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(54) **HANDLE FOR A SLIDING DOOR AND METHOD FOR MOUNTING SAID HANDLE**

(57) Handle (100) for a sliding door comprising a rotatable knob (10) provided with an outer portion (11), defining frontally a manual gripping region for a user, and an inner portion (12). The handle (100) further comprises a pawl (20) provided with an outer portion (21), an inner portion (22) telescopically couplable with the inner portion (12) of the knob (10). The handle (100) further comprises, for each of said knob (10) and pawl (20), a washer (30) that is applicable stably to a hole made in the sliding door (P) and provided with a central opening, by which the washer (30) is fitted to the knob (10) or to the pawl (20). At least between one of the washers (30) and the respective knob (10) or pawl (20) a connecting ring (40) is interposed that is fitted stably to a receiving portion (14, 24) of the knob (10) or of the pawl (20) and provided with an annular recess (41) within which a circular edge (30a) is housed stably, defining the central hole of the washer (30).

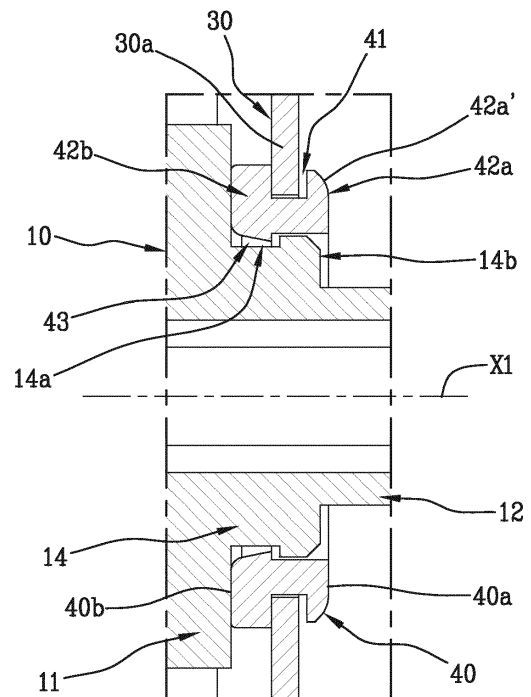


Fig.3A

Description

TECHNICAL FIELD

[0001] The present invention relates to a handle for a sliding door that is widely used in the field of windows and doors.

[0002] A method for mounting a handle for a sliding door is also an object of the present invention.

[0003] The term sliding door means a door whose leaf is movable slidingly along an opening and closing direction.

PRIOR ART

[0004] To date, handles are known which are provided with a rotatable knob comprising an outer portion that can be gripped by a user and an inner portion extending along an axis of rotation of the knob. The known handles are also provided with a pawl, also comprising an outer portion and an inner portion extending along a central axis of the pawl itself.

[0005] The inner portion of the pawl and the inner portion of the knob are telescopically couplable, so that the outer portions of the knob and of the pawl can be arranged and abut on opposite sides of the sliding door.

[0006] For example, the inner portion (so-called "male") of the knob is configured to fit into the inner portion (so-called "female") of the pawl and to slide into it in order to cause an appropriate distancing or reciprocal approach of the knob with the pawl, in order to adapt the handle to the thickness of the door on which it is mounted.

[0007] As can be seen in figure 1, the known handles comprise a pair of washers each installable near a respective end of a through hole made in the sliding door. Each washer is inserted into a housing made on the surface of the door and is provided with a central opening through which the washer is fitted on the knob or pawl. To secure the knob or the pawl stably within the hole of the washer, the known handles comprise a seeger ring (or other elastic metal ring) and a washer both fitted on a receiving portion of the pawl and of the knob.

[0008] In more detail, as shown in figure 1A, the washer 300 wraps the pawl 301 or the knob 302 and is interposed between a seeger ring 303, positioned within a circumferential groove suitably obtained on the receiving portion of the knob or the pawl, and a washer 304 in mechanical abutment with the outer portion of the knob or of the pawl. In this situation, the knob or the pawl is axially constrained thanks to the shoulders and undercuts provided by the seeger ring and by the washer in the receiving portion.

[0009] The known handles can be supplied with knob and pawl already mounted on the washer or even in a disassembled condition; in this case, an operator must take care of properly installing the washer and the seeger ring-with respect to the washer to accommodate the knob or the pawl that will be, at the end of the installation, flush with a respective surface of the door.

[0010] Once the knob and the pawl have been axially constrained, it is possible, by means of the telescopic coupling between the respective portions of the knob and of the pawl, to adapt the handle to the thickness of the sliding door on which it is mounted. In particular, if the sliding door has a considerable thickness, the knob and the pawl are mutually distanced by extracting the inner portion of the knob from that of the pawl. On the contrary, if the door has a lesser thickness, the knob and the pawl are mutually approached by further inserting the inner portion of the knob inside that of the pawl.

[0011] The maximum thickness of the leaf on which the handle can be mounted is therefore defined by the maximum pull-out of the inner portion of the knob with respect to the inner portion of the pawl, i.e. by the maximum possible length of the telescopic coupling. On the contrary, the minimum thickness of the leaf on which the handle can be mounted is instead defined by the total insertion of the inner portion of the knob inside that of the pawl. As a rule, the known handles can be installed on leaves with a thickness varying between 48 mm and 38 mm.

[0012] To date, however, there is an increasing demand for sliding doors with very thin leaves, in particular with thicknesses less than 38 mm.

[0013] In this situation, to reduce the encumbrance of the handle, it is no longer possible to exploit the telescopicity of the pawl and of the knob by further inserting the inner portion of the knob inside that of the pawl.

[0014] To overcome this problem and to adapt the known handles to doors with thicknesses less than 38 mm, a shim must be inserted between the washer and a respective side surface of the door. In other words, the shim is configured to compensate for the impossibility of further inserting the inner portion of the knob inside that of the pawl.

[0015] In this situation, however, the washers are protruding with respect to the door surfaces, making the handle aesthetically unpleasant to the eye.

[0016] In addition, the insertion of a shim makes the handle expensive and more complex to assemble during mounting on the door.

[0017] Alternatively to inserting a shim, the washer can be lowered, i.e. its encumbrance along an axis of rotation of the handle is reduced, so that the washer can be fully inserted into the housing made on the surface of the door.

