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(54) **Oven muffle and oven comprising such muffle**

Ofenmuffel und Ofen, der eine solche Muffel umfasst

Moufle de four et four comportant ce moufle

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Description

[0001] The present invention relates to oven muffles comprising a muffle wall with a mounting region for a fan and a cover element for said mounting region, wherein a plurality of through-holes is provided in the perimeter of the mounting region for insertion of connection bolts, wherein the cover element comprises a plurality of lugs comprising openings which overlap the through-holes of the muffle wall, and wherein the lugs project from the cover element towards the muffle wall so as to maintain the cover element at a distance of the muffle wall. The present invention further relates to ovens comprising such oven muffles.

[0002] In ovens, particularly in convection ovens, fan ovens or hot air ovens, typically a fan is provided in the rear wall of the oven muffle so as to circulate hot air within the interior cavity of the oven muffle so as to heat food products.

[0003] An oven muffle and oven respectively of the generic type is disclosed in EP 1 464 898 A1. A similar concept is known from DE 10 2004 047 993 A1 and in DE 10 2006 004 348 A1.

[0004] A common problem in such conventional ovens is that if, as is typically the case, the fan cover is made of sheet metal which is provided with a protective enamel coating, providing for the required distance between the muffle wall and the cover element is difficult to achieve. In particular, if such distance is to be provided by the shape of the cover element, and in particular by the shape of the lugs, this often leads to surface geometries which are difficult to enamel. Thus, if, for example, the lugs are provided in cup-shaped bulges of the sheet material of the cover element, which bulges often are employed due to their stability, providing for a sufficient distance between the cover member and the muffle wall requires a rather deep cup, in which, in order to provide for an enamel coating, more enamel is required than for the remaining surface areas of the cover element.

[0005] It is an object of the invention to provide an oven muffle, in which the above problems are solved, and in particular, to provide an oven muffle which is easier to manufacture.

[0006] In an oven muffle as it is defined in the pre-characterizing portion of claim 1 the above object is solved in that each of the through-holes provided in the muffle wall comprises a lug which projects towards the cover element, wherein the lug of the cover element and the lug of the muffle wall abut at their projecting surfaces and wherein the lug of the cover element and the lug of the muffle wall have substantially the same extension in a plane essentially parallel to the muffle wall at the location of the lugs.

[0007] In this manner the distance, which is required between the cover element and the muffle wall has not to be provided by the shaping of only the lugs provided at the cover element, as in conventional oven muffles, but rather said distance is maintained by a first lug pro-

vided at the cover member, which lug cooperates with a second lug which is provided at a corresponding location at the muffle wall. In other words, rather than providing for each connecting element, as it is used for connecting the cover member to the muffle wall, a single steep projection, in accordance with the present invention such projection is replaced by two shallow projections, one of which is provided at the cover member and the other one of which is provided at the muffle wall.

[0008] Due to the shorter distances, which have to be spanned by the individual projections provided at the cover member and at the muffle wall, the required distancing function can be implemented with shallower and smoother surface geometries which are easier to manufacture than those used in prior art muffles.

[0009] Preferred embodiments of the present invention are defined in the dependent claims.

[0010] In particular, the lugs of the cover element comprise generally cup-shaped bulges, which provides for a higher stability.

[0011] Similarly, also the lugs provided at the muffle wall preferably comprise generally cup-shaped bulges which project towards the cover element.

[0012] In order to provide for a design of the oven muffle in which the fan and fan cover project into the muffle cavity only as much as is required to provide for an efficient air circulation within the muffle cavity, the muffle wall in the mounting region preferably comprises a recess for accommodation of the fan impeller.

[0013] The muffle wall further can comprise in said mounting region at least one recess for accommodation of a heating element that is used in operation of the oven to heat air to be circulated through the oven muffle by the fan impeller.

[0014] In addition to the air outlets which are provided by maintaining the cover element at a distance to the muffle wall, the cover element further can comprise in its central region one or more vent openings so as to direct an air stream towards the central region of the oven muffle.

[0015] Preferably the muffle wall and/or the cover element are made of sheet metal, which further can be provided with an enamel coating so as to provide for corrosion and oxidation resistance and to facilitate cleaning of the oven muffle. Alternatively, other materials and/or protective coatings could be used, such as ceramic coatings or coatings with other high-temperature resistive materials such as Teflon or the like.

