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(54) **CAVITY ASSEMBLY FOR AN OVEN WITH MICROWAVE HEATING FUNCTION FOR HEATING COMESTIBLE**

(57) The invention relates to a cavity assembly (1) for an oven (2) with microwave heating function for heating comestible, the cavity assembly (1) has a front side (3) and a rear side (4), the front side (3) being the side accessible in use, wherein the cavity assembly (1) comprises at least the following components:

- a cavity member (5) having a frontal opening (6) toward the front side (3) for receiving comestible; and
- a front frame (7) connected to the cavity member (5) at the frontal opening (6),

wherein the cavity member (5) comprises a cavity-side flange (8) at the frontal opening (6) and the front frame (7) comprises a frame-side flange (9), the flanges (8,9) extending toward the rear side (4). The cavity assembly (1) is characterized in particular in that the two flanges (8, 9) are embraced at least in sections by at least one common choke profile (10, 11), the choke profile (10, 11) being configured for blocking against microwave radiation.

With the choke profile proposed here, control electronics can be effectively protected from microwave radiation.

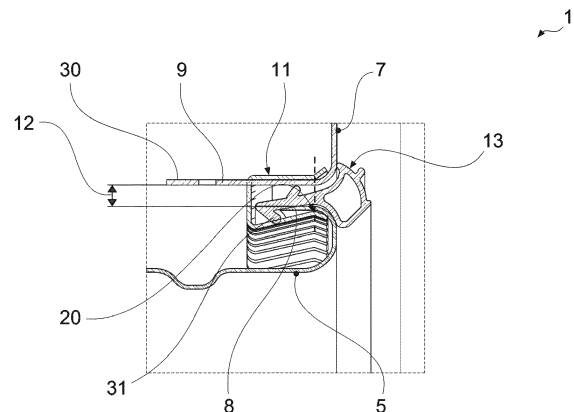


Fig. 7

Description

[0001] The invention relates to a cavity assembly for an oven with microwave heating function for heating comestible, an assembly method for such a cavity assembly, and an oven with such a cavity assembly with microwave heating function for heating comestible.

[0002] Ovens with microwave heating function for heating comestible are sufficiently known in various embodiments. An important safety aspect of such an oven is that the user must be shielded from microwave radiation. However, it has also been found that failures can occur in the electronics of the oven if microwave radiation is emitted from the front side of the cavity in which comestible can be placed for heating and is reflected from the rear side.

[0003] For this purpose, it is known to provide a gasket between the cavity member and a front frame, this gasket being mixed with electrically conductive material, for example metal, in order to reflect and/or absorb any microwave radiation that may occur. It is desired to find a more cost-effective solution for this.

[0004] The present invention is based on the task of at least partially overcoming the disadvantages known from the prior art. The features according to the invention result from the independent claims, for which advantageous embodiments are shown in the dependent claims. The features of the claims can be combined in any technically sensible manner, wherein the explanations from the following description as well as features from the figures, which comprise supplementary embodiments of the invention, can also be consulted for this purpose.

[0005] The invention relates to a cavity assembly for an oven having microwave heating function for heating comestible,

the cavity assembly having a front side and a rear side, the front side being the side accessible in use, the cavity assembly comprising at least the following components:

- a cavity member having a frontal opening toward the front side for receiving comestible; and
- a front frame connected to the cavity member at the frontal opening,

wherein the cavity member comprises a cavity-side flange at the frontal opening and the front frame comprises a frame-side flange, the flanges extending toward the rear side.

[0006] The cavity assembly is characterized in particular by that the two flanges are embraced at least in sections by at least one common choke profile, the choke profile being configured for blocking against microwave radiation.

[0007] Unless explicitly stated to the contrary, ordinal numbers used in the preceding and following descrip-

tions are merely for the purpose of unambiguous distinguishability and do not reflect any order or ranking of the designated components. An ordinal number greater than one does not imply that another such component must necessarily be present.

[0008] The oven for which the cavity assembly is arranged is functionally designed, for example, as conventionally known. The oven comprises a heatable treatment chamber for treating food, mostly comprising a top wall, a bottom wall, two opposing lateral walls, a frontal opening and a door for closing and opening the frontal opening. The oven is arranged for heating comestible by means of microwave radiation. For this purpose, the cavity assembly comprises a cavity member and a front frame. The cavity member encloses with its walls on a plurality of sides an interior space in which comestible can be placed. The cavity member is preferably formed in one piece. Alternatively or additionally, the cavity member has further structural elements which are, for example, screwed on, riveted, welded on or soldered/brazed on and are mounted before, during or after being connected to the front frame. The cavity member is preferably a formed, for example deep-drawn, sheet metal component. The cavity member is preferably closed by means of its walls on five sides of an imaginary parallelepiped, often with the shape of the cavity member being somewhat more complex than the shape of a parallelepiped, for example with chamfered edges and corners, indentations and/or passages. Passages are formed, for example, for structural elements, for example, screws, light, ventilation, supply lines, and/or an inlet for microwave radiation from a microwave source located outside the interior of the cavity member. In one embodiment, at least one passage in use in an oven is not closed, but merely suitably covered against excessive leakage of microwave radiation. A frontal opening is formed from the cavity member to the front side, which can be closed by means of a door of the oven. The front frame has the function to bear against the closed door and reduce escape of heat, humidity, and microwave radiation.

[0009] In one embodiment, the cavity assembly is further adapted for steam cooking, wherein at least one inlet and outlet for steam from at least one steam source arranged outside the interior of the cavity member is accordingly provided and/or at least one steam source is arranged inside the cavity member. Accordingly, such an oven comprises a water source, for example a tank and/or a water connection for a household water pipe. In this embodiment, it is often necessary, at least desired or required for safety regulations or a desired service life, respectively, that the cavity member is double enamelled.

[0010] The cavity member or its interior is visible to the user from the front side through the frontal opening when the door is open. A front frame is attached to the front side of the cavity member. The front side is the side that faces the user in use and can be closed with the door of the oven. In use, the oven is frequently integrated into a kitchen unit, for example, so that the rear side opposite

the front side is not accessible, for example, it is aligned with a wall. The lateral sides of the oven adjoin, for example, adjacent kitchen elements, for example cabinet elements or other kitchen appliances, or at least one lateral side is exposed. The top side, or rather its surface normal pointing away from the interior of the cavity member, points upward, and the bottom side points downward, with respect to the earth gravity field. It should be noted that the sides are described here in an idealized manner and, as already indicated above, often do not correspond to the shape of the walls of the cavity member and are or are intended to be precisely aligned with the earth's gravitational field only to technical scales, for example with the aid of a standard household spirit level.

[0011] In principle, it is not excluded that the cavity member also partially covers the front side with a wall i.e., partially encloses the interior space. In a preferred embodiment, the cavity member does not comprise a wall that encloses the interior space towards the front side. Nevertheless, at least one flange is provided, for example, which extends at least in part parallel to the front side, preferably outwardly i.e., away from the frontal opening of the cavity member. In one embodiment, such a flange is formed circumferentially in the plane of the front side face. Such a flange is adapted to be connected to the front frame, for example. The flanges of the cavity member and of the front frame in one embodiment surround respective frontal opening of the cavity member and a corresponding central opening in the front frame.

