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(54) **A REFURBISHMENT SYSTEM FOR A ROOF WINDOW HAVING A STATIONARY FRAME AND A SET OF ADJUSTMENT BUSHINGS, AND A METHOD FOR REFURBISHING A WINDOW**

(57) A refurbishment system adapted for refurbishing a window (1), in particular of a roof window installed in a roof structure. The system comprises a replacement sash (3) set hinges (5) and adjustment bushings (600). The replacement sash (3) is connected to a stationary frame (2) by means of the hinges (5) and the adjustment bushings (600) to attain a mounted condition.

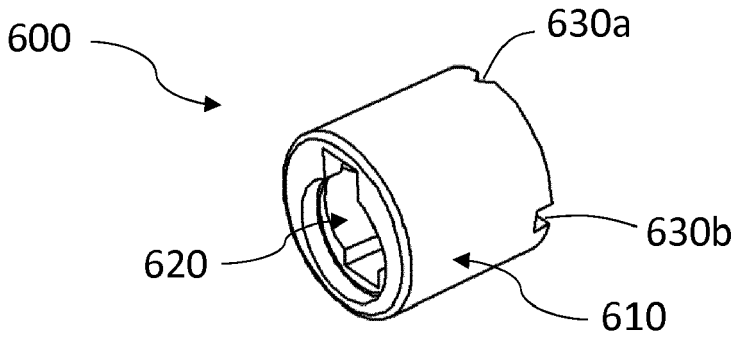

Fig. 11

EP 3 450 665 A1

Description

Technical Field

[0001] The present invention relates to a refurbishment system for a roof window having a stationary frame, a sash, and a set of hinges, in which the refurbishment system comprises a set of adjustment bushings. The invention furthermore relates to a method for refurbishing a window.

Background Art

[0002] Replacement of windows involves a substantial investment for a household due to the cost of the new window and the high cost of contractors for installing the new window and removing the old one.

[0003] The reasons for replacing an old window can be numerous but often the decision to replace a window is made due to material decay or to gain the benefits provided by advances in window technology such as improved inlet of incident light, ventilation, or thermal insulation to provide an improved indoor climate.

[0004] As the movable sash will often be worn at a faster rate than the frame due to the frequent movement when opening and closing the sash, the sash may often need replacement before the stationary frame. Furthermore, as advances within the field of window, e.g. improvements of the thermally insulating window pane, sash and window pane may become obsolete sooner than stationary frames.

[0005] Consumers may be interested in being able to refurbish their window by simply replacing the sash of the old window and keeping the existing stationary frame, thereby prolonging the life of the window while minimizing replacement elements and installation materials, contractor work, and overall refurbishment costs.

[0006] In case a replacement sash, or a refurbished sash, is to be reinstalled in a stationary frame, it may however occur that the location of the hinges on the stationary frame is not optimal. The non-optimal positions are typically due to minor skewness, either in the position of the stationary frame in the roof structure, or in the sash frame itself.

[0007] Thus, how to complete the refurbishment of a window remains a challenge.

Summary of Invention

[0008] It is therefore an object of the invention to provide a refurbishment system which allows for improvement of roof window properties, including the final visual appearance and functionality of an openable window that integrates an original stationary frame with a replacement sash. Furthermore, the refurbishment system should be easily installed in the roof structure.

[0009] In a first aspect, this and further objects are met by a refurbishment system, of the kind mentioned in the introduction, which is furthermore characterised in comprising a set of adjustable bushings adapted to be connected to the frame members of the stationary frame in a mounted condition, and a replacement sash.

[0010] The adjustable bushings provide multiple points where to adjust the distance between the stationary frame and the replacement sash in a manner making it possible to achieve maximal contact surface between these two elements in a mounted condition in closed position, this ensuring optimal sealing and aesthetic cohesion. Thus, the appearance and functionality of the openable window may be optimized at the refurbishment window installation stage. Consumers may be interested in being able to refurbish their window by simply replacing the sash of the old window and keeping the existing stationary frame, thereby prolonging the life of the window while minimizing contractor work and refurbishment costs. As the stationary frame of the window is maintained, this frame functions as an installation frame, thus rendering the mounting simple. The advantages are particularly present in roof windows, in which installation takes place in an inclined roof.

[0011] In a presently preferred embodiment, which is particularly advantageous for a roof window in which the sash is movable between an open and a closed position, the refurbishment system comprises a stationary frame with a top frame member, a bottom frame member, and two side frame members defining a central opening, and, placed within the stationary frame, a sash with sash members carrying a pane.

[0012] Frame and sash members are typically made of a rigid material, such as wood, polyurethane with a wooden core, polyvinyl chloride (PVC) or other polymers such as acrylonitrile butadiene styrene (ABS) or polyethylene (PE), metals such as aluminium, fiberglass, and combinations thereof, and have an elongated shape with at least one flat surface facilitating contact with other window elements. In this, whenever the term "frame" is used it is to be understood as including referring to a stationary frame carrying a sash. The terms stationary frame and frame are used interchangeably.

[0013] Said sash is connected to the stationary frame side members by means of a set of two hinges, and is movable between an open and a closed position about a turning axis defined by the pivot hinges. Each hinge includes a frame hinge part with a set of spigots configured to be received in a first set of mounting holes in the side frame member.

[0014] By a first set of mounting holes, it is meant the set of mounting holes that was originally used for mounting the roof window. These would typically be in the face of the stationary frame side members facing the central opening at a position that would best ensure stationary frame and sash contact in the closed position.

[0015] In the context of the application, a closed position of the sash means a position in which the plane defined by the stationary frame and plane defined by the sash coincide, and form an angle of no more than a few

degrees with each other. Similarly, an open position of the sash as used herein generally means a position in which the sash is tilted about the pivot hinge axis such that the stationary frame plane and the sash plane no longer coincide.

[0016] In said preferred embodiment, the refurbishment system further comprises a set of adjustment bushings adapted to be received in a second set of mounting holes formed in the side frame members in a mounted condition.

[0017] In the context of this application, adjustment bushings means bushings comprising an outer bushing part with an outer circumference fitting the second set of mounting holes in a rotational manner, and a substantially cylindrical internal opening in which an inner bushing part is received also in a rotational manner. Said inner bushing part has a substantially cylindrical outer circumference fitting in the internal opening of the outer bushing part.

[0018] Furthermore, the inner bushing part has a through-going hole which is offset from the centre of the inner bushing part and is configured to receive a spigot of said hinge. Likewise, the internal opening of the outer part has an axis which is offset from the centre of the adjustment bushing, such that both the through-going hole in the inner bushing part, and the internal opening in the outer bushing part are able to assume a plurality of positions by rotating the inner and/or outer bushing parts relative to the second mounting holes in the side frame members.

[0019] An advantage of providing a system where bushings are adjustable to compensate for the skewness between the sash and the stationary members is it is possible to provide a makeover to an old window and thereby extend its lifetime. Furthermore, as the replacement sash members and features are not limited to the material or functionality of the original sash, they may provide new functionalities to be added to the window by enabling the use of various materials or construction types.

