



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 260 771 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.11.2002 Bulletin 2002/48

(51) Int Cl.7: **F24C 15/32**

(21) Application number: **02010716.5**

(22) Date of filing: **14.05.2002**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

- **Zanzani, Walter**
47014 Meldola, Forli/Cesena (IT)
- **Todoli, Silvano**
47100 Forli (IT)
- **Zanetti, Giuliano**
47100 Forli (IT)

(30) Priority: **24.05.2001 IT PN20010018 U**

(71) Applicant: **Electrolux Home Products
Corporation N.V.**
1930 Zaventem (BE)

(74) Representative: **Giugni, Valter**
PROPRIA S.r.l.,
Via Mazzini 13
33170 Pordenone (IT)

(72) Inventors:
• **Milanesi, Giuseppe**
47100 Forli (IT)

(54) Cooking oven with anti-condensation ventilation apertures

(57) Cooking oven comprising a muffle or cooking cavity (10), which is provided with a front door (11) for tightly closing it.

The cooking cavity (10) is associated with a hollow space or jacket (14) which is in a communicating relationship with the interior of the cooking cavity, and through which a natural closed-loop circulation of vapour takes place when the oven is operating.

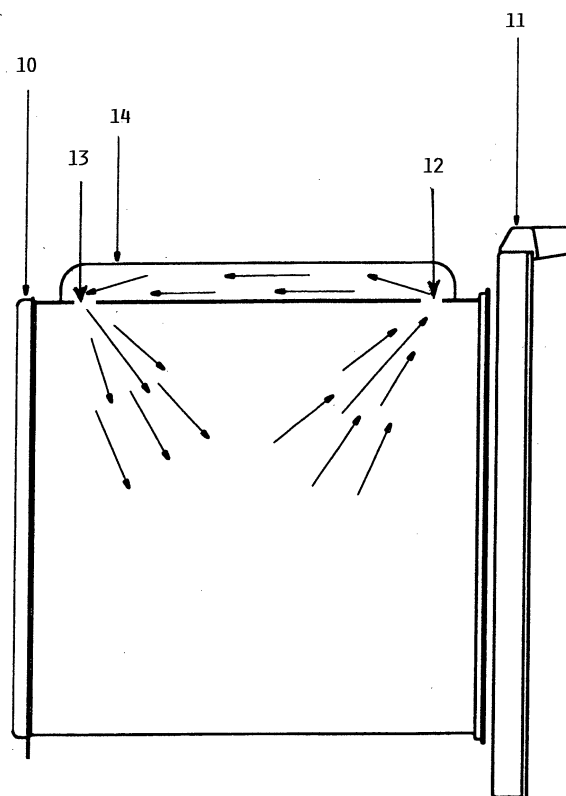


FIG. 1

EP 1 260 771 A1

Description

[0001] The present invention refers to a cooking oven, in particular of the kind intended for use in association with household-type cookers, featuring an innovative design concept in view of doing away with all problems encountered in the use of such appliances owing to condensate forming during the operation of the oven.

[0002] Cooking ovens that are adapted to carry out both traditional and forced-convection, i.e. fan-assisted cooking processes are known since quite a long time now.

[0003] These ovens are usually made of a sheet-metal material and comprise a muffle, or cooking cavity, inside and outside which there are arranged a number of functional component parts, such as electric heating elements, insulation materials, lighting lamps, fans, sealing gaskets, and the like. The front access or loading aperture of such ovens is adapted to be tightly closed by a door, which is generally is a glazed door provided with an outside handle and sealing gaskets arranged all along the peripheral edges thereof, and hinged on to the lower edge of said front aperture of the cooking cavity.

[0004] A major drawback that is generally encountered in such cooking ovens during the operation thereof is brought about by the generation of hot vapours which, by condensing on to the cold surfaces, in particular the glass panes of the door, give rise to misting effects, which prevent the interior of the cooking cavity from being properly viewed from the outside, as well as to the formation of water which, when the oven door is opened, can disadvantageously drip both inside and outside the same oven. Further to these practical drawbacks, real risky situations for the user can be triggered when, upon opening the oven door, a relatively large amount of steam at a rather high temperature is suddenly discharged outside.

[0005] In view of finding a solution to this kind of problems, it has been suggested (Italian patent no. 1 234 821) that the cooking vapours be exhausted from the oven by drawing them out through appropriate apertures provided in a wall of the cooking cavity, and forcing them into the outside atmosphere by means of a fan and the related conduit provided to oven cooling purposes. This solution, however, causes both the oven manufacturing costs and the oven operating costs to increase significantly owing to an additional dynamic component part having to be specially used and, on the other hand, such an additional dynamic component part, i.e. the fan, using electric energy in its operation.

