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(54) A COOKING DEVICE FOR DETECTING THE AMOUNT OF LOAD

GARGERÄT ZUM ERFASSEN DER LASTMENGE

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(73) Proprietor: **Arçelik Anonim Sirketi**
34445 Istanbul (TR)

(72) Inventors:
- **KANTAS, Murat**
  34445 ISTANBUL (TR)
- **KANDEMIR, Nihat**
  34445 ISTANBUL (TR)

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Description

[0001] The present invention relates to a cooking device for detecting the amount of load.

[0002] In cooking devices, the detection of the weight of the foodstuff, which is placed into the cooking chamber and which is desired to be cooked, is critical in terms of enabling the user to see the weight of the foodstuff to be cooked, preventing any excessive load, adjusting the cooking time with respect to the weight of the foodstuff to be cooked or operating the programs suitable for the weight and thus increasing the cooking efficiency of the cooking device. Moreover, determining the cooking method suitable for the weight by detecting the weight of the foodstuff to be cooked is also important in the energy efficiency of the cooking device. In the state of the art, weight sensors positioned under the tray are used to detect the weight of the foodstuffs to be cooked. In these embodiments, the weight sensors can be damaged due to high temperatures in the cooking device.

[0003] In the state of the art Patent Application No. US5463207, a cooking device is disclosed, wherein the weight of the tray placed therein is detected. Further prior art can be found in the documents EP1918643A2, EP0173855A1 and DE102011010239A1.

[0004] The aim of the present invention is the realization of a cooking device wherein the weight of the tray and the foodstuff placed into the tray to be cooked can be easily determined.

[0005] The cooking device according to the invention, comprises a tray which is suitable for placing the ingredients to be cooked therein, a cooking chamber wherein the tray is placed, a casing which surrounds the cooking chamber, which has two side walls and which is in the form of a box with the front side being open, and at least one support which is provided on the side wall and which enables the tray to be placed into the cooking chamber.

[0006] The cooking device of the present invention further comprises an elastic member which changes length by being squeezed by the weight of the tray upon placing the tray on the support and which is at least partially produced from a magnetic material so as to generate a magnetic field by interacting with the magnetic, at least one magnet which is placed onto the support so as to generate a magnetic field with the elastic member, and a magnetic sensor which is disposed on the side wall and which detects the changes in the magnetic field intensity generated between the elastic member and the magnet. The length of the elastic member decreases due to the weight of the tray placed on the support. When the force acting on the elastic member is removed, the length of the elastic member returns to the initial state. As the length of the elastic member decreases, the magnetic field intensity generated between the same and the magnet changes. The changing magnetic field intensity is detected by the magnetic sensor disposed on the side wall. Depending on the changing magnetic field intensity, the decrease in the length of the elastic member is determined. The length of the elastic member decreases in proportion to the weight of the tray or there is a certain correlation between the weight of the tray and the decrease in the length of the elastic member. Thus, the weight of the tray can be easily calculated.

[0007] According to the invention, there are two elastic members each disposed on the support on each of the two side walls, at least two magnets with at least one being disposed on each of the supports, and two magnetic sensors each disposed on each of the two side walls.

[0008] The cooking device comprises a control unit which regulates the operation. The control unit adjusts the cooking time and the suitable cooking method according to the data received from the magnetic sensor.

[0009] In another version of the present invention, a plurality of magnets are disposed on the support. Thus, the intensity of the magnetic field generated between the magnets and the elastic member is increased.

[0010] In another version of the present invention, a magnet and an elastic member are provided on each of the supports on both side walls, and a magnetic sensor is provided on each of the two side walls. In case of the presence of unbalanced load on the tray, more weight may act on one side. In this case, a measurement performed at one side may cause erroneous results. By performing measurement at both sides after the tray is placed onto the support from both sides, the weight can be calculated more correctly.

[0011] In another version of the present invention, a cut-out is formed on the part of the side wall remaining between the magnet and the magnetic sensor. Thus, the detection of the magnetic field generated between the elastic member and the magnet by the magnetic sensor is facilitated.

