

The present invention relates to a microwave oven with a turntable.

A microwave oven usually comprises a compartment serving as a treatment chamber and a compartment intended to accommodate a microwave-producing magnetron system. The microwaves produced by the producing system are brought by a waveguide into the treatment chamber containing an article or food product subjected to a cooking or heating-up or thawing treatment. If this article or food product remains stationary inside this chamber during this treatment, the microwaves in their standing wave mode in this chamber give rise to a non-uniform treatment in the mass of this article or product, in other words, in the mass of this article or food product there are zones which are more cooked or are well heated up or correctly thawed which alternate with zones which are less cooked or still cold or inadequately thawed. In order to make this treatment uniform in the mass of this article or food product, several solutions have been proposed. One of these known solutions consists in mounting, in the oven at the exit of a waveguide, a device for stirring the microwaves in order to obtain a complex standing wave pattern of microwaves in the treatment chamber. This solution provides an improvement to the result obtained, but the treatment is still far from being uniform throughout the mass of the article or product subjected to this treatment. Another known solution provides, in the treatment chamber of the oven, a turntable with a fixed concentric axis of rotation, the axis being coincident with the centre of the plate, in order to receive an article or product subjected to a treatment. During this treatment, the turntable with a concentric axis of rotation makes it possible to change continually the position of the article or product in the chamber while presenting it to the microwaves. The result obtained reveals that, in the mass of the article or product subjected to this treatment, there are concentric zones which are well cooked or well heated up or correctly thawed alternating with concentric zones which

are less cooked or still cold or inadequately thawed. These zones are all concentric with the fixed axis of rotation of the turntable. Such an apparatus is described, for example, in Belgian Patent No. 845,849.

5 The present invention aims to avoid the drawbacks of the known solutions referred to hereinabove and makes it possible to produce an economical and efficient microwave oven giving a uniform treatment throughout the mass of the article or product subjected to a treatment
10 in its chamber.

 The subject of the present invention is a microwave oven according to Claim 1 or 3.

 In order to explain the invention better, a number of illustrative embodiments thereof are described
15 hereinbelow, illustrated by the drawings appended hereto, in which:

 - Figure 1 shows a diagrammatic and partial front view of a microwave oven equipped with a turntable according to the prior art;

20 - Figure 2 shows a partial diagrammatic view, in vertical section, of the microwave oven according to a first illustrative embodiment;

 - Figure 3 shows a partial diagrammatic view, in horizontal section IV-IV, of the microwave ovens of
25 Figure 2, and

 - Figure 4 shows a diagrammatic partial view, in vertical section, of a microwave oven according to a second illustrative embodiment.

 A microwave oven 1 according to the illustrative
30 embodiment illustrated in Figure 1 comprises two compartments 2, 3, a compartment 2 intended to accommodate a microwave-producing system, which is not shown, and a compartment 3 serving as a treatment chamber. The compartment 3 is closed by a door 5. The microwaves produced
35 by the system accommodated in the compartment 2 are brought into the treatment chamber 3 by a waveguide, which is not shown. The microwaves maintain a standing wave mode therein, penetrate the articles or food products contained in this chamber 3 and effect a

cooking, heating-up or thawing treatment.

In a known manner, a microwave oven comprises, in its treatment chamber, as turntable, a plate which receives articles or products subjected to a treatment and, during this treatment, moves these articles or products along a circular path in this treatment chamber.

According to the illustrative embodiment illustrated in Figure 1, the microwave oven 1 comprises, in its treatment chamber 3, as turntable, a horizontal plate turning about the vertical axis 10 corresponding to the centre of the plate.

So that all the parts of the articles or food products subjected to the treatment are presented to the microwaves by the turntable, in the treatment chamber 3, a solution in which the oven includes a fixed vertical axis inside the chamber is proposed, as shown in Figures 2 and 3, the axis being offset with respect to the centre of the plate, the said vertical axis of the plate being simultaneously driven in rotation about the fixed vertical axis of the oven.

According to this illustrative embodiment partially and diagrammatically illustrated in Figures 2 and 3, the microwave oven 1 comprises, in the treatment chamber 3, on the one hand, a fixed circular hollow horizontal base 11 and a movable drive disc 12 mounted so as to rotate concentrically with this base in a central opening of the latter about a vertical axis 13 and provided, on the periphery of its upper surface, with a circular friction device 14 with a high coefficient of friction and, on the other hand, as turntable, a free plate 15 with a circular rim 16 placed free of all attachment in the fixed circular hollow horizontal base 11 and straddling over this movable drive disc 12.