[0018] Disadvantageously, in this situation, the washers are flush with the respective side surfaces of the door, but the knob and the pawl are protruding with respect to the washers themselves, as they cannot be reduced in terms of overall dimensions. The known handles are thus made aesthetically unpleasant and are such that they offer a poor manual grip by a user since, having lowered the washer, the portion within which a user can insert the fingers to move the door is reduced.

SUMMARY

[0019] The technical task of the present invention is to provide a handle for a sliding door and a relative mounting method that are able to overcome the drawbacks arising from the prior art.

[0020] The object of the present invention is therefore to provide a handle that is adaptable to be mounted flush with surfaces of sliding doors of different thickness, in particular also of doors having a thickness of less than 38 mm.

[0021] A further object of the present invention is to provide a handle that is simpler to mount and less expensive.

[0022] A further object of the present invention is to provide a method for mounting a handle in a simple and fast manner.

[0023] The technical task set and the objects specified are substantially attained by a handle for a sliding door and a method for mounting a handle for a sliding door comprising the technical characteristics as set out in one or more of the accompanying claims. The dependent claims correspond to possible embodiments of the invention.

[0024] In particular, the invention relates to a handle for sliding door comprising a rotatable knob having an outer portion with a greater diameter defining frontally a manual gripping region for a user, and an inner portion with a lesser diameter extending along an axis of rotation of the knob. The handle further comprises a pawl comprising an outer portion with a greater diameter and an inner portion with a lesser diameter extending along a central axis of the pawl. The inner portion of the pawl and the inner portion of the knob are telescopically couplable, so that the outer portions of the knob and of the pawl can be arranged on opposite sides of a sliding door. The handle also comprises, for the knob and the pawl, a washer that is applicable stably to a hole made in the sliding door. The washer is provided with a hole, typically central, by which the washer itself is fitted to the knob or pawl. According to one aspect of the present invention, between at least one of the washers and the respective knob or pawl a connecting ring is interposed that is fitted stably to a receiving portion of the knob or of the pawl and provided with an annular recess within which an edge is housed stably, defining the hole of the washer. Preferably, the connecting ring comprises, on an outer surface, a first and a second protrusion cooperating to bound the annular recess and to retain the edge by an undercut. Even more preferably, the connecting ring comprises an inner relief that is stably engageable within a respective recess of the corresponding receiving portion, preferably with a snap engagement. In this situation, the connecting ring stably constrains the knob or pawl to the respective washer, so that the knob or pawl is locked thereon. Advantageously, the introduction of the connecting ring makes it possible to reduce the overall dimensions of the handle, in such a way as to make it installable even on

doors with thicknesses less than 38 mm, without it protruding and being uncomfortable to the eye and not very functional. In particular, the insertion of the connecting ring allows to decrease the axial overall dimensions of the receiving portion of the knob and of the pawl (indicated in figure 1A by means of an arrow) since the seeger ring and the washer are replaced by a single body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] Further characteristics and advantages of the present invention will become more apparent from the indicative and thus non-limiting description of an embodiment of a handle for a sliding door and a relative method for mounting the handle.

[0026] Such a description will be set out below with reference to the appended drawings, which are provided solely for illustrative and therefore non-limiting purposes, in which:

- figures 1 and 1A show respectively a sectional view and a detail of a handle made in accordance with the prior art and mounted on a sliding door;
- figures 2A and 2B show sectional views of a handle according to the present invention, in two different configurations;
- figures 3A and 3B show details of the handle illustrated in figures 2A and 2B;
- figures 4A and 4B show respectively a sectional view and a top view of a component of the handle subject-matter of the present invention.

DETAILED DESCRIPTION

[0027] With reference to the accompanying figures, 100 denotes a handle for a sliding door "P" comprising a rotatable knob 10 provided with an outer portion 11 with a larger diameter, defining frontally a manual gripping region "R" for a user, and an inner portion 12 with a lesser diameter extending along an axis of rotation "X1" of the knob 10.

[0028] In accordance with an aspect of the invention, the manual gripping region "R" comprises a rib that divides the manual gripping region "R" itself into two gripping zones "Z" to allow movement of the door "P". In accordance with a further aspect, the rib of the manual gripping region "R" also allows the rotation of the knob to control the extraction and retraction of a latch (not illustrated).

[0029] The handle 100 further comprises a pawl 20 comprising an outer portion 21 with a greater diameter and an inner portion 22 with a lesser diameter extending along a central axis "X2" of the pawl 20.

[0030] The inner portion 22 of the pawl 20 and the inner portion 12 of the knob 10 are telescopically couplable so that the outer portions 11, 21 of the knob 10 and of the pawl 20 can be arranged on opposite sides of the sliding door "P", like for example shown in figures 2A and 2B.

[0031] In more detail, after the handle 100 has been mounted on the door "P", the inner portion 12 of the knob 10 is slidably movable within the inner portion 22 of the pawl 20 so as to assume, preferably continuously, a plurality of stable positions.

[0032] By sliding the inner portion 12 of the knob 10 inside the inner portion 22 of the pawl 20 it is in fact possible to move the pawl 20 and the knob 10 away or closer to each other, so as to adapt the latter to the thickness of the door "P" on which they must be installed.

[0033] In greater detail, if the door "P" has a high thickness (figure 2B), the knob 10 and the pawl 20 are mutually moved away by extraction or pulling out the inner portion 12 of the knob 10 from the inner portion 22 of the pawl 20.

[0034] On the contrary, if the door "P" has a reduced thickness (figure 2A), the knob 10 and the pawl 20 are mutually approached by inserting the inner portion 12 of the knob 10 into the inner portion 22 of the pawl 20.

[0035] Once the mutual position that the knob 10 and the pawl 20 must have for the outer portions 11, 21 to lie on the respective side surfaces of the door "P" is determined, the inner portion 12 of the knob 10 is wedged and locked within the inner portion 22 of the pawl 20.

