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Remarks:

A request for correction of the numbering of claims has been filed pursuant to Rule 139 EPC. A decision on the request will be taken during the proceedings before the Examining Division (Guidelines for Examination in the EPO, A-V, 3.).

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(54) **Oven, especially domestic oven**

(57) The invention relates to an oven (1), especially to a domestic oven, having a cooking cavity (2) and means (3) for illuminating the cavity, wherein the means (3) for illuminating comprise a reflector element (4) which is illuminated by at least one lamp (5) and wherein the reflector element (4) has at least one opening (6) for the light facing the cooking cavity (2). To avoid any blinding

of the user by the means for illuminating, the invention is **characterized in that** the reflector element (4) has a first section (7) which extends substantial in a longitudinal direction (L) with flat wall elements (8, 9, 10) and has a second section (11) with wall elements (12, 13, 14) wherein at least one of the wall elements (13) has a bow-shaped form.

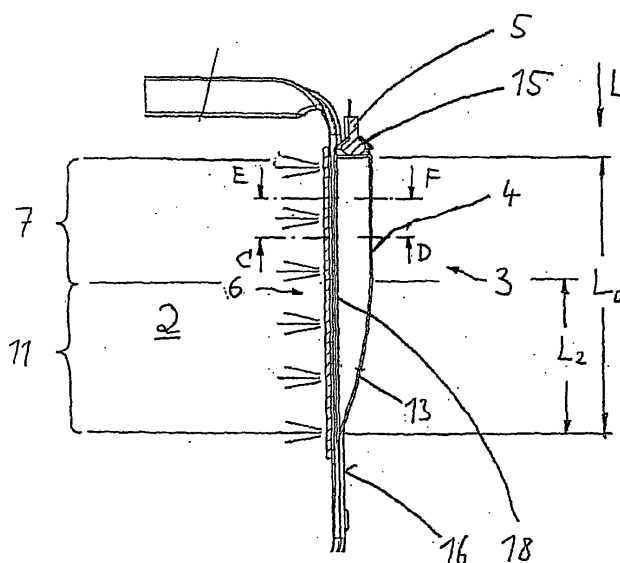


FIG 3

Description

[0001] The invention relates to an oven, especially to a domestic oven, having a cooking cavity and means for illuminating the cavity, wherein the means for illuminating comprise a reflector element which is illuminated by at least one lamp and wherein the reflector element has at least one opening for the light facing the cooking cavity.

[0002] Ovens of this kind are well known in the art. To ensure proper working conditions for the user of the oven the cavity must be duly illuminated. For doing so different solutions are known in the prior part.

[0003] DE 299 08 990 U1 shows an illumination system for the cavity of an oven, which has a reflector of a substantial prismatic shape. Within the reflector element a plurality of reflectors are arranged having a saddle-shaped form.

[0004] DE 103 18 859 A1, DE 103 18 860 A1, DE 103 18 861 A1 and DE 103 14 543 A1 show means for illumination having also a prismatic reflector element.

[0005] In DE 102 04 612 A1 a container element is shown which is part of means for illuminating the cavity and which has a substantial prismatic form. A plurality of mirrors is arranged in longitudinal direction of the container element.

[0006] A substantial classical reflector with lamp is used in DE 101 22 878 A1, in DE 86 02 774 U1 and in DE 34 04 430 A1 to illuminate the cavity.

[0007] Other solutions for illuminating the cavity of the oven are shown in DE 38 08 717 A1, in EP 0 922 910 B1, in EP 0 513 758 A2 and in FR 2 826 707 A1.

[0008] It has been found detrimental, that the pre-known means for illumination of the cavity have often a quite complex design. Thus, the costs for producing and mounting the systems are high, accordingly. Furthermore, the pre-known solutions do not always ensure that a blind-free illumination of the cavity can be obtained.

[0009] Therefore, it is an object of the invention to propose a concept for means for illumination of a cavity of an oven which can be produced in an economical way and which makes sure that the illumination of the cavity can take place without any blinding of the user. Furthermore, it is aimed that the whole cavity is illuminated equally in vertical direction. By doing so all baking trays on different levels within the cavity should be illuminated equally. Also, it should become possible to employ only one lamp per illumination element.

[0010] The solution of this object according to the invention is **characterized in that** the reflector element of the illumination means has a first section which extends substantial in a longitudinal direction with flat wall elements and has a second section with wall elements, wherein at least one of the wall elements has a bow-shaped form.

[0011] Preferably, the reflector element is made as a one-piece element.

[0012] The extension of the second section is preferably between 30 % and 85 % of the entire length of the

reflector element; specifically preferred is an extension of the second section which is between 40 % and 60 % of the entire length of the reflector element.

[0013] The lamp can be arranged outside the reflector element. A concentration element can be arranged between the lamp and the reflector element to bundle the light of the lamp. The concentration element can be part of the socket or of the housing of the lamp. It can be made of a coating on the lamp or its socket and housing respectively.

[0014] Preferably, one single lamp is arranged in or at the reflector element.

[0015] A preferred embodiment of the invention has at least one flat wall element, wherein the plane of the wall element and the plane of a cavity wall enclose an angle. This angle is preferably between 30° and 60°, specifically 45°

[0016] A further aspect of the invention is that a first blind is arranged between the reflector element and the cavity wall. The first blind can be part of the reflector element.

