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

(11) **EP 3 900 879 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
01.05.2024 Bulletin 2024/18

(21) Application number: **21169645.5**

(22) Date of filing: **21.04.2021**

(51) International Patent Classification (IPC):
B25B 27/00 *(2006.01)* ***B26B 5/00*** *(2006.01)*
E04D 13/00 *(2006.01)* ***E04D 15/00*** *(2006.01)*
B26B 11/00 *(2006.01)* ***B26B 29/02*** *(2006.01)*
E04D 12/00 *(2006.01)* ***E04D 13/03*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B25B 27/0092; B26B 11/00; B26B 29/025; E04D 12/002; E04D 13/031; E04D 15/00

(54) **KIT COMPRISING A TOOL AND A VAPOUR BARRIER COLLAR**

KIT MIT EINEM WERKZEUG UND EINER DAMPFSPERRMANSCHETTE

KIT COMPRENANT UN OUTIL ET UN COLLIER BARRIÈRE À LA VAPEUR

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

(30) Priority: **22.04.2020 DK PA202070246**

(43) Date of publication of application:
27.10.2021 Bulletin 2021/43

(73) Proprietor: **VKR Holding A/S**
2970 Hørsholm (DK)

(72) Inventors:
- **Ansø, Bo**
  2970 Hørsholm (DK)
- **Honnens de Lichtenberg, Tobias Brønnum**
  2970 Hørsholm (DK)

(74) Representative: **AWA Denmark A/S**
Strandgade 56
1401 Copenhagen K (DK)

(56) References cited:
EP-A2- 2 711 480
FR-A1- 3 058 350
US-A- 4 578 851
US-A- 4 790 059
US-A- 5 749 434
US-A- 5 868 900
US-A1- 2005 034 309
US-A1- 2007 033 740
US-A1- 2007 193 689
US-A1- 2009 158 529

EP 3 900 879 B1

Description

Technical Field

[0001] The present invention relates to a kit comprising a tool and a vapour barrier collar including mounting means according to the preamble of claim 1.

Background Art

[0002] It is known that during installation of a window frame of a roof window, a vapour barrier collar is arranged along the circumference of the window frame and connected to the vapour barrier membrane of the roof structure such that insulation is protected from moisture from the interior. Such a vapour barrier collar is disclosed in Applicant's European patents Nos 2 243 893 B1 and 2 711 480 B1, which disclose a kit according to the preamble of claim 1, according to which the collar is arranged to comprise circumferentially joined sheet elements.

[0003] During installation, the vapour barrier collar is arranged around the aperture of the roof window by mounting means present along the edges of the vapour barrier collar. The mounting takes place by inserting the mounting means of the vapour barrier collar in a circumferential groove of the window frame. The mounting means are typically in the form of a number of individual "press-in pieces", or a coherent strip, of a relatively stiffer material compared to the vapour barrier collar material, the press-in pieces being distributed with intervals along the edge of the collar that is to be inserted into the groove of the building structure. The vapour barrier collar material is made from a substantially incompressible material, typically formed as a film or foil of a plastic material such as polyethylene, with a thickness of about 0.2 mm and having a low permeability.

[0004] To ensure a reliable and sealing when arranging the vapour barrier collar, a tool is typically provided for assisting in the arrangement of the vapour barrier collar within the groove in the window frame. The known tool is formed as a cap having a tooltip which has rounded edges. This is arranged to be pushed and slid to arrange the mounting means of the vapour barrier in the groove of the window frame. Even though such a tool has proven to function well and is generally used by installers, it requires some caution in use. This is due to the fact that there may be friction between the material of the vapour barrier collar and the tooltip during installation, which leads to the material being pushed as the sliding action occurs. In turn, this may form an accumulation of material of the vapour barrier collar at the corners of the building structure, following which the installation of the collar needs to be restarted. It may also cause weakening or even rupture of the vapour barrier collar material. This in turn may lead to decreased quality, longer installation times, or in worst case, costly damages due to leakage. Thus, there is a need for an improved solution of an installation tool.

[0005] Examples of other types of tools in the prior art include US 2005/034309 A1 and US 2007/033740 A1.

Summary of Invention

[0006] With this background, it is therefore an object of the invention to provide a kit with a tool that diminishes the drawbacks of known arrangements.

[0007] This and further objects are met by a kit of the kind mentioned in the introduction, which is furthermore characterised by the features of the characterising portion of claim 1. With such a tool in the kit, the installation of the vapour barrier collar is made efficient and reliable. Since the material of the vapour barrier collar will be subjected to a rolling action and the mounting means so to say rolled into position in the groove, any unnecessary friction in the longitudinal direction is avoided and as a consequence, material stack-up for instance in the corners of the window frame is prevented. The provision of two roller wheels connected to each other by a snap hook leg and a receiving aperture provides for a mechanically simple, yet reliable structure, which is furthermore easy to assemble and disassemble.

[0008] In one embodiment, each roller wheel of the roller wheel set is provided with a cog-like outer face, wherein cogs are arranged across a substantial part of the width of the roller wheel. By the term "cog-like" is to be understood as encompassing any teethed surfaces, including configurations of arbitrary tyre tread patterns. Likewise, the term "cogs" should be interpreted in this broad sense. By providing cogs, it allows the roller wheel to sufficiently hold down the substantially incompressible material of the vapour barrier collar and move over the vapour barrier material without sliding.

[0009] The cogs may be arranged at an angle at least partially across the width of the roller wheel, or perpendicular to a linear rolling direction of the roller wheel in the longitudinal direction of the tool, and the cogs may have a pre-defined maximum depth. These measures are preferable to prevent any damage to the material of the vapour barrier collar. Therefore, the cogs may not be too sharp at the edges. The sharpness may be varying, since the material of the vapour barrier collar may vary depending on the current type of installation. By providing a specific depth to the cogs, it is ensured that the vapour barrier collar will not be damaged when the installation personnel applies pressure to the roller wheel. If the cogs are too deep, an excessively applied pressure may perforate the material of the vapour barrier collar. Thus, a correctly determined cog depth may prevent damage and increase quality of the installation.

[0010] In a presently preferred embodiment, the other roller wheel comprises a socket portion with guiding means for said at least one snap hook leg and cooperating with the opening in the protruding front portion. This provides for a mechanically simple, yet reliable structure, which is furthermore easy to assemble and disassemble.

[0011] It is preferred that the roller wheels are connect-

ed to the head element at a wheel centre such that the roller wheels are confined substantially at extensions of the contours of the head element of the tool. This provides for improved usage and storage properties.

[0012] In one embodiment, each roller wheel of the roller wheel set may have a width-to-diameter ratio being about 1:1. Preferably 1:2 but not more than 1:3. In this way, it may be ensured that the width is not too narrow. If the width of the roller wheel is narrow, the wheel may inadvertently act as a cutting tool and perforate the material of the vapour barrier collar. Therefore, it may be ensured that the roller wheel has a width so that the roller is not too sharp at its edge.

[0013] In another presently preferred embodiment, the operating means of the head element comprise an oblong cavity and an opening towards the ambient at the rear end of the head element in connection with said cavity, which is able to receive at least partially and retain an oblong body element. While the dimension of the operating means in the longitudinal direction may be of a size permitting the operating means to be used as handle in itself, the configuration with an oblong body element renders the installation process more comfortable.

[0014] In a further development of this presently preferred embodiment, an accessory equipment is arranged in connection with the head element of the tool and optionally the body element.

[0015] The body element, or the accessory equipment, may be a pencil, a measurement stick, a multi-tool, a knife, a tucker, an adapter element, or the like. In that way, the tool may constitute a multi-purpose tool and fulfil several functions during installation of the vapour barrier collar and/or other building components, and further time may be saved by reducing the installation personnel's effort. Again, "oblong" means that the dimension of the operating means in a longitudinal direction is at least slightly larger than the dimension of the operating means in a transversal direction.

[0016] In such embodiments, in which said operating means comprise an oblong cavity and an opening towards the ambient at the rear end of the head element in connection with said cavity, "oblong" means that the dimension of the cavity in a longitudinal direction is at least slightly larger than the dimension of the cavity in a transversal direction. In this way, the tool may be completed with a body element and/or an accessory equipment. The accessory equipment may be arranged at the body element, be part of the body element, or be the body element. The body element, alternatively the accessory equipment, may serve as a handle as it prolongs or extends the operating means of the tool when partly contained in the cavity. This provides for a tool that is easy to operate and fits well into the installer's hand. As the tool can be removed from the body element and/or accessory equipment when not in use, the tool is very little space consuming due to its compact structure.

[0017] Further details and advantages will appear from the appended claims and the following description.

Brief Description of Drawings

[0018] In the following description embodiments of the invention will be described with reference to the drawings, in which

Fig. 1 is a perspective view of a tool of a kit in a first embodiment of the invention;
Fig. 2 is a perspective view of a head element of a tool of the kit of the first embodiment of the invention;
Fig. 3 shows an exploded perspective view of the tool of the kit of the first embodiment;
Fig. 4 is a perspective partial view, on a larger scale, of details of the tool of Fig. 3;
Fig. 5 shows a side view of the tool of the kit in the first embodiment;
Fig. 6 is an exploded perspective view of the tool of the kit of the first embodiment according to the invention;
Fig. 7 is a perspective partial view of a tool of a kit in a second embodiment of the kit according to the invention;
Fig. 8 a schematic sectional isometric view of a detail of the second embodiment of the kit according to the invention;
Fig. 9 is an exploded perspective partial view of a tool of a kit in a third embodiment of the invention;
Fig. 10 is a partial side view of the tool of Fig. 9;
Fig. 11 shows a variant of the tool of Fig. 9;
Fig. 12 is an exploded perspective partial view of a tool of a kit in a fourth embodiment of the invention;
Fig. 13 shows a variant of the tool of Fig. 12;
Fig. 14 is a partial sectional perspective view of a vapour barrier collar in a mounted condition, surrounding an aperture of a roof-penetrating building structure in the form of a roof window;
Fig. 15 is a partial sectional perspective view, on a larger scale, of the detail XV of Fig. 14, showing the mounting means in engagement with the groove in the frame of the roof window; and
Fig. 16 is a schematic side view, on a larger scale, showing the construction of the mounting means of the vapour barrier collar.

Description of Embodiments

[0019] In the following, embodiments of a kit according to the invention will be described. The tool forms part of a kit including also at least a vapour barrier collar to be used in the installation of a roof window.

[0020] Referring now to Fig. 14, a perspective, partial sectional view of a vapour barrier collar generally designated 10 is shown in connection with a roof window 1 having a window frame 2 mounted in an aperture in a roof structure. The vapour barrier collar 10 comprises a number of sheet elements of which the bottom sheet element 11 is shown. For example, two side sheet elements, a top sheet element and the bottom sheet element

11 may be provided. The roof window 1 also comprises a sash 3 in which a pane 4 is encased. The window frame 2 is built into a roof structure of any suitable configuration, here represented by battens 7, but may also comprise rafters, underroof, insulation and further details not described. A lining panel 5 is configured to form a transition between the window frame 2 and an inner wall of a room of the building in which the roof window 1 is installed, on the interior side of the vapour barrier collar 10. In the example shown, the roof window 1 is substantially rectangular, and the window frame 2 comprises four mutually orthogonal frame members; each of these members will be referred to only as "window frame 2".