[0012] In an advantageous embodiment, the front frame is set up as a door frame for the door of the oven. The front frame is permanently, preferably directly, connected to the cavity member in use. The front frame then correspondingly comprises a receptacle for a hinge or joint for the door and/or a gasket element for abutment against the door when the door is closed. Often, the front frame comprises a plurality of openings for venting, for example, to remove heat and/or moisture. In one embodiment, the front frame itself is not completely closed by the door of the oven, but a channel is provided to the outside, for example to the front side. Nevertheless, an interior space of the cavity member is completely closed by means of the door, at least with respect to microwave radiation i.e., on all six sides. It should be noted that in some embodiments, microwave radiation is also allowed to escape up to a permissible small extent to the front side, i.e., through a door or a slot between the door and the front frame or cavity member or gasket element. However, the microwave radiation is then reduced to such a small extent that it is classified as harmless and may thus be considered technically shielded. The microwave radiation is then also referred to hereafter as blocked. The choke profile has a specific structure that is itself tight against microwave radiation, and, thus, absorbs or reflects microwave radiation.

[0013] It should be noted that in one embodiment, the front frame surrounds the frontal opening of the cavity member. The front frame has a corresponding opening

that surrounds the frontal opening of the cavity member. Furthermore, it should be noted that in one embodiment the front frame is connected to the cavity member immediately adjacent to the frontal opening. Alternatively or in areas deviating therefrom, the front frame is connected to the cavity member outside the frontal opening i.e., towards the upper side, the lower side or one of the lateral sides, respectively, at a distance from the frontal opening. In an advantageous embodiment, a gap is formed between the cavity member and the front frame. Such a gap is open, for example, for receiving a gasket element. In one embodiment, the gap is partially closed at least once, preferably multiple times, for forming a connecting element between the cavity member and the front frame.

[0014] The front frame is preferably formed in one piece. Alternatively or additionally, the front frame has further structural elements which are, for example, screwed on, riveted, welded on or soldered/brazed on and are mounted before, during or after connection to the cavity member.

[0015] As already described above, the cavity member at the frontal opening comprises a cavity-side flange and the front frame comprises a frame-side flange. The cavity-side flange is connected to the cavity member, preferably formed integrally therewith, particularly preferably from a blank, for example by means of deep drawing from a sheet metal component. The frame-side flange is connected to the front frame, preferably formed integrally therewith, particularly preferably from a blank, for example by means of cold forming, for example folding over, from a sheet-metal component. The flanges extend at least with a part towards the rear side, preferably parallel to the upper side, lower side or lateral side. In an advantageous embodiment, the two flanges are aligned parallel to each other. In one embodiment, the flanges are formed circumferentially around the frontal opening. In one embodiment, the flanges are formed from a plurality of individual flange elements, of which an intended circumferential element is formed collectively. Preferably, the flanges are uniquely interrupted by fastening portions and/or passages. In a preferred embodiment, at least one of the flanges comprises at least one fastening element for connection to the front frame and/or the cavity member. Particularly preferably, the cavity member and the front frame are connected to each other by means of said flanges, for example exclusively by means of said flanges. In an advantageous embodiment, said flanges are formed extending to the rear side outside of fastening portions, for example apart from the previously described fastening elements, preferably parallel to each other.

[0016] It should be noted that the ends of the flanges i.e., the open ends, in one embodiment have an end formation, for example a flanged edge or a rounding, which deviate from the original extension towards the rear side. In a preferred embodiment, the respective open end of one of the flanges is a planar extension of the rear side extension i.e., the relevant flange is planar up to a cut edge or up to a rounded end. Alternatively or additionally,

in the region of the flat outward and/or inward extension of a flange, at least in sections, at least one elevation with outward and/or inward deviation from the flat surface or a hole is provided.

[0017] The choke profile is designed to prevent, to a technical degree, the passage of at least such microwave radiation that has been introduced into the interior of the cavity member. This means that a permissible or uncritical amount of microwave radiation is allowed to pass through. This is not a matter of protecting a user. Rather, the electronics located in the oven and outside the cavity member are protected from excessive intensity or frequentness of a microwave radiation. For example, the probability of a radiation angle is also taken into account for an estimation of a frequentness, so that not necessarily every slot has to be blocked, but for example a coverage of, for example, at least 70% to 90% of a passage area to be blocked is sufficient. Alternatively, at least technically complete coverage is achieved.

[0018] The choke profile is set up in such a way that, in use, it embraces both, the cavity-side flange and the frame-side flange. Such a choke profile is easy to install and at the same time forms an effective barrier against microwave radiation. For this purpose, the choke profile is formed with a microwave radiation absorbing and/or reflecting material. Such a material is, for example, a metal or a plastic with itself electrically conductive properties or embedded aggregates, for example metallic particles or fibers. Preferably, the choke profile is a cold-formed sheet element, wherein, in addition to metallic sheets, so-called organo sheets are also a suitable material.

[0019] In an advantageous embodiment, the choke profile is self-retaining, wherein low friction forces or spot soldering/brazing or welding are sufficient for self-retaining due to the purely static load in use. Preferably, the choke profile is designed to be self-retaining in such a way that it is highly unlikely or certain not to fall off during transport without further securing. Preferably, apart from the placement of the choke profile, no other measure is necessary for the (self-retaining) mounting of the choke profile.

[0020] The choke profile embraces the two flanges in such a way that contact, preferably direct contact, is formed with both the cavity-side flange and the frame-side flange. Preferably, the choke profile is of one-piece and simple design, wherein further separate elements are not provided and are not mounted later. For example, the choke profile is designed as a U-profile, with the two flanges engaging in the U-profile in the assembled state. A U-profile in a simple design has a back and two arms extending from the back. Preferably, that U-profile is made by extrusion molding.

[0021] It is further proposed in an advantageous embodiment of the cavity assembly that a gap is formed between the two flanges at least in sections,

wherein the gap is covered at least in sections at the rear side by the choke profile,

wherein preferably the two flanges are aligned parallel to each other.

[0022] In this embodiment, it is proposed that a gap is formed between the two flanges and thus between the cavity member and the front frame. This gap is formed circumferentially or only in sections. For example, such a gap is provided as an interruption of heat conduction i.e., to prevent heat transfer by direct contact. For example, in the area of fastening portions the gap is closed and there, for example directly, the front frame is in contact with the cavity member. Here, a sufficient barrier against microwave radiation is often already formed, so that no additional element for blocking is necessary here. Preferably, outside these fastening portions, the gap is covered by means of the choke profile everywhere; preferably everywhere except for gaps due to technical reasons, for example due to necessary clearance for assembly. The choke profile is applied from the rear side over the two flanges, for example pushed on, so that the gap is thus covered from the rear side.

[0023] In an advantageous embodiment, the two flanges are aligned parallel to each other so that the choke profile can be easily applied on to the two flanges and the flanges are thus embraced by the (common) choke profile. In a particularly preferred embodiment, the flanges are aligned parallel to the direction of insertion of comestible into the interior of the cavity member, for example a direction which is perpendicular to the frontal opening of the cavity member. Alternatively or additionally, this insertion direction is oriented transverse to the earth gravity field and directed from the front side to the back when the cavity assembly is mounted in an oven in use.

[0024] It is further proposed in an advantageous embodiment of the cavity assembly that the gap to the front side is closed, at least in sections, by a gasket element.

