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(54) **A HOME APPLIANCE HAVING AN EARTHING ELEMENT AND AN ELECTRICAL FUNCTIONAL ELEMENT**

(57) The present invention is a home appliance (1) comprising a body (11) made of metal material having an insulator layer (40); an electrical functional element (12) coupled to the body (11) from a connection tip; an earthing element (9) having an earthing terminal (8) connected onto the body (11). The home appliance (1) comprises a band (3) for providing earthing of the electrical

functional element (12) and having a conductive layer (31) extending on the body (11) from the connection tip of the electrical functional element (12) towards the earthing terminal (8) of the earthing element (9) so that an earthing connection is provided between the connection tip of the electrical functional element (12) and the earthing terminal (8).

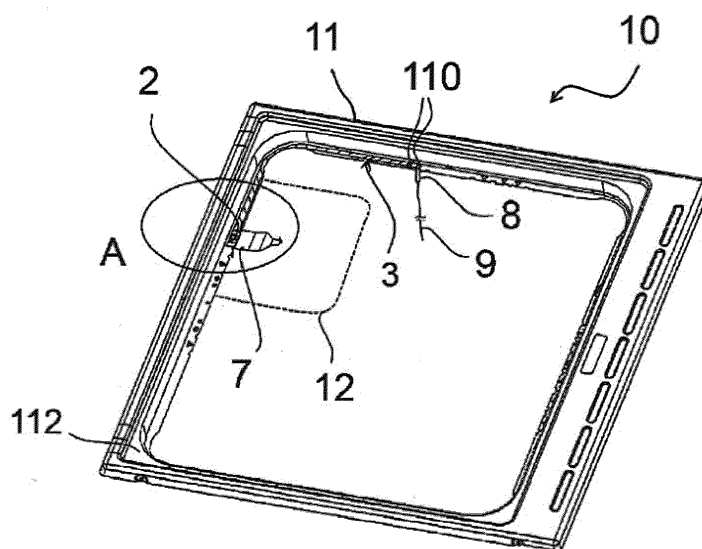


Figure 1

## Description

**[0001]** The present invention relates to a home appliance where an electrical functional element, coupled to a body of the home appliance, is earthed through a body having an insulator coating.

**[0002]** An electrical functional element is mounted onto any region of the home appliance, particularly onto the body of the home appliance for various purposes. The undesired electrical charge of the electrical functional element shall be discharged through the body, and earthing shall be realized against risky cases like electric shock.

**[0003]** As an example to the home appliance, a cooking device, particularly a cooktop embodiment can be taken into account. Earthing shall be realized through a section where an electrical heater group is connected to a cooktop plate. Here, the electrical heater group is an electrical functional element. For the earthing process, a mechanical and electrical connection shall be provided between the two pieces. During the application of mounting, a conductive connection element like a bolt and some auxiliary connection elements are used. However, if there is an insulator coating on one of the pieces, said insulator coating shall be slightly removed. This method is already in use for discharging the undesired electrical charge.

**[0004]** In the present art, a device where electrical earthing elements are used is given in patent publication GB2154079A. In said embodiment, an earth connection between an electrical enclosure and a cable termination received by the enclosure is disclosed. A screw threaded cable termination deforms an earth plate.

**[0005]** In the patent publication DE102005010044, an earthing embodiment provided on a cooking device of the present art can be seen. An earthing embodiment is provided for an electrical equipment such as a cooker. The cooker has a housing wall which has a sheet metal outer layer and within this is a thicker metal insert that has a threaded hole. The outer layer is electrically earthed and good contact with the inner region is provided by a screw that has a serrated surface.

**[0006]** The object of the present invention is to provide earthing of an electrical functional element, connected to a body of the home appliance, through a body having an insulator coating.