[0017] A part of the wall elements of the reflector element can be coated to improve the reflection of the light to better distribute the light.

[0018] A transparent plate can be arranged in the opening of the reflector element. This transparent plate is preferably made of glass.

[0019] A further preferred embodiment of the invention suggests a second blind which is arranged on or at the transparent plate. The second blind can be made of sheet metal or of a foil. It can be printed on the transparent plate.

[0020] At least one aperture can be arranged in the second blind. More specifically, a plurality of square apertures can be arranged in the second blind to illuminate the different levels of the cavity. Furthermore, the aperture can have the shape of an alphabetic character or of a cipher.

[0021] As specifically preferred embodiment of the invention proposes that the at least one aperture - preferably a plurality of apertures - corresponds to a defined level of a tray in the cooking cavity of the oven. With this design it becomes possible to easily mark the different tray levels of the cavity.

[0022] Preferably, the reflector element is arranged remote from a rear wall of the cavity. It can be arranged in the side region of the cavity near a door. Preferably, two reflector elements are arranged in both side region of the cavity.

[0023] Preferably the longitudinal direction of the reflector element is extending vertically.

[0024] With the suggested solution it is made sure, that a quite easy design is obtained which can be manufactured and assembled in an easy and thus cheap way.

[0025] Furthermore, the illumination of the cavity can occur with a minimum of lamps.

[0026] It is surely prevented that a blinding of the user takes place due to the illumination means.

[0027] Advantageously, all levels of the cavity in ver-

tical direction can sufficiently be illuminated with the proposed design.

[0028] It is also possible to easily illuminate a logo within the cavity. For doing so no additional lamp is required.

[0029] The light from the lamp leaves the means for illumination by being reflected by the walls of the reflector element and not directly via the lamp, i. e. an indirect illumination of the cavity takes place. Therefore, no "hot spot" exists which can be the source for blinding.

[0030] As the lamp is preferably not visible from the cavity no blinding effect can come into being. This is also ensured by the fact that the light is preferably emitted by the means for illumination from the front side of the cavity to the rear region of the cavity.

[0031] The whole vertical-extension of the cavity can be sufficiently illuminated by the means, i. e. all levels where baking trays are arranged.

[0032] When a respective blind with apertures is employed is becomes possible to illuminate specific regions, of the cavity in a quite specific way. More specifically, light can be emitted between two baking trays.

[0033] Also, the blind can have characters or ciphers which can be illuminated by only one lamp. Thus, a numbering for the levels of the cavity can be displayed in an illuminated manner or a logo without employing a separate lamp.

[0034] A preferred solution comes up with the arrangement of the means for illuminating in the front side region; in this case the means can illuminate the cavity from the front region to the rear region.

[0035] Preferably, the lamp is not visible when looking into the cavity from the front, even when it is installed in the reflector element; the lamp can thus be covered by the reflector element.

[0036] In the drawings embodiments of the invention are depicted.

FIG 1 shows a sectional top plan view of a domestic oven, i. e. a section viewed from the top,

FIG 2 shows a sectional bottom plan view of the oven according to FIG 1, i. e. a section viewed from the bottom,

FIG 3 shows the sectional view A-B according to FIG 1,

FIG 4 shows the sectional view C-D according to FIG 3,

FIG 5 shows the sectional view E-F according to FIG 3,

FIG 6 shows a perspective view of a reflector element according to the invention,

FIG 7 shows a view similar to FIG 5 according to an alternative embodiment of the invention,

FIG 8 shows a view similar to FIG 3 according to the alternative embodiment of the invention,

5 FIG 9 shows a view similar to FIG 4 according to the alternative embodiment of the invention,

FIG 10 shows a perspective view of a second blind arranged between the reflector element and the cavity of the oven,

10 FIG 11 shows a perspective view of a reflector element according to the alternative embodiment of the invention and

15 FIG 12 shows the mounted state of means for illuminating in a side wall of a cavity.

[0037] In FIG 1 and in FIG 2 a domestic oven 1 is depicted having a cooking cavity 2 as usual. While FIG 1 shows the sectional top plan view, FIG 2 shows the sectional bottom plan view. The cavity 2 is closable by a door (not depicted). To illuminate the cavity 2 means 3 for illuminating are employed. Those means 3 are arranged on both side regions 22 and 23 of the cavity 2, remote from the rear wall 21, i. e. in the front region of the cavity.

[0038] The means 3 for illuminating the cavity 2 are depicted in detail in FIG 3 till FIG 6 according to a first embodiment of the invention.

[0039] The means 3 have a reflector element 4 having a longitudinal direction L. At one end of the reflector element 4 a lamp 5 is arranged. The lamp 5 is positioned outside the reflector element 4. A concentration element 15 is employed to focus the light of the lamp 5 and to lead it into the reflector element 4. The concentration element 15 can be a part of the socket of the lamp 5.

[0040] Beside the longitudinal direction L of the reflector element 4 an opening 6 is formed into the reflector element 4. As the reflector element 4 is inserted into a fitting aperture in the cavity wall 16 the light can thus leave the reflector element 4 and can illuminate the cavity.

[0041] The specific form of the reflector element 4 is shown in FIG 3 till FIG 6.

