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(54) **AN INDUCTION HEATING DEVICE**

(57) The present invention provides a heating device (C) which comprises at least one body (1); at least one carrier plate (3) located in the body (1); at least one induction coil (4) located on the carrier plate (3); at least one electronic board (2) for controlling operation of the induction coil (4); and at least one upper surface (5) located on the induction coil (4). The heating device (C) further comprises at least a first connection member (3a) located on the carrier plate (3), which has at least one vertical portion extending upward from the carrier plate (3) and at least one horizontal portion located on the side of the vertical portion distal to the carrier plate (3); at least a second connection member (3b) extending upward from the carrier plate (3); at least one base plate (6) located in the lower part of the induction coil (4); at least a first slot (6a) in the base plate (6) suitable for accommodating the vertical portion of the first connection member (3a); and at least a second slot (6b) in the base plate (6) suitable for accommodating the second connection member (3b).

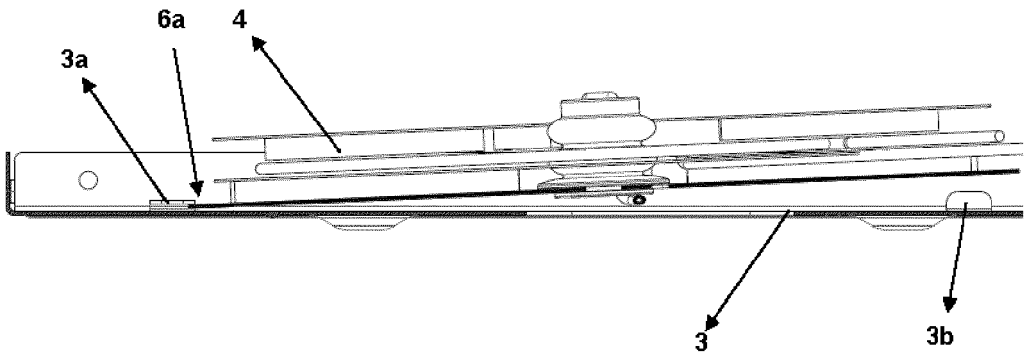


**Figure – 3**

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## Description

### Technical Field

**[0001]** The present invention relates to induction heating devices.

### Background of the Invention

**[0002]** Heating devices such as cookers are used for heating products in kitchenware such as pots, pans, or coffee pots. Said heating process can be provided with various heating elements. In conventional applications, the heating process is provided by burners in which a flammable gas such as natural gas is burned. However, in such applications, the flame resulting from the burning of the gas can create a safety problem. In order to solve this problem, electric heating devices are used in the known art. In electric heating devices, a resistance type heating element or an induction heating structure can be used. Induction heating devices are more popular among users since they operate more efficiently than heating devices with resistance.

**[0003]** In induction heating devices, at least one induction coil is positioned under a ceramic or glass upper surface. When said induction coil is energized, it creates magnetic waves. These magnetic waves heat the vessel located on the upper surface and containing a compatible metal.

**[0004]** Induction heating devices also comprise a carrier plate on which the induction coil is positioned and an electronic board that enables the induction coil to be energized in a controlled manner. In order for the heating device to be operated reliably, said induction coils must be fixed to the carrier plate. Said fixing process in the known art is carried out by fasteners such as screws. However, using screws for the connection process both causes a long production time and increases production costs.

### Brief Description of the Invention

**[0005]** The present invention provides a heating device which comprises at least one body; at least one carrier plate located in the body; at least one induction coil located on the carrier plate; at least one electronic board for controlling operation of the induction coil; and at least one upper surface located on the induction coil. The heating device further comprises at least a first connection member located on the carrier plate, which has at least one vertical portion extending upward from the carrier plate and at least one horizontal portion located on the side of the vertical portion distal to the carrier plate; at least a second connection member extending upward from the carrier plate; at least one base plate located in the lower part of the induction coil; at least a first slot in the base plate suitable for accommodating the vertical portion of the first connection member; and at least a second slot in the base plate suitable for accommodating the second connection member.