[0016] In an oven which comprises an oven muffle in accordance with the present invention, a fan is attached to the muffle wall such that the fan impeller is located within the mounting region. As in conventional ovens this can be accomplished by mounting a motor for driving the fan at the rear side of the muffle wall and providing in the muffle wall a through-hole through which the motor shaft projects, wherein the fan impeller then is attached onto the motor shaft.

[0017] In the mounting region of the muffle wall there

further can be provided one or more heating elements, such as a ring-shaped heating element which is located to be arranged about the surface region of the muffle wall which is overlapped by the fan impeller.

[0018] A preferred embodiment of the present invention will be described below by reference to the drawings, in which:

Fig. 1 is a top view of a cover member made in accordance with the present invention;

FIG. 2 is a sectional view of the cover member of FIG. 1 through a lug as indicated in FIG. 1 at line 2-2;

FIG. 3 is a top view of the region of a muffle wall where a fan is to be mounted;

FIG. 4 is a sectional view of the cover member of FIG. 3 through a lug as indicated in FIG. 3 at line 4-4;

FIG. 5 shows the cover member of FIG. 1 when mounted to the muffle wall shown in FIG. 3; and

FIG. 6 is a sectional view in the region of a lug as indicated at line 6-6 of FIG. 5.

[0019] Cover element 10 shown in FIG. 1 has a generally rectangular shape and comprises an elevated central region 12 which bulges out from a peripheral edge region 14 and comprises a circular central region 16 behind which, in the mounted state, there will be located a fan impeller of an oven muffle within which fan cover 10 is mounted.

[0020] Cover element 10 is mounted to a muffle wall 22, such as the rear wall of an oven muffle, by means of connection bolts 36 (see FIG. 5), such as screws, rivets or the like, which are inserted through-openings 18 provided in lugs 20, which in the embodiment shown in FIG. 1 are located in the corner regions of rectangular cover element 10.

[0021] As can be seen in FIG. 2, lugs 20 comprise generally cup-shaped depressions, which are formed into the cover element 10, which in the embodiment shown in FIG. 1 is made of a metal sheet material and which has been shaped by deep drawing.

[0022] FIG. 3 shows a portion of a muffle wall 22 and in particular the portion of a rear wall of an oven muffle where a fan is to be located. Mounting region 24 has a generally rectangular shape in the center of which there is a shallow circular depression 26, in which in the assembled state of the oven the impeller of a fan will be located. In order to drive such impeller, a motor is mounted at the rear side of muffle wall 22 so that the motor shaft extends through an opening 28 in the center of circular depression 26. In the embodiment shown in FIG. 3, muffle wall 22 further comprises an annular depression 30 for accommodating a ring-shaped heating element.

[0023] For fixation of cover element 10 at muffle wall 22, four through-holes 32 are provided in the mounting region 24 of muffle wall 22 at locations which correspond to the locations of openings 18 of cover member 10. Through-holes 32 are arranged within lugs 34, a sectional view of which is shown in FIG. 4.

[0024] As shown in FIG. 4, lugs 34 comprise cup-shaped depressions of the sheet material provided in mounting region 24, which depressions project from muffle wall 22 towards cover element 10.

[0025] FIG. 5 shows cover element 10 when mounted in the mounting region 24 of muffle wall 22. During mounting, cover element 10 was lined to mounting region 24 of muffle wall 22 so that the openings 18 of lugs 20 overlap openings 32 of lugs 34 provided in muffle wall 22. Then, connecting bolts which preferably provide for a releasable connection of cover element 10 and muffle wall, such as screws 36, only one of which is shown in FIG. 5, are inserted through holes 18.

[0026] As can be seen in FIG. 6, which is a sectional view along line 6-6 of FIG. 5, when cover element 10 is mounted to muffle wall 22, lug 32 of muffle wall 22 cooperates with lug 20 of cover element 10, so as to maintain distance between cover element 10 and muffle wall 22, so that air can be directed from under pass cover element 10 along muffle wall 22 to the muffle cavity. In addition, in the embodiment shown in FIGS. 1 and 5, cover element 10 is provided in its central region 16 with a plurality of vent openings 38.