[0042] The reflector element 4 extends along a certain length L_0 . It has a first section 7 which has a substantial prismatic form, which extends in the longitudinal direction. The reflector element 4 is here formed by three wall elements 8, 9 and 10. While the wall elements 8 and 9 are arranged parallel or perpendicular to the plane of the cavity wall 16 this is not the case for the third wall element 10. As can be seen from FIG 4 and FIG 5 this wall element 10 is arranged under an angle α to the plane of the cavity wall 16 which is about 45° .

[0043] As can be seen specifically in FIG 3 and FIG 6 the reflector element 4 has furthermore a second section 11, also extending in the longitudinal direction L. Here, the reflector element 4 is also formed by three wall elements 12, 13 and 14. While the wall elements 12 and 14

are flat as the wall elements 8, 9 and 10 this is not the case for the wall element 13. This wall, element 13 is curved (arcuated) as can be seen specifically from FIG 3.

[0044] The extension of the second section 11 is denoted with L_2 in FIG 3. This extension L_2 is preferably between 40% and 60% of the entire length L_0 of the reflector element 4.

[0045] To avoid any blinding of the user of the oven the reflector element 4 has furthermore a first blind 17 as can be seen from FIG 4, FIG 5 and FIG 6. This blind 17 covers a part of the beams from the lamp 5. Consequently, no blinding can occur depending on the width of the blind 17.

[0046] As can be seen from the figures the reflector element 4 is made of a one-piece element. More specifically, a sheet metal part is edge bended to obtain the depicted form.

[0047] The ends 24 and 25 of the reflector element 4 (see FIG 4) are bended so that the reflector element 4 can be easily mounted into the aperture in the cavity wall 16. Thus, a snap-fit connection is obtained.

[0048] The transition from the reflector element 4 to the cavity 2 is closed by a transparent plate 18. This plate 18 is a glass plate which prevents that any dirt enters from the cavity 2 into the reflector element 4.

[0049] An alternative embodiment of the invention is shown in FIG 7 till FIG 11. The design of the means 3 for illuminating are quite similar compared to the first embodiment explained above.

[0050] Here a second blind 19 is employed (see specifically FIG 8 and FIG 10). The second blind 19 has a substantial rectangular shape and can be a separate element but also a print on the transparent plate 18.

[0051] In FIG 8 the lamp 5 enters the means for illuminating 3 basically coming from the top in vertical direction. In an alternative solution (not depicted) the lamp 5 enters the means 3 from the side.

[0052] The blind 19 has a plurality of apertures 20 which are brought into the blind 19 to allow light beaming from the reflector element 4 into the cavity 2. As can be seen the apertures can have a square form (see aperture 20'). Furthermore, they can be formed as an alphabetic character 20" or as a cipher 20". Thus, the characters or ciphers can easily be read when looking into the cavity as they are illuminated from the reflector element 4.

[0053] In all embodiments the light from the lamp 5 enters in longitudinal direction into the reflector element 4. The light strikes on the wall elements of the reflector element 4 and thus also on the bow-shaped wall element 13. The light shines from the walls and through the transparent plate 18 (glass) into the cavity 2.

[0054] By the first blind 17 the distribution of the light is improved and blinding is surely prevented.

[0055] The wall elements of the reflector element 4 can be coated or structured so that an improved distribution of light can be obtained.

[0056] While the lamp 5 is positioned outside the reflector element 4 in the depicted embodiments of the in-

vention it can also be located at one end of the reflector element 3 inside the same.

[0057] With respect to the second blind 19 different possibilities exist for realization. It can be arranged under or on the glass 18. It can be a separate part or can be printed on the glass 18.

[0058] When the blind 19 is used the blind 17 is not mandatory. In this case the shielding and the support of the distribution of the light can be done by the blind 19.

[0059] With respect to FIG 12 it should be emphasized again that the means for illuminating 3 can be mounted in an opening or recess 26 in the cavity wall 16. The lamp (light source) itself is covered by the reflector element as explained above. Thus, no blinding takes place and the lamp illuminates equally all levels for baking trays all over the vertical direction. By the depicted concept a simple and cheap design can be realized.

[0060] The light source can be e. g. a halogen lamp. When a halogen lamp is employed a concentration element has advantages. Alternatively, the use of a halogen lamp can be taken into consideration which is evaporated at one side.

[0061] The reflector element can be manufactured e. g. from sheer metal of stainless steel or zinc-plated sheet metal. It can also be made from aluminium or from plastic; in this case the material (aluminium or plastic) can be coated.

[0062] By employment of the above discussed blind 19 the housing can be designed in an easier way. The blind can cover the means for illuminating 3 and further improve the blind-free illumination of the cavity. Furthermore, by use of the blind it becomes possible to specifically illuminate desired regions of the cavity. As described above the blind can have alphabetic characters or ciphers. In the case of the blind according to FIG 10 only specific areas are illuminated by the apertures 20. With the solution according to FIG 12 the whole vertical extension can be illuminated.

[0063] The blind 19 can be covered by a glass plate. But it is also possible that the blind is arranged on a glass plate and has the function of a holding frame.

