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(54) **AN OVEN WITH A DOOR COMPRISING A DRIP COLLECTION CHANNEL**

OFEN MIT EINER TÜR MIT EINEM TROPFSAMMELKANAL

FOUR À PORTE DOTÉE D'UN CANAL DE COLLECTE DE GOUTTES

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**Description****TECHNICAL FIELD**

- 5 **[0001]** The invention relates to the oven with a drip collection channel in which condensation droplets are collected on the inner pane of the door.

**STATE OF THE ART**

- 10 **[0002]** A cavity is provided in the body domestic ovens, in which the consumables to be cooked are placed, and a hinged door to seal the cavity. The vapour formed during cooking in the cavity condenses by hitting the inner pane of the door. Drops form on the inner pane that doors the cavity are formed by condensation. At the bottom of the door, there is a reservoir where the drops are collected.
- 15 **[0003]** EP3440408, the cooking appliance comprises a door for the cooking chamber, a rear wall and a condensation collection device to collect the condensation that drains from the rear wall. condensate collection device comprises a collection and guide rail arranged on the door, which collection and guide rail catches condensate draining from the rear side and diverts said condensate in the direction of of a collection container of the condensate collection device arranged on the door. Further relevant prior art may be found in J4599267 B2, EP0408529 A1 or EP1918644 B1.

20 **BRIEF DESCRIPTION OF THE INVENTION**

- [0004]** The object of the invention is to eliminate the need for additional collecting and guide rails adapted to the door pane in ovens.
- 25 **[0005]** In order to achieve the above objective, an oven comprising a cavity provided inside an casing and confining a cooking chamber, a front wall having a frame being formed from a one-piece metal sheet adapted to the casing and surrounding the outer periphery of the cavity, and a door that is hinged from an inner pane to the casing sealing the outer periphery in the closed position, and in such a way that abuts against the frame. The oven further comprises a bottom profile with a drip collection channel bent to extend forward under the inner pane and formed in the depression structure on the upper part of the front wall facing the inner pane therein.
- 30 **[0006]** Therefore, during the forming of the front wall in one piece, for example by deep drawing, the drip collection channel can also be cold formed from the metal sheet itself. The drip collection channel in the depression structure can be formed as monolithically or multipartite, or even in a plurality of adjacent cavities. A drip collection channel with high thermal resistance against high temperatures formed on the front wall of the oven during the baking operation is obtained thanks to its monolithic structure.
- 35 **[0007]** In a preferred embodiment the drip collection channel has a V-like cross-sectional form. Thanks to its cross-sectional form, the drips reaching the bottom profile from the inner door pane are accelerated and directed to the bottom of the channel. In possible embodiments, alternative shape forms such as u, w may be preferred.
- [0008]** According to the invention, the bottom profile includes a bottom bending extension that is bent backwards towards the cavity at a distance from the drip collection channel and on which an air duct is provided. In this way, with a single piece of metal sheet, both the drip collection channel and the air passage, through which the cooling air passes, can be obtained in one operation.
- 40 **[0009]** In a preferred embodiment of the invention, the air duct is in the staggered hole form extending along the width of the bottom profile. The staggered hole structure reduces the turbulence effect during the entry of ambient air from the lower part of the cavity. In a possible embodiment, the staggered hole structure consists of a plurality of elongated and adjacent holes.
- 45 **[0010]** In a preferred embodiment of the invention, the bottom bending extension is arranged inclined to direct the air duct towards the cavity. In this way, the negative pressure value required for the outer periphery of cooling air from the outside environment is reduced. In alternative embodiments, the bottom bending extension may also be configured in an upright position.
- 50 **[0011]** In a preferred embodiment of the invention, the door comprises an intermediate pane parallel and spaced to the inner pane, and a lower holding element that is aligned to the drip collection channel from the inner corner by holding the inner pane together from the bottom. The lower holding element receives the condensation drops accumulated on the inner pane from the lower corner of the inner pane and directs them to the drip collection channel. In addition, it keeps the inner pane and intermediate pane(s) together at a distance from each other on doors consisting of more than one pane.
- 55 **[0012]** The lower holding element is preferably made of metal or a high temperature (eg 200C) resistant plastic.
- [0012]** In a preferred embodiment of the invention, the front wall is made of cold-formed, monolithic metal sheet deep-drawn so as to provide a bottom profile that is fixed from one end to the outer periphery of the cavity from an inner edge and from one end to the casing from one lower edge. In this way, when the front wall obtained by the deep drawing operation is

placed aligned to form a flange on the cavity outer periphery, the bottom profile can be fixed from its inner edge to the lower edge of the cavity outer periphery and from its lower edge to the casing. Thus, the bottom profile forms a compact structure with a drip collection channel mounted on the cavity and the casing.

