(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 789 705 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.03.2021 Bulletin 2021/10

(21) Application number: **19195603.6**

(22) Date of filing: **05.09.2019**

(51) Int Cl.:
F25D 23/10 *(2006.01)* ***A47F 3/04*** *(2006.01)*
F25D 23/02 *(2006.01)* *E05B 17/06* *(2006.01)*
E05D 11/00 *(2006.01)* *E05F 17/00* *(2006.01)*

(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
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **ELECTROLUX APPLIANCES AKTIEBOLAG**
105 45 Stockholm (SE)

(72) Inventors:
- **BALDO, Federico**
  33080 Porcia (IT)
- **Naibo, Sergio**
  33080 Porcia (IT)

(74) Representative: **Electrolux Group Patents**
AB Electrolux
Group Patents
105 45 Stockholm (SE)

(54) **A MOUNTING TOOL FOR A CONNECTION SYSTEM OF A DOOR OF A BUILT-IN DOMESTIC APPLIANCE TO A DOOR OF A FURNITURE**

(57) A mounting tool (1) for a connection system (10) of a door (2) of a built-in domestic appliance (3) to a door (4) of a furniture (5) that contains the built-in domestic appliance (3); the connection system (10) comprises: a guide profile (11) designed to be fixed to the door (4) of the furniture (5); and a sled (12) designed to be fixed to an outer edge (13) of the door (2) of the built-in domestic appliance (3) and to slidably couple to the guide profile (11). The mounting tool (1) is configured to removably couple to the sled (12) and to the guide profile (11) and it comprises: a main body (15), provided with a seat (18) designed to house at least portion of the guide profile (11) in a predetermined position and to allow the fixing of the guide profile (11) to the door (4) of the furniture (5); a coupling plate (14) designed to couple to the sled (12); and a reference plate (16) designed to abut against an outer edge (17) of the door (4) of the furniture (5), when the coupling plate (14) is coupled to the sled (12) and the main body (15) is coupled to the guide profile (11), so as to define a fixing position of the guide profile (11) to the door of the furniture (5).

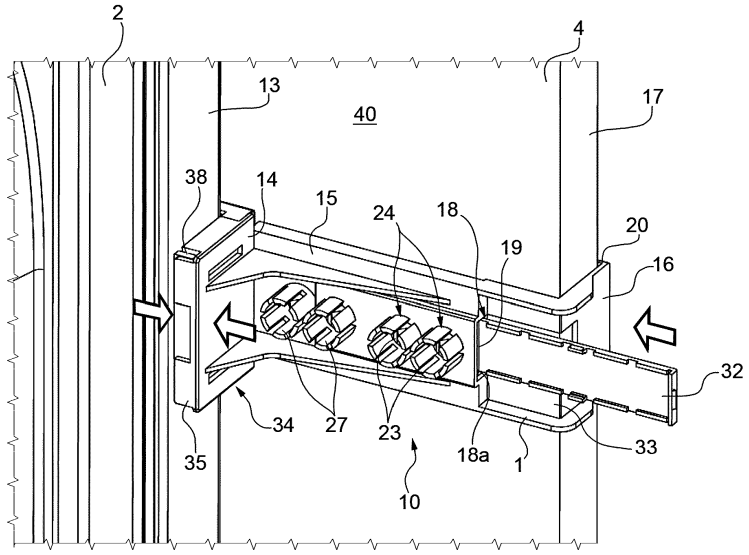


FIG.8

EP 3 789 705 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a mounting tool for a connecting system of a door of a built-in appliance to a door of a furniture, inside which the built-in appliance is fixed.

[0002] The present invention finds advantageous application in the connection of a door of a built-in refrigerator to a door of kitchen furniture, to which the following treatment will make explicit reference without losing its generality.

PRIOR ART

[0003] Nowadays, to mount a built-in refrigerator (i.e. a refrigerator intended to be fixed inside a kitchen furniture) inside a kitchen furniture, after properly placing the built-in refrigerator inside the kitchen furniture, an installer must fix (typically by means of screw fixing systems) the built-in refrigerator to the kitchen furniture and then he must connect the door of the built-in refrigerator to the door of the kitchen furniture so as to make possible the simultaneous opening of the door of the built-in refrigerator and of the door of the kitchen furniture.

[0004] In detail, the installer must fix two parallel and opposite walls of the built-in refrigerator to two parallel and opposite walls of the kitchen furniture and then he must connect the door of the built-in refrigerator to the door of the kitchen furniture by means a sliding connection system. A known sliding connection system comprises a sled (typically with a "C"-shaped cross section) intended to be fixed to an edge of the door of the built-in refrigerator and a guide profile (typically with a "T"-shaped cross section) intended to be fixed to the door of the kitchen furniture, after having slidably coupled the sled to the guide profile, so that the sliding of the sled along the guide profile allows to open and close simultaneously the door of the kitchen furniture and the door of the built-in refrigerator.

[0005] To mount the sliding connection system, the installer must fix the sled to an edge of the door of the built-in refrigerator (typically by means of one or two screws), then he must couple the sled to the guide profile and finally he must fix, typically by means of a plurality of screws, the guide profile to the door of the furniture in a determined fixing position. In detail, in this determined fixing position, the guide profile must be perfectly aligned with the sled along an horizontal direction (i.e. along a direction orthogonal to the rotation axis about which the door of the furniture rotates during its opening and/or closing) so as to allow the sliding of the sled along the guide profile minimizing the mutual friction between the sled and the guide profile. At the same time, the guide profile must be placed in a position such that to prevent the sled to uncouple from the guide profile at the time of maximum opening of the door of the furniture, or maximum closure of the door of the furniture, causing, in this way, the disconnection of the door of the built-in refrigerator from the door of the furniture.

[0006] Therefore, the connection of the door of a built-in refrigerator to the door of a furniture is a complex operation and it involves the execution of a series of measurements in order to identify the correct fixing position of the guide profile.

[0007] In light of what above, it is clear that the known connection systems and methods require a certain amount of experience and practicality in the execution of the operations described above in order to correctly connect the door of the built-in refrigerator to the door of the furniture. Therefore, to connect a door of a built-in refrigerator to a door of a furniture it is necessary to have a good dose of manual skills or it is necessary the assistance of a skilled operator, with a consequent cost increase.

DESCRIPTION OF THE INVENTION

[0008] The object of the present invention is to provide a mounting tool for a connecting system of a door of a built-in domestic appliance to a door of furniture which is free from the drawbacks described above and and which, in particular, allow to simplify and speed up the connection of the door of a built-in domestic appliance to the door of a furniture.

[0009] According to the present invention, there are provided a mounting tool for a connection system of a door of a built-in domestic appliance to a door of a furniture, a connection system of a door of a built-in domestic appliance to a door of a furniture by means of said mounting tool and a connection method of a door of a built-in domestic appliance to a door of a furniture by means of said mounting tool, in accordance with what is described in the attached claims.

[0010] The claims describe preferred embodiments of the present invention forming an integral part of the present disclosure.

[0011] Preferably, the mounting tool, is configured to removably couple to the sled and to the guide profile and it comprises:

- a main body, which is provided with a seat designed to house at least a portion of the guide profile in a predetermined position (that is the position in which an edge of the guide profile abuts against a closed end of the seat so as to arrest the sliding of the guide profile with respect to the mounting tool) and to allow the fixing of the guide profile to the door of the furniture when the at least a portion of the guide profile is housed in the seat;
- a coupling plate which is designed to couple to the sled, is angularly placed with respect to the main body, and is arranged at a first end of the main body; and
- a reference plate which is angularly placed with re-

spect to the main body, is arranged at a second end of the main body opposite to the first end, and is designed to abut against an outer edge of the door of the furniture, when the coupling plate is coupled to the sled, the sled is at least properly positioned (preferably already fixed) on the outer edge of the door of built-in domestic appliance and the main body is coupled to the guide profile (and the sled is slidably coupled to the guide profile), so as to define a fixing position of the guide profile to the door of the furniture.

[0012] In this way, advantageously, the mounting tool allows the identification of the fixing position of the guide profile, that is to say the identification of that position in which the guide profile is at the correct distance from the edge of the door of the furniture and, at the same time, it is positioned with respect to the sled so as to allow the sled to slide along the guide profile (during the opening and closing of the door of the furniture) without losing contact with the guide profile itself and assuring at the same time the due alignment between the sled and the guide profile minimizing the mutual sliding friction.

[0013] Preferably, the main body is designed to allow, when the at least a portion of the guide profile is housed in the seat, the installation of a fixing device suitable to fix the guide profile to the door of the furniture.

[0014] Preferably, the fixing device comprises at least a screw; the guide profile comprises at least a first through hole designed to receive the screw; and the main body comprises at least at least a second through hole arranged so as to be aligned with the first through hole when the at least a portion of the guide profile is housed in the seat on the predetermined position.

[0015] Preferably, the main body comprises a tubular invitation element which protrudes from the main body and is arranged around the second through hole.

[0016] Advantageously, the presence of this tubular invitation elements facilitates the correct insertion of the at least a screw through the mounting tool and the guide profile.

[0017] Preferably, the tubular invitation element comprises:

a plurality of first flaps which are arranged around the second through hole to guide a stem of the screw, when the screw is inserted in the second through hole, and are designed to deform under the action of an head of the screw during the passage of the head of the screw through the second through hole; and

a plurality of second flaps arranged around the second through hole outside of the first flaps to guide the head of the screw, when the screw is inserted in the second through hole.

[0018] Preferably, the first flaps are arranged along a first circular profile at an edge of the second through hole spaced from each other so as to define a series of slits between adjacent first flaps; and the second flaps are arranged along a second circular profile concentric and larger than the first circular profile and each in front of a respective slit so as to allow the first flaps to be bent outward of the second through hole when the screw is inserted in the second through hole and the head of the screw contacts the first flaps.

