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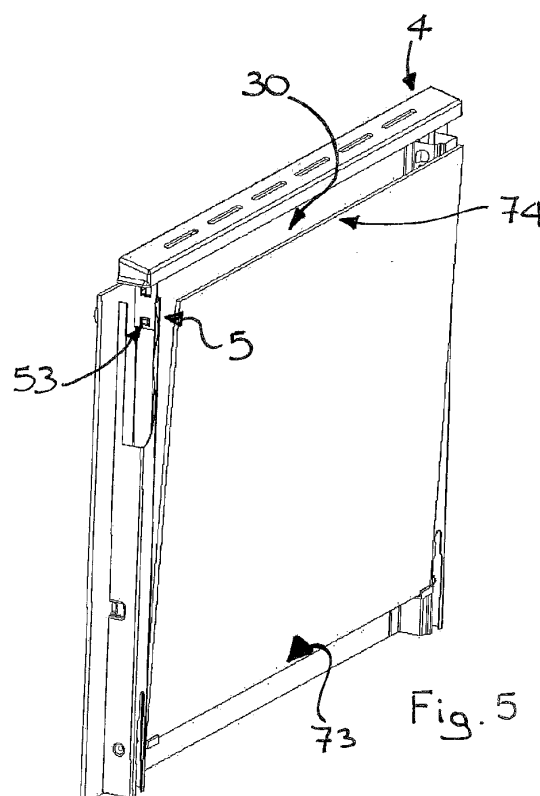
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(54) **Oven for cooking food products**

(57) An oven for cooking food products comprising a cooking compartment (2) and a door (3) providing access to the cooking compartment (2). The door (3) comprises a first plate (31) and a second plate (32) and extends in thickness along a direction connecting the first and the second plate (31,32). At least an air space (30) is interposed between the first and the second plate (32); when the door (3) is closed the first plate (31) is nearer the cooking compartment (2) compared with the second plate (32). The door comprises a profile (4) which: has a main direction of extension (400) along a perimeter edge of the first plate (31), comprises a projection (40) for holding the first plate (31), may adopt a first and a second position which are distinct and in which it is coupled to remaining parts of the door; in the first position the holding projection (40) contributes to holding the first plate (31) on the remaining parts of the door (3), in the second position said projection (40) being disengageable from the first plate (31) and allowing the first plate to be removed from the door without further moving the profile (4).



Description

[0001] The present invention relates to an oven for cooking food products.

[0002] An oven for cooking food products comprising a cooking compartment and a door is well known. The door comprises two or more plates of glass placed adjacent and parallel to each other so as to create at least an air space for the passage of a fluid current. This solution makes it possible to increase the heat insulation of the oven door and simultaneously enables the use of transparent glass so that the user can look inside the cooking compartment.

[0003] At least the glass of the door which is nearest the cooking compartment (considering the door in the closed configuration) is removable to permit cleaning and maintenance operations.

[0004] Conveniently, for this purpose such ovens comprise removable means, which, once applied to the door contribute to holding the glass in place. In order to take out the glass, the removable means must necessarily be removed. A drawback of this solution is that the removable means, when removed, are habitually put down in proximity to the oven, but there is the risk of them falling, getting lost or stepped on and broken, etc... Moreover, such removable means are specific components that are added to the door with the sole specific function of enabling or preventing removal of the glass.

[0005] In this context, the technical task at the basis of the present invention is to propose an oven for cooking foods which overcomes the above-mentioned drawbacks of the prior art.

[0006] In particular, it is an object of the present invention to provide an oven for cooking foods which enables the oven components to be optimized, while at the same time facilitating maintenance.

[0007] The stated technical task and the specified objects are substantially achieved by an oven for cooking foods, comprising the technical features set forth in one or more of the appended claims.

[0008] Additional features and advantages of the present invention will be more apparent from the approximate, and hence non-restrictive description of a preferred but non-exclusive embodiment of an oven for cooking foods, as illustrated in the appended drawings, in which:

- figure 1 shows a schematic view of an oven according to the present invention;
- figures 2 and 3 show a door of the oven in two distinct configurations;
- figures 4 and 5 show a first embodiment of a door of the oven in two distinct configurations;
- figure 6 shows a component of the door of figure 4;
- figures 7 and 8 show a second embodiment of a door of the oven in two distinct configurations.

