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(54) **Hinge, and hinge assembly and disassembly method**

(57) The present invention provides a hinge, including a first leaf (3) and a second leaf (5) pivotally interconnected via respective knuckles (13, 15) by a hinge pin (4),
the hinge further including blocking means (51, 61, 62) for preventing axial removal of the hinge pin (4) from the knuckles (13, 15),
wherein the blocking means include a blocking member (51) that has a first state for engaging a groove (4A) of the hinge pin (4) and a second, deformed state for release of the hinge pin (4).

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Title: Hinge, and hinge assembly and disassembly method

The invention relates to a hinge.

Hinges are known in various types. Basically, a hinge consists of two hinge leaves, having knuckles that pivotally couple the leaves together via a hinge pin.

Known hinges can be mass-produced from plate (i.e. sheet) material, e.g. metal or steel plate material, by cutting out leaf preforms from a plate and deforming lateral sections of the preforms (by curling, bending or rolling) to form respective knuckles. Next, the knuckles of the two preforms of a hinge, to be assembled, can be axially aligned for receiving the hinge pin. The knuckles can be provided with low-friction bearings/bushings or the like, e.g. for improving hinge action and durability. A disadvantage of such common-type hinges is that they are relatively weak, and can be forced open during burglary attempts e.g. by simply peeling open the hinge knuckles.

It is also desired to provide relatively heavy-duty hinges, for heavy-duty operation such as the pivotally coupling of a large/ heavy panel to a frame (e.g. a window to a window frame or a heavy door to a door frame), utilizing only a relatively small number (e.g. only three or only two) of hinges. This leads to a relatively swift, efficient and economical mounting of the panel, compared to a mounting operation wherein a large number of hinges is required for swiveably connecting a panel to a frame.

Heavy-duty hinges are known, that include double-wrapped leaf sections (the so called double wrap hinge). In this type of hinge, each leaf consists of two layers of plate material, the respective one or more knuckles being made in one-piece with the two layers (which is inherent of the respective deforming process). An advantage of this type of hinge is its high strength (also in a lateral direction), wherein the hinge can still be

manufactured economically using the (preferably cold) deformation/wrapping technique. A serious disadvantage is that the double-wrapped leaf has double the thickness of a regular (single plated) hinge. Besides, the manufacturing of these hinges leads to relatively large loss of sheet material, in view of the leaf preform shapes required to provide such type of hinge.

Besides, it is desired to provide burglary-proof hinges. Various features are known in the prior art to prevent unauthorized opening of a panel that is swiveably connected to a frame by a number of hinges. For example, to that aim, hinges are known ("security hinges") that include blocking pins, extending from one hinge leaf via an opening of the opposite hinge leaf into the respective panel/frame-assembly. However, such hinges usually require drilling additional pin receiving openings in the respective panel/frame-assembly. The security hinge also requires additional hinge manufacturing steps for welding the security pin on one leaf and providing the respective pin receiving opening in the other leaf.

NL2021911 discloses an improved relatively sturdy, and durable hinge that can be manufactured in an economical manner, wherein the hinge can still be relatively compact (particularly relatively thin). Also it is can provide good protection against burglary.

According to a preferred embodiment, the known hinge includes a slidable blocking finger for preventing axial removal of the hinge pin from the knuckles. In particular, the blocking finger can slide between a blocking position for engaging the hinge pin and a release position for releasing of the pin. In this way, unauthorized hinge disassembly can be achieved, providing good anti-burglary protection. Also, this can prevent undesired axial movement of the hinge coupling means (e.g. hinge pin) during normal hinge operation.

A disadvantage of the known configuration is that handling of the hinge pin blocking finger can only be carried out when the hinge has been

swiveled to an open hinge state. For example, the hinge pin can not be entered and locked in case the hinge leaves (and aligned knuckles) are already joined in an closed state, which has certain disadvantages during assembly of e.g. a system that includes the hinge for swivably connecting a door to a frame. Also, a preferred embodiment of the known hinge requires a additional screw for fastening the blocking finger in its pin locking state, which requires additional handling steps.

The present invention aims to provide an improved hinge. In particular, the invention aims to provide a hinge wherein a sturdy, reliable locking of the hinge pin can be achieved in a straight-forward, efficient manner.

According to an aspect, this is achieved by the features of claim 1.

Advantageously there is provided a hinge, including a first leaf and a second leaf pivotally interconnected via respective knuckles by a hinge pin, the hinge further including blocking means for preventing axial removal of the hinge pin from the knuckles, wherein the blocking means include a blocking member that has a first state for engaging a groove of the hinge pin and a second,(preferably elastically) deformed state for release of the hinge pin (the second state in particular being different from said first state).

In this way, locking of the hinge pin can be achieved efficiently, in a straight-forward manner. The same holds for unlocking of the hinge pin. In particular, during assembly, the blocking member can snap in place, to a first state engaging the groove of the pin, wherein the snapping can e.g. be achieved via inherent elasticity/resiliency of the blocking member. The blocking member may be spring biased when it is in that first state, however, that is certainly not required. When it is desired to remove the hinge pin, the blocking member can be deformed to its second (e.g. elastically) deformed state, allowing removal of the hinge pin. In particular, the blocking member can be configured to allow passage of the pin (i.e. the

blocking member has disengaged from the pin groove) when it is in its deformed second state.