[0019] Advantageously, it is ensured that the at least a screw is correctly inserted in the door of the furniture. In this way, the risk of an incorrect placement of the guide profile because of an incorrect insertion of the at least a screws in the door of the furniture, which would compromise the correct connection between door of the built-in domestic appliance and door of the furniture, is minimized.

[0020] Preferably, the reference plate extends orthogonally to the main body on the opposite side with respect to the coupling plate, giving to the mounting tool a "Z" shape.

[0021] Preferably, the coupling plate has an edge which is arranged perpendicularly to the coupling plate, protrudes from the coupling plate from the side opposite to the main body, and is designed to embrace the sled when the coupling plate is coupled to the sled.

[0022] Preferably, the edge extends on three sides of the coupling plate leaving free the side facing the door of the furniture.

[0023] Preferably, the mounting tool comprises a snap-on fixing system for establishing a connection between the coupling plate and the sled.

[0024] Preferably, the snap-on fixing system comprises:

two recesses formed on two edges of the sled parallel to each other and oriented along the thickness of the door of the built-in domestic appliance, when the sled is fixed to the door of the of the built-in domestic appliance; and

two teeth which are provided on the coupling plate and are shaped to insert into the two recesses of the sled.

[0025] Preferably, the seat of the main body has an open end through which the at least a portion of the guide profile can be slidably inserted into said seat, and has a closed end against which an edge of the guide profile abuts, on the predetermined position.

[0026] Preferably, the reference plate comprises an edge which is arranged perpendicularly to the reference plate, protrudes from the reference plate from the same side of the main body, and is designed to embrace at least partially the door of the furniture.

[0027] Preferably, the reference plate comprises a through opening designed to receive a hinged cover of the guide profile, when the at least a portion of the guide profile is housed in the seat.

[0028] Preferably, the connection system comprises:

a guide profile which is intended to be fixed to the door of the furniture, oriented orthogonally to a rotation axis of the door, by means of at least a fixing device; and
a sled which is intended to be fixed to an outer edge of the door of the built-in domestic appliance and is shaped to slidably couple to the guide profile so that, when the guide profile is fixed to the door of the furniture and the sled is fixed to the outer edge of the door of the built-in domestic appliance and is coupled to the guide profile, the sliding of the sled along the guide profile induces the opening of the door of the built-in domestic appliance following the opening of the door of the furniture; and
the mounting tool above described.

[0029] Preferably, the connection method of a door of a built-in domestic appliance to a door of a furniture comprises the steps of:

coupling the mounting tool to the guide profile;
coupling the mounting tool to the sled;
coupling the guide profile to the sled;
by appropriately rotating the door of the built-in domestic appliance and the door of the furniture, resting the mounting tool coupled with the sled and the guide profile to an internal surface of the door of the furniture in a position such that the reference plate abuts against the outer edge of the door of the furniture and the sled is in contact with the outer edge of the door of the built-in domestic appliance;
fixing the sled to the outer edge of the door of the built-in domestic appliance;
fixing the guide profile to the door of the furniture by at the least a fixing device; and
uncoupling the mounting tool from the guide profile and the sled, after fixing the sled to the outer edge of the door of the built-in domestic appliance and the guide profile to the door of the furniture.

[0030] Preferably, the sled is fixed to the outer edge of the door of the built-in domestic appliance before coupling the sled to the mounting tool.
[0031] Preferably, the guide profile is coupled to the sled after coupling the mounting tool to the guide profile.
[0032] Preferably, when the reference plate comprises a through opening designed to receive a hinged cover of the guide profile, the step of coupling the mounting tool to the guide profile involves inserting the hinged cover of the guide profile in the through opening formed in the reference plate of the mounting tool.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] The present invention will be described with reference to the attached drawings, which illustrate some non-limiting examples of embodiment thereof, in which:

- figure 1 is a perspective view of a built-in refrigerator fixed inside a furniture, wherein a door of the built-in refrigerator is connected to a door of the furniture according to the present invention;
- figure 2 is a perspective view of a sled, a guide profile and a mounting tool of a connection system of the door of the built-in refrigerator to the door of the furniture according to a first embodiment of the present invention;
- figures 3 and 4 are two different perspective views of the mounting tool of figure 2 coupled to the guide profile of figure 2;
- figure 5 is a perspective view of the mounting tool of figure 2 coupled to the guide profile and the sled of figure 2;
- figures from 6 to 12 show schematic views of the successive connection steps to connect the door of the built-in refrigerator to the door of the furniture, according to the connection method of the invention; and
- figures 9A and 9B are perspective and enlarged views and on an enlarged scale of successive phases of the step of coupling a screw inside an invitation element of the mounting tool according to a second embodiment of the present invention.

PREFERRED EMBODIMENTS OF THE INVENTION

[0034] In the figures from 2 to 10, the number 1 indicates as whole a mounting tool to connect a door 2 of a built-in refrigerator 3 to a door 4 of a kitchen furniture 5.
[0035] In detail, as shown in figure 1, the furniture 5 has a wall 6, a wall 7 which is parallel and opposite to the wall 6, and a door 4 which is hinged to the wall 7; and the built-in refrigerator 3 has a wall 8, a wall 9 which is parallel and opposite to the wall 8, and a door 2 which is hinged to the wall 9. In use, the two walls 6 and 7 of the furniture 5 are preferably, fixed, respectively, to the walls 8 and 9 of the built-in refrigerator 3 by means of known fixing techniques (typically with screw fastening systems), and the door 4 of the furniture 5 is connected to the door 2 of the built-in refrigerator 3 by means of a sliding connection system 10.
[0036] Advantageously, the sliding connection system 10 is designed to allow to open simultaneous the door 2 of the built-in refrigerator 3 together with the door 4 of the furniture 5, despite the door 4 being rotatably mounted (hinged) around a rotation axis X and the door 2 is rotatably mounted (hinged) around another rotation axis (not visible in the attached figures) which is arranged offset with respect to the rotation axis X.
[0037] The sliding connection system 10 illustrated in the attached figures (see for example figures 1, 2, 5, 7-12) comprises a guide profile 11 which is designed to be fixed to the door 4 of the furniture 5 oriented orthogonally to the rotation axis X of the door 4, and a sled 12 which is designed to be fixed to an outer edge 13 of the door 2 of the built-in refrigerator 3 and to slidably couple to the

guide profile 11 so that, when the guide profile 11 is fixed to the door 4 of the furniture 5 and the sled 12 is fixed to the outer edge 13 of the door 2 of the built-in refrigerator 3 and is coupled to the guide profile 11, the sliding of the sled 12 along the guide profile 11 induces the opening of the door 2 of the built-in refrigerator 3 following the opening of the door 4 of the furniture piece 5.

[0038] In other words, the sliding of the sled 12 along the guide profile 11 (and thus the opening, or the closure, of the door 2 of the built-in refrigerator 3) is caused by the rotation of the door 4 of the furniture 5 around the rotation axis X (and thus by the opening, or the closing, of the door 4 of the furniture 5).

[0039] According to the preferred, but not limitative, embodiment shown in the attached figures (see for example figures 2 and 7) the guide profile 11 has a "T" shaped cross section and the sled 12 has a "C" shaped cross section to envelop the wings of the "T" section of the guide profile 11.

[0040] It is understood that any other configuration of the sled 12 and/or of the guide profile 11 which allow, in use (i.e. when the guide profile 11 is fixed to the door 4 and the sled 12 is fixed to the door 2), a sliding coupling between the sled 12 and the guide profile 11 could be provided.

[0041] The connection system 10 further comprises the mounting tool 1 which can be removably coupled to the guide profile 11 (as shown, for example, in figures 3 and 4) and to the sled 12 (as shown, for example, in figure 5).

[0042] Particularly, according to the embodiment of the invention shown in the attached figures (see, for example, figures 2, 3, 4 and 5), the mounting tool 1 comprises a coupling plate 14 to allow the removable coupling of the mounting tool 1 with the sled 12 and a main body 15 to allow the removable coupling of the mounting tool 1 with the guide profile 11.

[0043] The mounting tool 1 further comprises a reference plate 16 which is designed to abut against an outer edge 17 of the door 4 of the furniture 5 (as shown in figures 8 and 9) so as to define a fixing position of the guide profile 11 to the door 4 of the furniture 5.

[0044] In particular, when the mounting tool 1 is coupled to the sled 12 and to the guide profile 11 (i.e. when the coupling plate 14 is coupled to the sled 12 and the main body 15 is coupled to the guide profile 11), the guide profile 11 is placed in contact the door 4 of the furniture 5, and the sled 12 is at least opportunely placed (preferably fixed) to the edge 13 of the door 2 of the built-in refrigerator 3 (in a condition in which the sled 12 is slidably coupled to the guide profile 11), the mounting tool 1 allows the identification of the fixing position of the guide profile 11, that is to say the identification of that position in which the guide profile 11 is at the correct distance from the edge 17 of the door 4 of the furniture 5 and, at the same time, it is positioned with respect to the sled 12 so as to allow the sled 12 to slide along the guide profile 11 (during the opening and closing of the door 4 of the furniture 5) without losing contact with the guide profile 11 itself.

[0045] In the preferred but non-limiting embodiment illustrated for example in figures from 2 to 5, the coupling plate 14 is perpendicular to the main body 15 and is arranged at an inner end 15a of the main body 15, and the reference plate 16 which is perpendicular to the main body 15, is arranged at an outer end 15b of the main body 15 and extends orthogonally to the main body 15 on the opposite side with respect to the coupling plate 14, thus giving the mounting tool 1 a "Z" shape.