[0009] In the appended drawings, the reference

number 1 indicates an oven for cooking food products. Such a cooking oven is typically an electrical household appliance and thus intended for use in a domestic environment. It falls into the category of brown goods.

[0010] The oven 1 comprises a cooking compartment 2 and a door 3 for accessing the cooking compartment 2.

[0011] The door 3 is able to move between an open configuration allowing access to the cooking compartment 2 by a user (for example, to introduce and remove food) and a closed configuration (in which case the door 3 is advantageously set in a vertical position). In the closed configuration, the door 3 advantageously contributes to delimiting the cooking compartment 2.

[0012] The door 3 comprises:

- a first plate 31;
- a second plate 32.

[0013] The door 3 extends in thickness along a direction connecting the first and the second plate 31,32.

[0014] The door 3 could comprise at least a third plate interposed between the first and second plates 31,32. Conveniently, the first and second plates 31,32 (and advantageously the third plate as well) are reciprocally side by side; in particular they are parallel. In the closed configuration of the door, the second plate 32 defines an interface between the door 3 and the outside of the oven 1. In the closed configuration of the door 3, the first plate 31 separates part of the door 3 from the cooking compartment 2.

[0015] Conveniently, the first and second plates 31, 32 comprise at least one portion which can enable a user to see through them, at least in a predetermined configuration of the oven 1 (for example, when the door 3 is in the closed configuration and a light is on inside the cooking compartment 2). If present, the third plate, too, comprises at least a portion enabling a user to see through it (in at least a specific configuration of the oven). Preferably, the first plate 31, second plate 32 and third plate, if present, are made of transparent material, typically glass.

[0016] Conveniently, at least one air space 30 is interposed between the first and second plates 32.

[0017] In the closed configuration, the first plate 31 is nearer the cooking compartment 2 compared with the second plate 32.

[0018] Advantageously, the cooking oven 1 comprises a profile 4 which: has a main direction of extension 400 along a perimeter edge of the first plate 31 and comprises a projection 40 for holding the first plate 31. Conveniently, the profile 4 may adopt a first position (see figure 2) and a second position (see figure 3). In the first position, the holding projection 40 contributes to holding the first plate 31 on the remaining parts of the door 3. In the second position of the profile 4, said projection 40 being disengageable from the first plate 31 and allowing the first plate 31 to be removed from the door 3 without the need for further movements of the profile 4. In the second position

the profile 4 is shifted relative to the first position. The profile 4 is coupled to remaining parts of the door 3 in both the first and second positions. The oven 1 thus comprises means 5 for coupling the profile 4 to remaining parts of the door 3. Such coupling means 5 thus enable the profile 4 to be coupled to remaining parts of the door 3 in both the first and second positions. The profile 4 is a single body. In this regard, the coupling means 5 are operative in both the first and second positions. The coupling means 5 can also be at least partly integrated into said profile 4. As better described below, during the passage of the profile 4 from the first to the second position and vice versa the coupling means 5 can be operative (see, for example, the embodiment of figures 7 and 8) or inoperative (see, for example, the embodiment of figures 4-6). Conveniently, the door 3 comprises a first and a second tubular member 33, 34. Conveniently, the first and second tubular members 33, 34 are substantially parallel. When the door 3 is in the closed configuration, the first and second tubular members 33, 34 are substantially vertical. Conveniently, the first and second tubular members 33, 34 extend, respectively, along a first and a second side 35, 36 of the door 3 of the oven. The first and second sides 35, 36 are reciprocally opposite; said profile 4, at least in the first position, is preferably superposed on a first end of the first tubular member 33 and a first end of the second tubular member 34. Conveniently, the profile 4, at least in the first position, occludes the first end of the first tubular member 33 and the first end of the second tubular member 34. The profile 4 comprises at least one opening 44 for the flow of a gaseous fluid into or out of said air space 30. The gaseous fluid contributes to thermally insulating the second plate 32 from the cooking compartment 2. For example, this reduces the risk of a user getting burned by resting against the second plate while the oven is on. Conveniently, the profile 4 is a bracket which is directly visible by a user at least in the open configuration of the door 3. Considering the closed configuration of the door 3, the profile 4 is an upper profile of the door 3. The profile 4 conveniently comprises a cover 41. The cover 41 covers at least remaining parts of the door 3 (for example, the first plate 31 or the air space 30).