**[0007]** In order to realize the above mentioned objects and the objects to be deducted from the detailed description below, the present invention is a home appliance comprising a body made of metal material having an insulator layer; an electrical functional element coupled to the body from a connection tip; an earthing element having an earthing terminal connected onto the body. The present invention is characterized in that the home appliance comprises a band for providing earthing of the electrical functional element and having a conductive layer extending on the body from the connection tip of the electrical functional element towards the earthing terminal of the earthing element so that an earthing connection

is provided between the connection tip of the electrical functional element and the earthing terminal. Thus, the electrical functional element is earthed on the body by means of a conductive band extending between the electrical functional element and the earthing element.

**[0008]** In a preferred application of the present invention, the home appliance comprises at least one retaining element which contacts the electrical functional element and which supports the electrical functional element in a manner fixing it to the body. Thus, by means of the retaining element, the electrical functional element is fixed to the body, and at the same time, it is supported by the retaining element. In probable embodiments of the present invention, the holder element is conductive and flexible. In other embodiments, the holder element can be in the form of various connection elements.

**[0009]** In a preferred application of the present invention, the retaining element is the connection tip of the electrical functional element which contacts the body. Thus, the electrical charges, which are desired to be discharged, are transmitted to the connection tip through the electrical functional element and they are transmitted from the connection tip onto the body connected to the connection tip.

**[0010]** In a preferred application of the present invention, the retaining element is made of an electrically conductive material. Thus, the electrical charges, which are desired to be conducted, can be transmitted to the conductive band, provided on the body, through the electrical functional element.

**[0011]** In a preferred application of the present invention, the retaining element comprises a fixation section fixed to the body in a manner contacting the band. Thus, the excessive electrical charge, transmitted to the retaining element through the electrical functional element, will be carried from the retaining element to the conductive band. Said excessive electrical charge will be transmitted to the earthing element by means of the band.

**[0012]** In a preferred application of the present invention, the home appliance comprises a connection element which fixes the retaining element to the body. Thus, the retaining element and thus the electrical functional element are fixed to the body. In probable embodiments of the present invention, the connection element can be a screw with a threaded and serrated surface, or it can be a latch or a clips. Moreover, the connection element is made of a conductive material.

**[0013]** In a preferred application of the present invention, the band comprises an adhesive layer formed on a face thereof which is to be fixed to the body. Thus, the band is fixed on the body.

**[0014]** In a preferred application of the present invention, the home appliance is a cooking device. Thus, the electrical functional elements of the cooking device can be earthed in a low-cost and practical manner.

**[0015]** In a preferred application of the present invention, the body is a cooktop plate of the cooking device. Thus, the electrical functional element is earthed through

the body.

**[0016]** In a preferred application of the present invention, the electrical functional element is an electrical heater unit. Thus, the electrical heater unit is earthed through the body.

Figure 1 is a top perspective view of a body of a cooktop plate of the home appliance such as a cooking device.

Detail A is taken from Figure 1, and it is a zoomed view of the section where the band, having a conductive layer contacting a holder element, is connected to the body.

Cross section B-B' is taken from Detail A, and it is the zoomed two-dimensional view of the features and layers provided on the body.

Figure 2 is the view of the layers of a metal layer section of the body and the band.

Figure 3 is a frontal perspective view of the home appliance such as a cooking device.

**[0017]** In Figure 1, the perspective view of a cooktop plate (10), prior to assembly, is given. The cooktop plate (10) comprises a body (11) which is in frame form. A connection opening (110) is provided along one of the inner edges of the body (11). An earthing terminal (8) engages to the connection opening (110). The earthing terminal (8) is connected to the earthing element (9) which is in cable form. A retaining element (7) is fixed in another connection opening (110) provided on the adjacent edge. The retaining element (7) is fixed onto the body (11) by means of a connection element (2), which is in screw form, so as to be removable from an upper side (112) with respect to the assembly direction.