[0036] According to one aspect of the present description, the inner portion 12 of the knob 10 is provided with a plain screw, or other connecting element, having a terminal end 12a substantially conformed as a truncated cone and configured to cooperate with the inner portion 12 of the knob to spread it apart so as to interfere with the inner portion 22 of the pawl 20 and thus block the mutual approach or distancing of the pawl 20 and of the knob 10, i.e. so as to lock the knob 10 and the pawl 20 in a predetermined mutual position. In further detail, the plain screw or other connecting element is moved relative to the inner portion 12 of the knob 10 along the direction of the axis X1, such that the terminal end 12a with truncated cone interferes with the side surfaces of the inner portion 12, pushing them in abutment against the side surface of the inner portion 22 of the pawl with which they are telescopically coupled, as previously described. The handle 100 further comprises, for the knob 10 and for the pawl 20, a washer 30 that is applicable stably to a hole made in the sliding door and provided with an opening, preferably central, by which the washer 30 is fitted to the knob 10 or pawl 20.

[0037] Preferably, each washer 30 is made of metal material, for example zamak, of steel machined by deep drawing and of turned brass.

[0038] As shown in the accompanying figures, the washer 30 has a hollow main body 30b with preferably a circular section within which the outer portion 11 of the knob 10 and the outer portion 21 of the pawl 20 can be housed. In addition, the washer 30 comprises a circumferential edge 30c configured to protrude externally from the hole made on the door "P" so as to abut with contact with the side surface of the door "P" itself.

[0039] According to a further aspect of the present description and with particular reference to figures 3A and

3B, between at least one of the washers 30 and the respective knob 10 or pawl 20 a connecting ring 40 is interposed. In the preferred embodiment, the handle 100 comprises a connecting ring 40 interposed between the knob 10 and the respective washer 30 and a further connecting ring 40 interposed between the pawl 20 and the respective washer 30.

[0040] According to a further aspect of the present description, the connecting ring 40 is stably fitted on a receiving portion 14, 24 of the knob 10 or of the pawl 20, respectively and is provided with an annular recess 41 within which a typically circular edge 30a defining the typically central hole of the washer 30 is housed stably.

[0041] As better visible in figures 3A and 3B, the receiving portion 14, 24 is comprised between the outer portion 11, 21, and the inner portion 12, 22 of the knob 10 and/or pawl 20, respectively.

[0042] Preferably, the receiving portion 14, 24 has an intermediate diameter between the diameter of the outer portion 11, 21 and the diameter of the inner portion 12, 22.

[0043] With reference to figure 4A and according to one aspect of the present description, the connecting ring 40 extends around an axis "A", preferably with axial symmetry.

[0044] The connecting ring 40 has a dimension, measured along the aforesaid axis "A", comprised between 1.5 mm and 4 mm.

[0045] As shown in figures 3A and 3B, the connecting ring 40 comprises, on an outer surface, a first and a second protrusion 42a, 42b cooperating to bound the aforesaid annular recess 41 configured to retain the edge 30a of the hole of the washer 30 by an undercut.

[0046] Preferably, the first protrusion 42a extends in proximity of a base surface 40a of the connecting ring 40, while the second protrusion 42b extends in proximity of a head surface 40b of the connecting ring 40 (figure 4A).

[0047] As shown in particular in figures 3A and 3B and according to one aspect of the present description, the first protrusion 42a is provided with a lead-in surface 42a' conformed that the connecting ring 40 is snap-fitted within the hole, for example central, of the washer 30.

[0048] In accordance with a further aspect, the lead-in surface 42a' of the first protrusion 42a is curved such that it facilitates the snap-fitting of the connecting ring 40 within the hole of the washer 30.

[0049] In more detail, as shown in figure 4A, the lead-in surface 42a' extends from the base surface 40a of the connecting ring 40 and extends laterally away therefrom towards the recess 41 so as to define an arc or a substantially concave curvature.

[0050] When the connecting ring 40 is inserted into the hole of the washer 30, the connecting ring 40 is brought closer to the hole so that the axis "A" of the connecting ring 40 is aligned with the axis of the hole of the washer 30. In particular, the connecting ring 40 is oriented so that the base surface 40a faces the hole itself. In such a situation, the first protrusion 42a is arranged in proximity

of the edge 30a of the hole of the washer 30.

[0051] Subsequently, an axial thrust is imprinted on the connecting ring 40 such as to cause a mechanical abutment between the circular edge 30a of the hole of the washer 30 and the lead-in surface 42a' of the first protrusion 42a of the connecting ring 40. In this situation, as the connecting ring 40 is pushed towards the hole of the washer 30, the lead-in surface 42a' of the first protrusion 42a slides in contact with the edge 30a of the hole of the washer 30 progressively deforming.

[0052] In particular, the pressure exerted by the edge 30a of the hole of the washer 30 on the lead-in surface 42a' of the first protrusion 42a during the insertion of the connecting ring 40 forces the first protrusion 42a to progressively bend towards the recess 41.

[0053] At the end of the sliding of the lead-in surface 42a' against the circular edge 30a, the first protrusion 42a undergoes an elastic return and the recess 41 accommodates the edge 30a of the hole. In this situation, the edge 30a of the hole of the washer 30 is trapped between the first and second protrusion 42a, 42b, inside the recess 41 by an undercut.

[0054] In accordance with a further aspect, during the insertion of the connecting ring 40 into the hole of the washer 30, the connecting ring 40 itself also undergoes a radial deformation such as to momentarily reduce its diameter in order to facilitate the snap-fitting thereof.

[0055] According to one aspect of the present description, in fact, the connecting ring 40 is elastically deformable at least in the radial direction.

[0056] Preferably, the connecting ring 40 is elastically deformable and is made, for example, of metal, metal alloy, plastics, etc.

[0057] With particular reference to figure 4B and according to a further aspect of the present description, the radial elasticity is favoured by a radial notch 44 made on the connecting ring 40 in such a way that it extends along an open line.

[0058] In such a situation, the connecting ring 40 is deformable between a deformed configuration, in which it is elastically deformed so as to vary its diameter, and a rest configuration, in which it is not subject to any deformation. In more detail, thanks to the radial notch 44, the connecting ring 40, in the deformed configuration, can be compressed elastically so as to reduce its diameter by a mutual approach of the ends of the connecting ring 40 that bound the radial notch 44 itself.

[0059] In use, therefore, during the approach of the base surface 40a of the connecting ring 40 to the hole of the washer 30, the connecting ring 40 has a diameter substantially equal to that of the hole of the washer 30. In such a situation, in order to snap-fit the connecting ring 40 into the hole of the washer 30, i.e. so that the lead-in surface 42a' of the first protrusion 42a comes into contact with the edge 30a of the hole of the washer 30 and is progressively deformed, the connecting ring 40 is brought into a deformed configuration, so as to be compressed radially by exploiting the radial notch 44.