**[0006]** In the heating device according to the present invention, the induction coil is connected to the carrier plate by inserting the first connection member and the second connection member located on the carrier plate into the first slot and the second slot located on the base plate of the induction coil. Therefore, the connection process is carried out in an easy and reliable manner.

### Object of the Invention

**[0007]** An object of the present invention is to provide a heating device in which the induction coil of the heating device is easily connected to the carrier plate.

**[0008]** Another object of the present invention is to provide a durable and reliable energy heater device.

### Description of the Drawings

**[0009]** Exemplary embodiments of the heating device according to the present invention are illustrated in the attached drawings, in which:

Figure 1 is an exploded view of the heating device according to the present invention.

Figure 2 is a perspective view of a carrier plate in the heating device according to the present invention.

Figure 3 is a side view of the carrier plate in the heating device according to the present invention.

Figure 4 is a perspective view of a connection detail of the carrier plate in the heating device according to the present invention.

Figure 5 is a perspective view of another connection detail of the carrier plate in the heating device according to the present invention.

**[0010]** All the parts illustrated in figures are individually assigned a reference numeral and the corresponding terms of these numbers are listed below:

| | |
|---|---|
| Heating device | (C) |
| Body | (1) |
| Electronic board | (2) |
| Switching element | (2a) |
| Cooling block | (2b) |
| Carrier plate | (3) |
| First connection member | (3a) |
| Second connection member | (3b) |
| Induction coil | (4) |
| Upper surface | (5) |
| Base plate | (6) |
| First slot | (6a) |
| Second slot | (6b) |

## Description of the Invention

**[0011]** Heating devices used for heating and/or cooking the products in a vessel may comprise various heating elements for the heating process. Heating devices comprising an induction coil for the heating process are called induction heating devices. Such a heating device comprises an induction coil, as well as at least one carrier plate to which the induction coil is connected. The present invention provides an induction heating device which enables the induction coil to be connected to the carrier plate in a practical and reliable way.

**[0012]** The heating device (C) according to the present invention, as illustrated in Figures 1-15, comprises at least one body (1); at least one carrier plate (3) located in the body (1); at least one induction coil (4) located on the carrier plate (3); at least one electronic board (2) for controlling operation of the induction coil (4); and at least one upper surface (5) located on the induction coil (4). The heating device (C) further comprises at least a first connection member (3a) located on the carrier plate (3), which has at least one vertical portion extending upward from the carrier plate (3), preferably in a vertical manner, and at least one horizontal portion located on the side of the vertical portion distal to the carrier plate (3) and preferably extending parallel to the carrier plate; at least a second connection member (3b) extending upward from the carrier plate (3), preferably in a vertical manner; at least one base plate (6), preferably in the form of a fedora, which is located in the lower part of the induction coil (4); at least a first slot (6a) in the base plate (6) suitable for accommodating the vertical portion of the first connection member (3a); and at least a second slot (6b) in the base plate (6) suitable for accommodating the second connection member (3b).

**[0013]** In an exemplary embodiment of the invention, while manufacturing the heating device (C), which is exemplified as a stove, the induction coil (4) is connected to the carrier plate (3) by inserting the first connection member (3a) and the second connection member (3b) into the first slot (6a) and the second slot (6b). For this process, first of all, the induction coil (4) is positioned on the carrier plate (3) at an angle such that the first slot (6a) faces the vertical portion of the first connection member (3a) and the first slot (6a) remains below (as shown in Figure 3). Then, by moving the induction coil (4) to approach the first connection member (3a), the vertical portion of the first connection member (3a) is placed in the first slot (6a). Afterwards, the other upper part of the induction coil (4) is released to move downwards so that it engages the second connection member (3b) of the second slot (6b). In this position, a part of the base plate (6) around the first slot (6a) remains between the horizontal portion of the first connection member (3a) and the carrier plate (3). Thus, the movement of the induction coil (4) in the vertical axis is limited. Here, also, the movement of the induction coil (4) in horizontal axes is prevented by the placement of the vertical portion of the first connection member (3a) in the first slot (6a) and the second connection member (3b) in the second slot (6b). Thus, it is ensured that the induction coil (4) is connected to the carrier plate (3) in a practical and reliable manner.