[0019] In the closed configuration of the door 3, the projection 40 extends downwards from said cover 41. In the operative configuration of the oven 1, at least a part of the upper edge of the first plate 31 is interposed between the air space 30 and the projection 40. The profile 4 comprises a first and a second grip area situated at two opposite ends of the profile 4 along the main direction of extension 400. The first grip area comprises a first ledge; the first ledge is integrated into a first wall 71 of the profile 4, which borders on and extends transversely (preferably at right angles) to said cover 41 and said projection 40. The second grip area comprises a second ledge and is integrated into a second wall 72 of the profile 4; the second wall 72 borders on and extends transversely (preferably at right angles) to said cover 41 and said

projection 40. Advantageously, the profile 4 can comprise at least one protrusion 9 intended to come up against the third plate and prevent it from coming near the first plate 31. For this purpose, said at least one protrusion 9 is inserted in a space interposed between the third and the first plate. The use of the profile 4 according to the present invention enables the oven components to be optimized by integrating the holding means into a component which contributes to delimiting the air space and the door and simultaneously prevents the same from being lost by a user during removal of the first plate 31.

[0020] Advantageously, the second plate 32 is connected to the first and second tubular members 33, 34 by means of a double-sided adhesive. Typically, the door 3 rotates around a horizontal axis in order to pass from the closed configuration to the open one and vice versa. In such a case, the hinges are fixed to the first and second tubular members 33, 34 at an end opposite to the one topped by the profile 4.

[0021] As exemplified in the appended figures, at least in the first position (but advantageously also in the second position) of the profile 4, the coupling means 5 are at least partly inside the first and/or second tubular members 33, 34.

[0022] Conveniently, the door 3 comprises means which hold the first plate 31, preventing movements along a first direction which:

- is at right angles to the extension of the first and second tubular members 33, 34;
- connects the first and second tubular members 33, 34.

[0023] The first direction is parallel to the first plate 31.

[0024] In this regard, the means holding the first plate 31 and preventing movement along the first direction comprise a first and second low relief fashioned, respectively, on the first and second tubular members 33, 34 and in which the first plate 31 is inserted. With reference to the closed configuration of the door 3, the oven 1 comprises lower support means 6 for supporting the first plate 31. Such means 6 comprise at least one tooth 60 which helps to prevent a lower portion of the first plate 31 from moving away from a lower portion of the first and second tubular members 33, 34. Reference will be made, by way of example, to the embodiment of figures 7 and 8.

[0025] The coupling means 5 comprise elastic means 50 which recall the profile 4 from the second to the first position.

[0026] The elastic means 50 comprise at least a first spring 51 having one end connected to the profile 4 and another end connected to a portion of the door 3, in particular connected to the first tubular member 33. The first spring 51 is housed at least partly inside the first tubular member 33. In the first position of the profile 4, 90% or more of the volume of the first spring 51 is housed inside the first tubular member 33. In the second position of the profile 4, the first spring 51 extends outwardly from the

first tubular member 33. Preferably, in the second position of the profile 4, the first spring 51 is longer and more tensioned than in the first position of the profile 4.

[0027] Conveniently, the elastic means 50 comprise a second spring 52. The second spring 52 has a first end connected to the profile 4 and a second end connected to a portion of the door 3 (preferably to the second tubular member 34). What was previously described with reference to the positioning of the first spring 51 relative to the first tubular member 33 can be repeated with reference to the second spring 52 and the second tubular member 34. The first and/or second spring 51, 52 are advantageously coil springs.

[0028] Reference will now be made, by way of example, to the embodiment of figures 4-6.

[0029] The first plate 31 is substantially rectangular. The profile 4 also comprises a first and a second appendage 42, 43 which extend from the cover 41.

[0030] The first and second appendages 42, 43 are side appendages. The first appendage 42 and the second appendage 43 extend, respectively, from a first and a second end section of the cover 41. The first and second sections occupy the two ends of the cover for a tenth of the length of the cover 41 along the direction 400. The cover 41 entirely occupies a whole first side of the perimeter of the first plate 31. The first and the second appendages 42, 43 extend transversely to the cover 41. The first and second appendages 42, 43 extend along two opposite sides of the perimeter of the first plate 31.

