

SPECIFICATION

Supporting food in microwave ovens

5 This group of inventions relates to apparatus for supporting food to be heated in a cooking cavity of a microwave oven, to microwave ovens having such apparatus, and to a method of heating food in a cooking cavity of a microwave oven.

10 In order to properly cook most foods, it is necessary to heat the foods uniformly. Due to uneven energy distribution in microwave ovens, or conventional ovens for that matter, frequently some portions of a dish may be overcooked while other portions remain uncooked.

15 When cooking with microwave ovens, food is placed in a microwave cavity which is essentially a six-walled box. Microwave energy injected into the box is reflected from the walls in a pattern forming cold spots where the microwave fields are partially cancelled and hot spots where the microwave fields reinforce. The action of the mode stirrer within the box and the location of the hot and cold spots tends to differ between ovens even when the ovens are made in the same production run of a given model because even slight changes in dimensions can affect the location of the cancelling and reinforcing microwave fields.

20 The location of hot and cold spots also changes with the nature of objects placed within the oven. Consequently, changing the food placed in the oven and/or the dish holding the food will shift hot and cold spots. Accordingly, even if the person cooking knows where hot spots are for a given portion of food within a given dish or container, this knowledge will not necessarily help once the food and/or the container are changed. This is readily seen because in order to cook, food must absorb microwave energy reflected within the oven, and different foods having different dimensions will absorb some of the reflected waves and not others. Consequently, in some situations reflected microwave fields may be available for reinforcement whereas in other situations these microwave fields may have been cancelled or absorbed. Containers can have dielectric constants greater than air, thereby changing the effective size of the oven as sensed by the microwave fields by loading the oven with high dielectric constant material and changing the path of microwave fields in the oven by channeling microwave fields through the container instead of through the air.

25 Manufacturers of microwave ovens recognize that non-uniform heating is a problem. Consequently, instructions included with many microwave ovens instruct the users to turn the food at certain intervals which may be, for example, one, two, three or five minutes depending on the nature of the food being cooked. In order to obviate this inconvenience, there are now microwave ovens available with built-in turntables that slowly rotate food being cooked. U.S. Patent 3,182,166 is exemplary of a microwave oven having such a turntable. There are, however, millions of microwave ovens already in the hands of consumers which do not have turntables. Furthermore, for one reason or another, most microwave

ovens which are being manufactured and sold do not have turntables. Accordingly, there is a great need for a turntable which can be purchased as an accessory so as to enhance the convenience and desirability of the microwave ovens currently in use and now being manufactured and sold which do not have built-in turntables.

70 If one is to provide a turntable for use as an accessory for household microwave ovens, there are numerous considerations which must be taken into account in order that the turntable be both beneficial and safe. A primary consideration is that the turntable should be usable in both microwave and conventional ovens. There is a dichotomy here in that materials which one would normally use for constructing a turntable for operation in a conventional oven would not necessarily be compatible with the environment of an operating microwave oven. Ordinarily, conventional ovens have an upper temperature limit of about 260°C (500°F). Accordingly, one would construct the turntable for operation in a conventional oven from materials such as steel or other metals which resist high temperatures. These materials would disrupt the operation of microwave ovens by interfering substantially with microwave patterns within the oven since they are conductors. On the other hand, most materials which are transparent to microwave fields or have a relatively low dielectric constant so as to be compatible with the environment of a microwave oven cannot withstand the 260°C (500°F) temperatures of conventional ovens. Accordingly, there is a need for a turntable which will readily adapt to both types of ovens.

80 U.S. Patents 2,897,746 and 3,177,335 each disclose turntables which are built into conventional ovens. These turntables are not accessories which one can easily add to an oven but are part of the oven structure itself. They are therefore similar in concept to the turntable of U.S. Patent 3,182,166 which is built into a microwave oven. One reason for making the turntables in each of these ovens integral with the oven structure is so that the power for rotating the turntable can be conveniently and safely delivered to the turntable. Note in each case that the power source is a motor positioned outside of the oven enclosure which delivers power to the turntable via a shaft which projects through a wall of the oven enclosure. It is readily seen, that if one has an oven which is not already provided with a drive shaft extending through a wall, these patents offer no suggestions as to how one would equip the oven with a turntable. This problem is especially acute with microwave ovens because the ovens must remain sealed in order to prevent excessive leakage of microwave energy which is a potential health hazard. Accordingly, there is need for some type of self-contained power source which can fit into any oven so as to drive a turntable within the oven without having to be connected in some manner to an outside power supply.