[0020] In an embodiment of the invention, the adjustment bushings further comprise a first and a second end face, wherein at least one of said end faces has at least one groove.

[0021] In another embodiment, two or more grooves span the internal opening on the adjustable bushing end face, and are aligned to each other forming sets of aligned grooves.

[0022] By providing grooves on the end face of the adjustable bushings, these may receive a tool head, such as a screwdriver head, and enable the easy rotation of the inner bushing part or/and the outer bushing part relative to the second mounting holes during installation of the replacement sash.

[0023] In some embodiments multiple groove sets provide arrangements allowing for rotation of the adjustment bushings using tool heads that require greater contact surface.

[0024] The increased contact surface provides greater friction between the tool head and the end face of the adjustment bushing, resulting in a more effective transition of rotational force and better control on behalf of the user.

[0025] In an embodiment of the invention the bushing part has a groove extending internally from an end face, creating an additional end face opening. In another embodiment said groove extends between the two of faces of the bushing part, creating two end face openings. In all of the considered embodiments, this groove is large enough to receive at least some of commonly employed tool shafts, but also not so large as to compromise structural integrity of the bushing. By providing such a groove, rotation is enabled to an even easier extent when the end face opening to the groove is accessible to said tool shaft in the mounted condition. In addition, provision of said end face opening and internal groove allows for the insertion of plyer-like tools that may assist in removing the adjustable bushings from the mounting holes in case of need.

[0026] In an embodiment of the invention the substantially cylindrical through-going hole of the outer bushing part has at least one internal groove which interfaces with a circumferentially extending retention notch on the outer surface of the inner bushing part. This internal groove and retention notch operate to maintain the inner bushing part in place in the outer bushing part.

[0027] Both during normal usage of the movable sash, which results in frequent movement when opening and closing the sash, and during installation, substantial mechanical stress on the adjustable bushings may ensue, causing the bushing parts to disassemble. By providing such a groove and retention notch, integrity of the adjustable bushings is ensured.

[0028] In an embodiment at least one of the adjustment bushings further comprises flexible flanges adapted for engaging an adjustment bushing or the stationary frame to provide a snap lock. By providing a snap lock the process of mounting the bushings on the frame members may be facilitated such that it may be performed by a person with limited expertise.

[0029] In an embodiment of the invention the outer bushing part further comprises an adhesive material arranged on the outer surface. This is preferably a slow drying adhesive material that will allow sufficient time for the installer to complete the installation before cementing the contacting parts. By adding an adhesive material arranged on the outer bushing part outer surface, increased assurance that the elected position of the adjustable bushings will not differ over time is obtained.

[0030] In an embodiment of the invention at least one of the adjustment bushings are made from at least two separate pieces. This is particularly advantageous in the embodiments in which the substantially cylindrical through-going hole of the outer bushing part has at least one internal groove which interfaces with a circumferentially extending retention notch on the outer surface of

the inner bushing part. In these embodiments, the bushing parts may not be adjoined by simply inserting the inner bushing part into the outer bushing part as the circumferentially extending retention notch would obstruct the end face opening. Thus, an embodiment contemplating adjustment bushings made from at least two pieces provides for a possible sequential bushing part assembly process and facilitates replacement sash mounting.

[0031] In an embodiment of the invention at least one of the bushings are made from polyvinyl chloride (PVC). PVC allows the bushings to be made inexpensively without compromising durability and structural integrity. Other conceivable materials include stainless steel, aluminium, acrylonitrile butadiene styrene (ABS) and polyethylene (PE).

[0032] In a further embodiment the refurbishment system further comprises at least one further component selected from the group comprising a frame part of a pivot hinge, a frame covering, a frame cladding, a top casing, a striking plate and insulation elements.

[0033] The insulation element may be adapted to fit in any hollow cavity between the replacement sash and a stationary frame member. By providing insulation for any cavity formed between the sash members and the frame members, the thermal and/or sound conductive properties of the frame may be improved.

[0034] In a second aspect of the invention, a method for refurbishing a window, in particular of a roof window installed in a roof structure, having a stationary frame and a sash, and a set of hinges is provided, comprising the steps of a) providing a refurbishment system as defined in the first aspect, b) preparing the roof window for refurbishment including removal of the sash, and c) mounting the refurbishment system to the stationary frame.

[0035] By providing a method of this kind, the refurbishment is carried out in a number of simple and logical steps so as to allow a person with limited expertise to upgrade the window. Thus, making the method more cost efficient for the consumer.

[0036] Other presently preferred embodiments and further advantages will be apparent from the following detailed description and the dependent claims.

Brief Description of Drawings

[0037] The invention will now be described in more detail below by means of non-limiting examples of embodiments and with reference to the schematic drawing, in which

Fig. 1 shows a perspective view of a roof window in an open state from the interior side;

Fig. 2 shows a perspective view of a stationary frame of a roof window without the sash from the interior side;

Fig. 3 shows a partial perspective exploded view of a hinge with part of a side frame member of a conventional roof window;

Fig. 4 shows a partial perspective view of a side frame member of a roof window refurbishment system in an embodiment of the invention;

Fig. 5 shows a view of an adjustment bushing of the roof window refurbishment system in an embodiment of the invention, in a first position;

Fig. 6 shows a view of the adjustment bushing of Fig. 5 in a second position;

Figs 7 to 10 show views of an adjustment bushing of the roof window refurbishment system in an embodiment of the invention, showing end views, and side views, respectively;

Fig. 11 shows a perspective view of the adjustable bushing of the roof window refurbishment system in an embodiment of the invention;

Fig. 12 shows an exploded perspective view of the adjustable bushing of the roof window refurbishment system in the embodiment of Fig. 11; and

Figs 13a to 13e show end views of an adjustment bushing of the roof window refurbishment system in an embodiment of the invention, in a number of possible positions.

Description of Embodiments

[0038] In the following, embodiments of the first and the second aspects will be described in further detail. The window will be referred to as a roof window, installed in an inclined roof surface. Directional terms such as "upper", "lower" etc. relate to the position shown in the drawings. The invention is applicable to all types of windows, however.

[0039] Fig. 1 shows a roof window 1 seen from the side of the roof window which faces the interior side of a building structure in which the roof window 1 is installed. The roof window shown in Fig. 1 comprises a frame 2 which is stationary when the roof window 1 is in a mounted condition. The stationary frame 2 has a top frame member 300, a bottom frame member 200 and two side frame members 100 defining a central opening, and a sash 3' carrying a pane 4. Each of the frame members 100, 200, 300 has an inner side facing the central opening.

[0040] By the terms "exterior" and "interior", mutually opposite sides of components of the roof window 1 are indicated, in a direction substantially perpendicular to the plane of the pane 4. The terms "outer" and "inner" are used to indicate for instance mutually opposite sides of the frame members 100, 200, 300, substantially in a direction parallel to the plane of the pane 4.