**[0014]** In a preferred embodiment of the invention, there is a 180° angle between the first slot (6a) and the second slot (6b). Thus, when the induction coil (4) is positioned at an angle, with the first slot (6a) facing downwards, during the assembly of the heating device (C), the second slot (6b) faces upwards. Therefore, it is ensured that the second slot (6b) is easily fitted on the second connection member (3b).

**[0015]** In another preferred embodiment of the invention, the first connection member (3a) is in the form of an inverted "L". In an alternative embodiment, the first connection member (3a) is in the form of a "T".

**[0016]** In another preferred embodiment of the invention, the first connection member (3a) and/or the second connection member (3b) are in a monolithic structure with the carrier plate (3). In this embodiment, the first connection member (3a) and/or the second connection member (3b) may be formed by cutting the carrier plate (3). Yet in an alternative embodiment, the first connection member (3a) and/or the second connection member (3b) are in the form of external parts connected to the carrier plate (3). In this embodiment, the heating device (C) comprises at least one connection mechanism for connecting the first connection member (3a) and/or the second connection member (3b) to the carrier plate (3). Said connection mechanism may comprise welding or adhering.

**[0017]** In another preferred embodiment of the invention, the electronic board (2) comprises at least one switching element (2a). Said switching element (2a) is connected with at least one induction coil (4) and controls the operation of the induction coil (4) to which it is connected. The electronic board (2) also comprises at least one cooling block (2b) in the form of a heat sink.

**[0018]** In the heating device (C) according to the present invention, the induction coil (4) is connected to the carrier plate (3) by inserting the first connection member (3a) and the second connection member (3b) located on the carrier plate (3) into the first slot (6a) and the second slot (6b) located on the base plate (6) of the induction coil (4). Therefore, the connection process is carried out in an easy and reliable manner.

## Claims

1. A heating device (C) comprising at least one body (1); at least one carrier plate (3) located in the body (1); at least one induction coil (4) located on the carrier plate (3); at least one electronic board (2) for controlling operation of the induction coil (4); and at least one upper surface (5) located on the induction coil (4), **characterized by** comprising

   - at least a first connection member (3a) located

on the carrier plate (3), which has at least one vertical portion extending upward from the carrier plate (3) and at least one horizontal portion located on the side of the vertical portion distal to the carrier plate (3);
- at least a second connection member (3b) extending upward from the carrier plate (3);
- at least one base plate (6) located in the lower part of the induction coil (4);
- at least a first slot (6a) in the base plate (6) suitable for accommodating the vertical portion of the first connection member (3a); and
- at least a second slot (6b) in the base plate (6) suitable for accommodating the second connection member (3b).

**2.** A heating device (C) according to claim 1, **characterized in that** the base plate (6) is in the form of a fedora.

**3.** A heating device (C) according to claim 1 or 2, **characterized in that** the angle between the first slot (6a) and the second slot (6b) is 180°.

**4.** A heating device (C) according to any of the preceding claims, **characterized in that** the first connection member (3a) is in the form of an inverted "L".

**5.** A heating device (C) according to any of the claims 1 to 3, **characterized in that** the first connection member (3a) is in the form of a "T".

**6.** A heating device (C) according to any of the preceding claims, **characterized in that** the first connection member (3a) and/or the second connection member (3b) are in a monolithic structure with the carrier plate (3).

**7.** A heating device (C) according to any of the claims 1 to 5, **characterized in that** it comprises at least one connection mechanism for connecting the first connection member (3a) and/or the second connection member (3b) to the carrier plate (3).

**8.** A heating device (C) according to claim 7, **characterized in that** the connection mechanism comprises a weld.

**9.** A heating device (C) according to claim 7, **characterized in that** the connection mechanism comprises an adhesive.

