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(54) **ASSEMBLABLE DRAWER FOR FURNITURE AND METHOD FOR ASSEMBLING THE DRAWER**

**ZUSAMMENSETZBARE SCHUBLADE FÜR MÖBEL UND VERFAHREN ZUM ZUSAMMENSETZEN
DER SCHUBLADE**

TIROIR ASSEMBLABLE POUR MEUBLE, ET PROCÉDÉ D'ASSEMBLAGE DUDIT TIROIR

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(56) References cited:

EP-A2- 1 932 448 DE-U1- 9 001 484

DE-U1- 20 007 411 GB-A- 2 206 034

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Description

[0001] The present invention relates to an assemblable drawer for furniture and a method for its assembly.

[0002] As is known, in the furniture sector assemblable drawers are available, of the type comprising a profiled rear wall and side walls made of metallic material, and a bottom and a front panel made of wood or other material.

[0003] In order to connect the side walls to the front panel and to the rear wall of the drawer, usually front connectors and corner connectors respectively are used, which have parts for coupling which can be inserted in corresponding end openings of the rear and side walls so as to enable a simple and rapid assembly of the parts that make up the drawer.

[0004] The connection between the connectors and the walls of the drawer can occur by simple forced coupling of the parts. However, such type of forced coupling or engagement, in the event of high stresses that are generated in particular when the drawer is full, can be insufficient to keep the drawer stably assembled.

[0005] Substantially, what happens is a possible decoupling of the several elements that make up the drawer.

[0006] In order to overcome the above mentioned problem, the connectors can be provided with tabs or other elastic retention means that can engage by snap action an adapted opening provided on the sides of the side walls and of the rear wall of the drawer.

[0007] However, the above solution, although efficacious from the viewpoint of keeping the drawer in the assembled condition, requires carrying out a number of machining operations on the side walls and on the rear wall of the drawer in order to define the lateral openings. Furthermore, the presence of such lateral openings is not aesthetically pleasing.

[0008] DE 200 07 411 U discloses a drawer known in the state of the art.

[0009] The aim of the present invention is to devise an assemblable drawer that has a rear wall and side walls made of metallic material but free from lateral openings, thus eliminating the need to carry out additional machining operations on those walls, so as to not further negatively affect the overall aesthetic appearance of the drawer, while at the same time ensuring a stable assembly of the drawer even in the event of high stresses.

[0010] Within this aim, an object of the present invention is to devise an assemblable drawer for furniture that can be assembled in a simple and rapid manner.

[0011] Another object of the present invention is to devise an assemblable drawer for furniture that is highly reliable, easily and practically implemented and low cost.

[0012] This aim and these and other objects which will become better apparent hereinafter are achieved by an assemblable drawer for furniture, comprising a pair of side walls, a rear wall, a bottom, and a front panel, characterized in that said side walls and said rear wall are provided with end openings which are adapted to allow the coupling of coupling means which in turn are adapted

to be locked within said end openings by engagement means which can move for forced or shape coupling of such moveable engagement means in such end openings of such side walls and of such rear wall, wherein said moveable engagement means comprise at least one eccentric engagement element for the forced or shape coupling of said moveable engagement means in said end openings of said rear and side walls, and wherein said moveable engagement means for said corner and front connectors comprise screw means which can engage in said side walls and/or said rear wall.

[0013] Further characteristics and advantages of the invention will become better apparent from the detailed description of a preferred, but not exclusive, embodiment, of the assemblable drawer according to the present invention, which is illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of an assemblable drawer according to the invention;

Figure 2 is a partially exploded perspective view of the assemblable drawer in Figure 1;

Figure 3 is an exploded perspective view of the drawer in Figures 1 and 2;

Figure 4 is a detailed perspective view of a corner coupling element of the drawer according to the invention;

Figure 5 is a detailed perspective view of a further, front coupling element of the drawer according to the invention;

Figure 6 is an exploded perspective view of the coupling of two corner elements of the drawer according to the invention;

Figure 7 is an exploded perspective view of the coupling of two front elements of the drawer according to the invention;

Figure 8 is a perspective view of the two elements shown in Figure 7 in a first position of insertion;

Figure 9 is a further perspective view of the two elements shown in Figure 7 in a second position for coupling;

Figure 10 is a partially cross-sectional side view of the drawer according to the invention;

Figure 11 is a cross-sectional view of a side wall of the drawer according to the invention, with the moveable engagement means in the disengaged position;

Figure 12 is a cross-sectional view of the rear wall of the drawer according to the invention;

Figure 13 is the cross-sectional view of Figure 11, with the engagement means in the rotated position for coupling.

[0014] With reference to the figures, the drawer according to the invention, generally designated by the reference numeral 1, comprises a pair of side walls 2 and 3, a rear wall 4, a bottom 5 and a front wall 6.

[0015] Conveniently, the side walls are profiled walls made of metallic material that have hollow cross-sections

that define end openings or cavities; the possibility is not ruled out however that the walls can instead be made of other materials, for example plastic materials, wood or the like.

[0016] The end openings are provided in the side walls 2, 3 and in the rear wall 4.

[0017] In the figures, the end openings of the side walls are designated by the reference numeral 7, while the end openings of the rear wall are designated by the reference numeral 8.

[0018] The side walls 2, 3 and the rear wall 4 have lateral surfaces that are extended according to a respective longitudinal axis, and according to a preferred embodiment of the invention these surfaces have no openings and/or machining; in particular there is no opening or protrusion whose axis extends at right angles to the longitudinal axis of the walls proper.

[0019] In order to mutually couple the side walls with the rear wall 4 and with the front wall 6, coupling means are provided which are constituted by corner elements 10 which are provided at the coupling between the side walls 2 and 3 and the rear wall 4, and front connectors 11 which are provided for coupling the side walls 2 and 3 with the front wall 6.

[0020] The front connectors 11 are engaged by the front coupling means 12 which are arranged to be integral with the wall of the front panel 6.

[0021] Conveniently, the side walls 2 and 3 have grooves 15 which are adapted to allow the coupling of the bottom 5 of the drawer.

[0022] Preferably, when the walls 2, 3 and 4 are very high, the rear corner connectors 10 are coupled to the corner elements 16 which are inserted in the end cavities 8 of the rear wall 4 and in end cavities 18 of the side walls 2 and 3.

[0023] By contrast, the corner connectors 10 are inserted in the end openings 7 of the side walls 2 and 3 on one side and in a central groove 20 of the rear wall 4 of the drawer according to a preferred embodiment of the invention.

[0024] In order to lock the coupling means (i.e. the corner elements 10 and the front elements 11), the drawer according to a preferred embodiment of the invention has moveable engagement means which have a control element for example in the form of a slotted head for a screwdriver.

[0025] The moveable engagement means with control element preferably comprise eccentric engagement elements 25 which are rotatably moveable and, for the front connectors 11 and the parts of the corner connectors 10 that are to be inserted in the openings 7 of the side walls 2, 3, are in the form of screw means 25', for example trilobular screws, which when they are tightened, among other things, generate a pull for a firmer coupling of the parts; the head 26 is adapted to be rotated in an adapted seat defined in the corner connectors 10 (in this case designated by the reference numeral 27) and in the front connectors 11 (in this case the seat is designated by the

reference numeral 28) and is conveniently shaped, for example with radial protrusions or beaks 26', so as to define a stroke limiting stop for the rotation of the engagement means.

[0026] The head 26 is adapted to be rotated in such seats 27 and 28 and with their profile the screw means 25' bite the inner profile of the end openings 7 with regard to the corner connectors 10 and the front connectors 11.

[0027] For the parts of the corner connectors 10 that are to be engaged with the rear wall 4, the moveable engagement means 25 comprise an eccentric engagement surface 30, with threading, which can engage an upper surface 20' of the central groove 20 of the rear wall 4; in this case also the head 26 is conveniently contoured, for example with a radial protrusion or beak 26', to define a stroke limiting stop for the rotation of the engagement means.

[0028] The coupling means 12 of the front panel 6, for example in the form of elements that can be pre-mounted on the front panel 6, are adapted to allow the coupling thereof in the front connectors 11 once these have been coupled to the side walls 2 and 3.