[0025] Here it is proposed that the gap towards the front side is closed with a gasket element, for example as previously described. In one embodiment, the gasket element is arranged for gasketingly abutting the door of an oven, in the state in which the door is closed. In one embodiment, the gasket element is designed with a barb such that it plunges through the gap behind at least one of the flanges or engages in a hole in one of the flanges to secure the position of the gasket element, preferably under tensile stress. The gasket element is, for example, of conventional design and the choke profile is preferably arranged, in view from the front side, overlapping and/or in the same circumferential manner, preferably apart from any fastening portions, as the gasket element, while preferably the choke profile and the gasket element are not physically overlapping each other. In another embodiment, the gasket element, for example a barbed hook of the gasket element, is configured and arranged as a friction element for the choke profile, wherein on the one hand a spring effect is formed on the choke profile and on the other hand, due to the surface of the gasket element, a pairing with a higher coefficient of friction and

thus increased friction locking is provided.

[0026] It is further proposed in an advantageous embodiment of the cavity assembly that the choke profile has a plurality of inwardly extending tongues, wherein preferably the tongues each have a, more preferably wedge-shaped, tongue-gap with respect to one another.

[0027] Here, it is proposed that the choke profile entirely or in sections, preferably for a rounding of the cavity member or a sharp-edged corner of the cavity member, which both are referred to here as a corner portion, has a plurality of inwardly extending tongues. Inward here is the direction from the outside toward the inside of the cavity member and, for example, along a radius with the insertion direction defined above as the axis. In one embodiment, these tongues are spaced apart from each other, preferably by means of a wedge-shaped tongue-gap, so that the choke profile for a corner portion is suitable for reshaping the respective curve or corner without the tongues interfering with each other. In a U-profile, the tongue and the respective tongue-gap extend over the back, at least partially, and one of the arms extending from the back. Preferably, the other arm does not have i.e., is free of, a tongue and tongue-gap.

[0028] In one embodiment, the shape of the tongue-gap is designed for an exact rounding radius or, if necessary, also a variable rounding radius. In an alternative embodiment, the tongue-gap is designed in such a way that a minimum rounding radius is possible without overlapping the tongues, but the choke profile for a corner portion can also be used for a larger rounding radius. In this case, the remaining deformed tongue-gap between the tabs after forming the choke profile is sufficiently small to achieve the above-mentioned desired barrier effect against microwave radiation.

[0029] In one embodiment, the tongues are made to overlap with each other after forming. In this case, for example, a pin-shaped tongue-gap is formed, with the pin head-shape being a start of the tongue-gap in the material of the choke profile and the needle-shape is extending from the pin head-shape to the end portion of the tongues. Preferably, the respective adjacent tongues are arranged offset from each other in the direction of the extension of the flanges and overlap each other after fitting to the respective non-straight portion of the cavity member, if necessary.

[0030] In one embodiment, the choke profile includes tongues over various sections or its entire extension parallel to the flanges, whereby the choke profile is configured to be adapted to an individual shape of the flanges to be embraced. In one embodiment the choke profile is provided in an arbitrary length of extension, preferably in a standardized length, and is to be cut for the present section of the flanges to be embraced. Having a plurality of tongues or tongues over the entire extension, it can be adapted to the present individual shape of the flanges to be embraced e.g., one or more corner portions within the present section to be embraced.

[0031] In one embodiment, the tongue-gaps are de-

signed to allow the choke profile to be adapted to a non-straight portion of the cavity member, for example, to be adapted by hand or with at least sufficiently low force so that this can be performed with a hand tool, such as pliers.

[0032] It is further proposed in an advantageous embodiment of the cavity assembly that the choke profile is made of metal, preferably of stainless steel.

[0033] In this embodiment, it is proposed that the choke profile is formed from a metal, thus, being an electric conductive material absorbing and reflecting microwave radiation. In one embodiment, the choke profile is made of spring steel allowing for high clamping forces and/or long durability of a clamping force over a long service life. Stainless steel has several advantageous properties for the intended use. On the one hand, very good corrosion resistance is achievable, which is particularly advantageous for use in an oven with a steam cooking function, for example. On the other hand, such material strength is achievable that even in the case of an embracing with an undersize, the choke profile achieves such sufficient elastic dimensional stability over a desired service life that it can be designed to be self-retaining over this service life, which can be the case for non-stainless metals, too. Furthermore, such a choke profile made of a stainless steel is easy to machine and, due to the high corrosion resistance, no special protective measures are necessary to provide special protection for the surface of the choke profile during, for example, cold forming and or thermal finishing.

[0034] It is further proposed in an advantageous embodiment of the cavity assembly that the choke profile for embracing the two flanges has at least an elastic undersize relative to the two flanges to be embraced.

[0035] In this embodiment, as already mentioned above in connection with the stainless steel design of the choke profile, the choke profile is undersized relative to the distance between the respective back sides and contact faces, respectively, of the flanges with which the choke profile comes into contact in the assembled state. Such a choke profile can be pushed onto the two flanges. Due to the undersize, preferably within the elastic deformation of the choke profile, for example a U-profile, a clamping is created between the choke profile and the two flanges. This ensures sufficient friction locking for self-retaining mounting of the choke profile on the two flanges by simple means.

[0036] It is further proposed in an advantageous embodiment of the cavity assembly that the choke profile comprises a guide surface for areal contact with one of the two flanges and, additionally, comprises a contact tab which is constructed to form a contact line with the other flange.

[0037] Here it is proposed that the choke profile has a guide surface on the one hand and a contact tab on the other. The contact tab is designed to form a technical contact line with one of the two flanges which is overlapped. In one embodiment, the contact line is a continuous line across the e.g., circumferential, extent of the

choke profile or a plurality of contact points through which an imaginary line can be drawn. This contact line is not necessarily straight. The contact plate thus has a kink which has an elevation facing the respective flange. Preferably, this kink is spaced with an, particularly preferably purely elastic, undersize in comparison to the opposite guide surface.

[0038] The guide surface, on the other hand, is set up for areal i.e., two-dimensional, contact, wherein here too the areal contact is to be regarded as two-dimensional from a purely technical point of view and it is irrelevant here whether the guide surface is in contact with the respective flange via a plurality of, for example stochastically distributed, points and/or lines. In one embodiment, the guide surface is implemented by a plurality of kinks, wherein the kink extension i.e., the ridge of such a kink, has a vector component in the mounting direction, for example is aligned parallel to the mounting direction. Such kinks are perpendicular to above-mentioned kink of the contact tab.

[0039] In addition to the advantage of easy assembly of such a choke profile, there is also the advantage that a thermal break is formed in that heat conduction is limited to the contact line. Preferably, the contact line is formed on the cavity-side flange, so that the choke profile is already only slightly heated.

[0040] In an alternative embodiment, the choke profile has such a contact tab on both sides, and preferably a guide portion is also provided by means of which the choke profile is guided to at least one of the flanges in such a way that simple and safe assembly of the choke profile is ensured.

[0041] In yet another embodiment, the choke profile has two guide surfaces, each for areal contact with one of the two flanges.

[0042] It is further proposed in an advantageous embodiment of the cavity assembly that the choke profile has a mounting widening on its front side.

[0043] In this embodiment, a mounting widening is provided, for example in the case of a choke profile made of a sheet material by means of an outwardly directed bend; outwardly relative to the receiving opening of the choke profile for the flanges. Such a mounting widening, for example also designed as a chamfer, is set up to make it easier to guide the choke profile onto the flanges.

[0044] In an embodiment of the choke profile with an undersize, the mounting widening is preferably designed in such a way that the choke profile can be placed on the flanges without elastic deformation and can be guided safely onto the two flanges even with limited visibility. For example, such a mounting widening or another guide device for the choke profile prevents the choke profile from being guided over only one of the two flanges, which false mounting position would not ensure the barrier effect against microwave radiation.