[0046] According to non-illustrated variants of the mounting tool 1, the reference plate 16 is angularly placed with respect to the main body 15 so as to abut against at least part of the outer edge 17 of the door 4 of the furniture piece 5. Similarly, according to a further not shown variant of the invention, (also) the coupling plate 14 is angularly placed with respect to the main body 15. According to the preferred embodiment of the invention illustrated in the attached figures (see in particular figures 3, 4, 5 and 7) the main body 15 is provided with a seat 18 which is designed to house at least a portion of the guide profile 11 in a predetermined position. In detail, according to the preferred but non-limiting embodiment illustrated in the attached figures, the seat 18 has a closed end 18a against which, in use (i.e. when when the at least a portion of the guide profile 11 is housed in the seat 18 on the predetermined position), an edge 19 of the guide profile 11 abuts (see, for example, figures 3-5 and 7-9) and an open end 18b, opposite the closed end 18a, through which the at least a portion of the guide profile 11 can be slidably inserted into said seat 18 (see figure 4). Therefore, the aforementioned predetermined position of the at least a portion of the guide profile 11 inside the seat 18 (shown for example in figures 3 and 4) is the position in which the edge 19 of the guide profile 11 abuts against the closed end 18a of the seat 18 so as to arrest the sliding of the guide profile 11 with respect to the mounting tool 1.

[0047] Further, according to the preferred embodiment shown in figures from 2 to 9, the reference plate 16 comprises an edge 20 which is arranged perpendicularly to the reference plate 16, protrudes from the reference plate 16 from the same side of the main body 15, and is designed to embrace at least partially the outer edge 17 of the door 4 of the furniture 5, when the at least a portion of the guide profile 11 is housed in the seat 18 in the predetermined position, the coupling plate 14 is coupled to the sled 12, and the sled 12 is at least properly positioned (preferably already fixed) to the outer edge 13 of the door 2 of the refrigerator 3. In this way, by abutting against the edge 17 of the door 4 of the furniture 5, the reference plate 16 defines the fixing position of the guide profile 11, that is the correct position of the guide profile 11 with respect to the edge 17 of the door 4 of the furniture 5 that with respect to the sled 12.

[0048] According to the embodiment shown in the attached figures, see for example figure 9, the seat 18 is

designed to allow, preferably by means of a fixing device 21, the fixing of the guide profile 11 to the door 4 of the furniture 5, once the above-described fixing position of the guide profile 11 has been defined.

[0049] In accordance with the preferred but non-limiting embodiment of the invention illustrated in figures from 9 to 11, the fixing device 21 (comprises) consists of two screws 21a, preferably self-threading, intended to be inserted through the mounting tool 1, the guide profile 11, and the door 4 of the furniture 5 thus fixing the guide profile 11 to the door 4 itself. According to this preferred but non-limiting embodiment, the guide profile 11 comprises a plurality of through holes 22, each designed to receive a screw 21a and the mounting tool 1 comprises a plurality of through holes 23, each designed to receive a respective screw 21a and each arranged so as to result aligned with a respective through hole 22, when the mounting tool 1 is coupled to the guide profile 11 in the predetermined position (i.e. when the at least a portion of the guide profile 11 is housed in the seat 18 in the predetermined position) as shown, in particular, in figures 3, 5, 8 and 9.

[0050] In accordance with an not shown embodiment, the fixing device 21 (comprises) consists of only one screw 21a, the guide profile 11 comprises only one through hole, similar to the through holes 22 described above and, designed to receive the one screw 21a and the mounting tool 1 comprises only one through hole which is similar to the through holes 23 described above and is arranged so as to result aligned with the one through hole of the guide profile 11, when the mounting tool 1 is coupled to the guide profile 11 in the predetermined position.

[0051] According to the advantageous but non-limiting embodiment shown in the attached figures (see figures 2 to 11) the main body 15 further comprises a series of tubular invitation elements 24, which protrudes from the main body 15 and are arranged around a respective through hole 23. Advantageously, the presence of this tubular invitation elements 24 facilitates the correct insertion of the screw 21a through the mounting tool 1 and the guide profile 11.

[0052] With particular reference to figures 9A and 9B, preferably but not necessarily, each tubular invitation element 24 comprises a plurality of flaps 25 arranged around the respective through hole 23 so as to guide a stem 26 of the screw 21a, when the screw 21a is inserted in the through hole 23, and a plurality of flaps 27 arranged around the through hole 23 outside of the flaps 25 so as to guide a head 28 of the screw 21a, when the screw 21a is inserted in the through hole 23.

[0053] Particularly, the flaps 25 are arranged along a circular profile 29 at an edge (not visible in the attached figures) of the through hole 23 spaced from one another so that between adjacent flaps 25 a series of slits 30 are defined. The flaps 27 are arranged at these slits 30 so as to allow the flaps 25 to be bent outward of the through hole 23 when the screw 21a is inserted in the through hole 23 and the head 28 of the screw 21a contacts the first flaps 25 of (as illustrated by the arrows shown in figure 9A-9B).

[0054] The circular profile 29 along which the flaps 25 are arranged has, indeed, a diameter approximately equal (with clearance) to the external diameter of the stem 26 of the screw 21a so as to envelop the stem 26 while the screw 21a is inserted inside the through hole 23 and to guide the screw 21a during its advancement. Advantageously, it is ensured that the screw 21a is correctly inserted in the door 4 of the furniture 5. In this way, the risk of an incorrect placement of the guide profile 11 because of an incorrect insertion of one or more screws 21a in the door 4 of the furniture 5, which would compromise the correct connection between door 2 of the refrigerator 3 and door 4 of the furniture 5, is minimized.

[0055] The flaps 27 are arranged along a further circular profile 31 which is concentric with the circular profile 29 and has a diameter greater than that of the circular profile 29. In detail, the diameter of the circular profile 31 is approximately equal (with clearance) to the outer diameter of the head 28 of the screw 21a so as to envelop the head 28, when the screw 21a is inserted inside the through hole 23 (thus inside the tubular invitation element 24, if present) so as to guide the screw 21a during its advancement and to guarantee (together with the first flaps 25) the correct placement of the screw 21a and therefore of the guide profile 11.

[0056] In accordance with a further embodiment illustrated in figures from 2 to 9, the tubular invitation element 24 comprises only a plurality of flaps 27 arranged around the through hole 23, preferably spaced from each other, along a circular profile 31 having a diameter approximately equal (with clearance) to the outer diameter of the head 28 of the screw 21a so as to guide the head 28 of the screw 21a, and thus the screw 21a, when the screw 21a is inserted in the through hole 23 so as to ensure the correct placement of the screw 21a and then the guide profile 11.

[0057] According to the non-limiting embodiment illustrated in figures from 2 to 12, the guide profile 11 further comprises a cover 32 hinged to the guide profile 11 at the edge 19 of this guide profile 11 and designed to cover the through holes 22 provided on the guide profile 11 and the screws 21a inserted in said through holes 22. According to this embodiment, the reference plate 16 comprises a through opening 33 designed to receive the hinged cover 32 so as to allow passage through the mounting tool 1 of the cover 32, when the cover 32 is in the open configuration (i.e. is angularly arranged with respect to the guide profile 11 so as to leave exposed the through holes 22 provided on the guide profile 11) and the at least one portion of the guide profile 11 is housed in the seat 18 in the predetermined position. Advantageously, the cover 32 allows to cover the screws 21a and the through holes 22, after having fixed the guide profile 11 to the door 4 of the furniture 5 and after having uncoupled the mounting tool 1 from the guide profile 11

and from the sled 12.

[0058] According to a further not shown embodiment of the invention, the fixing device 21 consists of (comprises) an adhesive fixing element which has two parallel and opposite adhesive surfaces, one typically glued from the beginning to the guide profile 11 and the other intended to be glued to the door 4 of the furniture 5, and a removable protective film to initially cover the adhesive surface intended to be fixed to the door 4 of the furniture 5. In this case, when the mounting tool 1 is coupled to the guide profile 11 (i.e. when the seat 18 houses the at least a portion of the guide profile 11 in the above-described predetermined position) and is placed so as to define the fixing position of the guide profile 11 (as explained above), the guide profile 11 can be fixed to the door 4 of the furniture 5 by removing the protective film, for example by means of a graspable removal flap arranged to protrude outwardly from the guide profile 11.

[0059] According to a further not shown embodiment of the invention the fixing device 21 could consist of (or comprise) one or more rivets intended to be inserted in respective through holes opportunely made on the guide profile 11 so as to fix the guide profile 11 to the door 4 of the furniture 5 in the above mentioned fixing position. In this case the main body 15 of the mounting tool 1 could comprise a series of references designed to indicate, when the mounting tool 1 is coupled to the guide profile 11 in the predetermined position, the position at which said one or more through holes must be made. For example, according to a not shown variant of this embodiment, the main body 15 could comprise a series of through openings (optionally each provided with an invitation element similar to the tubular invitations 24 described above) configured to leave exposed the area of the guide profile 11 at which the aforementioned through holes must be made.

[0060] With reference to the coupling of the mounting tool 1 to the sled 12, in the preferred embodiments shown in the attached figures (see for example figures 5 and 8) the mounting tool 1 comprises a snap-on fixing system 34 for establishing a connection between the coupling plate 14 and the sled 12.

[0061] In detail, according to the preferred embodiment illustrated in the attached figures, the coupling plate 14 has an edge 35 which is arranged perpendicularly to the coupling plate 14 on the side opposite the main body 15, protrudes from the coupling plate 14 and it is designed to embrace the sled 12 when the coupling plate 14 is coupled to the sled 12. Preferably but not necessarily, the edge 35 extends on three sides of the coupling plate 14 leaving free the side facing the door 4 of the furniture 5.