[0031] The coupling means 5 comprise a first protrusion 53, and a second protrusion and a first, a second, a third and a fourth hole 55,56,57,58. In the first position of the profile 4, the first protrusion 53 and the second protrusion are inserted, respectively, in the first and second holes 55,56 and in the second position they are inserted, respectively, in the third and fourth holes 57,58; the first protrusion 53 and the group formed by the first and third holes 55, 57 are fashioned so that one is on the first appendage 42 and one on the first tubular member 33.

[0032] The second protrusion and the group formed by the second and fourth holes 56, 58 are fashioned so that one is on the second appendage 43 and one on the second tubular member 34.

[0033] In the example embodiment of figures 4-6, the first protrusion 53 extends on the first tubular member, while the first and third holes 55, 57 extend on the first appendage 42. In the example embodiment of figures 4-6, the second protrusion extends on the second tubular member, while the second and fourth holes 56, 58 extend on the second appendage 43. Conveniently, the first and second appendages 42, 43 are elastically deformable to permit the disengagement of the coupling means 5. Preferably, in the first position the first and second appendages 42,43 are inside the first and second tubular members 33,34, respectively. Conveniently, the oven 1 comprises means for guiding the profile from the first to the second position. For example, in the embodiment of fig-

ures 4-6, the guide means are defined by the first and second tubular members 33, 34, inside which the first and second appendages 42, 43 slide.

[0034] The present invention further relates to a method for removing the first plate 31 from the door 3.

[0035] Let the lower and upper edges of the first plate 31 be defined as the first and second edges 73, 74, respectively, in the closed configuration of the door 3.

[0036] The method comprises the steps of disengaging the first plate 31 from the holding means 8 located at and acting on the first edge 73 (for example, the disengaging step involves raising the first plate 31). The disengaging step involves moving the first plate 31 along a direction joining (typically at right angles) the first and second edges 73, 74. Such a step is simultaneous with or follows a step of moving the profile 4 away from the holding means 8.

[0037] For example, in the example embodiment illustrated in figures 4-6, the step of disengaging the first plate 31 from the means 8 is normally preceded by a step of transferring the profile 4 from the first to the second position. The step of transferring the profile 4 from the first to the second position includes the following steps:

- disconnecting mechanical means which in the first position connect the profile 4 to remaining parts of the door 3;
- moving the profile 4 from the first to the second position;
- connecting mechanical means which in the second position connect the profile 4 to remaining parts of the door 3 (the mechanical means connecting the profile 4 in the first position preferably only partly coincide with the mechanical means which connect the profile 4 in the second position). In particular, the mechanical means connecting the profile in the first and second positions can coincide with the above-mentioned coupling means 5. Conveniently, the step of transferring the profile 4 from the first to the second position involves disconnecting the first protrusion 53 and the second protrusion inserted, respectively, in the first and second holes 55, 56 and then connecting them, respectively, to the third and fourth holes 57, 58.

[0038] Conveniently, in the first and second positions, the profile 4 is coupled to remaining parts of the door 3. It thus remains in position without needing to be supported by an operator. This is extremely convenient, as it enables a replacement to be performed by a single operator and moreover prevents the profile 4 from getting lost during removal.

[0039] In the embodiment of figures 7-8, the step of disengaging the first plate 31 from the means 8 normally takes place simultaneously with a step of transferring the profile 4 from the first to the second position.

[0040] In this case, the step of transferring the profile 4 from the first to the second position entails overcoming

the elastic reaction of the elastic means 50.

[0041] After the first plate 31 has been disengaged from the means 8, the method envisages moving the first edge 73 of the first plate from the second plate 32, rotating the first plate 31 on the second edge 74 and then pulling out the first plate 31 by extracting the second edge 74 from the profile 4.

[0042] After the first plate 31 has been pulled out, the elastic means 50 bring the profile 4 back from the second to the first position. After removal of the first plate 31, the third plate interposed between the first and the second plate 31, 32 can also be removed. The step of positioning the first plate 31 involves carrying out the above-specified operations for its removal in the opposite direction.

[0043] The invention thus conceived enables many advantages to be obtained.

[0044] In particular, the invention enables the oven components to be optimized, while at the same time facilitating maintenance and preventing a maintenance technician from losing, due to distraction, the components serving to secure the glass.

[0045] The invention thus conceived is susceptible of numerous modifications and variants, all falling within the scope of the inventive concept which characterises it. Moreover, all the details may be replaced with other technically equivalent ones. In practice, all of the materials used, as well as the dimensions, can be any whatsoever according to need.