**[0018]** As shown in Detail A, in the section which is a part of the border extending into the frame of the body (11), the connection element (2) is passed through a screw hole (72) of the retaining element (7). The retaining element (7) is in the form of a flat plate extending towards the inner section of the frame of the body (11). The retaining element (7) comprises a fixation section (71) which seats to the edges which are adjacent to the connection opening (110) on the body (11). The screw hole (72) is in hole form; and it is provided in the middle of the fixation section (71). A band (3) extends on the body (11) between the connection element (2) and the earthing terminal (8) in a manner staying under the fixation section (72).

**[0019]** In Figure 2, the BB' cross section is illustrated. The band is seated at the upper side (112) with respect to the assembly direction of the body (11). Under this, the cross section of the body (11) is seen or the metal layer (4) which is another wall mounted thereon is seen. The metal layer (4) has an insulator layer (40). There is a conductive layer (41) under the insulator layer (40). At the lower side (111) with respect to the body (11) assembly direction, there is the metal layer (4) conductive layer. The metal layer (4) is made of an enamel painted sheet

forming the body (11). The enamel section forms the insulator layer (40), and the metal sheet of the body (11) forms the conductive layer (41).

**[0020]** The band (3) has a multi-layered laminated structure. There is a conductive layer (31) on the upper section of the band (3), and there is an adhesive layer (32) under said conductive layer (31). The adhesive layer (32) is in the form of an acrylic foam. The conductive layer (41) is made of a metal material like aluminum foil. When the band (3) is adhered onto the metal layer (4), the adhesive layer (32) is adhered onto the insulator layer (40), and it positions the conductive layer (31) as the uppermost layer of the laminated structure.

**[0021]** As illustrated in Figure 3, the subject matter structure is mounted onto the home appliance (1) which is a cooking device. Heating elements (15) are arranged on the cooktop plate (10) provided at the uppermost section. The heating elements (15) are adjacent to an electrical functional element (12). The electrical functional element (12) can be an electrical resistance forming the heating element (15). The knob (14) and the cooking chamber (13) are placed on the home appliance (1).

**[0022]** During the assembly of the cooktop plate (10), the band (3) is adhered onto a connection opening (110) provided at the edge of the body (11). The band (3) is adhered linearly between the connection opening (110) and the earthing terminal (8) onto the body (11) along the inner edges. The connection element (2) is passed through the connection opening (110), and the retaining element (7) is fixed to the body (11). The connection element (2) deteriorates the corresponding insulator layer (40) of the body (11) from the lower side (111), and it contacts the conductive layer (41). The connection element (2) is conductive between its two ends. The connection element (2) is preferably in the form of a screw made of metal material. The band (3) has an end corresponding to the screw hole (72). The connection element (2) passes through the band (3) while it is mounted. Thus, the connection element (2) functions as a bridge providing electrical transmission between the conductive layer (31) of the band (3) and the conductive layer (41) of the metal layer (4). The retaining element (7) is made of metal material, and it bears the electrical functional element (12). Thus, in case an electrical leakage occurs from the electrical functional element (12), this leakage is transmitted to the band (3) through the retaining element (7), and it is transmitted to the earthing terminal (8) from here.