[0062] The snap-on fixing system 34 preferably comprises two recesses 36 (shown in particular in figures 2, 7, 10 and 11) formed on two edges 37 of the sled 12, preferably parallel to each other, and preferably oriented along the thickness of the door 2, when the sled 12 is fixed to the door 2, and two teeth 38 (shown in particular in figures 2, 5, 6, 7, 8, 9 and 10) which are provided on / borne by the coupling plate 14 and are shaped to insert into the two recesses 36 of the sled 12, when the mounting tool 1 is coupled to the sled 12.

[0063] With particular reference to figures from 3 to 12, a method of connecting the door 2 of the built-in refrigerator 3 to the door 4 of the furniture 5 is described. This connection method can be implemented using the connection system 10 described above, and in particular using the mounting tool 1 described above.

[0064] In detail, to correctly connect the door 2 of the built-in refrigerator 3 to the door 4 of the furniture 5, the installer, after having placed within and appropriately fixed the built-in refrigerator 3 inside the furniture 5, couples the mounting tool 1 to the guide profile 11, as shown in figure 3, 5, 6. Subsequently, after having fixed (with known methods) the sled 12 to the edge 13 of the door 2 of the built-in refrigerator 3, the installer connects the guide profile 11 to the sled 12, for example, by inserting a protruding portion 39 of the guide profile 11 (i.e. a portion 39 of the guide profile 11 which protrudes with respect to the mounting tool 1, when the at least one portion of the guide profile 11 is housed in the seat 1) inside the "C" section of the sled 12, so as to make slide the guide profile 11 with respect to the sled 12 until the coupling plate 14 abuts against the sled 12 so as to realize the aforementioned sliding coupling between the guide profile 11 and the sled 12 and the coupling of the mounting tool 1 to the sled 12.

[0065] Subsequently, by opportunely rotating the door 2 of the built-in refrigerator 3 and the door 4 of the furniture 5, the installer places the mounting tool 1 (coupled with the sled 12 and with the guide profile 11) on an inner surface 40 of the door 4 of the furniture 5 in a position such that the reference plate 16 abuts against the outer edge 17 of the door 4 of the furniture 5, as shown in figure 8, so as to define the above-described fixing position and immediately afterwards the installer fixes the guide profile 11 to the door 4 of the furniture 5, preferably by screwing the screws 21a, as described above and shown in figure 9. Finally, the installer decouples the mounting tool 1 from the guide profile 11 and from the sled 12, as shown in figure 10, by pulling the mounting tool 1 and/or by sliding the mounting tool 1 along the guide profile 11 away from the sled 12.

[0066] When the guide profile 11 has a cover 32, as described above, the installer preferably, after having removed the mounting tool 1, closes the cover 32 to cover the fixing screws 21a.

[0067] According to a further embodiment of the method of the invention the installer, after having placed within and opportunely fixed the built-in refrigerator 3 inside the furniture 5, couples the mounting tool 1 to both the guide profile 11 and the sled 12, then he places the sled 12 (coupled with the mounting tool 1) in contact with the outer edge 13 of the door 2 of the built-in refrigerator 3 and, keeping in position the sled 12, places the mounting tool 1 (coupled with the sled 12 and with the guide profile 11) to the inner surface 40 of the door 4 of the furniture

5 and rotates the door 2 of the built-in refrigerator 3 and the door 4 of the furniture 5 so that the reference plate 16 abuts against the outer edge 17 of the door 4 of the furniture 5 so as to define the fixing position of the guide profile 11, as described above, then he fixes the guide profile 11 to the door 4 of the furniture 5 and the sled 12 to the outer edge 13 of the door 2 of the built-in refrigerator 3.

[0068] According to a non-limitative embodiment of the method of the invention, the sled 12 can be fixed to the edge 13 of the door 2 of the built-in refrigerator 3 by means of a screw 41 (as shown in figures 2, 7, 10, 11 and 12). In this case, according a non-limitative and not shown embodiment of the invention, the reference plate 16 could be provided with a further through hole, similar to the through holes 23, and designed to receive the screw 41 so as to fix the sled 12 to the outer edge 13 of the door 2 of the built-in refrigerator 3, once the fixing position of the guide profile 11 has been defined.

[0069] The mounting tool 1, and the connection method and connection system 10 described above have numerous advantages.

[0070] Firstly, the mounting tool 1 described above allows the connection of the door 2 of the built- in refrigerator 3 to the door 4 of the furniture 5 in a quickly and easy manner. Indeed, thanks to the use of the mounting tool 1 the identification of the fixing position of the guide profile 11 can be carry out simply coupling the mounting tool 1 to the sled 12 and to the guide profile 11 and then opportunely rotating the door 2 and the door 4 until the reference plate 16 abuts against at least part of the edge 17 of the door 4 of the furniture 5, without carrying out several measurements as in the prior art. This allows, at the same time, to reduce the risk of error during the installation of the connection system 10.

[0071] Advantageously, the connection method described above can be easily performed even by an unskilled user.

[0072] Moreover, the mounting tool 1 is easy and inexpensive to manufacture and can be used several times, for different mounting operations.

LIST OF REFERENCE NUMBERS OF FIGURES

[0073]

1	mounting tool
2	door
3	refrigerator / appliance
4	door
5	furniture
6	wall
7	wall
8	wall
9	wall
10	connection system
11	guide profile
12	sled
13	edge
14	coupling plate
15	main body
16	reference plate
17	edge
18	seat
19	edge
20	edge
21	fixing device
22	through holes
23	through holes
24	tubular invitation element
25	flaps
26	stem
27	flaps
28	head
29	circular profile
30	slit
31	circular profile
32	cover
33	through opening
34	fixing system
35	edge
36	recesses
37	edges
38	teeth
39	protruding portion
40	inner surface
41	screw
15a	inner end
15b	outer end
18a	closed end
18b	open end
21a	screw
X	rotation axis

Claims

1. A mounting tool (1) for a connection system (10) of a door (2) of a built-in domestic appliance (3) to a door (4) of a furniture (5) that contains the built-in domestic appliance (3); the connection system (10) comprises: a guide profile (11) which is designed to be fixed to the door (4) of the furniture (5) oriented orthogonally to a rotation axis (X) of the door (4); and a sled (12) which is designed to be fixed to an outer edge (13) of the door (2) of the built-in domestic appliance (3) and to slidably couple to the guide profile (11); the mounting tool (1) is configured to removably couple to the sled (12) and to the guide profile (11) and it comprises:

a main body (15), which is provided with a seat (18) designed to house at least a portion of the guide profile (11) in a predetermined position and to allow the fixing of the guide profile (11) to the door (4) of the furniture (5) when the at

least a portion of the guide profile (11) is housed in the seat (18);
a coupling plate (14) which is designed to couple to the sled (12), is angularly placed with respect to the main body (15), and is arranged at a first end (15a) of the main body (15); and
a reference plate (16) which is angularly placed with respect to the main body (15), is arranged at a second end (15b) of the main body (15) opposite to the first end (15a), and is designed to abut against an outer edge (17) of the door (4) of the furniture (5), when the coupling plate (14) is coupled to the sled (12), the sled (12) is at least properly positioned on the outer edge (13) of the door (2) of the built-in domestic appliance (3) and the main body (15) is coupled to the guide profile (11), so as to define a fixing position of the guide profile (11) to the door (4) of the furniture (5).

2. The mounting tool (1) according to claim 1, wherein the main body (15) is designed to allow, when the at least a portion of the guide profile (11) is housed in the seat (18), the installation of a fixing device (21) suitable to fix the guide profile (11) to the door (4) of the furniture (5).

3. The mounting tool (1) according to claim 2, wherein:

the fixing device (21) comprises at least a screw (21a) ;
the guide profile (11) comprises at least a first through hole (22) designed to receive the screw (21a); and
the main body (15) comprises at least a second through hole (23) arranged so as to be aligned with the first through hole (22) when the at least a portion of the guide profile (11) is housed in the seat (18) on the predetermined position.

4. The mounting tool (1) according to claim 3, wherein the main body (15) comprises a tubular invitation element (24) which protrudes from the main body (15) and is arranged around the second through hole (23).

5. The mounting tool (1) according to any one of claims from 1 to 4, wherein the reference plate (16) extends orthogonally to the main body (15) on the opposite side with respect to the coupling plate (14), giving to the mounting tool (1) a "Z" shape.

6. The mounting tool (1) according to any one of claims from 1 to 5, wherein the coupling plate (14) has an edge (35) which is arranged perpendicularly to the coupling plate (14), protrudes from the coupling plate (14) from the side opposite to the main body (15), and is designed to embrace the sled (12) when the coupling plate (14) is coupled to the sled (12).

7. The mounting tool (1) according to any one of claims from 1 to 6, comprising a snap-on fixing system (34) for establishing a connection between the coupling plate (14) and the sled (12).

8. The mounting tool (1) according to any one of claims from 1 to 7, wherein the seat (18) of the main body (15) has an open end (18b) through which the at least a portion of the guide profile (11) can be slidably inserted into said seat (18), and has a closed end (18a) against which an edge (19) of the guide profile (11) abuts, on the predetermined position.

9. The mounting tool (1) according to any one of claims from 1 to 8, wherein the reference plate (16) comprises an edge (20) which is arranged perpendicularly to the reference plate (16), protrudes from the reference plate (16) from the same side of the main body (15), and is designed to embrace at least partially the door (4) of the furniture (5).

10. The mounting tool (1) according to any one of claims from 1 to 9, wherein the reference plate (16) comprises a through opening (33) designed to receive a hinged cover (32) of the guide profile (11), when the at least a portion of the guide profile (11) is housed in the seat (18).