[0021] The vapour barrier collar 10 is intended to be connected to a vapour barrier membrane 8 of an underroof forming part of the overall roof structure, here by a tape 9 at an interior edge 11a of the bottom sheet element 11 of the vapour barrier collar 10. The vapour barrier collar 10 is, in the example shown, substantially symmetrical about both a longitudinal central axis and a lateral central axis. Due to this symmetry, it is understood that the description applies for all sections of the vapour barrier collar 10 though only one section of the vapour barrier collar 10 is described.

[0022] In one example the vapour barrier collar is composed of four trapezoidal sheet elements 11 welded together to form a vapour barrier collar having the shape of a frustum of a pyramid. It is to be understood that the invention described is equally applicable to a vapour barrier collar having the shape shown in the above-mentioned EP 0 994 991. The sheet elements 11 are mutually joined together in joints extending along end edges to form a collar including a coherent rim along first edges of the respective sheet elements.

[0023] The material of the vapour barrier collar 10 is a substantially incompressible plastic material, formed as a film or foil of a suitable plastic material, for instance of polyethylene. The vapour barrier collar 10 has a thickness of about 0.2 mm and has a low permeability such that the insulation is protected from moisture formed on the warmer inside of the building.

[0024] Referring now also to Figs 15 and 16, mounting means 12 of the vapour barrier collar 10 are successively introduced into a circumferential groove 21 of the window frame 2 by applying a pressure on the mounting means 12 by the aid of an inventive tool to be described below. The configuration of the respective sections of the vapour barrier collar 10 is represented by the bottom sheet element 11, in which a sheet of a suitable foil material is provided with the mounting means 12 at an exterior edge 11b, opposite the interior edge 11a. The mounting means 12 comprise an anchor element 12a of a suitable material, such as a relatively rigid plastic material, which is fastened to the foil of the bottom sheet element 11 by for instance welding. At a respective end of the anchor element 12a, sealing elements 12b and 12c are provided, typically of a resilient foam material. A height HM of the mounting means 12 is defined as the distance substantially between opposing outer edges of the sealing elements 12b and 12c. The height HM is chosen such that a reliable fit is obtained when the vapour barrier collar 10 is brought into connection with the groove 21 of the window frame 2. Typical measurements of the groove 21 and hence of the height HM are about 12.5 mm. This will also accommodate lining panels 5 made of gypsum or other board materials of standard thickness.

[0025] Now referring to Figs 1 to 6, a first embodiment of a tool 50 of a kit according to the present invention for use in the installation, or mounting, of a vapour barrier will be described in further detail. The tool 50 is thus applicable for use in mounting a vapour barrier of any suitable configuration, for instance in the form of a vapour barrier collar as described above whether formed by 1) four trapezoidal sheet elements, 2) two trapezoidal sheet elements and two rectangular sheet elements as the prior art vapour barrier collar described in EP 0 994 991, or 3) any other shape. The tool 50 comprises a head element 51 including a front end 55 at which insertion means 52 for introducing the mounting means 12 of the vapour barrier collar 10 into the groove 21 are formed. The head element 51 of the tool 50 is furthermore provided with operating means 54 for operating the tool 50 when arranging the mounting means 12 into the groove 21 of the window frame 2.

[0026] The head element 51 of the tool 50 has a rear end 59, which in principle could form the rear end of the entire tool 50. A longitudinal direction LX is defined as extending through the front end 55 and the rear end 59. In the embodiment shown, the tool 50 also comprises a body element 60, cf. Fig. 6, which has a second rear end 65 opposite the front end 55 of the head element 51 of the tool 50. Depending on the dimensions of the head element 51 and the body element 60, the overall length of the tool 50 in the embodiment shown, between the second rear end 65 and front end 55, may range between 100 and 300 mm to ensure ease of operability of the tool 50 while still being able to be stored conveniently between uses. The length of the head element 51 between the front end 55 and the rear end 59 is chosen such that the operating means 54 of the tool 50 are oblong so as to serve as a handle in itself by providing a sufficiently comfortable grip on the operating means 54. The total length of the head element 51 typically amounts to 50 to 100 mm, here about 75 mm.

[0027] Further details of the head element 51 of the tool 50 include a clip 58. The clip may provide a storage option when not in use, for instance to secure the tool onto a piece of clothing. The clip 58 may also serve as a rest for the installer's index finger. The head element 51 of the shown embodiment of the tool 50 furthermore comprises an oblong cavity 56 and an opening 57 towards the ambient in connection with the cavity 56, at the rear end 59. The cavity 56 is able to receive at least partially and retain a correspondingly oblong object, here the body element 60, and/or an accessory equipment. The dimension of the cavity 56 in a longitudinal direction

is at least slightly larger than the dimension of the cavity 56 in a transversal direction. In this particular embodiment, the dimension of the cavity 56 in a longitudinal direction is approximately 1.5 times larger than the dimension of the cavity 56 in a transversal direction. The body element 60 is arranged to be inserted in the cavity 56. Thus, the body element needs to have slightly smaller dimensions in order to comfortably fit into the cavity 56. The cavity 56 is provided with longitudinal ridges 56a to provide at the same time easy insertion into and a suitable resistance against inadvertent withdrawal from the cavity 56 of the body element, or of accessory equipment to be described below. The body element 60 may thus be serving as a handle as it prolongs, or extends, the operating means 54 of the tool 50. Different cross-sectional shapes may be envisaged besides rectangular, for instance square, oval, elliptic or round. The body element 60 here comprises a carpenter's pencil with a front portion 60a configured to form a tip of the carpenter's pencil to be sharpened as desired.

[0028] The insertion means 52 comprise a roller wheel set 53 including at least one roller wheel for applying a pressure and rolling on the mounting means 12 of the sheet elements, including bottom sheet element 11 as shown in Fig. 14, of the vapour barrier collar 10 to arrange the mounting means 12 into the groove 21 of the window frame 2 of the roof window. The roller wheel set 53 is connected to the operating means 54 of the head element 51 at a wheel centre 53.1 at the front end 55 of the tool 50. Two wheels 53a and 53b are provided. Thus, the insertion means 52 in the form of the roller wheel set 53 53, here the two wheels 53a, 53b, provided at the proximity of the front end 55 has a width and a diameter and are arranged so that a rotation of the roller wheels 53a, 53b in the longitudinal direction LX of the tool 50 is admitted so that the mounting means 12 are arranged in the groove 21 by rolling the rolling wheels in the longitudinal direction LX of the tool 50 and along the respective length direction of the individual members of the window frame 2. Each roller wheel 53a, 53b has a pre-defined diameter DW and a width WW. The diameter may relate to the width as a ratio in order to ensure that the rollers do not damage the vapour barrier material. If the roller wheel is too narrow, the roller wheel may cut through the material of the vapour barrier collar. In order to obtain a smooth movement of the tool and a proper and precise mounting of the mounting means of the vapour barrier collar, the width of the roller wheel set at the insertion means is slightly smaller than the distance between the two sidewalls of the groove. Typical values of the width of the tool may be 75-95% of the size of the mounting means of the vapour barrier collar, and 80-90% of the groove in the building component. A total width WT of the roller wheels 53a, 53b is chosen in accordance with the expected width of the corresponding groove 21 in which the mounting means 12 of the vapour barrier collar 10 are to be arranged. The width WW of each roller wheel 53a, 53b is sufficiently wide to not cause damage onto the vapour barrier collar 10. The roller wheel 53; 53a, 53b may have a width-to-diameter ratio of between 1:1 to 1:3, meaning that the width WW and the diameter DW may be equally big, but also that the width cannot be too narrow. If the width is too narrow, the applied pressure during installation may cause perforation in the barrier material. The two roller wheels 53a, 53b are arranged so that they share a centre of rotation. As regards the width of the insertion means 52 at the front end 55 of the tool 50, substantially corresponding to the total width WT of the roller wheels 53a, 53b at either side of the protruding front portion 51.1, it is expedient that it is slightly smaller than the distance between the two side walls of the groove 21 into which the mounting means of the vapour barrier collar is to be inserted. The width of the insertion means 52 at the front end 55 of the tool 50 generally preferably lies between 10 and 12 mm, depending on the width of the groove 21. The width of the insertion means 52 should be chosen such that the tool 50 may be moved along the groove 21 in the window frame 2, however without catching against the side walls of the groove 21. In this first embodiment, the operating means 54 of the head element 51 of the tool comprises a narrow front portion 54a having a width substantially corresponding to or slightly smaller than the total width WT, and a wider rear portion 54b. For instance, the width of the wider rear portion 54b may exceed the width of the groove 21 such that only the narrow front portion 54a and the insertion means 52 of the tool 50 move within the groove 21.

[0029] Referring now also to Figs 3 and 4, the roller wheels 53a, 53b are shown in more detail. It emerges that a circumferential face of the roller wheels 53a, 53b has a cog-like structure to provide a teethed surface, or tyre tread pattern. Any suitable configuration providing a rolling action of the tool 50 against the surface of the vapour barrier collar 10 aimed at may in principle be chosen. In the following the cog-like structure is referred to as cogs 53.2. The cogs 53.2 are arranged to improve the grip towards the vapour barrier material and subsequently during installation; the roller wheels 53a, 53b ensure an improved installation since the tool 50 does not push the vapour barrier material in front of the tool (or below the tool 50, in case the tool 50 is rolled backwards). In this way, stack-up of the material is prevented. The movement of the tool 50 in the groove 21 may in principle be carried out either forwards or backwards in the longitudinal direction LX. The cogs 53.2 may be arranged across at least part of the width of the roller wheel, preferably across at least 80% of the width. The cogs may as shown have a blunt tip. This may ensure that the cog edges do not perforate the vapour barrier material. However, the cogs may be substantially sharp. As best seen in Fig. 4, the cogs 53.2 are shallow. This means that they have a major diameter-to-minor diameter ratio close to 1:1. The shallowness of the cog may ensure that the applied pressure onto the roller wheel 53 during installation does not cause perforations in the vapour barrier material. The cogs may be arranged at an angle relative to the rolling

direction across the width of the roller wheel 53a, 53b, or be provided with angled sections, either outwards or inwards relative to the axial direction of the roller wheel/s. The angle, if any, may be determined based on the best grip provided to the mounting means. In some embodiments, the circumferential surface of the roller wheel may be provided with additional gripping means. This may be a coating, such as a layer or part layer of a rubber material. The cogs of the roller wheel may have a pre-defined maximum depth of 0.1 to 5 mm, preferably 1 to 2 mm. The short depth ensures that the cogs does not receive too much pressure and transfers it onto the vapour barrier material. A too high pressure may cause a cog to perforate the vapour barrier material.

[0030] The two roller wheels 53a, 53b are arranged at a respective side of the protruding front portion 51.1 of the head element 51 and are connected to each other by means of two snap hook legs 53.3 on one roller wheel 53a interacting with a counterpart receiving aperture 53.4 in the other roller wheel 53b via an opening 51.2 in the protruding front portion 51.1. The other roller wheel 53b is here provided with a socket portion 53.5 with guiding means for the snap hook legs 53.3 and cooperates with the opening 51.2 in the protruding front portion 51.1 such that a smooth rolling movement is facilitated. The wheels 53a, 53b are easily assembled during manufacture. They may also be easily disassembled by releasing the snap engagement, for instance in order to re-use the tool as a holder/extender for a carpenter's pencil.