[0027] In contrast to conventional oven muffles in which projecting lugs were provided only at the cover element, and the through-holes provided in the muffle wall for insertion of connecting bolts were provided in a flat section of the muffle wall, so that in such conventional oven muffles the entire distance between the cover element and the muffle wall had to be provided by the lug of the cover element, in the oven muffle suggested herein much shallower lugs can be employed, which facilitates manufacturing of the oven muffle.

Claims

1. An oven muffle, comprising:

(a) a muffle wall (22) comprising a mounting region (24) for a fan, and a plurality of through-holes (32) provided in the perimeter of said mounting region for insertion of connection bolts (36), and

(b) a cover element (10) for said mounting region (24), said cover element comprising a plurality of lugs (20) comprising openings (18) which overlap said through-holes (32) of the muffle wall (22), said lugs projecting from said cover element towards the muffle wall so as to maintain the cover element at a distance to said muffle wall;

characterized in that each said through hole (32) provided in the muffle wall (22) comprises a lug (34) projecting towards the cover element (10), wherein the lug (20) of the cover element (10) and the lug (34) of the muffle wall (22) abut at their projecting surfaces and wherein the lug (20) of the cover element (10) and the lug (34) of the muffle wall (22) have substantially the same extension in a plane essentially parallel to the muffle wall (10) at the location of the lugs (20, 34).

2. The oven muffle of claim 1, wherein said lugs (20) of the cover element (10) comprise generally cup-shaped bulges.

3. The oven muffle of claim 1 or 2, wherein said lugs 34 provided at the muffle wall (22) comprise generally cup-shaped bulges.

4. The oven muffle of any one of the preceding claims, wherein said muffle wall (22) comprises in said mounting region (24) a recess (26) for accommodation of a fan impeller.

5. The oven muffle of any one of the preceding claims, wherein said muffle wall (22) comprises in said mounting region (24) at least one recess (30) for accommodation of a heating element.

6. The oven muffle of any one of the preceding claims, wherein said cover element (10) in its central region comprises at least one vent opening (38).

7. The oven muffle of any one of the preceding claims, wherein said cover element (10) comprises in its central region a bulge (16) adapted to accommodate a fan impeller.

8. The oven muffle of any one of the preceding claims, wherein said muffle wall (22) and/or said cover element (10) are made of sheet metal.

9. The oven muffle of claim 8, wherein said muffle wall (22) and/or said cover element (10) are provided with an enamel coating.

10. An oven, comprising:

- (a) an oven muffle as defined in any one of the preceding claims; and
- (b) a fan attached to the muffle wall 22 such that the fan impeller is located within the mounting region (24).

11. The oven of claim 10, further comprising at least one heating element located in the mounting region 24 of the muffle wall (22).

12. The oven of claim 11, wherein said heating element comprises a ring shaped heating element, wherein the fan impeller is located within the perimeter of the ring shaped heating element.

Patentansprüche

1. Ofenmuffel, umfassend:

- (a) eine Muffelwand (22), die einen Befestigungsbereich (24) für einen Ventilator und mehrere Durchgangslöcher (32) umfasst, die in dem Umfang des Befestigungsbereichs zur Einführung von Verbindungsbolzen (36) bereitgestellt sind, und
- (b) ein Abdeckelement (10) für den Befestigungsbereich (24), wobei das Abdeckelement mehrere Laschen (20) umfasst, die Öffnungen (18) umfassen, die sich mit den Durchgangslöchern (32) der Muffelwand (22) decken, wobei die Laschen aus dem Abdeckelement zu der Muffelwand hervorstehen, um so das Abdeckelement in einem Abstand zu der Muffelwand zu halten;

dadurch gekennzeichnet, dass das Durchgangslöcher (32), das in der Muffelwand (22) bereitgestellt ist, eine Lasche (34) umfasst, die zu dem Abdeckelement (10) hervorsticht, wobei die Lasche (20) des Abdeckelements (10) und die Lasche (34) der Muffelwand (22) an ihren hervorstehenden Oberflächen aneinander angrenzen und wobei die Lasche (20) des Abdeckelements (10) und die Lasche (34) der Muffelwand (22) im Wesentlichen die gleiche Ausdehnung in einer zu der Muffelwand (10) im Wesentlichen parallelen Ebene an der Position der Laschen (20, 34) aufweisen.

2. Ofenmuffel nach Anspruch 1, wobei die Laschen (20) des Abdeckelements (10) im Allgemeinen kelchförmige Wölbungen umfassen.