[0029] Preferably, the coupling elements 12, so as to retain in a longitudinal direction, have lateral grooves 12' that extend vertically to engage with internal protrusions 11' of the front connectors 11 by way of a sliding movement from the top downward shown in Figures 8 and 9; furthermore the coupling elements 12 have, on a rear side, an elastic retainer tooth 12" which can engage a transverse rib 11" in the front connector 11, so as to firmly retain the parts and allow an uncoupling thereof only if a preset and significant upward stress is applied to the front panel 6.

[0030] Substantially, the assemblable drawer according to the invention is assembled as follows: firstly the operator arranges the side walls 2, 3, the rear panel or rear wall 4, and the front panel 6, together with the bottom 5 of the drawer. At this point the operator couples the coupling means, in the form of the rear corner connectors 10 and the front connectors 11, within the side walls 2, 3, by tightening the coupling means within such walls with the moveable engagement means 25' and 30.

[0031] The moveable engagement means cause an engagement, with forced and/or shape coupling, in the end openings of the side walls 2, 3 and in the central groove 20 of the rear wall 4.

[0032] Subsequently, the operator applies the bottom panel 5 to the side walls by inserting it in the grooves 15 and finally he/she applies the front panel 6 by coupling the front coupling means 12 in the front connectors 11.

[0033] In practice it has been found that the drawer according to the present invention fully achieves the set aim and objects, in that it makes it possible to be assembled in a simple and rapid manner, and it does not require lateral openings in the side walls of the drawer, making use instead of end openings that are substantially invisible to the user.

[0034] The assemblable drawer, thus conceived, is

susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0035] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0036] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An assemblable drawer (1) for furniture, comprising a pair of side walls (2, 3), a rear wall (4), a bottom (5), and a front panel (6), said side walls (2, 3) and said rear wall (4) being provided with end openings (7) which are adapted to allow the coupling of coupling means (10, 11) which in turn are adapted to be locked within said end openings (7) by engagement means (25, 26, 27, 28) which can move for forced or shape coupling of said moveable engagement means in said end openings (7) of said side walls (2, 3) and of said rear wall (4), wherein said moveable engagement means comprise at least one eccentric engagement element (25, 30) for the forced or shape coupling of said moveable engagement means in said end openings (7) of said rear and side walls **characterized in that** said moveable engagement means for said corner and front connectors comprise screw means (25) which can engage in said side walls (2, 3) and/or said rear wall (4).
2. The assemblable drawer according to claim 1, wherein said side walls (2, 3) and said rear wall (4) are provided with lateral surfaces that are extended according to a respective longitudinal axis of extension thereof, **characterized in that** said lateral surfaces of the side walls (2, 3) and of the rear wall (4) have no openings and/or machining.
3. The assemblable drawer according to one or more of the preceding claims, **characterized in that** said coupling means (10, 11) comprise a pair of rear corner connectors (10) for coupling between said side walls (2, 3) and said rear wall (4) and a pair of front connectors (11) for the coupling of said front panel (6) to said side walls (2, 3).
4. The assemblable drawer according to one or more of the preceding claims, **characterized in that** said rear corner connectors (10) are provided with seats (29) for accommodating said moveable engagement means.

5. The assemblable drawer according to one or more of the preceding claims, **characterized in that** said front connectors (11) are provided with seats (28) for accommodating said moveable engagement means.
6. The assemblable drawer according to one or more of the preceding claims, **characterized in that** it comprises additional connection means (16) which are adapted to allow the coupling of said side walls (2, 3) with said rear wall (4) of the drawer.
7. The assemblable drawer according to one or more of the preceding claims, **characterized in that** it comprises first front coupling means (12) which can be fixed to said front panel (6) and can be mated with said front connectors (11).
8. A method for assembling an assemblable drawer, comprising the steps of:
 - starting from a pair of side walls (2, 3), a rear wall (4), a bottom (5) and a front panel (6) of a drawer, coupling coupling means (10, 11) in end openings (7) of said side walls, for the coupling of said side walls (2, 3) with said rear wall (4) of the drawer;
 - locking in place said coupling means by way of moveable engagement means (25, 30) which are adapted to allow a forced or shape coupling between said coupling means (10, 11) and said end openings (7) of said side walls (2, 3) and said rear wall (4);
 - applying said bottom (5) to said side walls (2, 3);
 - fixing the front panel (6) to said coupling means (10, 11) which are arranged at the end of said side walls (2, 3) that is adapted to be directed toward said front panel (6), wherein said moveable engagement means comprise at least one eccentric engagement element (25, 30) for the forced or shape coupling of said moveable engagement means in said end openings (7) of said rear and side walls **characterized in that** said moveable engagement means for said corner and front connectors comprise screw means (25) which can engage in said side walls (2, 3) and/or said rear wall (4).

Patentansprüche

1. Eine zusammensetzbare Schublade (1) für Möbel, die ein Paar von Seitenwänden (2, 3), eine Rückwand (4), einen Boden (5) und eine Frontplatte (6) umfasst, wobei die Seitenwände (2, 3) und die Rückwand (4) mit Endöffnungen (7) versehen sind, die ausgebildet sind, um den Anschluss von Kopplungsmitteln (10, 11) zu ermöglichen, die wiederum aus-

gebildet sind, um in den Endöffnungen (7) von Eingriffsmitteln (25, 26, 27, 28) arretiert zu werden, die sich zur Zwangs- oder Formkopplung der beweglichen Eingriffsmittel in den Endöffnungen (7) der Seitenwände (2, 3) und der Rückwand (4) bewegen können, wobei die beweglichen Eingriffsmittel mindestens ein exzentrisches Eingriffselement (25, 30) für die Zwangs- oder Formkopplung der beweglichen Eingriffsmittel mit den Endöffnungen (7) der Rück- und Seitenwände umfassen, **dadurch gekennzeichnet, dass** die beweglichen Eingriffsmittel für die Eck- und Frontseiten-Kopplungsmittel Schraubmittel (25) umfassen, die in die Seitenwände (2, 3) und/oder die Rückwand (4) eingreifen können.

2. Die zusammensetzbare Schublade gemäß Anspruch 1, wobei die Seitenwände (2, 3) und die Rückwand (4) mit Seitenflächen versehen sind, die sich entlang einer entsprechenden Längsachse der Erstreckung derselben erstrecken; **dadurch gekennzeichnet, dass** die Seitenflächen der Seitenwände (2, 3) und der Rückwand (4) keine Öffnungen und/oder spanende Bearbeitung haben.
3. Die zusammensetzbare Schublade gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Kopplungsmittel (10, 11) ein Paar hinterer Eck-Kopplungsmittel (10) für die Kopplung zwischen den Seitenwänden (2, 3) und der Rückwand (4) und ein Paar von Front-Kopplungsmitteln (11) für die Kopplung der Frontplatte (6) mit den Seitenwänden (2, 3) umfassen.
4. Die zusammensetzbare Schublade gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die hinteren Eck-Kopplungsmittel (10) mit Sitzen (29) für die Aufnahme der beweglichen Eingriffsmittel ausgestattet sind.
5. Die zusammensetzbare Schublade gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Front-Kopplungsmittel (11) mit Sitzen (28) für die Aufnahme der beweglichen Eingriffsmittel ausgestattet sind.
6. Die zusammensetzbare Schublade gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie zusätzliche Verbindungsmittel (16) umfasst, die ausgebildet sind, um die Verbindung der Seitenwände (2, 3) mit der Rückwand (4) der Schublade zu ermöglichen.
7. Die zusammensetzbare Schublade gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie erste Front-Kopplungsmittel (12) umfasst, die an der Frontplatte (6) befestigt und mit den Front-Kopplungsmitteln (11) verbunden werden können.

