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(54) DOOR FOR A HOUSEHOLD APPLIANCE WITH A DEVICE FOR SECURING GLASS

TÜR FÜR EIN HAUSHALTSGERÄT MIT EINER VORRICHTUNG ZUR SICHERUNG VON GLAS

PORTE POUR UN APPAREIL ÉLECTROMÉNAGER AVEC UN DISPOSITIF DE SÉCURISATION DE VITRE

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(56) References cited:
EP-A2- 1 081 437
EP-A2- 2 244 017
WO-A1-2010/076181
WO-A2-2010/049337
DE-B3- 10 336 138

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Description

[0001] The present invention refers to a door for a household appliance, in particular for an oven, where said door comprise an outer glass, at least one middle glass, an inner glass and a device for securing glass, said outer glass being provided at the inner side thereof and in the marginal area of each vertical side with a vertical bar provided to receive a door hinge, and said outer glass being provided at the inner side thereof and in the upper marginal area between said vertical bars with a transversal bar serving as an air guide, said transversal bar being associated with a handle arranged at the outside of the outer glass.

[0002] Several known documents disclose solutions regarding door for a household appliance such as for instance WO 2010/076181 A1, DE 103 36 138 B3, EP 1 081 437 A2, EP 2 244 017 A2, WO 2010/049337 A2. None of the known documents, however, does not teach how to secure a glass of said door. Usually, securing one or more middle glass and the inner glass with the door of the household appliance, in particular of an oven, is achieved by means of adhesive, snapping-in, locking by mechanisms and, respectively, handles, different levers and similar. Chattering of glass occurs very often due to the specific characteristics of glass and due to the fixing thereof, and during heating up of the oven a breaking or twisting of the glass may occur due to the influence of the local temperature differences. Thus, securing glass is rather complex job resulting in difficulties for the user when cleaning of the glass is to take place.

[0003] It is the object of the present invention to create a door for a household appliance, in particular for an oven, which remedies drawbacks of known solutions.

[0004] According to the present invention, the object as set above is solved with characteristics disclosed in claim 1. Details of the invention are further disclosed in the corresponding subclaims.

[0005] The invention is further described in detail by way of non-limiting embodiment, and with a reference to the accompanying drawings, where

Fig. 1 shows a three-dimensional view of a door of an oven,

Fig. 2 shows a cross-sectional view door of Fig. 1 in a vertical plane,

Fig. 3 shows a door of Fig. 2 with glass partially inserted,

Fig. 4 shows a detail of a door assembly in an exploded view,

Fig. 5 shows a three-dimensional view of a device for securing glass according to the invention,

Fig. 6 shows a device of Fig. 5 viewed from the other side.

[0006] An embodiment of the invention is described in the foregoing with reference to a household appliance, in particular an oven, where the term outside/outer refers to a position and an arrangement facing away from the oven compartment, and where the term inside/inner refers to a position and an arrangement facing the oven compartment. The term glass refers to a transparent door element made of an arbitrary transparent material. A door 1 of a household appliance and, respectively, an oven comprises an outer glass 2, at least one middle glass 3 and an inner glass 4. Said outer glass 2 is provided on the inner side thereof and in the marginal area of each vertical side with a vertical bar 5 resembling the cross-sectional form of a letter U and being provided to receive a hinge 6 of the door 1. Furthermore, said outer glass 2 is provided on the inner side thereof and in the upper marginal area between said vertical bars 5 with a transversal bar 7 serving as an air guide and being associated in a manner know *per se* with a handle 8 arranged at the outside of the outer glass 2. An assembly of at least one middle glass 3 is inserted into a frame composed of each vertical bar 5 and the transversal bar 7 and fixed by means of at least one device 9 for securing glass, preferably by means of two said devices for securing glass each of them cooperating with one of said bars 5, and by means of at least one spacer 10, preferably by means of two said spacers. Inner glass 4 is fixed into said device 9 after said at least one middle glass 3 has been inserted into said frame. Said device 9 is preferably arranged and articulated with the vertical bar 5 in the area of the free end thereof, whereas the spacer 10 is arranged in the area of the transversal bar 7.