110 U.S. Patent 557,344, issued March 31, 1896, discloses a rotary stand or turntable for baking which is driven by a spring motor, and therefore has a self-contained power source so that it can be placed within an oven without utilizing a power source pro-

jecting through the oven wall. While the device disclosed in this patent may be suitable for conventional ovens, it is not suitable for microwave ovens because it is undoubtedly made of a metal such as steel which, as pointed out above, interferes with the operation of microwave ovens. Accordingly, U.S. Patent 557,344, while appearing to offer a solution to the problem of powering the turntable, presents many additional difficulties which must be contended with in order to provide a turntable suitable for both microwave and conventional ovens.

According to a first invention of the present group of inventions there is provided apparatus for supporting food to be heated in a cooking cavity of a microwave oven, comprising a generally planar base for resting on the floor of an oven cavity so that the apparatus is readily removable from the oven cavity, a generally planar platform rotatively mounted on the base to support food in close proximity to the floor of the oven cavity with no drive motor beneath either the platform or the base, said platform and said base each being formed of a material which is transparent to microwave energy, and a drive motor assembly mounted on the upper side of the base to one side of the platform for rotatively driving the platform, said drive motor assembly being of substantially smaller lateral extent than the platform for location in one corner of the oven cavity.

Conveniently a turntable according to the invention has a shape and dimensions which are suitable for most microwave ovens already sold or being manufactured and sold which are not integrally equipped with turntables.

According to a preferred embodiment of the first invention, the turntable is driven by a spring motor which is easily wound by the average householder and yet can rotate a load of food of up to approximately 6.8 Kg (15 pounds) at a constant speed for sufficient time to cook the food within a microwave or conventional oven. Preferably the turntable which is made of material that is compatible with both the operation of a microwave oven and of a conventional oven wherein the materials are also resistant to chemicals such as detergents which may be used to wash the turntable. Thus, preferably, the turntable comprises a rotatable platform upon which food is placed, the platform being made of a material having a relatively low dielectric constant but which is heat resistant and being driven by the spring motor through a train of gears. The gears composing the train and the spring motor are preferably shielded to prevent entrance of microwave energy therein, except for the final driving gear which is outside the shield and, like the platform, is made of a material which is heat resistant and has a relatively low dielectric constant.

According to a second invention of the present group of inventions there is provided a microwave oven having an apparatus according to the first invention provided in a cooking cavity of the oven, the base of the apparatus resting on the floor of the cooking cavity, the drive motor assembly being located in one corner of the cooking cavity, and the apparatus being readily removable from the cooking cavity.

According to a third invention of the present group of inventions, there is provided in a method of heating food in a cooking cavity of a microwave oven, the steps of placing an apparatus according to the first invention in the cooking cavity with the base resting on the floor of the cavity with the drive motor assembly located in one corner of the cooking cavity, placing food to be heated on the platform, actuating the drive motor assembly to rotate the platform and the food carried thereby, and introducing microwave energy into the cavity while the platform is rotating to heat the food.

Reference is now made to the accompanying drawings which illustrate one embodiment of the invention by way of example, and of which:

FIGURE 1 is a perspective view of a turntable according to the invention;

FIGURE 2 is a top plan view of the turntable shown in FIGURE 1;

FIGURE 3 is a side elevation of a spring motor used to drive the turntable taken along lines 3-3 of FIGURE 2;

FIGURE 4 is a side elevation of the spring motor taken along lines 4-4 of FIGURE 2 showing how the spring motor drives a rotating platform of the turntable;

FIGURE 5 is an elevational view of the spring motor taken along 5-5 of FIGURE 3 and showing the construction of a spring and associated winding drums for the spring motor; and

FIGURE 6 is a top elevational view taken along lines 6-6 of FIGURE 3 showing a gear train which is driven by the spring motor and couples the spring motor to the rotating platform.