**[0013]** In a preferred embodiment of the invention, the oven comprises a vertically extending threshold between the inner edge of the front wall and the drip collection channel. The vertical threshold ensures that the drip collection channel formed by bending is detracted from the temperature of the cavity and reduces the thermal stresses on it.

**[0014]** A preferred embodiment of the invention comprises a first upper bend line extending transversely between the threshold and the drip collection channel, forming an angled transition wall. The upper bend line and the transition wall under the threshold ensure that in case of any splash from the door pane or condensation in the cavity or the front wall frame, the dripping or splashing drops from the threshold to the drip collection channel are accelerated and collected here.

**[0015]** In a preferred embodiment of the invention, the bending angle of the first upper bending line is adjusted perpendicular to the lower corner of the inner pane. In this way, the largest possible transition wall surface area is provided to catch the drippings from lower corner of the inner pane.

**[0016]** In a preferred embodiment of the invention, the outer pane is extended from its lower part in such a way that it at least partially closes the front wall inside the casing. Thus, any condensation drops splashing out of the oven is prevented and the bottom profile is visually closed.

**[0017]** In a preferred embodiment of the invention, the drip collection channel is arranged to extend through the outer periphery width in the bottom profile. In this way, droplet entry into the cavity through the outer periphery is prevented. In alternative embodiments, the drip collection channel may be set narrower or wider than the outer periphery width.

**[0018]** A preferred embodiment of the invention comprises a side slot provided by cold forming at the opposite ends of the bottom profile, where a hinge adapted to the door is partially inserted. The side slot facilitates the adaptation of the bottom profile to the hinged door and a more compact structure is obtained thereof.

## BRIEF DESCRIPTION OF THE FIGURES

### [0019]

Figure 1 is a perspective illustration of a representative embodiment of a household oven in the partially open position.

Figure 2 is a perspective illustration of a front frame abutting the oven door from an inner pane.

Figure 3 is an upper profile illustration of the lower wall of the frame shown in Figure 2.

Figure 4 is a bottom sectional illustration of the lower wall of the frame shown in Figure 2.

Figure 5 is a side sectional illustration of a representative embodiment of a household oven.

Figure 6 is a cross-sectional illustration of the bottom wall of the oven shown in Figure 5, comprising the collection chamber.

## DETAILED DESCRIPTION OF THE INVENTION

**[0020]** In this detailed explanation, the development according to the invention is explained only for a better understanding of the subject without any limiting effect.

**[0021]** Figure 1 perspectively shows a household built-in oven. A prismatic casing (10) surrounds a cavity (30) with planar side walls (14) in the pane structure. The cavity (30) delimits a cooking chamber (1). A flange-forming front wall (40) is fixed to the cavity (30) made of flat metal sheet at the boundary of a rectangular outer periphery (34) of the cavity (30). A door (20) adapted to the casing (10) from its lower corner with the help of a hinge (50) is fixed to the front wall (40) over a frame (41), dooring the outer periphery (34) in the closed position. An upper pane (12) is provided in the casing (10) at the upper portion of the door (20). The upper pane (12) extends transversely in the form of a strip and comprises control elements on which the operating parameters of the furnace are adjusted. In the closed position of the door (20), two opposing columns (16) arranged to extend from the top pane (12) from both sides of the door (20) and an outer pane (24) of the door (20) are aligned in the same plane. Meanwhile, an inner pane (22) parallel and spaced to the outer pane (24) doors the opening (34) and an inner frame (21) delimiting the opposite side edges of the inner pane (22) fits within the frame (41) of the front wall (40). An upper edge (23) connecting the upper part of the inner and outer panes (22, 24) of the door (20) is in the form of a strip and is equipped with holes that allow air passage.

**[0022]** Figure 2 perspectively demonstrates the solid sheet metal front wall (40) separately. The frame (41), which has inwardly extended edges on the upper portion and sides, is in the form of a solid hollow rectangle. The lower edge of the

frame (41) is in the form of a bottom profile (42) extended forward by deep drawing. A drip collection channel (43) on the upper edge of the bottom profile (42) is self-formed in a depression structure. The drip collection channel (43) extends parallel to the inner edge (45) of the frame (41) from below. The inner edge (45) forms a threshold (44) outwardly. A side slot (46) is formed on opposite sides of the bottom profile (42). The side slot (46) forms a recess suitable for the corresponding hinge (25) extensions.