Reference Numerals

[0064]

1	Oven
2	Cooking cavity
3	Means for illuminating
4	Reflector element
5	Lamp
6	Opening
7	First section
8	Wall element
9	Wall element
10	Wall element
11	Second section
12	Wall element

13	Wall element	
14	Wall element	
15	Concentration element	
16	Cavity wall	
17	First blind	5
18	Transparent plate	
19	Second blind	
20	. Aperture	
20'	Square aperture	
20''	Aperture (alphabetic character)	10
20'''	Aperture (cipher)	
21	Rear wall	
22	Side region	
23	Side region	
24	End	15
25	End	
26	Opening / recess	
L	Longitudinal direction	
L ₀	Length of the reflector element	
L ₂	Extension of the second section	20
□	Angle	

Claims

1. Oven (1), especially domestic oven, having a cooking cavity (2) and means (3) for illuminating the cavity, wherein the means (3) for illuminating comprise a reflector element (4) which is illuminated by at least one lamp (5) and wherein the reflector element (4) has at least one opening (6) for the light facing the cooking cavity (2),

characterized in that

the reflector element (4) has a first section (7) which extends substantial in a longitudinal direction (L) with flat wall elements (8, 9, 10) and has a second section (11) with wall elements (12, 13, 14), wherein at least on of the wall elements (13) has a bow-shaped form.

2. Oven according to claims 1, **characterized in that** the reflector element (4) is made as a one-piece element.

3. Oven according to claims 1 or 2, **characterized in that** the extension (L₂) of the second section (11) is between 30 % and 85 % of the entire length (L₀) of the reflector element (4) or **in that** the extension (L₂) of the second section (11) is between 40 % and 60 % of the entire length (L₀) of the reflector element (4).

4. Oven according to at least one of claims 1 to 3, **characterized in that** the lamp (5) is arranged outside the reflector element (4) and/or that a concentration element (15) is arranged between the lamp (5) and the reflector element (4), wherein in particular the concentration element (15) is part of the socket or of the housing of the lamp (5) or the concentration

element (15) is made of a coating on the lamp (5) or its socket.

6. Oven according to at least one of claims 1 to 5, **characterized in that** one single lamp (5) is arranged in or at the reflector element (4) and/or **in that** at least one flat wall element (10, 14) is arranged, wherein the plane of the wall element (10, 14) and the plane of a cavity wall (16) enclose an angle (□), wherein in particular the angle (D) is between 30° and 60°, in particular 45°.

7. Oven according to at least one of claims 1 to 6, **characterized in that** a first blind (17) is arranged between the reflector element (4) and the cavity wall (16), wherein in particular the first blind (17) is part of the reflector element (4).

8. Oven according to at least one of claims 1 to 7, **characterized in that** at least a part of the wall elements (8, 9, 10, 12, 13, 14) of the reflector element (4) is coated and/or **in that** a transparent plate (18) is arranged in the opening (6) of the reflector element (4), wherein in particular the transparent plate (18) is made of glass and/or a second blind (19) is arranged on or at the transparent plate (18), wherein in particular the second blind (19) is made of sheet metal or of a foil or is printed on the transparent plate (18).

9. Oven according to claim 8, **characterized in that** at least one aperture (20) is arranged in the second blind (19), wherein in particular at least one square aperture (20') is arranged in the second blind (19) and/or the aperture (20) has the shape of an alphabetic character (20'') or of a cipher (20''').