[0045] It is further proposed in an advantageous embodiment of the cavity assembly that a straight choke profile for a straight portion of the cavity member and/or

the front frame and a rounded choke profile for a corner portion of the cavity member and the front frame are one piece.

[0046] Here, it is proposed that a straight choke profile and at least one rounded choke profile for a corner portion of the cavity member, for example as previously described, or with a predetermined shape adapted to the respective corner portion of the cavity member and the front frame, are formed in one piece. In one embodiment, the choke profiles are formed from a common sheet, joined together with another before assembly, for example by welding.

[0047] In one embodiment, a circumferential profile is formed including a plurality of straight and rounded choke profiles, with preferably corresponding recesses being formed for any fastening portions between the cavity member and the front frame

[0048] In a particularly simple embodiment, a straight choke profile is provided with one or two rounded or roundable choke profiles, the roundable choke profiles being adaptable for the respective corner portion, so that such a profile can be used for a plurality of cavity assemblies in different embodiments.

[0049] It should be noted that a straight portion of the cavity member is not necessarily a straight portion of the front frame and vice versa. Rather, for example, a curve is formed on one of them, for example, for a passage or installation of another element.

[0050] It is further proposed in an advantageous embodiment of the cavity assembly that the choke profile is fixed to the cavity member and the front frame by means of at least one of the following:

- friction locking;
- positive locking; and
- material locking.

[0051] For example, the friction locking i.e., a gripping fixation, is achieved via a clamping. In that embodiment, the choke profile is a, preferably metal, clamp corresponding to the flanges brought into alignment with each other. For example, the positive locking i.e., a fixation with corresponding interlocking structures, is formed via an undercut, preferably together with a corresponding elasticity of the choke profile or by means of a bayonet-type slide-on. For example, the material locking i.e., a chemical or physical bond between substrates or their contacted surfaces, is formed by means of welding spots and/or soldering/brazing spots. In one embodiment, a combination is applied, preferably of friction and positive locking.

[0052] It is further proposed in an advantageous embodiment of the cavity assembly that the cavity member and the front frame are non-destructively detachably connected to each other.

[0053] Here, it is suggested that the cavity member and the front frame are not welded together, for example, but can be dismantled from each other again by simple

means. For example, the cavity member and the front frame are screwed together. In one embodiment, the two elements are riveted together, wherein neither the cavity member nor the front frame are damaged if the rivets are removed accordingly, for example drilled out. An advantage of non-destructively joined elements is that the two elements can have material property or surface property independent from requirements for welding and/or the order of assembly and surface treatment can be designed more flexible.

[0054] It is further proposed in an advantageous embodiment of the cavity assembly that the cavity member is double enamelled and the front frame is single enamelled.

[0055] In this embodiment of the cavity assembly, it is particularly advantageous for an oven with a steam cooking function, so that the cavity member, which is exposed to the steam, is sufficiently corrosion resistant due to a double enamel coating, and the front frame, which is not exposed to the steam or is exposed to it to a significantly lesser extent, only needs to be single enamelled. If, for example, the cavity member and the front frame are welded together, the front frame must be enamelled as well when the cavity member is enamelled. Due to the thermal treatment of enamelling, it is a complex task to prevent distortion of the cavity member. Significant costs can therefore be saved here.

[0056] According to a further aspect, an assembly method for a cavity assembly according to an embodiment as described above is proposed, comprising the following steps:

- a. Providing the cavity member, the front frame and the at least one choke profile;
- b. after step a., aligning the front frame with the cavity member at the frontal opening of the cavity member; and
- c. after step a., applying the at least one choke profile over the two flanges of the cavity member and the front frame so that the two flanges are embraced.

[0057] With the assembly method for the cavity assembly proposed herein, as previously described, the assembly of the cavity assembly can be carried out in a particularly simple and cost-efficient manner. In the step a., for a respective cavity assembly, the cavity member and the front frame and the required number of choke profiles are provided, depending on the embodiment. It should be noted that the providing in the step a. does not have to take place simultaneously and that at least one of the choke profiles is provided, for example, only at the step c.. In a preferred embodiment, steps a., b., and c. take place in alphabetical order.

[0058] In step b., the front frame and the cavity member are aligned with each other so that the front frame can be connected to the cavity member at the frontal opening. In a preferred embodiment, in step b. the front frame is already connected to the cavity member, for example

screwed or riveted. Preferably, the front frame and the cavity member are connected to each other in a non-destructively detachable manner.

[0059] In step c., the at least one choke profile is applied to the two flanges such that the choke profile is adapted to block microwave radiation in operation of the oven housing the cavity assembly as described above. In one embodiment, after step c., the connection between the front frame and the cavity member is made.

[0060] It is further proposed in an advantageous embodiment of the assembly method that in a step d. before step a., the cavity member and the front frame have been final surface treated.

[0061] Here, it is suggested that the cavity member and the front frame are already provided with a surface treatment before step a. is carried out. For example, the cavity member is already single or double enamelled and the front frame is also single or double enamelled.

[0062] According to a further aspect, an oven with microwave heating function for heating comestible is proposed, comprising at least the following components:

- a cavity assembly according to an embodiment as described above;
- a door by means of which, in cooperation with the front frame, the frontal opening of the cavity assembly is closable;
- a microwave source for providing microwave radiation for heating comestible located inside the cavity member;
- control electronics for controlling functions of the oven;
- a supply connection for the microwave source; and
- a control interface for controlling functions of the oven, wherein the at least one choke profile is arranged to shield the control electronics against microwave radiation,

wherein preferably the oven comprises a steam source which is configured to steam cook comestible which is located inside the cavity member.

[0063] The oven proposed here with microwave heating function, and preferably with steam cooking function, for comestible accommodated inside the cavity member has a cavity assembly as described above. The cavity assembly, respectively its frontal opening, is closable via a door in cooperation with the front frame, preferably by means of a gasket element.

[0064] The microwave source, for example a magnetron, is preferably arranged outside the interior of the cavity member and the microwave radiation is conducted to the interior of the cavity member via a corresponding radiation line. Control electronics, which are set up to regulate the functions of the oven and can be controlled at least indirectly via a user interface, are also arranged outside the cavity member. In one embodiment, the control electronics are integrated into power electronics. Alternatively, the control electronics are separate and pref-

erably spatially separated from the power electronics. In one embodiment of the oven as a system, for example, the control electronics are common control electronics for other elements, such as a cooktop.

[0065] The control interface is set up for the user to operate the functions of the oven, for example, by means of buttons, by means of a touch screen and/or via a wireless communication link to an external separate control element and is connected to control electronics in a communicating manner. A wireless communication link makes use of radio-waves, preferably as standardized such as personal area network, wireless local area network, mobile communication standards as LTE and 5G or the like.

[0066] A supply connection for, for example, electricity and/or water for the steam source is further provided, and preferably the power take-off is controlled by means of the control electronics.

[0067] By means of the at least one choke profile, the control electronics are adequately protected from microwave radiation and thus a failure of the oven due to damage by microwave radiation is virtually excluded.

[0068] In a preferred embodiment, as mentioned above, the cavity, preferably for an oven having a steam function, is double enameled because a single enamel layer often does not provide sufficient corrosion protection in a steam oven, whereas two layers do. However, that is not needed on the front frame, allowing to save costs. The proposed oven allows to combine a double-enamelled cavity with a single enamelled front frame even in a steam oven that has in addition microwaves.