**[0023]** Figure 3 perspectively demonstrates a bottom profile (42) at the lower end of the front wall (40) from the front portion. The bottom profile (42) is in the structure of a gradually elongated metal profile. The frame (41) has a U-like cross-section form at the side and upper portion. Bottom profile (42) comprises an outwardly stepped curved structure. The bottom profile (42) is mounted in the cavity (30) with a straight inner edge (45) at the outer periphery (34) of the cavity (30). The inner edge (45) extends downwards in L shape and forms a threshold (44). The threshold (44) is in the form of a straight strip. A flat platform extending outward is provided by bending over a first upper bending line (421) extending along the lower edge of the threshold (44). The platform also comprises a drip collection channel (43) in the form of depression structure extending along the outer periphery (34). The platform is extended downwards by bending along a second upper twist line (422) from its lower end to its entire length. The side slots (46) of the bottom profile (46) are in the form of a prismatic cavity.

**[0024]** Figure 4 perspectively demonstrates the bottom profile (42) from the inside. The platform of the bottom profile (42) is bent inward at an angle to form a first lower bending line (423) from its lower edge. A bottom bending extension (48) obtained by bending extends in a planar strip structure. The bottom bending extension (48) comprises air ducts (47), which are formed thoroughly, and are arranged in the same extension axis adjacent to each other. The end of the bottom bending extension (48) is bent along a second lower bending line (424) and brought to a position parallel to the inner edge (45).

**[0025]** Figure 5 shows the side sectional illustration of the furnace. The cavity (30) is fixed in the housing (10) at a distance from the outer edges in a prismatic structure. A retaining portion (33) is formed on a planar side wall (32) of the cavity (30), protruding outwardly and forming parallel channels between them thereof. The inner pane (22) rests on the frame (41) in the closed position of the door (20). The door (20) is mounted to the casing (10) in a way that it can be opened from its lower part with a hinge (50) mounted from its lower edge.

**[0026]** Figure 6 demonstrates the enlarged view of the lower part of the furnace. The door (20) comprises intermediate panes (28) between the inner pane (22) and the outer pane (24), which are spaced and parallel to the inner and outer pane (22, 24). A connecting piece (26) extending thoroughly grips the inner pane (22) and the intermediate panes (28) from their lower ends and abuts the outer pane (24) from the inside. A screw extends downwards from the lower part of the connector (26), forming a guide end (25) thereof. The front wall (40) that is mounted in the cavity (30) with the help of a flange bent down around the outer periphery (34) is mounted on the flange (45) from its inner edge. The threshold (44), formed by bending the inner edge (45) downwards vertically, is aligned to the lower end of the inner pane (22) from the corresponding flat edge of the lower holding element (26). The lower end of the threshold (44) reaches the transition wall (425) with the first upper bending line (421) at a wide angle. The first upper bend line (421) is aligned to the inner corner of the lower holding member (26). Lower end of the transition wall (425) comprises a drip collection channel (43) in the depression structure. The drip collection channel (43) is in the form of a v-section. The opposite edge of the drip collection channel 43 extends upward towards the inner corner of the guiding end (25). The second upper bend line (422) makes a curvilinear downward U-shaped turn. In this way, the downwardly extending bottom profile (42) passes into the bottom bending extension (48) by forming a first lower bending line (423) with a large inward angle. The bottom bending extension (48) is in the form of a flat strip, having an air duct (47) thoroughly. The angle of the bottom bending extension (48) directs the air duct (47) towards the cavity (30). The second lower bending line (424) forms an inward obtuse angle and forms the lower edge (49) extending parallel to the inner edge (45). The lower edge (49) attaches the front wall (40) to the casing (10) from below with a screw-like fastener (60) from its end. The air duct (47) is aligned coaxially with the drip collection channel (43) on the vertical axis.

**[0027]** The transition wall (425) and the bottom bending extension (48) are arranged symmetrically on the horizontal axis.

**[0028]** In the closed form of the oven door (20), the lower holding element (26) is aligned with its inner corner and the guiding end (25) facing into the drip collection channel (43). Thus, The condensate formed by the condensation of the steam formed during cooking in the cavity (30) on the inner pane (22), is filtered from the inner pane (22), and drops are formed over the lower holding element (26) and over the guiding end (25), allowing them to descend into the drip collection channel (43). In addition, the vacuum created by the venturi effect on the upper edge (23) is transferred to the lower part of the door (20) between the inner pane (22) and the outer pane (24). In this way, the ambient air coming from the air duct (47) is drawn from the upper edge (23) to cool the door (20) panes (22, 24, 28). The air duct (47) faces upwards at the bottom bending extension (48), therefore, it is possible to draw ambient air from the outside environment with less vacuum.