[0060] In accordance with a further aspect, the connecting ring 40 is deformed radially until the ends that bound the radial notch 44 are substantially in mutual contact (or even overlapping) eliminating the radial notch 44 itself. Subsequently, the connecting ring 40 is snap-fitted into the hole of the washer 30 by deforming the first protrusion 42a. In this situation, the connecting ring 40 undergoes an elastic return in the radial direction such as to move, at least partially, the ends that bound the radial notch 44 away and such as to imprint on the edge 30a of the hole a radial thrust capable of stably constraining the connecting ring 40, and in particular the recess 41, to the edge 30a of the hole.

[0061] As shown in figures 3A and 3B, following insertion, the connecting ring 40 is firmly wedged within the hole of the washer 30, so that the recess 41 accommodates the circular edge 30a of the hole and retains it by an undercut given by the first and second protrusions 42a, 42b. In this situation, the connecting ring 40, thanks to its elastic properties, would tend to return to the rest configuration but, being wedged within the hole of the washer 30, this is impossible and it is thus constrained by pressure within the hole of the washer 30.

[0062] In use, once the connecting ring 40 is inserted into the hole of the washer 30, the knob 10 and the pawl 20 are in turn inserted into the hole of the washer 30 itself so that the connecting ring 40 is interposed between the washer 30 and the knob 10 or the pawl 20, respectively.

[0063] With particular reference to figures 3A and 3B, to stably constrain the knob 10 and the pawl 20 to the respective connecting ring, each connecting ring 40 comprises an inner relief 43 that can be stably engaged within a respective recess 14a, 24a of the corresponding receiving portion 14, 24, preferably by snap engagement.

[0064] As shown in figures 3A, 3B, the recess 14a, 24a is made on the receiving portion 14, 24 in proximity of the outer portion 11, 21, while the inner relief 43 of the connecting ring 40 is aligned with the second protrusion 42b. Preferably, the inner relief 43 is aligned with the second protrusion 42b along a diameter of the ring 40.

[0065] Preferably, the inner relief 43 and the recess 14a, 24a have an annular shape.

[0066] As can be seen in figure 3A and 3B, the inner relief 43 has a tilted and/or chamfered side surface to define a coupling lead-in with the corresponding receiving portion 14, 24. Preferably, the side surface has an inclination such that the inner relief 43, once the connecting ring 40 is inserted within the washer 30, is convergent towards the centre of the hole of the washer 30, or towards the axes of rotation X1 and X2 of the knob 10 and the pawl 20, respectively.

[0067] With particular reference to figures 3A and 3B and according to one aspect of the present description, the receiving portion 14, 24 also comprises a tilted surface configured to define a coupling lead-in with the tilted side surface of the inner relief 43. In particular, the receiving portion 14, 24 comprises a protrusion 14b, 24b having such a tilted surface. Preferably, the protrusion

14b, 24b is made on the receiving portion 14, 24 in proximity of the inner portion 12, 22 so that the recess 14a, 24a is interposed between the receiving portion 14, 24 itself and the outer portion 11, 21.

[0068] The protrusion 14b, 24b is further configured to come into abutment with the inner relief 43, as will be described in detail below.

[0069] In use, after the connecting ring 40 has been inserted, the knob 10 and the pawl 20 are arranged in such a way that, respectively, the axis of rotation "X1" and the central axis "X2" are aligned with the axis of the hole of the respective washer 30. In such a situation, the inner portion 12, 22 of the knob 10 and of the pawl 20 respectively is inserted into the hole until the receiving portion 14, 24 gets in proximity of the hole itself, such that the protrusion 14b, 24b is in proximity of the head surface 40b of the connecting ring 40. In such a situation, the tilted surface of the protrusion 14b, 24b contacts the tilted side surface of the inner relief 43 of the connecting ring 40.

[0070] As the knob 10 and the pawl 20 are pushed into the hole of the washer 30, the tilted surface of the protrusion 14b, 24b slides into contact with the tilted side surface of the inner relief 43 of the connecting ring 40, so as to facilitate and guide the insertion of the knob 10 or of the pawl 20.

[0071] At the end of the sliding, the inner relief 43 of the connecting ring 40 is housed within the recess 14a, 24a of the receiving portion 14, 24 and the second protrusion 42b, aligned therewith, is interposed between the washer 30 and the outer portion 11, 21.

[0072] As shown in figures 3A and 3B, after the inner relief 43 of the connecting ring 40 has been housed within the recess 14a, 24a of the receiving portion 14, 24, the knob 10 and/or the pawl 20 is axially constrained and unable to be pulled out of the hole of the washer 30 thanks to the shoulder given by the interaction of the protrusion 14b, 24b of the receiving portion 14, 24 with the inner relief 43 of the connecting ring 40. In this situation, the washer 30, the connecting ring 40 and the knob 10 or the pawl 20 are mutually constrained and ready to be mounted on the door "P". Alternatively, the knob 10 and the pawl 20 are inserted within the respective connecting ring 40 and, subsequently, both are inserted within the hole of the washer 30 so that the connecting ring 40 is interposed between the washer 30 and the knob 10 or the pawl 20.

[0073] Advantageously, the fact of being able to assemble the handle 100 before mounting the latter on the door "P" makes mounting operations simple, fast and less expensive. In particular, once the handle 100 has been assembled, the knob 10 and the pawl 20 are axially constrained and no longer able to be released with respect to the washer 30. In fact, should one try to pull the knob 10 or the pawl 20 in an axial direction so as to release it with respect to the washer 30, the protrusion 14b, 24b of the receiving portion 14, 24 would come into abutment with the inner relief 43 of the connecting ring 40. In

this situation, it would be impossible for the connecting ring 40 to be pulled out of the hole of the washer 30 thanks to the action of the first protrusion 42a. The latter, in fact, would abut with the washer 30 wedged within the annular recess 41.

[0074] Advantageously, the connecting ring 40 allows the knob 10 or the pawl 20 to be constrained to a respective washer 30 in a stable and reliable manner.