[0069] The invention described above is explained in detail below against the relevant technical background with reference to the accompanying drawings, which show preferred embodiments. The invention is in no way limited by the purely schematic drawings, it being noted that the drawings are not dimensionally accurate and are not suitable for defining dimensional relationships. It is illustrated in

- Fig. 1: an oven with cavity assembly in a perspective front side view;
- Fig. 2: a cavity assembly in a perspective rear side view;
- Fig. 3: a detail of the cavity assembly according to Fig. 2 in a perspective view;
- Fig. 4: a choke profile in a first embodiment;
- Fig. 5: a choke profile in a second embodiment;
- Fig. 6: a rounded choke profile in a sectional view;
- Fig. 7: in a sectional view a corner portion of a cavity assembly; and
- Fig. 8: A flowchart of an assembly process for a cavity assembly.

[0070] Fig. 1 shows an example of an oven **2** which includes a cavity assembly **1**, for example as shown in Fig. 2 and as will be explained in more detail later on. Here the perspective view is from the front side, so that

we are looking here at the door **22** at the front side **3**. For orientation, further top side **27**, bottom side **28**, lateral side **29** and rear side **4** are designated. On the top side **27** is a microwave source **23**, for example a magnetron, and control electronics **24**, both of which are located outside the cavity member **5** of the cavity assembly **1**. Furthermore, a supply connection **25** is provided, shown here for electrical power, here with a standard household plug **32** for a standard household wall socket. An optional steam source for steam cooking is not shown in this view.

[0071] On the front side **3** above the door **22**, buttons of a control interface **26** are furthermore visible, via which the control electronics **24** of the oven **2** can be addressed by a user. With the aid of the at least one choke profile **10, 11**, as shown for example in Fig. 2 and/or Fig. 7 and explained in more detail later on, the control electronics **24** are effectively protected from microwave radiation which could leak out from the interior of the cavity member **5** to the outside towards the top **27**.

[0072] In Fig. 2, a cavity assembly **1** for an oven **2**, for example as depicted in Fig. 1, is shown in a perspective rear side view, obliquely from the rear side **4**. The approximately parallelepiped-shaped cavity member **5** is thus visible in the foreground and the front frame **7**, which surrounds the frontal opening **6**, is partially concealed in the background. The top side **27**, bottom side **28** and visible lateral side **29**, as well as the front side **3** are designated in the drawing for orientation. A section of the frontal opening **6** is visible through an opening in the upper wall of the cavity member **5**.

[0073] In this embodiment, the front frame **7** and the cavity member **5** are screwable or rivetable to each other, which can be seen via the fastening elements **30** on a lateral side **29** of the cavity member **5**. Choke profiles **10, 11** are provided in the remaining areas, namely a straight locking profile **10**, where the cavity member **5** and the front frame **7** have a straight portion **14**, and a rounded choke profile **11**, where the cavity member **5** and the front frame **7** have a corner portion **15**.

[0074] In Fig. 3, a detail of the cavity assembly **1** according to Fig. 2 is shown in a perspective view, whereby the frame-side flange **9** of the front frame **7** and the cavity-side flange **8** of the cavity element **5** are clearly visible. In this embodiment, there is a considerable gap **12** between the two flanges **8, 9**, through which microwave radiation can reach the control electronics **24** (cf. Fig. 1) without further measures.

[0075] In Fig. 4, a suitable choke profile **10, 11** in a first embodiment for the cavity assembly **1** according to Fig. 2 and Fig. 3 is shown in a sectional perspective view. Preferably, the rounded choke profile **11** has a fixed shape, so that no adjustment is necessary during assembly (in-situ). In this first embodiment, a straight choke profile **10** and a rounded choke profile **11** are formed separately from each other (regardless of the embodiment of the rounded choke profile **11**).

[0076] In Fig. 5, a suitable choke profile **10, 11** in a second embodiment for the cavity assembly **1** according to

Fig. 2 and Fig. 3 is shown in a sectional perspective view. Preferably, the rounded choke profile **11** has an adaptable shape so that, although an adjustment may be necessary during assembly (in-situ), a more precise adjustment and/or a use of the rounded choke profile **11** for a larger number of different corner sections **15** (cf. Fig. 3) is applicable. In this second embodiment (regardless of the embodiment of the rounded choke profile **11**), a straight choke profile **10** and a rounded choke profile **11** are integrally formed with each other, preferably formed from a single sheet or formed from a single extruded profile.

[0077] The rounded choke profile **11** differs from the straight choke profile **10** (cf. Fig. 2) primarily in that a plurality of tongues **16** are formed, in this case on the side of the contact tab **19**, which are each spaced from one another by a tongue-gap **17**, of which a single tongue **16** is designated here pars-pro-toto with the respective adjacent tongue-gaps **17**. As a result of the tongue-gaps **17**, it is possible to adapt the choke profile **11** to the respective radius of curvature of the corner portion **15** of the cavity member **5** and the front frame **7** without the tongues **16** overlapping each other.

[0078] In Fig. 6, a rounded choke profile **11** according to Fig. 5 is shown separately in a sectional view as it is shown in use in the following Fig. 7. This rounded choke profile **11** comprises a plurality of tongues **16**, each of which is separated from the other using tongue-gaps **17** in such a way that the tongues **16** do not overlap each other in the (rounded) form shown. In an advantageous embodiment, such a rounded choke profile **11** is adaptable to different radii. In one embodiment, only exactly one shape, for example with a constant rounding radius, can thus be formed, with the tongue-gaps **17** being just evenly closed at least in the region of overlap of the gap **12**.

[0079] Apart from the plurality of individual tongues **16** and tongue-gaps **17** arranged therebetween, the property described below is preferably also present in an embodiment without these tongues **16** and tongue-gaps **17**, for example as shown in Fig. 4.

[0080] In this (second) embodiment, the rounded choke profile **11** is designed as a U-profile and a guide surface **18** is formed on the side of the frame-side flange **9**, by means of which a planar contact with the frame-side flange **9** is formed (cf. Fig. 7). A contact tab **19** is formed on the cavity-side flange **8**, which forms a bend at which a contact line **20** to the cavity-side flange **8** is formed (cf. Fig. 7). It should be noted again that the contact tongue **19** is not necessarily formed from a plurality of separated tongues **16**.

[0081] In this embodiment, a mounting widening **21** is provided on both sides, which facilitates the assembly of the choke profile **11**. Preferably, the choke profile **11** is designed with an undersize so that the choke profile **11**, preferably purely elastically, is deformed in use (cf. Fig. 7) and thus a contact force is exerted for a desired friction locking for self-retaining securing of the choke profile **11**.

[0082] Fig. 7 shows a sectional view of a corner portion **15** of a cavity assembly **1**. Here, the front frame **7** and the cavity member **5** each have a flange **8,9**, which extend towards the rear side **4** (here on the left in the illustration) and parallel to each other and preferably parallel to an insertion direction. Both the cavity-side flange **8** and the frame-side flange **9** are embraced by the (rounded) choke profile **11** and thus a gap **12** present between the two flanges **8,9** is blocked against penetration of microwave radiation.

[0083] Furthermore, a gasket element **13** can be seen here in the picture, which is inserted from the front side **3** into the gap **12** and fixed by means of a barbed hook **31**, here in cooperation with the cavity-side flange **8**, and, thus, is secured in a self-retaining manner. The gasket element **13** is set up for gasketing closure of the interior space in the cavity member **5** together with a door **22** (cf. Fig. 1).