## REFERENCE NUMBERS

**[0029]**

|    |    |                       |     |                          |
|----|----|-----------------------|-----|--------------------------|
|    | 1  | Cooking chamber       | 40  | Front wall               |
|    | 10 | Casing                | 41  | Frame                    |
|    | 12 | Front pane            | 42  | Bottom profile           |
| 5  | 14 | Sidewall              | 421 | First upper bend line    |
|    | 16 | Columns               | 422 | Second upper bend line   |
|    | 20 | Door                  | 423 | First lower bend line    |
|    | 21 | Inner frame           | 424 | Second lower bend line   |
| 10 | 22 | Inner pane            | 425 | Transition wall          |
|    | 23 | Upper edge            | 43  | Drip collection channel  |
|    | 24 | Outer pane            | 44  | Threshold                |
|    | 25 | Guide end             | 45  | Inner edge               |
|    | 26 | Lower holding element | 46  | Side slot                |
| 15 | 28 | Intermediate pane     | 47  | Air duct                 |
|    | 30 | Cavity                | 48  | Bottom bending extension |
|    | 32 | Sidewall              | 49  | Lower edge               |
|    | 33 | Retainer portion      | 50  | Hinge                    |
| 20 | 34 | Outer periphery       | 60  | Fastener                 |

## Claims

1. An oven comprising a cavity (30) provided inside an casing (10) and confining a cooking chamber (1), a front wall (40) having a frame (41) surrounding the outer periphery (34) of the cavity (30), and a door (20) that is hinged from an inner pane (22) to the casing (10) sealing the outer periphery (34) in the closed position, and in such a way that it abuts against the frame (41) **characterized in that** the frame (41) is formed from a one-piece metal sheet adapted to the casing (10), that a bottom profile (42) with a drip collection channel (43) is bent to extend forward under the inner pane (22) and formed in the depression structure on the upper part of the front wall (40) facing the inner pane (22) therein; the bottom profile (42) comprises a bottom bending extension (48) bent backwards towards the cavity (30) at a distance from the drip collection channel (43) and on which an air duct (47) is provided and the air duct (47) extends across the width of the bottom profile (42) and is in the form of a staggered hole.
2. An oven according to Claim 1, wherein the drip collection channel (43) has a V-like cross-sectional form.
3. An oven according to any one of the preceding claims, wherein the bottom bending extension (48) is inclined to direct the air duct (47) towards the cavity (30).
4. An oven according to any of the preceding claims, wherein the door (20) comprises an intermediate pane (28) parallel to the inner pane (22) and at a distance, and a lower holding element (26) aligned to the drip collection channel (43) from the inner corner by holding the inner pane (22) together from the bottom.
5. An oven according to any one of the preceding claims, wherein the front wall (40) is made of cold-formed, monolithic metal sheet deep-drawn such that providing a bottom profile (42) secured from one end to the outer periphery (35) of the cavity (30) from an inner edge (45) and from one end to the casing (10) from one lower edge (49).
6. An oven according to Claim 5, wherein the front wall (40) comprises a vertically extending threshold (44) between the inner edge (45) and the drip collection channel (43).
7. An oven according to Claim 6, wherein a first upper bending line (421) is extending transversely between the threshold (44) and the drip collection channel (43) in the form of an angled transition wall (425).
8. An oven according to any one of the preceding claims, wherein the outer pane (24) is extended from lower part such that front wall (40) is at least partially enclosed within the casing (10).
9. An oven according to any one of the preceding claims, wherein the drip collection channel (43) is arranged in the bottom profile (42) to extend across the width of the outer periphery (34).

10. An oven according to any one of the preceding claims, wherein a side slot (46) at opposite ends of the bottom profile (42) by cold forming and adapted to the door (20) in which a hinge (25) is partially inserted.