[0006] It therefore is a purpose of the present invention to provide a cooking oven, in particular for home use, which is capable of doing away with the above cited condensation problems in an effective manner and using definitely simpler means, while at the same time improving the functionality of the same oven.

[0007] According to the present invention, this aim is reached in a cooking oven comprising a muffle, or cook-

ing cavity, which is provided with a front door for tightly closing it, characterized in that a sealed hollow jacket is applied on to the outer surface of at least a wall of said muffle or cooking cavity of the oven, and said hollow jacket is in a communicating relationship with the interior of the cooking cavity via at least two apertures provided in said wall, and spaced from each other, in such a manner as to bring about a closed-loop circulation of vapour between said jacket and said cooking cavity.

[0008] Features and advantages of the present invention will be more readily understood from the description of an embodiment thereof that is given below by way of non-limiting example with reference to the accompanying drawings, in which:

- Figure 1 is a schematic, simplified sectional view along a vertical plane of a cooking oven made on the basis of the present invention;
- Figure 2 is a schematic, perspective view of the muffle or cooking cavity of the oven shown in Figure 1; and
- Figures 3A-3E are views of some embodiments of a detail of the oven shown in Figure 1.

[0009] A cooking oven according to the present invention (Figure 1) substantially comprises a muffle 10, which is generally made of enamel-coated sheet-metal, and which defines a cavity whose front aperture is closed by a door 11.

[0010] According to the present invention, the upper wall of said muffle or cooking cavity 10 is provided with two apertures 12 and 13 (Figure 2), which arranged spaced, i.e. at a distance from each other and, preferably, in mutually opposed positions with respect to a central plane of the oven muffle. These apertures enable the interior of the muffle to communicate with an outer hollow jacket 14 that substantially covers the whole surface of the wall.

[0011] It has been found and confirmed experimentally that, when the oven is operating and vapours are generated from the food being cooked, a natural circulation of vapour sets in, according to a closed-loop pattern, between the cooking cavity 10 and the hollow jacket 14. The vapour exits the cooking cavity 10 through the aperture 12 and, upon filling up the entire hollow jacket 14, flows back into the cooking cavity 10 via the aperture 13. Such a natural circulation is brought about by the fact that the value of the pressure is not the same throughout the interior of the cooking cavity. Such a lack of homogeneity depends not only on the kind of foods being cooked, but also on a number of other factors, such as the size and the arrangement of the food items on the related cooking supports, the form of the cooking supports themselves, the frequency or mode of opening of the door 11, and the like.

[0012] It is important to notice that, while passing into

and flowing through the interior of the hollow jacket 14, the temperature of the vapour decreases, but not to such an extent as to cause it to condensate. In fact, the inner wall of the hollow jacket 14 is formed by the corresponding wall of the cooking cavity 10, so that it is quite hot.

[0013] The hollow jacket 14 may be applied on to any wall of the oven muffle, but is preferably associated to the upper wall thereof. Furthermore, the hollow jacket may be made in any of a number of different forms, i.e. in a curved form (Figure 3A), in the form of rectilinear segments (Figure 3B), in a box-like form (Figure 3C), in the form of a double superposed chamber (Figure 3D), or in the form of a curvilinear conduit (Figure 3E).

[0014] The advantages of the solution according to the present invention are manifold, i.e.:

- a reduction in both energy usage of the oven and cooking time, since the vapour is circulated within the cooking cavity throughout the entire cooking process, thereby maintaining its whole thermal capacity inside the same cooking cavity;
- an improvement in the quality of those cooking operations which usually require the presence of vapour within the cooking cavity;
- elimination of various construction and design restraints, owing to the fact that there is no longer a need for the oven to be specially provided with either proper conduits to exhaust vapours outside or proper guarding means for preventing the various parts on the front side of the oven from overheating;
- a rationalization in the manufacturing process, considering that the hollow jacket may be directly designed and manufactured as an integral part of the oven muffle;
- elimination of such a dynamic component part as a fan;
- finally, oven cleaning is noticeably facilitated, since the circulation of the vapour opposes a deposit of fat onto the walls of the cooking cavity.

wall and arranged at a distance from each other.

2. Cooking oven according to claim 1, **characterized in that** a natural circulation of vapour sets in in a closed-loop pattern when the oven is operating.
3. Cooking oven according to claim 1 or 2, **characterized in that** said apertures (12, 13) are provided in the upper wall of said muffle or cooking cavity of the oven.
4. Cooking oven according to any of the claims 1 to 3, **characterized in that** said hollow jacket (14) extends to cover the whole surface of the wall of said muffle or cooking cavity of the oven.
5. Cooking oven according to any of the claims 1 to 3, **characterized in that** said hollow jacket (14) is shaped in the form of a conduit connecting said two apertures (12, 13) in the wall of the muffle or cooking cavity of the oven with each other.