[0041] In the type of roof window 1 shown in Fig. 1, the sash 3' is movably mounted in the stationary frame 2 by means of a set of hinges, here shown as pivot hinges 5 (cf. Figs 2 and 3), such that the sash 3' is movable about a substantially centrally located axis between an open and closed position relative to the stationary frame 2. Other types of hinges providing the desired movement pattern are conceivable as well, for instance so-called

pantograph hinges including a linkage mechanism.

[0042] The inner sides of the respective frame members 100, 200, 300 each comprises an exterior portion 102, 202, 302, which, when the window is in the closed position, is covered by the sash 3' and therefore not visible from the interior of the building structure, and an interior portion 101, 201, 301 which is not covered by the sash 3, when the window is in the closed position. Hence, the interior portion 101, 201, 301 is visible from the interior side of the building structure in both in the open and closed positions of the sash. In the shown embodiment, the exterior portions 102, 202, 302 of the inner sides of each of the frame members 100, 200, 300 are offset relative to the interior portions 101, 201, 301 to form a recess in which the sash 3' abuts when the window is in a closed position. Eventually, each of the stationary frame members 100, 200, 300 also has a bottom surface 103, 203, 303 which here, in a manner known *per se*, includes a groove adapted to accommodate a lining forming a transition between the roof window 1 and the roof structure.

[0043] In order to renovate or refurbish the roof window 1 to extend the lifetime and/or improve the properties thereof, including for instance the appearance and insulating properties, a refurbishment system according to the invention is provided. In general, a refurbishment system comprises any parts of roof window, and substitute or additional parts. Here, a replacement sash is for instance indicated throughout by reference numeral 3' in the following in a particular embodiment of the invention. Other, not shown additional parts may include a set of capsules adapted to be connected to the frame members 100, 200, 300 of the stationary frame 2 in the mounted condition. In further embodiments, which are not shown or described in detail, the refurbishment system comprises at least one further component selected from the group comprising a frame covering to replace existing frame cover 6, a frame cladding to replace existing frame cladding 7, a top casing to replace existing top casing 8, a striking plate to replace existing striking plate of the lock casing at the top of the window and insulation elements.

[0044] Details of embodiments of the present inventive roof window refurbishment system and the method for refurbishing will be described in the following.

[0045] In a first step, Fig. 2 shows the stationary frame 2 of the roof window 1, where the sash 3' has been dismounted to reveal the interior portions 101, 201, 301 and the exterior portions 102, 202, 302 of the inner sides of the frame members 100, 200, 300. Also the frame part of the hinge 5 is shown in Fig. 2.

[0046] Referring now to Figs 3 to 6, the refurbishment system of one embodiment to be applied to the roof window 1 comprises re-installing a sash in the stationary frame 2 following the mounting of an adjustment bushing 600 to receive fastening means of the frame part of the hinge 5. The sash could be a replacement sash (not shown) corresponding in principle to sash 3', or the sash 3' with or without a new sash part of the hinge. The present invention is in principle also applicable to mounting of a sash hinge part.

[0047] As shown in Fig. 3, the hinge 5 is represented by its frame hinge part 51 having fastening means in the form of two spigots 52, 53 on the side facing the frame side member 100 in the mounted condition. The general configuration of such a hinge is well-known in the art and only parts relevant to the present invention will be described in detail. In the conventional roof window, e.g. the window before application of the refurbishment system, the spigots 52, 53 are received in mounting holes 152, 153 in the side frame member 100.

[0048] In a first step in the refurbishment procedure of the present invention, a new set of mounting holes 162, 163 are arranged to receive a set of adjustment bushings 600. In a preferred embodiment, these mounting holes are essentially cylindrical in shape and are larger in diameter than and have centres coinciding with those of the first set of mounting holes 152, 153. In an embodiment of this application said mounting holes are configured so as to receive directly the adjustment bushings. In another embodiment the holes are configured to receive the adjustment bushings with a second set of bushings between the inner face of the second mounting holes and the outer circumference of the outer bushing part, thereby increasing contact and better securing the elements for increased functionality and durability.

[0049] Referring now to Figs 5 to 12, the adjustable bushings each comprises an outer bushing part 610 with an outer circumference fitting the second set of mounting holes 162, 163 in a rotational manner, and a substantially cylindrical internal opening 611 in which an inner bushing part 620 is received also in a rotational manner. Said inner bushing part has a substantially cylindrical outer circumference fitting in the internal opening 611 of the outer bushing part 610 and a substantially cylindrical internal opening 621.

[0050] The substantially cylindrical internal opening 621 in the inner bushing part 620 may be viewed as a through-going hole indicated which is offset from the centre of the inner bushing part and is configured to receive a respective spigot 52, 53 of the frame hinge part 51. In addition, the internal opening 611 of the outer part 610 has an axis which is offset from the centre of the adjustment bushing 620 as a whole, such that both the through-going hole 621 in the inner bushing part, and the internal opening 611 in the outer bushing part are able to assume an infinite number of positions by rotating the inner and/or outer bushing parts relative to the second mounting holes 162, 163 in the side frame members 100. The outer bushing part 610 may be rotated 360° independently of the inner bushing part 620 position. Since the internal opening 611 in the outer bushing part 610 is offset, the position of the inner bushing part 620 relative to the centre of the second mounting holes 162, 163 will be changed. Furthermore, the inner bushing part 620 may be rotated 360° independently of the outer bushing part position. Since the internal opening 621 in the inner bushing part 620 is offset as well, the position of the inner bushing part 620

relative to the centre of the second mounting holes 162, 163 will be changed. This results in it being possible to combine rotation of the outer and inner bushing parts 610, 620 to position the inner bushing part internal opening at an infinity of positions within the range limited by the degree of offset of the internal openings from the centres of each bushing part. Furthermore, in the embodiment of the examples provided herein, two adjustable bushings 600 are used per each hinge 5, additional adjustment bushings being useful for increasing the number of adjustment points available and thus, by combining the adjustment of one and more adjustment bushings, the number of possible adjustment settings is multiplied. Internal opening positioning should be chosen so as to receive spigots 52, 53 of the frame hinge part 51 in a manner that best corrects skewness and best ensures contact between the replacement sash 3' and the stationary frame 100.

[0051] In the context of this application, whenever the term "internal opening" is used, it is to be understood as including reference to an essentially cylindrical through-going hole, and *vice versa.* The terms internal opening and through-going hole are used interchangeably.

[0052] In an embodiment of the invention, the adjustment bushings 600 further comprise two end faces and a groove on one of said end faces. Said groove is arranged to receive a tool head, such as a screwdriver head, which is used to transmit rotational force to the adjustment bushing through the placement of such a tool in said groove. In an embodiment of the invention, the adjustment bushing end face comprises several grooves. In a preferred embodiment said several grooves are aligned in pairs across the internal opening of the adjustment bushing, forming sets of aligned grooves, cf. in particular Figs. 7 to 10, thereby increasing the groove surface available, and thus enabling better transition of rotational force.