[0007] Each said device 9 for securing glass comprises a body 11 having at least one groove 12 to accommodate the middle glass 3, said body preferably having two grooves to accommodate the middle glass 3. Each groove 12 is formed slightly conical in the direction from an aperture 13 towards a bottom 13', thus, additionally securing the middle glass 3. Said body 11 is formed at its side which is averted from the transversal bar 7 and faces the outer glass 2 with a chamfer 14. The side of the body 11 being averted from the outer glass 2 is provided in the area above the groove 12 for the accommodation of the middle glass 3 with a T shaped recess 15 in which is arranged a damper 16 for the inner glass 4. In addition, a tooth 17 for accommodation of the inner glass 4 is provided in the area above the groove 12 for the accommodation of the middle glass 3, said tooth 17 being placed onto said side of the body 11 which is averted from the outer glass 2. Once the inner glass is placed onto the body 11 it is secured by means of a securing means 18 arranged in an additional T shaped groove 19 formed in the area above said chamfer 14. Said securing means 18 holds the inner glass by means of a tongue 20, whereas said securing means 18 is formed at its opposite end and at the side facing said body 11 with a snap-in tooth 21 which cooperates with a recess 22 in the body 11, thus preventing the inner glass 4 to be unintentionally released. Moreover, a through-hole 23 is formed in the area between said grooves 12 for accommodation of middle glass 3, said through-hole 23 intend-

ed to fasten said body 11 when the door 1 is produced without middle glass 3. In the present embodiment, said securing means 18 can be moved only manually from the position when the inner glass 4 is released to the position when the inner glass 4 is secured, and vice versa. It is understood that an embodiment is possible where a resilient means is arranged between the securing means 18 and the body 11, said resilient means facilitates by elastic action the movement of the securing means into a position when the inner glass 4 is released. It is further provided for according to the present invention that the body 11 of said device 9 is formed on its side facing the vertical bar 5 with a cylindrical projection 24 which cooperates with a suitable hole 25 formed in the area of the free end of said bar 5. Said projection 24 enables for the device 9 to rotate about the centre line of the projection 24 when the latter is inserted into said hole 25 in the bar 5. Said projection 24 comprises snap-in protrusions 26 preventing the projection 24 to unintentionally slip out of the hole 25.

[0008] One device 9 for securing glass according to the invention is inserted with said projection 24 into each said hole 25 in each bar 5 where it is locked by means of snap-in protrusions 26 in order to prevent unintentional disengagement. Said device 9 is oriented in a manner that said chamfer 14 faces the outer glass 2 and the bottom section of the door where said hinges 6 are located. Afterwards, both devices 9 are rotated about the centre line of said projection 24 so as said chamfer 14 lies essentially in parallel with the outer glass 2 and, respectively, may even sit thereon. The middle glass 3 is inserted into said grooves 12 of each device 9, where at least one spacer 10 is placed on the free end of the middle glass 3 inserted into the device 9, said spacer 10 securing the middle glass 3 in the required distance. Afterwards, the module of middle glass 3 assembled in the described manner is rotated along with each device 9 about the centre line of said projection 24 into direction toward the outer glass 2, so that middle glass 3 in now aligned in parallel with the outer glass 2, and the spacer 10 locks in said transversal bar 7. Eventually, the inner glass 4 is mounted, the first end thereof being pushed into a slit of the transversal bar 7. The inner glass 4 is afterwards placed in a flat position onto the damper 16 on the device 9, wherein the glass 4 abuts with the free end thereof against said tooth 17. After that the inner glass 4 is secured against disengagement by means of securing means 18 which is pushed in the plane of the inner glass 4 so as to said tongue 20 press the inner glass 4 against the body 11 of the device 9 and, respectively, against the damper 16. Said tooth 21 of the securing means 18 sits into said recess 22, thus securing the inner glass 4 both against disengagement as well as against possible unintentional movement. In order for the the glass 3, 4 to be removed, the free end of the securing means 18 is to be lifted so that said tooth 21 disengages the recess 22, and after that the securing means 18 is to be moved in the direction towards the bottom section of the door so that the inner glass 4 is released.

Claims

1. A door for a household appliance, in particular for an oven, wherein said door (1) comprise an outer glass (2), at least one middle glass (3), an inner glass (4) and a device its (9) for securing glass, said outer glass (2) being provided at its inner side and in the marginal area of each vertical side with a vertical bar (5) provided to receive a door hinge (6), and said outer glass (2) being provided at its inner side and in the upper marginal area between said vertical bars (5) with a transversal bar (7) serving as an air guide, said transversal bar being associated with a handle (8) arranged at the outside of the outer glass (2), ***characterized in that*** the device (9) comprises a body (11) with at least one groove (12) to accommodate a middle glass (3), wherein said body (11) is formed at its side averted from a transversal bar (7) and facing an outer glass (2) with a chamfer (14), wherein the side of the body (11) averted from the outer glass (2) is formed in the area above said groove (12) with a T shaped recess (15) in which is arranged a damper (16) of an inner glass (4), wherein a tooth (17) to accommodate the inner glass (4) is provided in the area above said groove (12), and wherein a securing means (18) for securing the inner glass (4) is arranged in an additional T shaped groove (19) formed in the area above said chamfer (14).