[0084] Furthermore, a fastening element **30** for screwing to the cavity member **5** can be seen here in extension of the frame-side flange **9**. For example, the detail shown is a detail of a cavity assembly **1**, as shown in Fig. 2.

[0085] It should be noted that the elements are shown here partially in the undeformed state and therefore collisions can be seen, for example, of the barbed hook **31** of the gasket element **13** and the contact tab **19**.

[0086] Fig. 8 shows a flow diagram of an assembly process for a cavity assembly **1**. In the following description of the assembly process, reference is made to Fig. 1, Fig. 2 and Fig. 7 and in this respect, reference is made to the description there without exclusion of generality. In step **d.** of the assembly process, the cavity member **5** and the front frame **7** are already provided with a surface treatment. For example, the cavity member **5** is already single or double enamelled and the front frame **7** is also single or double enamelled, preferably in independent process steps.

[0087] In step **a.**, following step **d.**, the cavity member **5** and the front frame **7** and the required number of choke profiles **10,11**, as well as possibly further elements such as screws and/or rivets, are provided for a respective cavity assembly **1**. It should be noted that the provision in step **a.** does not have to take place simultaneously and that at least one of the choke profiles **10,11** is not provided until step **c.**, for example.

[0088] In step **b.**, the front frame **7** and the cavity member **5** are aligned with respect to each other so that the front frame **7** is connectable to the cavity member **5** at the frontal opening **6**. In step **c.**, the at least one choke profile **10,11** is applied to the two flanges **8,9** such that the choke profile **10,11** is adapted to block microwave radiation in operation of the oven **2** in which the cavity assembly **1** is mounted, as described above.

[0089] With the choke profile proposed here, control electronics can be effectively protected from microwave radiation.

List of reference numerals

[0090]

1	cavity assembly
2	oven
3	front side
4	rear side
5	cavity member
6	frontal opening
7	front frame
8	cavity-side flange
9	frame-side flange
10	straight choke profile
11	rounded choke profile
12	gap
13	gasket element
14	straight portion
15	corner portion
16	tongue
17	tongue-gap
18	guide surface
19	contact tab
20	contact line
21	mounting widening
22	door
23	microwave source
24	control electronics
25	supply connection
26	operating interface
27	top (side)
28	bottom (side)
29	lateral side
30	fastening element
31	barbed hook
32	plug

Claims

1. A cavity assembly (1) for an oven (2) having a microwave heating function for heating comestible,

the cavity assembly (1) having a front side (3) and a back side (4), the front side (3) being the side accessible in use,
the cavity assembly (1) comprising at least the following components:

- a cavity member (5) having toward the front side (3) a frontal opening (6) for receiving comestible; and
- a front frame (7) connected to the cavity member (5) at the frontal opening (6),

wherein the cavity member (5) comprises a cavity-side flange (8) at the frontal opening (6) and the front frame (7) comprises a frame-side

flange (9), the flanges (8, 9) extending toward the back side (4),

characterized in that the two flanges (8, 9) are embraced, at least in sections, by means of at least one common choke profile (10, 11), the choke profile (10, 11) being configured for blocking against microwave radiation.

2. The cavity assembly (1) according to claim 1, wherein

a gap (12) is formed between the two flanges (8, 9) at least in sections,
wherein the gap (12) is covered at least in sections at the rear by the choke profile (10, 11), wherein preferably the two flanges (8, 9) are aligned parallel to each other.

3. The cavity assembly (1) according to claim 2, wherein

the gap (12) to the front side (3) is closed at least in sections by a gasket element (13).

4. The cavity assembly (1) according to any one of the preceding claims, wherein

the choke profile (11) has a plurality of unidirectionally extending tongues (16), wherein preferably the tongues (16) each have a, more preferably wedge-shaped, tongue-gap (17) with respect to each other.

5. The cavity assembly (1) according to any one of the preceding claims, wherein

said choke profile (10, 11) is made of metal, preferably of stainless steel.

6. The cavity assembly (1) according to any one of the preceding claims, wherein

the choke profile (10, 11) for embracing the two flanges (8, 9) has an at least elastic undersize relative to the two flanges (8, 9) to be embraced.

7. The cavity assembly (1) according to any one of the preceding claims, wherein

the choke profile (10, 11) has a guide surface (18) for areal contact with one of the two flanges (8) and, additionally, has a contact tab (19) which is constructed to form a contact line (20) with the respective other flange (9).

8. The cavity assembly (1) according to any one of the preceding claims, wherein

the choke profile (10, 11) has a mounting widening (21) on its front side.

9. The cavity assembly (1) according to any one of the preceding claims, wherein

a straight choke profile (10) for a straight portion (14) of the cavity member (5) and/or the front frame (7)

and a rounded choke profile (11) for a corner portion (15) of the cavity member (5) and the front frame (7) are one piece.

10. The cavity assembly (1) according to any one of the preceding claims, wherein the choke profile (10,11) is fixed to the cavity member (5) and the front frame (7) by means of at least one of the following:
- friction locking;
 - positive locking; and
 - material locking.

11. The cavity assembly (1) according to any one of the preceding claims, wherein said cavity member (5) and said front frame (7) are non-destructively detachably connected to each other.

12. The cavity assembly (1) according to any one of the preceding claims, wherein said cavity member (5) is double enamelled and said front frame (7) is single enamelled.

13. An assembly method for a cavity assembly (1) according to any one of the preceding claims, comprising the following steps:

- a. Providing the cavity member (5), the front frame (7) and the at least one choke profile (10,11);
- b. after step a., aligning the front frame (7) with the cavity member (5) at the frontal opening (6) of the cavity member (5); and
- c. after step b., applying the at least one choke profile (10,11) over the two flanges (8,9) of the cavity member (5) and the front frame (7) so that the two flanges (8,9) are embraced.

14. The assembly method of claim 13, wherein in a step d. prior to step a., the cavity member (5) and the front frame (7) have been final surface treated.

15. An oven (2) with microwave heating function for heating comestible, comprising at least the following components:

- a cavity assembly (1) according to any one of claims 1 to 12;
- a door (22) by means of which, in cooperation with the front frame (7), the frontal opening (6) of the cavity assembly (1) is closable;
- a microwave source (23) for providing microwave radiation for heating comestible located inside the cavity member (5);
- control electronics (24) for controlling functions

of the oven (2);

- a supply connection (25) for the microwave source (23); and
- an operating interface (26) for operating functions of the oven (2),

wherein the at least one choke profile (10, 11) is arranged to shield the control electronics (24) against microwave radiation, wherein preferably the oven (2) comprises a steam source which is configured to steam-cook comestible which is located inside the cavity member (5).