Claims

1. An oven for cooking food products comprising a cooking compartment (2) and a door (3) providing access to the cooking compartment (2); the door (3) being able to move between an open configuration allowing access to the cooking compartment (2) by a user and a closed configuration and comprising:

a first plate (31);

a second plate (32), the door (3) extending in thickness along a direction connecting the first and the second plate (31, 32); at least one air space (30) being interposed between the first and the second plate (32); in the closed configuration the first plate (31) being nearer the cooking compartment (2) compared with the second plate (32);

characterised in that it comprises a profile (4) which: has a main direction of extension (400) along a perimeter edge of the first plate (31), comprises a projection (40) for holding the first plate (31), may adopt a first and a second position; in the first position the projection (40) contributing to holding the first plate (31) on the remaining parts of the door (3), in the second position the projection (40) allowing the first plate (31) to be removed from the door (3) without the

need for further movements of the profile (4), the profile (4) being coupled to remaining parts of the door (3) in both the first and the second position.

2. The oven according to claim 1, **characterised in that** it comprises means (5) for coupling the profile (4) to remaining parts of the door (3), the coupling means (5) being operative in both the first and second position, the coupling means (5) being also at least partly integral with the profile (4).
3. The oven according to claim 1 or 2, **characterised in that** the door (3) comprises a first and a second tubular member (33, 34) extending, respectively, along a first and a second side (35, 36) of the door (3) of the oven, the first and the second side (35, 36) being reciprocally opposite each other; the profile (4), at least in the first position, being superposed on an end of the first tubular member (33) and an end of the second tubular member (34).
4. The oven according to claim 3 when it depends on claim 2, **characterised in that** the coupling means (5) are at least partly inside the first and/or the second tubular member (33, 34).
5. The oven according to claim 3 or 4, **characterised in that** in the closed configuration of the door (3) the profile (4) is an upper profile of the door (3); the first and the second tubular member (33, 34) comprising holding means of the first plate (31) preventing movements along a first direction, the so-called first direction:

being at right angles to the extension of the first and second tubular member (33, 34); connecting the first and the second tubular member (33, 34); with reference to the closed configuration of the door (3) the oven (1) comprising lower means (6) for supporting the first plate (31) comprising at least one tooth (60) which helps to obstruct the moving away of a lower portion of the first plate (31) from the first and second tubular member (33, 34).
6. The oven according to any one of claims 3 to 5 when it depends directly or indirectly on claim 2, **characterised in that** the coupling means (5) comprise elastic means (50) which recall the profile (4) from the second to the first position.
7. The oven according to claim 6, **characterised in that** the elastic means (50) comprise at least one first spring (51) having an end connected to the profile (4) and another end connected to the first tubular member (33); the first spring (51) being housed at least partly inside the first tubular member (33), in

the second position of the profile (4) the first spring (51) being longer and more in tension than in the first position of the profile (4).

8. The oven according to any one of the preceding claims, **characterised in that** the first plate (31) is substantially rectangular and the profile (4) comprises:

a cover (41);

- a first side appendage (42);
- a second side appendage (43);

the first and the second appendage (42, 43) extending transversely to the cover (41); the cover (41) extending entirely along all a first side of the perimeter of the first plate (31), the first and the second appendage (42, 43) extending transversely to the cover (41) and extending close to two opposite sides of the perimeter of the first plate (31).

9. The oven according to claim 8 when it depends on claims 2 and 3, **characterised in that** the coupling means (5) comprise a first protrusion (53), a second protrusion and a first, a second, a third and a fourth hole (55, 56, 57, 58); the first protrusion (53) and the second protrusion in the first position of the profile (4) being inserted, respectively, in the first and second hole (55, 56) and in the second position inserting, respectively, in the third and the fourth hole (57, 58); the first protrusion (53) and the group formed by the third and the fourth hole (55, 57) being made one on the first appendage (42) and one on the first tubular member (33), the second protrusion and the group formed by the second and the fourth hole (56, 58) being made one on the second appendage (43) and one on the second tubular member (34).

10. The oven according to claim 8 or 9 when it depends on claim 3, **characterised in that** in the first position the first and the second appendage (42, 43) extend inside, respectively, the first and the second tubular member (33, 34).

11. The oven according to any one of the preceding claims, **characterised in that** the profile (4) comprises at least one opening (44) for the flowing in or out of a gaseous fluid in the air space (30) between the first and second plate (31, 32).

