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3,461,260

MICROWAVE OVEN

Filed May 16, 1966

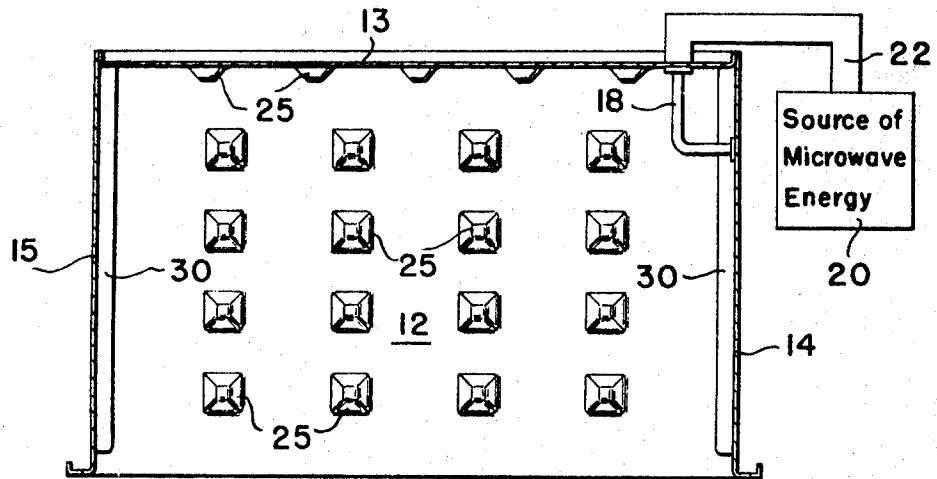


Fig. 3

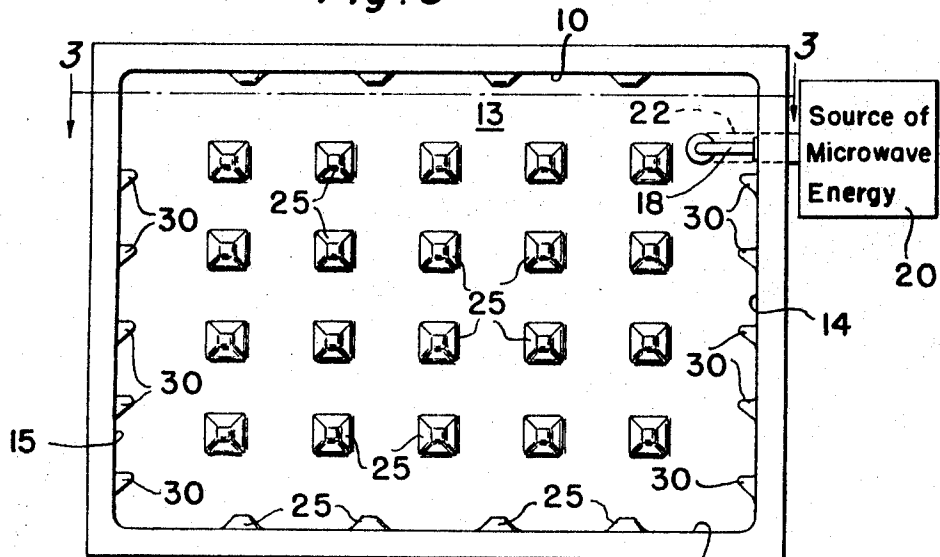


Fig. 2

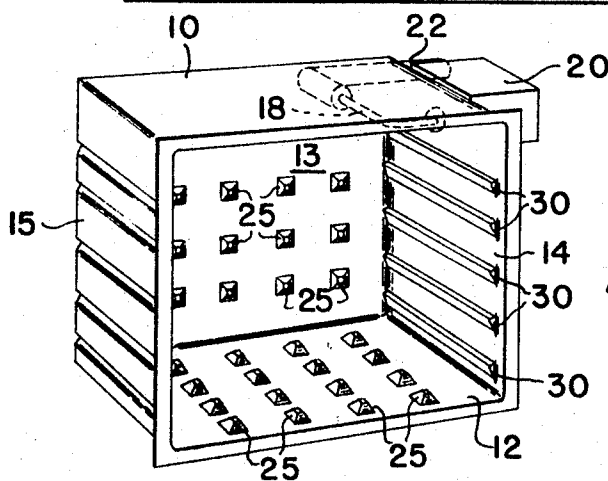


Fig. 1

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3,461,260

MICROWAVE OVEN

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2 Claims

ABSTRACT OF THE DISCLOSURE

A microwave oven enclosure comprising top, bottom, rear and side wall members of electro-conductive material defining a cavity adapted to receive a body to be heated by microwave energy introduced into the cavity. A plurality of microwave energy reflective protuberances are arranged to project into the cavity for the purpose of varying the mode pattern of the microwave energy introduced into the cavity.

The present invention relates to microwave ovens and, more specifically, to microwave ovens having static means for diffusing the microwave energy within the oven.

The major problem encountered in microwave ovens is the uneven distribution of the microwave energy within the oven which results in uneven distribution of heat through any body placed within the oven to be heated. This uneven distribution is a result of standing wave patterns set up in the oven enclosure which sustain minimum and maximum points of field intensity which cause the portions of the body in the more intense field regions to be heated more than the portions of the body in the minimum field intensity regions.