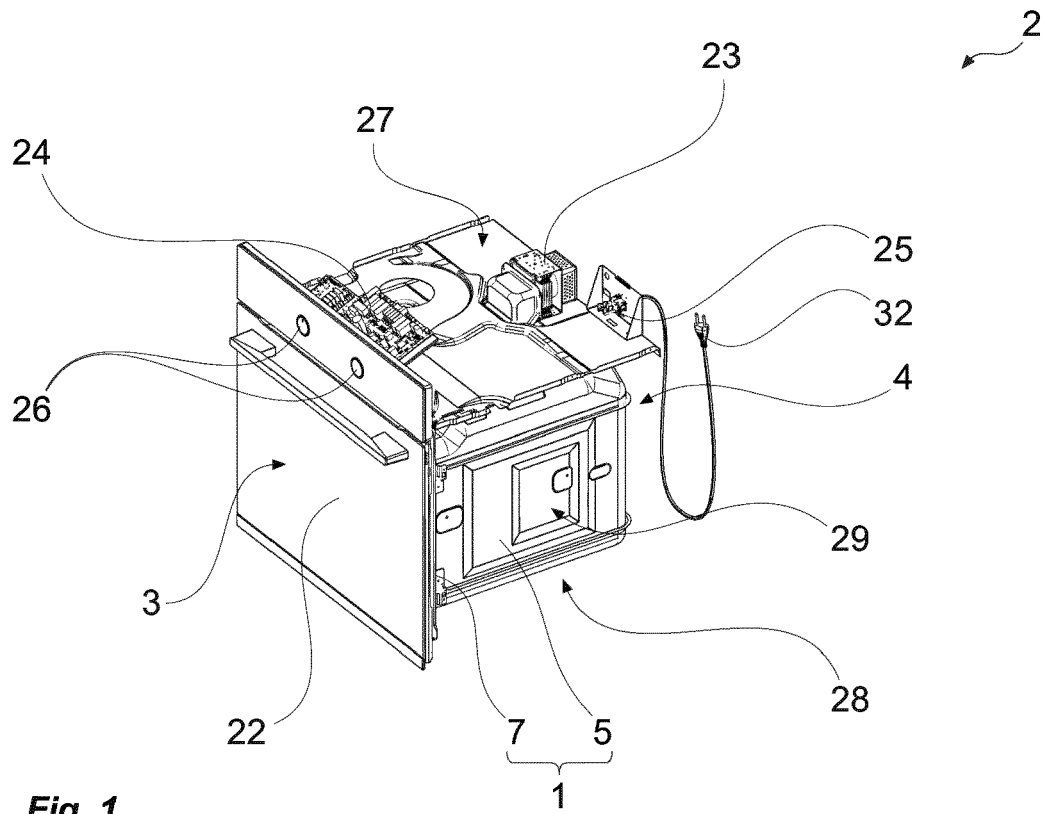


Fig. 1

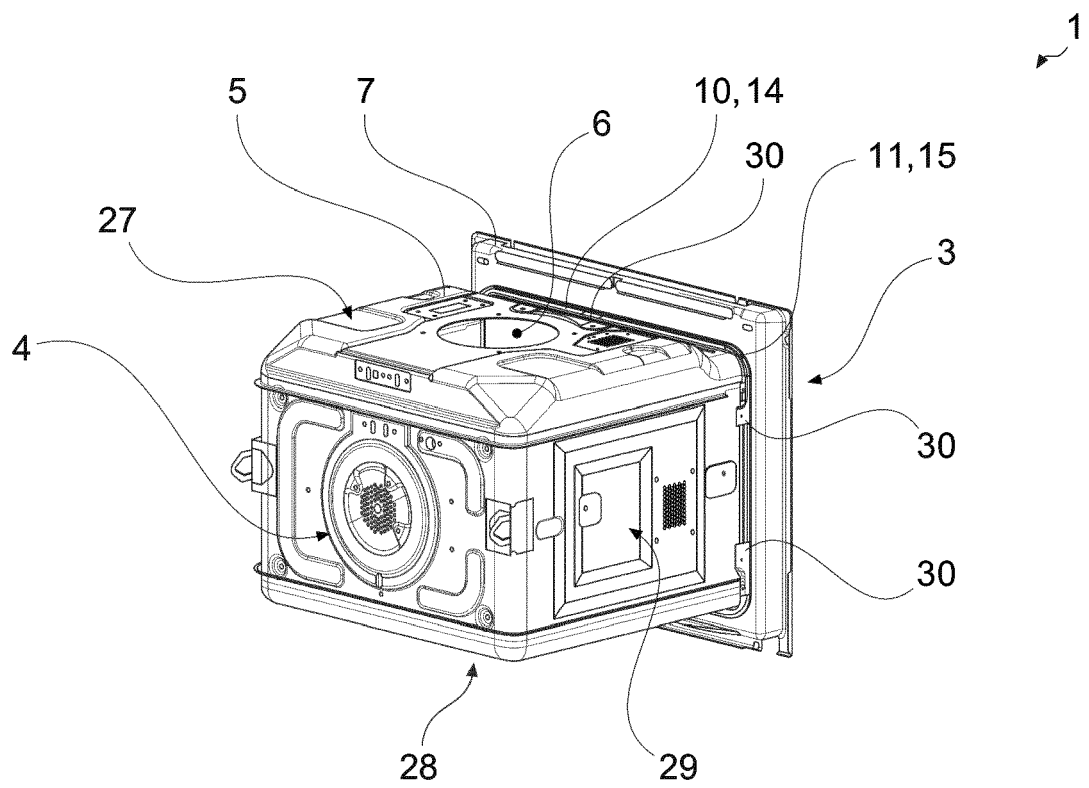


Fig. 2

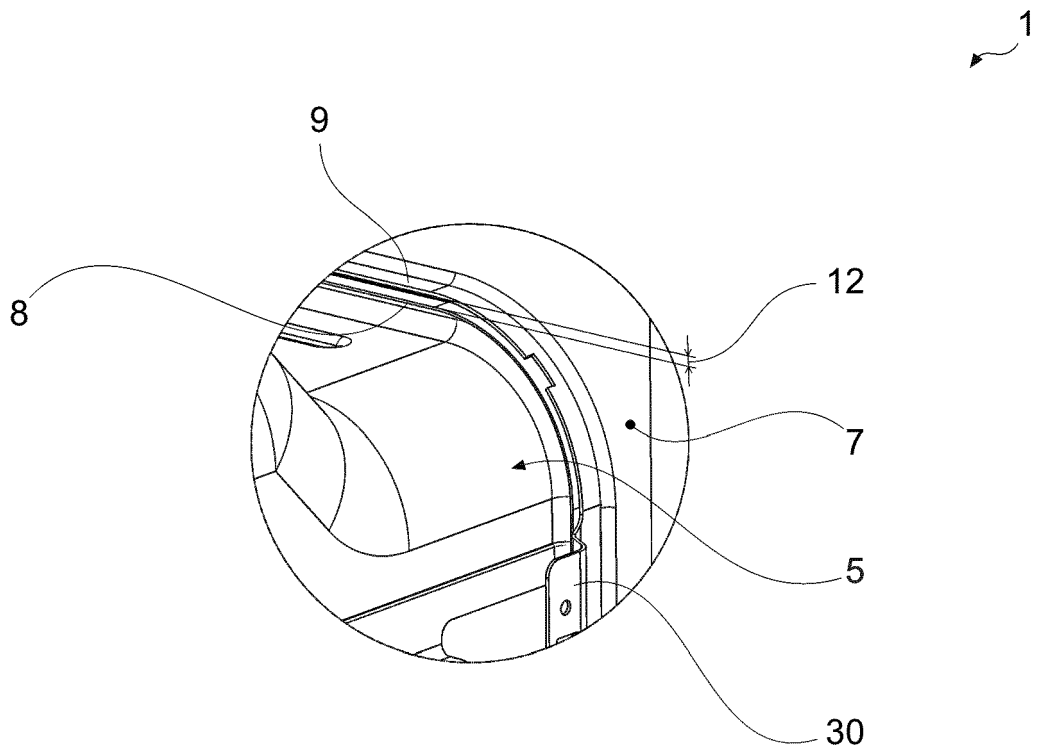


Fig. 3

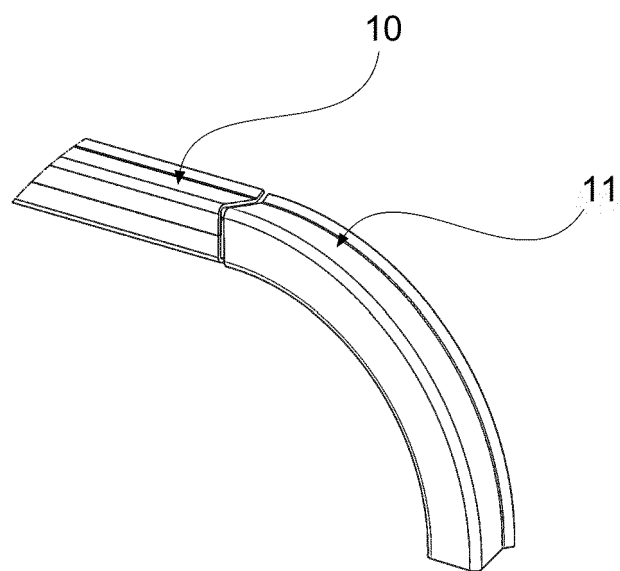


Fig. 4

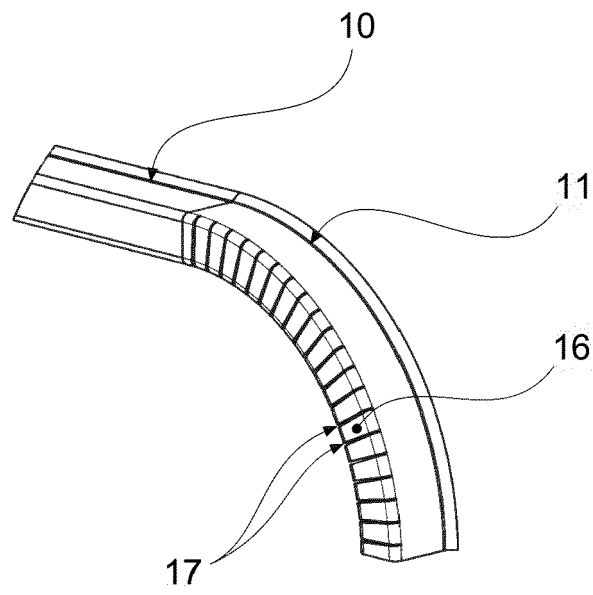


Fig. 5

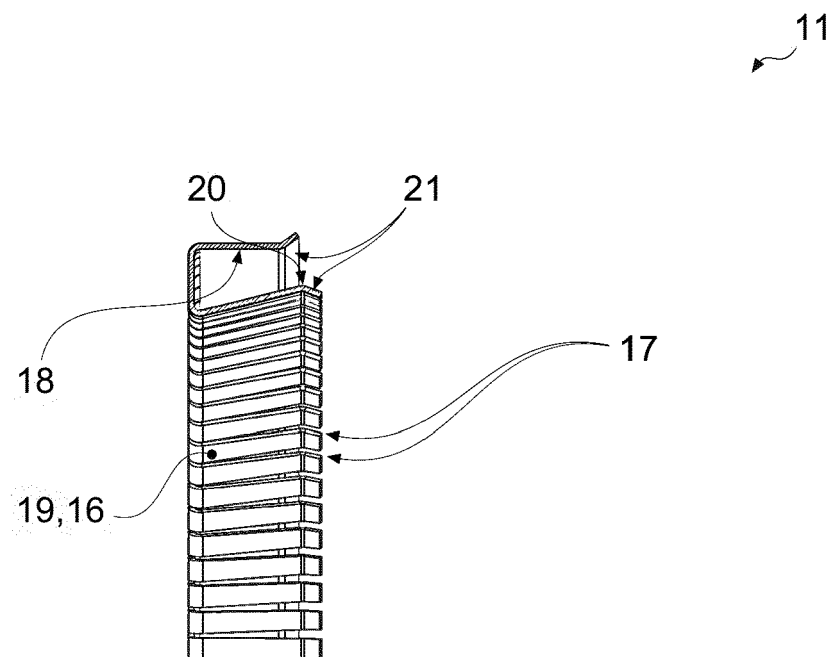


Fig. 6

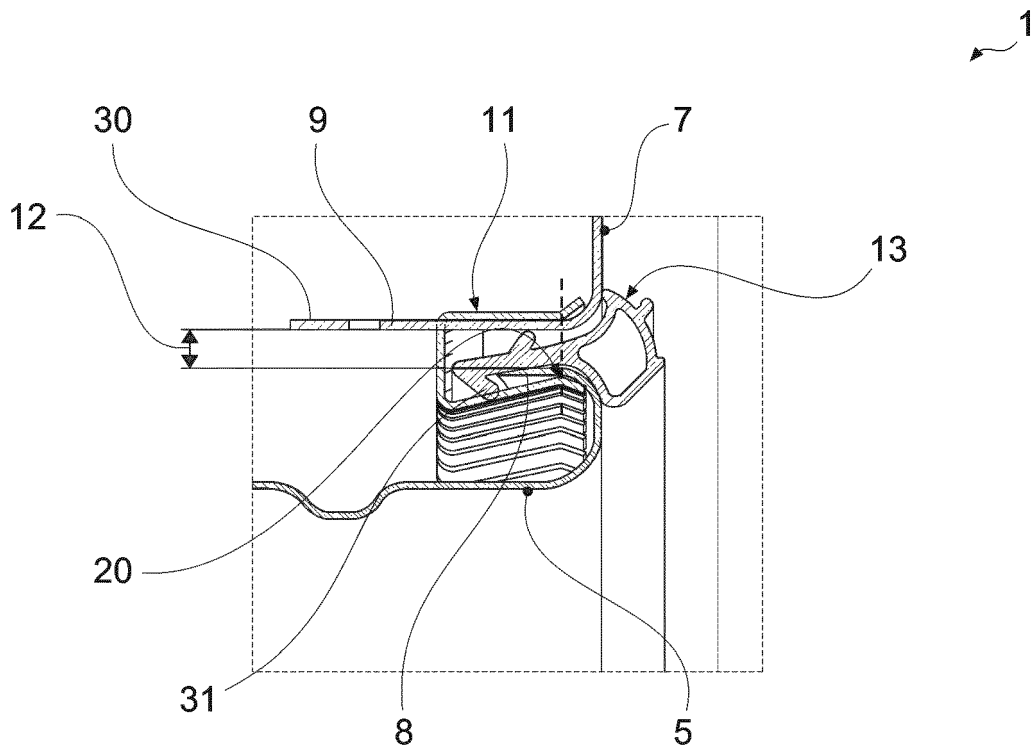


Fig. 7

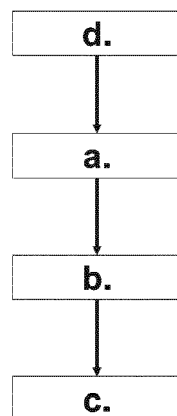


Fig. 8



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Application Number

EP 22 17 1043

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H05B

The present search report has been drawn up for all claims

1

EPO FORM 1503 03.82 (P04C01)

Place of search

Munich

Date of completion of the search

16 September 2022

Examiner

Pierron, Christophe

CATEGORY OF CITED DOCUMENTS

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

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