[0053] In some embodiments multiple groove sets provide arrangements allowing for rotation of the adjustment bushings using tool heads that require greater contact surface.

[0054] The increased contact surface provides greater friction between the tool head and the end face of the adjustment bushing, resulting in a more effective transition of rotational force and better control on behalf of the user.

[0055] In an embodiment of the invention, said groove has two equal surfaces 630a and forms an angular cross-section. In another embodiment of the invention, said groove has three surfaces 630b, one bottom face and two equal opposed side surfaces, thus forming a substantially rectangular cross-section. In a preferred embodiment of the present invention, an end face comprises a variety of two-surface and three-surface grooves, that align to each other with matching number of surfaces. In other embodiments (not shown) of the present invention, the surfaces may have a curved cross-section forming a continuous arc.

[0056] Referring now also to Figs 11 and 12, each of the bushing parts 610, 620 comprises a groove 641, 642 extending internally from the end face, thus creating an additional end face opening on the opposing end face to that carrying grooves 630. This groove 641, 642 may be of many types, but is preferentially formed by 4 faces; a bottom face, two equal opposing side faces and one internal end face, and thus forming an angular cross-section. The groove 641 shown on outer bushing part 610 and the groove 642 shown in inner bushing part 620 in Fig. 10 are rather similar. Elements having the same or analogous function are denoted by the same reference numerals.

[0057] In another embodiment of the present invention, groove 641, 642 extends the full distance between the two bushing part end faces. This feature results in an additional end face opening and increases accessibility to groove 641, 642 even in installed condition, thus making rotational adjustment of the adjustable bushings even easier and the use of an increased selection of tools possible. Caution must be taken, however, for the inclusion of said fully extending groove 641, 642 not to compromise structural integrity of the bushing. In this situation, alternative, stronger materials may be desirable for the manufacturing of the adjustable bushings, such as more resistant polymers, metals, or fibres.

[0058] In an embodiment of the present invention, the outer bushing part 610 further comprises an adhesive material arranged on the outer surface. By adding an adhesive material arranged on the outer bushing part outer surface, increased assurance that the elected position of the adjustable bushings will not differ over time is obtained. Adhesive material includes all possible types of adhesive, such as, but not limited to; drying adhesives, hot, pressure-sensitive, contact, reactive, natural or synthetic adhesives. In the context of this application, adhesive material present on the outer surface of the outer bushing part also includes textures and contours arranged so as to increase the retention of said bushing part in mounting holes. It is also conceivable to include means affecting the contact between the outer and inner bushing parts. Such means may comprise a seal located in one of the facing recesses of the bushing parts, a coating, element providing on or both bushing parts with resilient properties etc.

[0059] In an embodiment of the invention at least one of the adjustment bushings are made from at least two separate pieces. This is particularly advantageous in the embodiments in which the substantially cylindrical through-going hole of the outer bushing part has at least one internal groove which interfaces with a circumferentially extending retention notch on the outer surface of the inner bushing part. It is desirable, in the context of the present application, to provide means of adjoining said two pieces of bushing parts so that the fully-formed bushing part may fulfil its function in the adjustable bushing.

[0060] Referring now to the series of views of Figs 13a

to 13e, a selection of the infinite adjustment possibilities is shown.

[0061] Thus, in the position of Fig. 13a, the internal opening is centred relative to the outer circumference of the adjustment bushing 600.

[0062] In Fig. 13b, the internal opening is positioned with maximal outward offset with regard to the bushing centre.

[0063] In Fig. 13c, the internal opening is positioned with maximal rightward offset with regard to the bushing centre.

[0064] In Fig. 13d, the internal opening is positioned with maximal inward offset with regard to the bushing centre.

[0065] Finally, in Fig. 13e the internal opening is positioned in an intermediate position.

[0066] According to the invention the method of refurbishing a window by replacing a sash should be simple, in such a way that it may be possible to perform by a person not having much expertise in window installation. Hence the invention both provides a method for refurbishing a roof window installed in a roof structure and having a stationary frame and an existing sash, in which a step of preparing the roof window for refurbishment is included.

[0067] In the above, a few embodiments of a refurbished roof window by means of a refurbishment system to be connected to the stationary frame have been described. It is to be understood that several modifications and combinations may be carried out. For instance, regarding the adjustable bushings shown and described, it is to be understood that adjustable bushings may also be used on other windows than the centre-hung pivotable roof window, and that their shape and design may be varied accordingly. Likewise, different combinations of features mentioned as alternatives above are also covered by the invention as defined by the scope of the claims.

[0068] List of reference numerals

1 roof window

2 stationary frame 100 side frame members 101 interior portion 102 exterior portion 103 bottom surface 152 mounting hole (first set) 153 mounting hole (first set) 162 mounting hole (second set) 163 mounting hole (second set) 200 bottom frame member 201 interior portion 202 exterior portion 203 bottom surface 300 top frame member 301 interior portion 302 exterior portion 303 bottom surface

3' sash

4 pane

5 hinge 51 frame hinge part 52 spigot 53 spigot

6 frame cover

7 frame cladding

8 top casing

600 adjustment bushing 610 outer bushing part 610 internal opening of outer bushing part 620 inner bushing part 621 through-going opening / internal opening of inner bushing part 630a groove 630b groove 641 groove 642 groove

Claims

1. A roof window refurbishment system, comprising a roof window (1) having a stationary frame (2) with a top frame member (300), a bottom frame member (200), and two side frame members (100) defining a central opening, and, placed within the stationary frame, a sash (3') with sash members carrying a pane (4) and connected to the stationary frame (2) by means of a set of two hinges (5) said sash being movable about a turning axis defined by said hinges and movable between an open and a closed position, each hinge (5) including a frame hinge part (51) with a set of spigots (52, 53) configured to be received in a first set of mounting holes (152, 153) in the side frame member (100), **characterised in that** the refurbishment system further comprises a set of adjustment bushings (600) adapted to be received in a second set of mounting holes (162, 163) formed in the side frame members (100) in a mounted condition, that each adjustment bushing (600) comprises an outer bushing part (610) with an outer circumference fitting the second set of mounting holes (162, 163) in a rotational manner, and a substantially cylindrical internal opening (611) in which an inner bushing part (620) is received in a rotational manner, that the inner bushing part (620) has a substantially cylindrical outer circumference fitting in the internal opening (611) of the outer bushing part (610) and a through-going hole (621) offset from the centre of the inner bushing part (620) and configured to receive a spigot (52, 53) of said hinge, and that the internal opening (611) of the outer part (610) has an axis which is offset from the centre of the adjustment bushing (600), such that both the through-going hole (621) in the inner bushing part (620), and the substantially cylindrical internal opening (611) in the outer bushing part (610) are able to assume a plurality of positions by independently rotating the inner (610) and outer bushing parts (610) relative to the second mounting holes (162, 163) in the side frame members.