**10.** A heating device (C) according to any of the preceding claims, **characterized in that** the electronic board (2) comprises at least one switching element (2a).

**11.** A heating device (C) according to any of the preceding claims, **characterized in that** the electronic board (2) comprises at least one cooling block (2b).

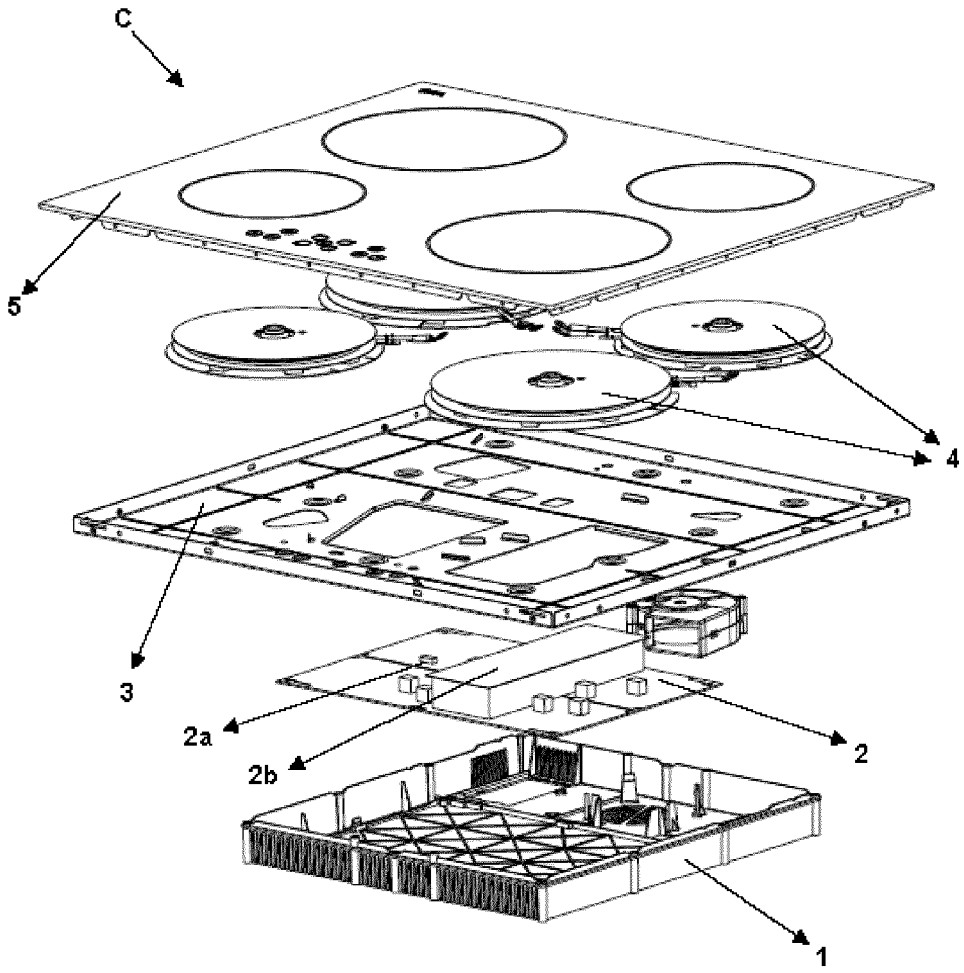


Figure – 1

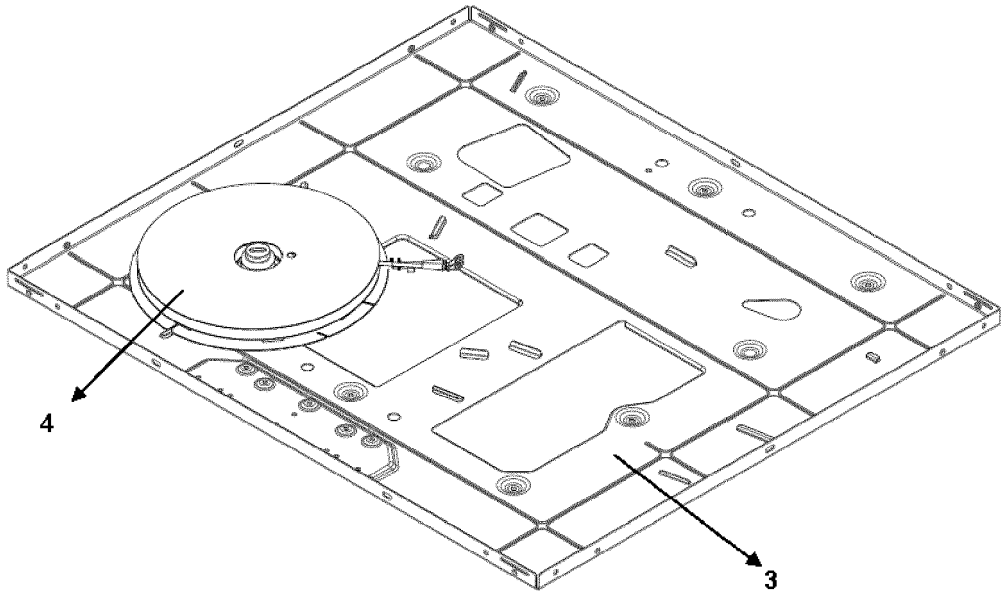


Figure – 2

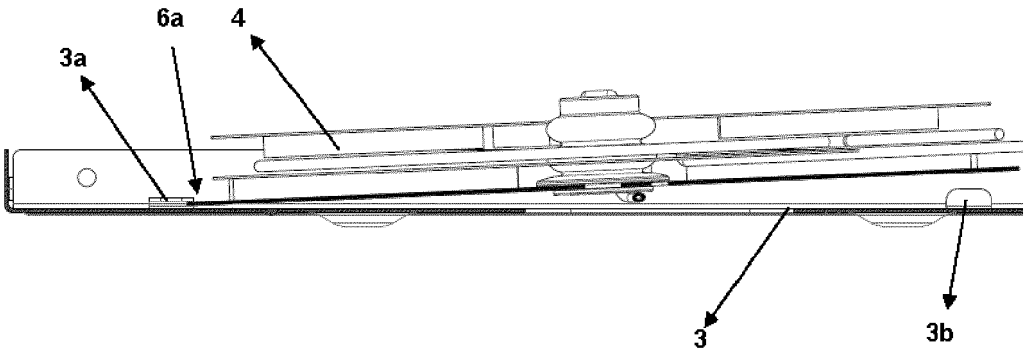


Figure – 3

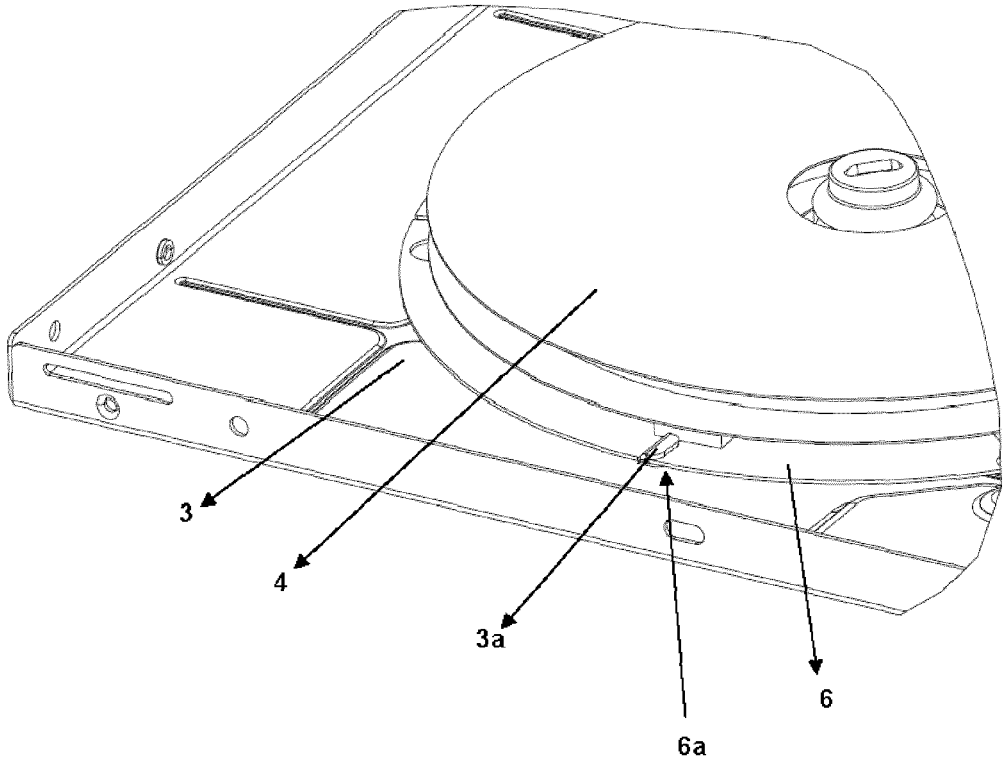


Figure – 4

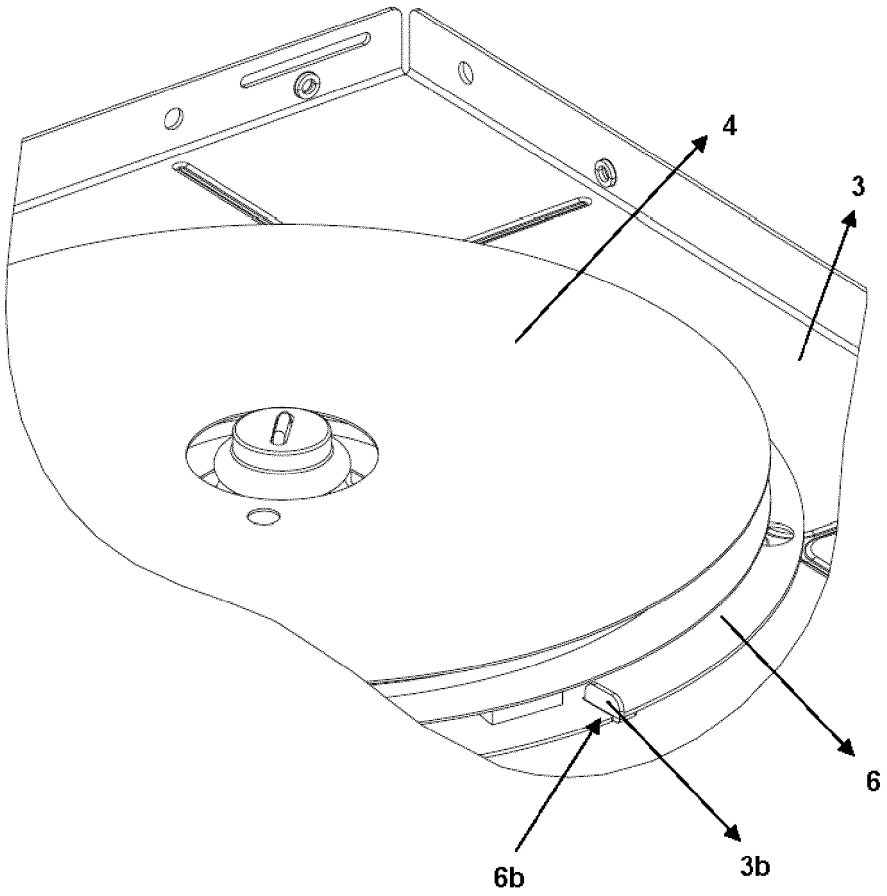


Figure – 5

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Application Number
EP 21 20 3140

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1 The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 21 February 2022 | Pierron, Christophe |

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 20 3140

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