

(19)



(11)

EP 3 348 738 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
24.02.2021 Bulletin 2021/08

(51) Int Cl.:
E04D 13/035 ^(2006.01) **E05D 1/04** ^(2006.01)
E05D 15/48 ^(2006.01)

(21) Application number: **18150283.2**

(22) Date of filing: **04.01.2018**

(54) **DUAL-FUNCTION ROOF WINDOW WITH A WINDOW SASH MOUNTING ASSEMBLY**

DUAL-FUNCTION DACHFENSTER MIT EINER DACHFENSTERFLÜGELMONTAGEANORDNUNG
FENÊTRE DE TOIT À DOUBLE FONCTION MUNIE D'UN ENSEMBLE DE MONTAGE D'OUVRANT

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **16.01.2017 PL 42020817**

(43) Date of publication of application:
18.07.2018 Bulletin 2018/29

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Description

[0001] The invention relates to a dual-function roof window with window sash mounting assembly wherein said window is opened as a pivoting one, that is by rotation of the sash around a horizontal axis located slightly above half of the window, or opened as a tilting one, that is by rotation of the sash around a horizontal axis located at the top of the window, near the upper member of the window frame.

[0002] FIELD OF THE INVENTION. From patent descriptions no. WO2005/106174, WO2009/058039 dual-function roof windows are known, opened at a user's discretion as pivoting or tilting ones. Each of these windows features two intermediate arms whose upper ends are attached to the window frame by means of hinges, while on lower ends of these arms there are pivoting hinges - one in each arm - designed to mount the window sash, executing the opening of the window in the pivoting function. Intermediate arms are sections in the form of angle bars whose vertical walls are situated from the side of the window sash, these arms may also be channel sections with long shelves located horizontally, where the web of the channel section (the web joining the shelves) is located at the top. The pivoting hinge comprises two sub-assemblies, one of them, featuring an arch-shaped guide, is connected to the intermediate arm, while the other sub-assembly, fitted with the arch-shaped slider moving along the guide, is connected to the window sash. The hinge sub-assembly with the arch-shaped guide is mounted on the vertical wall of the angle bar in the intermediate arm, on the outer side of this angle bar, that is on the opposite side in relation to the top wall of the same. Also in the channel section intermediate arm, the hinge sub-assembly with the arch-shaped guide is mounted on the outer side of the channel section from the side of the sash.

[0003] There is also a known solution of the hinge for dual-function roof window, i.e. opened as a top hung window by a turn of the sash around a horizontal axis located in the upper part of the window, and as a pivot window - by a turn of the sash around a horizontal axis located lower, in particular in the window central zone. Said hinge consists of a sub-assembly fitted with an arc-shaped slide, secured to the roof window sash and a sub-assembly fitted with an arc-shaped guide, secured to the window frame. The hinge sub-assembly, fitted with a guide, is a component of a metal intermediary arm, not shown in this invention as well as connection of the intermediary arms to the window frame.

[0004] Apart from the roof window known from EP 2419589, there is also known from publication BE1015350A3 a solution of roof window consisting mainly of a frame and a tilting wing, characterized in that the frame is essentially composed of a fixed part in the form of a frame and from an outwardly rotatable part - posts hingedly mounted on the frame by means of two hinge elements arranged at the same height at a distance from

the bottom of the frame, wherein the tiltable wing is an inwardly tilting wing which is arranged at the bottom by means of one or more coaxial hinges on the rotatable part of the frame. Said window comprises a pivoting hinge build from the slider and the guide, wherein the slider is located on one side, closer to the window frame therefore is centered laterally with respect to the post.

[0005] THE INVENTION is defined by claim 1 and relates to a dual-function roof window with window sash mounting assembly, where said sash mounting assembly comprising two intermediate arms, situated on the outside of the window sash on its right and left side. A lower ends of said arms are connected by two pivoting hinges (one on each side of the window) to the window sash, where in each of the hinges, the sub-assembly attached in the intermediate arm comprises an arch-shaped guide, and the sub-assembly attached to the sash comprises an arch-shaped slider, is characterised in that in each pivoting hinge two planes adjacent to the sides of the slider from the side of the sash and from the outside, on its section moving along the guide, are located on both sides of the plane perpendicular to the axis of rotation of the sash, determined by the geometrical centre of the intermediate arm's main cross-section. The indicated planes adjacent to the slider are further herein referred to as the 'inner plane of motion' - with regard to the plane adjacent to the slider from the side of the sash, and the 'outer plane of motion' - with regard to the plane adjacent to the slider from the outer, lateral side of the window.