2. A door according to claim 1, ***characterized in that*** an assembly of at least one middle glass (3) and a frame comprised of each vertical bar (5) and the transversal bar (7) is placed and secured by means of at least one device (9) for securing glass, each said device cooperates with one of each said bars (5), and by means of at least one spacer (10), wherein said device (9) is preferably arranged and articulated with the vertical bar (5) in the area of the free end of said vertical bar while the spacer (10) is arranged in the area of the transversal bar (7), and wherein the inner glass (4) is fixed into said device (9) only after said installation of at least one middle glass (3) into said frame.

3. A door according to claims 1 and 2, ***characterized in that*** said securing means (18) secures the inner glass by means of a tongue (20) while said securing means (18) is formed at its opposite end and at the side facing said body (11) with a snap-in tooth (21) which cooperates with a recess (22) in the body (11).

4. A door according to claim 1, ***characterized in that*** a through-hole (23) is formed in the area between said grooves (12), said through-hole being provided

for locking said body when the door (1) is produced with no middle glass (3).

5. A door according to claims 1 to 4, ***characterized in that*** a resilient means is arranged between the securing means (18) and the body (11), said resilient means facilitates by means of elastic action the movement of the securing means (18).

6. A door according to claim 1, ***characterized in that*** the body (11) is formed on its side facing the vertical bar (5) with a cylindrical projection (24) which cooperates with a hole (25) formed in the area of the free end of said bar (5), wherein said projection (24) enables the device (9) to rotate about the centre line of the projection (24).

7. A door according to claims 1 and 6, ***characterized in that*** said projection (24) is formed with snap-in protrusions (26) which prevent unintentional disengagement of the projection (24) from the hole (25).

8. A door according to claim 1, ***characterized in that*** each groove (12) is formed slightly conical in the direction from an aperture (13) towards a bottom (13'), thus, additionally securing the middle glass (3).

Patentansprüche

1. Tür für ein Haushaltsgerät, insbesondere für einen Ofen, wobei die Tür (1) ein äußeres Glas (2), wenigstens ein mittleres Glas (3), ein inneres Glas (4) und eine Vorrichtung (9) zur Sicherung von Glas umfasst, wobei das äußere Glas (2) an seiner Innenseite und in dem Randbereich von jeder vertikalen Seite mit einem Vertikalstab (5) versehen ist, der zur Aufnahme eines Türscharniers (6) dient, wobei das äußere Glas (2) an seiner Innenseite und in dem oberen Randbereich zwischen den Vertikalstäben (5) mit einer Querstange (7) versehen ist, die als eine Luftführung dient, wobei die Querstange mit einem Handgriff (8) verbunden ist, der an der Außenseite des äußeren Glases (2) angeordnet ist, **dadurch gekennzeichnet, dass** die Vorrichtung (9) einen Körper (11) mit wenigstens einer Rille (12) zur Aufnahme eines mittleren Glases (3) umfasst, wobei der Körper (11) an seiner von der Querstange (7) abgewandten und einem äußeren Glas (2) zugewandten Seite mit einer Fase (14) ausgebildet ist, wobei die Seite des Körpers (11), die von dem äußeren Glas (2) abgewandt ist, in dem Bereich oberhalb der Rille (12) mit einer T - förmigen Aussparung (15) ausgebildet ist, in welcher ein Dämpfer (16) eines inneren Glases (4) angeordnet ist, wobei ein Zahn (17) zur Aufnahme des inneren Glases (4) in dem Bereich oberhalb der Rille (12) vorgesehen ist, und wobei ein Sicherungsmittel (18) zur Sicherung des inneren Glases (4) in einer zusätzlichen T - förmigen Rille (19) angeordnet ist, welche in dem Bereich oberhalb der Fase (14) ausgebildet ist.