2. A roof window refurbishment system according to claim 1, wherein the adjustment bushings (600) further comprise a first and a second end face, wherein at least one of said end faces has at least one groove (630a, 630b, 641, 642), such as two aligned grooves either side of the internal opening in the adjustment bushings end faces, forming a set of aligned grooves, and arranged to receive a tool head, such as a screwdriver head.

3. A roof window refurbishment system according to claim 2, wherein at least one of the end faces of the adjustment bushings (600) has more than one set of aligned grooves (630a, 630b).

4. A roof window refurbishment system according to any one of the preceding claims, wherein the at least one groove (630a, 630b, 641, 642) is arranged so as to be engaged individually or simultaneously, resulting in the rotational adjustment of the relative position of an adjustment bushing part (610, 620).

5. A roof window refurbishment system according to claim 4, wherein said groove (630a) has two faces.

6. A roof window refurbishment system according to claim 4 or 5, wherein the groove (630b) has three faces, one bottom face and two opposed side faces.

7. A roof window refurbishment system according to any one of the preceding claims, wherein at least one of said bushing parts (610, 620) has a groove (641, 642) extending internally from at least one end face creating an additional end face opening.

8. A roof window refurbishment system according to claim 7, wherein said groove (641, 642) extends between the two end faces of the inner bushing part (620).

9. A roof window refurbishment system according to any one of the preceding claims, wherein the substantially cylindrical opening (611) has at least one internal groove which interfaces with a circumferentially extending retention notch on the outer surface of the inner bushing part (620) and operates to maintain the inner bushing part (620) in place in the outer bushing part (610).

10. A roof window refurbishment system according to any one of the preceding claims, wherein at least one of the adjustment bushings (600) further comprises a first and a second end, wherein the ends are provided with flexible flanges adapted for engaging an adjustment bushing (600) or the stationary frame (2) to provide a snap lock.

11. A roof window refurbishment system according to anyone of the preceding claims, wherein the outer bushing part (610) further comprises an adhesive material arranged on the outer surface.

12. A roof window refurbishment system according to anyone of the preceding claims, wherein at least one of the adjustment bushings (600) are made from at least two separate pieces.

13. A roof window refurbishment system according to anyone of the preceding claims, wherein at least one of the adjustment bushings (600) are made from polyvinyl chloride (PVC).

14. A roof window refurbishment system according to any one of the preceding claims, wherein the refurbishment system comprises at least one further component selected from the group comprising a frame part of a pivot hinge (5), a frame covering (6), a frame cladding (7), a top casing (8), a striking plate (9) and insulation elements.

15. A method for refurbishing a roof window (1) having a stationary frame (2), a sash (3'), and a set of hinges (5), comprising the steps of:

a) providing a refurbishment system according to any one of claims 1 to 14;
b) preparing the roof window for refurbishment; and
c) mounting the refurbishment system to the stationary frame (2).

16. The method of claim 15, wherein step c) includes the steps of:

i. providing a second set of mounting holes (162, 163),
ii. mounting the adjustment bushings (600) into said second set of mounting holes (162, 163),
iii. engaging at least one groove individually or simultaneously, rotationally adjusting the position of an adjustment bushing part (600), and
iv. mounting the sash (3) in the stationary frame (2) by means of connecting the set of spigots (52, 53) with the internal openings (611) of the inner bushing parts (620).

17. The method of any one of claims 15 and 16, wherein step a) includes the provision of at least one further component selected from the group comprising a frame part of a pivot hinge (5), a frame covering (6), a frame cladding (7), a top casing (8), a striking plate (9) and an insulation element, and wherein the step b) includes the respective steps of:

i. removing the striking plate, and/or
ii. removing the frame parts of the pivot hinges, and/or
iii. removing the top casing, and/or
iv. removing sides and bottom frame coverings, and/or
v. removing frame claddings.