## 5 Patentansprüche

1. Ein Ofen, umfassend einen Hohlraum (30), der innerhalb eines Gehäuses (10) vorgesehen ist und eine Garraumkammer (1) begrenzt, eine Vorderwand (40), die einen Rahmen (41) aufweist, der den Außenumfang (34) des Hohlraums (30) umgibt, und eine Tür (20), die über eine innere Scheibe (22) an dem Gehäuse (10) angelenkt ist und im geschlossenen Zustand den Außenumfang (34) abdichtet und so an den Rahmen (41) anliegt, **dadurch gekennzeichnet, dass** der Rahmen (41) aus einem einstückigen Blech gebildet ist, das an das Gehäuse (10) angepasst ist, dass ein Bodenprofil (42) mit einem Tropfsammelkanal (43) nach vorne unter die innere Scheibe (22) gebogen ist und in der Vertiefungsstruktur an dem oberen Teil der Vorderwand (40), der der inneren Scheibe (22) zugewandt ist, ausgebildet ist; das Bodenprofil (42) umfasst eine rückwärts in Richtung des Hohlraums (30) gebogene untere Biegeverlängerung (48), die in einem Abstand zum Tropfsammelkanal (43) liegt, und auf welcher ein Luftkanal (47) vorgesehen ist, wobei der Luftkanal (47) über die Breite des Bodenprofils (42) verläuft und in Form einer versetzten Öffnung ausgebildet ist.
2. Ofen nach Anspruch 1, **dadurch gekennzeichnet, dass** der Tropfsammelkanal (43) eine V-förmige Querschnittsform aufweist.
3. Ofen nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die untere Biegeverlängerung (48) geneigt ist, um den Luftkanal (47) in Richtung des Hohlraums (30) zu führen.
4. Ofen nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Tür (20) eine Zwischenplatte (28) umfasst, die parallel zur inneren Scheibe (22) und in einem Abstand dazu angeordnet ist, sowie ein unteres Halteelement (26), das aus der inneren Ecke mit dem Tropfsammelkanal (43) fluchtet, indem es die innere Scheibe (22) von unten zusammenhält.
5. Ofen nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vorderwand (40) aus kaltgeformtem, einstückigem Blech besteht, das tiefgezogen ist, sodass ein Bodenprofil (42) bereitgestellt wird, das an einem Ende vom Innenrand (45) an den Außenumfang (35) des Hohlraums (30) und an einem Ende vom unteren Rand (49) an das Gehäuse (10) befestigt ist.
6. Ofen nach Anspruch 5, **dadurch gekennzeichnet, dass** die Vorderwand (40) eine vertikal verlaufende Schwelle (44) zwischen dem Innenrand (45) und dem Tropfsammelkanal (43) umfasst.
7. Ofen nach Anspruch 6, **dadurch gekennzeichnet, dass** eine erste obere Biegelinie (421) quer zwischen der Schwelle (44) und dem Tropfsammelkanal (43) in Form einer geneigten Übergangswand (425) verläuft.
8. Ofen nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die äußere Scheibe (24) vom unteren Teil aus verlängert ist, sodass die Vorderwand (40) zumindest teilweise innerhalb des Gehäuses (10) eingeschlossen ist.
9. Ofen nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Tropfsammelkanal (43) im Bodenprofil (42) über die Breite des Außenumfangs (34) verläuft.
10. Ofen nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** ein Seitenschlitz (46) an gegenüberliegenden Enden des Bodenprofils (42) durch Kaltumformung gebildet ist und an die Tür (20) angepasst ist, in die ein Scharnier (25) teilweise eingeführt ist.

## Revendications

1. Un four comprenant une cavité (30) prévue à l'intérieur d'un boîtier (10) et délimitant une chambre de cuisson (1), une paroi frontale (40) comportant un cadre (41) entourant la périphérie extérieure (34) de la cavité (30), et une porte (20) montée pivotante à partir d'un panneau intérieur (22) sur le boîtier (10), obturant la périphérie extérieure (34) en position fermée, de manière à venir en butée contre le cadre (41), **caractérisé en ce que** le cadre (41) est formé à

partir d'une tôle métallique monobloc adaptée au boîtier (10), **en ce qu'un** profilé inférieur (42) doté d'un canal de récupération de gouttes (43) est plié pour s'étendre vers l'avant sous le panneau intérieur (22) et formé dans la structure en creux sur la partie supérieure de la paroi frontale (40) faisant face au panneau intérieur (22) ; le profilé inférieur (42) comprend une extension de pli inférieur (48) repliée vers l'arrière en direction de la cavité (30), à distance du canal de récupération de gouttes (43), et sur laquelle est prévu un conduit d'air (47), le conduit d'air (47) s'étendant sur toute la largeur du profilé inférieur (42) et étant sous forme de trou en quinconce.