2. Tür nach Anspruch 1, **dadurch gekennzeichnet, dass** eine Baugruppe aus wenigstens einem mittleren Glas (3) und einem Rahmen, der jeden Vertikalstab (5) und die Querstange (7) beinhaltet, mittels wenigstens einer Vorrichtung (9) zur Sicherung von Glas und mittels wenigstens einem Abstandhalter (10) positioniert und fixiert ist, wobei jede Vorrichtung mit einem der Vertikalstäbe (5) zusammenwirkt, wobei die Vorrichtung (9) vorzugsweise in dem Bereich des freien Endes des Vertikalstabs angeordnet und mit dem Vertikalstab (5) gelenkig verbunden ist, während der Abstandhalter (10) in dem Bereich der Querstange (7) angeordnet ist, und wobei das innere Glas (4) erst nachdem das wenigstens eine mittlere Glas (3) in dem Rahmen installiert wurde, in der Vorrichtung (9) fixiert wird.

3. Tür nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Sicherungsmittel (18) das innere Glas mithilfe einer Zunge (20) sichert, wobei das Sicherungsmittel (18) an seinem entgegengesetztem Ende und an der Seite, die zu dem Körper (11) weist, mit einem Einschnappzahn (21) ausgebildet ist, der mit einer Aussparung (22) in dem Körper (11) zusammenwirkt.

4. Tür nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Durchgangsloch (23) in dem Bereich zwischen den Rillen (12) ausgebildet ist, wobei das Durchgangsloch zur Verriegelung des Körpers vorgesehen ist, wenn die Tür (1) ohne mittleres Glas (3) gefertigt ist.

5. Tür nach den Ansprüchen 1 bis 4, **dadurch gekennzeichnet, dass** ein Federmittel zwischen dem Sicherungsmittel (18) und dem Körper (11) angeordnet ist, wobei das Federmittel durch eine elastische Wirkung die Bewegung des Sicherungsmittels (18) erleichtert.

6. Tür nach Anspruch 1, **dadurch gekennzeichnet, dass** der Körper (11) an seiner dem Vertikalstab (5) zugewandten Seite mit einem zylindrischen Vorsprung (24) ausgebildet ist, der mit einem Loch (25) zusammenwirkt, das in dem Bereich des freien Endes des Vertikalstabs (5) ausgebildet ist, wobei der Vorsprung (24) ermöglicht, dass sich die Vorrichtung (9) um die Mittelachse des Vorsprungs (24) herum dreht.

7. Tür nach Anspruch 1 und 6, **dadurch gekennzeichnet, dass** der Vorsprung (24) mit Einschnappüberständen (26) ausgebildet ist, welche eine unbeabsichtigte Abkopplung des Vorsprungs (24) von dem

Loch (25) verhindern.

8. Tür nach Anspruch 1, **dadurch gekennzeichnet, dass** jede Rille (12) in der Richtung von einer Apertur (13) zu einem Boden (13') leicht konisch ausgebildet ist, wodurch das mittlere Glas (3) zusätzlich gesichert ist.

Revendications

1. Porte pour un appareil électroménager, en particulier pour un four, ladite porte (1) comprenant une vitre externe (2), au moins une vitre intermédiaire (3), une vitre interne (4) et un dispositif (9) de sécurisation de vitre, ladite vitre externe (2) étant munie, sur son côté interne et dans la zone marginale de chaque côté vertical, d'une barre verticale (5) prévue pour recevoir une charnière de porte (6), et ladite vitre externe (2) étant munie, sur son côté interne et dans la zone marginale supérieure entre lesdites barres verticales (5), d'une barre transversale (7) servant de guide d'air, ladite barre transversale étant associée à une poignée (8) disposée à l'extérieur de la vitre externe (2), ***caractérisée par le fait* que** le dispositif (9) comprend un corps (11) ayant au moins une rainure (12) pour recevoir une vitre intermédiaire (3), ledit corps (11) comportant, sur son côté à l'opposé d'une barre transversale (7) et faisant face à une vitre externe (2), un chanfrein (14), le côté du corps (11) à l'opposé de la vitre externe (2) comportant dans la région au-dessus de ladite rainure (12) un évidement en forme de T (15) dans lequel est disposé un amortisseur (16) d'une vitre interne (4), une dent (17) pour recevoir la vitre interne (4) étant prévue dans la région au-dessus de ladite rainure (12), et un moyen de sécurisation (18) pour sécuriser la vitre interne (4) étant disposé dans une rainure en forme de T supplémentaire (19) formée dans la région au-dessus dudit chanfrein (14).