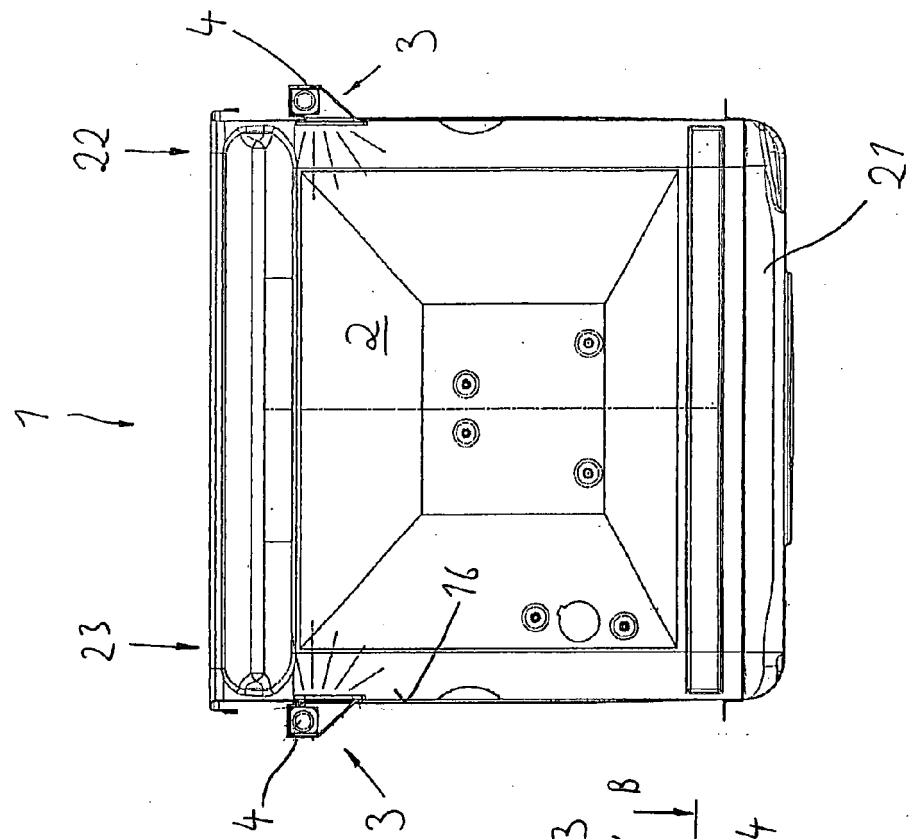
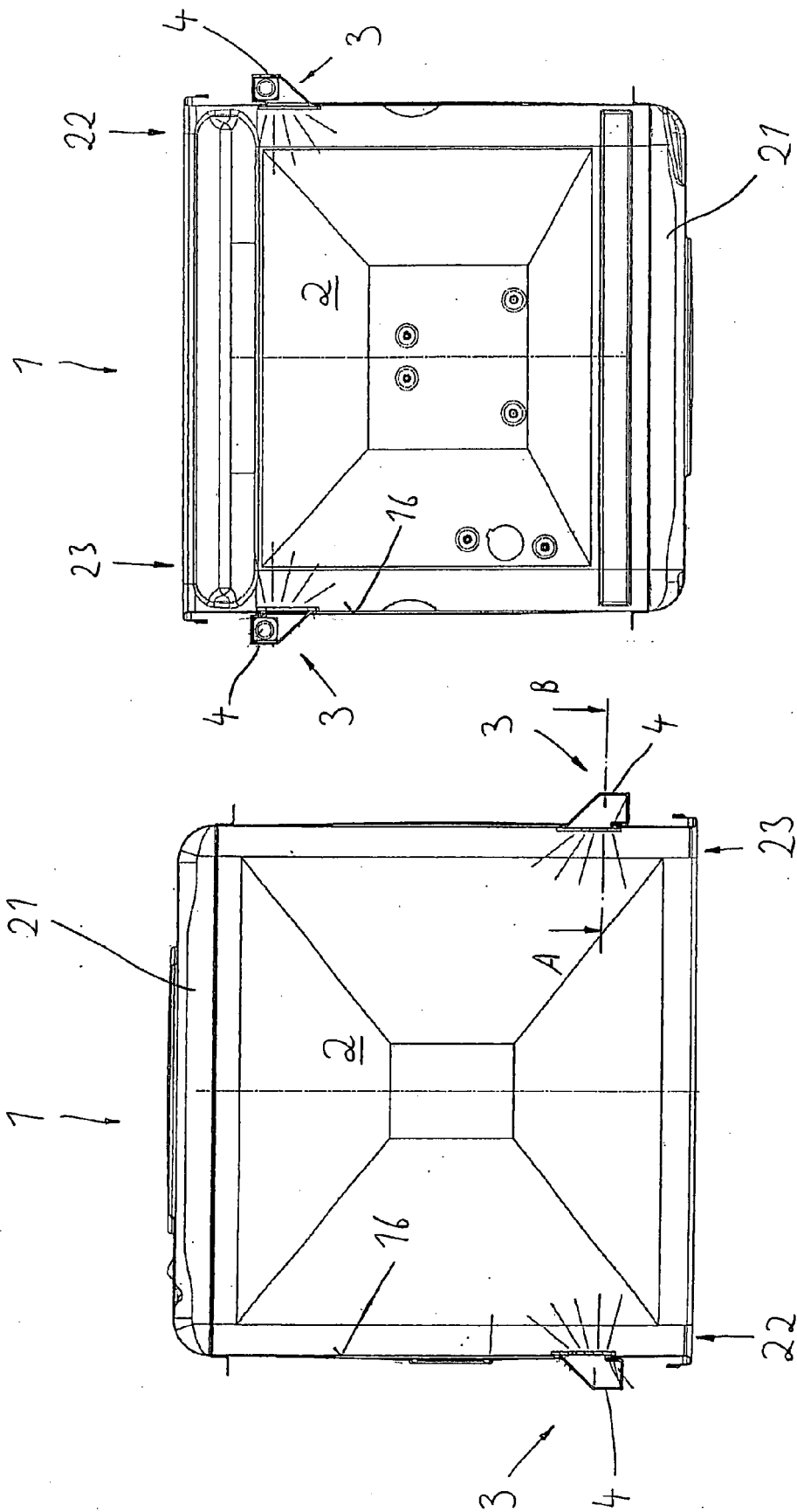
10. Oven according to claim 9, **characterized in that** the at least one aperture (20) corresponds to a defined level of a tray in the cooking cavity (2) of the oven (1).