[0006] Upper ends of the intermediate arms are connected by tilting hinges to the window frame. When the window is opened in the pivoting function, intermediate arms rest on the window sash frame, whereas only the sash is rotating. When the window is opened in the tilting function, intermediate arms are rotating along with the window sash. Intermediate arms always move around the horizontal axis, i.e. in the vertical plane; therefore, location of the slider's inner plane of motion and outer plane of motion on both sides of the plane perpendicular to the axis of rotation of the sash, determined by the geometrical centre of the intermediate arm's main cross-section, as indicated above, refers to all temporary positions of the intermediate arm. The indicated location of the inner and outer plane of motion of the slider with respect to the geometrical centre of the intermediate arm's cross-section, refers also to the situation wherein the arch-shaped slider is locked in a fixed position, in which the slider is in forward-most position slid out of the guide, and the window is further opened by rotation of the sash on the axis connecting the arch-shaped slider with the plate referred to as the 'slider plate' and attaching the hinge sub-assembly to the lateral plane of the window sash frame.

[0007] In particular, the intermediate arm has a box-like structure, and the slider of the pivoting hinge fits into the cross-section of this intermediate arm with at least some of its width. Preferably, the slider's inner plane of

motion and outer plane of motion in the pivoting hinge are located symmetrically with respect to the plane perpendicular to the axis of rotation of the sash, determined by the geometrical centre of the intermediate arm's main cross-section.

[0008] For implementation of the slider's location with respect to the intermediate arm, as described herein, the slider plate has a spacer offset that is monolithic with the same. From the offset protrudes the slider's axis on which the arch-shaped slider is mounted in the form of a metal sheet pack: near the point of attachment on the slider's axis there are two metal sheet plates, and on the section fitting into the arched guide there are three metal sheet plates. The slider plate of the pivoting hinge is preferably cast, in particular of the aluminium-zinc alloy. The slider plate of the hinge has also a supporting tab, protruding from the plate's spacer offset towards the subassembly of the arched guide-comprising hinge. In the hinge's position with the slider in forward-most position slid out of the guide, where the window is further opened by rotation of the sash on the slider's axes, the supporting tab rests on the guide in the first sub-assembly of the pivoting hinge on both sides of the arch-shaped slider.

[0009] The invention's embodiment. The window sash mounting assembly in a dual-function roof window, being the subject of the invention, is illustrated in the drawings, wherein individual figures represent the following:

- Fig. 1 - The roof window, closed - in axonometric view. 30
- Fig. 2 - Cross-section through the pivoting hinge (with plane marked as A-A in Fig. 1) set up against the superimposed cross-section through the intermediate arm (with plane marked as B-B in Fig. 1). 35
- Fig. 3- Detail of the pivoting hinge, with parts of the window sash and of the intermediate arm, in the window's partially open position in the pivoting function - in axonometric view. 40
- Fig. 4- Pivoting hinge sub-assembly attached to the window sash, with its arch-shaped slider and slider plate - in axonometric view. 45

Reference symbols in the drawings.

[0010]

- 1 Window sash
- 2 Side member of the sash frame 50
- 3 Glazing unit in the window sash
- 4 Slider plate of the pivoting hinge
- 5 Arch-shaped slider of the pivoting hinge
- 6 Arch-shaped guide of the pivoting hinge
- 7 Intermediate arm 55
- 8 Channel section of the intermediate arm
- 9 Z-bar of the intermediate arm
- 10 Inner plane of motion

- 11 Outer plane of motion
- 12 Plane determined by the geometrical centre of the intermediate arm's cross-section
- 13 Geometrical centre of the intermediate arm's cross-section
- 14 Spacer offset
- 15 Slider axis
- 16 Supporting tab
- 17 Upper plane of the guide
- 18 Slider plate end stop
- 19 Flat spring (under the slider)
- 20 Socket for the threaded connector
- 21 Oblique socket for the threaded connector
- 22 Oblique bracket for the threaded connector

[0011] Not included: journals fixing the position of the slider plate with respect to the sash frame protrude from the slider plate perpendicularly to the same, on its opposite side with respect to the slider.