12. The oven according to any one of the preceding claims, **characterised in that** it comprises means for guiding the profile (4) from the first to the second position and vice versa.

13. A method for removing, in an oven according to any

one of the preceding claims, the first plate (31) from the door (3); there being defined in the oven a first and a second edge (73, 74) coincident, respectively, with the lower and upper edge of the first plate (31) in the closed configuration of the door (3); the method comprising the step of moving the first plate (31) away from holding means (8) located at and acting on the first edge (73), the step comprising moving the first plate (31) along a direction joining the first and the second edge and being simultaneous with or subsequent to a step for moving away the profile (4) from the holding means (8).

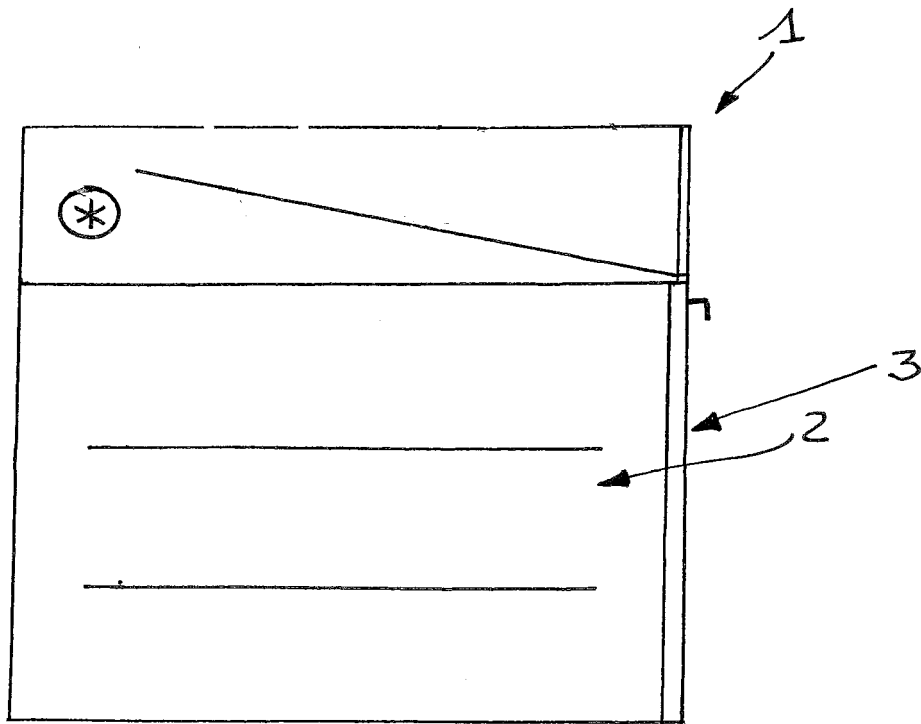
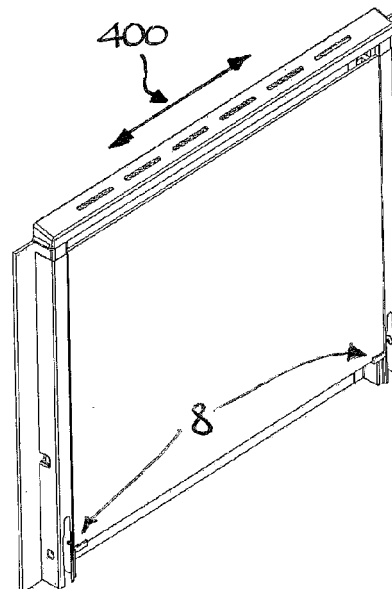
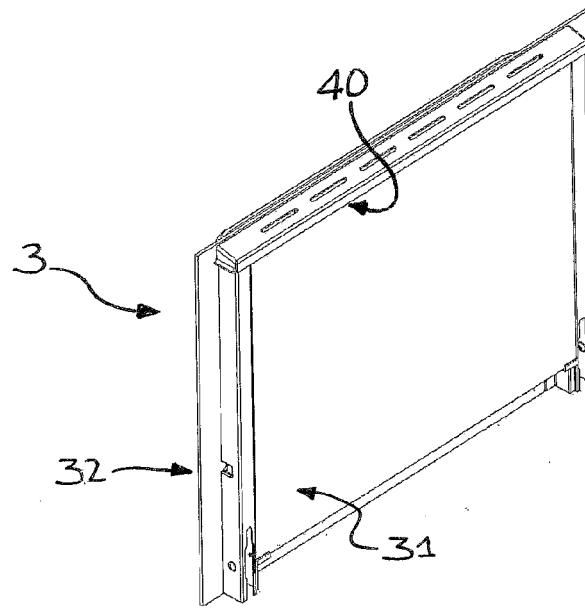
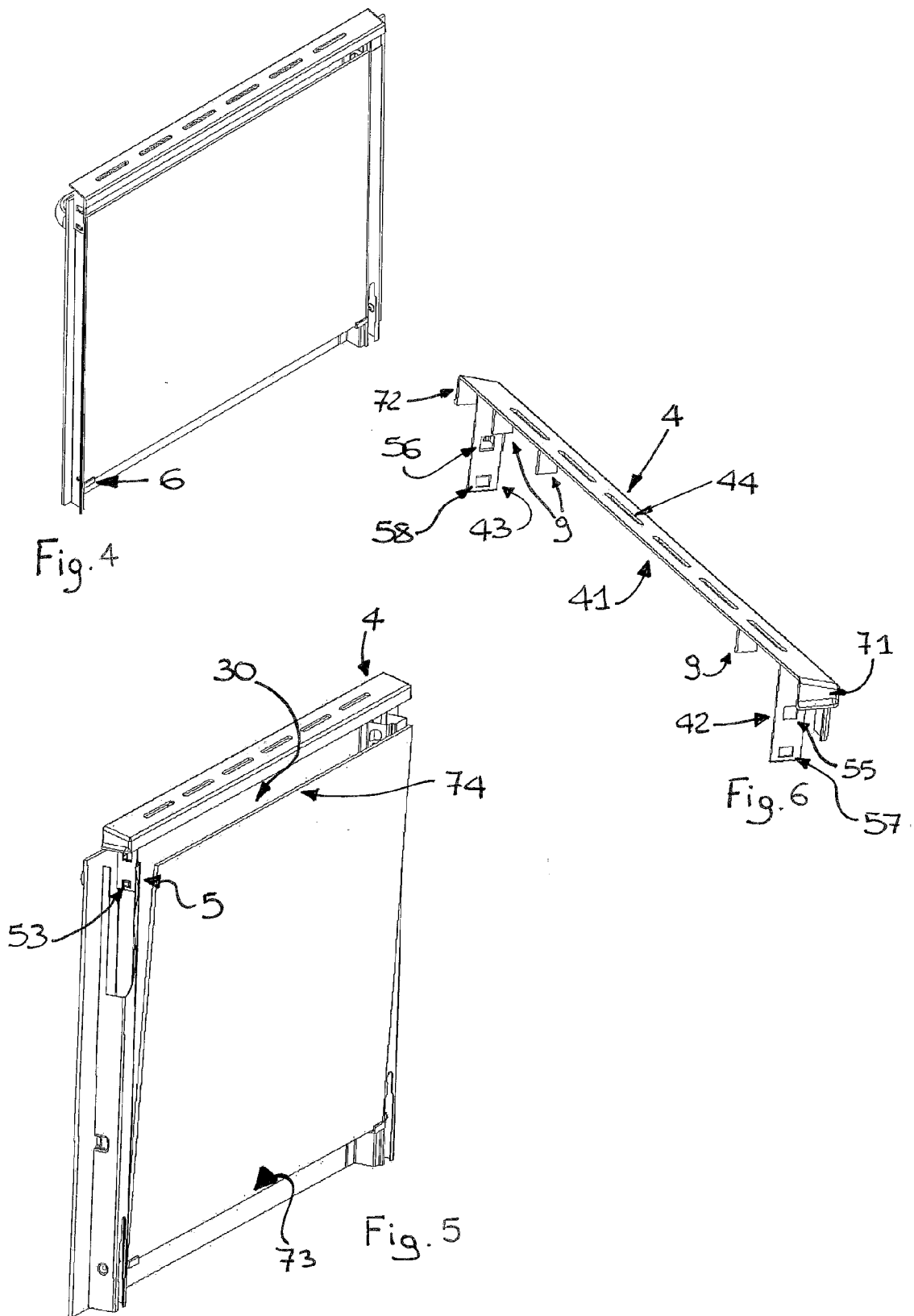