2. Porte selon la revendication 1, ***caractérisée par le fait* qu'**un ensemble d'au moins une vitre intermédiaire (3) et d'un cadre constitué de chaque barre verticale (5) et de la barre transversale (7), est placé et sécurisé au moyen d'au moins un dispositif (9) de sécurisation de vitre, chaque dispositif coopérant avec l'une desdites barres (5), et au moyen d'au moins un élément d'espacement (10), ledit dispositif (9) étant, de préférence, disposé et articulé avec la barre verticale (5) dans la région de l'extrémité libre de ladite barre verticale tandis que l'élément d'espacement (10) est disposé dans la région de la barre transversale (7), et la vitre interne (4) étant fixée dans ledit dispositif (9) uniquement après ladite installation d'au moins une vitre intermédiaire (3) dans ledit cadre.

3. Porte selon les revendications 1 et 2, ***caractérisée par le fait* que** ledit moyen de sécurisation (18) fixe la vitre interne au moyen d'une languette (20) tandis que ledit moyen de sécurisation (18) comporte, à son extrémité opposée et sur le côté faisant face audit corps (11), une dent à encliquetage (21) qui coopère avec un évidement (22) dans le corps (11).

4. Porte selon la revendication 1, ***caractérisée par le fait* qu'**un trou traversant (23) est formé dans la région entre lesdites rainures (12), ledit trou traversant étant conçu pour verrouiller ledit corps lorsque la porte (1) est produite sans vitre intermédiaire (3).

5. Porte selon les revendications 1 à 4, ***caractérisée par le fait* qu'**un moyen élastique est agencé entre le moyen de sécurisation (18) et le corps (11), ledit moyen élastique facilitant, par action élastique, le mouvement du moyen de sécurisation (18).

6. Porte selon la revendication 1, ***caractérisée par le fait* que** le corps (11) comporte, sur son côté faisant face à la barre verticale (5), une saillie cylindrique (24) qui coopère avec un trou (25) formé dans la zone de l'extrémité libre de ladite barre (5), ladite saillie (24) permettant au dispositif (9) de tourner autour de la ligne centrale de la saillie (24).

7. Porte selon les revendications 1 à 6, ***caractérisée par le fait* que** ladite saillie (24) est formée avec des saillies à encliquetage (26) qui empêchent un désengagement non intentionnel de la saillie (24) vis-à-vis du trou (25).

8. Porte selon la revendication 1, ***caractérisée par le fait* que** chaque rainure (12) est formée légèrement conique dans la direction allant d'une ouverture (13) vers un fond (13'), sécurisant ainsi encore la vitre intermédiaire (3).