8. Ein Verfahren zum Zusammensetzen einer zusammensetzbaren Schublade, das folgende Schritte umfasst:

- 5 - ausgehend von einem Paar von Seitenwänden (2, 3), einer Rückwand (4), einem Boden (5) und einer Frontplatte (6) einer Schublade, das Verbinden von Kopplungsmitteln (10, 11) mit Endöffnungen (7) der Seitenwände zum Koppeln der Seitenwände (2, 3) mit der Rückwand (4) der Schublade;
- 10 - das Arretieren der Kopplungsmittel durch bewegliche Eingriffsmittel (25, 30), die ausgebildet sind, um eine Zwangs- oder Formkopplung zwischen den Kopplungsmitteln (10, 11) und den Endöffnungen (7) der Seitenwände (2, 3) und der Rückwand (4) zu ermöglichen;
- 15 - das Anbringen des Bodens (5) an den Seitenwänden (2, 3);
- 20 - das Befestigen der Frontplatte (6) an den Kopplungsmitteln (10, 11), die an dem Ende der Seitenwände (2, 3) angeordnet sind, das ausgebildet ist, um der Frontplatte (6) zugewandt zu sein; wobei die beweglichen Eingriffsmittel mindestens ein exzentrisches Eingriffselement (25, 30) für die Zwangs- oder Formkopplung der beweglichen Eingriffsmittel mit den Endöffnungen (7) der Rück- und Seitenwände umfassen, **dadurch gekennzeichnet, dass** die beweglichen Eingriffsmittel für die Eck- und Front-Kopplungsmittel Schraubmittel (25) umfassen, die in die Seitenwände (2, 3) und/oder die Rückwand (4) eingreifen können.
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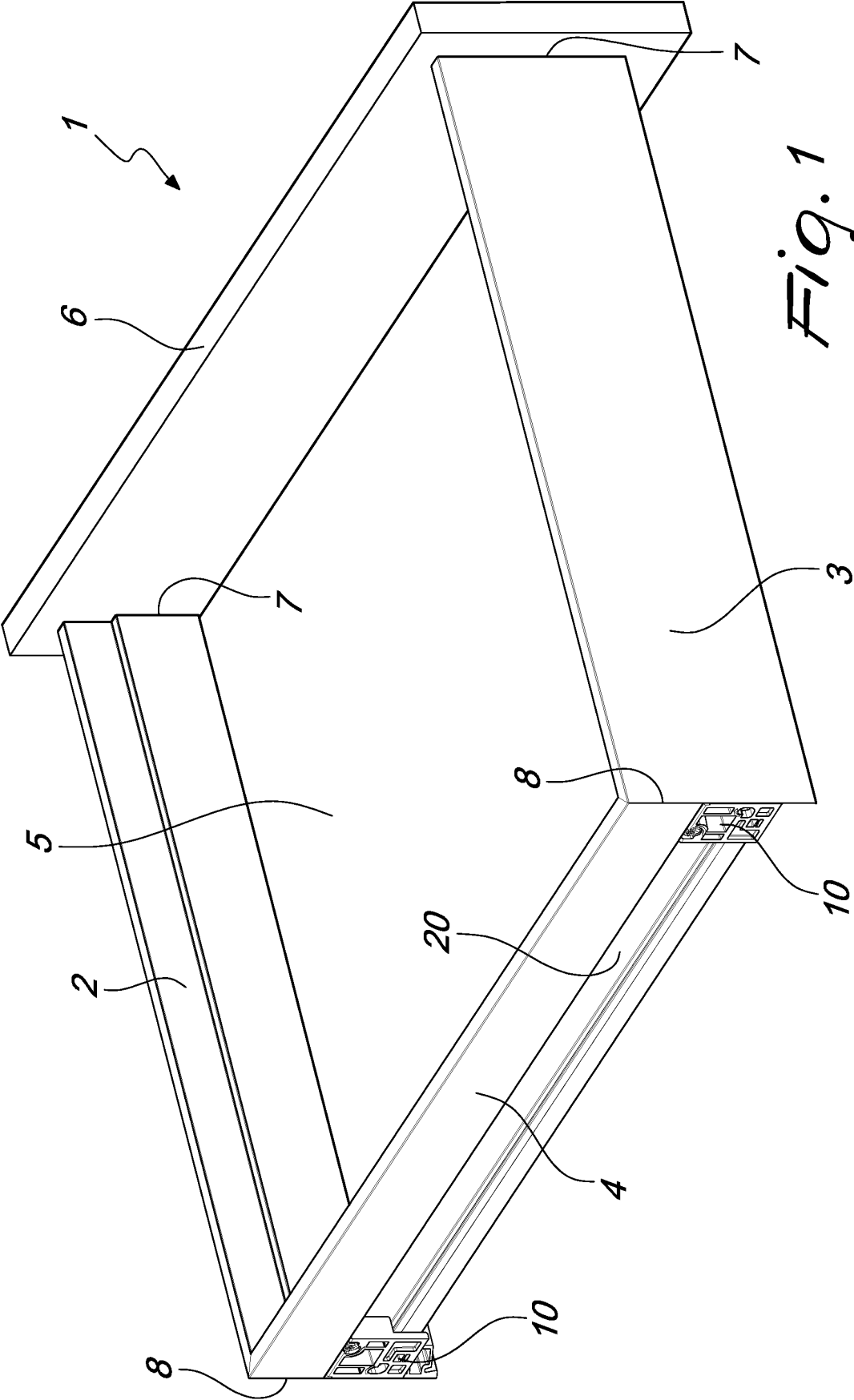
Revendications

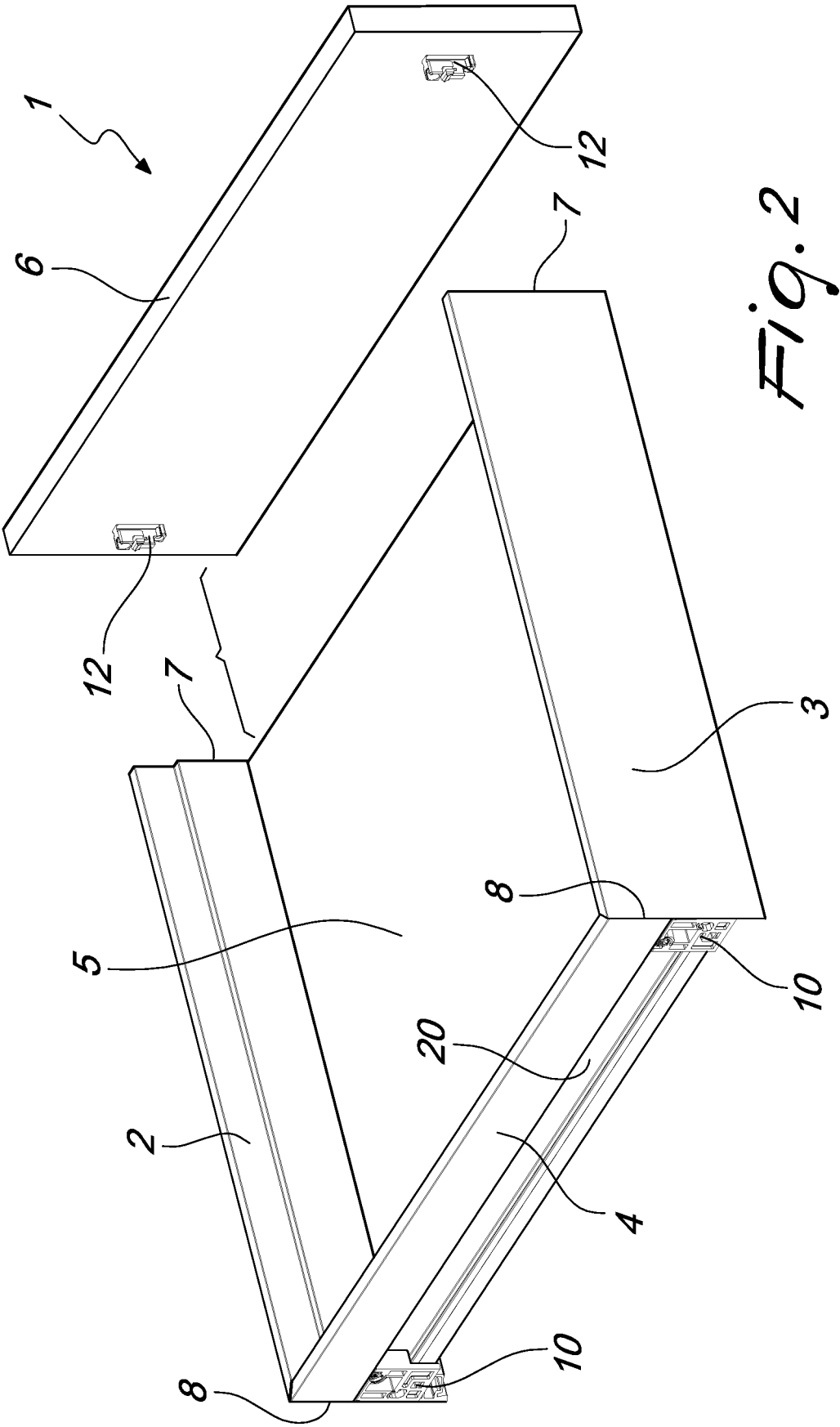
1. Tiroir pouvant être assemblé (1) pour meuble, comprenant une paire de parois latérales (2, 3), une paroi arrière (4), un fond (5) et un panneau avant (6), lesdites parois latérales (2, 3) et ladite paroi arrière (4) étant prévues avec des ouvertures d'extrémité (7) qui sont adaptées pour permettre le couplage des moyens de couplage (10, 11) qui sont, à leur tour, adaptés pour être verrouillés dans lesdites ouvertures d'extrémité (7) par des moyens de mise en prise (25, 26, 27, 28) qui peuvent se déplacer pour le couplage forcé ou par complémentarité de forme desdits moyens de mise en prise mobiles dans lesdites ouvertures d'extrémité (7) desdites parois latérales (2, 3) et de ladite paroi arrière (4), dans lequel lesdits moyens de mise en prise mobiles comprennent au moins un élément de mise en prise excentrique (25, 30) pour le couplage forcé ou par complémentarité de forme desdits moyens de mise en prise mobiles dans lesdites ouvertures d'extrémité (7) desdites parois arrière et latérales, **caractérisé en ce que** lesdits moyens de mise en prise mobiles pour lesdits