[0075] Advantageously, since the connecting ring 40 is a single body, it allows to decrease the dimensions of the receiving portion 14, 24 of the knob 10 and of the pawl 20 allowing the handle 100 to adapt even to doors "P" with a thickness less than 38mm. In particular, a connecting ring according to the invention has a dimension, measured along the aforesaid axis "A", comprised between 1.5 mm and 4 mm. In further detail, the presence of the connecting ring 40 allows in fact to significantly reduce the extension of the receiving portion (indicated with the arrow in figure 1A) with respect to the known handles and therefore allows to install the handle 100 even on very thin doors "P".

[0076] Preferably, the recess 14a of the receiving portion 14 of the knob 10 has a dimension, measured along the axis of rotation X1, comprised between 0.5 mm and 2 mm.

[0077] Preferably, the recess 24a of the receiving portion 24 of the pawl 20 has a dimension, measured along the central axis X2, comprised between 0.5 mm and 2 mm.

[0078] A method for mounting a handle 100 for a sliding door "P" comprising the steps of preparing a handle 100 in accordance with what is described above and for mounting the connecting ring 40 within the hole, typically central, of the washer 30 are also part of the present invention.

[0079] The step of mounting the connecting ring 40 comprises a sub-step of snap connection in an axial direction of the connecting ring 40 to the hole of the washer 30. This snap connection is given by the interaction of the first protrusion 42a with the circular edge 30a of the hole of the washer 30.

[0080] The method further comprises a step of fitting the connecting ring 40 to the receiving portion 14, 24 of the knob 10 and/or of the pawl 20. In this step, the inner relief 43 is constrained within the recess 14a, 24a obtained on the receiving portion 14, 24. This recess 14a, 24a is bounded by the protrusion 14b, 24b and by the outer portion 11, 21.

[0081] Preferably, the step of fitting the connecting ring is performed after the step of mounting the connecting ring itself. In this situation, the connecting ring 40 is first mounted within the washer 30 and subsequently, the knob 10 and the pawl 20 are inserted within the respective connecting ring 40 itself.

[0082] Alternatively, the step of fitting the connecting ring is performed prior to the mounting step. In such a situation, the knob 10 and the pawl 20 are inserted within the respective connecting ring 40 and, subsequently,

both are inserted within the hole of the washer 30 so that the connecting ring 40 is interposed between the washer 30 and the knob 10 or the pawl 20. Advantageously, the mounting method is simple, fast and versatile. Even more advantageously, the mounting method is simple even in the case in which it is automated.

[0083] Advantageously, the mounting method allows the handle 100 to be pre-mounted so that it simply has to be fixed to the door "P", even directly on site.

[0084] The present invention achieves the proposed objects, eliminating the drawbacks that have emerged from the known art.

[0085] The handle 100 is adaptable to doors having different thicknesses and in particular thicknesses of less than 38 mm without the washers and/or the knob 10 and/or the pawl 20 protruding with respect to the surface of the door and/or without the knob 10 and/or the pawl 20 protruding with respect to the washer 30 itself. The presence of the connecting ring 40 allows, in fact, to significantly reduce the extension of the receiving portion (indicated with the arrow in figure 1A) with respect to the known handles and therefore allows to install the handle 100 even on very thin doors "P".

[0086] Advantageously, the handle 100 can be provided pre-mounted so that an end user simply has to fix it to the door "P".

[0087] The handle 100 is easy to mount on the door "P" and pleasing to the eye.

Claims

1. A handle (100) for a sliding door comprising:

- a rotatable knob (10) having an outer portion (11) with a greater diameter defining frontally a manual gripping region for a user, and an inner portion (12) with a lesser diameter extending along an axis of rotation (X1) of the knob (10);
 - a pawl (20) comprising an outer portion (21) with a greater diameter and an inner portion (22) with a lesser diameter extending along a central axis (X2) of the pawl (20), the inner portion (22) of the pawl (20) and the inner portion (12) of the knob (10) being telescopically couplable so that the outer portions (11, 21) of the knob (10) and of the pawl (20) can be arranged on opposite sides of a sliding door (P),
- wherein the handle (100) further comprises, for each of said knob (10) and pawl (20), a washer (30) that is applicable stably to a hole made in the sliding door (P) and provided with an opening, preferably central, by which the washer (30) is fitted to said knob (10) or pawl (20), and wherein between at least one of said washers (30) and the respective knob (10) or pawl (20) a connecting ring (40) is interposed that is fitted stably to a receiving portion (14, 24) of the

knob (10) or of the pawl (20) and provided with an annular recess (41) within which a preferably circular edge (30a) is housed stably, defining said hole of the washer (30) and wherein the connecting ring (40) comprises, on an outer surface, a first and a second protrusion (42a, 42b) cooperating to bound said annular recess (41) and to retain said edge (30a) by an undercut.

2. The handle (100) according to claim 1, wherein said first protrusion (42a) is provided with a lead-in surface (42a') so conformed that said connecting ring (40) is snap-fitted within said hole of the washer (30).
3. The handle (100) according to any one of the preceding claims, wherein said receiving portion (14, 24) is comprised between the inner portion (12, 22) and the outer portion (11, 21) of the knob (10) and/or of the pawl (20), said receiving portion (14, 24) having an intermediate diameter between a diameter of the inner portion (12, 22) and a diameter of the outer portion (11, 21).
4. The handle (100) according to any one of the preceding claims, wherein said connecting ring (40) comprises an inner relief (43) that is stably engageable within a respective recess (14a, 24a) of the corresponding receiving portion (14, 24), preferably with a snap engagement.
5. The handle (100) according to claim 4, wherein said inner relief (43) and said recess (14a, 24a) have an annular shape.
6. The handle (100) according to claim 4 or 5, wherein said inner relief (43) has a tilted and/or chamfered side surface to define a coupling lead-in with the corresponding receiving portion (14, 24).
7. The handle (100) according to claim 6, wherein said receiving portion (14, 24) comprises a protrusion (14b, 24b) having a tilted surface configured to define a coupling lead-in with the tilted side surface of the inner relief (43), said protrusion (14b, 24b) being further configured to abut on said inner relief (43).
8. The handle (100) according to any one of the preceding claims, wherein said connecting ring (40) is elastically deformable at least in a radial direction, preferably said connecting ring (40) being made of plastics.
9. The handle (100) according to claim 8, wherein said connecting ring (40) has a radial notch (44) so that the connecting ring (40) extends along an open line.
10. The handle (100) according to any one of the preceding claims, wherein said connecting ring (40) ex-

tends around an axis (A), preferably with an axial symmetry, and wherein the connecting ring (40) has a dimension, measured along said axis (A), comprised between 1.5 mm and 4 mm.