Fig. 1





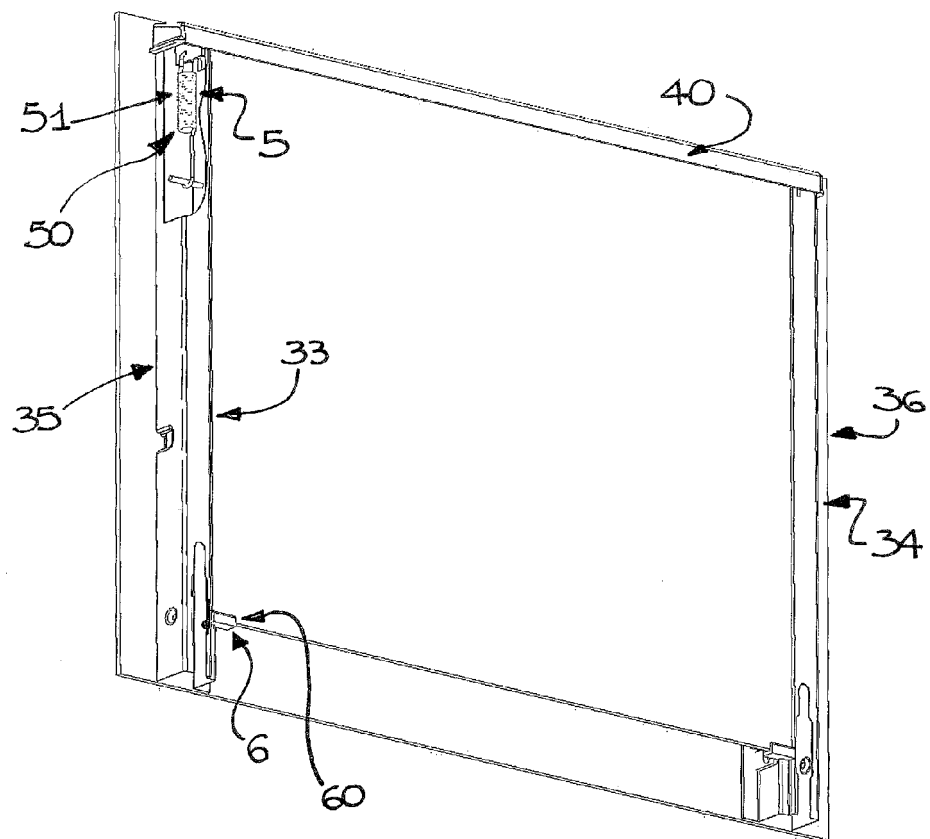


Fig. 7

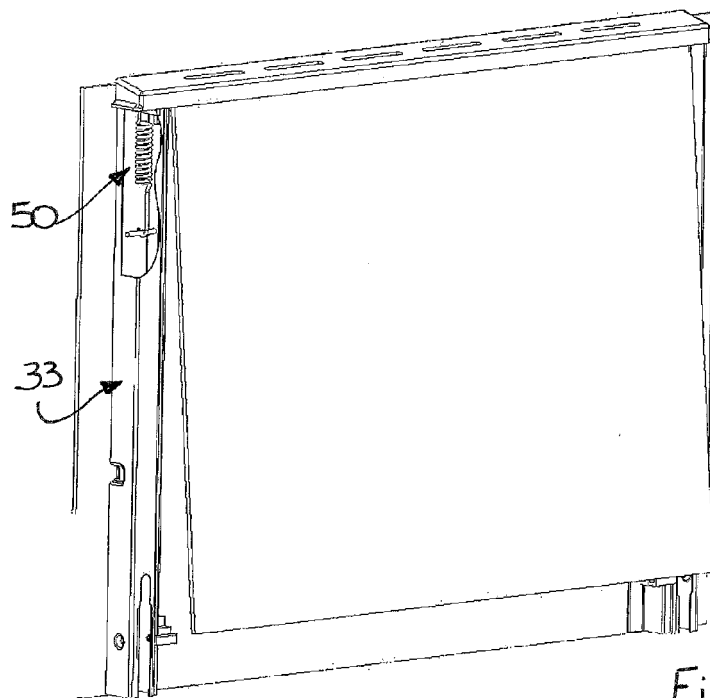


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 13 17 0793

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			F24C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		9 October 2013	Adant, Vincent
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 17 0793

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09-10-2013

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