[0031] As best shown in Fig. 5, each roller wheel 53a, 53b is connected to the head element 51 at the wheel centre 53.1 such that the roller wheels are confined substantially at extensions of the contours of the head element 51 of the tool 50, i.e. within a straight line continuing from the contour of an under side 51.3 of the head element 51 and a curved line continuing from the contour of a curved upper side 51.4. Only a portion of the roller wheels 53a, 53b protrudes beyond to ensure correct contact between the insertion means 52 and the substantially incompressible material of the vapour barrier collar 10 in use of the tool 50.

[0032] While the body element in the form of the carpenter's pencil 60 in the first embodiment is accommodated directly in the cavity 56 of the head element 51, a second embodiment shown in Fig. 7 comprises an accessory equipment 161. Elements of the second embodiment having the same or analogous function as elements of the first embodiment carry the same reference numerals to which 100 has been added. Only differences will be described in detail.

[0033] The accessory equipment 161 of the second embodiment is accommodated in the cavity (not visible in Fig. 7) of the head element 151 of tool 150. In the position shown in Fig. 7, the accessory equipment 161 is partially withdrawn from the head element 151. In its fully inserted position, a rear end 169 of the accessory equipment 161 is substantially flush with the rear end 159 of the head element 151.

[0034] Securing means 170 are provided to safely engage the accessory equipment 161 with the head element 151 of the tool 150. The securing means 170 comprises a hook element 172 and a connect element 171. The hook element 162 is arranged at or near the rear end 159 of the head element 151, and the connect element 171 is arranged at or near a rear end 169 of the auxiliary equipment 161 such that the hook element 172 engages the connect element 171 when the auxiliary equipment 161 is fully inserted into the oblong cavity of the head element 151.

[0035] One example of an accessory equipment of the second embodiment is shown in stylized form in Fig. 8. Here, the accessory equipment is in the form of an adapter element 161 having suitable dimensions and outer shape (for instance rounded, even though it is shown having a substantially rectangular cross-section) to engage with the head element 151. The adapter element 161 is provided with two cavities 164a and 164b of mutually different cross-sectional dimensions in the longitudinal direction such that for instance the cavity 164b closer to a rear end 169 of the adapter element 161 is configured to receive a carpenter's pencil of one standard size, for instance a cavity of about 16x7 mm, and the other cavity 164a having suitable dimensions to receive a different, smaller type of pencil, for instance 9x6 mm, as illustrated by alternative body element 160. The accessory equipment 161 of this embodiment may also act as an adapter element for receiving other accessory equipment.

[0036] Referring now to Fig. 9 in which an exploded view of a tool 250 in a third embodiment is shown. Elements of the third embodiment having the same or analogous function as elements of the first embodiment carry the same reference numerals to which 200 has been added. Only differences will be described in detail.

[0037] The tool 250 is shown with an auxiliary equipment 261 retracted from head element 251. Body element 60 is also shown separated from the auxiliary equipment 261. The auxiliary equipment comprises a knife blade 262 retained in a knife holder 263. The knife blade 262 is configured to be received in the oblong cavity 256 of the head element 251 as shown in Fig. 10. The knife holder 263 of the auxiliary equipment 261 is provided with an oblong cavity 266 configured to receive the body element 60. The knife blade 262 may for instance be of the kind which is industry standard for exchangeable knife blades.

[0038] As in the second embodiment, securing means 270 are provided for securing the auxiliary equipment 261 to the head element 251, cf. Fig. 10 in which the hook element 272 engages the connect element 271 in the position in which the auxiliary equipment 261 is fully inserted into the oblong cavity 256 of the head element 251.

[0039] The tool 250 thus constitutes a multi-purpose tool, having insertion means 252 on the head element 251 for use in arranging the vapour barrier collar in the

groove in the window frame member, but also a knife tool provided by the auxiliary equipment 261 and configured to be used independently from the insertion means 252. As a matter of safety, the knife tool may in fact not be used at the same time as the insertion means.

[0040] Fig. 11 shows a variant of the tool of the third embodiment. Elements having the same or analogous function as in the third embodiment are denoted by the same reference numerals to which ‘ has been added. Here, the tool 250’ is provided with insertion means 252’ of a rounded, fixed shape. Also tool 250’ functions as a multi-purpose tool.

[0041] An alternative accessory equipment 361 is shown in the fourth embodiment of Fig. 12. Elements of the fourth embodiment having the same or analogous function as elements of the first embodiment carry the same reference numerals to which 300 has been added. Only differences will be described in detail. A front portion 360a of a body element 360 is configured to be connected to the head element 351, which may be the same as in the above first, second and third embodiments of the tool 350, or slightly different. Operation of the tool 350 according to this embodiment may be carried out as described in the above, i.e. the insertion means 352 at the front end 355 of the tool 350 are introduced into the groove in the window frame and brought into engagement with the vapour barrier collar 10, for instance by gripping the body element 360 with the accessory equipment 361 thus acting as a handle. At a rear end 365 of the tool 350 in this embodiment, the accessory equipment 361 is provided as a wedge-shaped section with an inclined surface 363. By choosing suitable dimensions of the thickness and height of the accessory equipment 361, for instance 40 to 50 mm by 5 to 15 mm, and a suitable inclination of the inclined surface 363, the accessory equipment 361 may be used as a tucker, i.e. an assisting tool in the tucking-in of insulation material at the outer circumference of the window frame 2 of the roof window 1. This is particularly useful in the case of strips of insulating material to be tucked into narrow spaces surrounding a building component. The accessory equipment 361 of the tool 350 of this embodiment may also be used in other fields of application.

[0042] The tool 350 thus constitutes a multi-purpose tool, having insertion means 352 on the head element 351 for use in arranging the vapour barrier collar in the groove in the window frame member, but also a tucker tool provided by the auxiliary equipment 361 and configured to be used independently from the insertion means 352. Since the tucker tool is located at the opposite end of the tool 350, it may in fact not be used at the same time as the insertion means.

[0043] Fig. 13 shows a variant of the tool of the fourth embodiment. Elements having the same or analogous function as in the fourth embodiment are denoted by the same reference numerals to which ‘ has been added. Here, the tool 350’ is provided with insertion means 352’ of a rounded, fixed shape. Also tool 350’ functions as a multi-purpose tool.

[0044] The tool of any of the above embodiments may be re-used a number of times. Re-use may include installation of further vapour barrier collars, functioning as a holder/extender of a carpenter’s pencil, and/or as a receiver or holder/extender of auxiliary equipment. At the end of life, the parts of the tool may be disposed of in dependence on the material chosen, typically comprising hard plastic.

[0045] The invention is not delimited to the embodiments described in the above and shown in the drawings but various modifications and combinations may be carried out without departing from the scope of the claims.

List of reference numerals

[0046]

1	roof window
2	window frame
	21 groove
3	sash
4	pane
5	lining panel
6	insulating member
7	battens
8	vapour barrier membrane
9	tape
10	vapour barrier collar
	11 sheet element
	11a edge (interior)
	11b edge (exterior)
	12 mounting means
	12a anchor element
	12b, 12c sealing elements
50	tool
51	head element
	51.1 protruding front portion
	51.2 opening
	51.3 under side
	51.4 curved upper side
52	insertion means
53	roller wheel set
	53a first roller wheel
	53b second roller wheel
	53.1 wheel centre
	53.2 cogs
	53.3 snap hook leg
	53.4 receiving aperture for snap hook leg
	53.5 socket portion
54	operating means

54a narrow front portion
54b wide rear portion

55 front end of head element
56 oblong cavity
56a ridges
57 opening
58 clip
59 rear end of head element
60 body element (carpenter's pencil) 60a front portion (tip of carpenter's pencil)
65 second rear end (of body element)
150 tool
151 head element
152 insertion means
153 roller wheel set
154 operating means
155 front end of head element
159 rear end of head element

160 alternative body element (smaller carpenter's pencil)
161 auxiliary equipment / adapter element

164a cavity
164b cavity
169 rear end of auxiliary equipment

170 securing means

171 connect element
172 hook element

250 tool
251 head element
252 insertion means
253 roller wheel set
254 operating means
255 front end
256 oblong cavity
259 rear end of head element

261 auxiliary equipment / knife tool

262 knife blade
263 knife holder
266 oblong cavity
269 rear end of auxiliary equipment

270 securing means

271 connect element
272 hook element

350 tool
351 head element
352 insertion means
353 roller wheel set
354 operating means
355 front end
356 oblong cavity
359 rear end of head element
360 body element
360a front portion
361 accessory equipment / tucker tool
363 inclined surface
365 rear end

LX longitudinal direction
HM height, mounting means
DW diameter, wheel
WW width, wheel
WT width, total

Claims

1. Kit comprising a tool (50) and a vapour barrier collar (10) of a substantially incompressible material and including mounting means (12), wherein the tool (50) comprises a head element (51) with a front end (55) and a rear end (59), the head element (51) defining a longitudinal direction (LX) of the tool (50) and comprising operating means (54) for operating the tool and insertion means (52) for introducing the mounting means (12) of said vapour barrier collar (10) into a groove (21) of a roof window, said groove being adapted to receive said mounting means, **characterised in that** said insertion means (52) comprise a roller wheel set (53) including at least one roller wheel (53a, 53b) at the front end (55) of the head element (51) of the tool (50), the roller wheel set (53) having a width (WT) and a diameter (DW) and being arranged so that a rotation of the roller wheel set (53) in the longitudinal direction (LX) of the tool (50) is admitted so that the mounting means (12) of the vapour barrier collar (1) are arranged in the groove (21) by rolling said roller wheel set (53), wherein the roller wheel set (53) of the tool (50) comprises two roller wheels (53a, 53b) arranged at a respective side of a protruding front portion (51.1) of the head element (51) and connected to each other by means of at least one snap hook leg (53.3) on one roller wheel (53a) interacting with a counterpart receiving aperture (53.4) in the other roller wheel (53b) via an opening (51.2) in the protruding front portion (51.1).

2. Kit according to claim 1, wherein each roller wheel (53a, 53b) of the roller wheel set (53) of the tool (50) is provided with a cog-like outer face, wherein cogs (53.2) are arranged across a substantial part of the width of the roller wheel (53a, 53b).

3. Kit according to claim 2, wherein the cogs (53.2) are arranged at an angle at least partially across the width of the roller wheel (53a, 53b), or perpendicular

to a linear rolling direction of the roller wheel (53a, 53b) in the longitudinal direction (LX) of the tool (50), the cogs having a pre-defined maximum depth of 0.1 to 5 mm, preferably 1 to 2 mm.

4. Kit according to any one of the preceding claims, wherein the other roller wheel (53b) comprises a socket portion (53.5) with guiding means for said at least one snap hook leg (53.3) and cooperating with the opening (51.2) in the protruding front portion (51.1).

5. Kit according to any one of the preceding claims, wherein each roller wheel (53a, 53b) of the roller wheel set (53) of the tool (50) is connected to the head element (51) at a wheel centre (53.1) such that the roller wheel/s is/are confined substantially at extensions of the contours (51.3, 51.4) of the head element (51) of the tool (50).

6. Kit according to any one of the preceding claims, wherein each roller wheel (53a, 53b) of the roller wheel set (53) of the tool (50) has a width-to-diameter ratio of about 1:1, 1:2 but not more than 1:3.

7. Kit according to any one of the preceding claims, wherein said operating means (54) of the head element (51) comprise an oblong cavity (56) and an opening (57) towards the ambient at the rear end (59) of the head element (51) in connection with said cavity (56), said cavity (56) being able to receive at least partially and retain an oblong body element (60; 160; 260; 360).

8. Kit according to claim 7, further comprising an accessory equipment (161; 261; 361) arranged in connection with the head element (151; 251; 351) of the tool (150; 250; 350) and optionally the body element (60; 160; 260; 360).