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11. The handle (100) according to claim 4 or 5, wherein:

- at least the recess (14a) of the receiving portion (14) of the knob (10) has a dimension, measured along the axis of rotation (X1), comprised between 0.5 mm and 2 mm; and/or 10
- at least the recess (24a) of the receiving portion (24) of the pawl (20) has a dimension, measured along the central axis (X2), comprised between 0.5 mm and 2 mm. 15

12. A method for mounting a handle (100) for a sliding door (P) comprising the steps of:

- i) arranging a handle (100) according to one or more of the preceding claims, 20
- ii) mounting the connecting ring (40) inside the preferably central hole of the washer (30);
- iii) fitting said connecting ring (40) on the receiving portion (14, 24) of the knob (10) and/or the pawl (20); 25

preferably, the step iii) being performed after the step ii).

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13. The method according to claim 12, wherein the mounting step comprises a sub-step of snap connection in an axial direction of the connecting ring (40) to the central hole of the washer (30).

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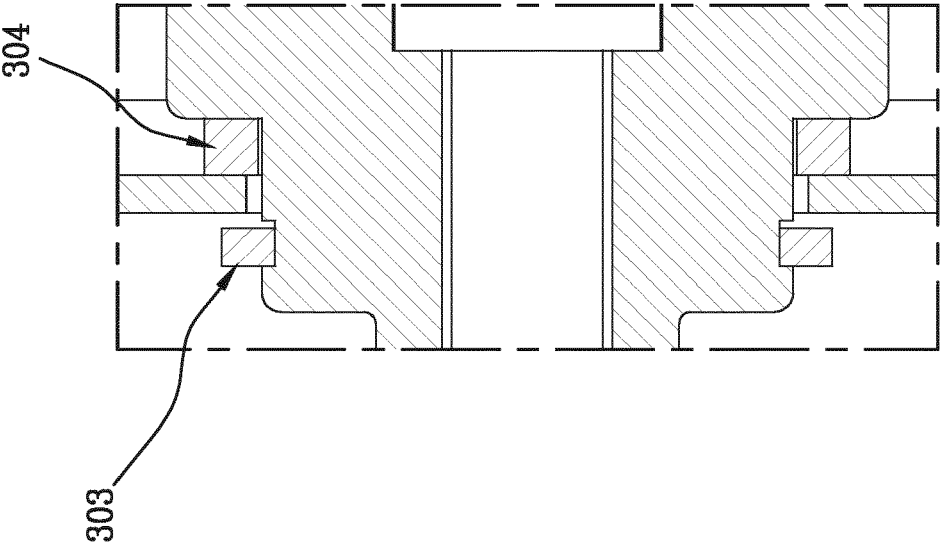