## REFERENCE NUMBERS

### [0023]

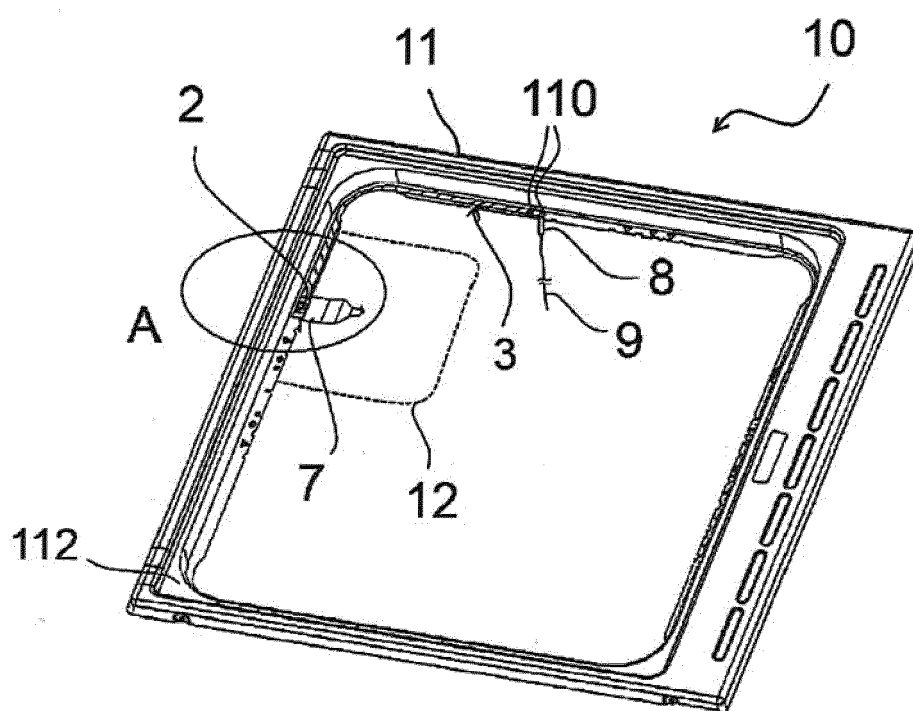
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|------|--------------------|
| 1.   | Home appliance     |
| 10.  | Cooktop plate      |
| 11.  | Body               |
| 110. | Connection opening |
| 111. | Lower side         |
| 112. | Upper side         |

- 12. Electrical functional element
- 13. Cooking chamber
- 14. Knob
- 15. Heating element
- 2. Connection element
- 3. Band
- 31. Conductive layer
- 32. Adhesive layer
- 4. Metal layer
- 40. Insulator layer
- 41. Conductive layer
- 7. Retaining element
- 70. Holder section
- 71. Fixation section
- 72. Screw hole
- 8. Earthing terminal
- 9. Earthing element