- connecteurs de coin et avant comprennent des moyens de vis (25) qui peuvent se mettre en prise dans lesdites parois latérales (2, 3) et/ou ladite paroi arrière (4).
2. Tiroir pouvant être assemblé selon la revendication 1, dans lequel lesdites parois latérales (2, 3) et ladite paroi arrière (4) sont prévues avec des surfaces latérales qui sont étendues selon leur axe d'extension longitudinal respectif, **caractérisé en ce que** lesdites surfaces latérales des parois latérales (2, 3) et de la paroi arrière (4) n'ont pas d'ouvertures et/ou d'usinage.
3. Tiroir pouvant être assemblé selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** lesdits moyens de couplage (10, 11) comprennent une paire de connecteurs de coin arrière (10) pour le couplage entre lesdites parois latérales (2, 3) et ladite paroi arrière (4) et une paire de connecteurs avant (11) pour le couplage dudit panneau avant (6) avec lesdites parois latérales (2, 3).
4. Tiroir pouvant être assemblé selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** lesdits connecteurs de coin arrière (10) sont prévus avec des sièges (29) pour loger lesdits moyens de mise en prise mobiles.
5. Tiroir pouvant être assemblé selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** lesdits connecteurs avant (11) sont dotés de sièges (28) pour loger lesdits moyens de mise en prise mobiles.
6. Tiroir pouvant être assemblé selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comprend des moyens de raccordement supplémentaires (16) qui sont adaptés pour permettre le couplage desdites parois latérales (2, 3) avec ladite paroi arrière (4) du tiroir.
7. Tiroir pouvant être assemblé selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comprend des premiers moyens de couplage avant (12) qui peuvent être fixés audit panneau avant (6) et peuvent être couplés avec lesdits connecteurs avant (11).
8. Procédé pour assembler un tiroir pouvant être assemblé comprenant les étapes consistant à :
- à partir d'une paire de parois latérales (2, 3), d'une paroi arrière (4), d'un fond (5) et d'un panneau avant (6) d'un tiroir, coupler des moyens de couplage (10, 11) dans des ouvertures d'extrémité (7) desdites parois latérales, pour le couplage desdites parois latérales (2, 3) avec ladite

paroi arrière (4) du tiroir ;

- verrouiller en place lesdits moyens de couplage au moyen des moyens de mise en prise mobiles (25, 30) qui sont adaptés pour permettre un couplage forcé ou par complémentarité de forme entre lesdits moyens de couplage (10, 11) et lesdites ouvertures d'extrémité (7) desdites parois latérales (2, 3) et de ladite paroi arrière (4) ;
- appliquer ledit fond (5) sur lesdites parois latérales (2, 3) ;
- fixer le panneau avant (6) sur lesdits moyens de couplage (10, 11) qui sont agencés à l'extrémité desdites parois latérales (2, 3) qui est adaptée pour être dirigée vers ledit panneau avant (6), dans lequel lesdits moyens de mise en prise mobiles comprennent au moins un élément de mise en prise excentrique (25, 30) pour le couplage forcé ou par complémentarité de forme desdits moyens de mise en prise mobiles dans lesdites ouvertures d'extrémité (7) desdites parois arrière et latérales, **caractérisé en ce que** lesdits moyens de mise en prise mobiles pour lesdits connecteurs de coin et avant comprennent des moyens de vis (25) qui peuvent se mettre en prise dans lesdites parois latérales (2, 3) et/ou ladite paroi arrière (4).