Claims

1. A dual-function roof window with sash mounting assembly comprising
- a sash (1) with glazing unit (3) and side member of the sash frame
 - a window frame
 - where said dual-function roof window is arranged to be opened in a pivoting function, that is by rotation of the sash (1) around a horizontal axis located slightly above half the height of the window, and/or opened in the tilting function, that is by rotation of the sash (1) around a horizontal axis located at the top of the window, and said sash mounting assembly comprising
 - pivoting hinges and tilting hinges,
 - two intermediate arms (7), located on the outside of the sash (1) on its right and left side, wherein upper ends of the said arms are connected by the tilting hinges to the window frame, and their lower ends are connected by two pivoting hinges to the window sash (1), where in each of the pivoting hinges, the first hinge sub-assembly comprises an arch-shaped guide (6) attached in the intermediate arm (7), and the other hinge sub-assembly comprises an arch-shaped slider (5), arranged to be moved along the arch-shaped guide (6) of the first sub-assembly, and comprises a plate for attaching the other sub-assembly to the lateral plane of the window sash (1), referred to as the 'slider plate' (4), whereas the arch-shaped slider (5) is connected to the slider plate (4) by means of the axis (15) which is arranged to allow for additional rotation the sash (1) after sliding the arch-shaped slider (5) out of the arched-shaped guide

(6) to the forward-most position,

characterised in that

- each pivoting hinge comprises two planes (10, 11) which are adjacent to the arched-shaped slider (5) sides from the side of the window sash (1) and from the outside of the sash (1) and each pivoting hinge is located on a section of the arch-shaped slider (5) which is arranged to be moved along the arch-shaped guide (6), and the slider plate (4) comprises a spacer offset (14), from which protrudes the axis (15) on which the arch-shaped slider (5) is mounted such that said planes (10, 11) referred to respectively as the 'inner plane of motion' (10), and the 'outer plane of motion' (11), are located on both sides of the plane (12) perpendicular to the axis of rotation of the sash (1), determined by the geometrical centre (13) of the intermediate arm's (7) main cross-section in all its positions, wherein the spacer offset (14) is monolithic with the slider plate (4).
- 2. A dual-function roof window with sash mounting assembly according to claim 1, **characterised in that** the intermediate arm (7) comprises a box-like structure, and the arch-shaped slider (5) of the pivoting hinge fits into the cross-section of the intermediate arm (7) with at least some of its width.
- 3. A dual-function roof window with sash mounting assembly according to claim 1 or 2, **characterised in that** the arch-shaped slider's inner plane of motion (10) and outer plane of motion (11) in the pivoting hinge are located symmetrically with respect to the plane perpendicular to the axis of rotation of the sash, determined by the geometrical centre (13) of the intermediate arm's (7) main cross-section.
- 4. A dual-function roof window with sash mounting assembly according to claim 1 or 2 or 3, **characterised in that** the slider plate (4) of the pivoting hinge comprises a supporting tab (16) protruding from the slider plate (4) towards the subassembly of the guide-comprising hinge, and while the pivoting hinge is in the position with the slider (5) slid out of the guide, the supporting tab rests on the arch-shaped guide (6) on both sides of the arch-shaped slider (5).
- 5. A dual-function roof window with sash mounting assembly according to claim 1 or 2 or 3 or 4, **characterised in that** the slider plate (4) of the pivoting hinge is cast, preferably of the aluminium-zinc alloy.
- 6. A dual-function roof window with sash mounting as-

sembly according to one of the claims from 1 to 5, **characterised in that** the arch-shaped guide (6) is cast, preferably of the aluminium-zinc alloy.

- 5 7. A dual-function roof window with sash mounting assembly according to one of the claims from 1 to 6, **characterised in that** the slider plate (4) comprises at least one oblique bracket (22) with an opening for at least one threaded connector attaching the slider plate (4) to the sash frame, the said connector being located at an acute angle with respect to the main plane of the plate's adhesion to the lateral plane of the sash (1), and geometrical axes of openings in oblique brackets are located in transversal planes with respect to the longer side of the slider plate.
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- 20 8. A dual-function roof window with sash mounting assembly according to claim 7, **characterised in that** the slider plate (4) comprises journals fixing its position with respect to the sash frame.

