid cooking options by means of the selection switch (8). So the current is passed only through those resistors involved in the selected cooking options. If the user depresses the swift preheating initiation button (2) after he/she selects the cooking option, at least one of the lower resistor (7), upper resistor (4), fan motor (6), and turbo resistor (5) is energized, in addition to the resistors involved in such

selected cooking option. If one or more of such resistors are already involved in the cooking option selected by the user, the energy supply of this/these resistor(s) shall be maintained, since they were (or, it was) already energized before the initiation button (2) was depressed. As for the unselected resistors, they shall be energized with depressing the button (2).

[0016] The diagram of Figure 1 illustrates the case where the preheating initiation button (2) is not depressed yet. The diagrams of figures 2 and 3 illustrate the system cases according to different heating functions with the initiation button depressed.

Claims

1. A preheating system comprising a thermostat (1) to adjust the temperature within the oven chamber; a button (2) used to initiate the swift preheating operation; a selection switch (8) used by the user to select various cooking functions; lower resistance (7), upper resistance (4), fan motor (6), and turbo resistance (5) as the heating elements in connection with the selection switch (8); necessary contacts to allow the use of at least one of said heating elements for preheating according to a selected cooking function; and relay contact (3) in connection with such contacts; said preheating system being **characterized by** comprising

- one contact (13) of said relay on the fan motor line (L3) connected to the output of the selection switch (8), which with its normally-closed position connects the switch (8) and the motor (6) to each other, and with its other position, connects the primary line (F1) extending from the main supply line (F) directly to the motor (6), while disconnecting said line (F1) from said switch;
- another contact (10) of said relay on the lower resistor line (L4) connected to the output of the selection switch (8), which with its normally-closed position connects the switch (8) and the lower resistor (7) to each other, and with its other position, connects the lower resistance (7) to the primary line (F1), while disconnecting said resistance (7) from the switch (8);
- normally-open contact (9) of said relay, which is positioned so as to precede the resistors (4, 5) between the upper resistor line (L1) and the turbo resistor line (L2) both connected to the output of said selection switch (8);
- a normally-open contact (14) of said relay, which is positioned on a relay contact line (F5) connected to the upper resistor line (L1) from between said switch (8) and upper resistor (4);

and

in that at least one of the lower resistor (7), upper

resistor (4), fan motor (6), and turbo resistors (5) is/are energized when current is passed from the relay coil (3) and when at least one of relay contacts (9, 10, 13, 14) alters position according to a selected cooking function, after thermostat (1) adjustment is made and the button (2) is depressed with the cooking function selected by means of the selection switch (8).

2. A system according to Claim 1, **characterized in that** the main supply line (F) used for energizing the system and connected to the phase (11) is split into two paths as said primary line (F1) and the secondary line (F2) with said thermostat (1) positioned on itself.
3. A system according to Claim 2, **characterized in that** said secondary line (F2) is split into two as the supply line (F3) extending to the selection switch (8) and the line (F4) with the initiation button (2) positioned on itself.
4. A system according to Claim 3, **characterized in that** said line (F4) is split into two as a line (F6) with the relay coil (3) positioned on itself, and the relay contact line (F5) with said normally-open contact (14) positioned on itself.
5. A system according to Claim 1, **characterized in that** a capacitor (C) is provided, which is connected in parallel to the normally-open contact (9) of said relay.
6. A system according to Claim 1, **characterized in that** one each capacitors (C) are provided, which are connected in parallel to the relay contact (10) in both positions of said contact (10).
7. A system according to Claim 1, **characterized in that** the supply lines (L1, L2, L3, L4) are connected to a neutral line (N).
8. A system according to Claim 3, **characterized in that** the relay line (F6) is connected to a neutral line (N).

