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b) where a control unit (2) is attached or arranged in and /or at the door (1) with which the door at least essentially in a pull out position (A) and/or during the pull out position can be brought alternatively in a state which is relatively fixed with respect to the pull out system (3) or into a state which is relatively movable with respect to the pull out system (3).

Description

[0001] The invention relates to a door system for closing a feeding opening of the cooking cavity of a cooking oven with a door which is movable using a pull out system from the feeding opening away and/or to the feeding opening.

[0002] A pull out system of a door of a cooking oven can be implemented by a sliding carriage, for example, and makes it possible to bring the food onto the baking tray and to take it from the baking trays without taking out the baking trays. These are fixed at the inner side of the door using supporting elements and are moved with the door which opens by horizontal shifting out of the cooking cavity and closes into the opposite direction. Therefore, the baking tray makes it possible that the operator does not have to grab into the hot cooking cavity any more to take out or to bring in the baking trays.

[0003] From the state of the art, different embodiments of horizontally guided oven doors are known.

[0004] In DE 102 11 519 A1, a sliding carriage is disclosed where at the inner side of the door several carrying devices are attached. These carrying devices are used for carrying and transverse moving of baking trays.

[0005] The transverse movement of the baking trays is performed by a telescope device. By this, the baking trays are pulled out of the area in front of the oven to the side and food as well as the baking tray itself can be taken out.

[0006] Disadvantageous is here the considerably increased required space as for completely extending the baking tray to the side at least a clearance as wide and as long as the cooking oven is necessary beside the oven. Also it is inconvenient to operate the sliding carriage from a side area, as the mobility of the operator is usually limited by other furniture or similar things.

[0007] DE 94 06 630 U1 and DE 39 24 588 A1 disclose further embodiments of sliding carriages with the same basic idea of the lateral movement and which therefore comprise the same disadvantages.

[0008] DE 27 40 607 A1 discloses an oven door, which is movable horizontally out of the cooking cavity and which comprises holders for baking trays at its inner side.

[0009] This door is, by transverse partitioning, splitted into an upper and a lower area. The upper part of the door is foldably connected with the front with the lower door part. Therefore, the baking trays are accessible from the front, however, they can only be attached at the lower door part, in the lower part of the cooking oven. So the cooking cavity of the cooking oven cannot be used completely, also the number of baking trays, which can be attached, is limited.

[0010] DE 44 44 316 A1 shows a sliding carriage, whose baking trays are moved upwards along a moving path in a vertical direction out of the door area, guided by a holding device, and therefore can be taken out above the door area. Here, the access to the baking trays is limited and only the highest baking tray is accessible

which is undesired if something is supposed to be added or taken out in the middle or lower tray during the cooking operation.

[0011] In DE 90 17 148 U1, a revolvable door for a baking oven is disclosed, which is, in an opened position, movable into the cooking oven and whose baking trays are rotatable using a rotatable basic plate. The basic plate can stay inside the cooking cavity but can also be moved out of the cooking cavity for moving out the baking trays. The door can be opened independently from the baking trays or closes the cooking cavity behind the extracted baking trays. The rotating mechanism of the door as well as the mechanism of the baking trays is carried out using the base plate, which complicates its operation. The disadvantage compared to the pull out mechanism of sliding carriages is here the less convenient handling and that the operator must grab into the hot cavity to pull out the baking trays or the door which has been pushed in.

[0012] In DE 196 09 105 C2, a sliding carriage with pivotable door is disclosed which is moved horizontally away from the cooking cavity by a pull out mechanism and where, at the door inner side, baking trays are attached. A pivoting device with an distance part which constitutes the arm for rotating related to a vertical axis, allows the rotation of the door. This rotation is carried out using guideways which are attached on the cover plate and can be facilitated by rollers or, alternatively, by a connection link where the door is moved in a guidance which is fixed on the pull out devices. The pivoting device is implemented in this way to maintain the stability in the sliding carriage. The traverse plate and the pivot point in the center are necessary for the stability of the door. At every rotation of the door, the baking trays and the door tilt out over the lateral side area of the traverse plate to both sides which increases the required place besides the cooking oven in both directions. A further disadvantage is the rotation using guideways or the connection link as, for example, by dirt these guides can be effected or jam.

[0013] Therefore, from the state of the art many different embodiments of door systems are known which allow the access to baking trays by their door arrangements. Disadvantageous is, however, that the access was, up to now, accomplished only with a complicated operation of the door mechanism or with insufficient operating comfort with respect to the accessibility of several baking trays. The reason for this is, that no satisfying solution has been found up to now, which also satisfies the demand for the stability.

[0014] Therefore, it is an object of the invention, to propose a new door system which moves the baking trays out of the cooking cavity and makes them accessible, where the stability and the degree of rotation of the door is improved significantly.

[0015] This object is solved by a door system according to claim 1, for closing a feeding opening of a cooking cavity of a cooking oven with a door which is movable using a pull out system from the feeding opening away

and/or to the feeding opening and which is in addition relatively movable to the pull out system, where a control unit is attached or arranged in and/or at the door with which the door at least essentially in a pull out position and/or during the pull out movement can be brought alternatively in a state which is relatively fixed with respect to the pull out system or into a state which is relatively movable with respect to the pull out system.

[0016] Advantageous embodiments are described particularly in the dependent claims.

[0017] Preferably, the pull out movement of the door using the pull out system proceeds at least partially along a horizontal direction. If sliding carriages are used, this can be the known opening and closing of the door. As an alternative, it is also possible to move the door via a further vertical and/or horizontal axis by pulling it out via the pull out system to a higher, deeper and/or laterally shifted position relative to the cooking cavity.

[0018] To maintain the stability of the door system, it is advantageous, if the door stays fixed until the desired pull out position or pivot position is reached. Only if a rotational movement is desired, this is allowed by the control unit according to the invention. Preferably, the door is pivotable in its movable state relatively to the pull out system around a, particularly vertical, pivot axis.

[0019] Preferably, the pivot axis is situated in the door center which improves the stability of the door system according to the invention. However, it is also possible, to provide the pivot axis in any other position of the pull out system or at a position shifted by a rotational arm. Thus, the access to the door interior is enabled by the rotation.

[0020] Preferably, the rotational movement is carried out by a rotation mechanism below the bottom of the door. This is carried out preferably by a pivot bearing. This pivot bearing can be integrated into the pull out system of the door system and is therefore located directly underneath the door, where the pivot axis is located preferably in the door center or in a side area of the door.

[0021] Preferably, the control unit can be in different positions. Preferably, in a first position of the control unit, the door is located in its state relatively stationary with respect to the pull out system. In this case, the control unit causes a fixing of the door at the pull out system, preferably in a snapping position. By this, the door stays relatively fixed during pulling out and pushing in of the door system and admits no pivoting. Furthermore, further snapping positions are possible, where for handling of the items to be cooked, a relatively fixed position of the door is desired.

[0022] Preferably, in a second position of the control unit, the door is in its state relatively movable to the pull out system. Therefore, the movement of the door can easily be controlled and operated by the operator. The rotation can optionally be carried out to the left or to the right. This can be determined by the user individually depending on the open space or at will.

[0023] Preferably, the control unit comprises at least

one locking or snapping device for locking or fixing the door relatively to the pull out system on the one hand and for releasing or disconnecting the door relatively to the pull out system on the other hand.

[0024] The locking and/or fixing in the control unit is advantageously implemented by moving a snapping slider which can be lifted by a folding joint which is attached with distance to a distance bolt by a height h to release the snapping position of the door for rotation. Preferably, the locking or snapping device comprises at least one locking or snapping slider, which is connected with a folding or swinging joint, where the distance of a folding joint to a distance bolt determines the lifting of the locking or snapping slider. The control device according to the invention can also comprise more than one snapping slider which can be moved conjointly or individually.

[0025] Preferably, the locking or snapping slider comprises a protrusion which engages through the door bottom into the pull out system in a locking or snapping position and thus avoids every movement of the door with respect to the pivot axis. The protrusion is the lower part of the snapping slider which ensures the locking by its form and its material. This protrusion can be attached to the snapping slider or integrally formed with the snapping slider.