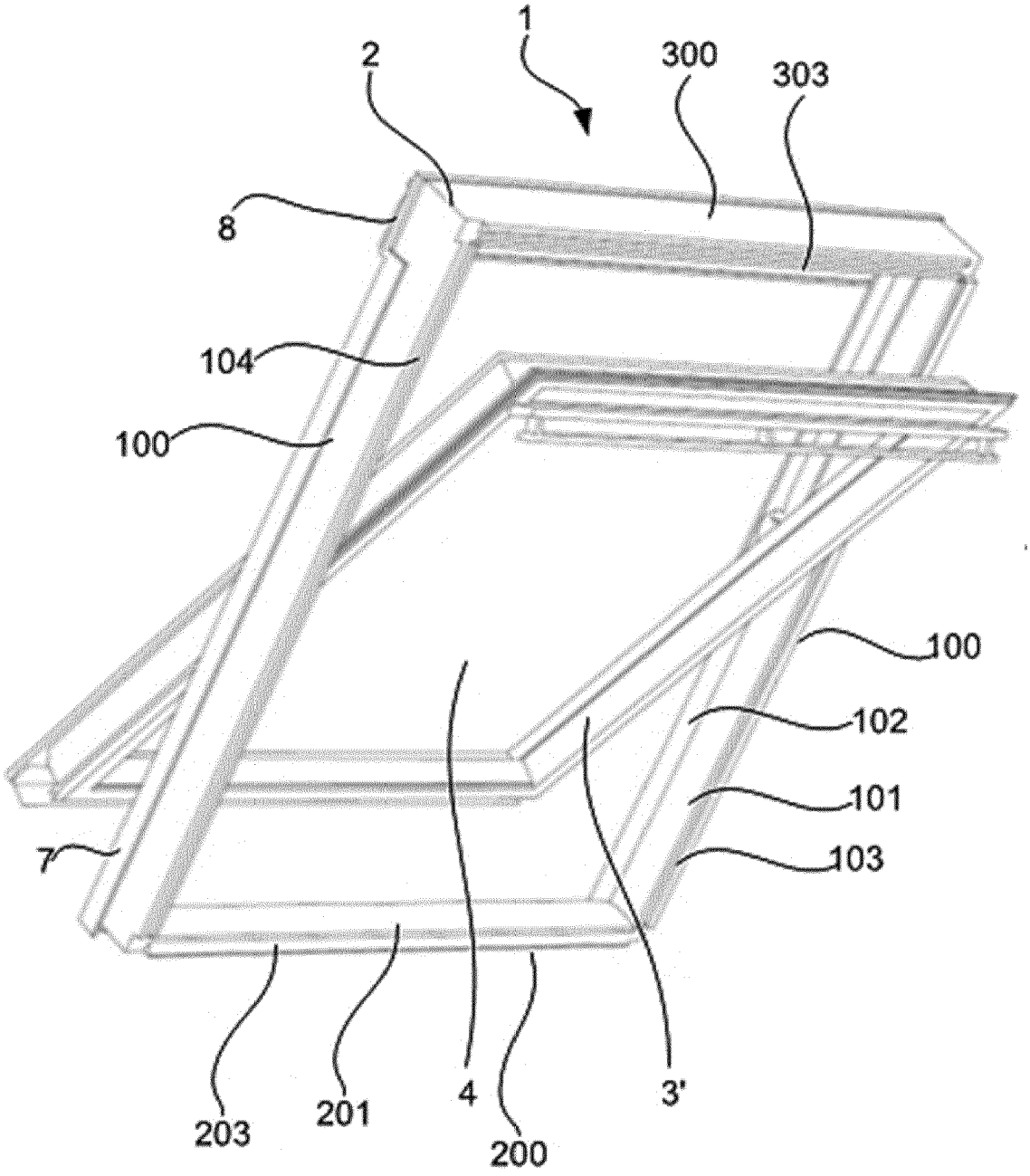

Fig. 1

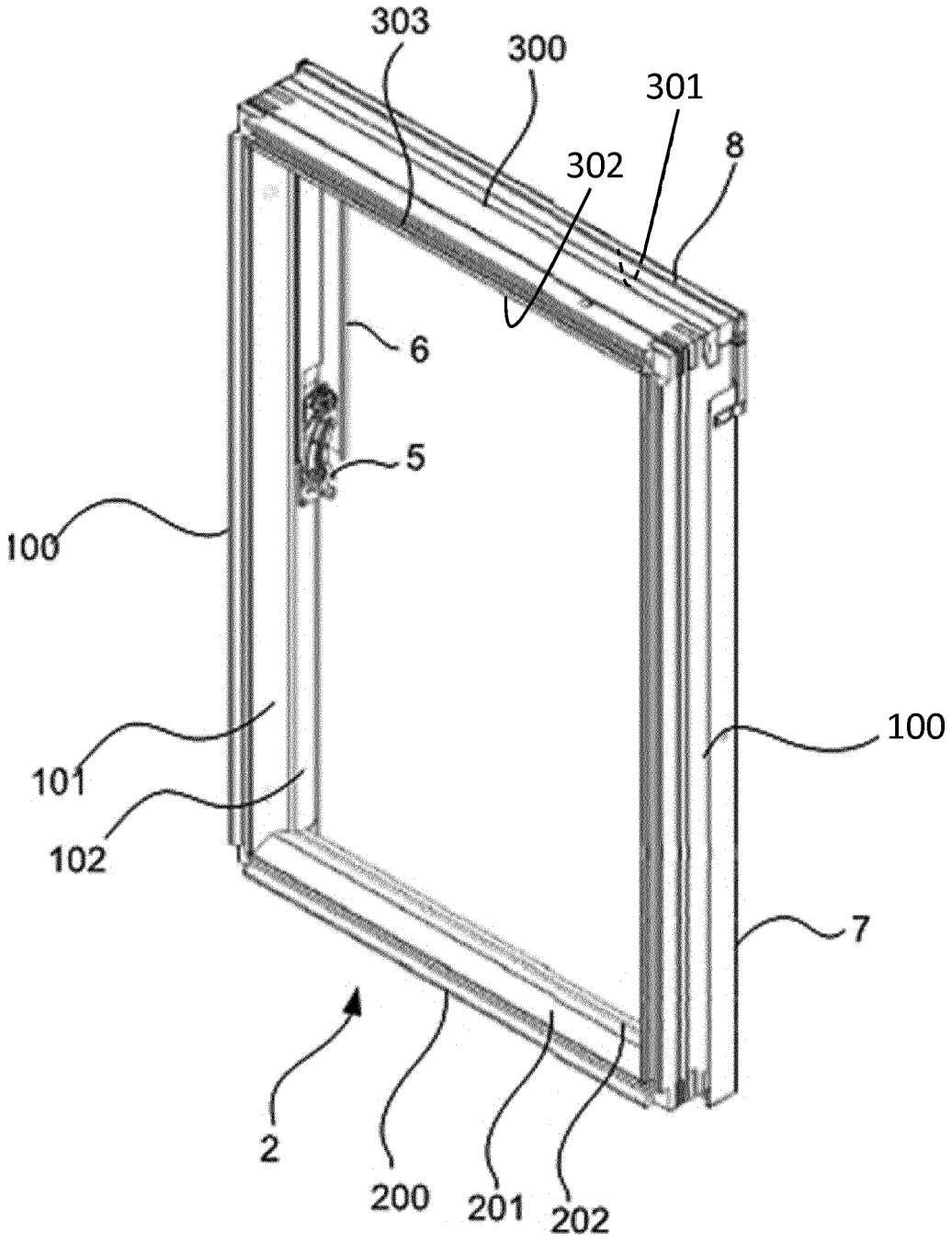

Fig. 2

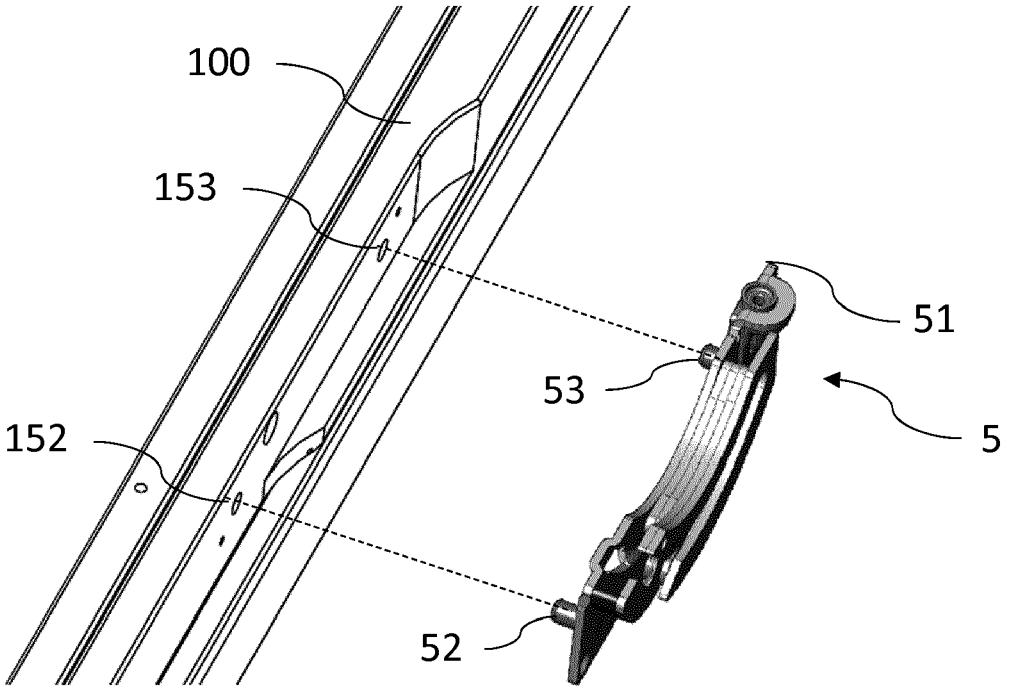

Fig. 3

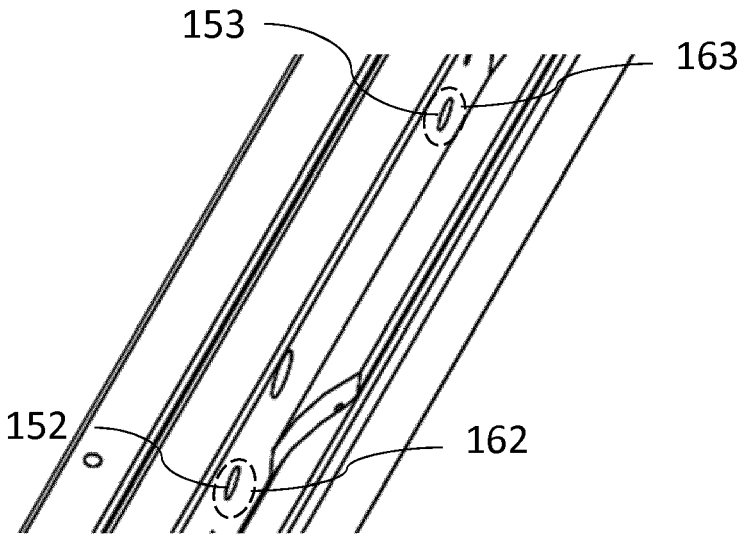

Fig. 4

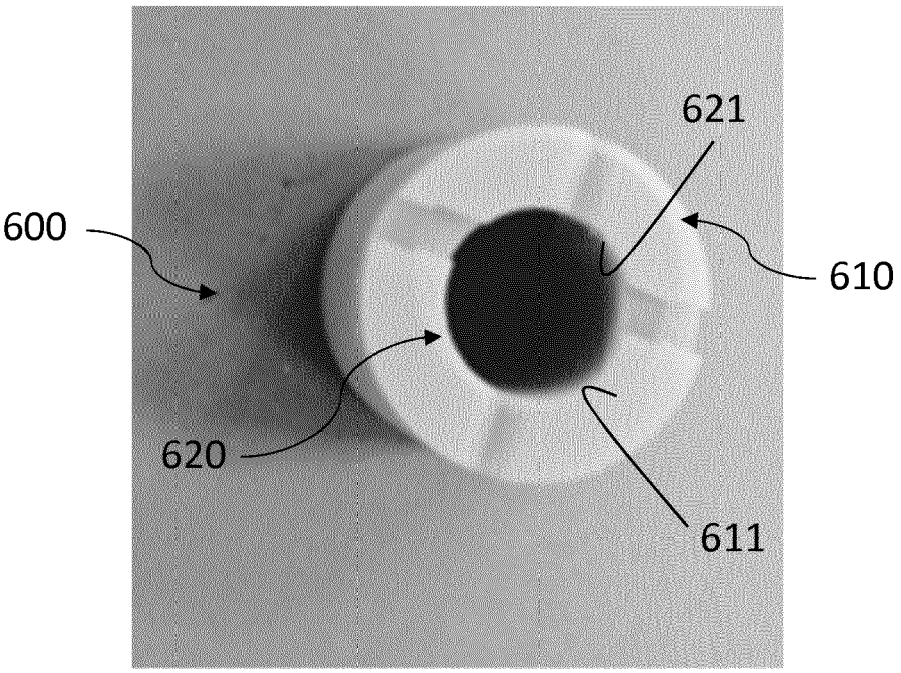

Fig. 5

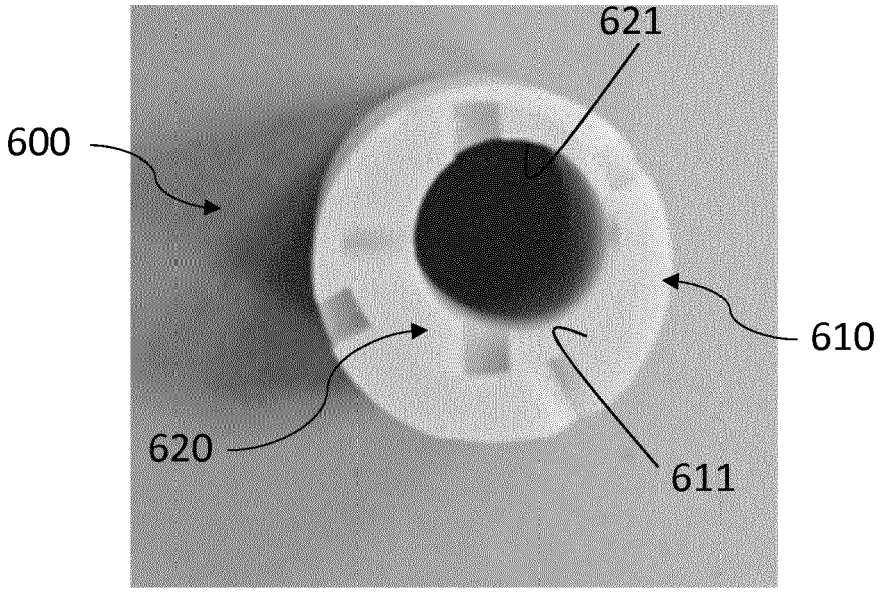

Fig. 6

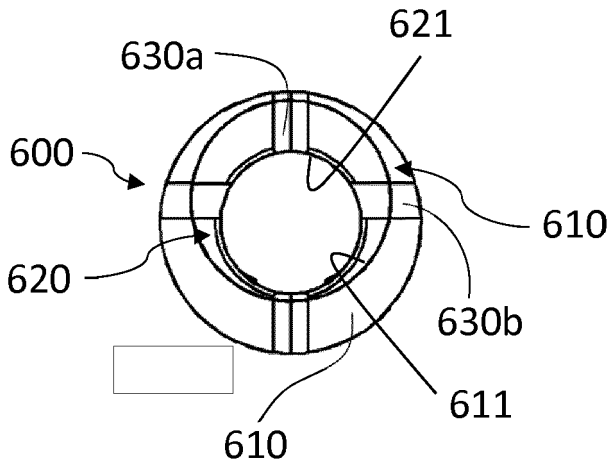

Fig. 7

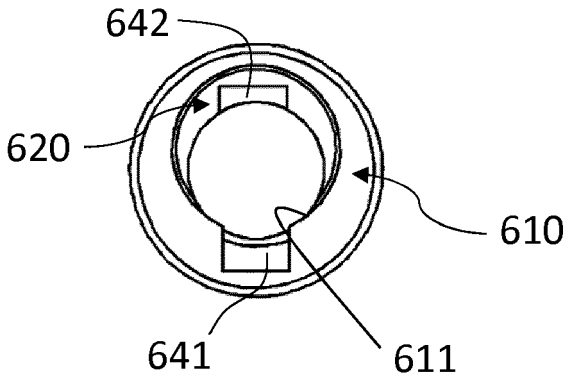

Fig. 8

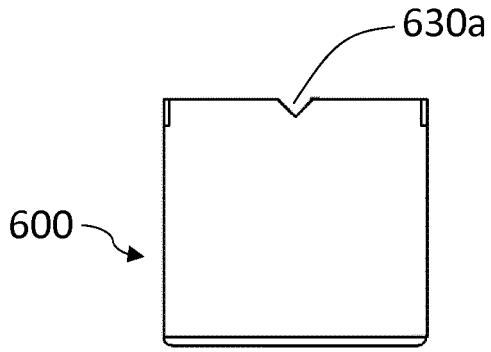

Fig. 9

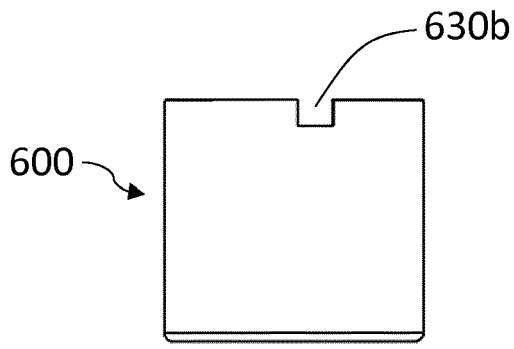

Fig. 10