11. Connection system (10) of a door (2) of a built-in domestic appliance (3) to a door (4) of a furniture (5) that contains the built-in domestic appliance (3); the connection system (10) comprises:

a guide profile (11) which is intended to be fixed to the door (4) of the furniture (5), oriented orthogonally to a rotation axis (X) of the door (4), by means of at least a fixing device (21); and
a sled (12) which is intended to be fixed to an outer edge (13) of the door (2) of the built-in domestic appliance (3) and is shaped to slidably couple to the guide profile (11) so that, when the guide profile (11) is fixed to the door (4) of the furniture (5) and the sled (12) is fixed to the outer edge (13) of the door (2) of the built-in domestic appliance (3) and is coupled to the guide profile (11), the sliding of the sled (12) along the guide profile (11) induces the opening of the door (2) of the built-in domestic appliance (3) following the opening of the door (4) of the furniture (5);
the connection system (10) **is characterized in that** it comprises the mounting tool (1) according to any one of the claims from 1 to 10.

12. Connection method of a door (2) of a built-in domestic appliance (3) to a door (4) of a furniture (5) using the mounting tool (1) according to any one of the

claims from 1 to 10; the connection method comprises the steps of:

coupling the mounting tool (1) to the guide profile (11) ;
coupling the mounting tool (1) to the sled (12);
coupling the guide profile (11) to the sled (12);
by appropriately rotating the door (2) of the built-in domestic appliance (3) and the door (4) of the furniture (5), resting the mounting tool (1) coupled with the sled (12) and the guide profile (11) to an internal surface (40) of the door (4) of the furniture (5) in a position such that the reference plate (16) abuts against the outer edge (17) of the door (4) of the furniture (5) and the sled (12) is in contact with the outer edge (13) of the door (2) of the built-in domestic appliance (3);
fixing the sled (12) to the outer edge (13) of the door (2) of the built-in domestic appliance (3);
fixing the guide profile (11) to the door (4) of the furniture (5) by at the least a fixing device (21); and
uncoupling the mounting tool (1) from the guide profile (11) and the sled (12), after fixing the sled (12) to the outer edge (13) of the door (2) of the built-in domestic appliance (3) and the guide profile (11) to the door (4) of the furniture (5).

13. Connection method according to claim 12, wherein the sled (12) is fixed to the outer edge (13) of the door (2) of the built-in domestic appliance (3) before coupling the sled (12) to the mounting tool (1).

14. Connection method according to claim 12 or 13, wherein the guide profile (11) is coupled to the sled (12) after coupling the mounting tool (1) to the guide profile (11).

15. Connection method according to claim 12 or 13 or 14 when depending to claim 10, wherein the step of coupling the mounting tool (1) to the guide profile (11) involves inserting the hinged cover (32) of the guide profile (11) in the through opening (33) formed in the reference plate (16) of the mounting tool (1).