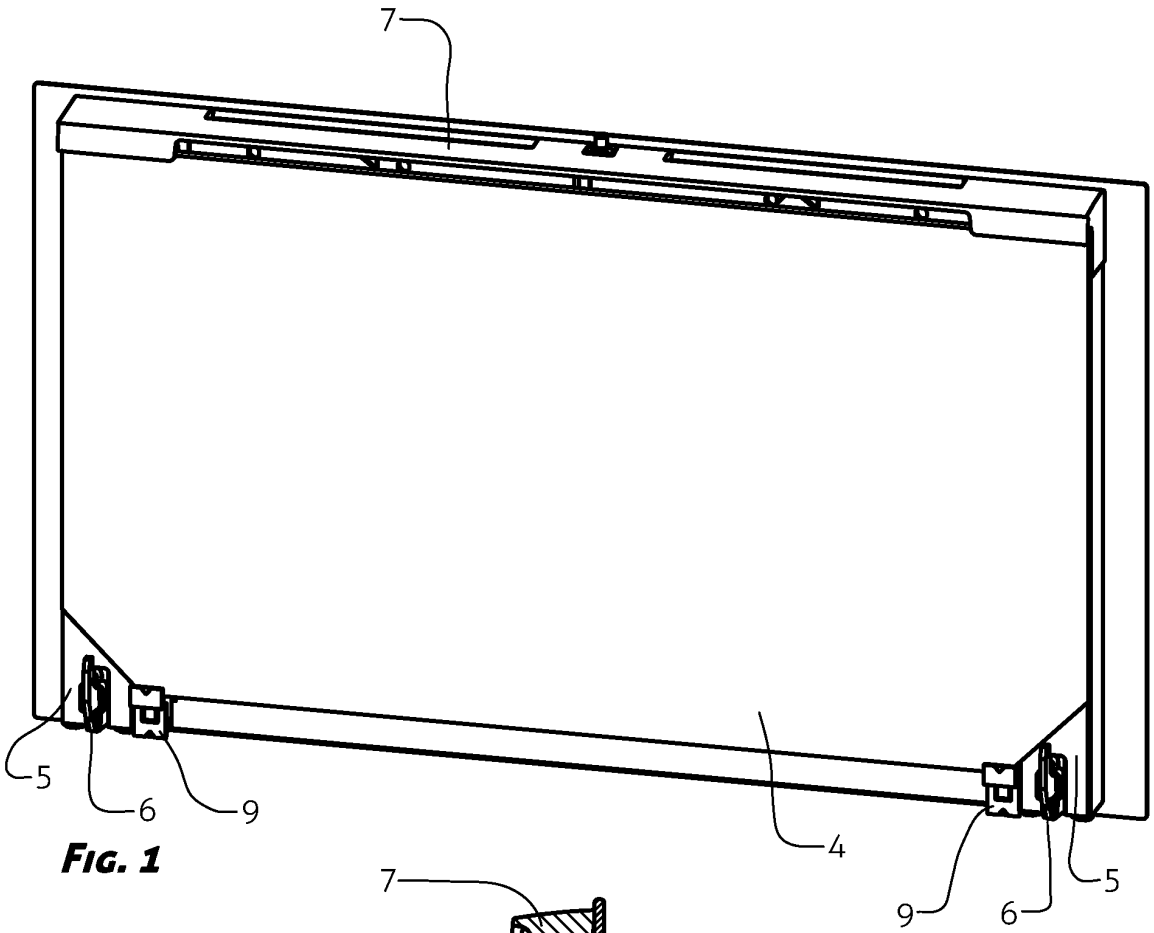

FIG. 1

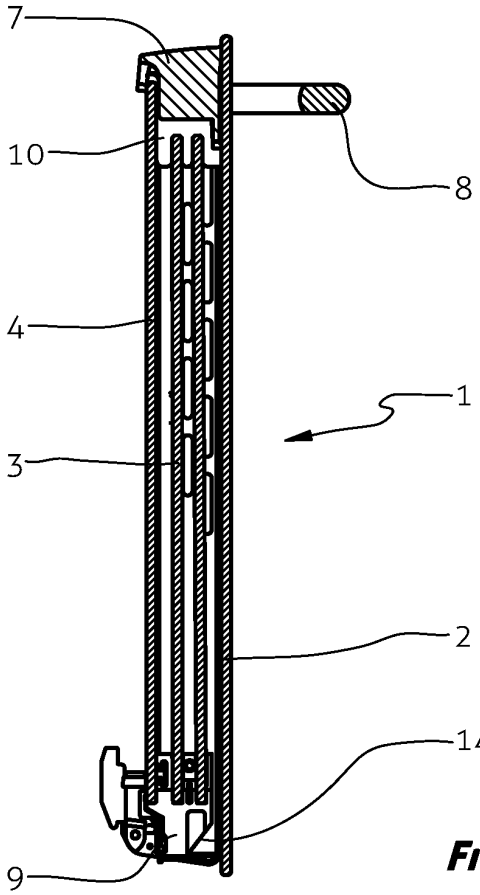

FIG. 2

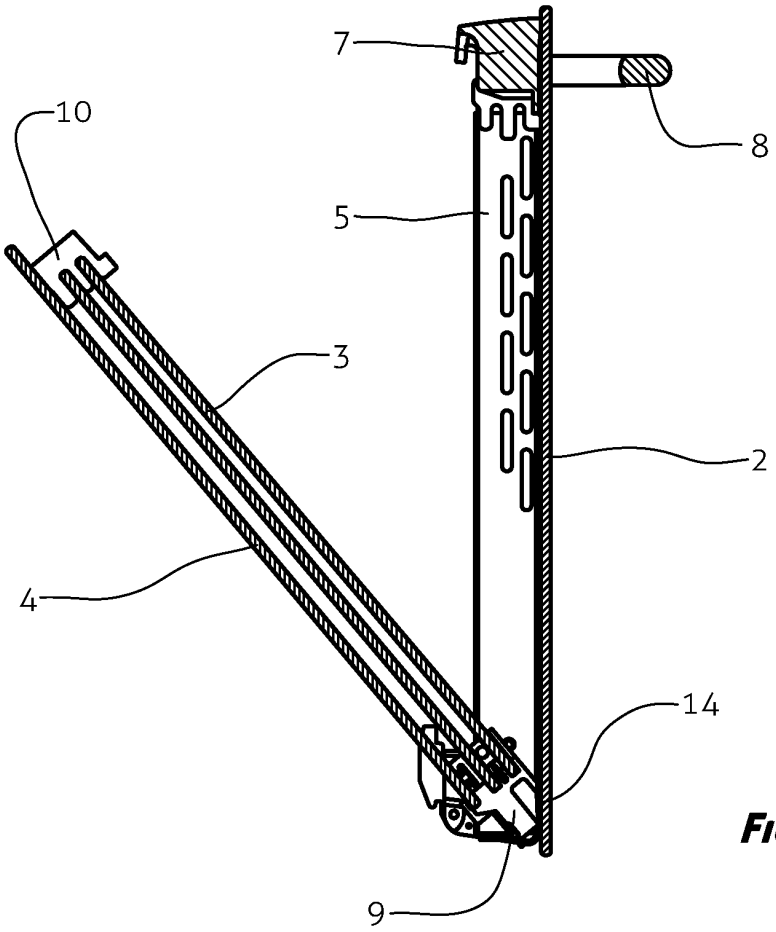

FIG. 3