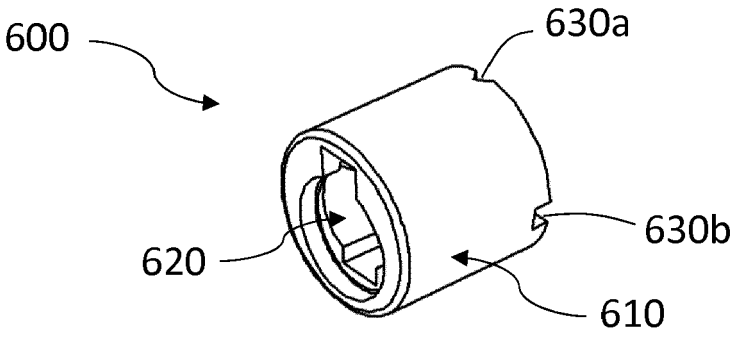

Fig. 11

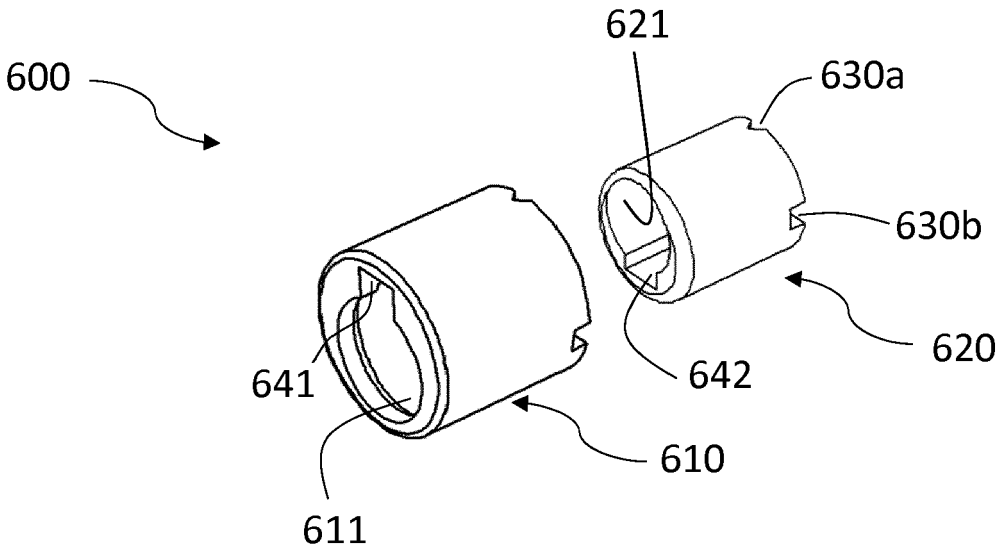

Fig. 12

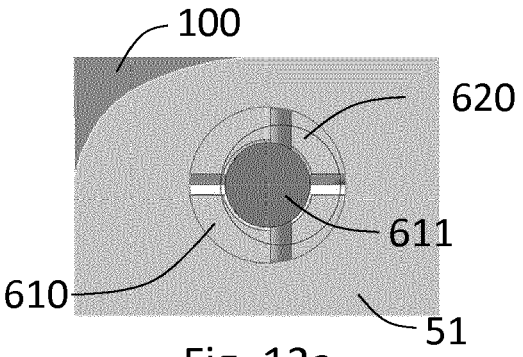

Fig. 13a

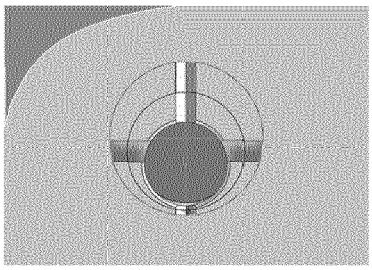

Fig. 13d

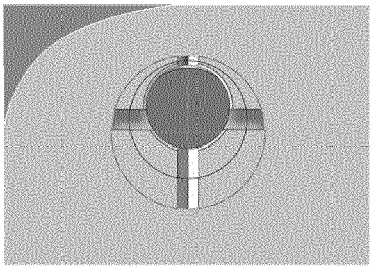

Fig. 13b

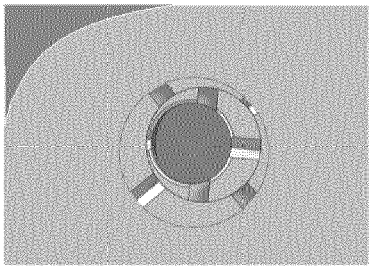

Fig. 13e

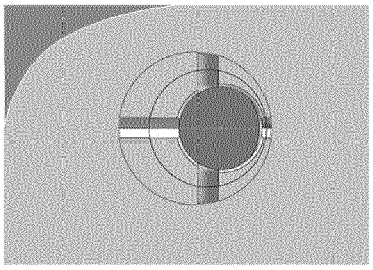

Fig. 13c

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EUROPEAN SEARCH REPORT

Application Number
EP 18 19 1943

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 419 589 B1 (FAKRO PP SPOLKA ZOO [PL]) 26 March 2014 (2014-03-26) * paragraph [0024]; figures 5,7-8 * -----	1-17	INV. E05D1/04 E04D13/035
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A	US 2005/117966 A1 (STEINBECK HERBERT [DE]) 2 June 2005 (2005-06-02) * figures 2,4 * -----	1-17	

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E05D
E04D
E05B
F16B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 January 2019	Leroux, Corentine

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