In the past, to obtain or produce an even distribution of the microwave energy throughout the oven cavity, devices such as rotating fan blades or reflectors, sometimes termed "mode mixers," have been employed to aid in the diffusion of the microwave energy throughout the oven cavity. Other methods of obtaining an even heat distribution have been to place the object or objects to be heated upon rotating tables which, in theory, revolve the objects through the maximum and minimum areas of energy distribution, thereby providing for even heating throughout.

All of these methods require additional moving parts which are undesirable from the standpoint of maintenance and cleaning.

It is, therefore, an object of this invention to provide an improved microwave oven.

It is another object of this invention to provide an improved microwave oven having static means for diffusing the microwave energy throughout the oven cavity.

In accordance with this invention, an improved microwave oven is provided wherein the microwave energy is diffused throughout the oven cavity by reflection from a plurality of microwave energy reflective protuberances projecting into the cavity.

For a better understanding of the present invention, together with additional objects, advantages and features thereof, reference is made to the following description and accompanying drawing in which:

FIGURE 1 is a perspective view of a microwave oven including the features of this invention,

FIGURE 2 is a front view of FIGURE 1, and

FIGURE 3 is a section view of FIGURE 2 taken along line 3—3 and looking in the direction of the arrows.

Throughout the several views, like elements have been given like characters of reference.

Referring to FIGURE 1 of the drawing, the microwave oven embodying the features of this invention com-

prises an enclosure having top 10, bottom 12, rear 13 and side wall 14 and 15 members of electroconductive material defining a cavity adapted to receive a body to be heated. The top, bottom, rear and side wall members may be of any suitable electroconductive material such as chrome plated steel.

To introduce microwave energy into the cavity, a microwave antenna, comprising an L-shaped rod 18 of conductive material, extending through rear wall member 13 and connected to side wall member 14 may be employed. Microwave energy is supplied to antenna 18 from a source of microwave energy which, since it may be any suitable microwave frequency electrical oscillator, has been shown in block form in the drawing and referenced by the numeral 20. Microwave energy is transmitted from generator 20 to the antenna member 18 through a suitable microwave energy transmission system 22.

To vary the mode pattern of the microwave energy within the cavity, a plurality of microwave energy reflective protuberances which project from the surface of either the top member 10, the bottom member 12 or rear wall member 13 or any combination of top, bottom or rear wall members, into the cavity may be employed.

In the figures, these microwave energy reflective protuberances are shown to be of the shape of the frustum of a pyramid, some of which are referenced by the numeral 25. However, it is to be specifically understood that alternate shapes which provide a plurality of microwave energy reflective surfaces may be employed without departing from the spirit of the invention.

The microwave energy introduced into the cavity through antenna 18 strikes the microwave energy reflective surfaces of the protuberances. As these reflective surfaces lie in different planes, the microwave energy reflected therefrom is diffused throughout the cavity to provide an even distribution of the microwave energy within the cavity.

These microwave energy reflective protuberances may be stamped into the top, bottom or rear wall members provided these members are made of a microwave reflective material. Alternately, the microwave energy reflective protuberances may be discrete members of microwave energy reflective material secured to the surfaces of the top, bottom or rear wall members.

Some applications may require that these microwave reflective protuberances be located only on the rear wall member, or only on the bottom member or only on the top member or, perhaps, on a combination of only two members. Although the microwave reflective protuberances are shown in the drawing to be arranged in columns and rows, it is to be specifically understood that these protuberances may be randomly located.

To provide a method for supporting racks within the oven cavity and also to provide for some diffusion of the microwave energy within the cavity, a plurality of parallel side rails 30 of microwave energy reflective material which extend from the front to the rear along each of side wall members 14 and 15 are projecting into the cavity, may be provided.

While specific shapes and arrangements have been set forth in the description of the novel microwave diffusing method of this invention, it is to be specifically understood that alternate shaped protuberances providing a plurality of reflective surfaces in different planes made of any microwave reflective material and arranged in any pattern or at random over the surfaces of either the rear wall member, the bottom member, the top member, or any combination thereof, or over the surfaces of the side wall members may be employed without departing from the spirit of the invention.

While a preferred embodiment of the present invention has been shown and described, it will be obvious to those skilled in the art that various modifications and substitutions may be made without departing from the spirit of the invention which is to be limited only within the scope of the appended claims.

What is claimed is as follows:

1. A microwave oven comprising, an enclosure having at least top, bottom, rear and side wall members of electroconductive material defining a cavity adapted to receive a body to be heated, means for introducing microwave energy into said cavity and a plurality of microwave energy reflective protuberances of the shape of a frustum of a pyramid projecting into said cavity from the surface of said members comprising said top, said bottom and said rear wall for varying the mode pattern of said microwave energy within said cavity.

2. A microwave oven comprising, an enclosure having at least top, bottom, rear and side wall members of electroconductive material defining a cavity adapted to receive a body to be heated, means for introducing microwave energy into said cavity, a plurality of parallel side rails of microwave energy reflective material extending front to rear along each of said side wall members and

projecting into said cavity and a plurality of microwave energy reflective protuberances of the shape of a frustum of a pyramid projecting into said cavity from the surface of said members comprising said top, said bottom and said rear wall for varying the mode pattern of said microwave energy within said cavity.

References Cited

UNITED STATES PATENTS

3,172,987	3/1965	Fitzmayer	219—10.55
3,321,605	5/1967	Reker	219—10.55
2,577,619	12/1951	Kock	343—753
3,099,836	7/1963	Carr	343—753
3,209,112	9/1965	Johnson	219—10.55

FOREIGN PATENTS

721,823 11/1965 Canada.

OTHER REFERENCES

German printed application, 1,180,468, October 1969.

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