[0012] In another version of the present invention, the cooking device comprises a magnet which is placed onto the support so as to be positioned on the elastic member. Thus, the intensity of the magnetic field to be generated between the magnet and the elastic member is increased, and the detection of said magnetic field by the magnetic sensor is facilitated.

[0013] By means of the present invention, a cooking device is realized, wherein the weight of the tray on which the foodstuff to be cooked is placed is detected by means of the elastic member which is squeezed with the weight of the tray placed on the support so as to decrease in length, the magnet which is placed on the support so as to generate a magnetic field between the magnet and the elastic member, and a magnetic sensor which detects the magnetic field generated.

[0014] The cooking device realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the schematic view of the cooking device related to an embodiment of the present invention.

Figure 2 - is the schematic view of the cooking device

related to an embodiment of the present invention.

[0015] The elements illustrated in the figures are numbered as follows:

1. Cooking device
2. Tray
3. Cooking chamber
4. Side wall
5. Casing
6. Support
7. Elastic member
8. Magnet
9. Magnetic sensor
10. Control unit

[0016] The cooking device (1) comprises a tray (2) which is suitable for placing the ingredients to be cooked therein, a cooking chamber (3) wherein the tray (2) is placed, a casing (5) which surrounds the cooking chamber (3), which has two side walls (4) and which is in the form of a box with the front side being open, and at least one support (6) which is provided on the side wall (4) and which enables the tray (2) to be placed into the cooking chamber (3). The tray (2) is placed on the support (6). The support (6) can be in the form of a wire shelf disposed on the side wall (4) or in the form of a recess or protrusion formed on the side wall (4), suitable for the placement of the tray (2) thereon.

[0017] The cooking device (1) of the present invention comprises an elastic member (7) which is disposed on the support (6) and which changes length by being squeezed by the weight of the tray (2) upon placing the tray (2) on the support (6), at least one magnet (8) which is placed onto the support (6) so as to generate a magnetic field with the elastic member (7), and a magnetic sensor (9) which is disposed on the side wall (4) and which detects the changes in the magnetic field intensity generated between the elastic member (7) and the magnet (8). The elastic member (7) comprises a material suitable for generating a magnetic field together with the magnet (8). The elastic member (7) can be a traditional spring or a spring steel. Moreover, the elastic member (7) can be produced from an elastic material such as silicone resistant to high temperatures. The weight of the elastic member (7) decreases when a weight is placed thereon. The length of the elastic member (7) returns to the initial state when the weight acting thereon is removed. In a preferred version of the present invention, the magnet (8) is a magnet (8) resistant to high temperatures, and is placed onto the support (6) so as to be positioned in the cooking chamber (3). In the preferred version of the present invention, the magnetic sensor (9) is disposed on the side wall (4) so as to be positioned outside the cooking chamber (3). The magnetic sensor (9) is disposed on the surface of the side wall (4) facing the outside so as to detect the magnetic field generated between the magnet (8) and the elastic member (7) and to be aligned with the magnet (8) which is disposed on the part of the side wall (4) facing the inner volume of the cooking chamber (3). The length of the elastic member (7) changes depending on the weight of the tray (2). As the length of the elastic member (7) changes, the intensity of the magnetic field generated between the elastic member (7) and the magnet (8) also changes. Said change in the intensity of the magnetic field is detected by the magnetic sensor (9). The magnetic sensor (9) can determine the change in the length of the elastic member (7) depending on the change in the intensity of the magnetic field. Since the change in the length of the elastic member (7) is proportional to the weight of the tray (2), the weight of the ingredients in the tray (2) to be cooked can be determined.

[0018] The cooking device (1) comprises a control unit (10) which processes the data received from the magnetic sensor (9) so as to perform the cooking program suitable for the weight of the tray (2). The control unit (10) regulates the operation of the cooking device (1). After the weight of the tray (2) placed into the cooking chamber (3) is determined by means of the data received from the magnetic sensor (9), the cooking program suitable for the determined weight is performed by the control unit (10). The control unit (10) determines the cooking time and the cooking method according to the weight of the foodstuff to be cooked. Thus, the efficiency of the cooking process is improved, providing savings in energy.