[0026] In the second position of the control device, especially for rotating the door, the protrusion of the snapping slider is lifted out of the pull out system particularly by the height h , or is out of engagement and thus allows the rotation into an arbitrary direction around the pivot axis of the door.

[0027] The snapping slider is, in a preferred embodiment, made at least partially out of plastics and/or is at least partially formed as a spring part. However, also other materials and forms are applicable.

[0028] This spring part is preferably arranged unmovable in a horizontal direction, preferably in the door interior space. This is carried out advantageously by a predetermined position of the snapping slider between supporting elements on the one hand and between a counter spring and a distance sleeve on the other hand.

[0029] Furthermore, the distance bolt can constitute a pivoting axis and/or a pivoting point of the folding joint. The door preferably comprises a front plate as an outer surface and the distance bolt is preferably located in the area or plane of the front plate, advantageously centered in an opening of the front plate. Thus, the control device is operated in an outer door area and the snapping slider is moved via the folding joint into the door interior space.

[0030] Advantageously, a limiting block extends through the opening of the front plate, where the limiting block comprises an outer area which is bigger than the opening of the front plate. Preferably, the limiting block also comprises an inner area which is smaller than the opening of the front plate and is preferably attached through the opening of the front plate. This aims the exact alignment of the limiting block into the door, as with this, the outer and the inner area of the limiting block comprise

defined dimensions and the arrangement can not slip away.

[0031] The limiting block preferably comprises a bore which preferably proceeds angular to the door interior space. Depending on if the first or the second position is desired to be the not operated position, the bore can proceed upwards or downwards. The folding joint preferably proceeds through this bore. Upper and lower stopping faces can limit the path of the folding joint, especially when operating the control unit. The stopping faces preferably are situated at the edges or walls of the bore. If the control device is desired to be not operated in a first position, then the bore normally proceeds upwards so that the folding joint lifts the snapping slider when it is operated.

[0032] Furthermore, the outer area of the limiting block can be provided with a cover. The cover preferably comprises an opening for an operating arm of the folding joint. Via this operating arm, the control device is operated. The opening is not substantially bigger than the action range of the operating arm. Therefore, the cover provides a protection against dirt and/or jamming.

[0033] This effect can be improved, if the cover moves with the control unit in a vertical movement, when the control unit is operated. This effects that the small opening of the cover does not limit the movement of the operating arm.

[0034] Preferably, a stop unit is arranged in the door interior which supports the folding joint in a state of the door or in a first position of the control unit. The stop unit is, in a preferred embodiment, attached at a interior plate in the door interior.

[0035] Preferably, a fixing element is attached in a rear part or at the inner end of the folding joint, where it holds the snapping slider in its position and/or prevents a detachment of the snapping slider from the folding joint. Preferably, the fixing element is a nut, which is screwed on a thread provided at the folding joint. This allows an exchange of the snapping slider in need of repair as well as an easy assembling of the snapping slider. However, also a rigid fixing of the snapping slider by known detachable or non-detachable connections of the folding joint is possible.

[0036] In a preferred embodiment, the folding joint is an extension of the door handle protruding into the door interior and/or the door handle is the operating arm of the folding joint.

[0037] Preferably, the control unit is a door handle automatic, with transforms the different positions of the control device by moving of the door handle so that preferably no further operating elements are necessary.

[0038] Preferably, the door handle of the door handle automatic is in one position aligned horizontally and in another position tilted around an operating angle α in a plane based on a side view of the door, preferably 15° . The folding movement can be carried out upwards as well as downwards. An operating angle of about 15° allows a convenient operation movement, however, also

another angle is possible as an operating angle. Furthermore, the door handle can be used as a pivoting arm for the operator to rotate the door which increases the operating comfort.

[0039] As an alternative, the door handle of the door handle automatic can be brought from the first position of the door handle automatic into a second position of the door handle automatic by rotating around its horizontal axis. To achieve this, merely the folding joint has to be moved downwards or upwards when the door handle is rotated.

[0040] Preferably, the door handle of the door handle automatic is aligned horizontally in a first position and, in a second position, is tilted with respect to a plane of a front view of the door. In this respect, the door handle has its point of application in the control unit and operates it by moving of the handle.

[0041] In an advantageous embodiment, the control unit is operated using a separate control device, for example a push button, an arm or a handle, preferably attached at the door system and/or the control panel and/or the pull out system.

[0042] According to a preferred embodiment, the door comprises other snapping positions in the rotated state, which are implemented by the same principle of a snapping position of the unrotated door by engaging the snapping slider in predetermined snapping openings in the corresponding positions. Preferably, the snapping positions are located in states where the door is rotated by 180° and/or 90° to the left or to the right. Particularly advantageous are snapping positions with a rotation of 180° and/or 90° to the left or to the right, as then the access to the baking trays from the front is particularly easy and the door handle is still very easy to operate.

[0043] In an advantageous embodiment, the rotation of the door is carried out using a rotatable U-clamp attached to the pull out system. It particularly rotates the door and is attached at the pivot point by a pintle or bolt.

[0044] Preferably, the U-clamp comprises a horizontal track adapted to the bottom of the door and/or two swords protruding vertically upwards from the track to hold the door.

[0045] In an advantageous embodiment, the swords of the U-clamp reach at least two thirds of the door height. This ensures or improves the stability of the door.

[0046] Preferably, the swords of the U-clamp are included into door columns of the door. This facilitates the assembling and improves the stability of the door.

[0047] In an advantageous embodiment, the door columns enclose the sword of the U-clamp several times, preferably three times. This enables the door columns to carry the force implied by the baking trays.

[0048] Preferably, the door columns are arranged at the left or at the right side of the door.

[0049] Preferably, the door columns are made from plastics, alternatively the door columns can also be made from metal or partly out of plastic.

[0050] Preferably, supporting elements are provided

at the door for at least one baking tray. For stabilizing of the door, glass holders can be used in the doors which support and stabilize the interior glass which carries the baking trays via the supporting elements. Finally, for locking and fixing, the transverse bar is inserted into the door columns.

[0051] The heavy load caused by the weight of the baking trays is thus carried conjointly by the different components of the door which also create the needed stability for rotating the door in the door center. The supporting elements can be fixed at the interior glass of the door as well as at the frame or at an own device for fixing the supporting elements.

[0052] Preferably, the invention comprises a cooking oven, especially a home cooking oven, with at least one cooking cavity and with a door system, according to the invention, assigned to the feeding opening for sealing or closing the feeding opening.

[0053] Furthermore, the invention relates to a door system for closing a feeding opening of a cooking cavity of a cooking oven, particularly according to one of the claims 1 to 12, where

- a) the door comprises a front plate and at least one interior plate,
- b) where two door columns are attached to the front plate for carrying the front plate and
- c) where the interior plate is attached to the door columns,
- d) where preferably the interior plate is fixed to the door system by plate holders protruding along the height of the door columns

[0054] In an advantageous embodiment the plate holders are clipped into the door columns. This enables a very easy assembling of the door system.

[0055] Preferably, the door columns comprise at least one elongated slot, where the at least one elongated slot is surrounded by the door column and/or with a distance to the front end of the door column in order to increase the gluing area for fixing the door columns to the front plate. This enables a very stable fixing of the door columns at the front plate.

[0056] In an advantageous embodiment, the plate holders comprise at least one elongated slot, where the elongated slot is surrounded by the plate holder and/or with a distance to the front end of the plate holder in order to increase the gluing area for fixing the door columns to the front plate, where preferably the at least one elongated slot of the plate holders and the at least one elongated slot of the door columns are arranged over each other. By this, a good air flow can be achieved while at the same time, the interior plate can be fixed in a stable way.

[0057] Preferably, the interior plate is carried at its lower end by at least two support elements, which are attached to the lower end of the door columns, where the support elements comprise a base area for carrying the interior plate and an adjoining holding peg protruding up-

wards and/or perpendicular to the base area to prevent the plate from sliding down from the support element, where the holding peg has a height of less than 7 mm, preferably less than 5 mm. This eases the disassembling of the door system as holding pegs with a height of less than 7 mm, preferably of less than 5 mm break infrequent as they are affected with lower forces when disassembling the door system. In a very advantageous embodiment, the holding pegs have a height of 3 mm.