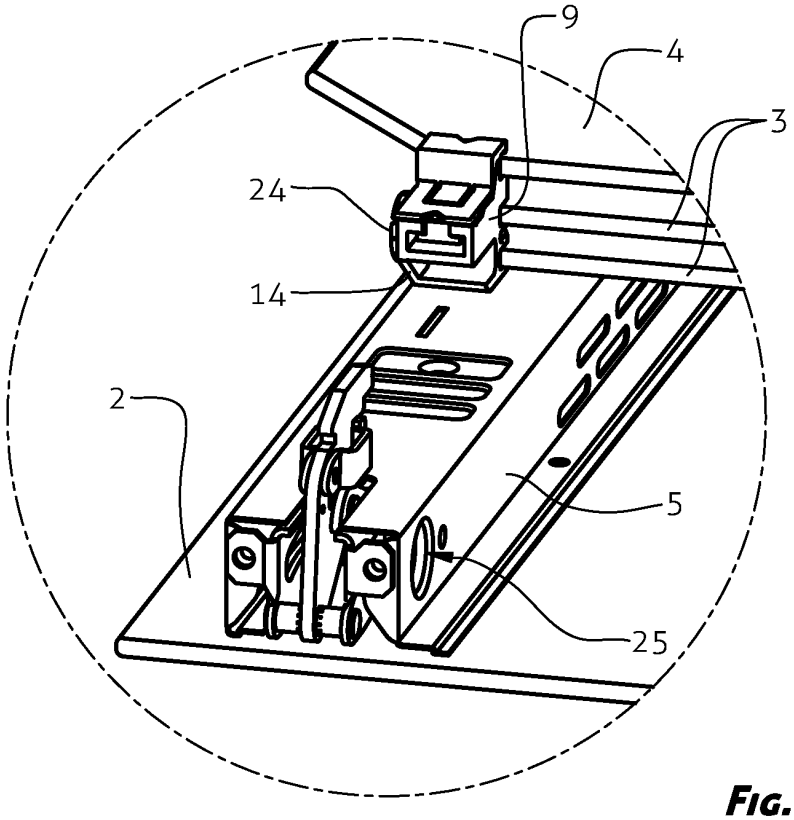

FIG. 4

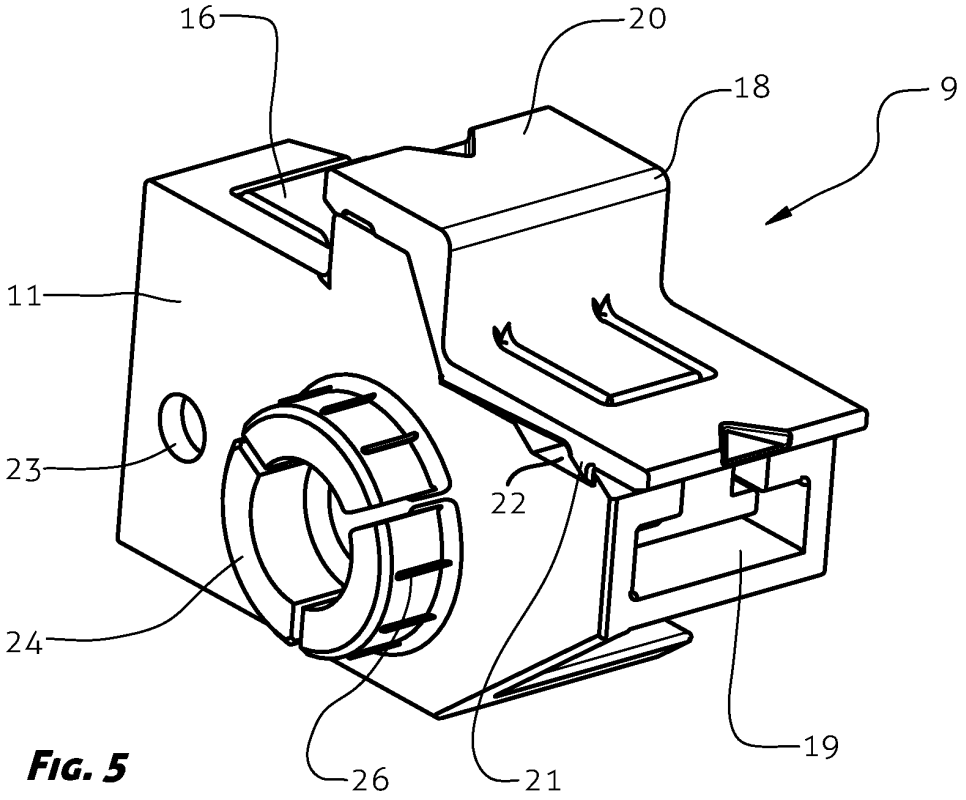

FIG. 5

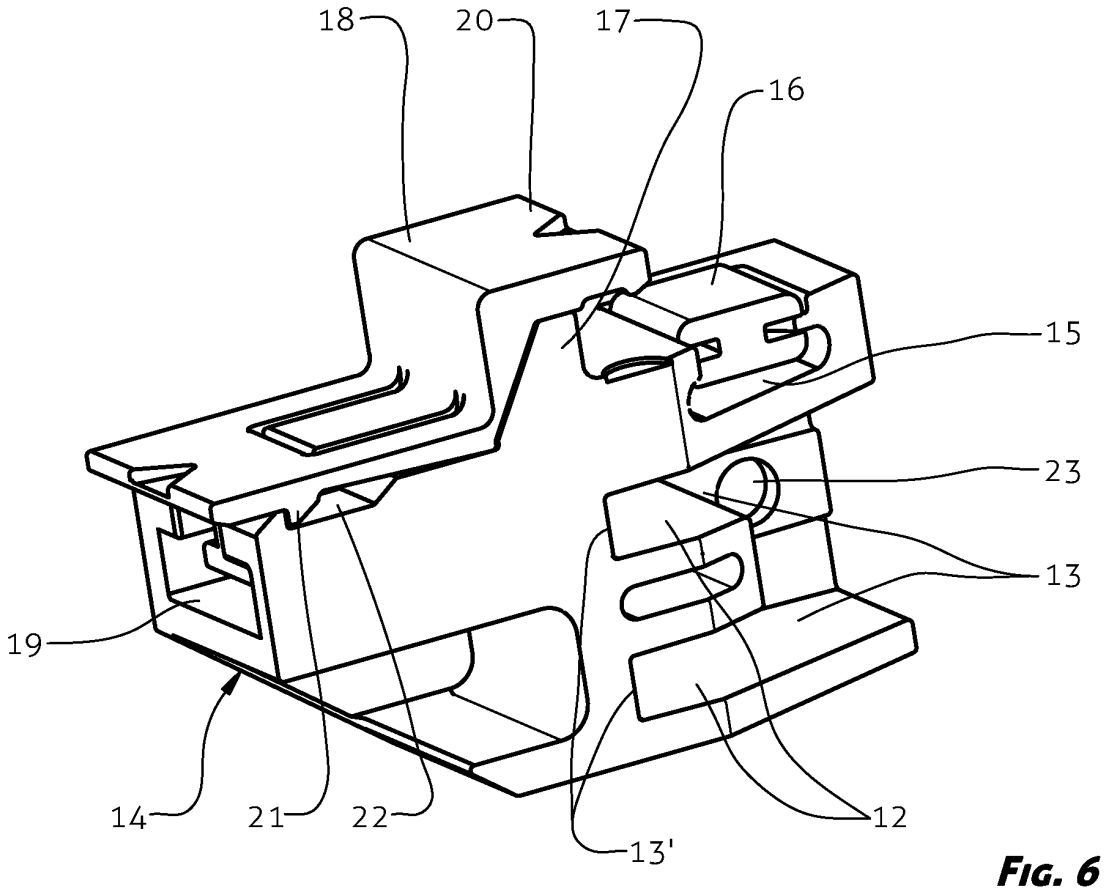

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2010076181 A1 **[0002]**
- DE 10336138 B3 **[0002]**
- EP 1081437 A2 **[0002]**
- EP 2244017 A2 **[0002]**
- WO 2010049337 A2 **[0002]**