Patentansprüche

- 25 1. Doppelfunktionsdachfenster mit Fensterflügelbefestigungssatz bestehend aus:
 - Fensterflügel (1) mit Verglasungseinheit (3) und seitlichem Blendrahmenholz,
 - Blendrahmen,
 - wobei das Doppelfunktionsfenster so angepasst ist, dass es in einer Schwingflügelfunktion, d. h. durch Drehen des Fensterflügels (1) um die horizontale Achse, die etwas über der Hälfte der Fensterhöhe liegt, geöffnet werden kann und/oder in einer Klappflügelfunktion, und zwar durch Drehen des Fensterflügels (1) um die horizontale Achse, die sich oben am Fenster befindet, geöffnet werden kann,
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- 40 wobei der Fensterflügelbefestigungssatz Folgendes beinhaltet:
 - Schwingflügelscharniere und Klappflügelscharniere,
 - zwei Zwischenarme (7), die sich rechts und links auf der Außenseite des Fensterflügels befinden und deren obere Enden über Klappflügelscharniere mit dem Fensterrahmen und deren untere Enden über zwei Schwingflügelscharniere mit dem Fensterflügel (1) verbunden sind, wobei in jedem der Schwingflügelscharniere eine Scharnierbaugruppe eine Bogenführung (6) aufweist, die in dem Zwischenarm (7) befestigt ist, und die andere Scharnierbaugruppe einen Bogenschieber (5) aufweist, der in der Bogenführung (6) der ersten Baugruppe gleitet, und eine Platte aufweist, welche die zweite Bau-
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- 50
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- gruppe an die seitliche Fläche des Fensterflügels (1) befestigt, die als "Schieberplatte" (4) bezeichnet wird, wobei der Bogenschieber (5) über eine Achse mit der Schieberplatte (4) verbunden ist, die eine zusätzliche Drehung des Fensterflügels (1) nach der maximalen Verschiebung des Bogenschiebers (5) aus der Bogenführung (6) ermöglicht, **dadurch gekennzeichnet, dass** jedes Schwingflügelscharnier zwei Ebenen (10, 11) aufweist, die im Abschnitt des Bogenschiebers (5) an dessen Seiten fensterflügelseits (1) und von der Außenseite anliegen und dass jedes Schwingflügelscharnier sich im Abschnitt des Bogenschiebers (5) befindet, der sich in der Bogenführung (6) bewegen soll, und dass die Schieberplatte (4) eine Distanzschulter (14) aufweist, wobei von dieser Schulter die Achse (15) herausragt, auf der der Bogenschieber (5) montiert ist, so dass die Ebenen (10, 11), die jeweils als "innere Bewegungsebene" (10) auf der Fensterflügelseite und "äußere Bewegungsebene" (11) bezeichnet werden, sich auf beiden Seiten der Ebene (12) befinden, die senkrecht zur Drehachse des Fensterflügels (1) angeordnet ist, welche wiederum durch die geometrische Mitte (13) des Querschnitts des Hauptzwischenarms (7) in all seinen Positionen definiert wird, wobei die Distanzschulter (14) mit der Schieberplatte (4) monolithisch ist.
2. Doppelfunktionsdachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** der Zwischenarm (7) eine Kastenstruktur aufweist und der Bogenschieber (5) des Schwingflügelscharniers zumindest mit dem Teil seiner Breite in den Querschnitt des Zwischenarms (7) hineinragt.
3. Doppelfunktionsdachfenster nach Anspruch 1 oder 2 **dadurch gekennzeichnet, dass** die innere Bewegungsebene (10) und die äußere Bewegungsebene (11) des Schiebers im Schwingflügelscharnier symmetrisch zu der Ebene liegen, die senkrecht zur Fensterflügeldrehachse angeordnet ist, die wiederum durch die geometrische Mitte (13) des Querschnitts des Hauptzwischenarms (7) definiert wird.
4. Doppelfunktionsdachfenster nach Anspruch 1 oder 2 oder 3, **dadurch gekennzeichnet, dass** die Schieberplatte (4) eine Stützlasche (16) aufweist, die aus dieser Platte in Richtung der Scharnierbaugruppe, welche die Führung enthält, herausragt, und dass die Stützlasche in der Scharnierposition, in welcher der Schieber (5) aus der Führung herausgeschoben ist, auf dieser Bogenführung (6) auf beiden Seiten des Bogenschiebers (5) gestützt wird.
5. Doppelfunktionsdachfenster nach Anspruch 1 oder 2 oder 3 oder 4, **dadurch gekennzeichnet, dass** die Schieberplatte (4) des Schwingflügelscharniers ein Gussstück darstellt, vorzugsweise aus einer Aluminium- und Zinklegierung.
6. Doppelfunktionsdachfenster nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Bogenführung (6) ein Gussstück darstellt, vorzugsweise aus einer Aluminium- und Zinklegierung.
7. Doppelfunktionsdachfenster nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Schieberplatte (4) mindestens eine schräge Halterung (22) mit einer Öffnung für mindestens ein Gewindeverbindungsstück aufweist, das diese Schieberplatte (4) am Fensterflügelrahmen befestigt, wobei dieses Gewindeverbindungsstück in einem spitzen Winkel in Bezug auf die Hauptkontaktenebene der Platte mit der Seitenfläche des Fensterflügelrahmens (1) angeordnet ist und die geometrischen Achsen der Löcher in den schrägen Halterungen in einer Querebene zur längeren Seite der Schieberplatte liegen.
8. Doppelfunktionsdachfenster nach Anspruch 7, **dadurch gekennzeichnet, dass** die Schieberplatte (4) Stifte zum Positionieren in Bezug auf den Flügelrahmen aufweist.
- 30 **Revendications**
1. Fenêtre de toit à double fonction munie d'un ensemble d'encastrement de l'ouvrant, contenant :
- 35 - un ouvrant (1) avec un paquet de vitrage (3) et des montants latéraux du cadre de l'ouvrant, - un cadre du chambranle, - où la fenêtre de toit à double fonction est adaptée à une ouverture en fonction de basculement, c'est-à-dire par rotation de l'ouvrant (1) autour d'un axe horizontal situé légèrement au-dessus de la moitié de la hauteur de ladite fenêtre, et/ou en fonction de basculement à l'italienne par rotation de l'ouvrant (1) autour d'un axe horizontal situé en haut de la fenêtre,
- 40 et l'ensemble d'encastrement de l'ouvrant possède :
- 45 - des charnières basculantes et des charnières basculantes à l'italienne, - deux bras intermédiaires (7), situés à l'extérieur de l'ouvrant à sa gauche et à sa droite, ces bras sont connectés par leurs extrémités supérieures avec le chambranle de la fenêtre à l'aide de charnières basculantes à l'italienne, et au niveau de leurs extrémités inférieures sont connectés avec l'ouvrant (1) par le biais de deux charnières basculantes, où dans chacune des