[0058] The invention will be described further in the following by means of a preferred embodiment. Therein, also figures will be referenced, where it shows

FIG 1 the assembled door,

FIG 2 the support for the interior plates,

FIG 3 the assembling of the glass holders and the transverse bar,

FIG 4 the door handle automatic in a not operated position in a lateral sectional view of the door handle area,

FIG 5 the door handle automatic in a not operated position in a lateral sectional view of the lower door area,

FIG 6 the door handle automatic in a not operated position in a side view,

FIG 7 the door handle automatic in an operated position in a lateral sectional view of the door handle area,

FIG 8 the door handle automatic in an operated position in a lateral sectional view of the lower door area,

FIG 9 the door handle automatic in an operated position in a side view,

FIG 10 the door guidance with a U-clamp,

FIG 11 the cooking oven with the door system in snapping position and

FIG 12 the cooking oven with door system with pulled out, rotated door.

[0059] Corresponding parts are provided with the same reference signs.

[0060] FIG 1 to 3 show the door system according to the invention. FIG 1 shows the door in a completely assembled state. The door 1 comprises a front plate 11 and an interior plate 12.

[0061] The interior plate 12 comprises screwed support elements 13 for carrying not shown baking trays. For

holding the interior plate 12, laterally glass holders 15 are attached.

[0062] These glass holders 15, in turn, are locked and held by the transverse bar 16. At the front plate of the door 1, the door handle 21 is attached in a horizontal alignment.

[0063] FIG 2 shows the door columns 14 according to the invention which are shown here as plastic parts, each made of one piece. The insertion of the swords 32 according to FIG 10 is carried out from the bottom. The door columns 14 comprise connecting notches 141 which allow the clipping in of the plate holder 15 in a simple and save way. The upper surface of the door columns 14 comprises connecting notches 142 for clipping in the transverse bar 16. The door handle 21 guides through each of the two openings 111 in the front plate 11 a folding joint 23 which serves for operating the door handle automatic shown with details in FIG 4 and 5. One of the openings 111 comprises the snapping slider 22 attached to the folding joint. In its upper area, it is fixed between a distance sleeve 27 and a nut 28.

[0064] FIG 3 shows the attachment of the plate holders 15 and the transverse bar 16. The plate holders 15 are clipped into the connecting notches 141 using connecting pivots 151. The transverse bar 16 is afterwards clipped into the connecting openings 142 of the door columns 14. The transverse bar 16 comprises openings for ventilating the door interior via the air section channel 54, which is shown in FIG 7 and 8.

[0065] Each door column 14 comprises two elongated slots 143 and 144 arranged along the outer side of each door column 14.

[0066] Furthermore, each plate holder 15 comprises two elongated slots 153 and 154, also arranged along the outer side of each plate holder 15.

[0067] The slots 143 and 153 on the one hand, and the slots 144 and 154 on the other hand are arranged over each other to enable the ventilation of the door, especially for pyrolysis ovens.

[0068] The elongated slots 143 and 144 are surrounded by the door columns 14 and arranged with distance d1 from the front end 145 of the door columns 14 in order to increase the gluing: area 61 for fixing the door columns to the front plate 11.

[0069] The interior plate 12 is carried by at least two support elements 63 and 64 which are attached at the lower end of the door columns 14.

[0070] The support element 63 comprises a base area 63A for carrying the interior plate 12 and an adjoining holding peg 63B protruding upwards and/or perpendicular to the base area 63A to prevent the plate from sliding down from the support element 63. The holding peg 63B has a height h2 of less than 5 mm, preferably of 3 mm.

[0071] The support element 64 comprises a base area 64A for carrying the interior plate 12 and an adjoining holding peg 64B protruding upwards and/or perpendicular to the base area 64A to prevent the plate from sliding down from the support element 64. The holding peg 64B

has a height h2 of less than 5 mm, preferably of 3 mm.

[0072] FIG 4 to 6 show the door handle automatic 2 in a first position. In FIG 4, the door handle 21 is aligned in a horizontal position with respect to the door side. The door handle 21 reaches with the corresponding folding joint 23 through the opening 111 of the front plate 11. The limiting block 25 proceeds through the opening of the front plate 111. The distance bolt 24, which is a pivot point for a tilting movement, is located on the level of the front plate 11. In a rear part of the folding joint 23 and so in the door interior, the snapping slider 22 is attached to the folding joint 23. Between the snapping slider 22 and the front plate 11, a distance sleeve 27 is attached, which holds the snapping slider in a position corresponding to its form. The snapping slider 22 protrudes vertically downwards, comprising the complete height of the door. The snapping slider is brought into a position underneath the distance bolt 27 as well as underneath the pivoting area of the folding joint 23 by a counter spring 224, which enables linear guidance of the snapping slider 22 in operation. This position is fixed in a horizontal direction via upper and lower supporting elements 222, 223 so that only a movement in vertical direction is possible. The operating arm protrudes through a cover 26 into the door interior. The cover comprises an opening 261, which is only marginally bigger than the operating arm at this place. Furthermore, the opening 261 comprises bevellings at its outer edges. By moving in a vertical direction when operating the door handle automatic 2, the opening 261 is large enough to allow the level movement of the door handle 21.

[0073] Inside the cover 26, the limiting block 25 is located. It protrudes through the opening of the front plate 111, is, in an outer area, with respect to the front plate 11, larger than its opening 111 and, in an inner area of the door, smaller than the opening of the front plate 11. The inner area of the limiting block 25 is surrounded by the distance sleeve 27. The folding joint 23 proceeds through a bore 251 of the limiting block 25. This bore 251 proceeds upwards from the outside to the inside, however with an incline which also admits an horizontal position of the folding joint 23. The horizontal position of the folding joint 23 is supported by a stop unit 29 which is attached to an intermediate plate. The folding joint 23 is seated on the stop unit 29 with an end directed to the door interior. A nut 28, which is also attached at this end of the folding joint 23, prevents a releasing of the snapping slider 22 from the folding joint 23. The nut 28, however, is screwed up so far that it will not touch the stop unit 29.

[0074] FIG 5 shows the lower supporting elements 222 for stabilizing the linear guidance of the snapping slider 22. Below the door bottom, the snapping slider 22 comprises a protrusion 221 for snapping into the pull out system.

[0075] It is stuck with the height h1 in corresponding, not shown openings or in a corresponding opening in the pullout system. The protrusion 221 therefore blocks a

rotational movement of the door. The door handle 21 for operating the snapping slider 22 is here an operating arm which can move the folding joint 23 upwards by folding, as shown in FIG 7.

[0076] FIG 6 shows the protrusion 221 of the snapping slider 22 in a snapping position with horizontal door handle 21 in a not operated position of the door handle automatic.

[0077] FIG 7 to 9 show the door handle automatic 2 in a second, operated position. Here, the door handle 21 is brought into a position folded downwards by an operating angle α viewed from the door side. Here, the folding joint 23 is moved upwards by the same operating angle α through the distance bolt 24. Therefore, the folding joint 23 moves upwards in the limiting block 23. Therefore, the folding joint 23 is moved inside the bore 251 in an inner area of the limiting block 25 to the upper edge. In this way, the limiting block 25 defines the height h1 the snapping slider 22 is lifted. The folding joint 23 pulls the snapping slider upwards by the height h1.

[0078] To prevent the protrusion 221 from being pulled into the door interior space, an upper horizontal portion of the snapping slider 22 is also moved by the height h1 and touches the distance sleeve 27 after reaching the height h1. The cover 26 also moves downwards during operation around the operating angle α to allow the folding movement by the operating angle α in spite of a small opening 261.

[0079] FIG 8 shows the snapping slider 22 pulled upwards by the height h1 where the protrusion 221 of the snapping slider 22 at the door bottom is also pulled at least largely into the inside of the door by the height h1 so that it can not engage into the door guidance 34 according to FIG 10 any more. As soon as the protrusion 221 of the snapping slider 22 is not engaged with the door guidance 34 any more, the rotation of the door 1 is possible.

[0080] FIG 9 shows the lifted protrusion 221 of the snapping slider 22 with operated door handle automatic 2 and tilted door handle 21, respectively.