Referring now to FIGURE 1 there is shown a turntable designated generally by the numeral 10 which includes a supporting base 11 upon which a rotatable platform 12 and spring motor housing 13 are mounted. The base 11 includes a pair of handles 14 projecting from opposite sides thereof for carrying the turntable.

The turntable 10 is configured as a self-powered accessory which can be purchased separate from and used within most microwave ovens not having a turntable integral therewith. The spring motor within the spring motor housing 13 is wound by a winding knob 20 on the top of the housing, preferably before the turntable is placed in the oven. Upon placing the turntable within an oven and starting operation of the motor, the oven door may be closed without any portion of the accessory extending outside of the oven. This is extremely important with microwave ovens in order to avoid excessive leakage of microwave energy out of the oven so as to expose people to the energy level which is believed to constitute a health hazard. The spring motor is a relatively large concern and therefore can alter the microwave pattern within the oven. Accordingly, the turntable 10 positions the spring motor off to the side of the rotatable platform 12 instead of beneath the platform. Consequently, the spring motor will be positioned adjacent to an inner wall or corner of the oven where its adverse effect on the microwave pattern is minimized.

In order to minimize the effect of the turntable on

the environment of microwave ovens, the base 11, platform 12, housing 13 and knob 20 are made of a non-metallic, non-conductive material which has a low loss tangent at microwave frequencies and can withstand temperatures of approximately 260°C (500°F) should the turntable also be used in a conventional oven. One preferred material is a modified thermoset polyester such as used in MICROWAVE cookware developed by the Plastics, Inc., subsidiary of Anchor Hocking Corporation. This material is not only non-microwave interactive and heat resistive but is also resistant to various chemicals and detergents in which cookware and kitchen appliances are frequently washed. This material is further advantageous in that it does not deform when exposed to relatively high heat, such as that encountered in conventional ovens, and therefore retains its mechanical properties so that moving mechanical elements made therefrom will continue to operate in a high heat environment. Furthermore, a modified polyester will readily accept a variety of colors so that turntables made therefrom can have a pleasing appearance which of course enhances their commercial appeal. In essence, the modified polyester is a preferable material because it has a low dielectric constant so that microwave interaction is minimized and has sufficient high heat resistance to withstand prolonged exposure to temperatures approximating 260°C (500°F).

As defined herein, "non-microwave interactive material" means a material which does not substantially affect the microwave fields within the cavity. Such materials typically have a dielectric constant of less than about 4 at the frequency of operation of the oven, i.e., 2450 MHz, and a low loss tangent at microwave frequencies.

Referring now to FIGURE 2 where the turntable 10 is shown in a plan view, it is seen that the rotatable platform 12 is supported on the base 11 by a plurality of spaced ball bearing assemblies 22 and a sleeve bearing assembly 23. Ball bearing assemblies 22 are designed to support a food load of approximately 15 pounds while the sleeve bearing assembly 23 positions the platform 12 on the base 11. Referring now to FIGURE 4 as well as FIGURE 2, it is seen that the platform 12 has outwardly facing gear teeth 25 formed in a downwardly projecting rim 26 which mesh with a final drive gear 27 projecting from the motor housing 13. The drive gear and platform are generally coplanar, and the turntable has a low profile. As is seen in FIGURE 4, the bearing assembly 23 includes an upwardly projecting hollow bore 28 which includes a bearing surface liner 29 that receives an axle 26 projecting from the platform 12. The bearing assembly 23 limits lateral movement of the platform 12 and thus keeps the gear teeth 25 in engagement with the final drive gear 27. If one desires to wash the platform 12 because, for example, food has been spilled on the platform, the platform is simply lifted up vertically off of the ball bearing supports 22 disengaging the axle 26 from the bore 28. Since the platform 12 is made of a material such as a modified polyester, it can be washed with most household cleaners without any ill effects.