9. Kit according to claim 8, wherein said accessory equipment comprises an adapter element (161) having at least two cavities (164a, 164b) of mutually different cross-sectional dimensions in the longitudinal direction (LX) of the tool (150).

10. Kit according to claim 8, wherein said accessory equipment (261) comprises a knife blade (262) retained in a knife holder (263).

11. Kit according to claim 10, wherein the knife blade (262) is configured to be received in the oblong cavity (256) of the head element (251), and wherein the knife holder (263) of the auxiliary equipment (261) is provided with an oblong cavity (266) configured to receive a body element (60).

12. Kit according to any one of claims 8 to 11, wherein said tool (150; 250) comprises securing means (170; 270) for securing said auxiliary equipment (161; 261) to said head element (151; 251).

13. Kit according to claim 12, wherein said securing means (170; 270) comprises a hook element (172; 272) and a connect element (171; 271), wherein the hook element (172) is arranged at or near the rear end (159; 259) of the head element (151; 251), and wherein the connect element (171; 271) is arranged at or near a rear end (169; 269) of the auxiliary equipment (161; 261) such that the hook element (172; 272) engages the connect element (171; 271) when the auxiliary equipment (161; 261) is fully inserted into the oblong cavity (256) of the head element (151; 251).

14. Kit according to claim 8, wherein said accessory equipment (361) comprises a wedge-shaped section including an inclined surface (163), configured to act as a tucker for insulation material.

Patentansprüche

1. Satz, umfassend ein Werkzeug (50) und eine Dampfsperrschürze (10), die aus einem im Wesentlichen nicht zusammendrückbaren Material besteht und Befestigungsmittel (12) umfasst, wobei das Werkzeug (50) ein Kopfelement (51) mit einem vorderen Ende (55) und einem hinteren Ende (59) umfasst, wobei das Kopfelement (51) eine Längsrichtung (LX) des Werkzeugs (50) definiert und Betätigungsmittel (54) zum Betätigen des Werkzeugs und Einführmittel (52) zum Einbringen der Befestigungsmittel (12) der Dampfsperrschürze (10) in eine Nut (21) eines Dachfensters umfasst, wobei die Nut dazu ausgelegt ist, die Befestigungsmittel aufzunehmen, **dadurch gekennzeichnet, dass** die Einführmittel (52) einen Rollradsatz (53) umfassen, der mindestens ein Rollrad (53a, 53b) an dem vorderen Ende (55) des Kopfelements (51) des Werkzeugs (50) umfasst, wobei der Rollradsatz (53) eine Breite (WT) und einen Durchmesser (DW) aufweist und derart angeordnet ist, dass eine Drehung des Rollradsatzes (53) in der Längsrichtung (LX) des Werkzeugs (50) zugelassen wird, so dass die Befestigungsmittel (12) der Dampfsperrschürze (1) durch Rollen des Rollradsatzes (53) in der Nut (21) angeordnet werden, wobei der Rollradsatz (53) des Werkzeugs (50) zwei Rollräder (53a, 53b) umfasst, die auf einer jeweiligen Seite eines vorstehenden vorderen Abschnitts (51.1) des Kopfelements (51) angeordnet und mittels mindestens eines Schnapphakenschenkels (53.3) auf einem Rollrad (53a) miteinander verbunden sind, der mit einem als Gegenstück dienenden Aufnahmedurchlass (53.4) in dem anderen Rollrad (53b) über eine Öffnung (51.2) in dem vorste-

henden vorderen Abschnitt (51.1) zusammenwirkt.

2. Satz nach Anspruch 1, wobei jedes Rollrad (53a, 53b) des Rollradsatzes (53) des Werkzeugs (50) mit einer zahnartigen Außenfläche versehen ist, wobei Zähne (53.2) über einen wesentlichen Teil der Breite des Rollrads (53a, 53b) angeordnet sind.

3. Satz nach Anspruch 2, wobei die Zähne (53.2) in einem Winkel zumindest teilweise über die Breite des Rollrads (53a, 53b) oder senkrecht zu einer linearen Rollrichtung des Rollrads (53a, 53b) in der Längsrichtung (LX) des Werkzeugs (50) angeordnet sind, wobei die Zähne eine vordefinierte maximale Tiefe von 0,1 bis 5 mm, vorzugsweise 1 bis 2 mm aufweisen.

4. Satz nach einem der vorhergehenden Ansprüche, wobei das andere Rollrad (53b) einen Fassungsabschnitt (53.5) mit Führungsmitteln für den mindestens einen Schnapphakenschenkel (53.3) umfasst und mit der Öffnung (51.2) in dem vorstehenden vorderen Abschnitt (51.1) zusammenwirkt.

5. Satz nach einem der vorhergehenden Ansprüche, wobei jedes Rollrad (53a, 53b) des Rollradsatzes (53) des Werkzeugs (50) derart mit dem Kopfelement (51) an einer Radmitte (53.1) verbunden ist, dass das Rollrad/die Rollräder im Wesentlichen auf Verlängerungen der Konturen (51.3, 51.4) des Kopfelements (51) des Werkzeugs (50) beschränkt ist/sind.

6. Satz nach einem der vorhergehenden Ansprüche, wobei jedes Rollrad (53a, 53b) des Rollradsatzes (53) des Werkzeugs (50) ein Verhältnis von Breite zu Durchmesser von etwa 1:1, 1:2, jedoch nicht mehr als 1:3 aufweist.

7. Satz nach einem der vorhergehenden Ansprüche, wobei die Betätigungsmittel (54) des Kopfelements (51) einen länglichen Hohlraum (56) und eine Öffnung (57) hin zur Umgebung an dem hinteren Ende (59) des Kopfelements (51) in Verbindung mit dem Hohlraum (56) umfassen, wobei der Hohlraum (56) ein längliches Körperelement (60; 160; 260; 360) zumindest teilweise aufnehmen und halten kann.

8. Satz nach Anspruch 7, ferner umfassend ein Zusatzgerät (161; 261; 361), das in Verbindung mit dem Kopfelement (151; 251; 351) des Werkzeugs (150; 250; 350) und optional dem Körperelement (60; 160; 260; 360) angeordnet ist.

9. Satz nach Anspruch 8, wobei das Zusatzgerät ein Adapterelement (161) umfasst, das mindestens zwei Hohlräume (164a, 164b) mit voneinander unterschiedlichen Querschnittsabmessungen in der Längsrichtung (LX) des Werkzeugs (150) aufweist.

10. Satz nach Anspruch 8, wobei das Zusatzgerät (261) eine Messerklinge (262) umfasst, die in einer Messerhaltevorrichtung (263) gehalten ist.

11. Satz nach Anspruch 10, wobei die Messerklinge (262) dazu ausgelegt ist, in dem länglichen Hohlraum (256) des Kopfelements (251) aufgenommen zu sein, und wobei die Messerhaltevorrichtung (263) des Hilfsgeräts (261) mit einem länglichen Hohlraum (266) versehen ist, der dazu ausgelegt ist, ein Körperelement (60) aufzunehmen.

12. Satz nach einem der Ansprüche 8 bis 11, wobei das Werkzeug (150; 250) Sicherungsmittel (170; 270) zum Sichern des Hilfsgeräts (161; 261) an dem Kopfelement (151; 251) umfasst.

13. Satz nach Anspruch 12, wobei das Sicherungsmittel (170; 270) ein Hakenelement (172; 272) und ein Verbindungselement (171; 271) umfasst, wobei das Hakenelement (172) an oder nahe dem hinteren Ende (159; 259) des Kopfelements (151; 251) angeordnet ist, und wobei das Verbindungselement (171; 271) an oder nahe einem hinteren Ende (169; 269) des Hilfsgeräts (161; 261) derart angeordnet ist, dass das Hakenelement (172; 272) das Verbindungselement (171; 271) in Eingriff bringt, wenn das Hilfsgerät (161; 261) vollständig in den länglichen Hohlraum (256) des Kopfelements (151; 251) eingeführt ist.

14. Satz nach Anspruch 8, wobei das Zusatzgerät (361) einen keilförmigen Abschnitt umfasst, der eine geneigte Fläche (163) umfasst, die dazu ausgelegt ist, als eine Einsetzvorrichtung für Isolationsmaterial zu dienen.

Revendications

1. Kit comprenant un outil (50) et un collier barrière à la vapeur (10) en un matériau sensiblement incompressible et comprenant un moyen de montage (12), l'outil (50) comprenant un élément de tête (51) ayant une extrémité avant (55) et une extrémité arrière (59), l'élément de tête (51) définissant une direction longitudinale (LX) de l'outil (50) et comprenant un moyen d'actionnement (54) pour actionner l'outil et un moyen d'insertion (52) pour introduire le moyen de montage (12) dudit collier barrière à la vapeur (10) dans une rainure (21) d'une fenêtre de toit, ladite rainure étant conçue pour recevoir ledit moyen de montage, **caractérisé en ce que** ledit moyen d'insertion (52) comprend un jeu de roues à rouleaux (53) comprenant au moins une roue à rouleaux (53a, 53b) au niveau de l'extrémité avant (55) de l'élément de tête (51) de l'outil (50), le jeu de roues à rouleaux

(53) ayant une largeur (WT) et un diamètre (DW) et étant disposé de sorte qu'une rotation du jeu de roues à rouleaux (53) dans la direction longitudinale (LX) de l'outil (50) soit admise pour que le moyen de montage (12) du collier barrière à la vapeur (1) soit disposé dans la rainure (21) en roulant ledit jeu de roues à rouleaux (53), le jeu de roues à rouleaux (53) de l'outil (50) comprenant deux roues à rouleaux (53a, 53b) disposées d'un côté respectif d'une partie avant en saillie (51.1) de l'élément de tête (51) et reliées l'une à l'autre au moyen d'au moins une patte de mousqueton (53.3) sur une roue à rouleaux (53a) interagissant avec une ouverture de réception homologue (53.4) dans l'autre roue à rouleaux (53b) par l'intermédiaire d'une ouverture (51.2) dans la partie avant en saillie (51.1).

2. Kit selon la revendication 1, chaque roue à rouleaux (53a, 53b) du jeu de roues à rouleaux (53) de l'outil (50) étant pourvue d'une face extérieure du type pignon, les pignons (53.2) étant disposés sur une partie importante de la largeur de la roue à rouleaux (53a, 53b) .

3. Kit selon la revendication 2, les pignons (53.2) étant disposés à un angle au moins partiellement à travers la largeur de la roue à rouleaux (53a, 53b), ou perpendiculairement à une direction de roulement linéaire de la roue à rouleaux (53a, 53b) dans la direction longitudinale (LX) de l'outil (50), les pignons ayant une profondeur maximale prédéfinie de 0,1 à 5 mm, de préférence de 1 à 2 mm.

4. Kit selon l'une quelconque des revendications précédentes, l'autre roue à rouleaux (53b) comprenant une partie femelle (53.5) ayant un moyen de guidage pour ladite au moins une patte de mousqueton (53.3) et coopérant avec l'ouverture (51.2) dans la partie avant en saillie (51.1).

5. Kit selon l'une quelconque des revendications précédentes, chaque roue à rouleaux (53a, 53b) du jeu de roues à rouleaux (53) de l'outil (50) étant reliée à l'élément de tête (51) au niveau d'un centre de roue (53.1) de sorte que la ou les roues à rouleaux soient confinées sensiblement au niveau d'extensions des contours (51.3, 51.4) de l'élément de tête (51) de l'outil (50).