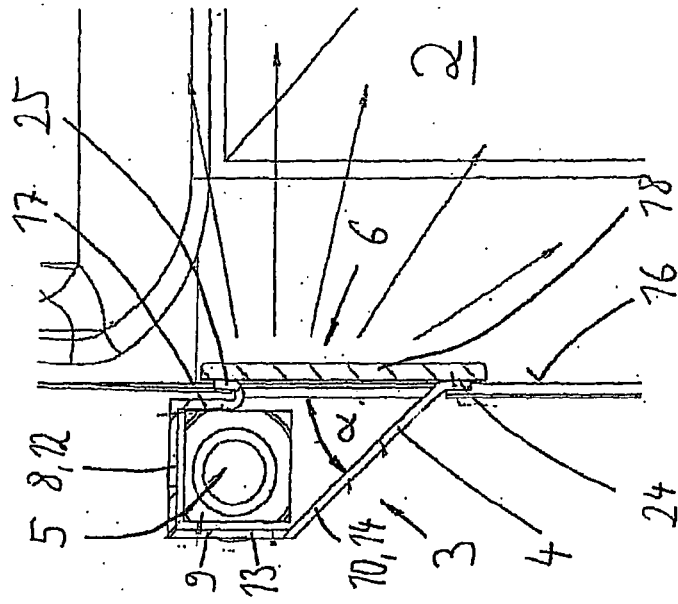
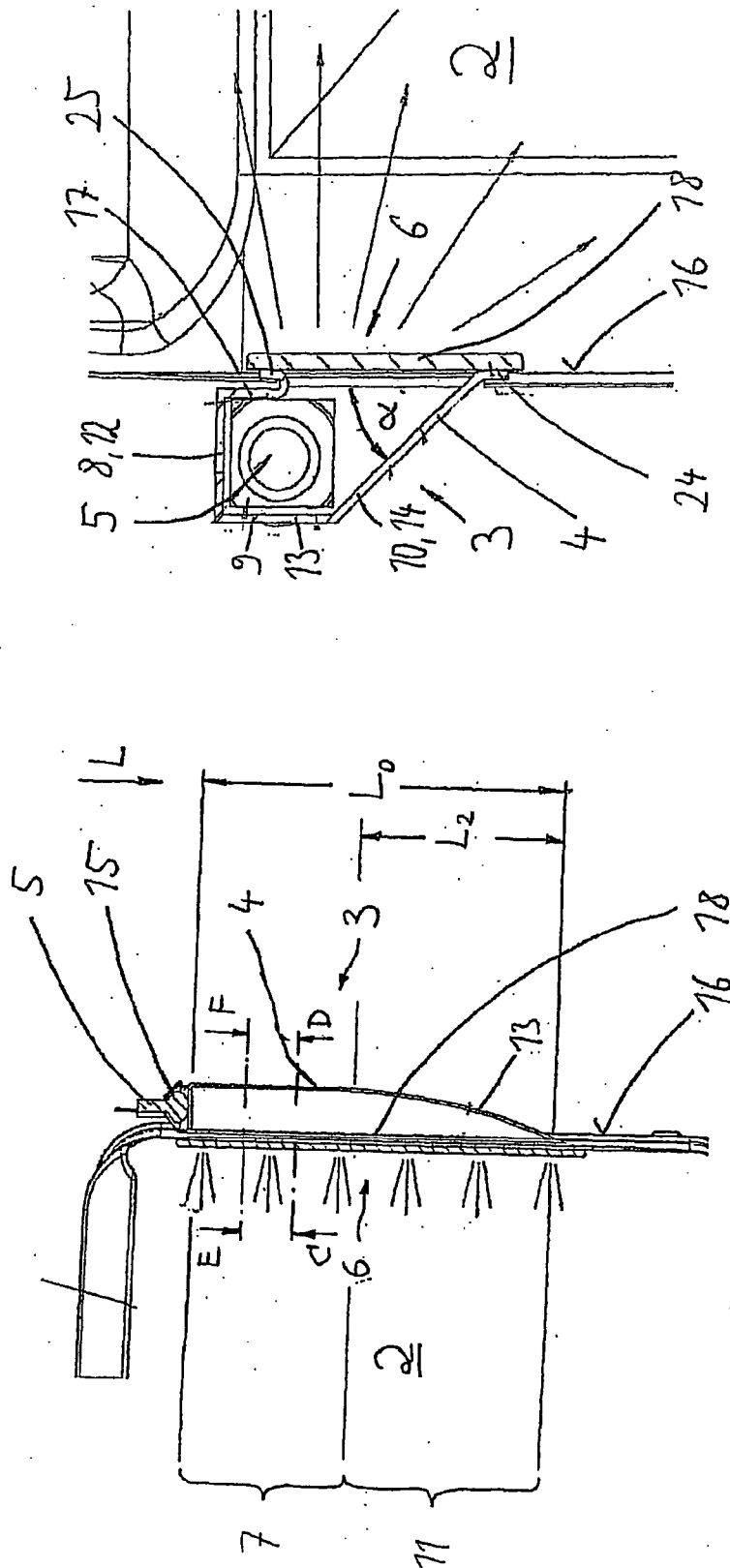
11. Oven according to at least one of claims 1 to 10, **characterized in that** the reflector element (4) is arranged remote from a rear wall (21) of the cavity (2).

12. Oven according to at least one of claims 1 to 11, **characterized in that** the reflector element (4) is arranged in the rear side region (22) of the cavity (2).

13. Oven according to claim 12, **characterized in that** two reflector elements (4) are arranged in both side region (22, 23) of the cavity (2).

14. Oven according to at least one of claims 1 to 13, **characterized in that** the longitudinal direction (L) of the reflector element (4) is extending vertically.