For example, good results can be achieved in case at least part of the blocking member surrounds the hinge pin, the hinge pin in particular having a circumferential (in particular circular, annular) blocking groove for receiving the blocking member or blocking member part. For example, also, a sturdy compact configuration can be achieved in case of a preferred embodiment, wherein the first state of the blocking member is a radially contracted state for engaging the groove of the hinge pin, wherein the second state of the blocking member is a radially expanded state for release of the hinge pin. In particular, the blocking member can engage the circumferential groove of the pin when the blocking member is in its radially contracted state, and release the pin when it has been (e.g. elastically) deformed to its radially expanded state.

According to a preferred embodiment, the first leaf includes a first outer plate section, at least one first inner plate section extending over an inner side of the first outer plate section, and at least one first knuckle, the inner side of the first outer plate section being partly covered by the at least one first inner plate section, wherein part of the second leaf) preferably mates with or nests in the at least one first inner plate section of the first leaf when the hinge is in a closed condition, wherein the hinge preferably includes at least two spaced-apart first inner plate sections, in particularly spaced-apart viewed in a direction in parallel with a hinge axis, the at least two spaced-apart first inner plate sections defining an intermediate space there-between, wherein part of the second leaf is arranged to be received by the intermediate space between the spaced-apart first inner plate sections when the hinge is in a closed state, wherein said intermediate space for receiving part of the second leaf is preferably defined between opposite edges of two inner plate sections of the first leaf.

In that case, for example, a said inner plate section can include an operating member receiving space for receiving part of a user operating member, the user operating member extending externally with respect to the knuckles, the user operating member being adjustable from a first position to a second position for (elastically/resiliently) changing the state of the blocking member.

Further, there is provided an efficient method of assembly of a hinge according to the invention, the method including:

-aligning the knuckles of the hinge leaves and providing (at least part of) the blocking member in one of the knuckles, preferably such that the blocking member is in an initial state, for example a radially contracted state wherein it provides an inner diameter that is smaller than an outer diameter of the hinge pin; and

-sliding the hinge pin into the aligned knuckles, preferably such that the blocking member deforms from its initial state to its second (pin release) state first and subsequently snaps into the groove of the hinge pin to achieve its first (hinge pin blocking) state.

In this way, above-mentioned advantages can be achieved.

Advantageously the method can further include providing two cylindrical bearing sections in one of the knuckles before joining the hinge pin to the knuckles, wherein the blocking member is preferably located at an axial position between opposite ends of the two bearing members. This provides improved manufacturability, wherein the two bearing members can define a space there-between the receive at least part of the blocking member, and can cooperate with that blocking member for locking the hinge pin when the blocking member is in its first state.

Besides, there is provided an efficient method of disassembly of a hinge according to the invention, which includes:

-adjusting the blocking member from its first state to its second state by deforming the blocking member; and

-removing the hinge pin from the knuckles.

For example, the adjusting of the blocking member can be achieved by manual manipulation of an afore-mentioned (optional) user operating member if available.

Further advantageous are described in the dependent claims. The invention will now be explained in more detail, referring to the drawings that show a non-limiting example of the invention.

Figure 1 depicts a perspective view of a non-limiting embodiment of a prior art hinge, wherein the hinge leaves are in an open hinge position;

Figure 2 shows a front view of the embodiment of Fig. 1, the hinge leaves being in a 180^0 opened position;

Figure 3 shows a side view of the embodiment of Fig. 1, the hinge leaves being in closed hinge position;

Figure 4 shows a top view of the embodiment of Fig 1, the hinge leaves being in a closed position and without the hinge pin;

Figure 5 is similar to Fig. 2, showing a non-limiting example of a hinge according to the present invention;

Figure 6 depicts an exploded view of the example of Fig. 5;

Figure 7 is a axial cross-section of the hinge, over line VII-VII of Fig. 5.;

Figure 8 is a lateral cross-section of the hinge, over line VIII-VIII of Fig. 5.;

Figure 9 is a detail IX of Fig. 8;

Figure 10A is a detail X of Fig. 7, wherein the blocking member is in its first, contracted state;

Figure 10B is similar to Fig. 10A and shows the blocking member is in its second, expanded, state;

Figure 11A is a perspective view of the hinge of Fig. 5 before assembly of the hinge pin, with the hinge in a closed hinge state;

Figure 11B is a perspective view of the hinge of Fig. 5 after assembly of the hinge pin, with the hinge in a closed hinge state;

Figure 12A is a perspective view of the hinge of Figure 5, the hinge being assembled and in an opened state and the operating member of the blocking member being moved to its second position;

Figure 12B is similar to Fig. 12A, depicting removal of the hinge pin; and

Figure 13 shows a longitudinal cross-section of part of a bearing member of the hinge of Fig. 5.