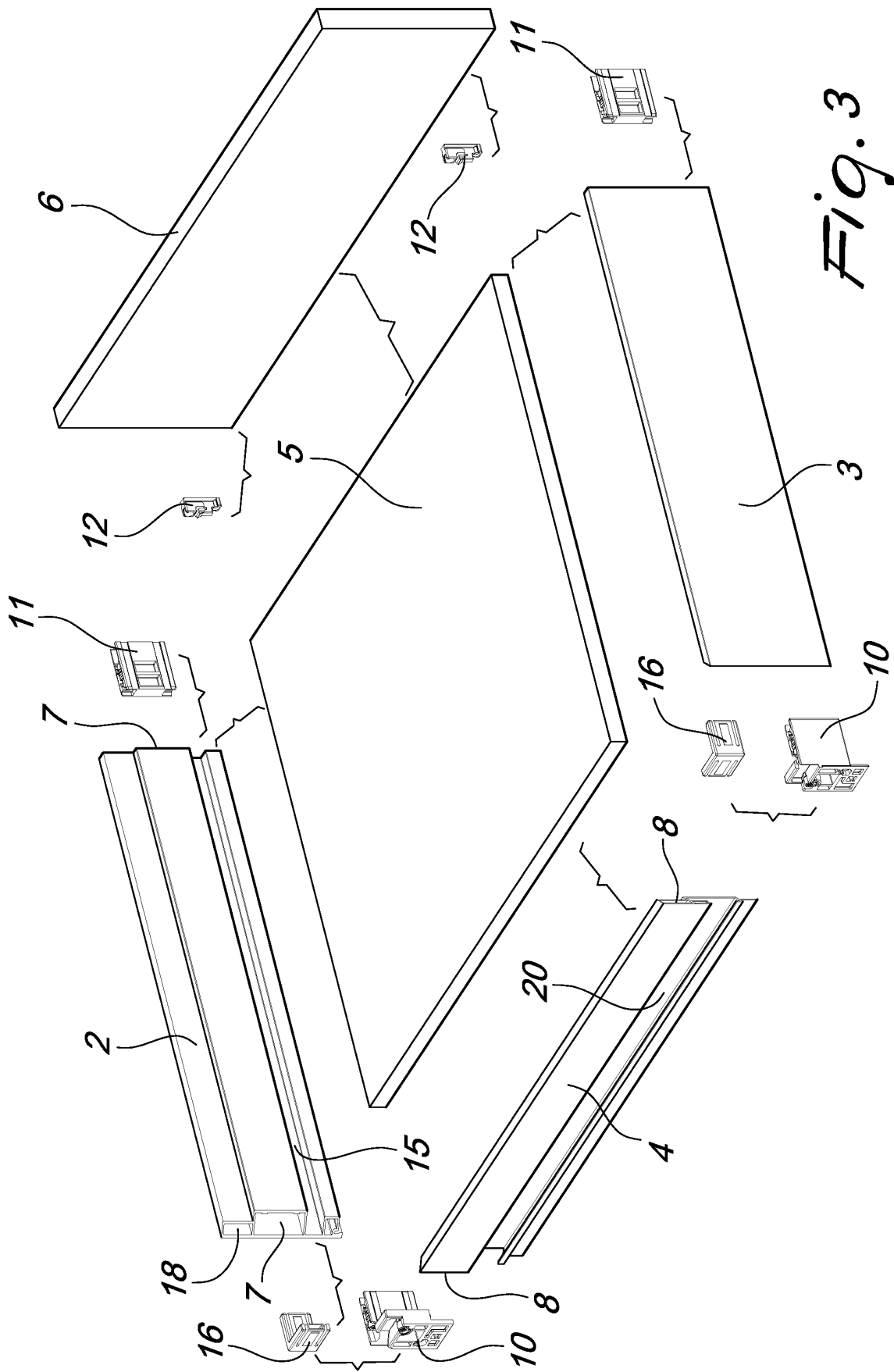
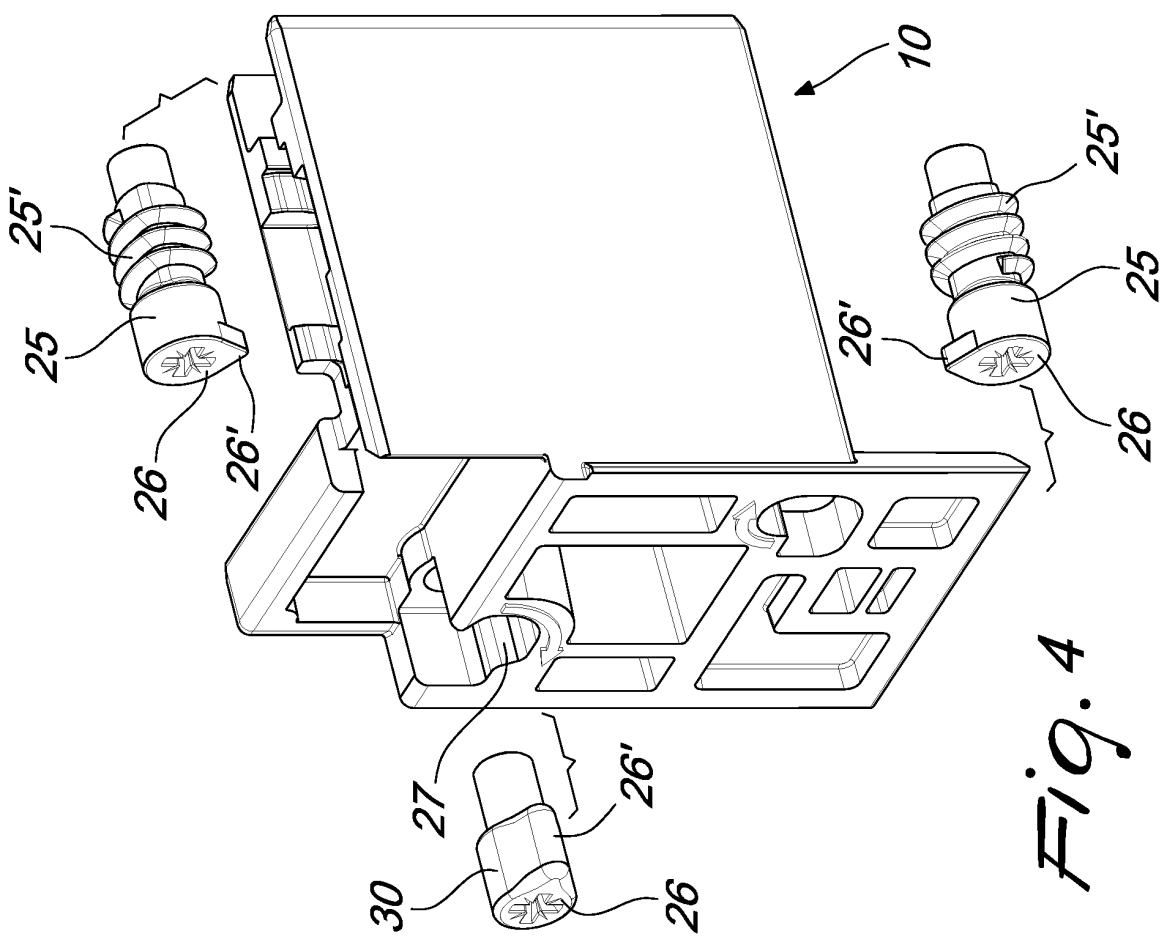
