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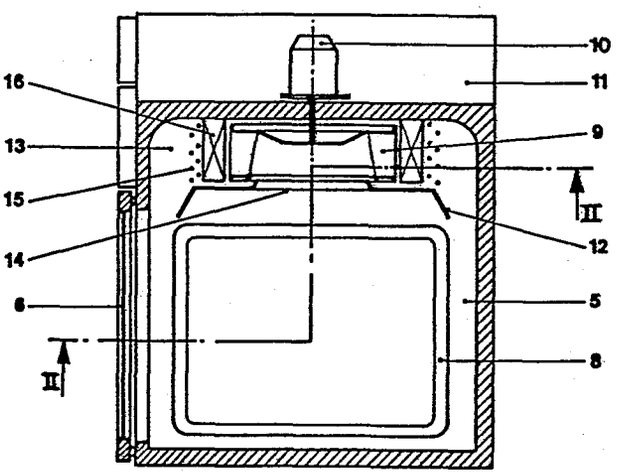
## (54) Forced convection oven.

(57) A forced convection oven has a cooking chamber (5) enclosing a motor-driven fan (9, 10) mounted adjacent a wall thereof and surrounded by heater elements (15) for heating air flowing towards the cooking chamber.

According to the invention, a circular diffusor (16) having numerous blades (17) of curvilinear shape is disposed between the fan (9) and the heater elements (15). Diffusor (16) is effective to deflect the air escaping from fan (9) to substantially radial directions with respect to the fan axis, and to reduce the air outflow velocity, resulting in a more uniform temperature distribution within the cooking chamber.

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# Forced Convection Oven

## Description

The present invention relates to a forced convection oven, particularly for community kitchens and the like, provided with means for ensuring uniform distribution of the heat in the interior of a cooking chamber and for thus improving the uniformity of the cooking condition of foods in the cooking chamber.

As generally known, uniform cooking of foods in this type of an oven presents certain difficulties due to the fact that the heated air circulated by a motor-driven fan mounted adjacent one wall of the cooking chamber flows to the various zones in the cooking chambers at different speeds.

In addition, and in particular in the case of community kitchen ovens containing a plurality of shelves for disposing food containers thereon, the heated air tends to circulate along preferential paths, resulting in the heat accumulating in specific zones.

For reasons relating to the dimensions and to the utility of an oven of this type, it is frequently preferred to install the motor-driven fan adjacent a lateral wall of the cooking chamber instead of adjacent the rear wall thereof. Also to be kept in mind is the advisability of providing a transparent door (usually of a heat-resistant glass) which permits the cooking process to be observed without having to open the door with the resultant considerable loss of heat and danger to the operator.

There have already been proposed various solutions for satisfying these apparently contradictory demands.

A first such solution provides for the empirically determined positioning of deflector means in or adjacent an outlet

chamber of the motor-driven fan. This solution permits the motor-driven fan to be positioned laterally and a transparent door to be used, but leads to relatively poor results as regards uniform cooking of the foods. A somewhat superior solution by comparison to the one outlined above consists in locating lateral air distributors in the interior of the cooking chamber. These distributors are in the form of metal sheet members provided with suitably arranged and dimensioned perforations and capable of regulating the air circulation, but permitting the interior of the oven through the closed door only if the motor-driven fan is mounted adjacent the rear wall. A further solution, optionally to be employed in combination with the above mentioned air distributors, provides for the installation of air outlet ducts of variable cross-section for obtaining uniform velocity of the air outflow from the perforations of the distributors. This solution is also subject to the limitations of the preceding solution, and additionally results in a more complicated construction of the oven, as it requires the cooking chamber to be designed with inclined walls.

It is an object of the present invention to provide a forced convection oven having a transparent door permitting the cooking process to be observed from outside, and without restrictions as to the location of the motor-driven fan, which may preferably be installed at a lateral position of the oven. It is particularly intended to provide an oven of the type defined above which is capable of ensuring improved uniformity of the distribution of heat in the interior of the cooking chamber.

These objects are attaiend according to the invention by a forced convection oven, particularly for community kitchens and the like, comprising a cooking chamber and mounted therein a motor-driven fan provided with an air diffusor, this oven being characterized in that said air diffusor is of circular configuration and disposed immediately adjacent

the rotor of said fan, and is provided with a plurality of blades of curvilinear shape for ensuring the outflow of the air towards said cooking chamber in substantially radial directions with respect to the axis of said fan and at a relatively low velocity.

These and other characteristics of the invention will become more clearly evident from the following description, given by way of example with reference to the accompanying drawings, wherein:

fig. 1 shows in diagrammatical representation a horizontal sectional view of an oven according to the invention, and

fig. 2 shows a sectional view of the oven taken along the line II-II in Fig. 1.