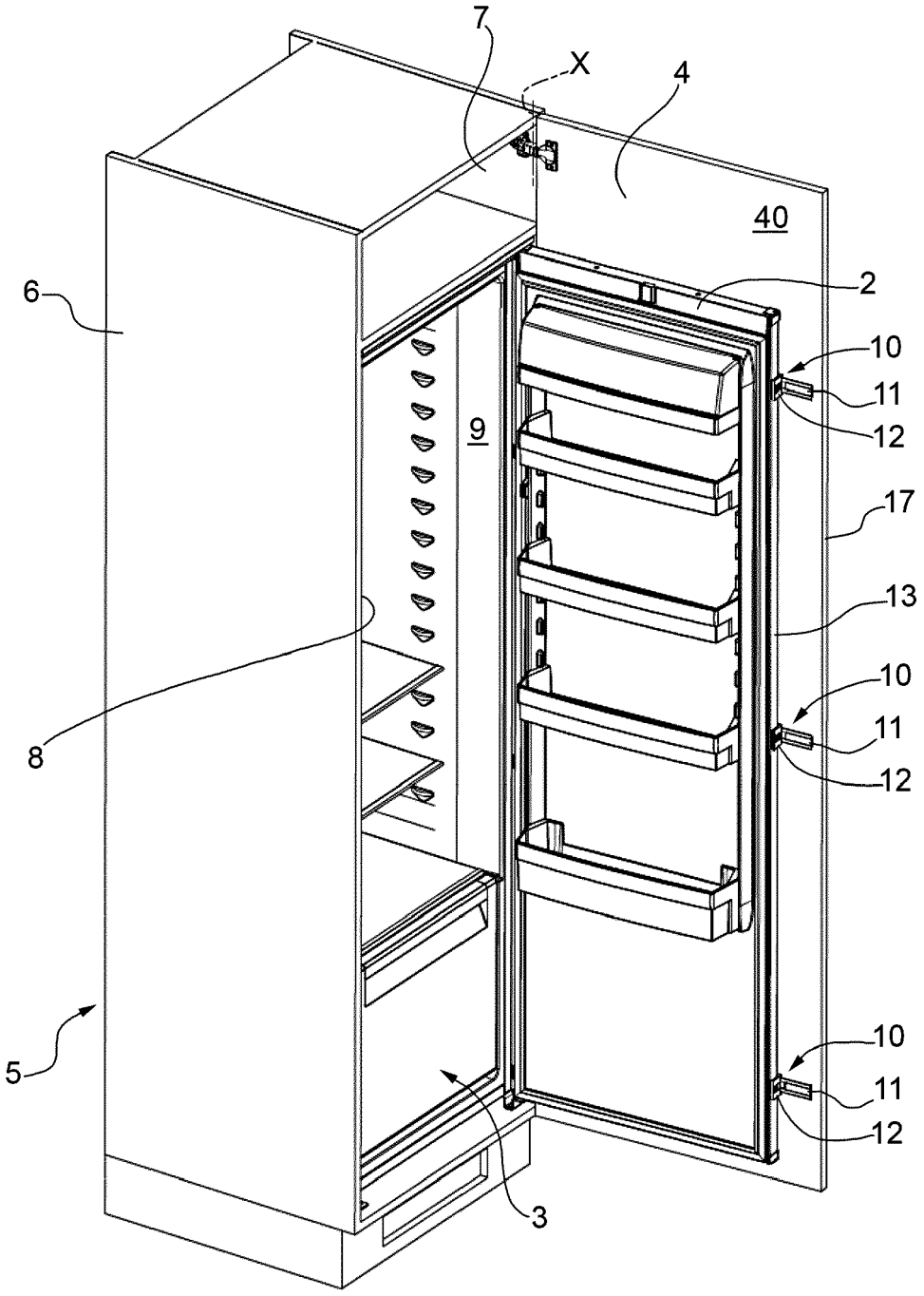


FIG.1

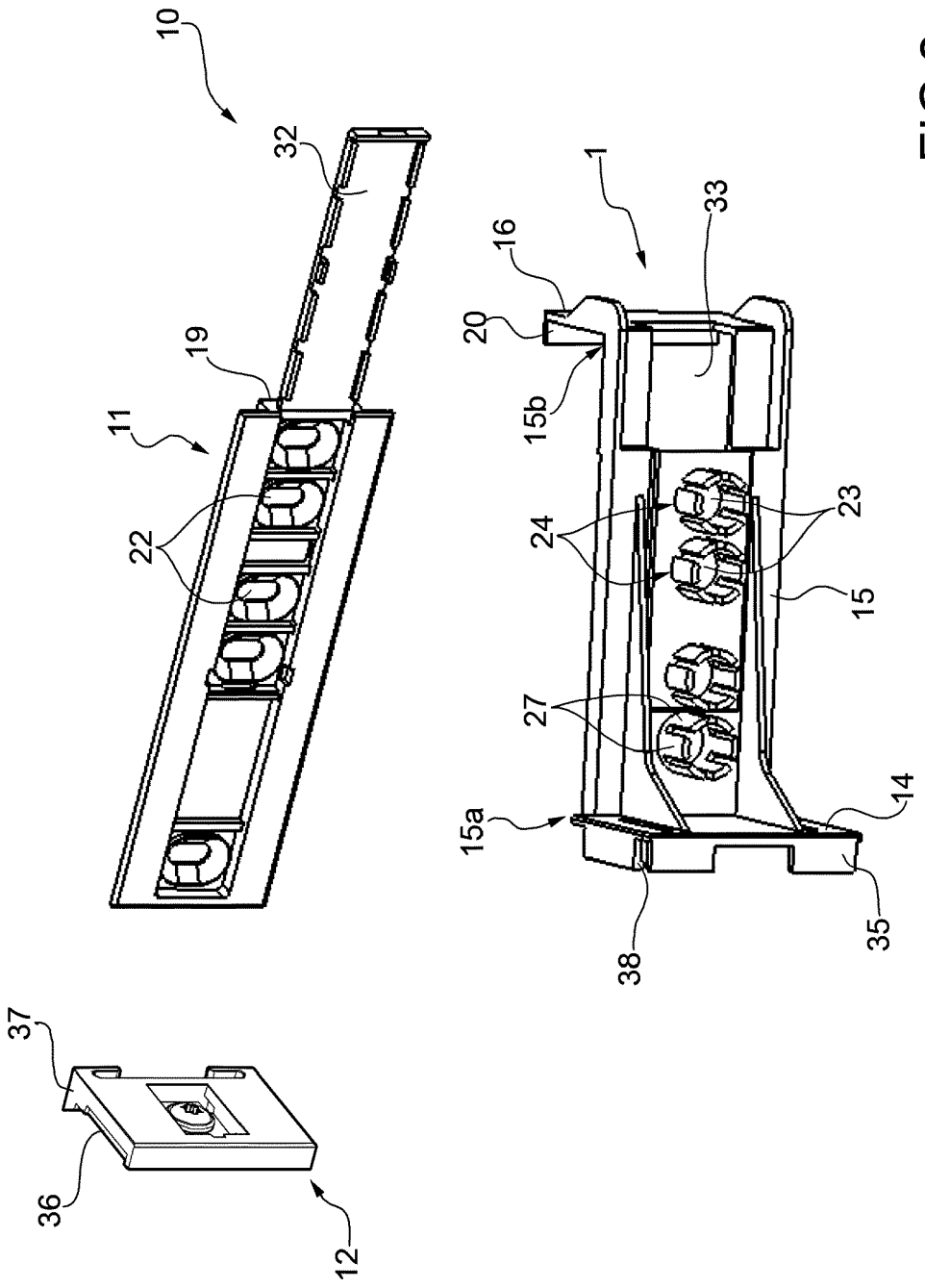


FIG.2

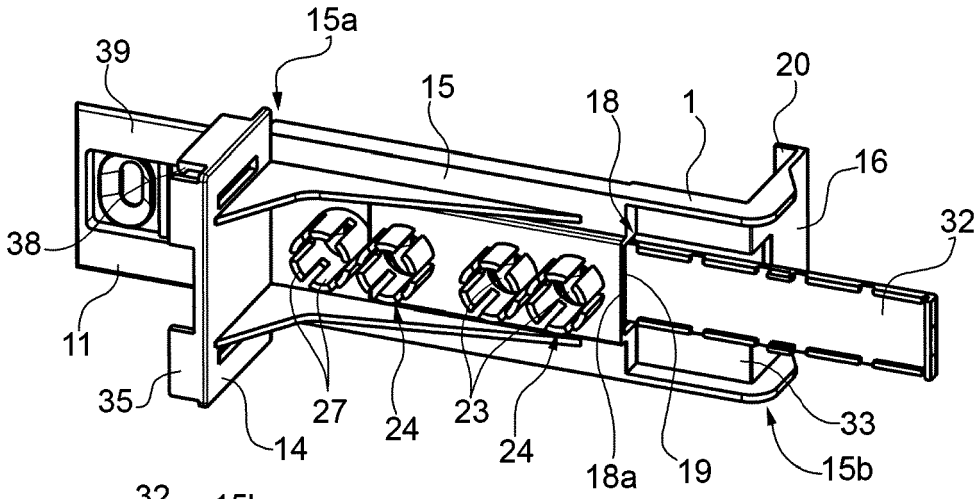


FIG.3

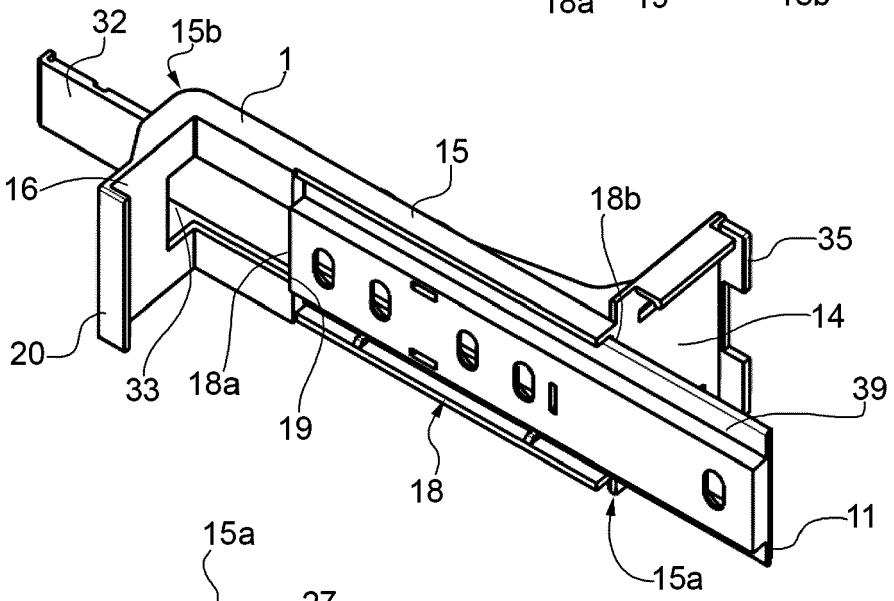


FIG.4

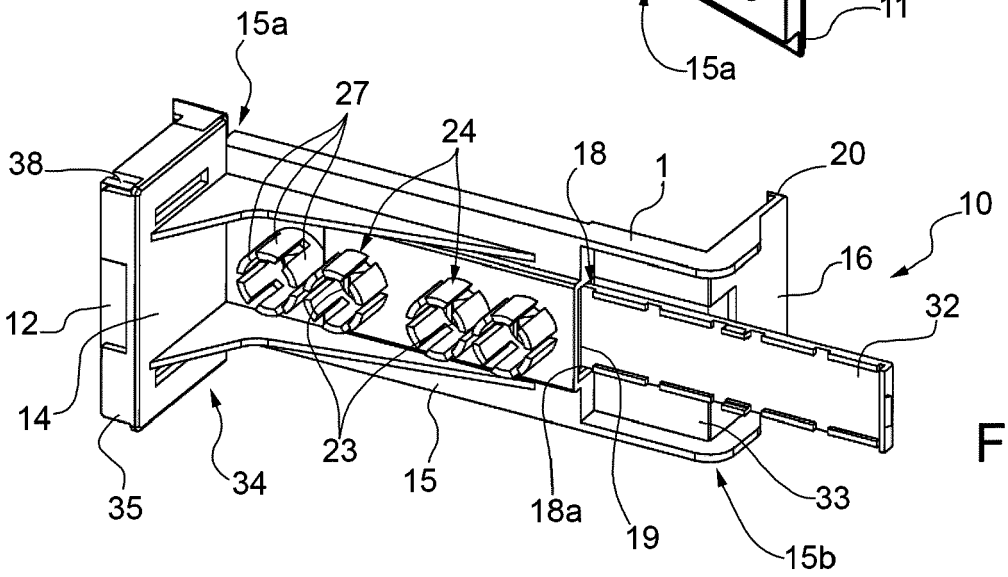


FIG.5

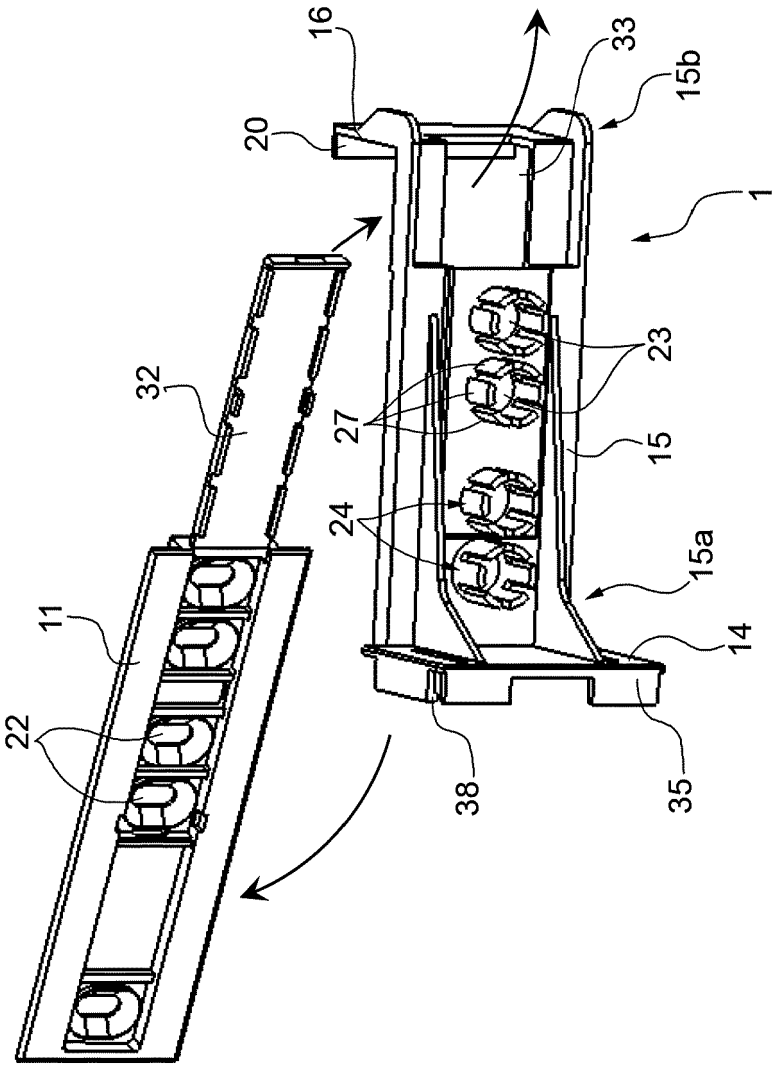


FIG.6

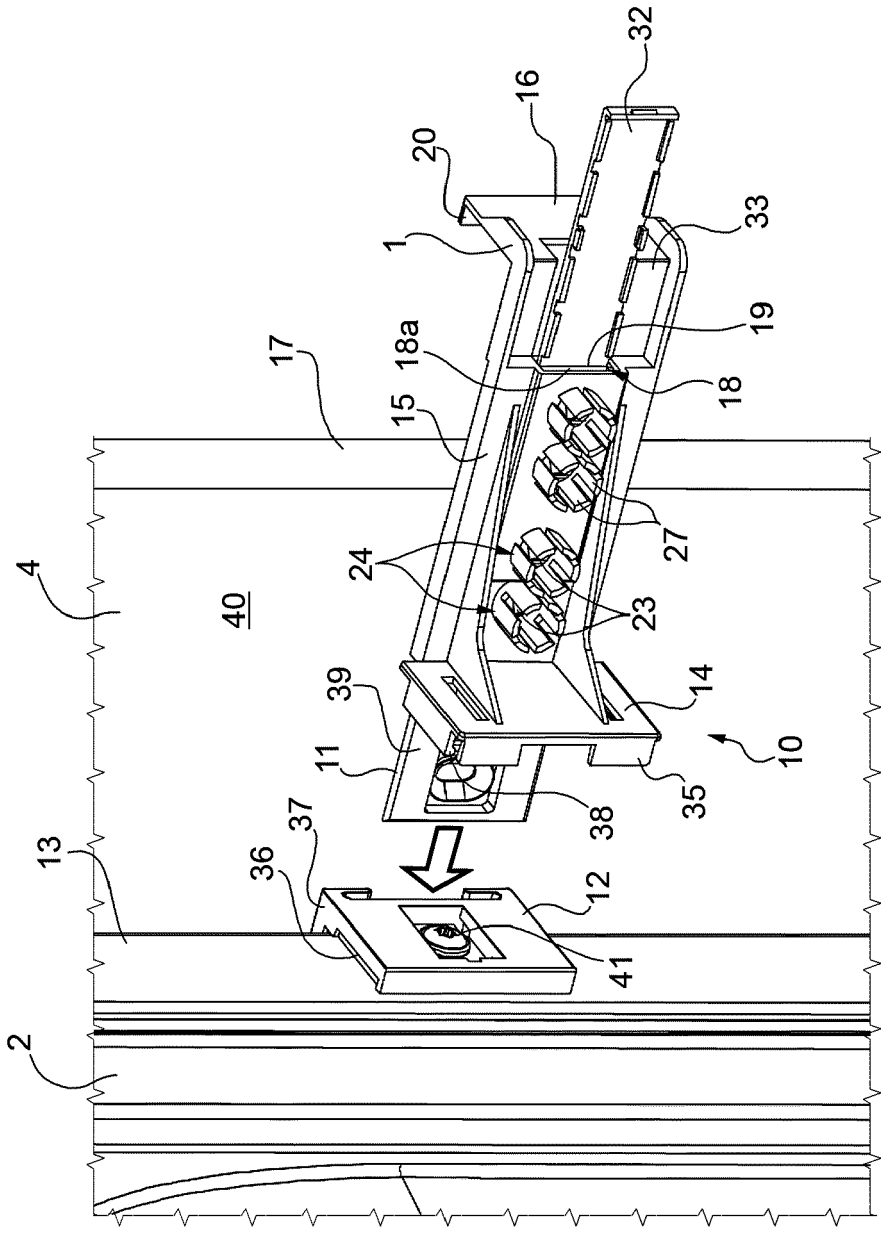

32
16
20
1
33
19
18a
18
17
15
27
24
23
4
40
39
14
11
10
35
38
37
13
36
12
41
2

FIG.7

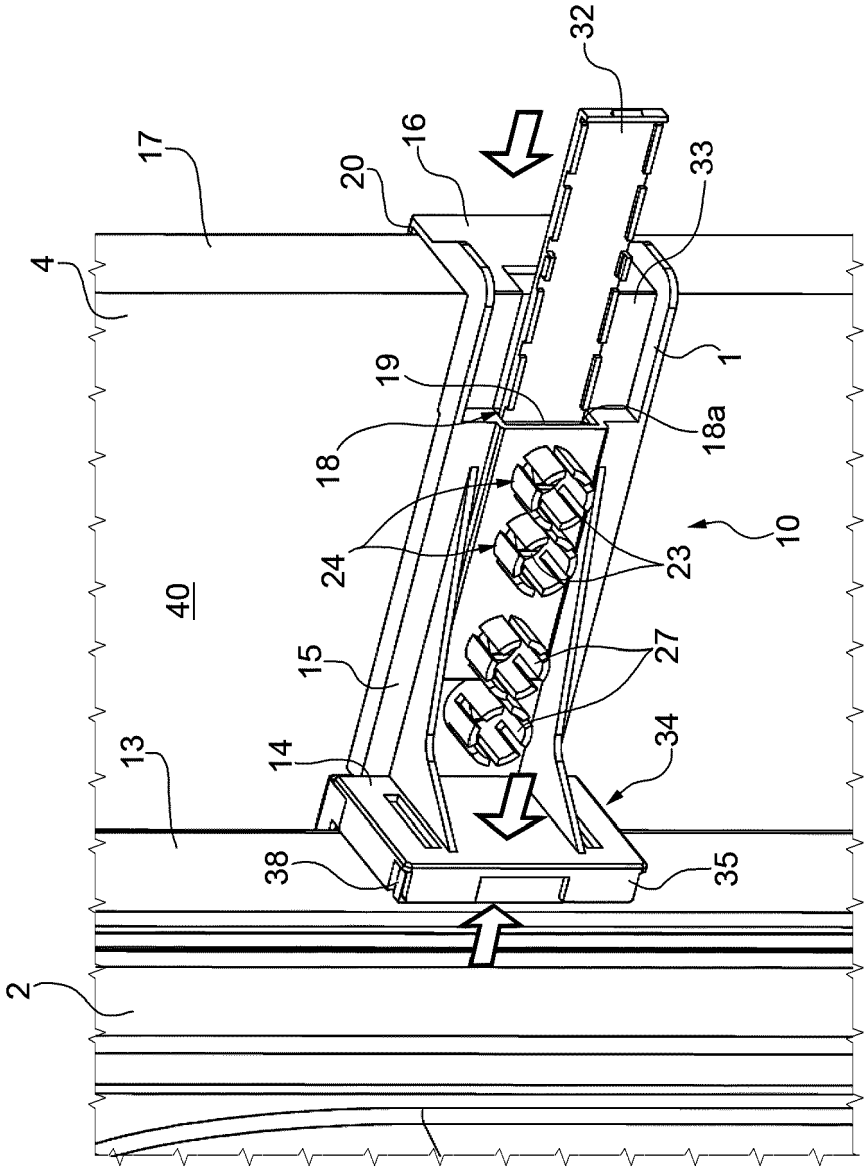


FIG.8

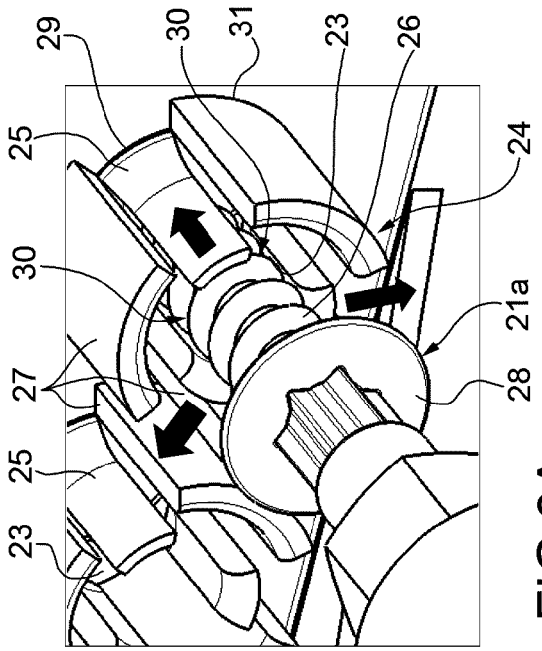


FIG.9A

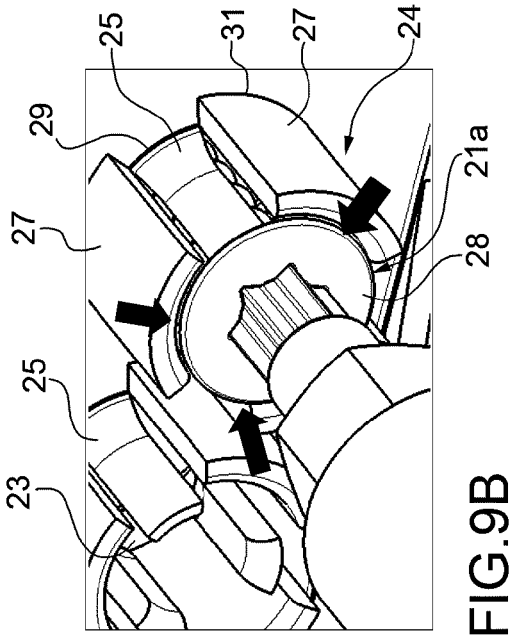


FIG.9B

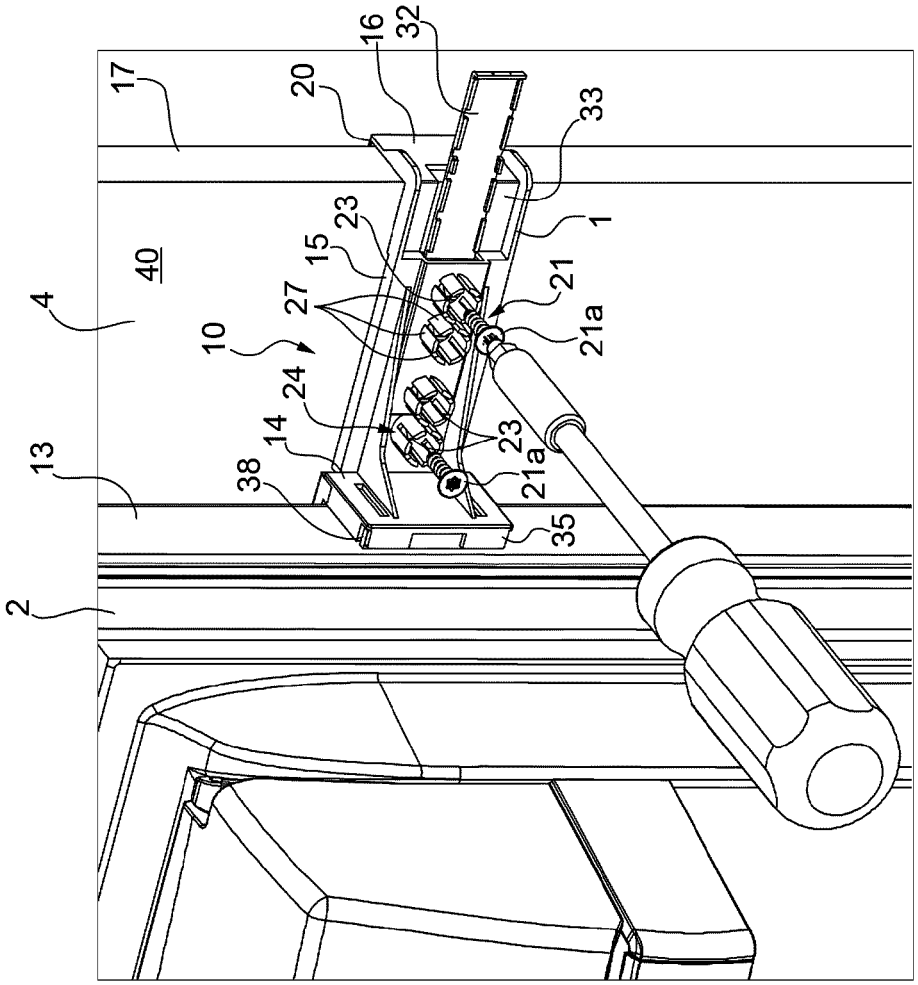