3. Ofenmuffel nach Anspruch 1 oder 2, wobei die Laschen 34, die an der Muffelwand (22) bereitgestellt sind, im Allgemeinen kelchförmige Wölbungen umfassen.

4. Ofenmuffel nach einem der vorhergehenden Ansprüche, wobei die Muffelwand (22) in dem Befestigungsbereich (24) eine Aussparung (26) zur Aufnahme eines Ventilatorlaufrads umfasst.

5. Ofenmuffel nach einem der vorhergehenden Ansprüche, wobei die Muffelwand (22) in dem Befestigungsbereich (24) mindestens eine Aussparung (30) zur Aufnahme eines Heizelements umfasst.

6. Ofenmuffel nach einem der vorhergehenden Ansprüche, wobei das Abdeckelement (10) in seinem zentralen Bereich mindestens eine Lüftungsöffnung (38) umfasst.
7. Ofenmuffel nach einem der vorhergehenden Ansprüche, wobei das Abdeckelement (10) in seinem zentralen Bereich eine Wölbung (16) umfasst, die zur Aufnahme eines Ventilatorlaufrads ausgelegt ist.
8. Ofenmuffel nach einem der vorhergehenden Ansprüche, wobei die Muffelwand (22) und/oder das Abdeckelement (10) aus Metallblech hergestellt sind.
9. Ofenmuffel nach Anspruch 8, wobei die Muffelwand (22) und/oder das Abdeckelement (10) mit einer Emailbeschichtung versehen sind.
10. Ofen, umfassend:
 - (a) eine Ofenmuffel nach einem der vorhergehenden Ansprüche; und
 - (b) einen Ventilator, der an der Ofenwand 22 derart befestigt ist, dass sich das Ventilatorlaufrad in dem Befestigungsbereich (24) befindet.
11. Ofen nach Anspruch 10, ferner umfassend mindestens ein Heizelement, das sich in dem Befestigungsbereich 24 der Muffelwand (22) befindet.
12. Ofen nach Anspruch 11, wobei das Heizelement ein ringförmiges Heizelement umfasst, wobei sich das Ventilatorlaufrad in dem Umfang des ringförmigen Heizelements befindet.

Revendications

1. Moufle de four, comprenant :

- (a) une paroi de moufle (22) comprenant une région de montage (24) pour un ventilateur, et une pluralité de trous traversants (32) prévus dans le périmètre de ladite région de montage en vue de l'insertion de boulons de raccordement (36), et
- (b) un élément de recouvrement (10) pour ladite région de montage (24), ledit élément de recouvrement comprenant une pluralité de protubérances (20) comprenant des ouvertures (18) qui chevauchent lesdits trous traversants (32) de la paroi de moufle (22), lesdites protubérances faisant saillie à partir dudit élément de recouvrement en direction de la paroi de moufle de façon à maintenir l'élément de recouvrement à une certaine distance de ladite paroi de moufle ;

caractérisé en ce que chaque trou traversant (32) prévu dans la paroi de moufle (22) comprend une protubérance (34) faisant saillie en direction de l'élément de recouvrement (10), la protubérance (20) de l'élément de recouvrement (10) et la protubérance (34) de la paroi de moufle (22) étant accolées au niveau de leurs surfaces en saillie et la protubérance (20) de l'élément de recouvrement (10) et la protubérance (34) de la paroi de moufle (22) présentant essentiellement la même étendue dans un plan essentiellement parallèle à la paroi de moufle (10) au niveau de l'emplacement des protubérances (20, 34).

2. Moufle de four selon la revendication 1, dans lequel lesdites protubérances (20) de l'élément de recouvrement (10) comprennent des renflements globalement en forme de godet.
3. Moufle de four selon la revendication 1 ou 2, dans lequel lesdites protubérances (34) prévues au niveau de la paroi de moufle (22) comprennent des renflements globalement en forme de godet.
4. Moufle de four selon l'une quelconque des revendications précédentes, dans lequel ladite paroi de moufle (22) comprend, dans ladite région de montage (24), un évidement (26) destiné à recevoir une hélice de ventilateur.
5. Moufle de four selon l'une quelconque des revendications précédentes, dans lequel ladite paroi de moufle (22) comprend, dans ladite région de montage (24), au moins un évidement (30) destiné à recevoir un élément chauffant.
6. Moufle de four selon l'une quelconque des revendications précédentes, dans lequel ledit élément de recouvrement (10), dans sa région centrale, comprend au moins une ouverture de ventilation (38).
7. Moufle de four selon l'une quelconque des revendications précédentes, dans lequel ledit élément de recouvrement (10) comprend, dans sa région centrale, un renflement (16) conçu pour pouvoir recevoir une hélice de ventilateur.
8. Moufle de four selon l'une quelconque des revendications précédentes, dans lequel ladite paroi de moufle (22) et/ou ledit élément de recouvrement (10) sont constitués de tôle.
9. Moufle de four selon la revendication 8, dans lequel ladite paroi de moufle (22) et/ou ledit élément de recouvrement (10) sont dotés d'un revêtement en émail.
10. Four, comprenant :