[0081] FIG 10 shows the pull out system 3 of the door system. In the door area, the U-clamp 31 is arranged. It comprises two swords 32 protruding vertically upwards. The U-clamp 31 is fixed in the pivot point 33 with the door guidance 34, and its swords 32 hold the door columns of the door. The bottom guidance 35 of the U-clamp comprises openings 351 which are arranged in a not rotated state over wholes 341 in the door guidance 34 of the pullout system which have the same size. This allows a ventilation of the door. By this, air can be sucked through the door into the oven or into the casing of the oven to cool the door as well as the oven itself or the casing.

[0082] FIG 11 shows an assembled cooking oven 4 with the door system 5 in a pull out position A. The door 1 is in a fixed and not rotated position and can be pushed in and pulled out at the door handle 21 like a common fixed door. Thus, not shown baking trays can be moved out of the cooking cavity 42 when opening and moved

into the cooking cavity 42 when closing. The feeding opening 43 is tightly closed with the door 1 by a sealing 41. A ventilation is possible via the air suction channel 45 of the cooking oven 4.

[0083] FIG 12 shows the cooking oven 4 with rotated door 1 of the door system 5 in a pull out position A. A vertically arranged pivot axis D can be seen within the center of the door and through the middle of the door guidance 34 which allows the not shown baking trays attached to the supporting elements 13 to rotate to both sides.

[0084] The rotatable front plate 11 is followed at its bottom by a non rotatable bottom front plate 37. Both plates are parallel if the door is on a non rotated state. However, if the door is rotated, the bottom front plate 37 stays unrotated.

References

[0085]

1	door
11	front plate
111	opening of front plate
12	interior plate
13	support elements
14	door column
141	connecting notch
142	connecting opening
143, 144	elongated slots
145	front end
15	glass holder
151	connecting pivot
153, 154	elongated slots
16	transverse bar
2	control unit
21	door handle
22	snapping slider
221	protrusion of snapping slider
222	lower supporting element
223	upper supporting element
224	counter spring
252	stopping faces
23	folding joint
24	distance bolt / pivot
25	limited block
251	bore
26	cover
261	cover opening
27	distance sleeve
28	nut
29	stop unit
3	pull out system
31	U-clamp
32	sword
33	pivot point
34	door guidance

35	ventilation opening in U-clamp
36	ventilation openings in pullout system
37	bottom front plate
4	cooking oven
41	sealing
42	cooking cavity
43	feeding opening
44	control panel
45	air suction channel
61	gluing area
63, 64	support elements
63A, 64A	base area
63B, 64B	holding pegs
5	door system
α	operating angle
A	pull out position
D	pivot axis
h1, h2	height
d1	distance

Claims

1. Door system (5) for closing a feeding opening (43) of a cooking cavity (42) of a cooking oven (4) with
 - a) a door which is movable using a pull out system (3) from the feeding opening (43) away and/or to the feeding opening (43) and which is, in addition, relatively movable to the pull out system (3),
 - b) where a control unit (2) is attached or arranged in and /or at the door (1) with which the door at least essentially in a pull out position (A) and/or during the pull out movement can be brought alternatively in a state which is relatively fixed with respect to the pull out system (3) or into a state which is relatively movable with respect to the pull out system (3).
2. Door system (5) according to claim 1, where the pull out movement of the door (1) using the pull out system (3) proceeds at least partially along a horizontal direction and/or where at its door (1), supporting elements (13) for at least one baking tray are provided.
3. Door system (5) according to claim 1 or 2, where the door is pivotable in its movable state relatively to the pull out system (3) around a, particularly vertical, pivot axis (D) and/or where the door is movable around a pivot axis (D) around a door center and/or with a rotation mechanism below the bottom of the door in order to rotate the door (1) relatively to the pull out system (3).
4. Door system (5) according to one of the proceeding claims, where the control unit (2) comprises two positions, where, in a first position of the control unit

(2), the door is located in its state relatively stationary with respect to the pull out system (3) and, in a second position of the control unit (2), the door is in its state relatively movable to the pull out system (3).

5. Door system (5) according to one of the proceeding claims, where the control unit (2) comprises at least one locking or snapping device for locking or fixing the door relatively to the pull out system on the one hand and for releasing or disconnecting the door relatively to the pull out system on the other hand and/or where the locking or snapping device comprises at least one locking or snapping slider (22), which is connected with a folding or swinging joint (23), where the distance of the folding joint (23) to a distance bolt (24) determines the lifting of the locking or snapping slider (22).
6. Door system (5) according to claim 5, where a protrusion (221) of the locking or snapping slider (22) engages through the door bottom into the pull out system (43) in a locking or snapping position and, in a related or disconnected position, is lifted out of the pull out system (34) or is out of engagement and/or where the locking or snapping slider (22) is at least partially a spring, which is advantageously arranged unmovable in a horizontal direction between supporting elements (222, 223) on the one hand and between a counter spring (224) and a distance sleeve (27) on the other hand and/or where the door comprises a front plate (11) as an outer surface and a distance bolt (24) constitutes a pivoting axis of the folding joint (23), which is located advantageously in the plane of the front plate (11).
7. Door system (5) according to claim 6, where a limiting block (25) extends through an opening of the front plate (111) with an outer area which is bigger than the opening of the front plate (111) and with an inner area which is smaller than the opening of the front plate, and/or where the limiting block (25) comprises a bore (251), which proceeds angular to the door interior space, where upper and lower stopping faces (252) limit the path of the folding joint (23) and/or where the outer area of the limiting block (25) is provided with a cover (26), where the cover provides an opening for an operating arm of the folding joint (23), which is not substantially bigger than its action range and/or where the cover (26) moves with the control unit (2) in a vertical movement, when the control unit is moved.
8. Door system (5) according to one of the claims 5 to 7, where a stop unit (29) supports the folding joint (23) in a fixed state of the door or in the first position of the control unit (2) and/or where a fixing element (28), especially a nut, is attached in a rear part of the folding joint (23), where this holds the snapping slider

(22) in its position and/or where the folding joint (23) is an extension of the door handle (21) protruding into the door handle (21).

9. Door system (5) according to one of the proceeding claims, where the control unit (2) is a door handle automatic, which transforms the different positions of the control device (2) by moving of the door handle (21) and/or where the door handle (21) of the door handle automatic (2) is in one position aligned horizontally and in another position tilted around an operating angle α in a plane based on a side view of the door (1), preferably 15° and/or where the door handle (21) of the door handle automatic (2) is brought from a first position of the door handle automatic (2) into a second position of the door handle automatic (2) by rotating around its horizontal axis and/or where the door handle (21) of the door handle automatic (2) is an arm which is aligned horizontally in a first position and which, in a second position of the door handle automatic, is tilted with respect to a plane of a front view of the door (1).
10. Door system (5) according to one of the proceeding claims, where the control unit (2) is operated using a push button at the door system (5) and/or the control panel (44) and/or where the control unit (2) is operated using an arm at the door system (5) and/or where the door (1) comprises snapping positions in a rotated state, preferably in a position of the door (1) which is rotated by 180° and/or 90° .
11. Door system (5) according to one of the proceeding claims, where the rotation of the door is carried out using a rotatable U-clamp (31) attached to the pull out system (34) and/or where the U-clamp (31) comprises a horizontal track adapted to the bottom of the door (1) and two swords (32) protruding vertically upwards from the track to hold the door (1) and/or where the swords (32) of the U-clamp (31) reach at least two thirds of the door height and/or where the swords (32) of the U-clamp (31) are included into door columns (14) of the door (1) and/or where the door columns (14) enclose the sword (32) of the U-clamp (31) several times, preferably three times.
12. Cooking oven (4), especially home cooking oven, with at least one cooking cavity (42) and with a door system (5) assigned to the feeding opening (43) for sealing or closing the feeding opening (43) according to at least one of the claims 1 to 11.
13. Door system (5) for closing a feeding opening (43) of a cooking cavity (42) of a cooking oven (4), particularly according to one of the claims 1 to 12, where

a) the door comprises a front plate (11) and at

least one interior plate (12),
 b) where two door columns (14) are attached to the front plate for carrying the front plate (11) and
 c) where the interior plate (12) is attached to the door columns (14),
 d) where preferably the interior plate (12) is fixed to the door system (5) by plate holders (15) protruding along the height of the door columns (14)