FIG.9

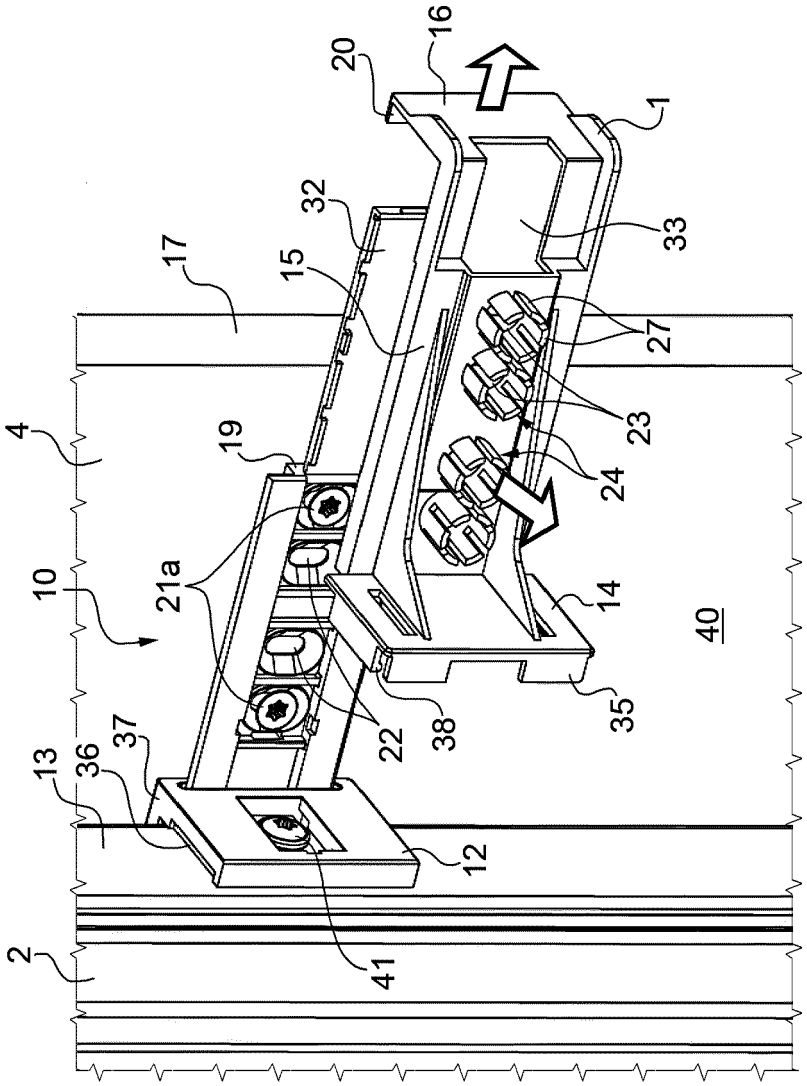


FIG.10

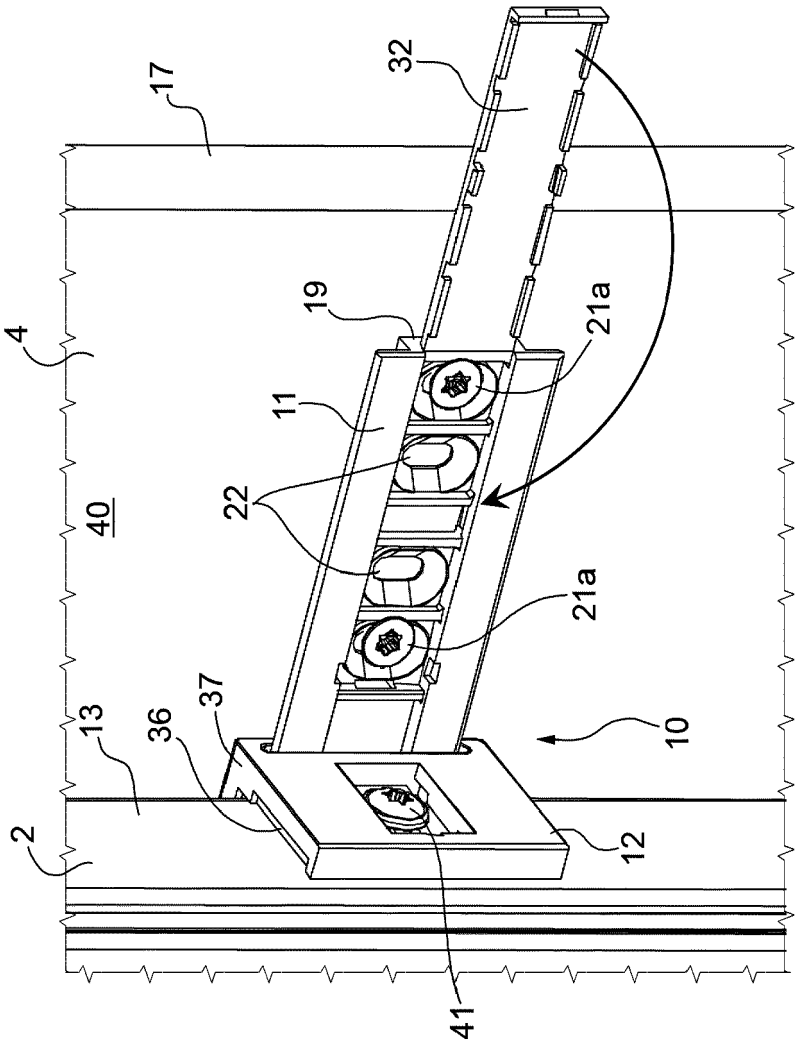
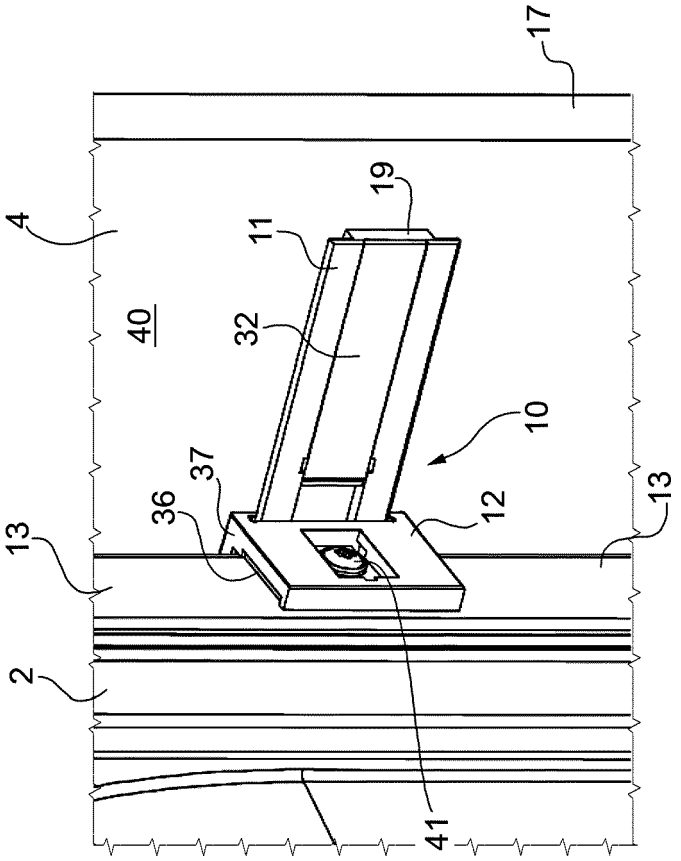


FIG.11

FIG.12



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 19 19 5603

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 3 032 022 A1 (BSH HAUSGERÄTE GMBH [DE]) 15 June 2016 (2016-06-15) * abstract; figures 1,3,4,6 * -----	1-15	INV. F25D23/10 A47F3/04
A	EP 0 857 929 A1 (BOSCH SIEMENS HAUSGERAETE [DE]) 12 August 1998 (1998-08-12) * abstract; figures 1-3 * -----	1-15	ADD. F25D23/02 E05B17/06 E05D11/00 E05F17/00

TECHNICAL FIELDS SEARCHED (IPC)

F25D
E05G
E05C
A47F
E05B
E05D
E05F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 February 2020	Bidet, Sébastien

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 19 5603

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-02-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3032022 A1	15-06-2016	CN 205795320 U	14-12-2016
		DE 102014225088 A1	09-06-2016
		EP 3032022 A1	15-06-2016
EP 0857929 A1	12-08-1998	DE 19704698 A1	13-08-1998
		EP 0857929 A1	12-08-1998
		ES 2176823 T3	01-12-2002
		SI 0857929 T1	31-08-2002
		TR 199800180 A2	21-08-1998

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82