Referring now specifically to the ball bearing

assemblies 22, it is seen that each assembly 22 includes a pair of spaced flanges 32 between which inner and outer ball bearing races 36, 37 are mounted, with a plurality of balls 35 between inner and outer races. The inner race 36 is mounted on a radially extending axle 34 while the outer race 37 is in rolling engagement with the platform.

As with other portions of the turntable 10, it is necessary for the bearing assemblies to be made of a microwave compatible material which will not interact with microwaves in a microwave oven and is also heat resistant so as to perform at the 260°C (500°F) temperatures encountered in conventional ovens. It is also necessary for balls 36 to be relatively strong since they support a load while they rotate. Preferably, the balls are made of borosilicate glass, and inner and outer races 36 and 37 respectively are made of a plastic. The plastic must also be a high temperature low dielectric material and may be made from an injection moldable polyamide or polyphenylene sulfide material. Likewise, it is preferable to make the axles 34 of a non-metallic material such as a modified thermoset polyester. By using non-metallic material throughout the bearing assemblies 22, one also eliminates the possibility of arcing between any of these elements and other metal objects which may be placed in microwave ovens.

Referring now to the sleeve bearing assembly 23, it is also desirable to make all elements of the sleeve assembly from microwave compatible, heat resistant materials. The bore 28 and axle 26 are integral with the base 11 and rotatable platform 12, respectively, and are made of a material such as a modified polyester.

However, the insert 29 should be made of a material which is of relatively low friction as well as being microwave compatible and heat resistant. A suggested material is Rulon (Registered Trade Mark) sold by the Dixon Corporation which is a fiberglass reinforced PTFE (Teflon) (Registered Trade Mark). An alternative material for the sleeve bearing could be an injection moldable polyamide compounded with a PTFE filler for lubricity reasons.

As is seen in FIGURES 2-6, the final drive gear 27 projects out of the housing 13 and is therefore not shielded by the housing 13. Accordingly, the gear 27 is made of a microwave compatible heat resistant material such as a modified polyester or polyphenylene sulfide and is connected to a gear train 40 within the housing via a shaft 41. The gear train 40 is in turn connected to a spring motor 42 via a shaft 43.

Since the spring motor 42 and gear train 40 are made of a metallic material, they should be shielded from the microwave fields in the oven. This is accomplished by mounting the motor 42 and the gear train 40 within a metallic enclosure 45 that is heat resistant and reflects microwave fields. The outside of the enclosure is covered with a layer of electrical insulation to reduce arcing to the shield. As is seen in FIGURE 3, the shaft 41 of the final drive gear 27 and a shaft 47 from the winding knob 20 project into the housing 13 and shielding enclosure 45 through cut-off tubes 48 and 49 respectively. The

winding tubes 48 and 49 are cut-off tubes in that they are smaller in diameter than the smallest diameter that will propagate microwave fields at the frequency of operation of the oven. The cut-off tubes 48 and 49 leak a small amount of energy by a principle other than propagation and the amount of leakage is a function of the microwave frequency, and dielectric material inside the tube, the diameter of the tube and the length of the tube. In any event, the cut-off tubes which are integral with shielding enclosure 45 prevent microwave energy within the oven from becoming involved with the motor 42 and the gear train 40.

In order to perform satisfactorily as a turntable within a microwave oven, the turntable 10 should, for example, be able to rotate a 6.8 kg (15 pound) load for approximately one-half hour at a rate of about 0.6 revolution per minute. The winding force required by the motor should not be so great that the average householder would have difficulty rotating the winding knob 20. A motor providing about 0.57 Nm (5 inch pounds) of torque should be able to provide sufficient output to rotate the desired load, at the desired speed.