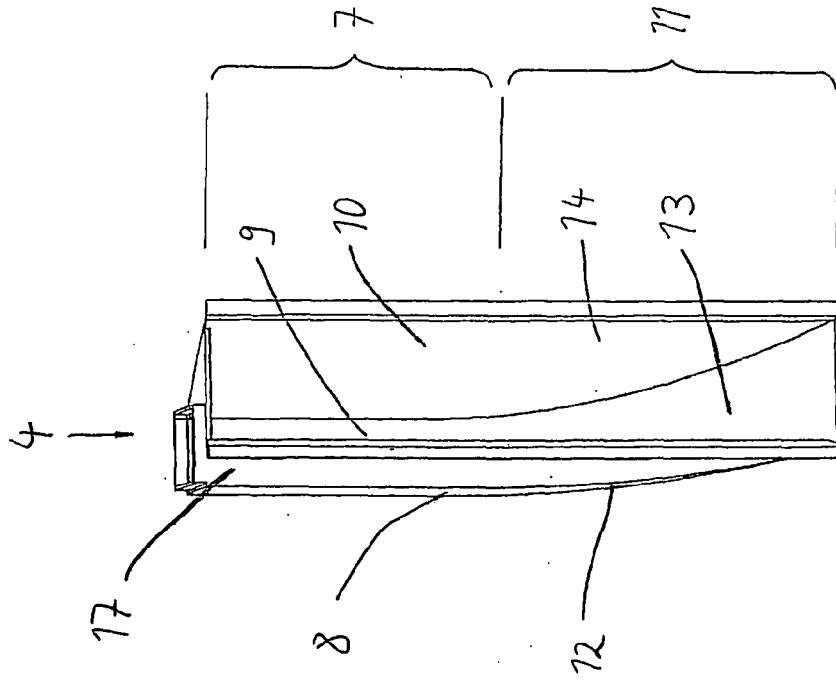


FIG 6

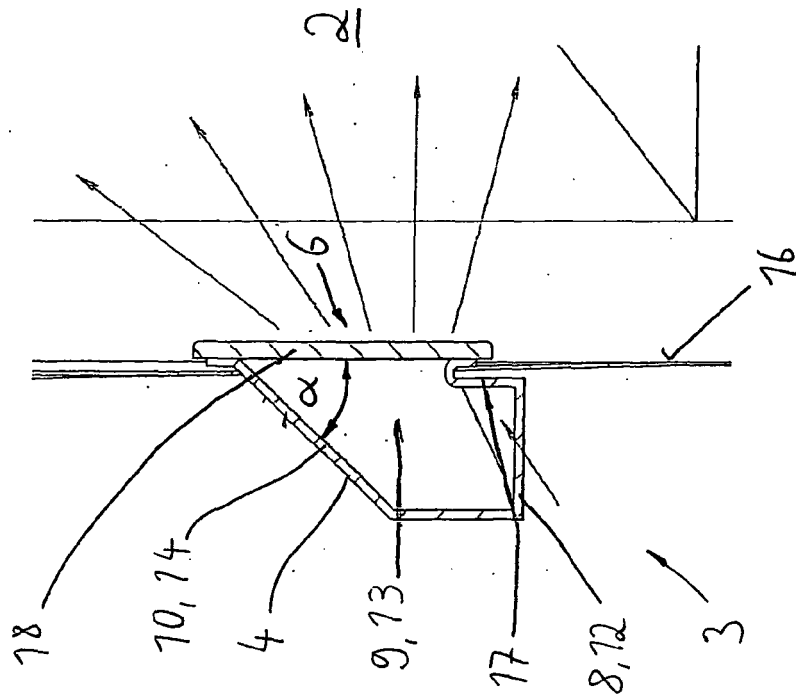


FIG 5

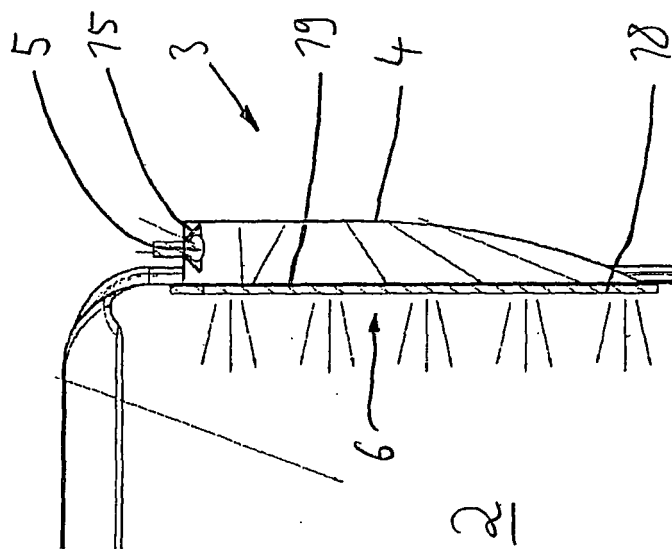


FIG 8

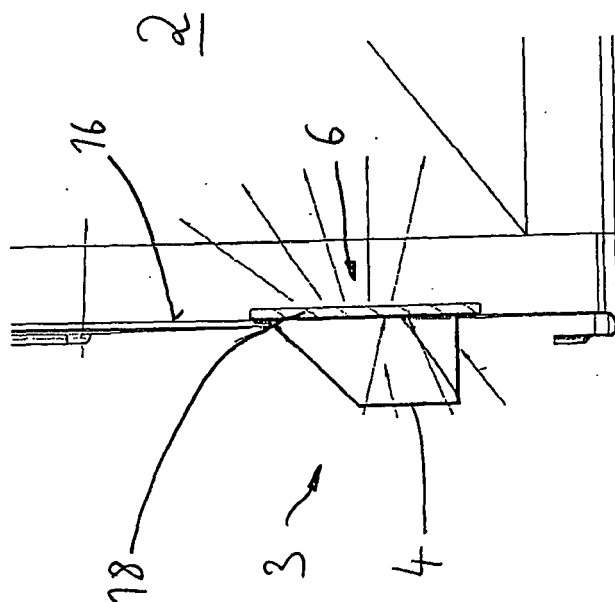


FIG 7

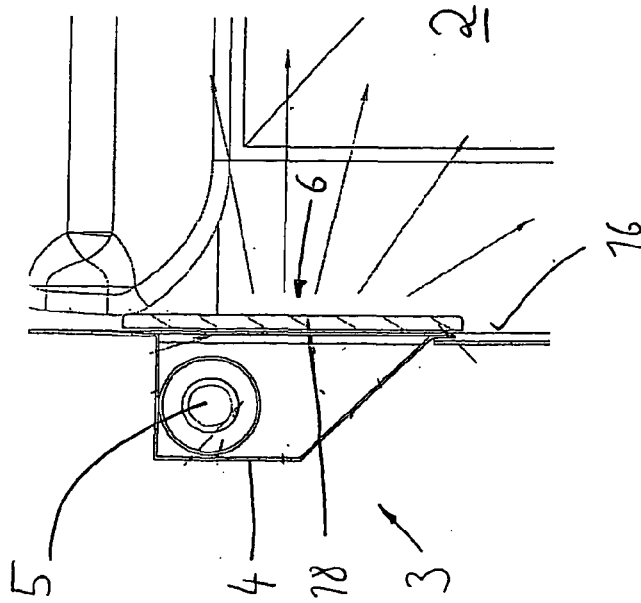


FIG 9

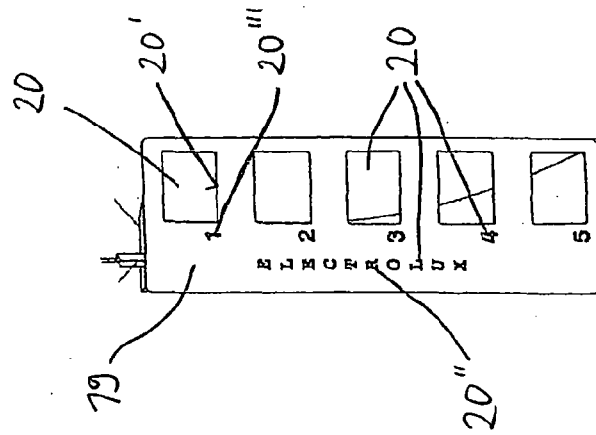


FIG 10

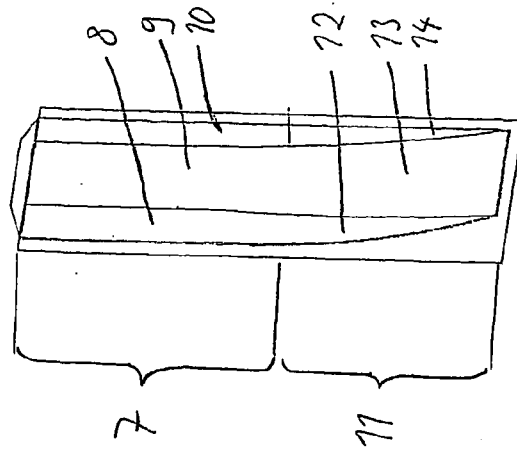


FIG 11