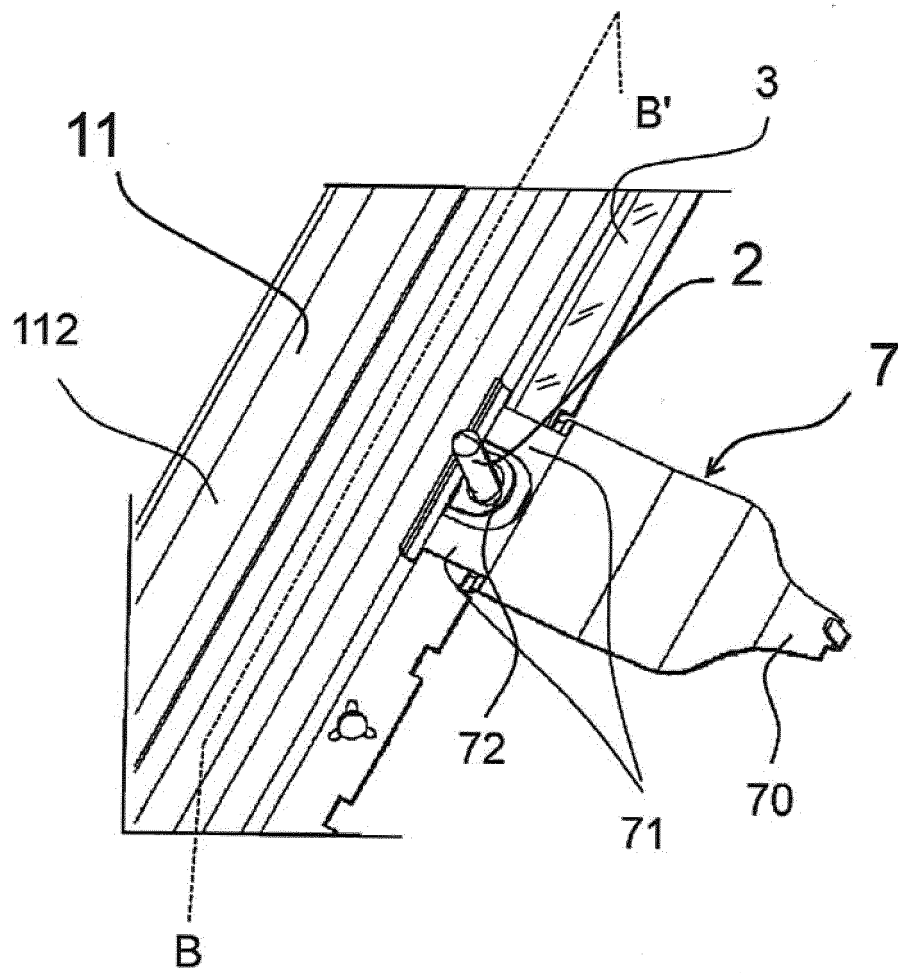
### Claims

- 1. A home appliance (1) comprising a body (11) made of metal material having an insulator layer (40); an electrical functional element (12) coupled to the body (11) from a connection tip; an earthing element (9) having an earthing terminal (8) connected onto the body (11), **characterized in that** the home appliance (1) comprises a band (3) for providing earthing of the electrical functional element (12) and having a conductive layer (31) extending on the body (11) from the connection tip of the electrical functional element (12) towards the earthing terminal (8) of the earthing element (9) so that an earthing connection is provided between the connection tip of the electrical functional element (12) and the earthing terminal (8).
- 2. A home appliance (1) according to Claim 1, wherein the home appliance (1) comprises at least one retaining element (7) which contacts the electrical functional element (12) and which supports the electrical functional element (12) in a manner fixing it to the body (11).
- 3. A home appliance (1) according to Claim 2, wherein the retaining element (7) is the connection tip of the electrical functional element (12) which contacts the body (11).
- 4. A home appliance (1) according to any one of the preceding claims, wherein the retaining element (7) is made of an electrically conductive material.
- 5. A home appliance (1) according to Claim 4, wherein the retaining element (7) comprises a fixation section (71) fixed to the body (11) in a manner contacting the band (3).

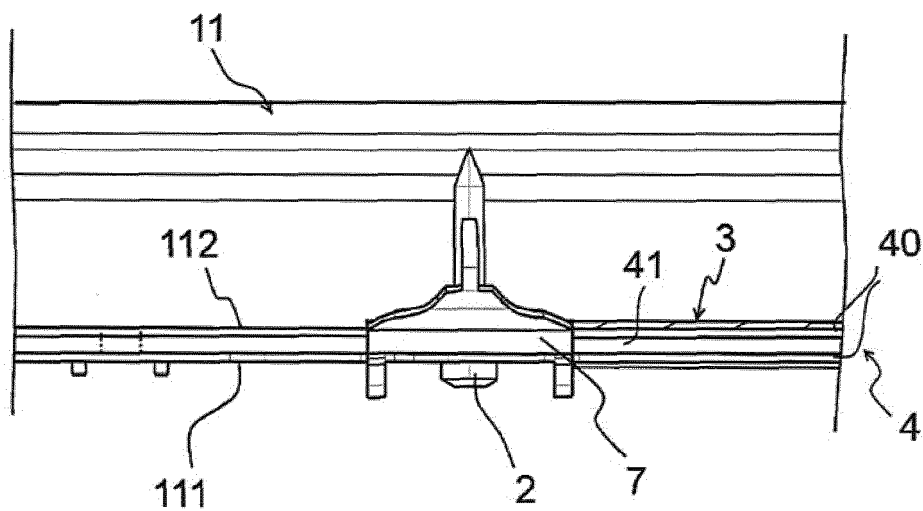
- 6. A home appliance (1) according to any one of the preceding claims, wherein the home appliance (1) comprises a connection element (2) which fixes the retaining element (7) to the body (11).
- 7. A home appliance (1) according to any one of the preceding claims, wherein the band (3) comprises an adhesive layer (32) formed on a face thereof which is to be fixed to the body (11).
- 8. A home appliance (1) according to any one of the preceding claims, wherein the home appliance (1) is a cooking device.
- 9. A home appliance (1) according to Claim 8, wherein the body (11) is a cooktop plate (10) of the cooking device.
- 10. A home appliance (1) according to Claim 8 or 9, wherein the electrical functional element (12) is an electrical heater unit.