6. Kit selon l'une quelconque des revendications précédentes, chaque roue à rouleaux (53a, 53b) du jeu de roues à rouleaux (53) de l'outil (50) présentant un rapport largeur sur diamètre d'environ 1:1, 1:2 mais pas plus de 1:3.

7. Kit selon l'une quelconque des revendications précédentes, ledit moyen d'actionnement (54) de l'élément de tête (51) comprenant une cavité oblongue (56) et une ouverture (57) vers l'environnement au niveau de l'extrémité arrière (59) de l'élément de tête (51) en liaison avec ladite cavité (56), ladite cavité (56) pouvant recevoir au moins partiellement et retenir un élément de corps oblong (60 ; 160 ; 260 ; 360).

8. Kit selon la revendication 7, comprenant en outre un équipement accessoire (161 ; 261 ; 361) disposé en liaison avec l'élément de tête (151 ; 251 ; 351) de l'outil (150 ; 250 ; 350) et éventuellement l'élément de corps (60 ; 160 ; 260 ; 360).

9. Kit selon la revendication 8, ledit équipement accessoire comprenant un élément adaptateur (161) ayant au moins deux cavités (164a, 164b) de dimensions transversales mutuellement différentes dans la direction longitudinale (LX) de l'outil (150).

10. Kit selon la revendication 8, ledit équipement accessoire (261) comprenant une lame de couteau (262) retenue dans un porte-couteau (263).

11. Kit selon la revendication 10, la lame de couteau (262) étant conçue pour être reçue dans la cavité oblongue (256) de l'élément de tête (251), et le porte-couteau (263) de l'équipement auxiliaire (261) étant pourvu d'une cavité oblongue (266) conçue pour recevoir un élément de corps (60).

12. Kit selon l'une quelconque des revendications 8 à 11, ledit outil (150 ; 250) comprenant un moyen de fixation (170 ; 270) pour fixer ledit équipement auxiliaire (161 ; 261) à l'élément de tête (151 ; 251).

13. Kit selon la revendication 12, ledit moyen de fixation (170 ; 270) comprenant un élément de crochet (172 ; 272) et un élément de liaison (171 ; 271), l'élément de crochet (172) étant disposé au niveau ou à proximité de l'extrémité arrière (159 ; 259) de l'élément de tête (151 ; 251), et l'élément de liaison (171 ; 271) étant disposé au niveau ou à proximité de l'extrémité arrière (169 ; 269) de l'équipement auxiliaire (161 ; 261), de sorte que l'élément de crochet (172 ; 272) vienne en prise avec l'élément de liaison (171 ; 271) lorsque l'équipement auxiliaire (161 ; 261) est entièrement inséré dans la cavité oblongue (256) de l'élément de tête (151 ; 251).

14. Kit selon la revendication 8, ledit équipement accessoire (361) comprenant une section en forme de coin comprenant une surface inclinée (163), conçue pour agir comme un dispositif plieur pour le matériau d'isolation.

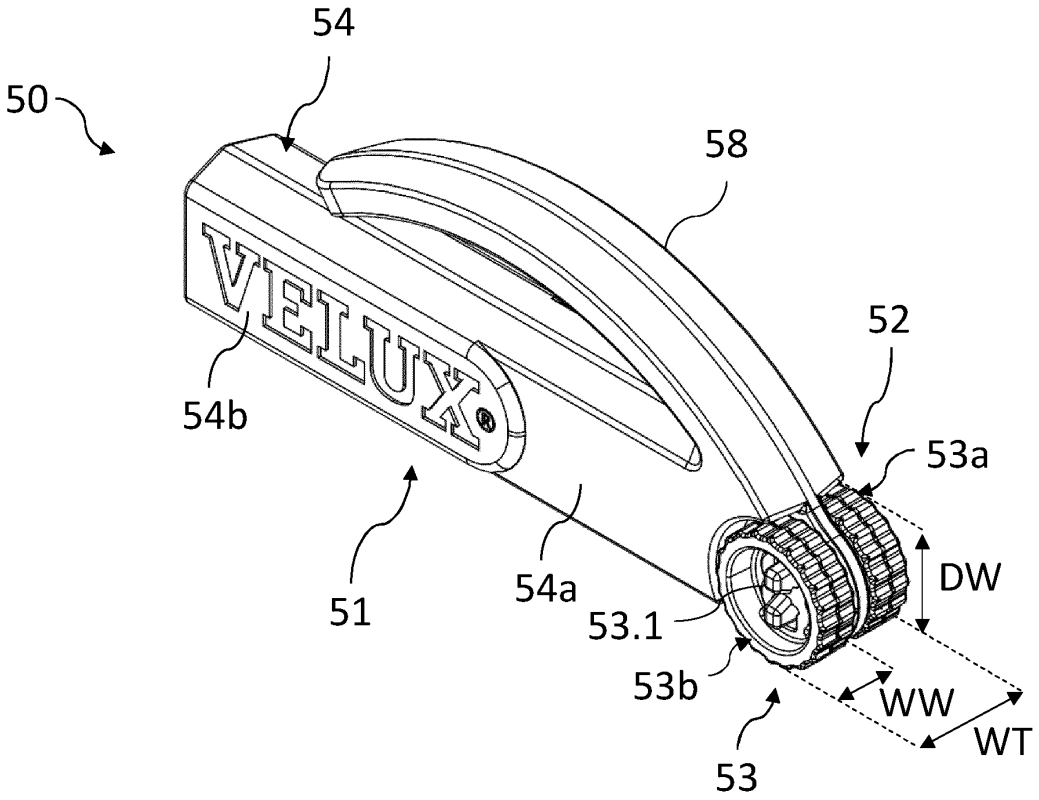
54
50
58
VELUX®
52
54b
53a
DW
51
54a
53.1
53b
WW
WT
53

Fig. 1

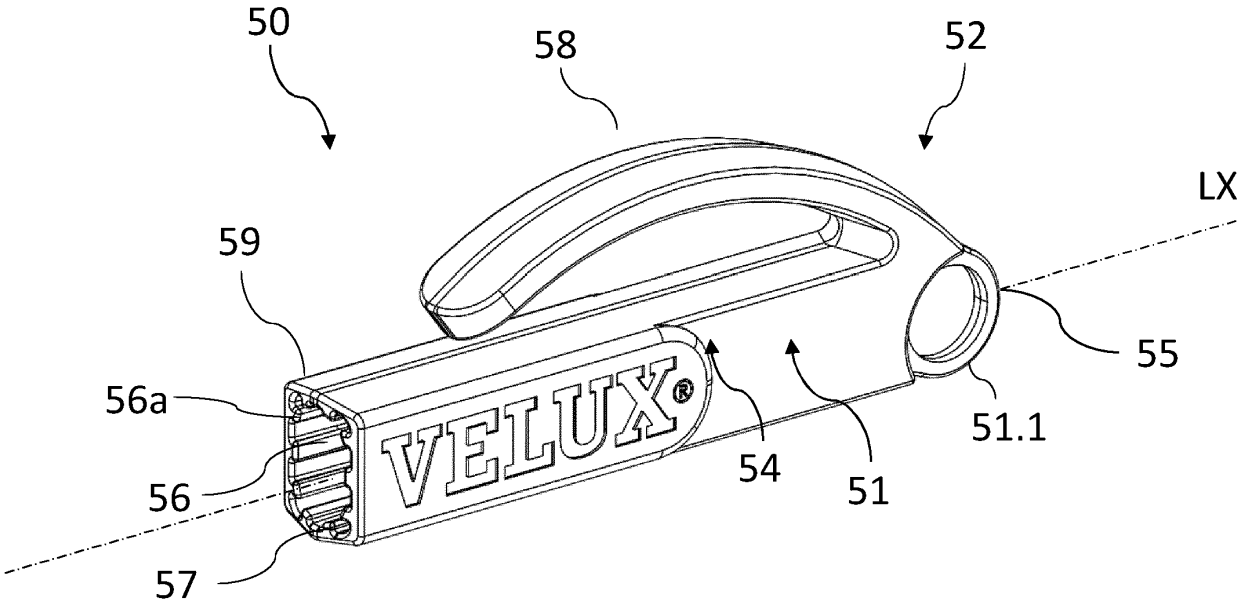
50
58
52
LX
59
55
56a
VELUX®
51.1
54
51
56
57

Fig. 2

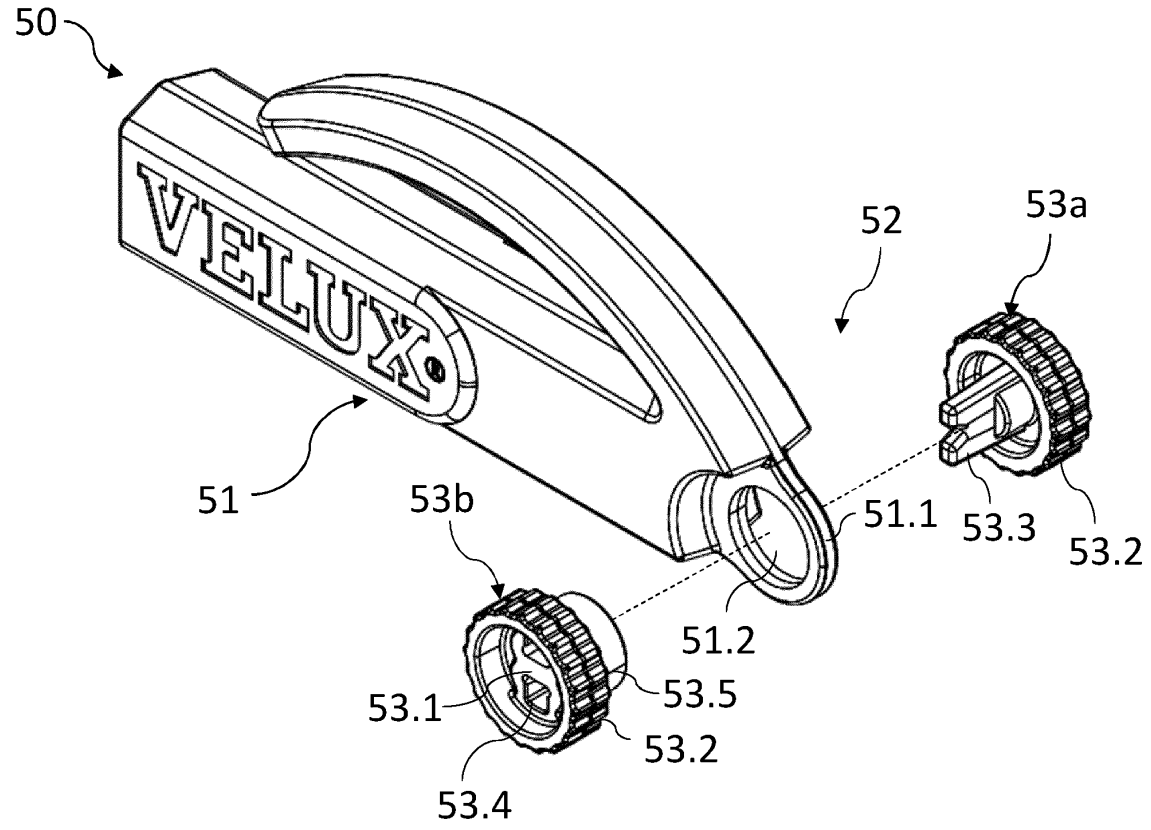
50
VELUX
52
53a
51
53b
51.1
53.3
53.2
51.2
53.1
53.5
53.2
53.4