14. Door system (5) according to claim 13,
 b) where the plate holders (15) are clipped into the door columns (14).
15. Door system (5) according to claim 13 or 14,
 a) where the door columns (14) comprise at least one elongated slot (143, 144),
 b) where the at least one elongated slot (143, 144) is surrounded by the door column (14) and/or with a distance (d1) to the front end (145) of the door column (14) in order to increase the gluing area (61) for fixing the door columns to the front plate (11).
16. Door system (5) according to claim 15,
 a) where the plate holders (15) comprise at least one elongated slot (153, 154),
 b) where the elongated slot (153, 154) is surrounded by the plate holder (15) and/or with a distance (d1) to the front end of the plate holder (15) in order to increase the gluing area (61) for fixing the door columns (14) to the front plate (11),
 c) where preferably the at least one elongated slot (153, 154) of the plate holders (15) and the at least one elongated slot (143, 144) of the door columns (14) are arranged over each other.
17. Door system (5) according to one of claims 13 to 16,
 a) where the interior plate (12) is carried at its lower end by at least two support elements (63, 64),
 b) which are attached to the lower end of the door columns (14),
 c) where the support elements (63, 64) comprise a base area (63A, 64A) for carrying the interior plate (12) and an adjoining holding peg (63B, 64B) protruding upwards and/or perpendicular to the base area (63A, 64A) to prevent the plate from sliding down from the support element (63, 64),
 d) where the holding peg (63B, 64B) has a height (h2) of less than 7 mm, preferably less than 5 mm.