2. Four selon la revendication 1, dans lequel le canal de récupération de gouttes (43) présente une forme de section transversale en V.
3. Four selon l'une quelconque des revendications précédentes, dans lequel l'extension de pli inférieur (48) est inclinée de manière à orienter le conduit d'air (47) vers la cavité (30).
4. Four selon l'une quelconque des revendications précédentes, dans lequel la porte (20) comprend un panneau intermédiaire (28) parallèle au panneau intérieur (22) et espacé de celui-ci, et un élément de maintien inférieur (26) aligné avec le canal de récupération de gouttes (43) à partir de l'angle intérieur en maintenant ensemble le panneau intérieur (22) par le bas.
5. Four selon l'une quelconque des revendications précédentes, dans lequel la paroi frontale (40) est constituée d'une tôle métallique monolithique formée à froid et emboutie de manière à former un profilé inférieur (42) fixé d'une extrémité à la périphérie extérieure (35) de la cavité (30) à partir d'un bord intérieur (45) et d'une autre extrémité au boîtier (10) à partir d'un bord inférieur (49).
6. Four selon la revendication 5, dans lequel la paroi frontale (40) comprend un seuil (44) s'étendant verticalement entre le bord intérieur (45) et le canal de récupération de gouttes (43).
7. Four selon la revendication 6, dans lequel une première ligne de pli supérieure (421) s'étend transversalement entre le seuil (44) et le canal de récupération de gouttes (43) sous forme d'une paroi de transition inclinée (425).
8. Four selon l'une quelconque des revendications précédentes, dans lequel le panneau extérieur (24) est prolongé à partir de la partie inférieure de sorte que la paroi frontale (40) soit au moins partiellement enfermée dans le boîtier (10).
9. Four selon l'une quelconque des revendications précédentes, dans lequel le canal de récupération de gouttes (43) est agencé dans le profilé inférieur (42) pour s'étendre sur toute la largeur de la périphérie extérieure (34).
10. Four selon l'une quelconque des revendications précédentes, dans lequel une fente latérale (46) est formée aux extrémités opposées du profilé inférieur (42) par formage à froid et adaptée à la porte (20) dans laquelle une charnière (25) est partiellement insérée.