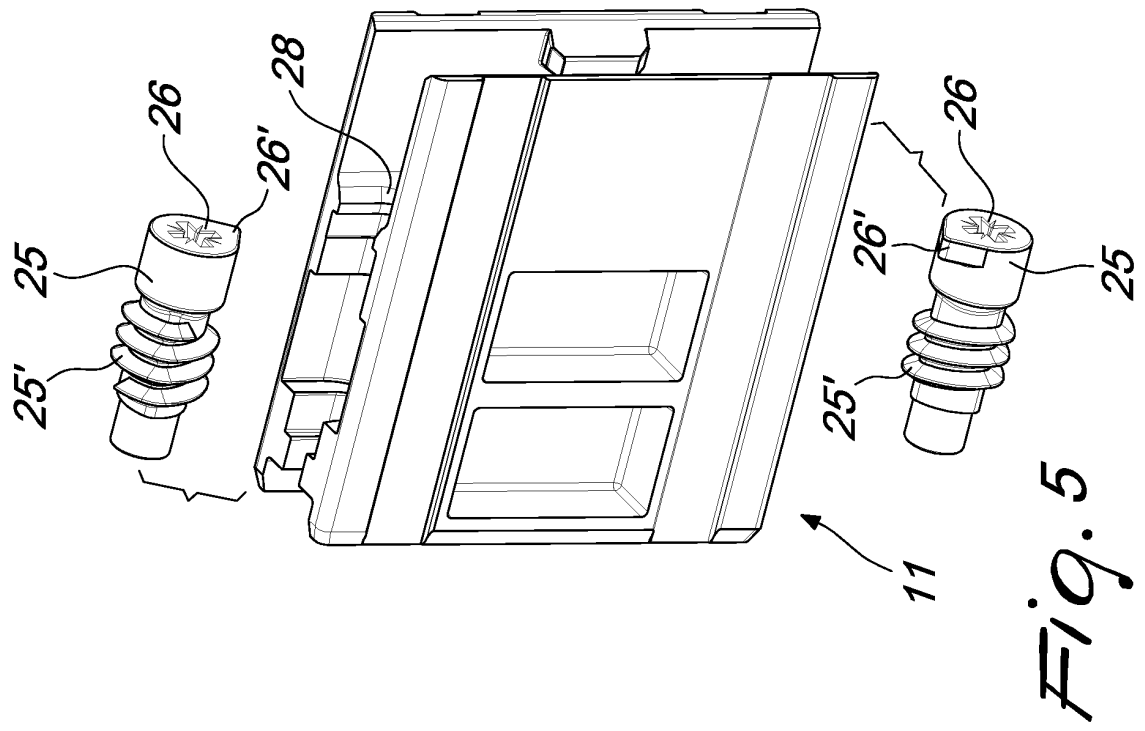
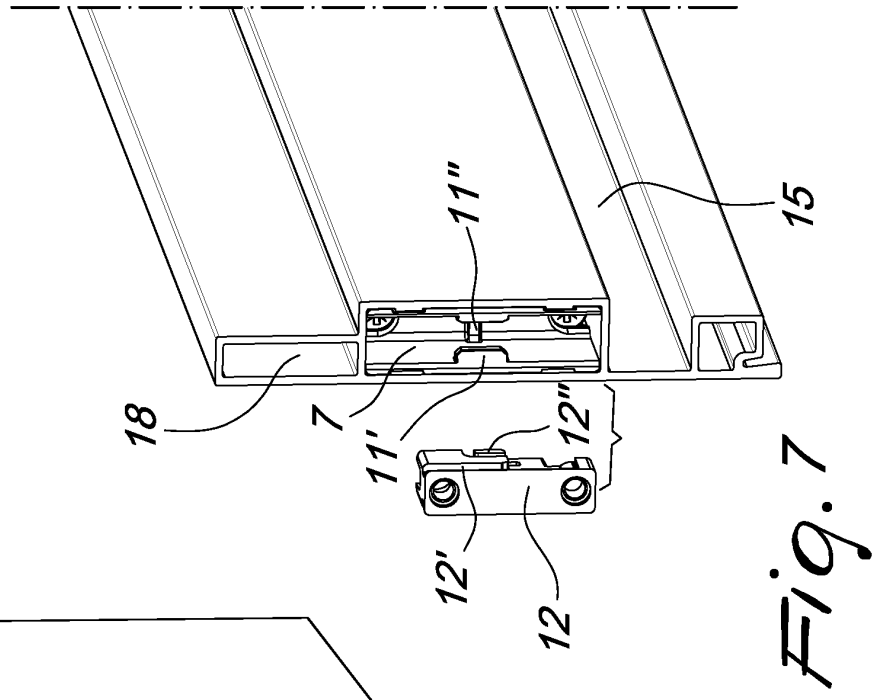
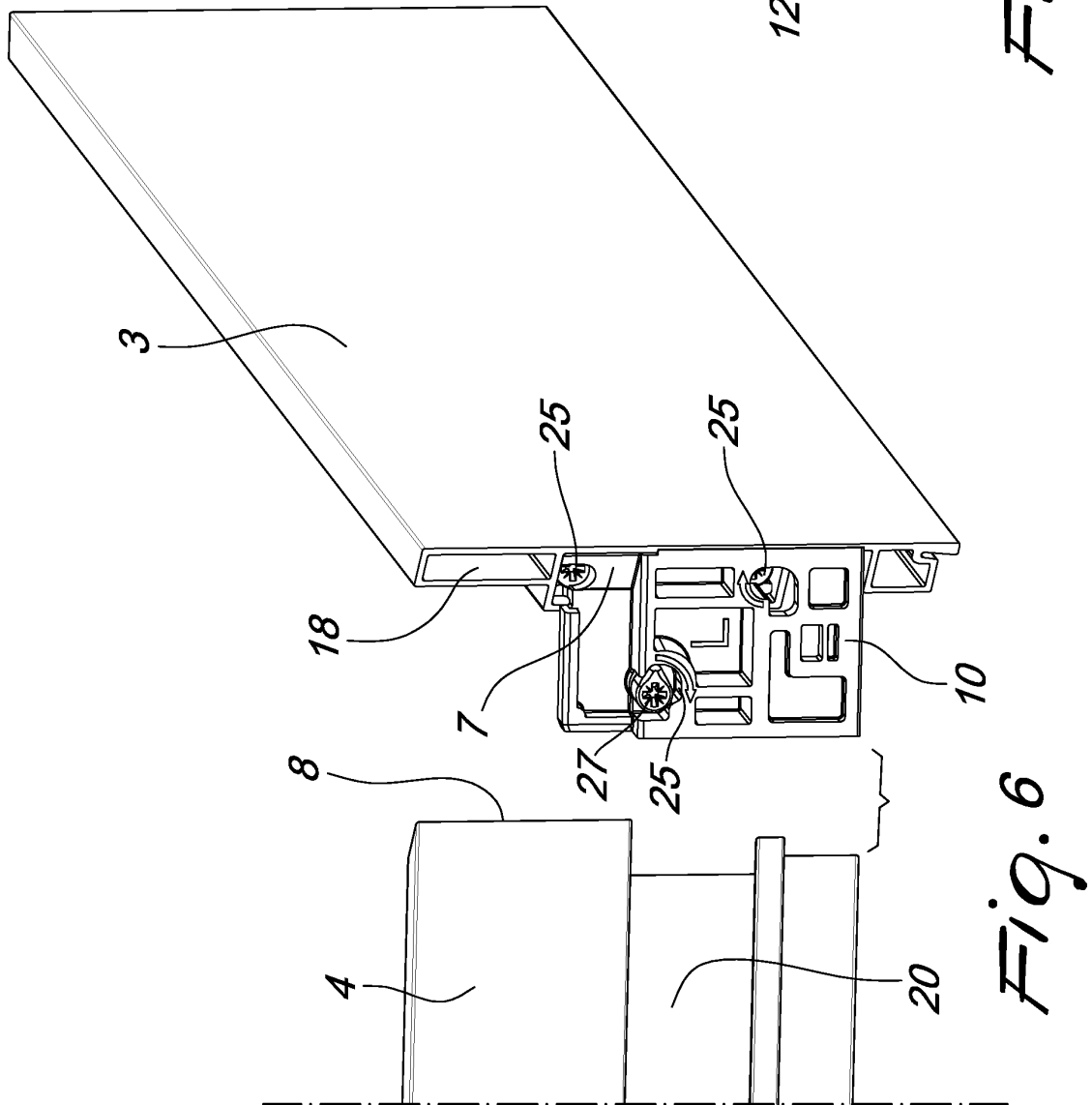