[0019] In an embodiment of the present invention, the cooking device (1) comprises a plurality of magnets (8) which are disposed on the support (6). By increasing the number of magnets (8), the intensity of the magnetic field generated between the magnets (8) and the elastic member (7) is also increased. Thus, the change in the length of the elastic member (7) causes the change in the intensity of the magnetic field to increase. The magnetic field is enabled to expand to the outside of the cooking chamber (3). Consequently, the detection of the change in the intensity of the magnetic field by the magnetic sensor (9) is facilitated.

[0020] According to the invention, the cooking device (1) comprises two elastic members (7) each disposed on the support (6) on each of the two side walls (4), at least two magnets (8) with at least one being disposed on each of the supports (6), and two magnetic sensors (9) each disposed on each of the two side walls (4). One support (6) is provided on each of the two side walls (4). The tray (2) is placed onto the supports (6) in the cooking chamber (3). The weight of the tray (2) on the elastic member (7) is measured at the side of the two side walls (4). Thus, in case the user cannot place the foodstuff on the tray in a balanced manner, the risk of calculating the weight erroneously is eliminated. Consequently, the weight on the tray (2) is enabled to be calculated more correctly.

[0021] In another embodiment of the present invention, the cooking device (1) comprises a cut-out which is formed on the part of the side wall (4) aligned with the magnet (8). In the preferred version of the present inven-

tion, the magnet (8) is disposed on the support (6) provided on the part of the side wall (4) facing the inner volume of the cooking chamber (3), and a magnetic sensor (9) is disposed on the outer surface of the side wall (4). The intensity of the magnetic field generated between the magnet (8) and the elastic member (7) disposed on the support (6) decreases while passing through the side wall (4), and may get difficult to be detected by the magnetic sensor (9). In order to prevent the magnetic field from weakening while passing through the side wall (4), a cut-out is formed on the part of the side wall (4) remaining between the magnet (8) and the magnetic sensor (9). Thus, the magnetic field generated in the cooking chamber (3) weakens less while passing through the side wall (4) and can be detected by the magnetic sensor (9) more easily. In another preferred version of the present invention, a material such as Teflon, silicone, etc. which is resistant to high temperatures and has a high magnetic permeability is filled into the formed cut-out.

[0022] In another embodiment of the present invention, the cooking device (1) comprises the magnet (8) which is placed onto the support (6) so as to be positioned on the elastic member (7).

[0023] By means of the present invention, a cooking device (1) is realized, wherein the weight of the tray (2) is efficiently detected by means of an elastic member (7) which changes in length depending on the weight of the tray (2) placed onto the support (6), a magnet (8), and a magnetic sensor (7) which is disposed on the side wall (4) so as to detect the changes in the magnetic field generated between the elastic member (7) and the magnet (8).

Claims

1. A cooking device (1) **comprising** a tray (2) which is suitable for placing the ingredients to be cooked therein, a cooking chamber (3) wherein the tray (2) is placed, a casing (5) which surrounds the cooking chamber (3), which has two side walls (4) and which is in the form of a box with the front side being open, and at least one support (6) which is provided on the side wall (4) and which enables the tray (2) to be placed into the cooking chamber (3), **characterized by**

   - an elastic member (7) which is disposed on the support (6) and which changes length by being squeezed by the weight of the tray (2) and ingredients in the tray (2) upon placing the tray (2) on the support (6), wherein the decrease in length of the elastic member is proportional to or has a certain correlation with the weight placed on the support (6),
   - at least one magnet (8) which is placed onto the support (6) so as to generate a magnetic field with the elastic member (7), and
   - a magnetic sensor (9) which is disposed on the side wall (4), which is adapted to detect the changes in the magnetic field intensity generated between the elastic member (7) and the magnet (8) and determine the change in length of the elastic member (7) based on the change in the magnetic field intensity,
   - a control unit (10) which processes the data received from the magnetic sensor (9) so as to perform the cooking program suitable for the weight of the tray (2),

   wherein two elastic members (7) each disposed on the support (6) on each of the two side walls (4), at least two magnets (8) with at least one being disposed on each of the supports (6), and two magnetic sensors (9) each disposed on each of the two side walls (4).