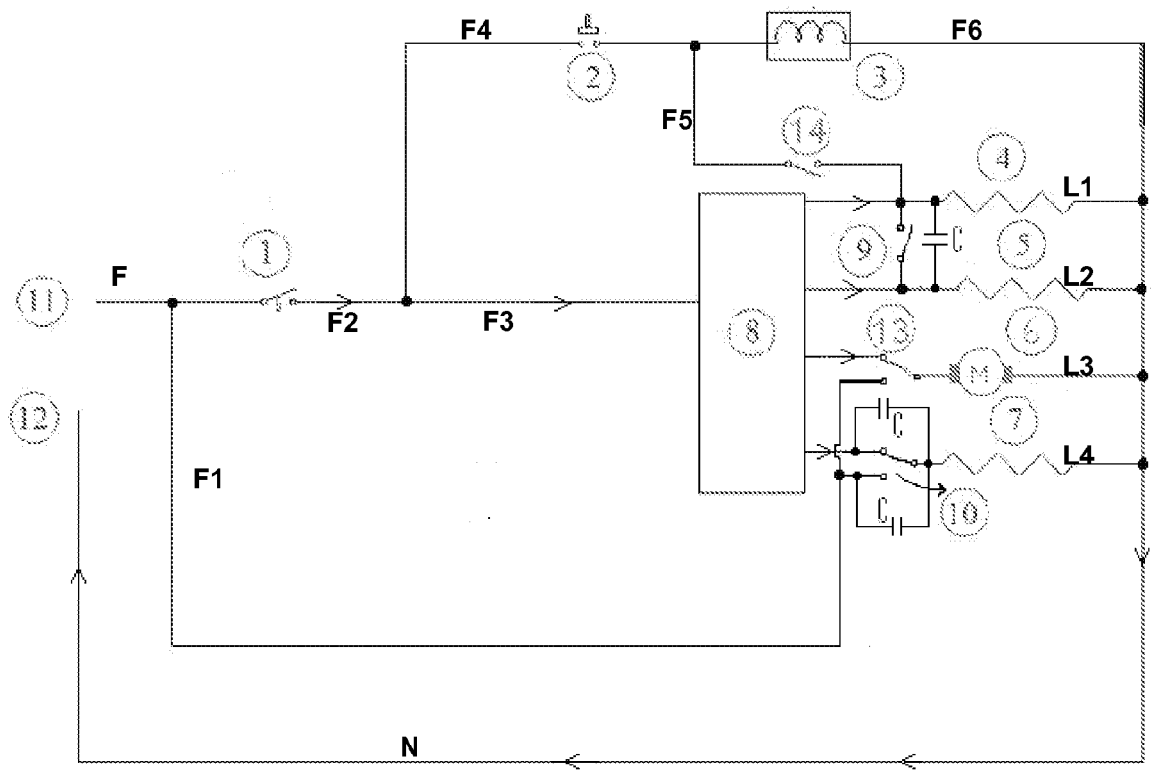


Figure - 1

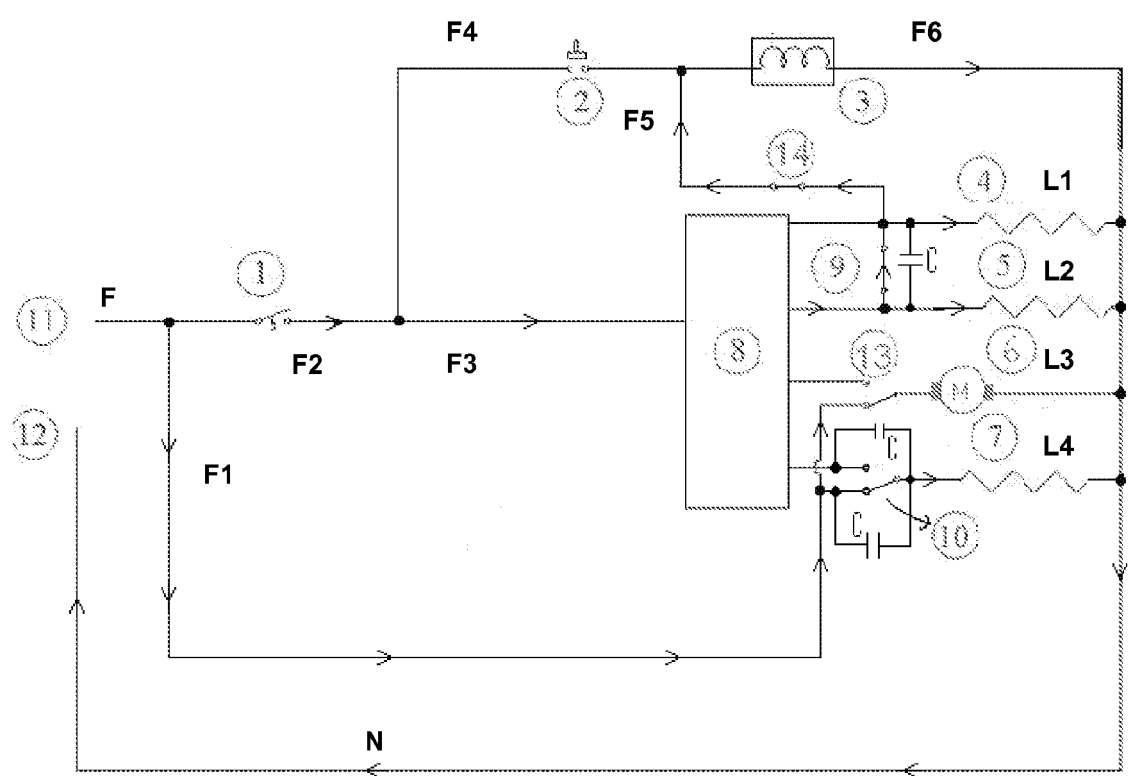


Figure – 2

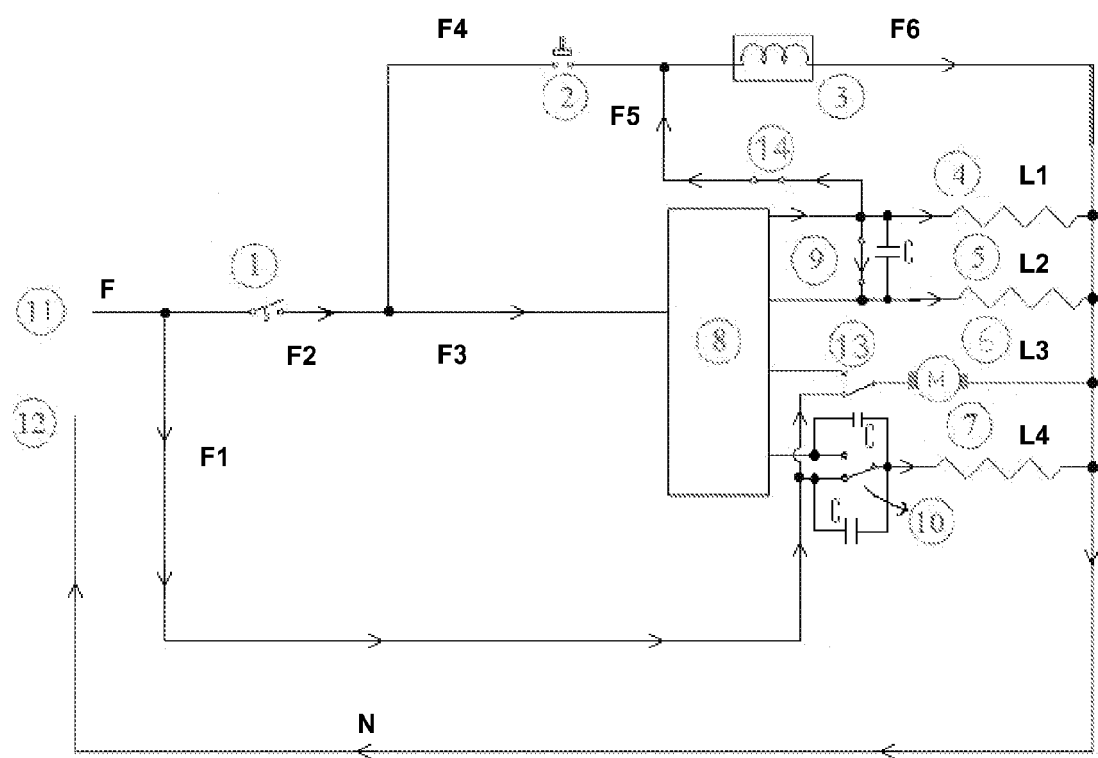


Figure – 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 59231331 B [0002]
- JP 2136622 A [0002]
- JP 3297086 B [0002]