The motor 42 is preferably a constant torque spring motor which utilizes a take-up drum 50 and an output drum 51. The output drum 51 has an upper "input" opening 52 which is square in cross section and receives the square shank of a shaft 47 connected to a knob 20 and a lower "output" opening 53 which is also square in cross section and receives the square shank of the shaft 43 connected to gear train 40. Accordingly, rotation of the winding knob 20 will rotate the drum 51 and rotation of the drum 51 rotates the shaft 43. A stainless steel spring 56 is anchored to the drum 51 and freely coiled about the take-up drum 50 which is itself freely rotatable about an axle 57. As the winding knob 20 is turned so as to rotate the drum 51 clockwise in FIGURE 5 the coil spring 56 is progressively transferred from take-up drum 50 to the output drum 51. As the coil spring 56 is transferred, it is first pulled straight as it traverses the space between the drums and is wrapped backwards counter to its relaxed configuration around the output drum. Upon releasing the output drum by disengaging a detent as will be explained hereinafter, the coil spring 56 rewinds around the take-up drum and while so doing applies a substantially tangential force to the output drum 51 so as to rotate the output drum. In order to prevent over travel of the spring 56 on either the take-up drum 50 or the output drum 51, a pawl 58 is urged by the torsion spring 59 through a slot 60 near the end of the spring 56 to engage a shoulder 61 beneath the winding surface 62 of the output drum. As the spring 56 is wound on the output drum 51 and pawl 58 is cammed out of the slot 60 in the spring 56 by a cam 64 and thereafter rests on top of the spring 56. When the spring 56 is completely unwound, the pawl 58 drops back into engagement with the shoulder 61. Take-up drum 50 is likewise equipped with a pawl 58' urged by a torsion spring 59' through a slot 60' in the spring 56 to engage a shoulder 61' beneath the winding surface onto the take-up reel 50. As the spring 56 is recoiled onto the take-up reel 50, the

pawl 58' is cammed out of the slot 60'.

By mounting the idler gears 66 and 71 so as to move in the slots 68 and 69, the idler gear 71 disengages from output gear 72 when the drive gear 65 is rotated in the clockwise direction upon winding the spring 56 on the drum 51. This is because the shaft 67 is moved to the top of the slot 69 (as seen in FIGURE 6) so that the teeth on gear 71 are spaced from the teeth on gear 72. Upon releasing the gearing for rotation as the spring 56 unwinds, the drum 51 and drive gear 65 rotate in the counterclockwise direction which urges the idler gears 66 and 71 downwardly and moves the shaft 67 to the bottom of the slot 69 (as seen in FIGURE 6). This causes the gear 71 to mesh with output gear 72 so as to drive final drive gear 27.

In order to control the rate at which the gear train transmits torque from the spring motor 42 to the platform 12, the gear train 40 is equipped with a governor which acts directly on the output shaft 41 through a gear 75 which is coaxial with output gear 72 and rigidly connected to the output shaft 41. The gear 75 meshes with an idler gear 76 that in turn is rigidly coaxial with a gear 77 meshed with idler gear 78. The idler gear 78 meshes with a star wheel gear 79 (see FIGURE 4) which is rigidly coaxial with a star wheel 80. As the star wheel 80 rotates it engages a governor plate 85 which is mounted on a shaft 86 and rocks back and forth between the solid line position and the dotted line position. The rate at which the governor plate 85 rocks depends upon the length and mass of the governor plate as well as the torque imparted to the governor plate by the star wheel 80. The rate at which plate 85 oscillates therefore determines the rate at which the star wheel 80 rotates and thus the rate at which output shaft 41 which drives the gear 27 rotates. In essence, the star wheel and governor plate form an escapement which operates in a fashion somewhat similar to the escapement used in spring powered timepieces.

In order to hold the spring motor 42 in its wound mode so that it can be released to drive the platform 12 at a convenient time, a rotary on-off switch 90 is provided. The on-off switch 90 is mounted on a rotary shaft 91 which has a cam 92 thereon which engages one leg 93 of a torsion spring 94 that has a second leg 95 engaged with a boss 96 projecting from the bottom plate 70 of the shielding enclosure 45. The leg 93 of the torsion spring 94 passes through a slot 97 in the governor plate 85. In the on position, which is shown in FIGURE 6, cam 92 positions the leg 93 so that it does not engage the edge of the slot 97 in the governor 85 thereby allowing the governor 85 to rock or oscillate back and forth. In the off position, the cam 92 releases the leg 93 of the torsion spring 94 so that the leg bears against the edge of the slot 97 thereby preventing the governor plate 85 from locking about its axis which coincides with shaft 86. In essence, when the governor plate 85 is free to move under the influence of star wheel 80, the wound spring 56 is free to transmit torque through output shaft 41 to the rotary platform 12 via the final drive gear 27.