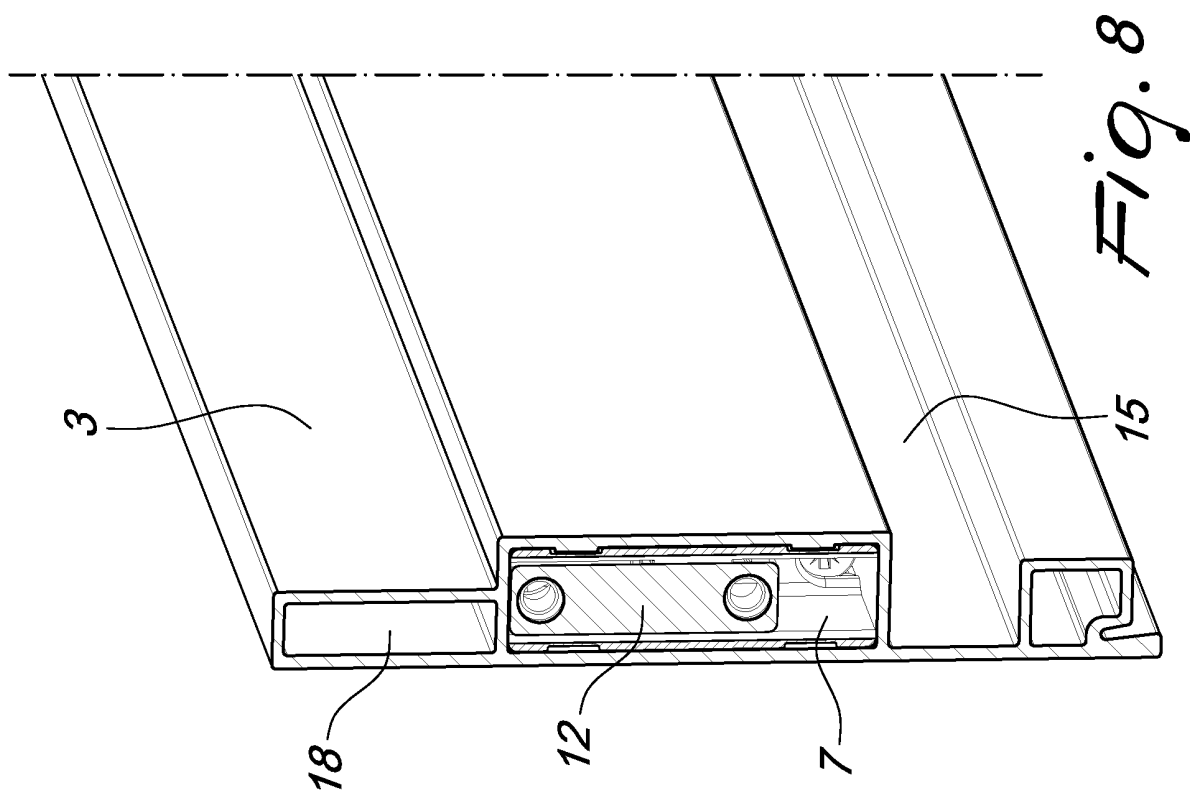
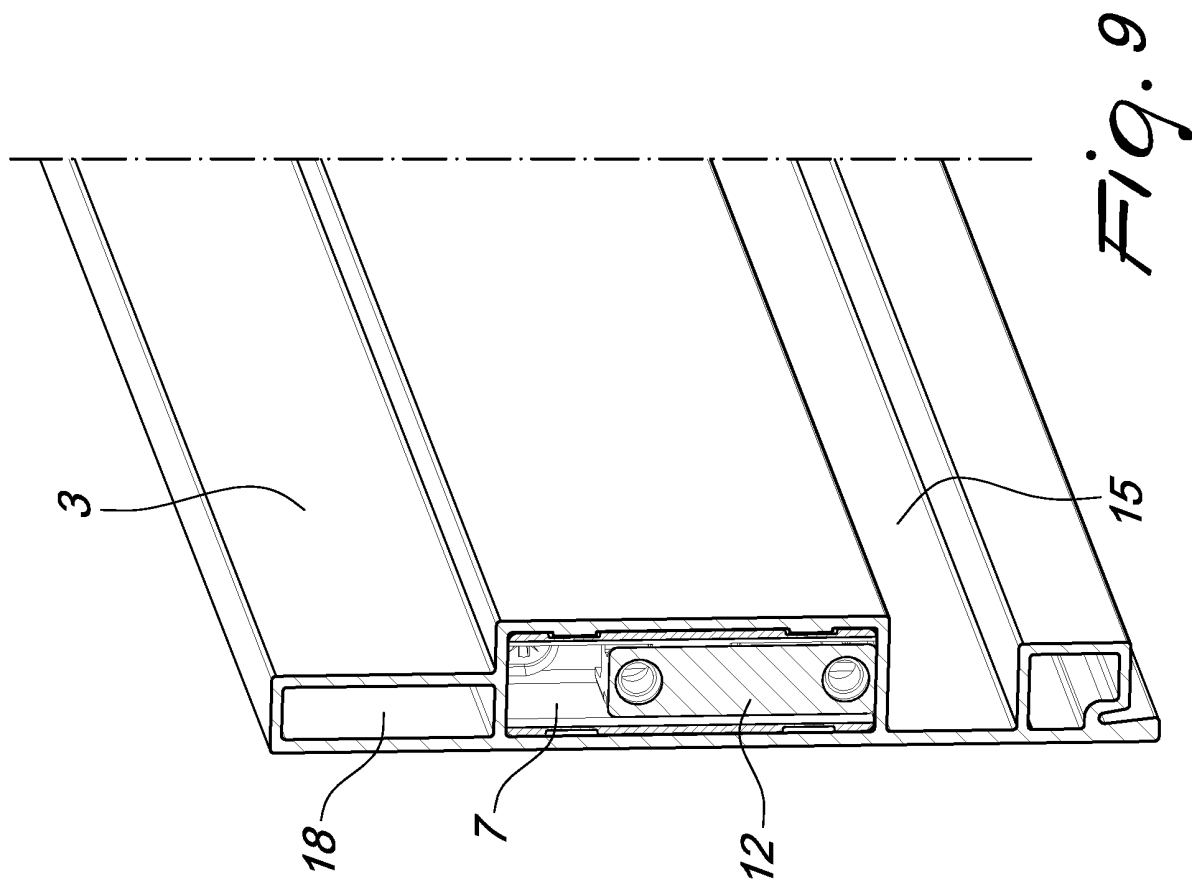