FIG 1

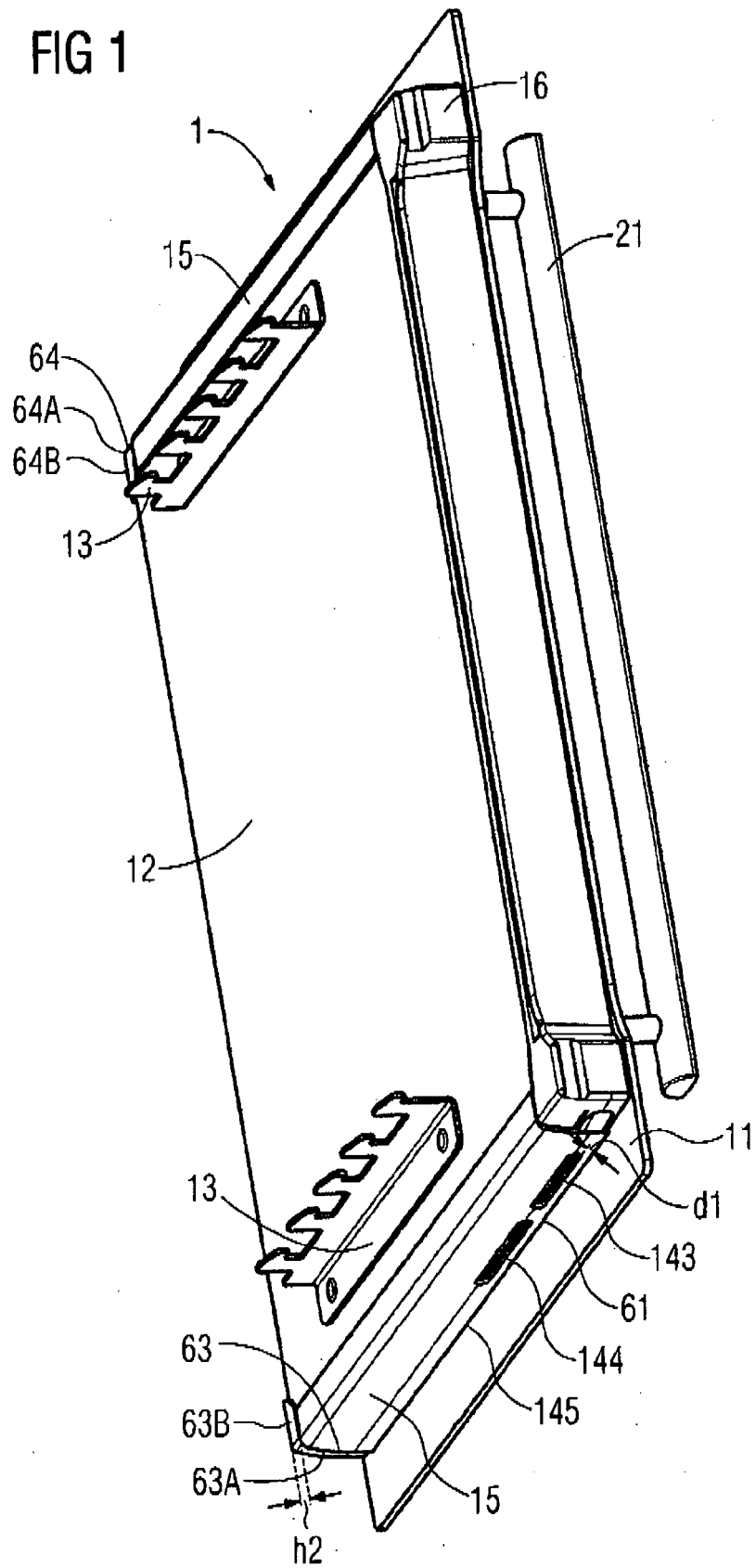


FIG 2

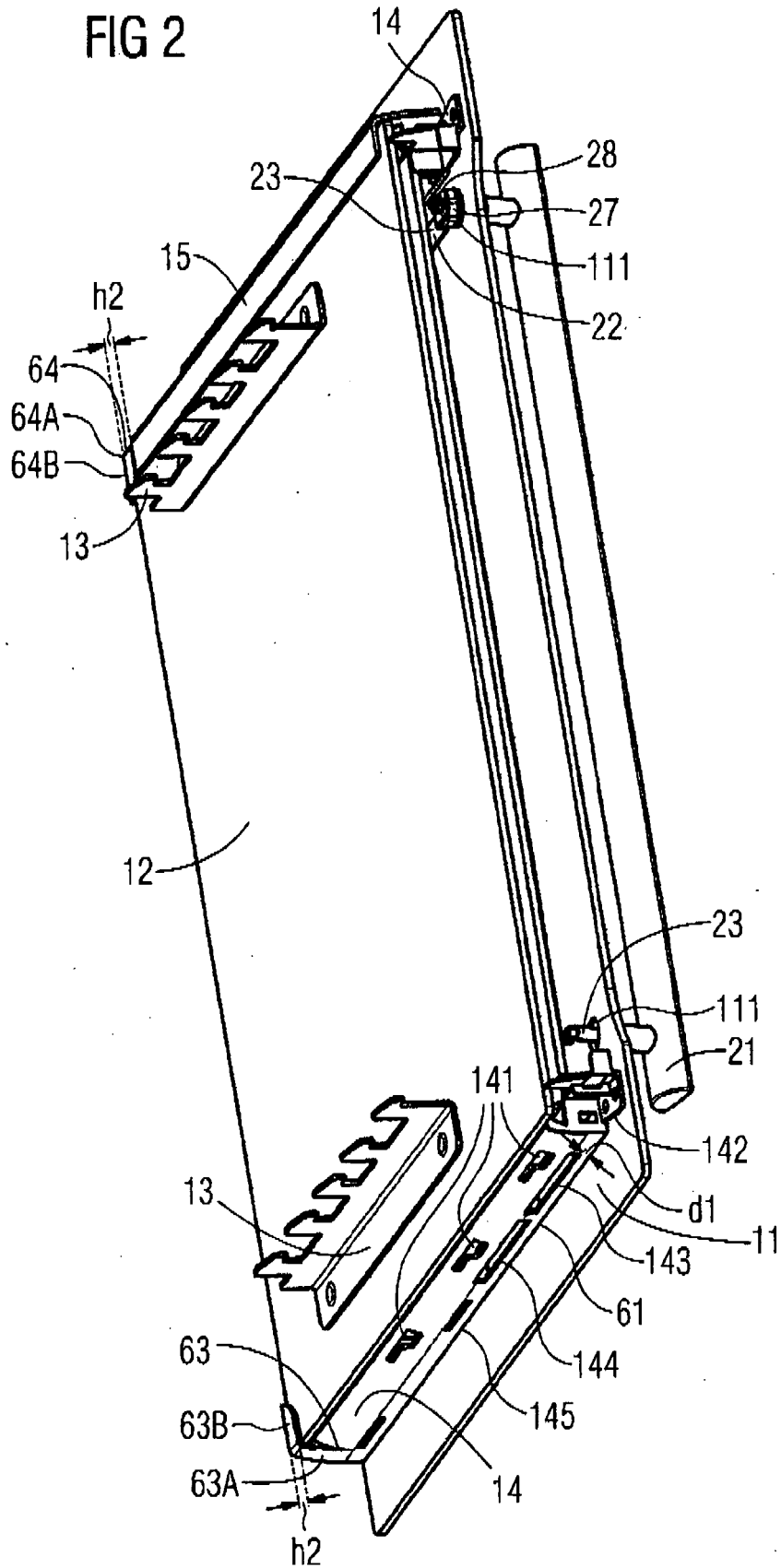


FIG 3

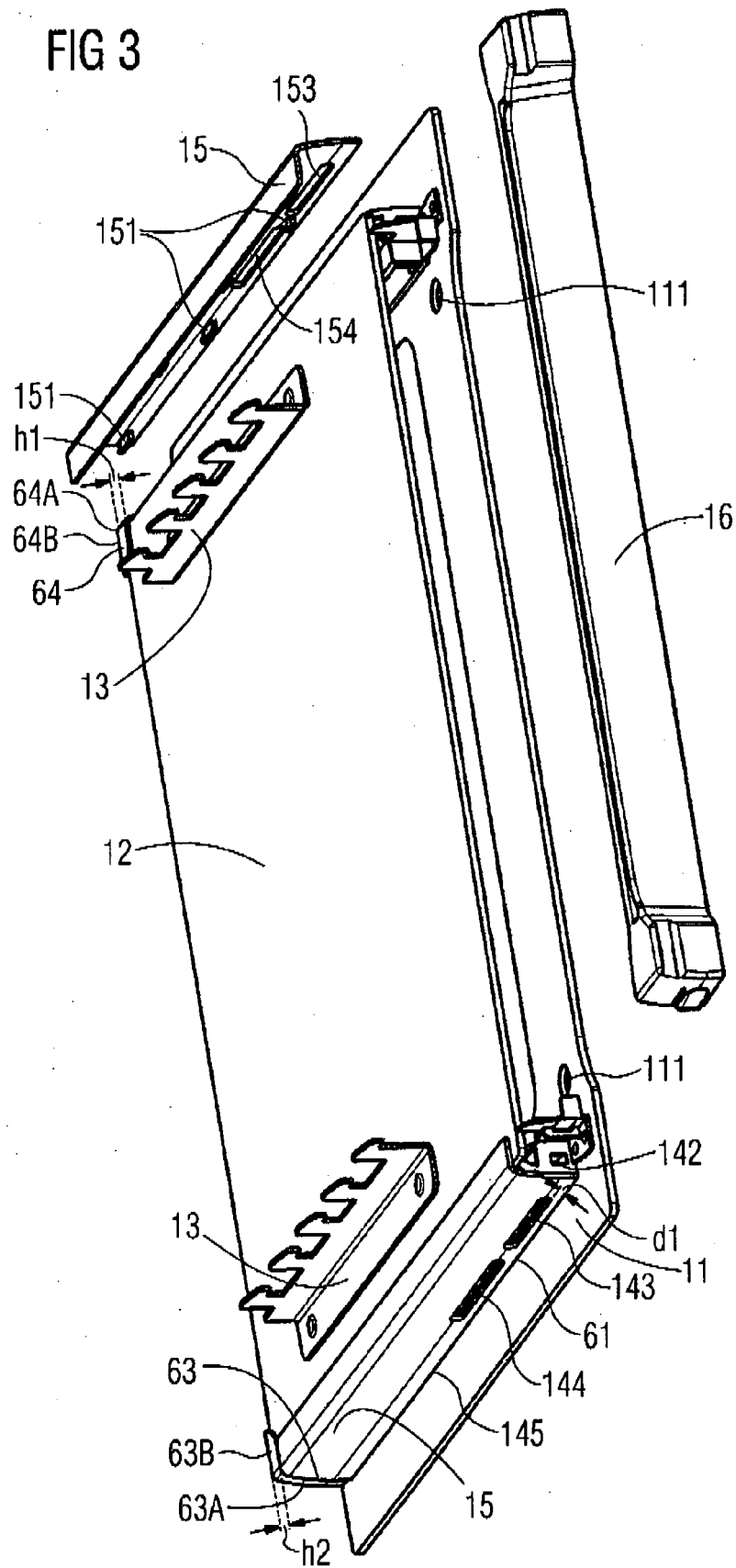


FIG 4

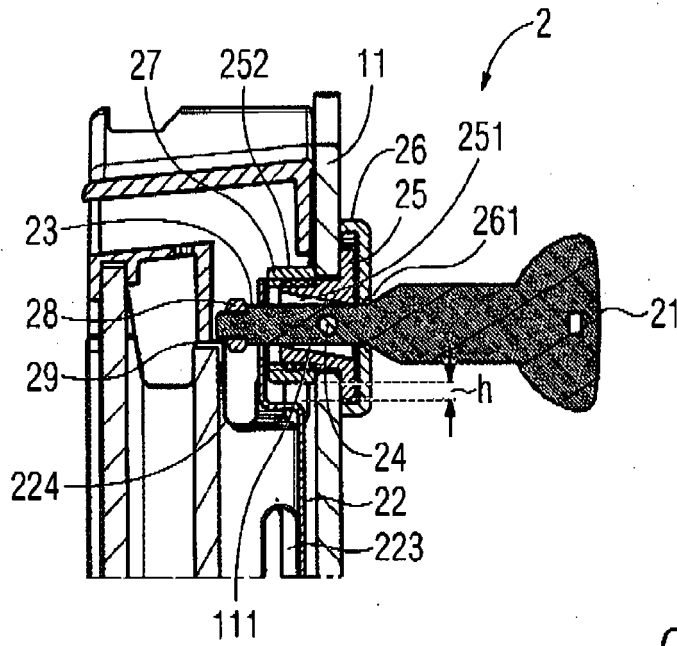


FIG 6

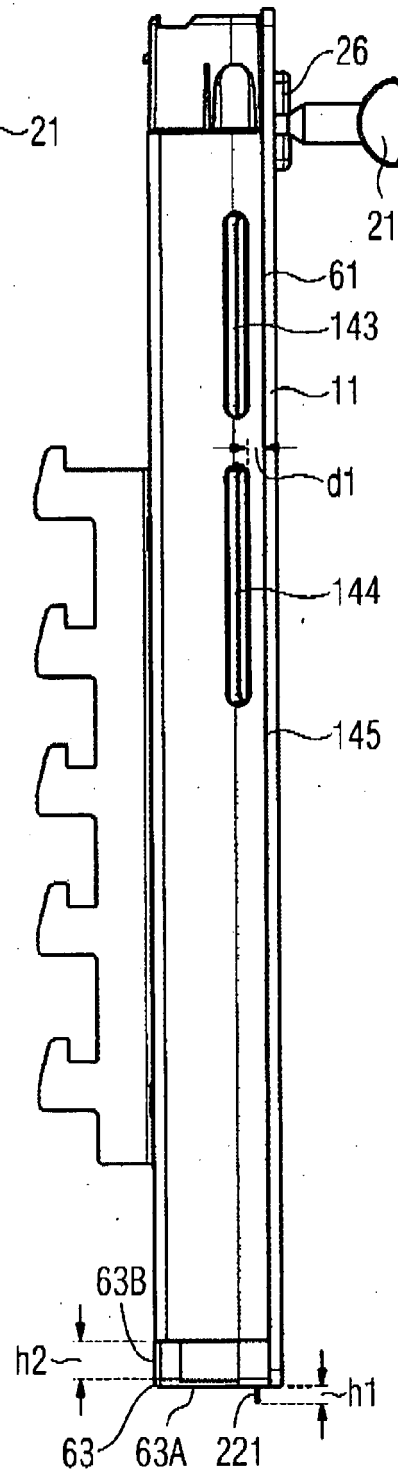


FIG 5