- (a) un moufle de four tel que défini dans l'une quelconque des revendications précédentes ;
et
(b) un ventilateur fixé à la paroi de moufle (22) de telle sorte que l'hélice du ventilateur soit située à l'intérieur de la région de montage (24). 5
11. Four selon la revendication 10, comprenant en outre au moins un élément chauffant situé dans la région de montage (24) de la paroi de moufle (22). 10
12. Four selon la revendication 11, dans lequel ledit élément chauffant comprend un élément chauffant de forme annulaire, dans lequel l'hélice du ventilateur est située à l'intérieur du périmètre de l'élément chauffant de forme annulaire. 15

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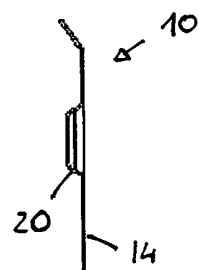
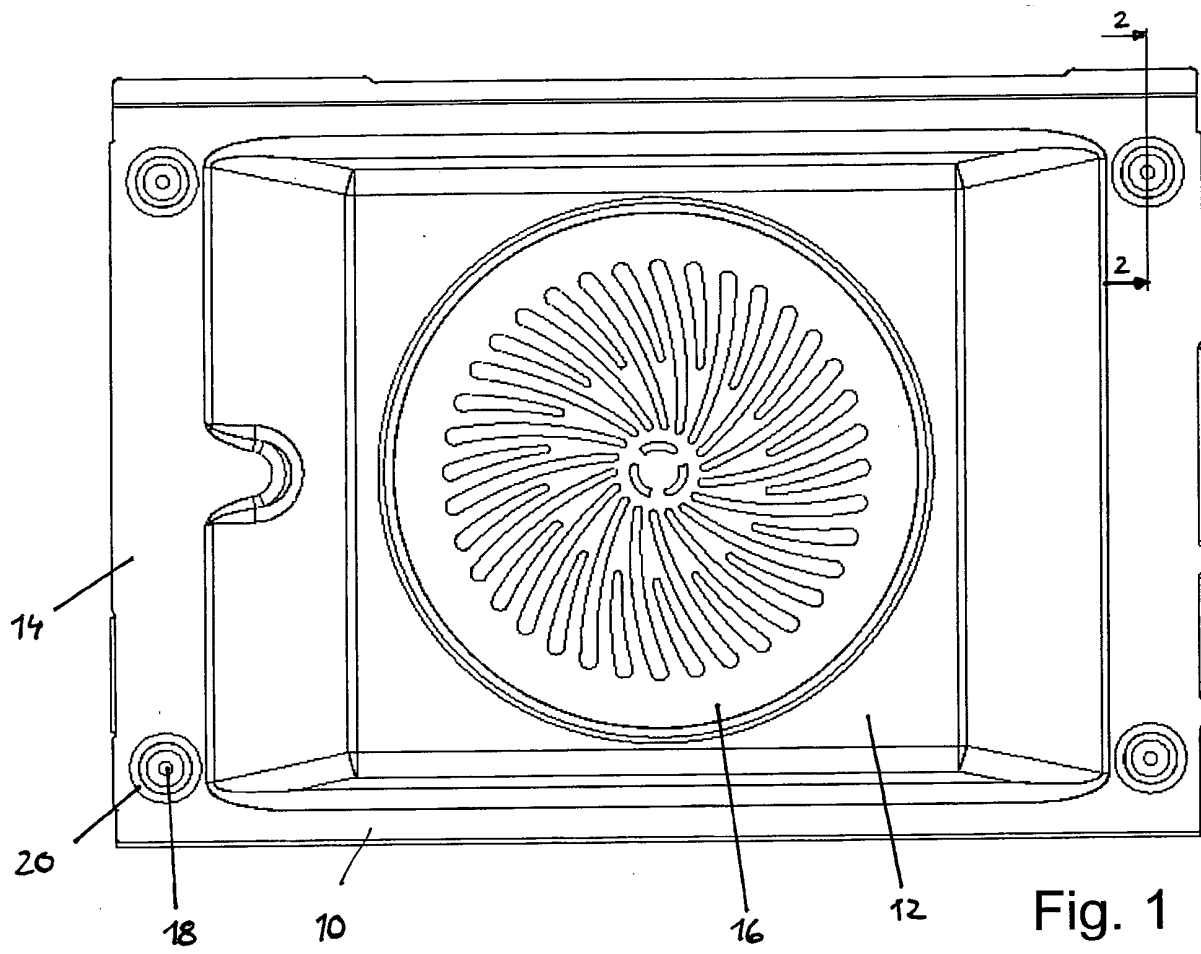
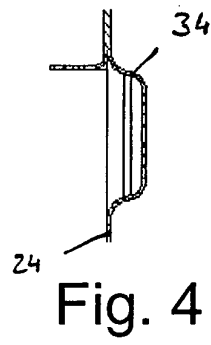
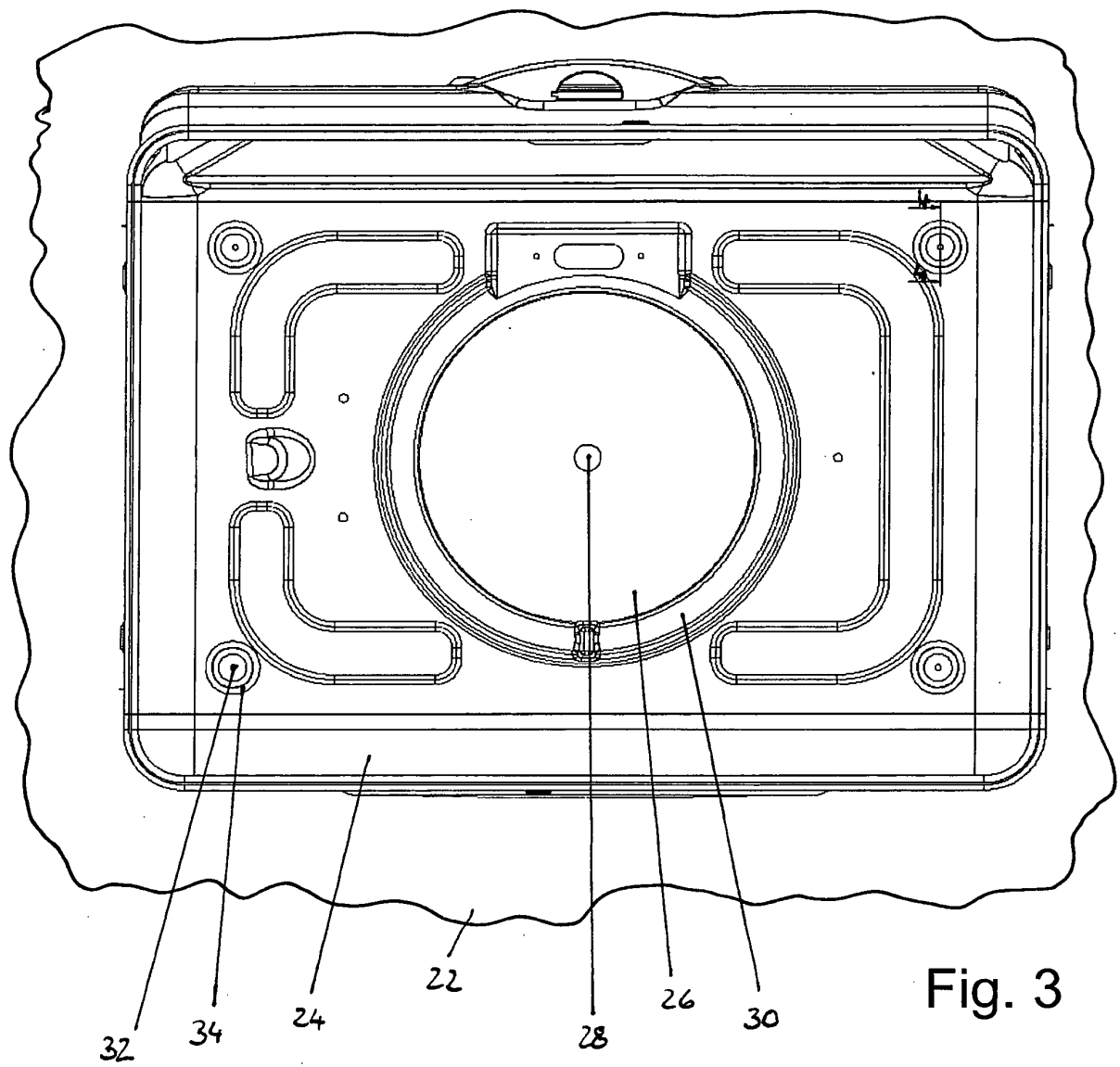