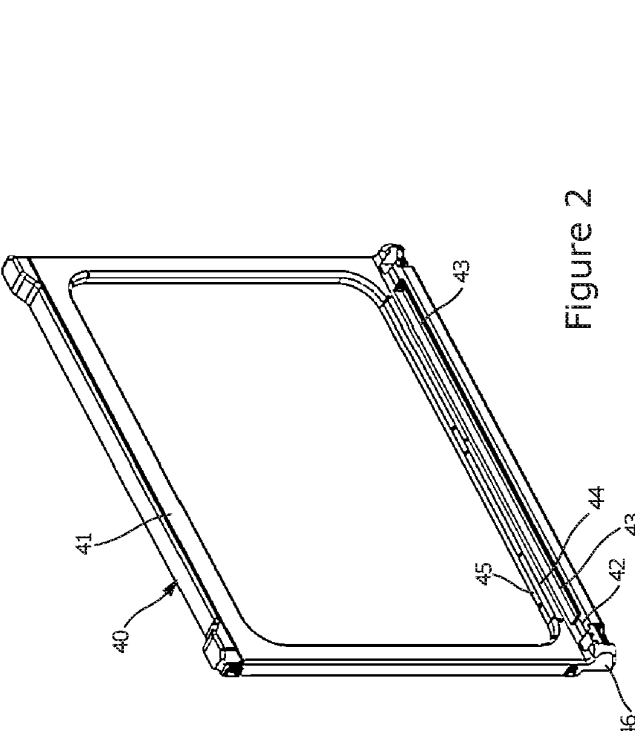


Figure 2

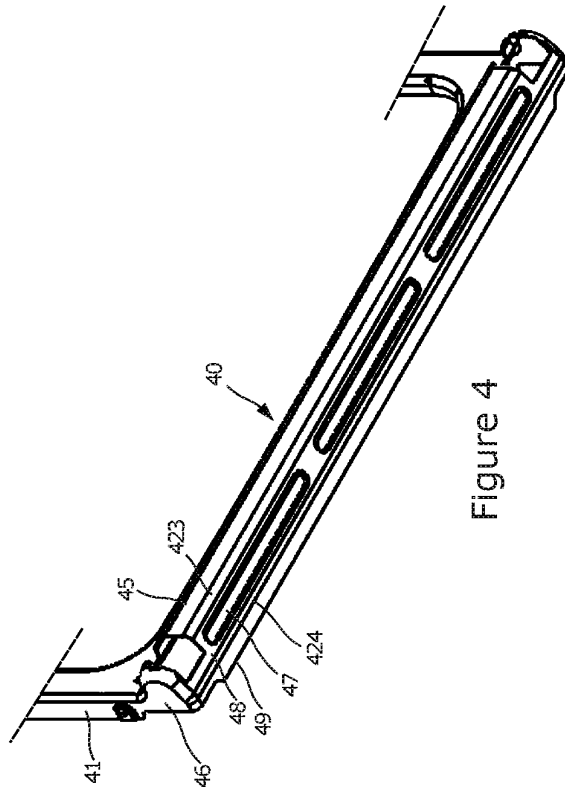


Figure 4

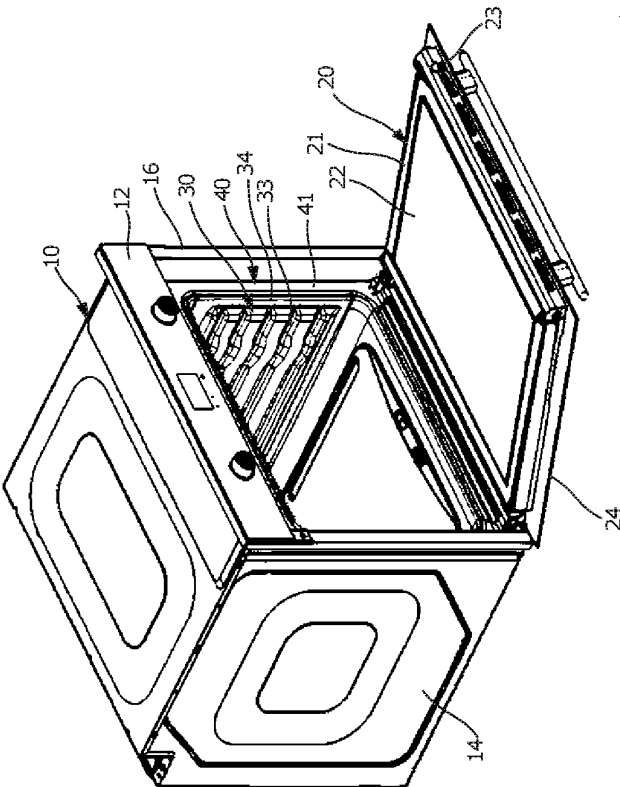


Figure 1

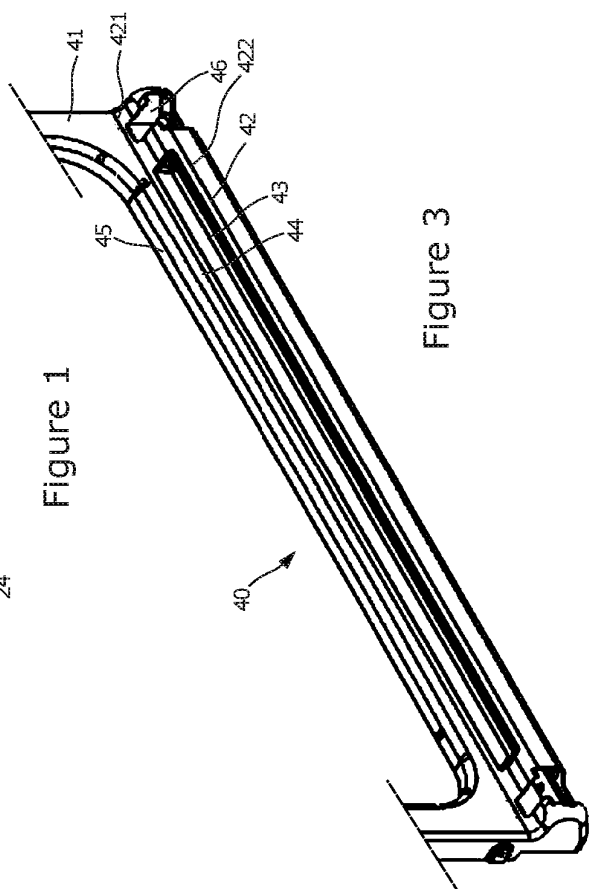


Figure 3