Fig.1A

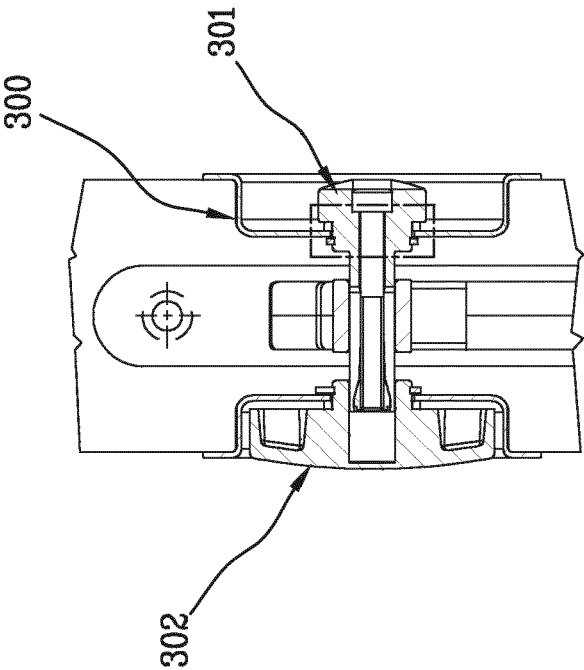
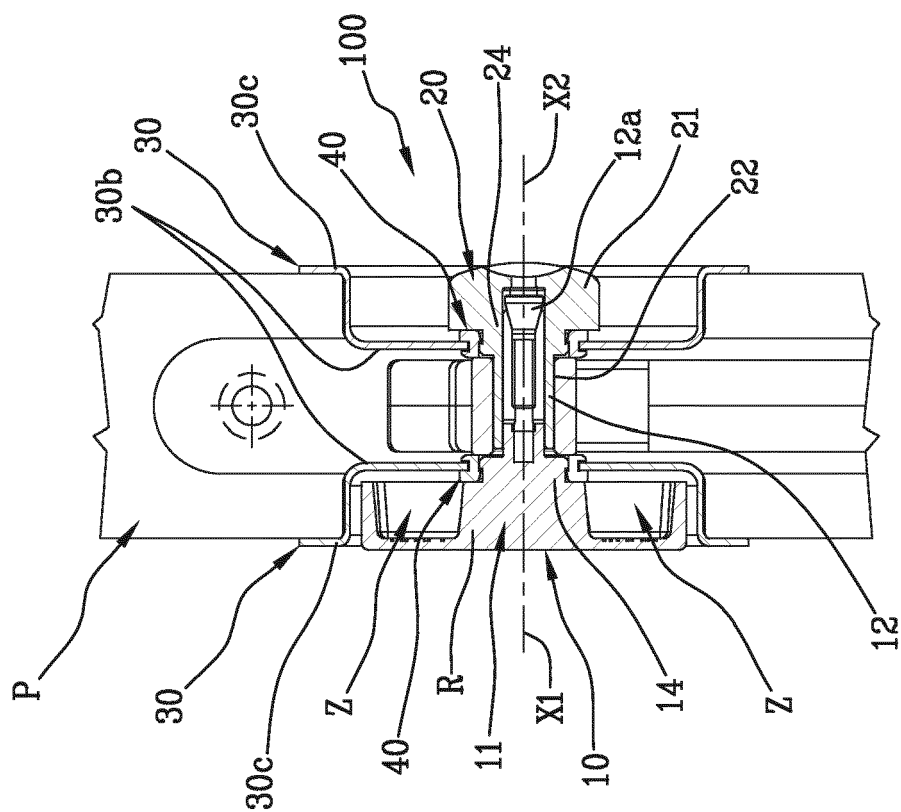
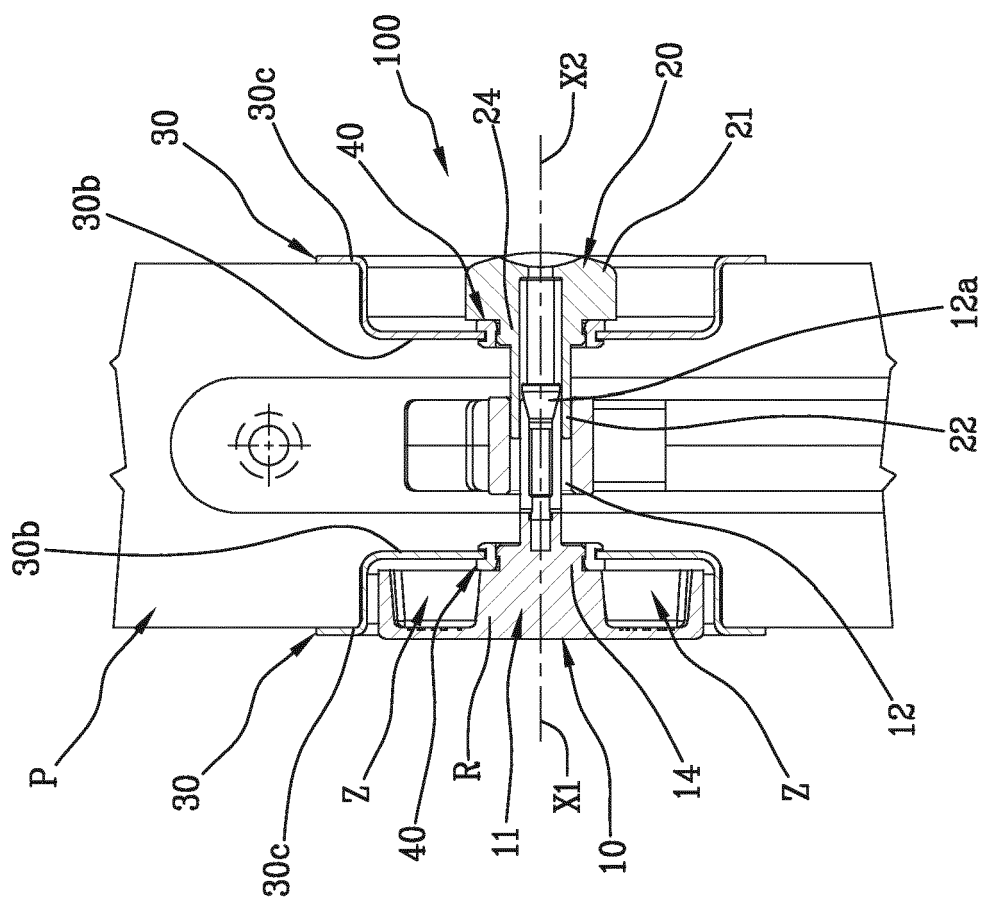