### Figure 1



Detail A



Cross section B-B'

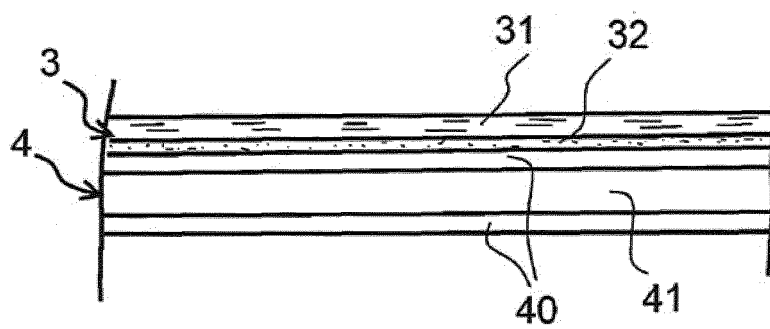


Figure 2

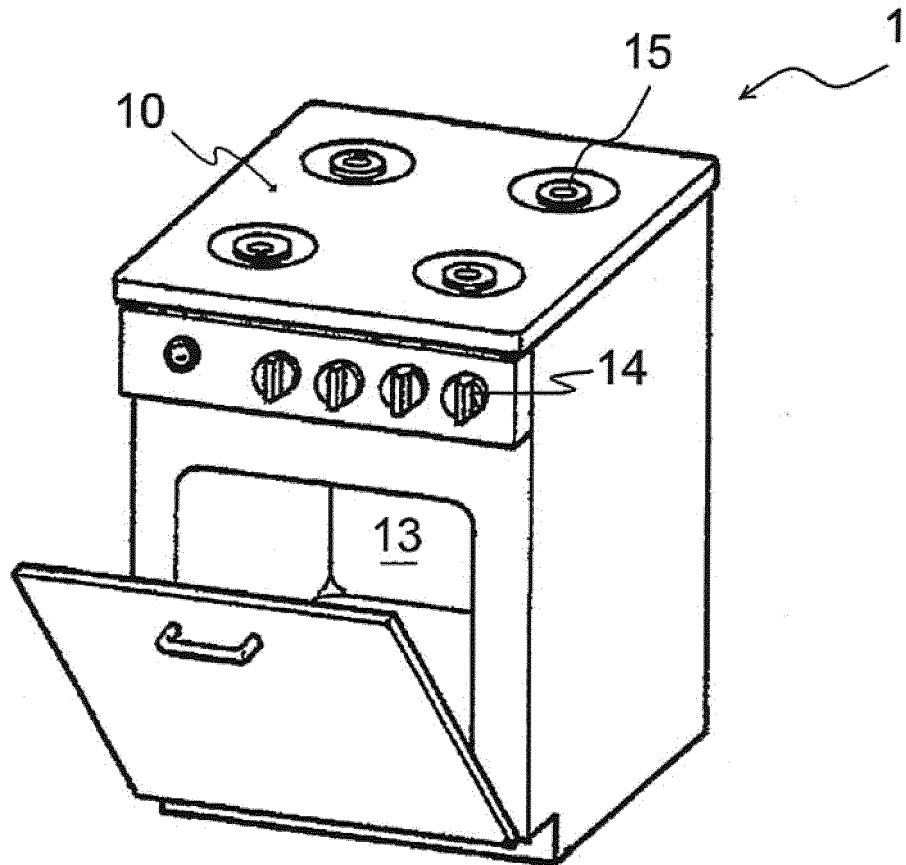


Figure 3





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 EP 15 20 0197

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The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>22 April 2016</b>	Examiner <b>Pugliese, Sandro</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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