Fig. 3

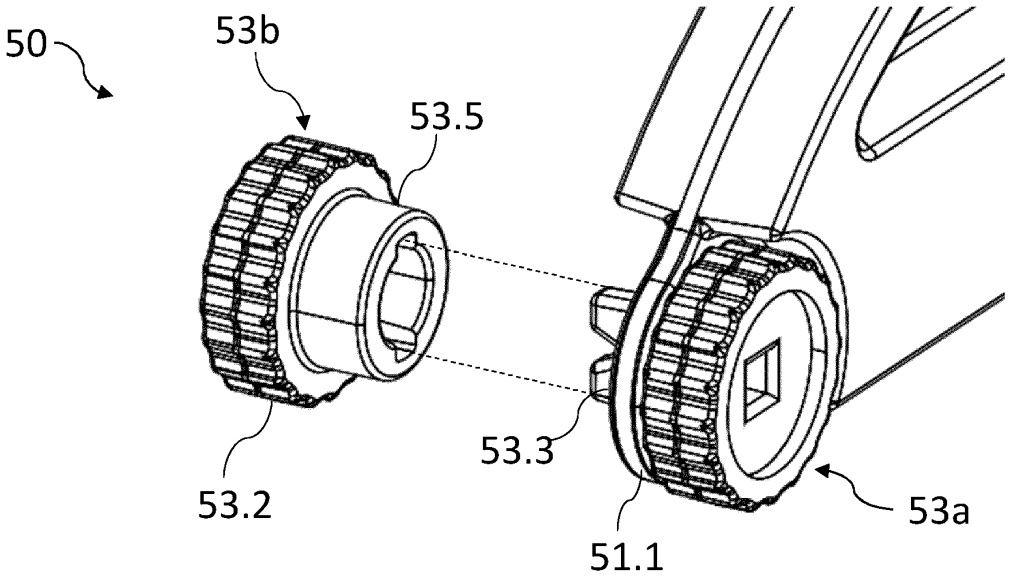
50
53b
53.5
53.3
53.2
53a
51.1

Fig. 4

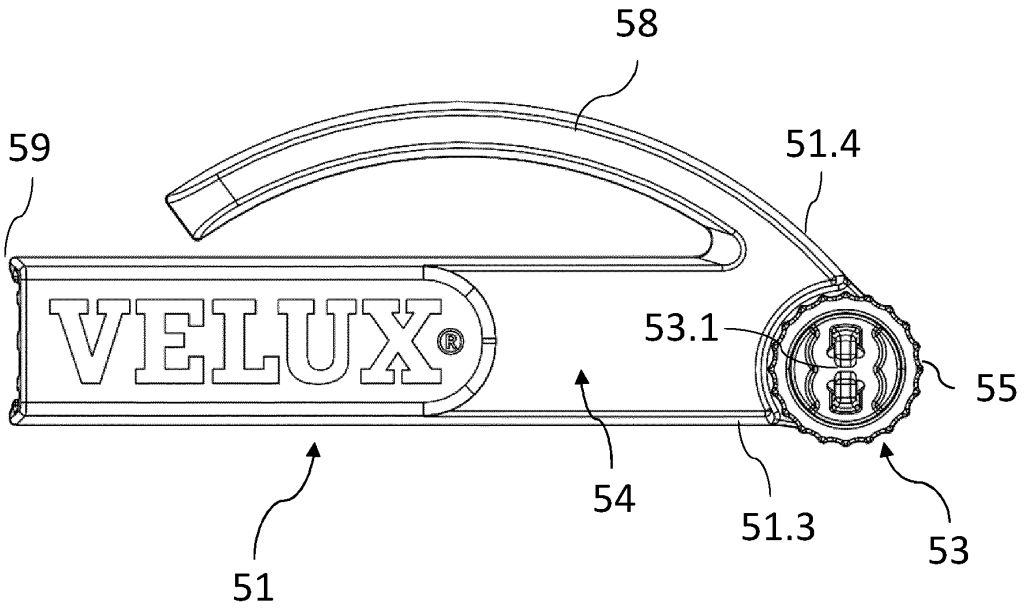

Fig. 5

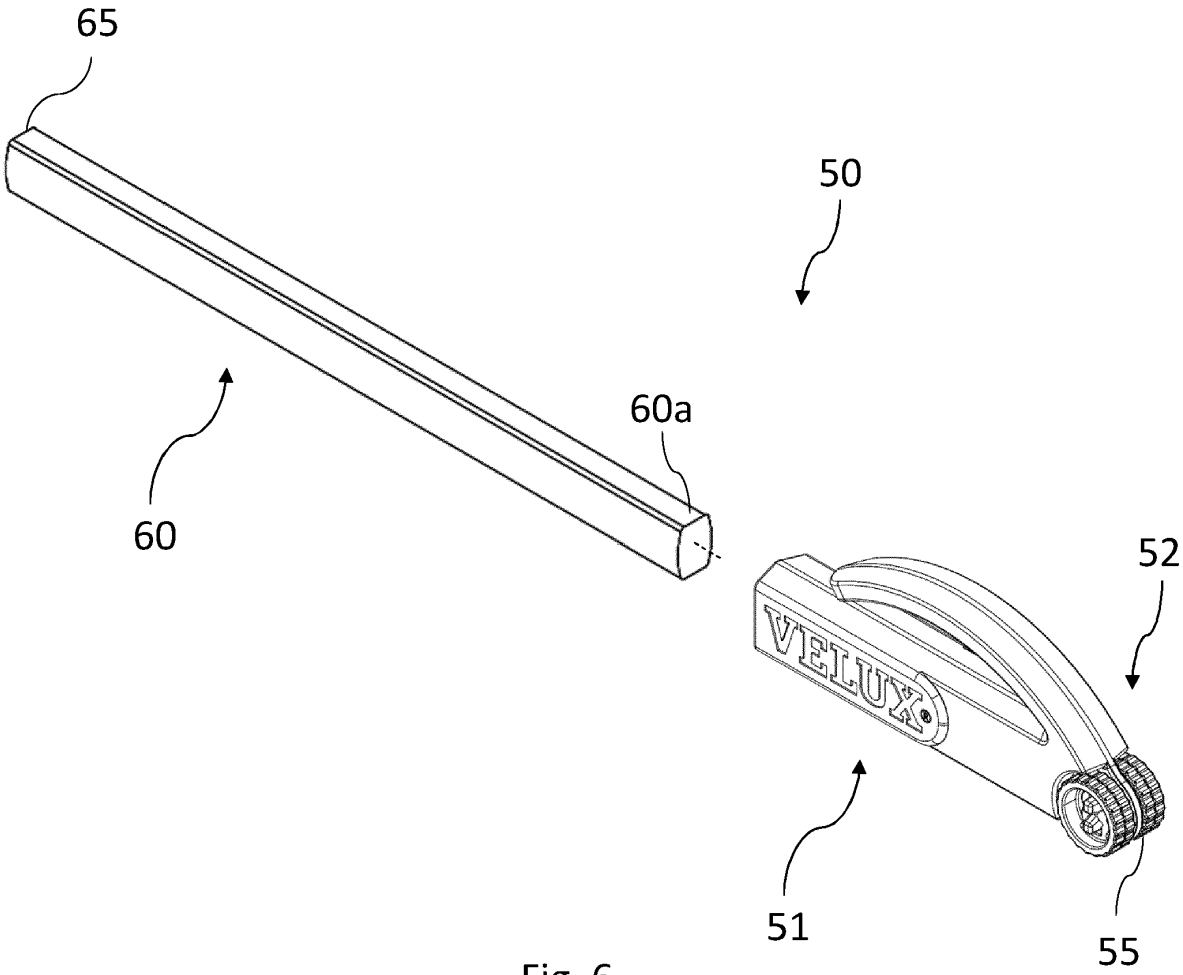

Fig. 6

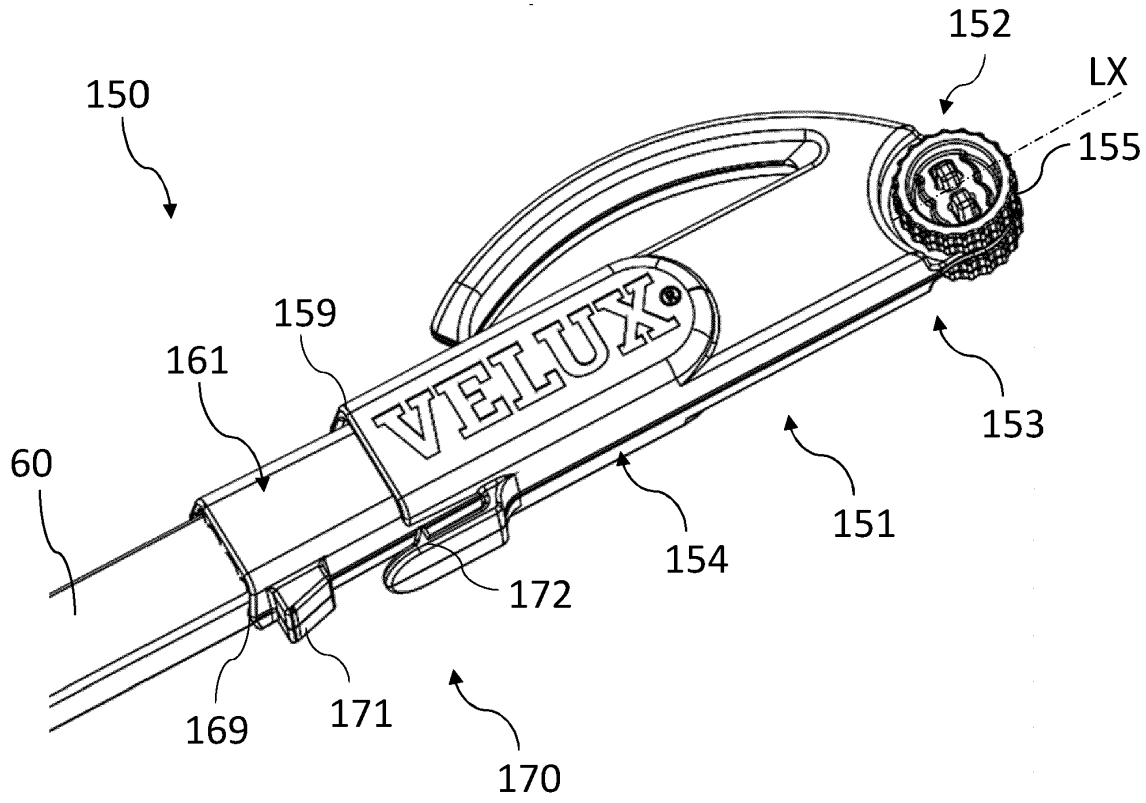
152
LX
150
155
159
161
VELUX®
153
60
151
154
172
169
171
170