Fig. 3







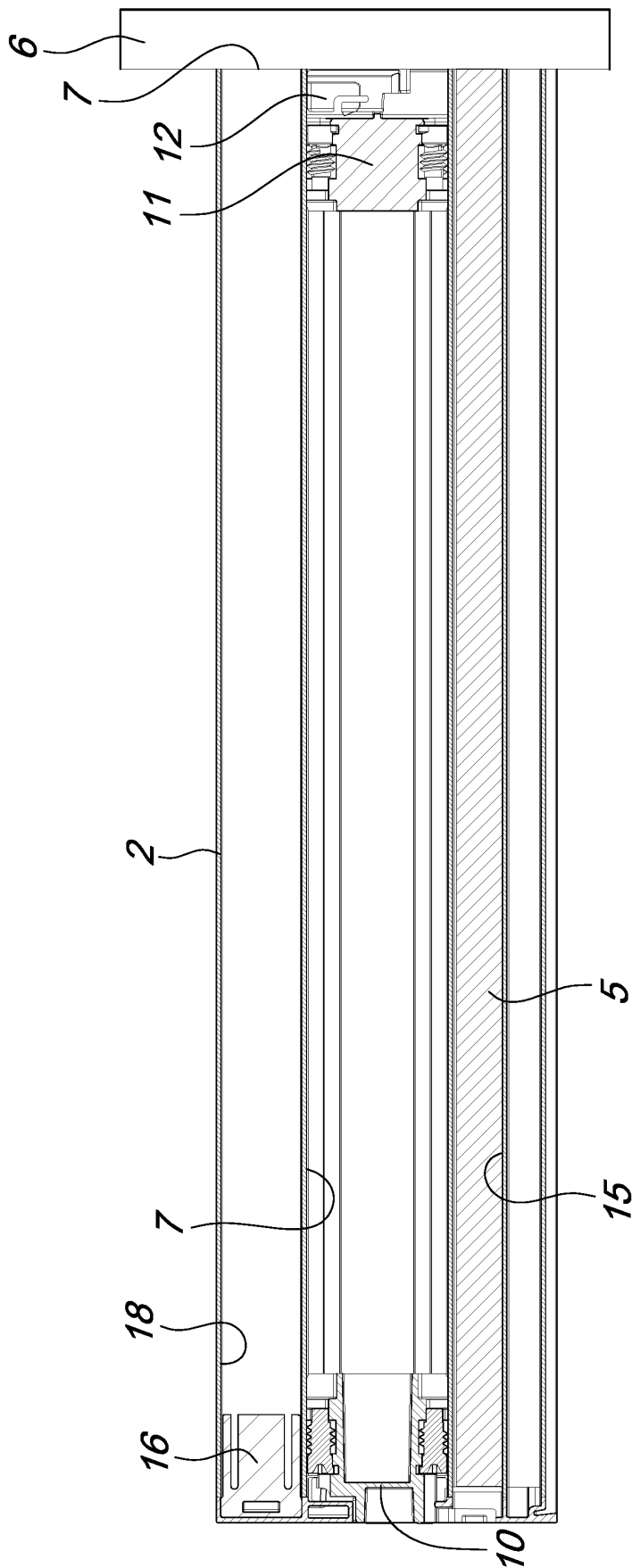


Fig. 10

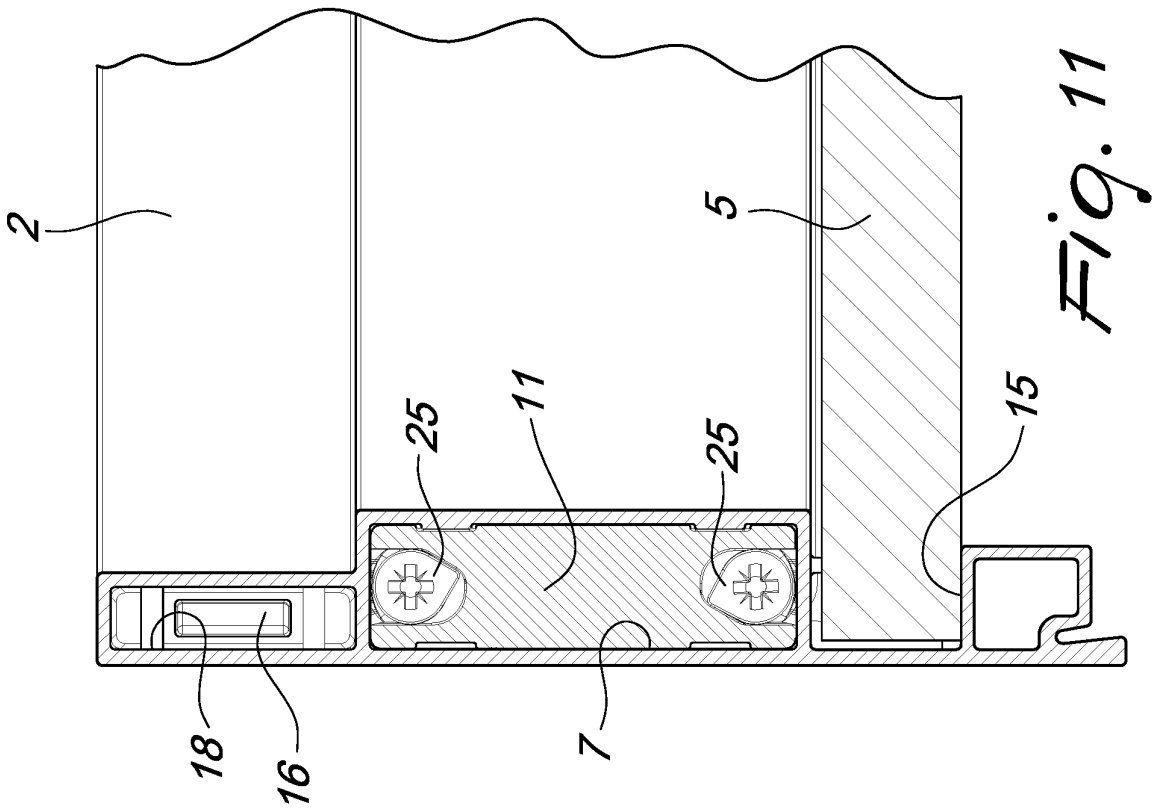


Fig. 11

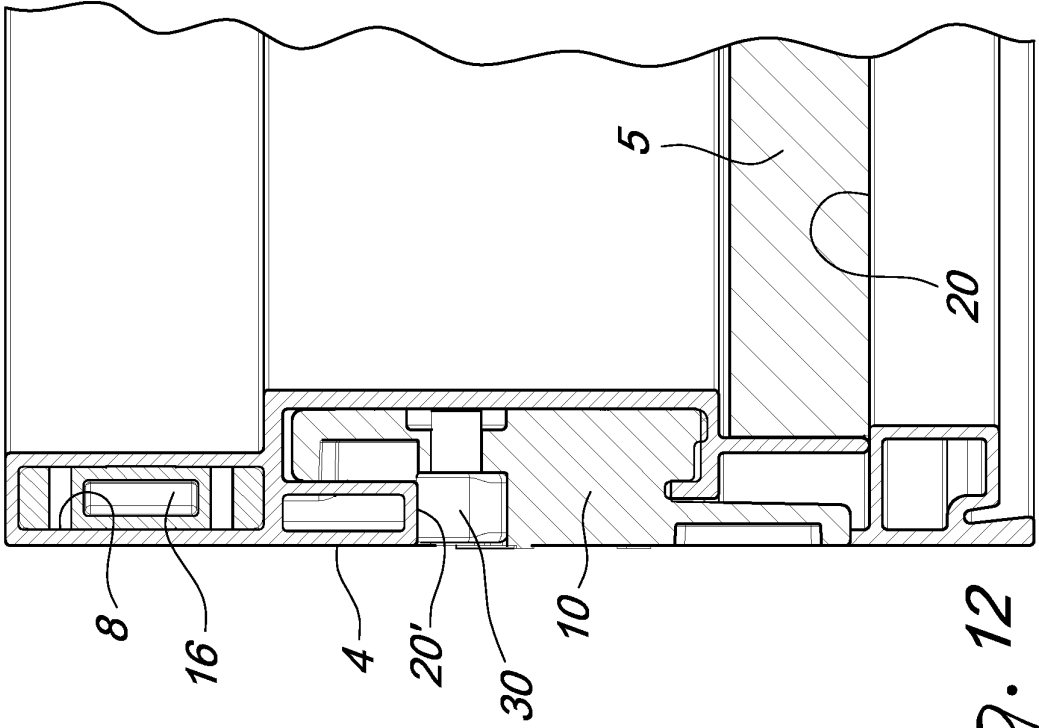
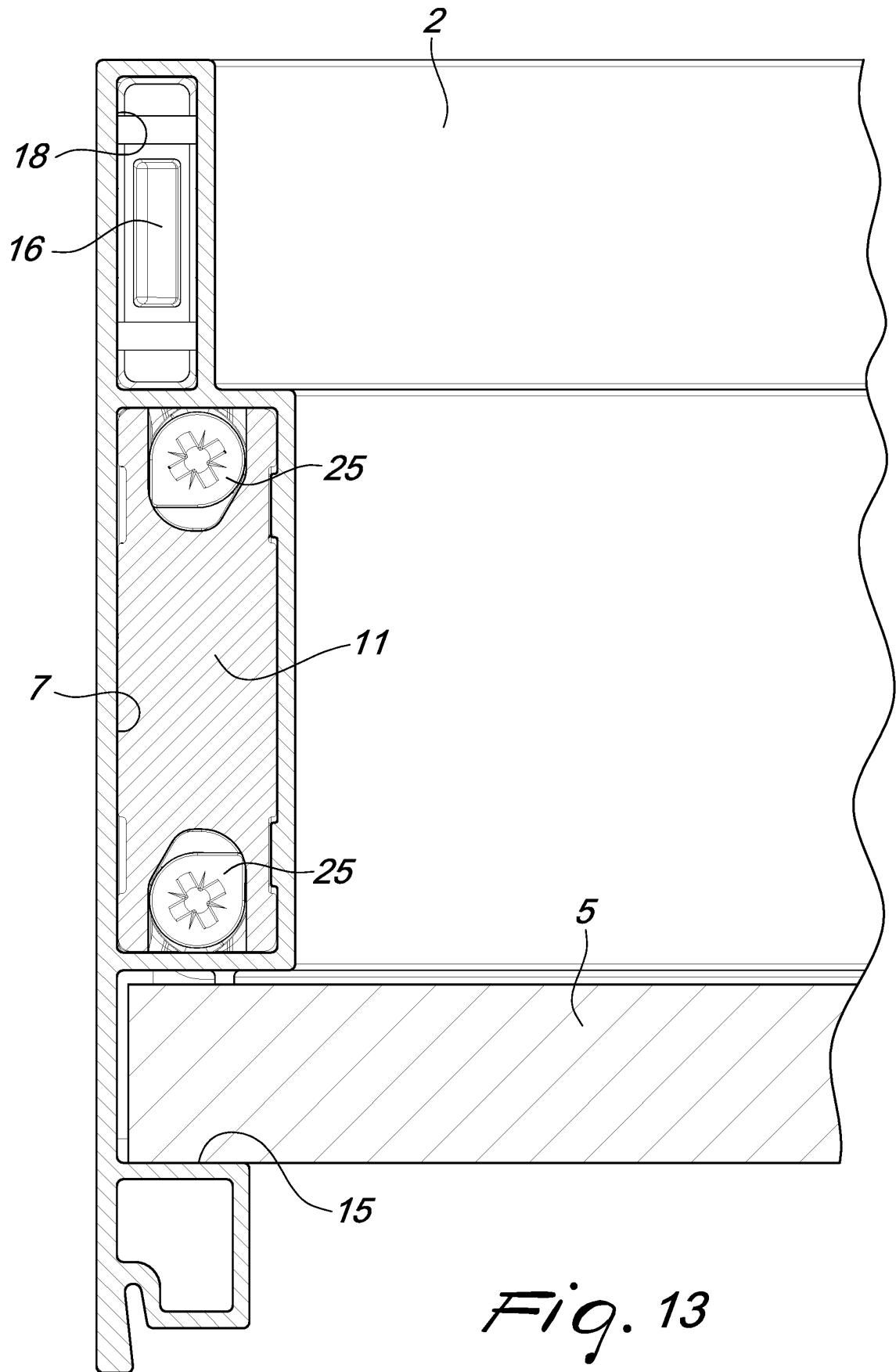


Fig. 12



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 20007411 U [0008]