The oven shown in figs. 1 and 2 of the drawings comprises a cooking chamber 5 having an access opening closed by a transparent door 6 and located at the front of the oven.

Provided within cooking chamber 5 is an arrangement of rails 7 for carrying a number of shelves 8 adapted to have containers for the foods to be cooked placed thereon.

Also within cooking chamber 5 and mounted adjacent a lateral wall thereof is a fan 9 driven by an electric motor 10, the latter being housed in a lateral housing portion 11 and operatively connected to fan 9 through a shaft extending through the respective lateral wall of the cooking chamber. Mounted between fan 9 and shelves 8 is a partition 12 formed with bent edge portions so as to define an air outlet duct leading towards the cooking chamber. Partition 12 is further formed with a circular central opening 14 for the return of the air from the cooking chamber to the fan. Disposed around fan 9 are electric resistance heaters 15 for heating the air supplied to the cooking chamber. According to the invention, a circular diffusor 16 having a plurality of blades 17 of

curvilinear shape is disposed between fan 9 and resistance heaters 15.

The number and the shape of blades 17 are determined as a function of the characteristics of the fan so as to ensure the outflow of the air through passage 13 towards the cooking chamber in substantially radial directions with respect to the axis of fan 9 and at a relatively low velocity.

By way of example it has been calculated that the outflow velocity of the air from fan 9 may for instance be 30 to 40 m/sec, while the outflow velocity from diffusor 16 is reduced by the factor 10, i.e. to about 3 to 4 m/sec.

As generally known, in fact, a fan located at the center of a cooking chamber of rectangular cross-section will circulate the air at considerably different velocities and pressures at the four corners of the outlet chamber due to the prevalently tangential escape of the air from the fan.

This results in considerable differences of the air flow velocity in different zones of the cooking chamber, and thus in non-uniform cooking of the foods.

In contrast thereto, the employ of diffusor 16 in the solution according to the invention results in a reduced air flow velocity and a more uniform pressure distribution in the outlet chamber, so that the air escapes from passage 13 at a uniform velocity, and is distributed within the cooking chamber in such a manner as to ensure more uniform cooking temperatures at all positions on shelves 8.

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# Forced Convection Oven .

## Patent Claims

1. A forced convection oven, particularly for community kitchens and the like, comprising a cooking chamber and mounted therein a motor-driven fan provided with an air diffusor, characterized in that said air diffusor (16) is of circular configuration and disposed immediately adjacent the rotor of said fan (9), and is provided with a plurality of blades (17) of curvilinear shape for ensuring the outflow of the air towards said cooking chamber (5) in substantially radial directions with respect to the axis of said fan (9) and at a relatively low velocity.

2. A forced convection oven according to claim 1, characterized in that said circular diffusor (16) is mounted between said fan rotor (9) and the electric resistance heater elements (15) of said oven.