In order for the motor 51 to deliver the requisite torque for the desired period of time, the gear train

40 is destined with ratio from the motor output shaft 43 to the gear train output shaft 41 of approximately 2.95-2.97 to 1. The torque on the output shaft 41 is the inverse of this ratio or is approximately 0.57 Nm (5 inch pounds) divided by 2.97 or approximately 0.19 Nm (1.7 inch pounds). Since the rotation of drum 51 is limited by the governor plate 85 to approximately one revolution per minute, the final drive gear 27 rotates at approximately three revolutions per minute. In order to rotate the rotary platform at approximately 0.6 revolutions per minute, the rotary platform will have a diameter approximately five times that of final drive gear 27.

In order to achieve these rotational speeds, the star wheel rotates at a speed in approximately the range of 160:1 with respect to the drum 51 and its associated shaft 43 and drive gear 65. This results with a torque at the star wheel of approximately 1/160th of 0.57 Nm (5 inch pounds) or approximately 3.5 Nmm (0.03 inch pounds) which is sufficiently low to minimize wear in the gear train 40 as well as on the governor plate 85.

Since the gears comprising the gear train 40 are within the shielded enclosure 45, they may be made of any convenient material. A preferable material for the gearing is powdered metal which is relatively inexpensive to produce and wears well. The governor plate 85 is preferably made of stainless steel or another metal such as steel plated with a corrosion resistant material.

While a preferred embodiment of the turntable according to the invention is usable in both microwave ovens and conventional ovens, it is also within the scope of this invention to provide a turntable 10 which is made of materials that are compatible with microwave ovens but cannot withstand the temperature of conventional ovens. In this limited embodiment, the plastics used for construction of the platform 12, base 11 and other portions of the turntable 10 need only to have a relatively low dielectric constant so as to not interact with microwave patterns within the oven but need not be particularly temperature resistant. Suitable materials for this particular limited use include polysulfone, thermoplastic polyesters, polypropylene, polycarbonate, polystyrene, acrylonitrile butadiene styrene, polyphenylene oxide, acrylic, and polyethylene.

CLAIMS

1. Apparatus for supporting food to be heated in a cooking cavity of a microwave oven, comprising a generally planar base for resting on the floor of an oven cavity so that the apparatus is readily removable from the oven cavity, a generally planar platform rotatively mounted on the base to support food in close proximity to the floor of the oven cavity with no drive motor beneath either the platform or the base, said platform and said base each being formed of a material which is transparent to microwave energy, and a drive motor assembly mounted on the upper side of the base to one side of the platform for rotatively driving the platform, said drive motor assembly being of substantially smaller lateral extent than the platform for location in one corner of the oven cavity.

2. Apparatus as claimed in claim 1, wherein the

drive motor assembly is mounted in an enclosure which is reflective to microwave radiation.

3. Apparatus as claimed in claim 2, further including a layer of electrically insulative materials outside the enclosure for reducing arcing from the reflective enclosure.

4. Apparatus as claimed in claim 2 or 3, wherein the drive motor assembly includes an output shaft which extends through a microwave attenuating passageway in one wall of the enclosure, together with a peripheral ring of outwardly facing gear teeth carried by the platform and a drive gear mounted on the shaft outside the enclosure in driving engagement with the gear teeth.

5. Apparatus as claimed in any of claims 2 to 4 wherein the drive motor assembly includes an on/off switch operable externally of the enclosure.

6. Apparatus according to any of the preceding claims, wherein the platform is mounted on the base by means of a central axle and a plurality of bearings spaced peripherally about the platform between the platform and the base.

7. Apparatus as claimed in any of the preceding claims, wherein the drive motor assembly includes a spring-operated motor.