Claims

1. Cooking oven, in particular of the kind intended for home use, comprising a muffle or cooking cavity (10), which is provided with a front door (11) for tightly closing it, **characterized in that** a sealed hollow space or jacket (14) is applied on to the outer surface of at least a wall of said muffle or cooking cavity and said hollow jacket is in a communicating relationship with the interior of the cooking cavity via at least two apertures (12, 13) provided in said

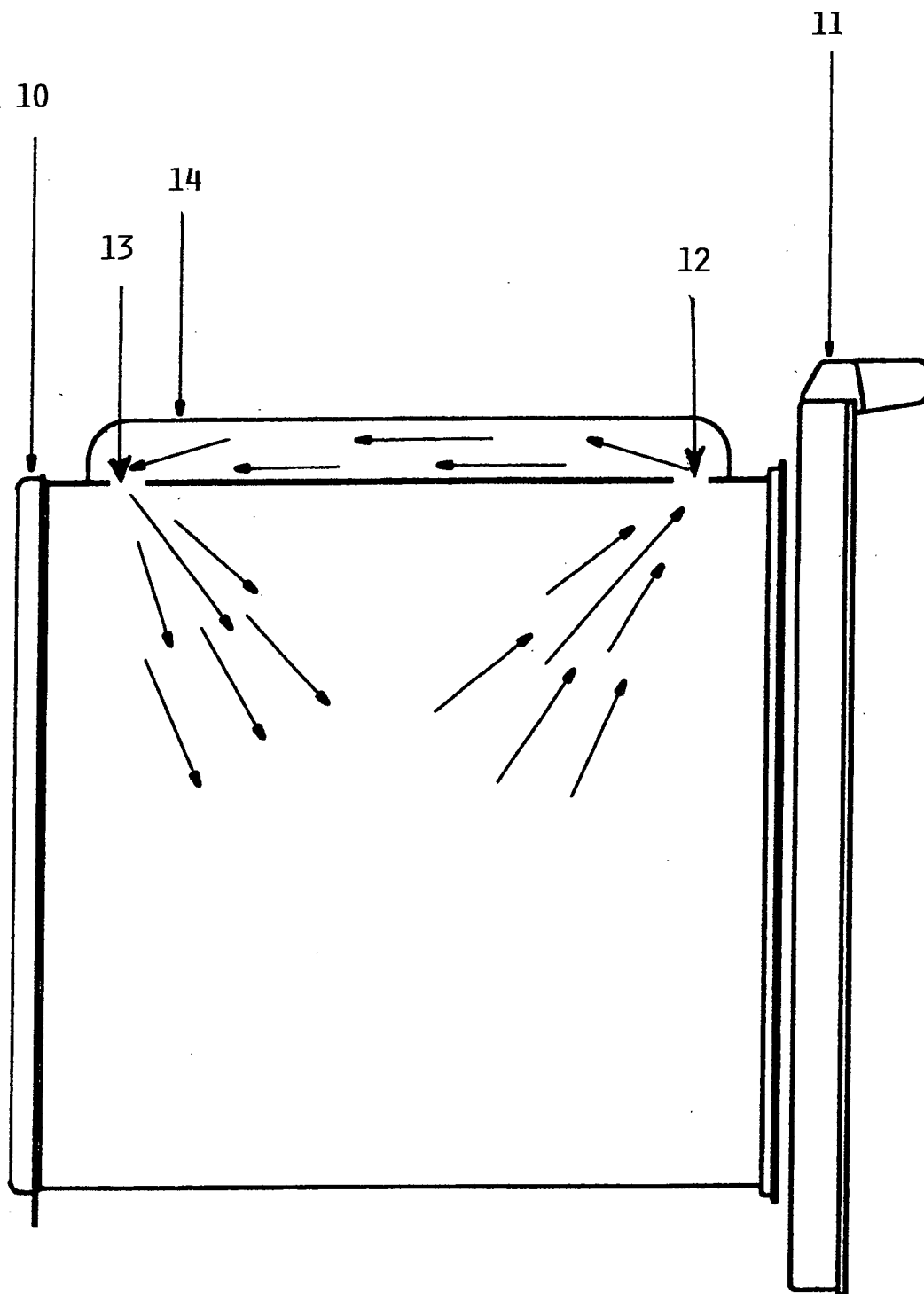
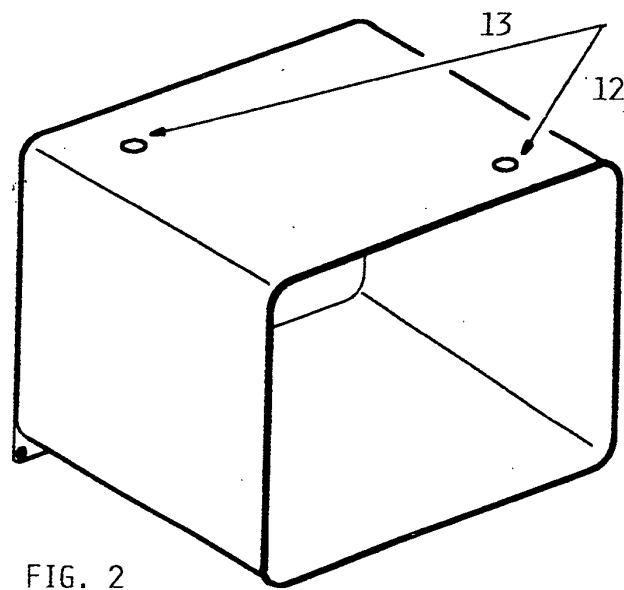
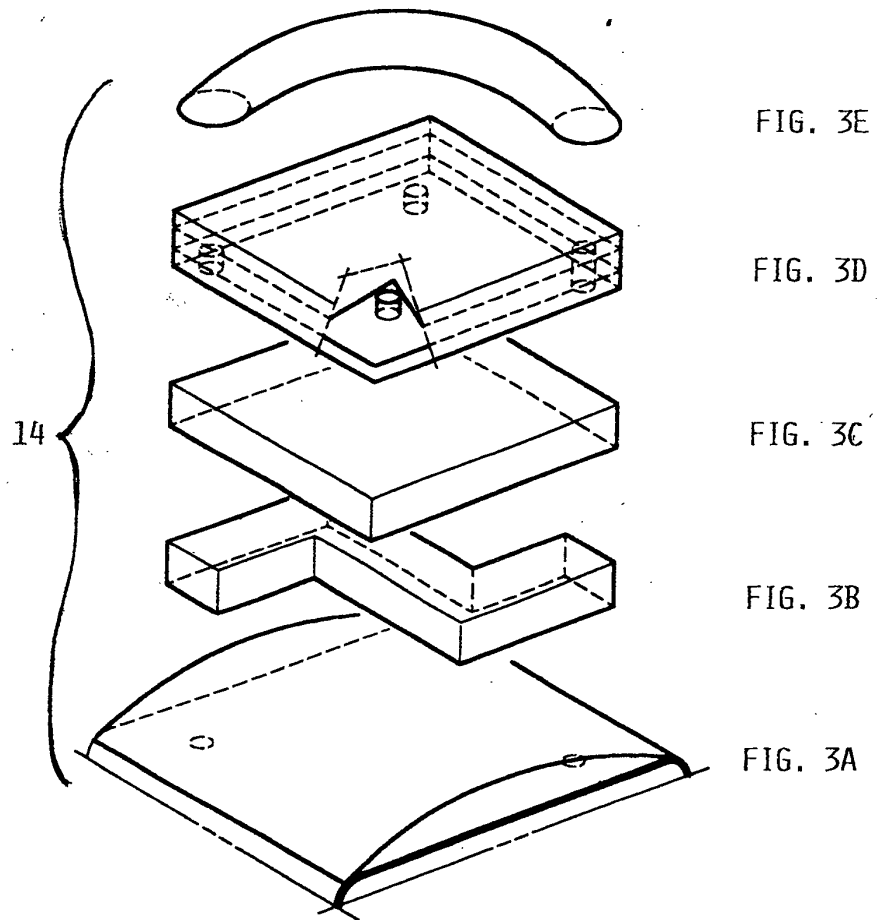


FIG. 1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 01 0716

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CI.7)
X	US 2 375 047 A (SUTHERLAND ERNEST E) 1 May 1945 (1945-05-01) * the whole document *	1,3,4	F24C15/32
X	DE 11 47 737 B (HOMANN WERKE WILHELM HOMANN) 25 April 1963 (1963-04-25) * the whole document *	1,3	
X	GB 292 653 A (CHARLES STEWART) 15 June 1928 (1928-06-15) * the whole document *	1,4	
			TECHNICAL FIELDS SEARCHED (Int.CI.7)
			F24C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		29 August 2002	Silvis, H
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03 82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 01 0716

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-08-2002

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2375047	A	01-05-1945	NONE	
DE 1147737	B	25-04-1963	NONE	
GB 292653	A	15-06-1928	NONE	