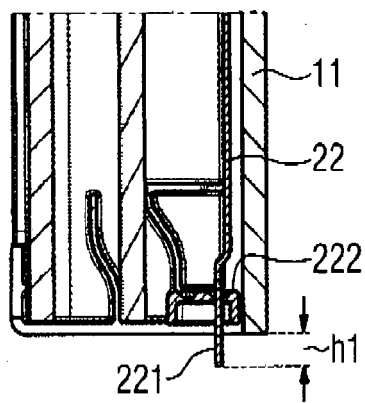


FIG 7

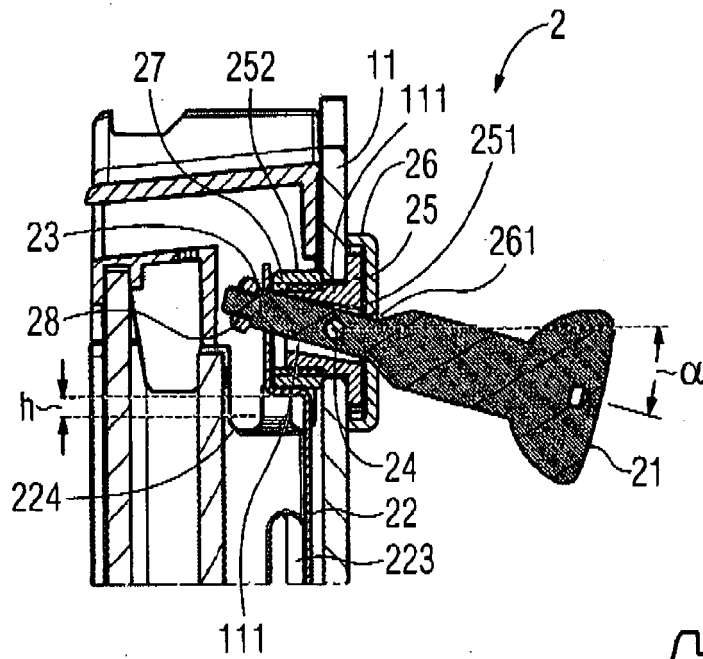


FIG 8

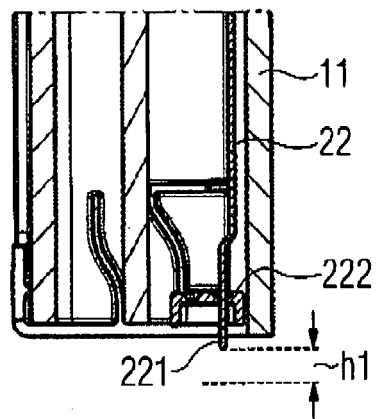


FIG 9

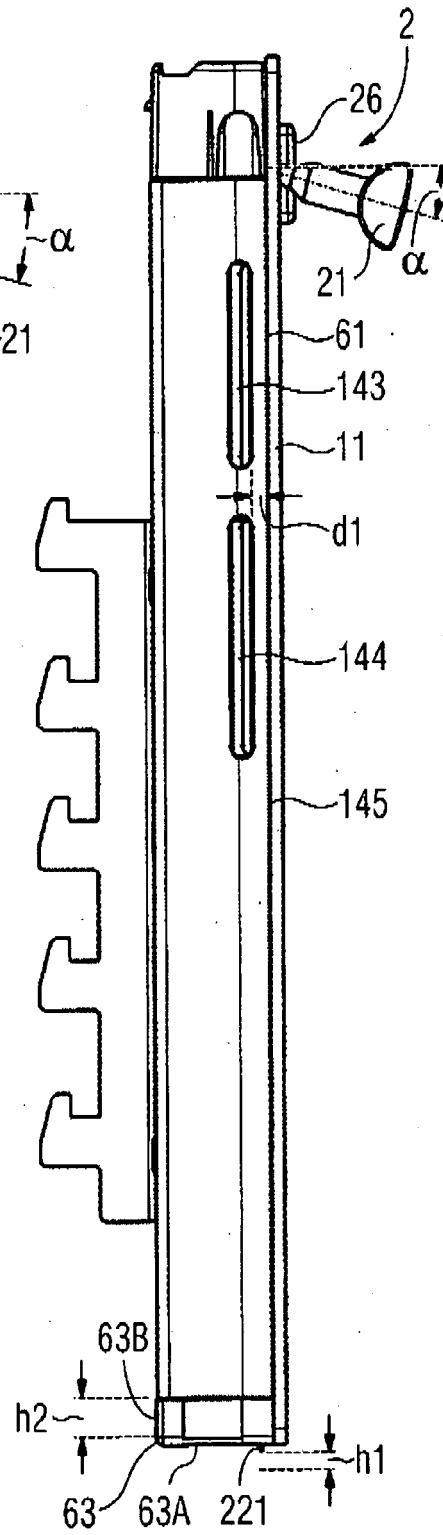


FIG 10

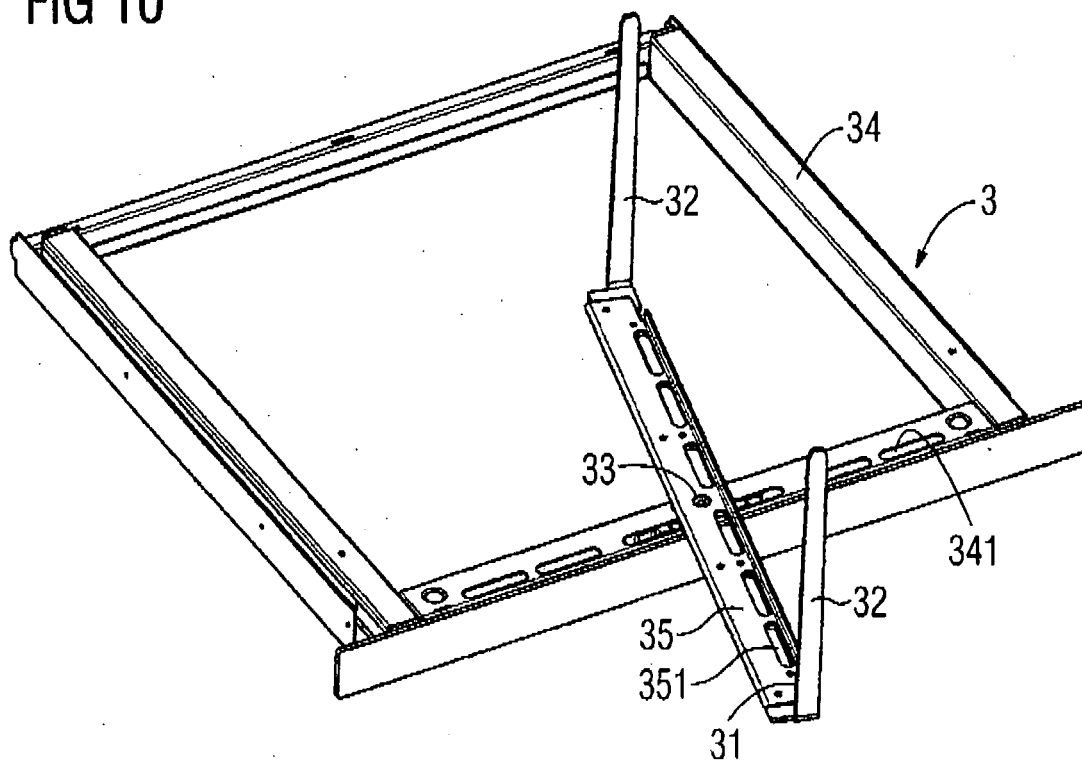
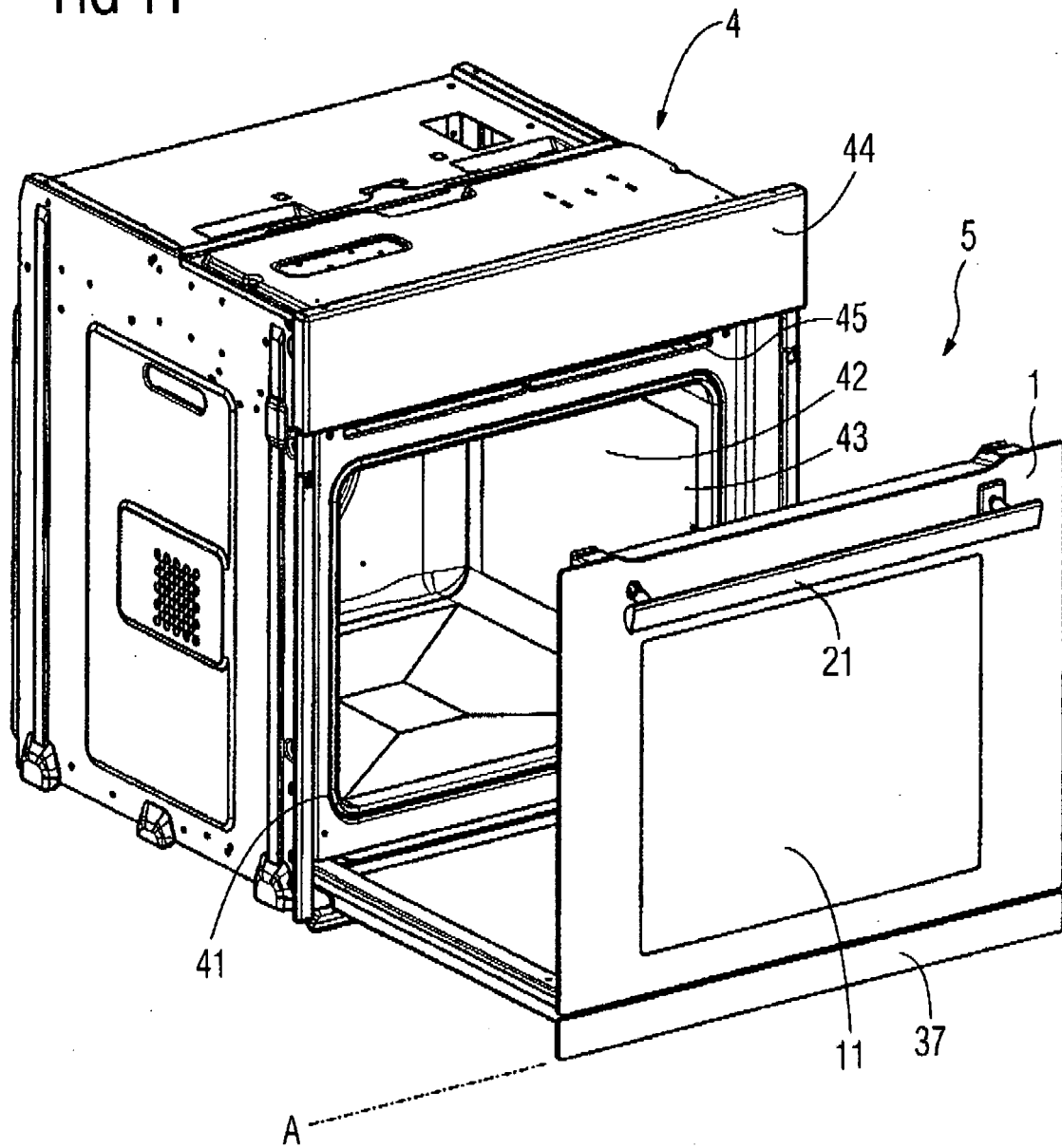