2. A cooking device (1) as in claim 1, **characterized by** a plurality of magnets (8) which are disposed on the support (6).

3. A cooking device (1) as in any one of the above claims, **characterized by** a cut-out which is formed on the part of the side wall (4) aligned with the magnet (8).

4. A cooking device (1) as in any one of the above claims, **characterized by** the magnet (8) which is placed onto the support (6) so as to be positioned on the elastic member (7).

5. A cooking device (1) as in any one of the above claims, **characterized by** the magnetic sensor (9) being disposed on the outer surface of the side wall (4).

Patentansprüche

1. Ein Kochgerät (1) umfasst eine Schale (2), die geeignet ist, die zu kochenden Zutaten darin zu platzieren, eine Garkammer (3), in der die Schale (2) platziert ist, ein Gehäuse (5), das die Garkammer (3) umgibt, das zwei Seitenwände (4) hat und das die Form eines Kastens hat, wobei die Vorderseite offen ist, und mindestens eine Stütze (6), die an der Seitenwand (4) vorgesehen ist und die es ermöglicht, die Schale (2) in die Garkammer (3) zu platzieren, gekennzeichnet ist es dadurch, dass

   - ein elastisches Element (7), das auf dem Träger (6) angeordnet ist und das seine Länge ändert, indem es durch das Gewicht des Tabletts (2) und der Bestandteile in dem Tablett (2) beim Aufsetzen des Tabletts (2) auf den Träger (6) zusammengedrückt wird, wobei die Abnahme

der Länge des elastischen Elements proportional zu dem auf dem Träger (6) platzierten Gewicht ist oder eine bestimmte Korrelation mit diesem aufweist,
- mindestens ein Magnet (8), der so auf der Unterlage (6) angeordnet ist, dass er mit dem elastischen Element (7) ein Magnetfeld erzeugt, und
- ein Magnetsensor (9), der an der Seitenwand (4) angeordnet ist, die Änderungen der zwischen dem elastischen Element (7) und dem Magneten (8) erzeugten Magnetfeldstärke erfassen und die Längenänderung des elastischen Elements (7) auf der Grundlage der Änderung der Magnetfeldstärke bestimmen kann,
- eine Steuereinheit (10), die die von dem Magnetsensor (9) empfangenen Daten verarbeitet, um das für das Gewicht des Tabletts (2) geeignete Garprogramm durchzuführen, wobei zwei elastische Elemente (7), die jeweils auf dem Träger (6) an jeder der beiden Seitenwände (4) angeordnet sind, mindestens zwei Magnete (8), von denen mindestens einer an jedem der Träger (6) angeordnet ist, und zwei Magnetsensoren (9), die jeweils an jeder der beiden Seitenwände (4) angeordnet sind.

2. Ein Kochgerät (1), wie in Anspruch 1 aufgeführt, **ist dadurch gekennzeichnet, dass** eine Vielzahl von Magneten (8) auf dem Träger (6) angeordnet sind.

3. Ein Kochgerät (1), wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** eine Aussparung, die auf dem mit dem Magneten (8) ausgerichteten Teil der Seitenwand (4) ausgebildet ist.

4. Ein Kochgerät (1), wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** der Magnet (8), der auf dem Träger (6) angebracht ist, auf dem elastischen Element (7) positioniert wird.

5. Ein Kochgerät (1), wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** der Magnetsensor (9) an der Außenfläche der Seitenwand (4) angeordnet ist.

Revendications

1. Un dispositif de cuisson (1) **comprenant** un plateau (2) apte à recevoir les éléments à cuire, une chambre de cuisson (3) dans laquelle le plateau (2) est placé, un boîtier (5) qui entoure la chambre de cuisson (3), qui a deux parois latérales (4) et qui se présente sous la forme d'une boîte avec une face avant ouverte, et au moins un support (6) qui est prévu sur la paroi latérale (4) et qui permet de placer le plateau (2) dans la chambre de cuisson (3), **caractérisé par**