Fig. 7

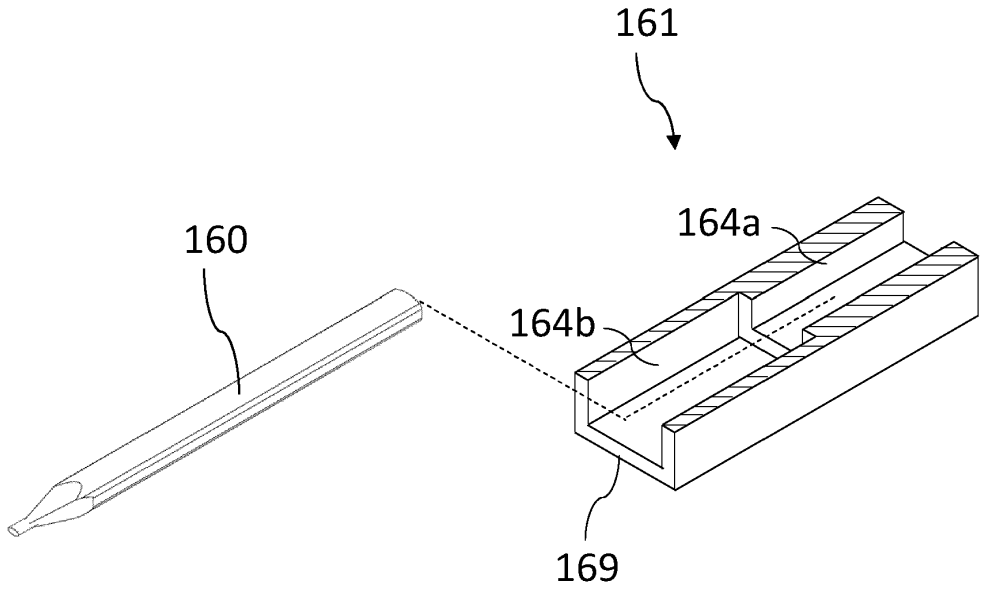
161
160
164a
164b
169

Fig. 8

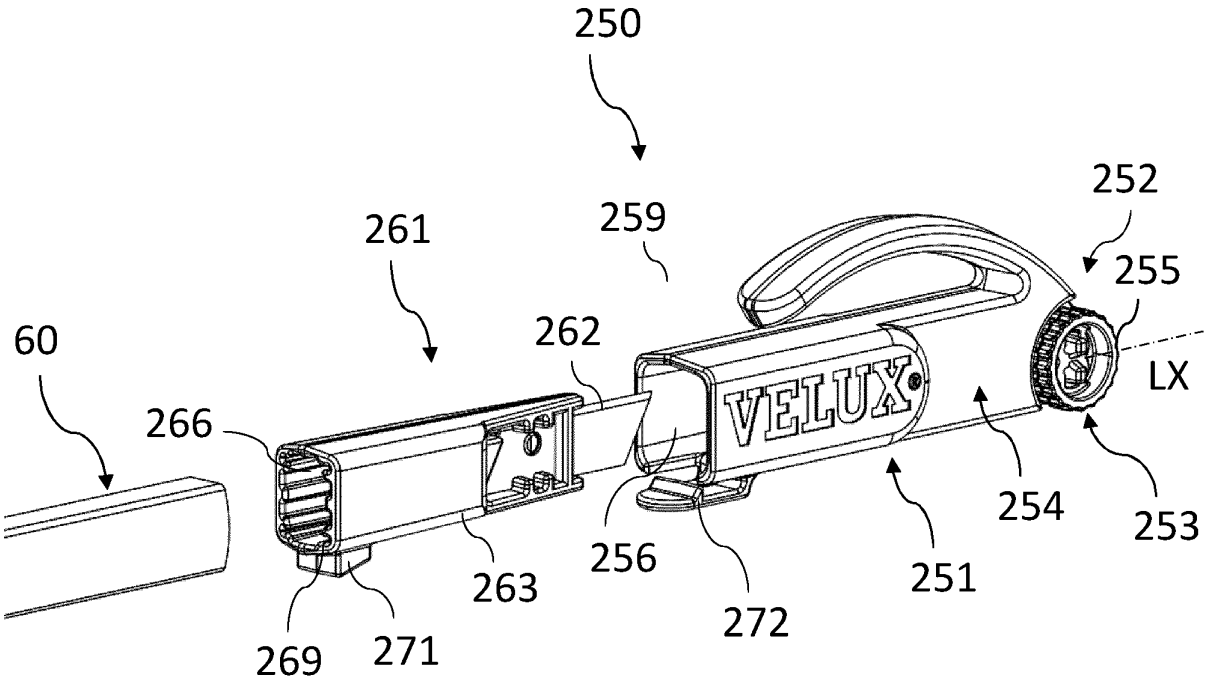
250
252
259
261
255
60
262
LX
266
VELUX®
254
253
256
251
263
272
269
271

Fig. 9

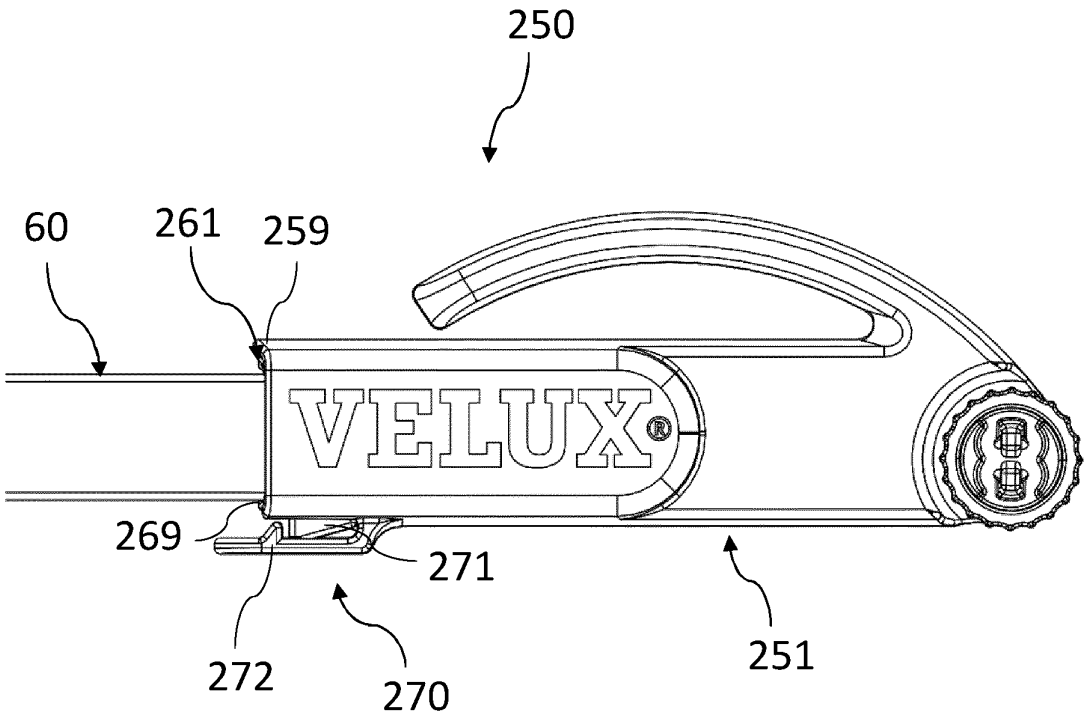
250
60
261
259
VELUX®
269
271
272
270
251