Fig. 2



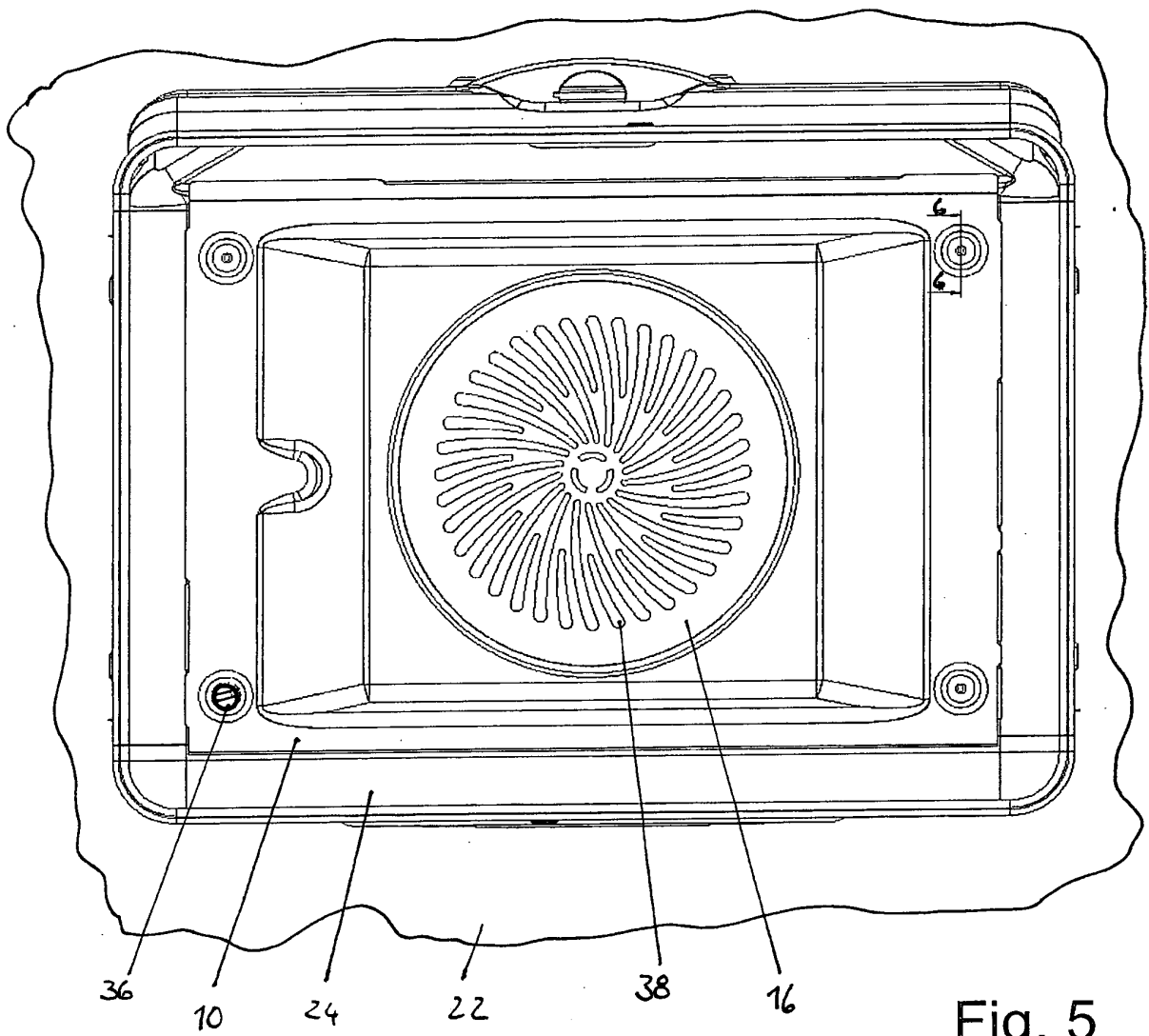


Fig. 5

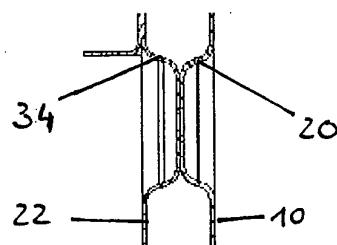


Fig. 6