- un élément élastique (7) qui est disposé sur le support (6) et dont la longueur change en étant comprimée par le poids du plateau (2) et des éléments se trouvant sur le plateau (2), lors du placement du plateau (2) sur le support (6), la diminution de la longueur de l'élément élastique étant proportionnelle ou présentant une certaine corrélation avec le poids placé sur le support (6),
- au moins un aimant (8) qui est placé sur le support (6) de manière à générer un champ magnétique avec l'élément élastique (7), et
- un capteur magnétique (9) qui est disposé sur la paroi latérale (4), qui est adapté pour détecter les changements d'intensité du champ magnétique généré entre l'élément élastique (7) et l'aimant (8) et pour déterminer le changement de longueur de l'élément élastique (7) en fonction du changement de l'intensité du champ magnétique,
- une unité de contrôle (10) qui traite les données reçues du capteur magnétique (9) afin d'effectuer le programme de cuisson approprié au poids du plateau (2),

dans lequel deux éléments élastiques (7) sont chacun disposés sur le support (6) de chacune des deux parois latérales (4), au moins deux aimants (8) dont au moins l'un est disposé sur chacun des supports (6), et deux capteurs magnétiques (9) qui sont chacun disposés sur chacune des deux parois latérales (4).

2. Un dispositif de cuisson (1) selon la revendication 1, **caractérisé par** une pluralité d'aimants (8) qui sont disposés sur le support (6).

3. Un dispositif de cuisson (1) selon l'une des revendications précédentes, **caractérisé par** une découpe qui est formée sur la partie de la paroi latérale (4) alignée avec l'aimant (8).

4. Un dispositif de cuisson (1) selon l'une des revendications précédentes, **caractérisé par** l'aimant (8) qui est placé sur le support (6) de manière à être positionné sur l'élément élastique (7).

5. Un dispositif de cuisson (1) selon l'une des revendications précédentes, **caractérisé par** le capteur magnétique (9) qui est disposé sur la surface extérieure de la paroi latérale (4).

Figure 1

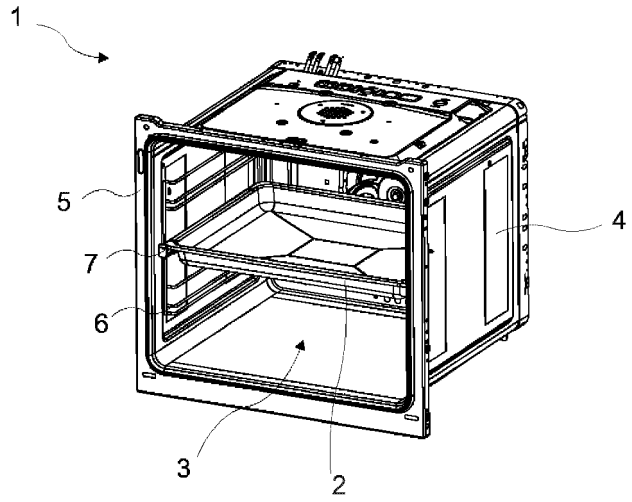
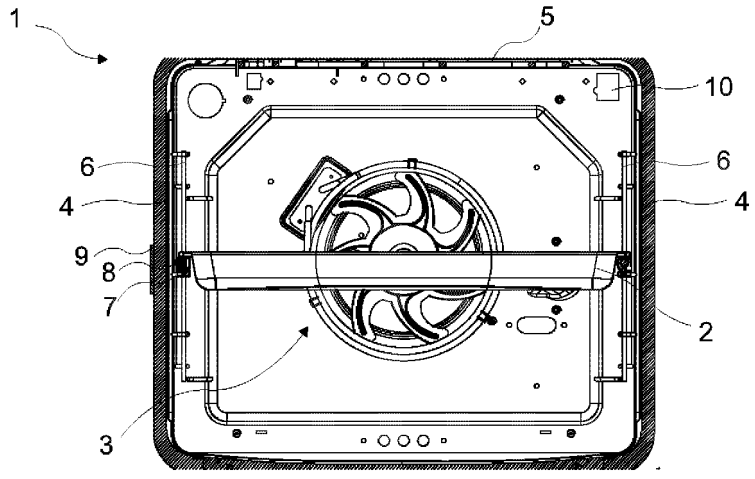


Figure 2



REFERENCES CITED IN THE DESCRIPTION

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