- charnières basculantes un sous-ensemble de la charnière possède une glissière arquée (6) montée dans le bras intermédiaire (7), le deuxième sous-ensemble de la charnière étant muni d'un coulisseau arqué (5) se déplaçant dans la glissière arquée (6) du premier sous-ensemble et possède une plaque attachant le deuxième sous-ensemble à la surface du cadre latéral de l'ouvrant (1), appelée « plaque du coulisseau » (4), et le coulisseau arqué (5) est connecté à la plaque du coulisseau (4) à l'aide d'un axe permettant une rotation additionnelle de l'ouvrant (1) une fois le coulisseau arqué (5) sorti au maximum de la glissière arquée (6), **caractérisé en ce que** dans chaque charnière basculante il existe deux plans (10, 11) qui sur le segment du coulisseau arqué (5) sont adjacentes à ses parois du côté de l'ouvrant (1) et du côté extérieur, et que chaque charnière basculante se trouve sur le segment du coulisseau arqué (5), dont la vocation consiste à se déplacer dans la glissière arquée (6), et que la plaque du coulisseau (4) est munie d'un épaulement d'écartement (14) et que de cet épaulement saillit un axe (15) sur lequel est encastré le coulisseau arqué (5) de la sorte à ce que les plans (10,11) définis respectivement comme « plan de mouvement intérieur » (10), soit du côté de l'ouvrant et « plan de mouvement extérieur » (11) soient situés des deux côtés du plan (12) perpendiculaire à l'axe de rotation de l'ouvrant (1), déterminé par le centre géométrique (13) du profil du bras intermédiaire principal (7) dans toutes ses positions et l'épaulement d'écartement (14) constitue un monolithe avec la plaque du coulisseau (4).
2. Fenêtre de toit à double fonction selon la revendication 1, **caractérisée en ce que** le bras intermédiaire (7) est doté d'une structure en caisson et qu'au moins une partie de la largeur du coulisseau arqué (5) de la charnière basculante pénètre dans le profil du bras intermédiaire (7).
3. Fenêtre de toit à double fonction selon la revendication 1 ou 2, **caractérisée en ce que** le plan de mouvement intérieur (10) et le plan de mouvement extérieur (11) du coulisseau dans la charnière basculante sont situés symétriquement par rapport au plan perpendiculaire à l'axe de rotation de l'ouvrant, désigné par le centre géométrique (13) du profil du bras intermédiaire principal (7).
4. Fenêtre de toit à double fonction selon la revendication 1 ou 2 ou 3, **caractérisée en ce que** la plaque du coulisseau (4) de la charnière est munie d'une languette de support (16), saillant de cette plaque dans la direction du sous-ensemble de la charnière contenant la glissière, et que dans la position de la charnière dans laquelle le coulisseau (5) est sorti de la glissière, la languette de support repose sur la glissière arquée (6) des deux côtés du coulisseau arqué (5).
5. Fenêtre de toit à double fonction selon la revendication 1 ou 2 ou 3 ou 4, **caractérisée en ce que** la plaque du coulisseau (4) de la charnière basculante est une pièce moulée, de préférence en alliage d'aluminium et de zinc.
6. Fenêtre de toit à double fonction selon l'une des revendications de 1 à 5, **caractérisée en ce que** la glissière arquée (6) est une pièce moulée, de préférence en alliage d'aluminium et de zinc.
7. Fenêtre de toit à double fonction selon l'une des revendications de 1 à 6, **caractérisée en ce que** la plaque du coulisseau (4) est munie d'au moins un montage oblique (22) muni d'un orifice pour au moins une attache filetée, qui fixe cette plaque coulissante (4) au cadre de l'ouvrant, laquelle attache est située à un angle aigu par rapport au plan principal de contact de la plaque avec la surface latérale du cadre de l'ouvrant (1), et les axes géométriques des orifices dans les montages obliques se trouvent dans des plans transversaux par rapport au côté long de la plaque du coulisseau.
8. Fenêtre de toit à double fonction selon la revendication 7, **caractérisée en ce que** la plaque du coulisseau (4) est munie de goupilles fixant sa position par rapport au cadre de l'ouvrant.