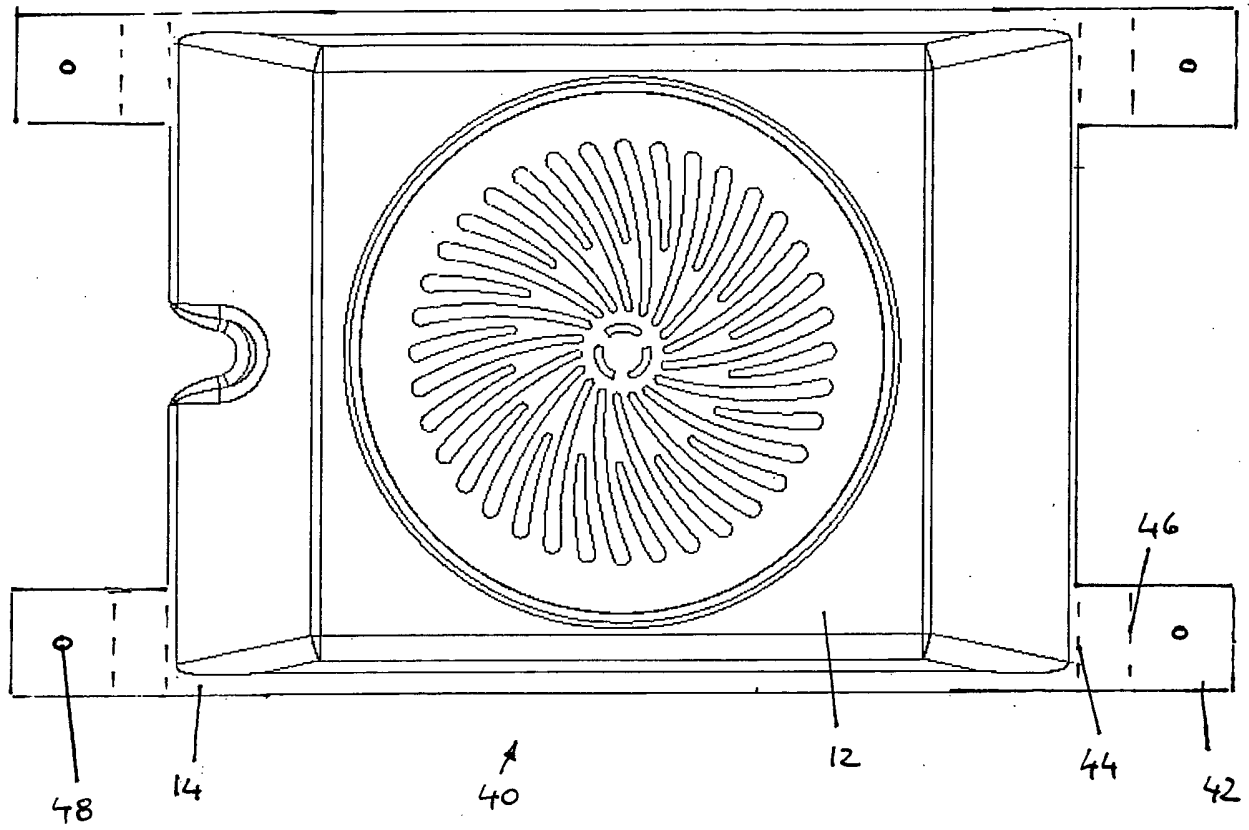


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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