Fig. 10

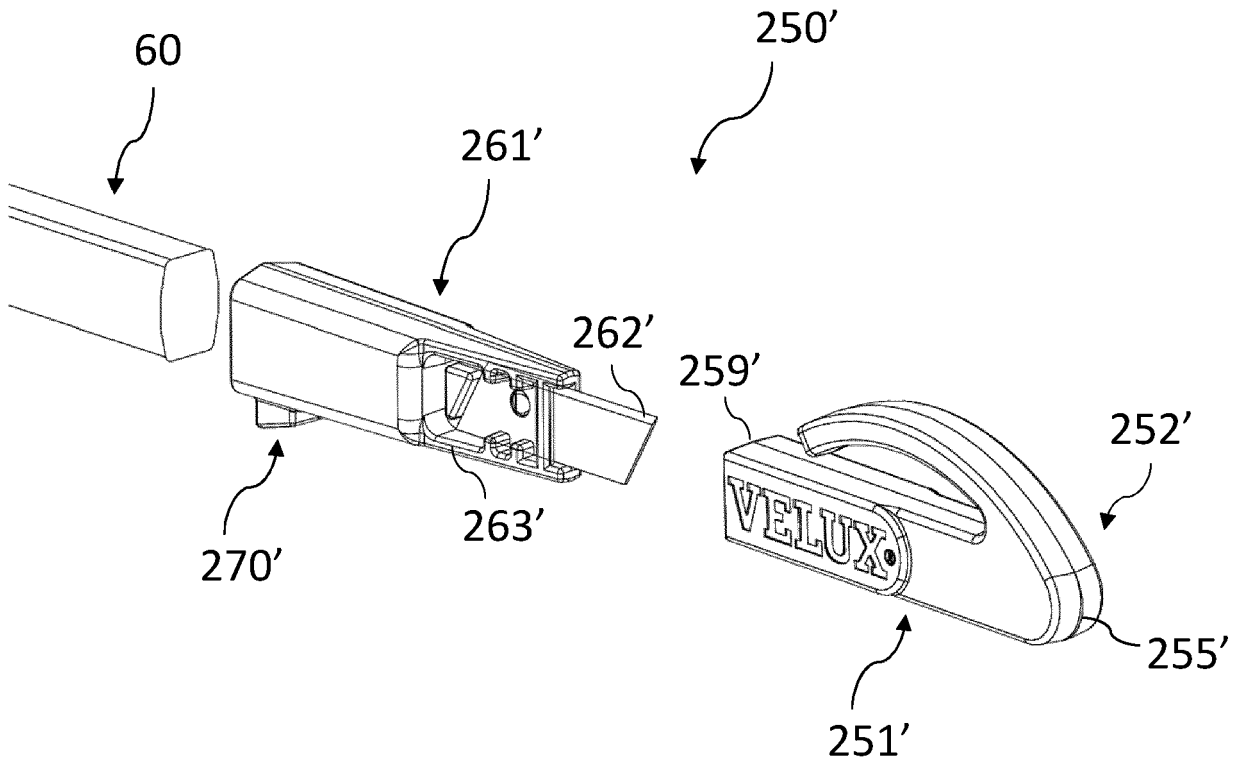

Fig. 11

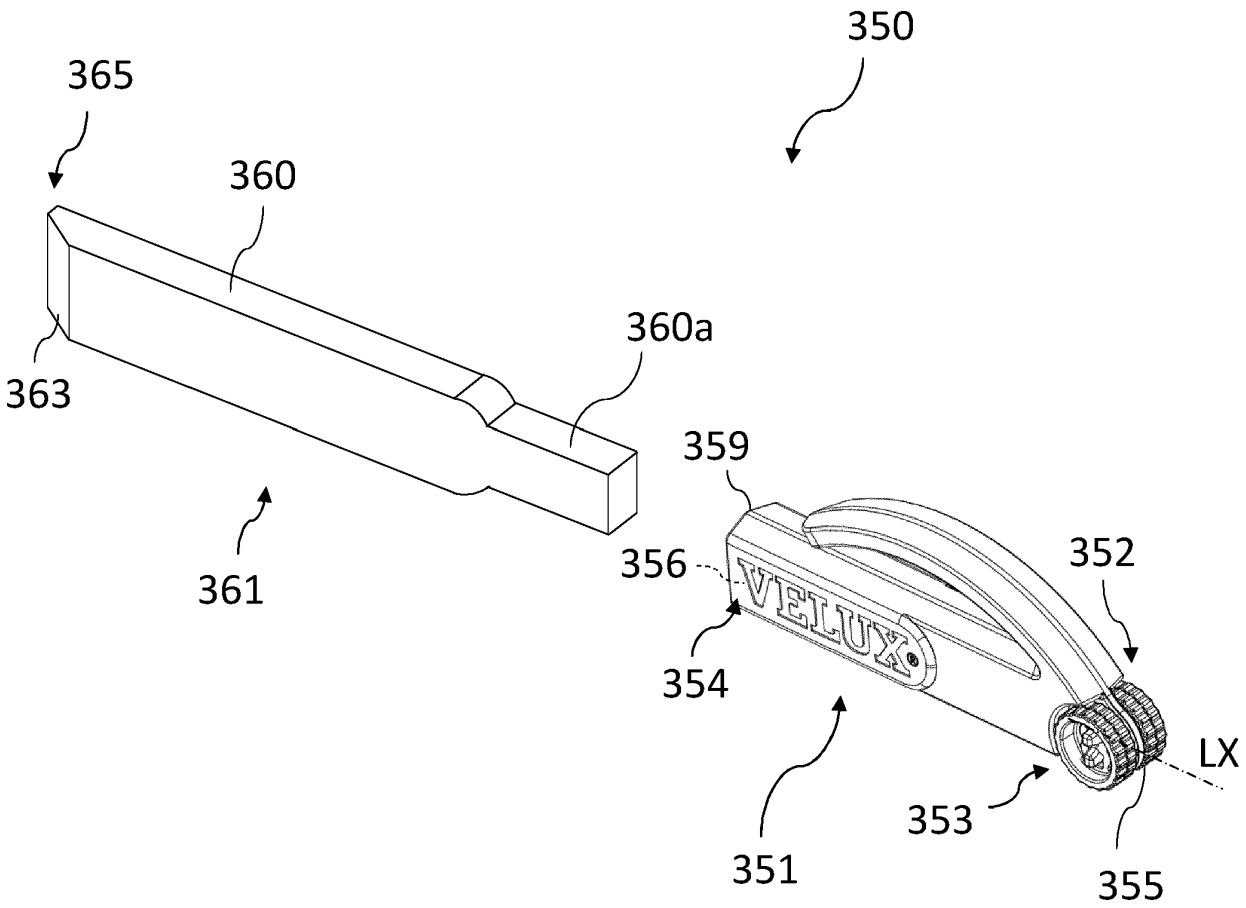

Fig. 12

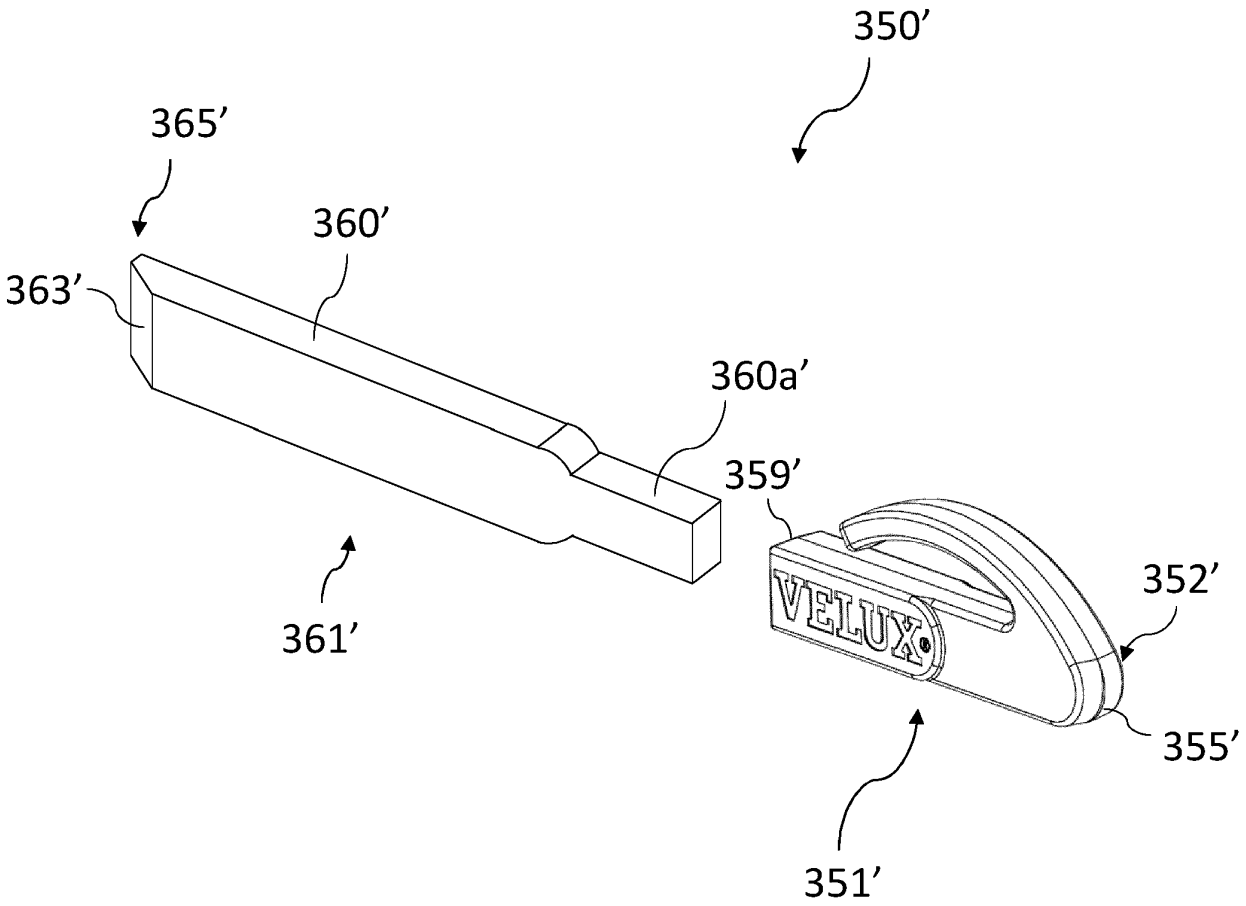

Fig. 13

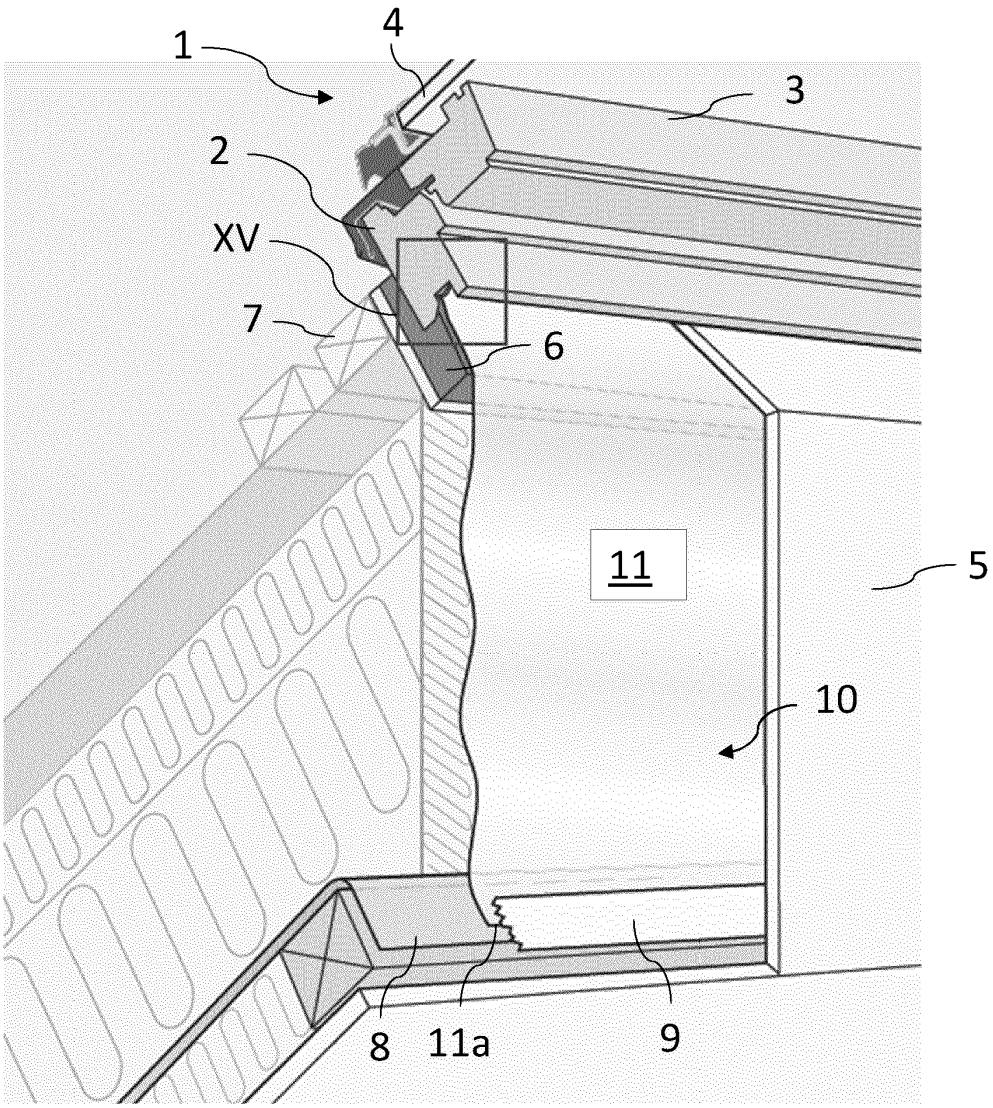

Fig. 14

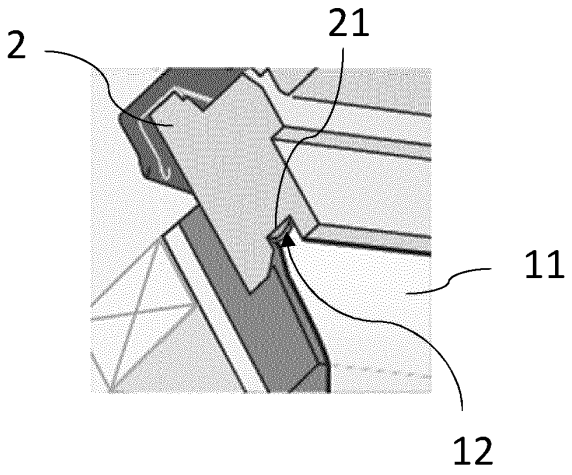

Fig. 15

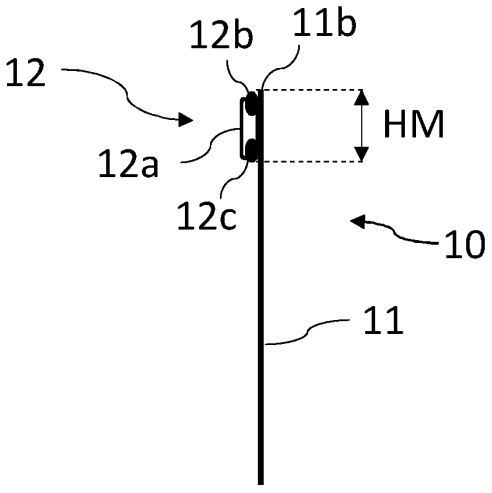

Fig. 16

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 2243893 B1 **[0002]**
- EP 2711480 B1 **[0002]**
- US 2005034309 A1 **[0005]**
- US 2007033740 A1 **[0005]**
- EP 0994991 A **[0022] [0025]**