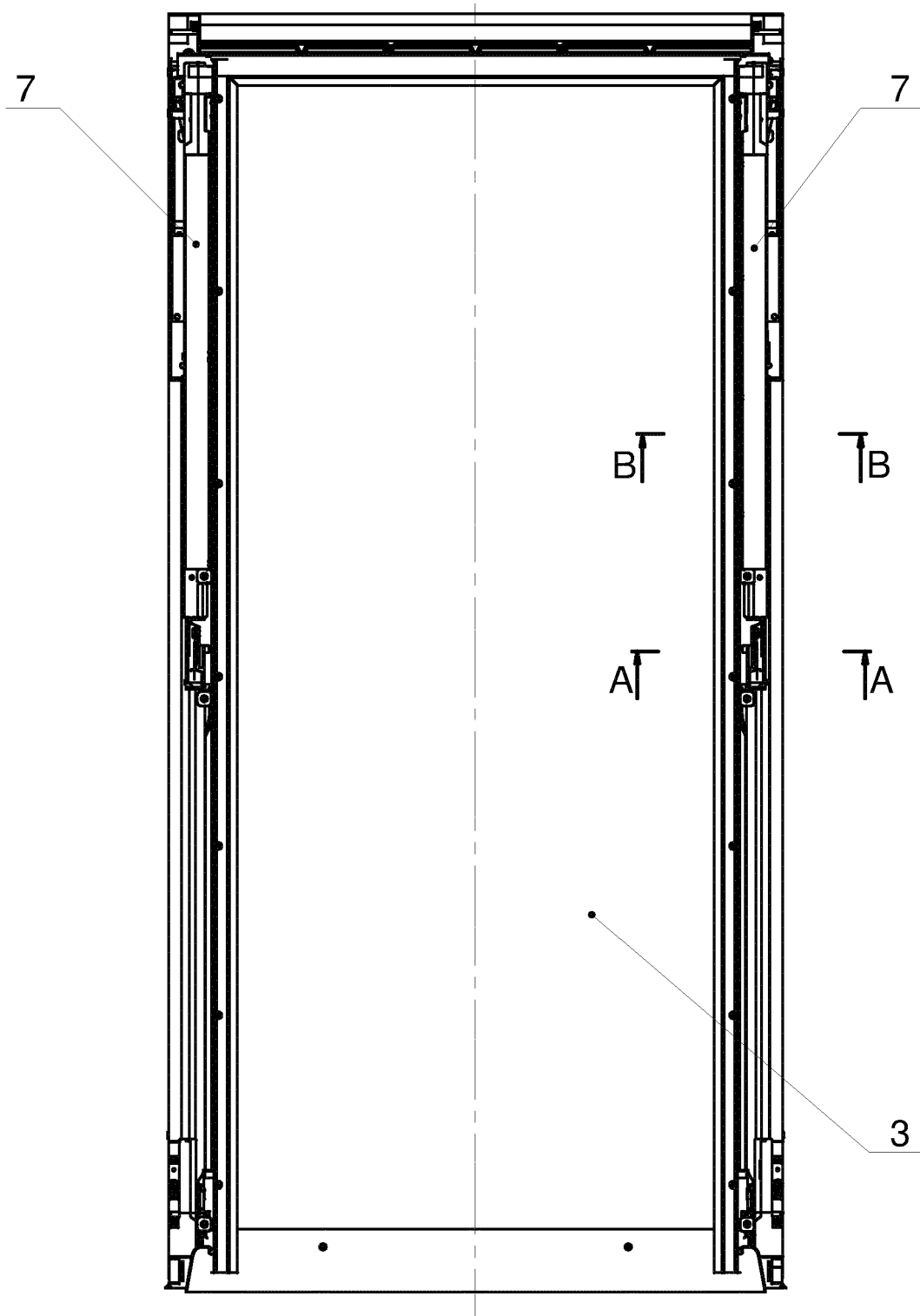


Fig. 1

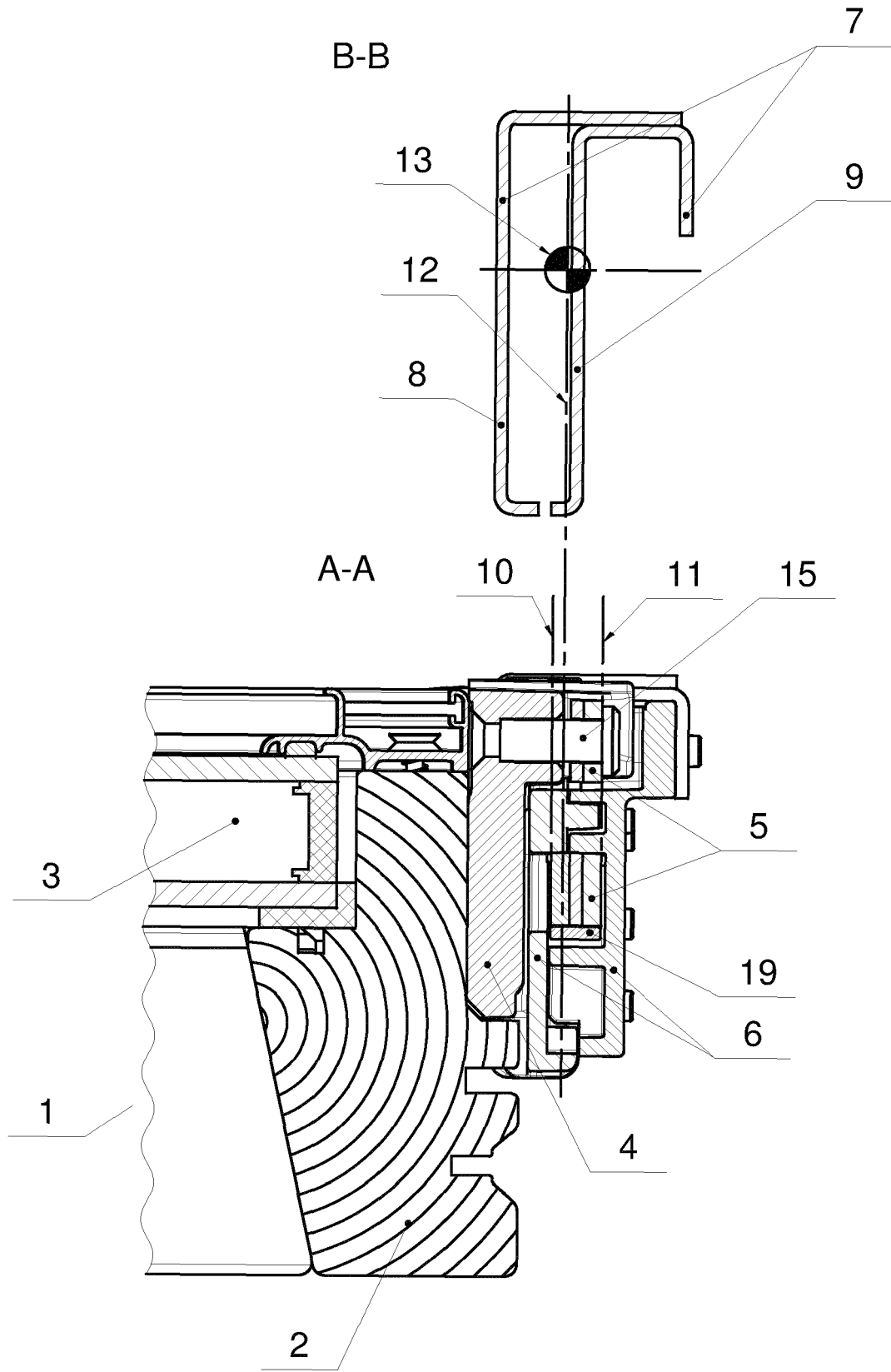


Fig. 2