8. Apparatus as claimed in any preceding claim, wherein the base and platform are fabricated of a material capable of withstanding temperatures of the order of 260°C (500°F) so that they can be used in a conventional oven as well as in a microwave oven.

9. Apparatus for supporting food to be heated in a cooking cavity of a microwave oven, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

10. A microwave oven having an apparatus as claimed in any of the preceding claims provided in a cooking cavity of the oven, the base of the apparatus resting on the floor of the cooking cavity, the drive motor assembly being located in one corner of the cooking cavity, and the apparatus being readily removable from the cooking cavity.

11. In a method of heating food in a cooking cavity of a microwave oven, the steps of placing an apparatus as claimed in any of claims 1 to 9 in the cooking cavity with the base resting on the floor of the cavity and with the drive motor assembly located in one corner of the cooking cavity, placing food to be heated on the platform, actuating the drive motor assembly to rotate the platform and the food carried thereby, and introducing microwave energy into the cavity while the platform is rotating to heat the food.

12. A method of heating food in a cooking cavity of a microwave oven, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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While a preferred embodiment of the turntable according to the invention is usable in both microwave ovens and conventional ovens, it is also within the scope of this invention to provide a turntable 10 which is made of materials that are compatible with microwave ovens but cannot withstand the temperature of conventional ovens. In this limited embodiment, the plastics used for construction of the platform 12, base 11 and other portions of the turntable 10 need only to have a relatively low dielectric constant so as to not interact with microwave patterns within the oven but need not be particularly temperature resistant. Suitable materials for this particular limited use include polysulfone, thermoplastic polyesters, polypropylene, polycarbonate, polystyrene, acrylonitrile butadiene styrene, polyphenylene oxide, acrylic, and polyethylene.

CLAIMS

1. Apparatus for supporting food to be heated in a cooking cavity of a microwave oven, comprising a generally planar base for resting on the floor of an oven cavity so that the apparatus is readily removable from the oven cavity, a generally planar platform rotatively mounted on the base to support food in close proximity to the floor of the oven cavity with no drive motor beneath either the platform or the base, said platform and said base each being formed of a material which is transparent to microwave energy, and a drive motor assembly mounted on the upper side of the base to one side of the platform for rotatively driving the platform, said drive motor assembly being of substantially smaller lateral extent than the platform for location in one corner of the oven cavity.

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drive motor assembly is mounted in an enclosure which is reflective to microwave radiation.

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4. Apparatus as claimed in claim 2 or 3, wherein the drive motor assembly includes an output shaft which extends through a microwave attenuating passageway in one wall of the enclosure, together with a peripheral ring of outwardly facing gear teeth carried by the platform and a drive gear mounted on the shaft outside the enclosure in driving engagement with the gear teeth.

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6. Apparatus according to any of the preceding claims, wherein the platform is mounted on the base by means of a central axle and a plurality of bearings spaced peripherally about the platform between the platform and the base.

7. Apparatus as claimed in any of the preceding claims, wherein the drive motor assembly includes a spring-operated motor.

8. Apparatus as claimed in any preceding claim, wherein the base and platform are fabricated of a material capable of withstanding temperatures of the order of 260°C (500°F) so that they can be used in a conventional oven as well as in a microwave oven.

9. Apparatus for supporting food to be heated in a cooking cavity of a microwave oven, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

10. A microwave oven having an apparatus as claimed in any of the preceding claims provided in a cooking cavity of the oven, the base of the apparatus resting on the floor of the cooking cavity, the drive motor assembly being located in one corner of the cooking cavity, and the apparatus being readily removable from the cooking cavity.

11. In a method of heating food in a cooking cavity of a microwave oven, the steps of placing an apparatus as claimed in any of claims 1 to 9 in the cooking cavity with the base resting on the floor of the cavity and with the drive motor assembly located in one corner of the cooking cavity, placing food to be heated on the platform, actuating the drive motor assembly to rotate the platform and the food carried thereby, and introducing microwave energy into the cavity while the platform is rotating to heat the food.

12. A method of heating food in a cooking cavity of a microwave oven, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.