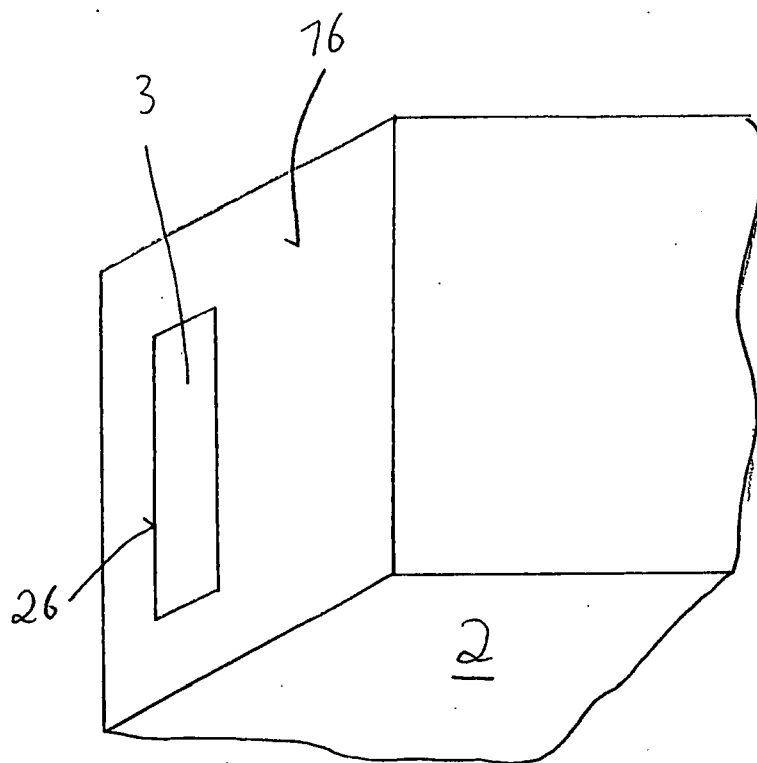


FIG 12



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Application Number
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Place of search The Hague		Date of completion of the search 12 February 2009	Examiner Verdoodt, Luk
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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