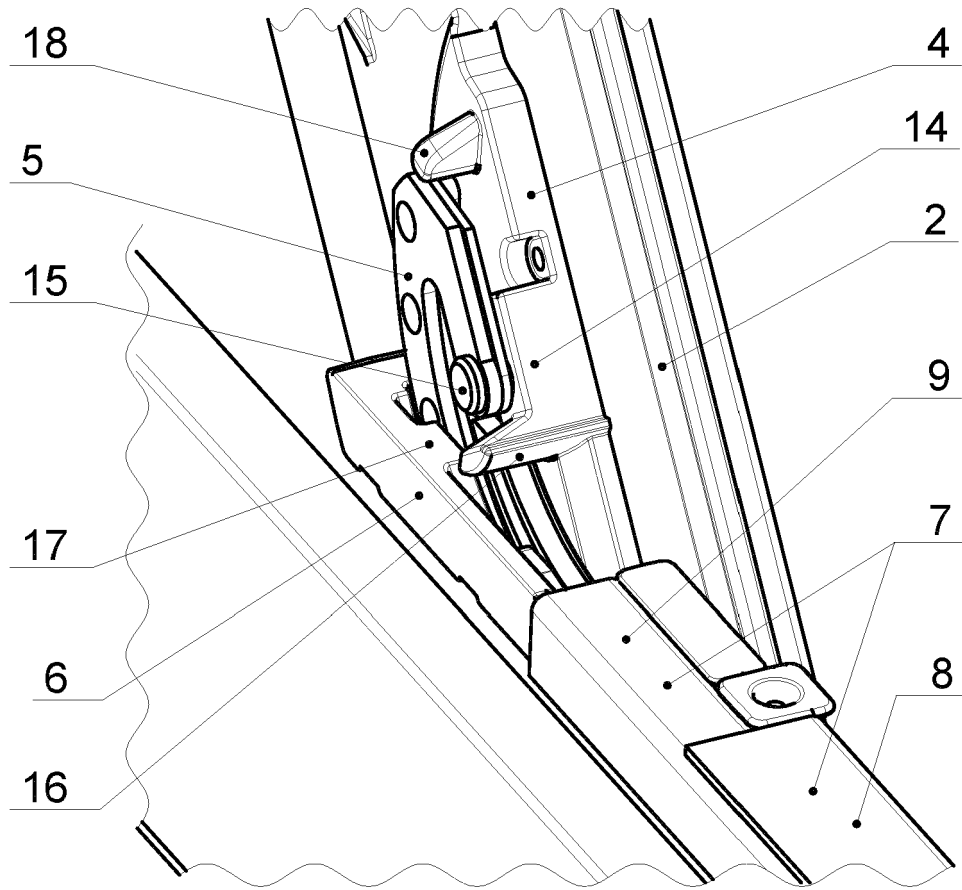


Fig. 3

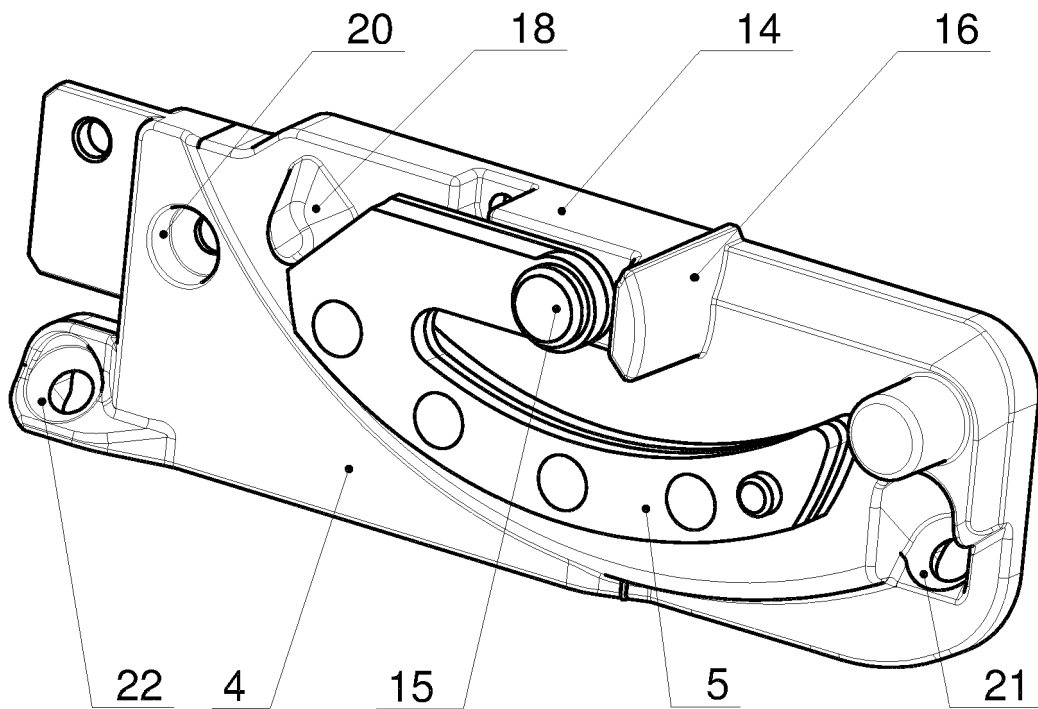


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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