Fig.1



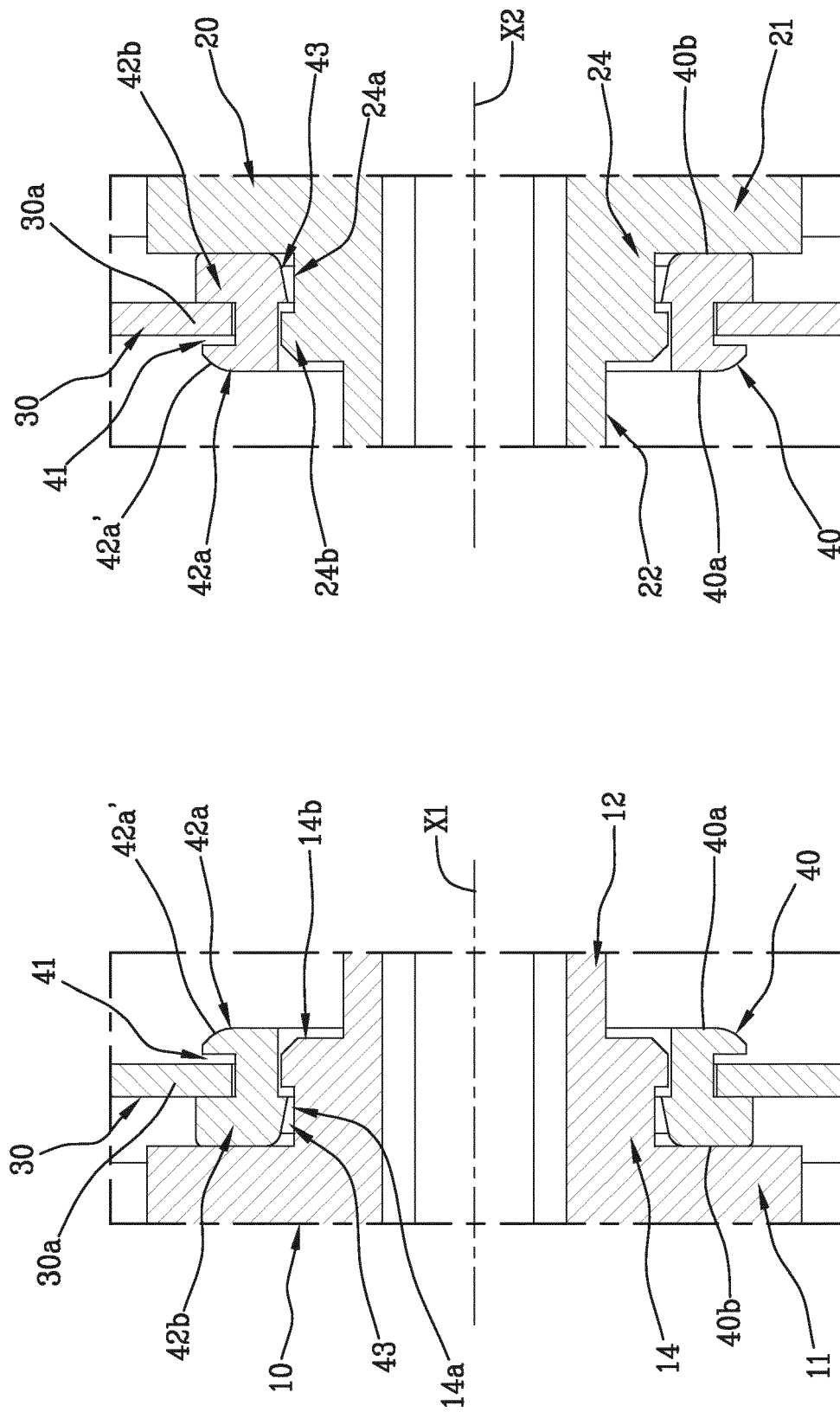
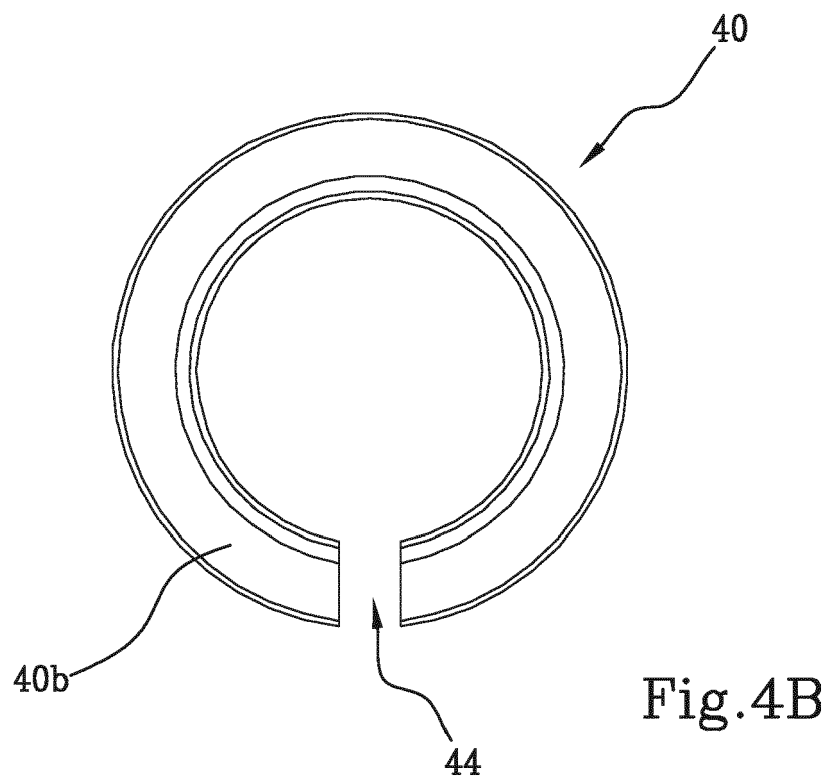
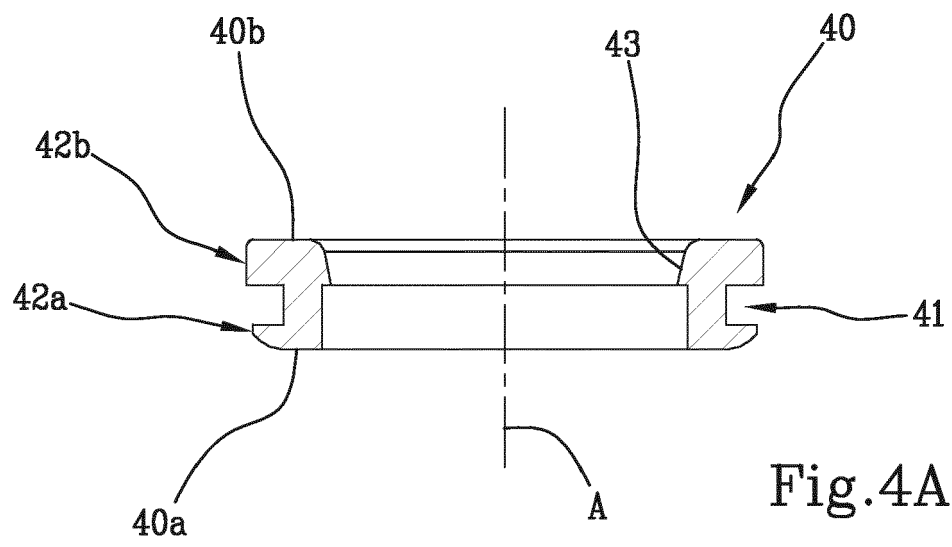


Fig.3B

Fig.3A





EUROPEAN SEARCH REPORT

Application Number

EP 22 16 3583

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EPO FORM 1503 03.82 (P04C01)

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	WO 2019/193559 A1 (BONAITI SERRATURE SPA [IT]) 10 October 2019 (2019-10-10) * the whole document *	1-13	INV. E05B5/00 E05B63/00 E05B65/08 E05B3/00
A	EP 3 249 140 A1 (S A B SERRATURE S R L [IT]) 29 November 2017 (2017-11-29) * the whole document *	1-13	
A	EP 1 398 435 A1 (HOPPE AG [IT]) 17 March 2004 (2004-03-17) * the whole document *	1-13	
A	IT 2019 0000 5042 A1 (TOMASELLA ROBERTO [IT]) 4 October 2020 (2020-10-04) * the whole document *	1-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 July 2022	Examiner Geerts, Arnold
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	

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

EP 22 16 3583

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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27-07-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2019193559 A1	10-10-2019	NONE	

EP 3249140 A1	29-11-2017	DK 3249140 T3	21-02-2022
		EP 3249140 A1	29-11-2017
		ES 2907491 T3	25-04-2022

EP 1398435 A1	17-03-2004	AT 323812 T	15-05-2006
		EP 1398435 A1	17-03-2004
		ES 2262922 T3	01-12-2006
		IT MI20020421 U1	12-03-2004

IT 201900005042 A1	04-10-2020	-----	