FIG 11



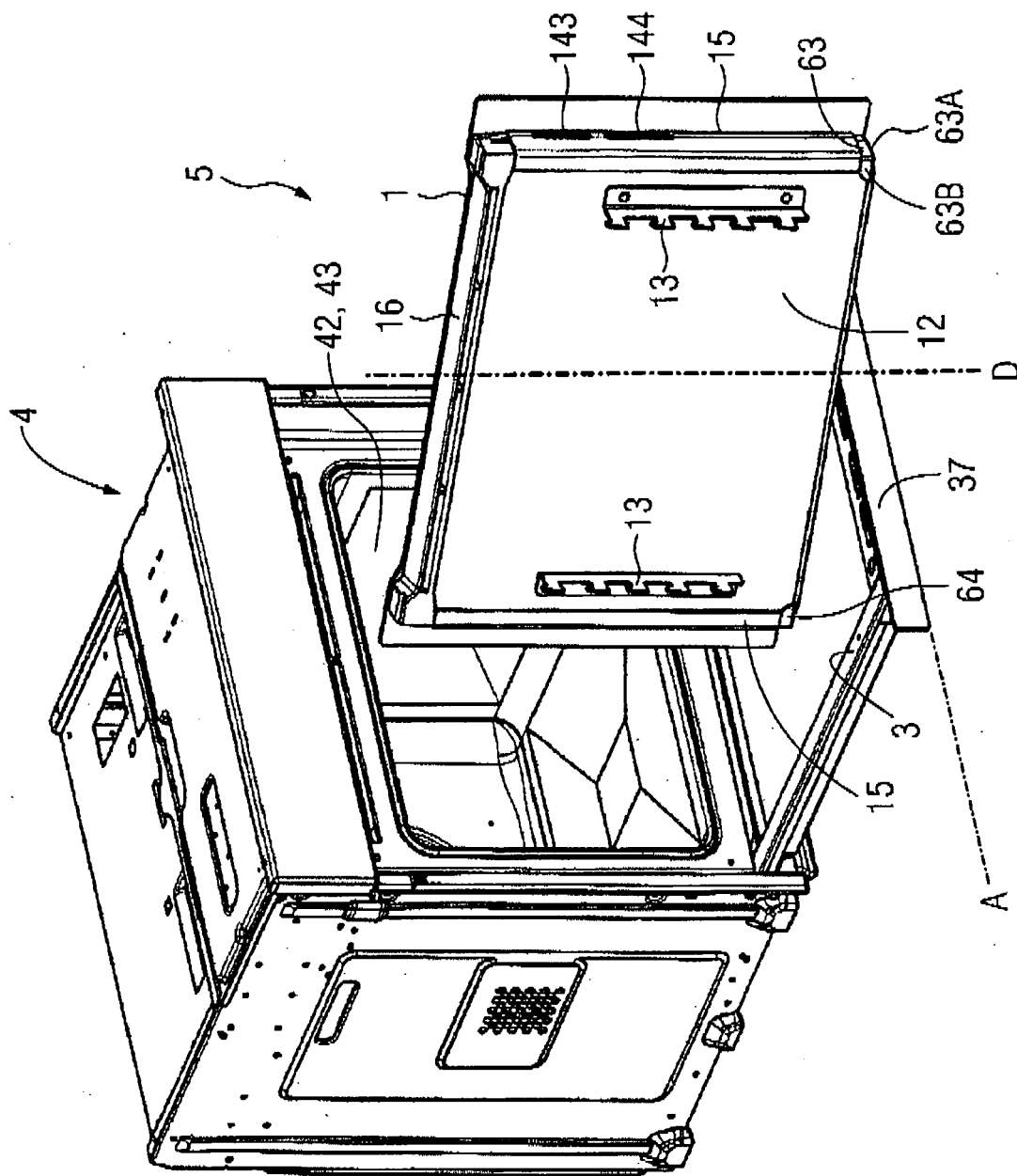


FIG 12



EUROPEAN SEARCH REPORT

Application Number
EP 08 00 2840

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Y		15,16	
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 March 2009	Examiner Blot, Pierre-Edouard
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

 4
EPO FORM 1503 03.82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
EP 08 00 2840

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The present search report has been drawn up for all claims				
Place of search Munich		Date of completion of the search 18 March 2009	Examiner Blot, Pierre-Edouard	
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>				

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EPO FORM 1503 03.82 (P04C01)



Application Number

EP 08 00 2840

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 08 00 2840

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-12

A door which is movable using a pull out system from the feeding opening away and/or to the feeding opening and which is, in addition, relatively movable to the pull out system, where a control unit is attached or arranged in and /or at the door with which the door at least essentially in a pull out position and/or during the pull out movement can be brought alternatively in a state which is relatively fixed with respect to the pull out system or into a state which is relatively movable with respect to the pull out system.

2. claims: 13-17

A door which comprises a front plate and at least one interior plate, where two door columns are attached to the front plate for carrying the front plate and where the interior plate is attached to the door columns.

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

EP 08 00 2840

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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