During a rotation of the horizontal drive disc 12 about its axis 13, the circular friction device 14 with a high coefficient of friction tends to displace the free plate 15, to push it towards the periphery of the circular hollow base 11 against the rim 18 of the latter and to force it to rotate by rolling along the rim 18 and

by sliding over the surface of this hollow horizontal base 11. Several positions of this free plate 15 on the hollow horizontal base 11 are indicated in broken lines 15a, 15b, 15c in Figure 3. The path of the articles or products subjected to a treatment in the chamber 3 and borne by the free plate 15 which is rotated and displaced over the hollow horizontal base 11 by the drive disc 12 is a non-circular path in a horizontal plane. By virtue of their non-circular path, the various parts of the articles or products, which are not shown, placed on this free plate 15 are all presented by this plate 15 to the microwaves in the treatment chamber 3.

According to a second illustrative embodiment illustrated diagrammatically and partially in Figure 4, the microwave oven 1 comprises, in the treatment chamber 3, on the one hand, as turntable, a circular horizontal plate 20 rotating about a concentric vertical axis 21, mounted free in displacement on this vertical axis 21 and provided on the periphery of its circular lower surface with at least three rollers 24 with a horizontal axis of rotation, which rollers are angularly spaced and in line on a circular line, and, on the other hand, on the base wall 27 of this chamber 3, a circular rolling track 29 for rollers 24, which are concentric with the vertical axis of rotation 21 of the circular horizontal plate 20, having a diameter equal to that of the circular line of alignment of these rollers 24 and formed by an alternating succession of a number of protuberances 30 and of hollows 31 which are angularly spaced, which is the same number or a multiple of the number of these rollers 24 of the plate 20.

In a rotation of the plate 20 when all the rollers 24 are on the tops of the protuberances 30 of the rolling track 29, the plate 20 reaches its maximum high position represented by solid lines in Figure 4 and, when the rollers 24 are in the bottoms of the hollows 31 of the rolling track 29, the plate 20 descends to its maximum low position represented by broken lines in Figure 4.

In its rotation, the horizontal plate 20 oscillates vertically between its maximum high position represented by solid lines and its maximum low position represented by broken lines in Figure 4.

5 The path of the articles or products borne by this plate 20 is a non-circular path forming a curve which is spatially skewed.

10 By virtue of their non-circular path, the various parts of the articles or products, which are not shown, placed on this turntable 20 are all presented to the microwaves in the treatment chamber 3.

15 In a variant embodiment, which is not shown, the rollers 24 of the plate 20 and the circular rolling track 29 are replaced by an equivalent system with cams and with cam followers or an equivalent system with a screw, of known type, enabling this plate 20 to rotate about a vertical axis and to oscillate simultaneously along this axis.

20 By virtue of the invention, the cooking, heating or thawing of an article or product in the treatment chamber 3 of the microwave oven 1 is advantageously uniform throughout the mass of this article or product.

CLAIMS

1. Microwave oven equipped, in its chamber, with a horizontal plate for receiving products subjected to a treatment and rotating about a vertical axis passing
5 through its centre, characterised in that the oven includes a fixed vertical axis (13) inside the chamber, offset with respect to the centre of the plate (15), the said vertical axis of the plate being simultaneously driven in rotation (15a, 15b, 15c) about the fixed
10 vertical axis of the oven (13).

2. Oven according to Claim 1, characterised in that it comprises, in its treatment chamber (3), on the one hand, a fixed circular hollow horizontal base (11) and a movable horizontal drive disc (12) mounted so as to
15 rotate concentrically with this base in a central opening of the latter about a fixed vertical axis (13) and provided, on the periphery of its upper surface, with a circular float [sic] (14) with a high coefficient of friction and, on the other hand, as turntable, a free
20 plate (15) with a circular rim (16) placed free of all attachment on this fixed circular hollow horizontal base (11) and straddling over this movable drive disc (12).

3. Microwave oven equipped, in its chamber, with a horizontal turntable for receiving products subjected to
25 a treatment, characterised in that the turntable is a circular plate (20) rotating about the vertical axis passing through its centre (21), mounted free in displacement on this vertical axis (21), and in that it includes means making it possible to oscillate it verti-
30 cally simultaneously along this axis.

4. Oven according to Claim 3, characterised in that the means consist of at least three rollers (24), with horizontal axes of rotation, which are angularly spaced and in line on a circular line on the periphery of the
35 lower surface of the plate and of a circular track (20) [sic] provided on the base wall (27) of the chamber (3), having a diameter equal to that of the circular line of alignment of these rollers (24) and formed from an



alternating succession of a number of protuberances (30) and hollows (31) which are angularly spaced, this number being the same number as or a multiple of the number of these rollers (24) of the horizontal plate (20).

- 5 5. Over according to Claim 4, characterised in that the rollers (24) of the horizontal turntable (20) and the circular track (29) intended for the displacement of these rollers are replaced by an equivalent system with cams and with cam followers or with a screw enabling this
- 10 plate (20) to rotate about a vertical axis (21) and to oscillate simultaneously along this axis.