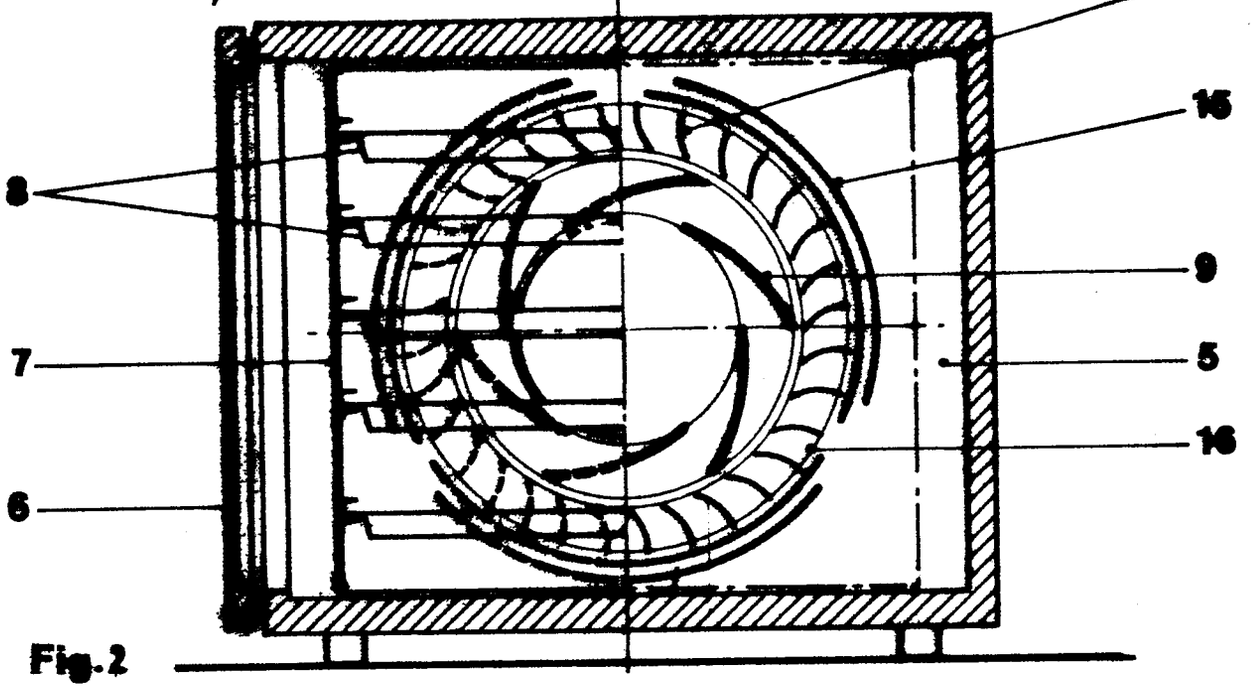


Fig.2

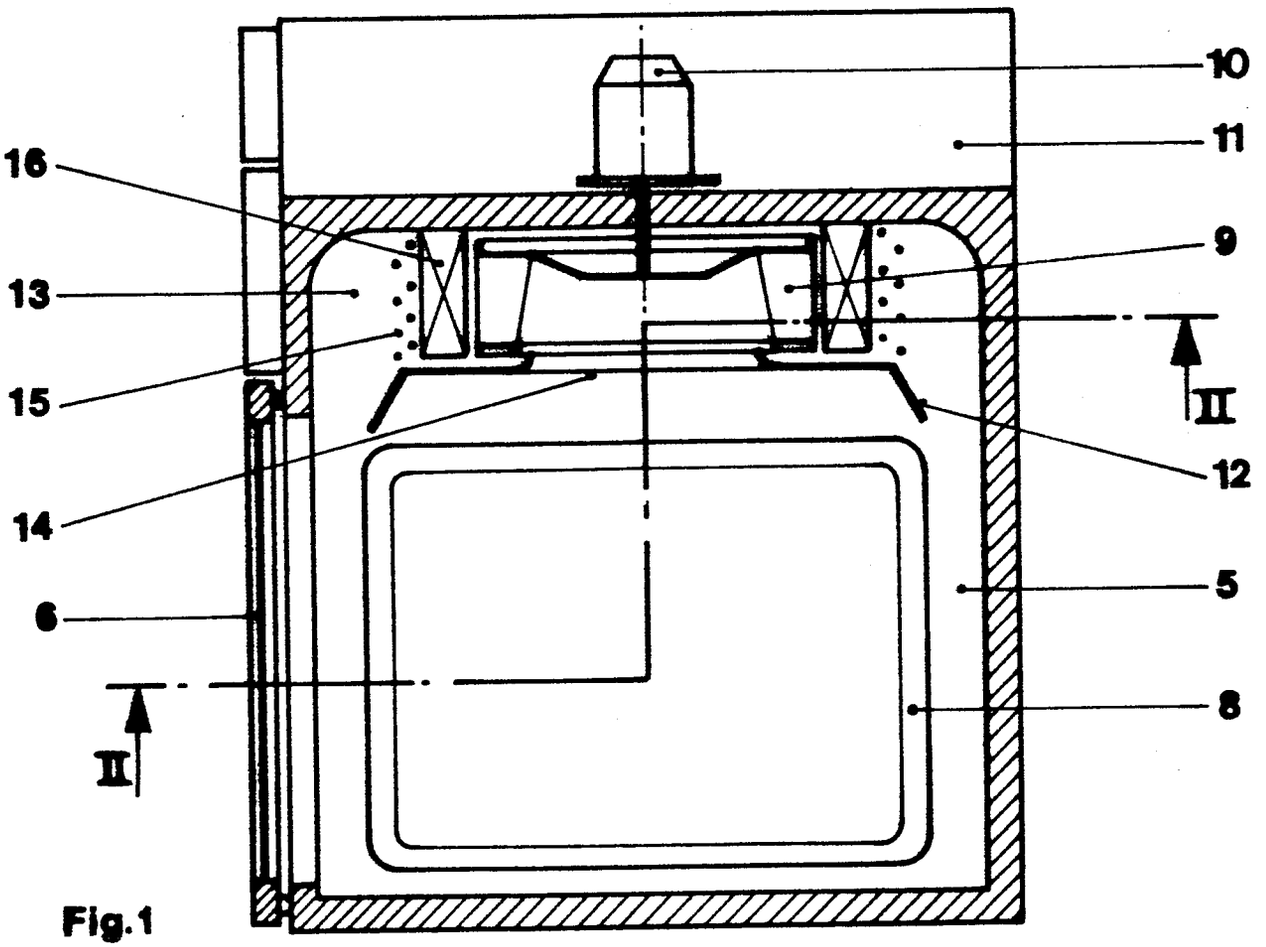


Fig.1