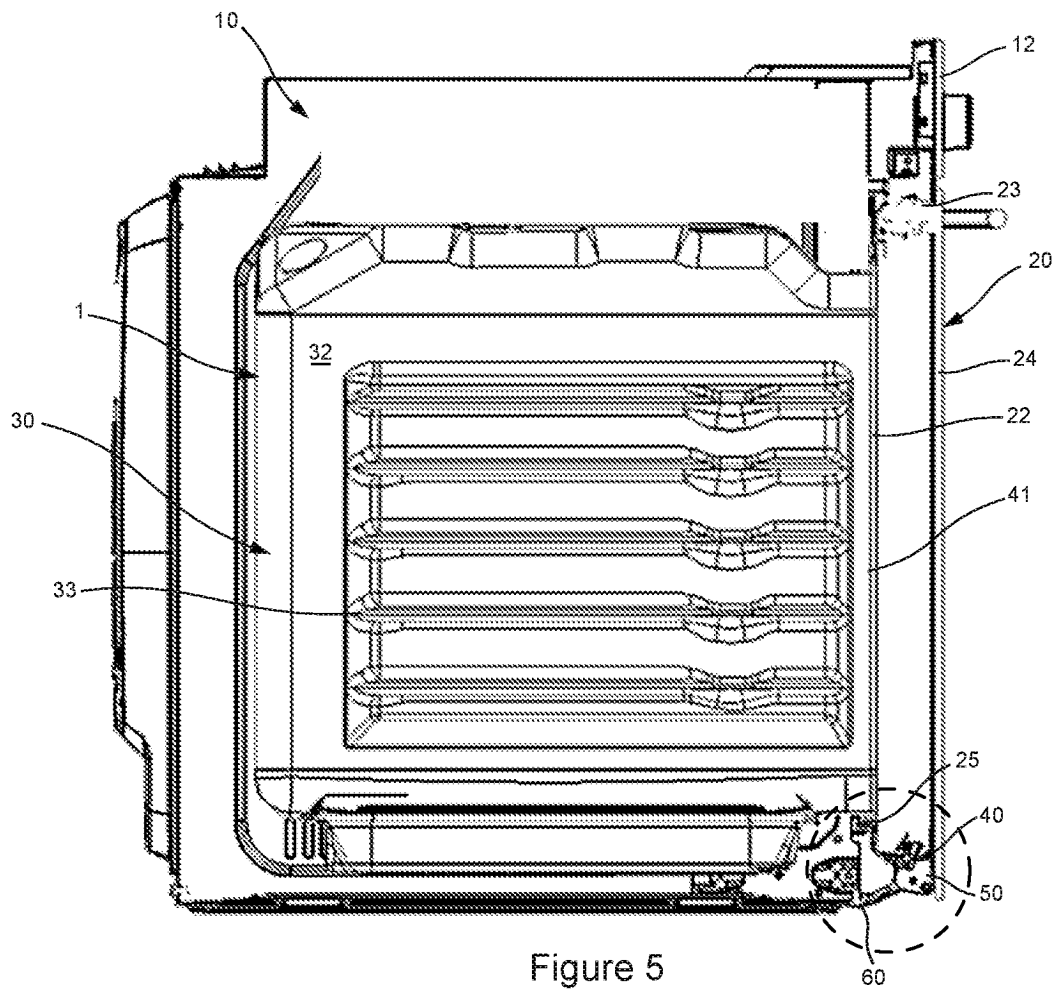


Figure 5

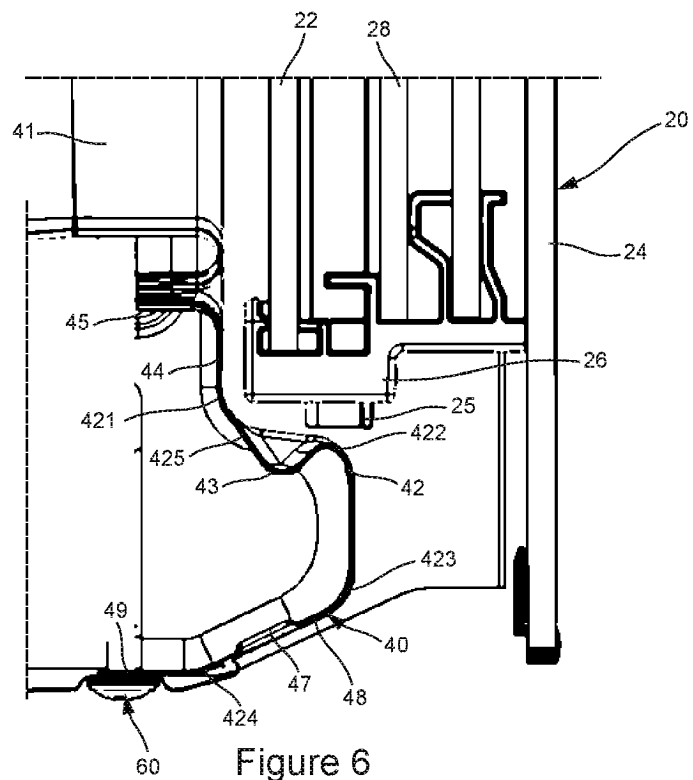


Figure 6

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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