In the present application, corresponding or similar features are denoted by corresponding or similar reference signs.

Figures 1-4 depict a prior art hinge 101, consisting of a first leaf 3 and a second leaf 5 pivotally interconnected via respective knuckles 13, 15 and a hinge pin 104. In the present example, the first leaf 3 only has two (first) outer knuckles 13, the second leaf 5 having a single (second) knuckle 15 being arranged centrally between the knuckles 13 of the first leaf 3. The pin 104 extends in direction X through the knuckles 13, 15, thereby pivotally interconnecting the leaves 3, 5. The present hinge 101 also includes a number of bearing sections (bushings) 131, 132, 33, 34 (see Fig. 3) having bearing flanges (reaching between opposite knuckle edges), the bearing sections reaching between the inner sides of the knuckles and the hinge pin 104. The bearing sections can provide a more durable and smooth hinge action, and can be made e.g. from a relatively smooth, rigid (e.g. plastic) material or the-like as will be appreciated by the skilled person.

In this example, each leaf 3, 5 consists of an outer plate section, a number of inner plate sections (extending in parallel on an inner side of the respective outer plate section) and respective knuckles extending between (or interconnecting) the respective outer and respective inner plate sections. In each leaf 3, 5, the outer plate section is only covered partly by the respective inner plate section(s). As will be described in more detail here-

below, the two hinge leaves can be manufactured in an efficient manner utilizing a sheet deformation (e.g. bending) process. As a result, the knuckle 13, 15 of the leaves 3, 5 can be made in one piece with the respective leaf.

Each leaf 3, 5 (particular respective plate sections 3A, 3B, 5A, 5B of each leaf 3, 5) includes a number of through-holes for receiving fasteners (not shown), e.g. fastening screws for securing the leaf to a panel or a frame. Both leaves 3, 5 are advantageously made entirely of steel plate material or metal plate material.

Referring to Figures 1-2, particularly, the first leaf 3 includes a first outer plate section 3A and two first inner plate sections 3B extending over an inner side S1 of the first outer plate section 3A. Two first knuckles 13 are provided, the knuckles being associated with the inner plate sections 3A. The inner side S1 of the first outer plate section 3A is only partly covered by the two first inner plate sections 3B, in particular covered by less than 50% (and more than 25%), in this example. It should be observed that the invention is not limited to these exemplary, extra-advantageous plate-coverage-percentages, but that the inner side S1 of the first outer plate section 3A can e.g. also be partly covered by the first inner plate sections, by less than 25%.

The inner plate sections 3B are integrally connected to the outer plate section 3A only via the respective, knuckles 13 made in one-piece therewith (i.e. without other connecting means such as e.g. welds or adhesive).

The second leaf 5 of the hinge 101 includes a second outer plate section 5A, and a single second inner plate section 5B extending over an inner side S2 of the second outer plate section 5A. A single second knuckle 15 is present, made in-one piece with the second inner and second outer plate sections. The inner side S2 of the second outer plate section 5A is also only partly covered by the respective (in this case single) second inner plate section 5B. As follows from the drawing, the shape of the second inner plate

section is such that it covers less than 50% of the surface S2 of the outer plate section (and more than 25% of that surface).

Also, the arrangement of the inner plate sections of the leaves 3, 5 is such that they can move into a substantially stacked state when the hinge is closed, see e.g. Figure 3 and Figure 4. In other words: the first inner plate sections 3B and the second inner plate section 5B extend next to each other, viewed in a direction X in parallel with the respective hinge axis, when the hinge 101 is in the closed hinge state. The two spaced-apart first inner plate sections 3B of the first leaf 3 have opposite edges (extending in parallel), adjoining an intermediate space for receiving the second inner plate section 5B of the second leaf 5. It follows that an outer side S3 of the at least one first inner plate section 3B, that is faced away from the inner side S1 of the first outer plate section 3A, extends over the inner side S2 of the second outer plate section (and e.g. mechanically contacts that inner side S2) when the hinge 1 is in a closed hinge state, providing hinge compactness.

Also, an outer side S4 of the at least one second inner plate section 5B, that is faced away from the inner side S2 of the second outer plate section 5A, extends over the inner side S1 of the first outer plate section (and e.g. mechanically contacts that inner side S1) when the hinge 1 is in the closed hinge state.

The gap between the two first inner plate sections provides a recess of the first leaf, wherein the second inner plate section acts as a corresponding, substantially matching, protrusion that can be received by the recess.

The resulting hinge is relatively thin and relatively strong, wherein a maximum thickness T of the hinge 101, measured perpendicularly through the leaves 3, 5 when the hinge is in a (nested) closed condition, is e.g. at most 10 mm, for example at most 9 mm (depending on the plate thicknesses).

Also, in this example, each of the inner plate sections 3B, 5B has rounded-off lateral edges (facing away from the respective knuckles). Besides, in the present example, the central axis of the knuckles is located off-axis with respect to a central plane of the stack of plate sections (see Fig. 4), said central plane being defined by a middle plane of the inner plate sections, -in this case-.

Referring to Figure 4, advantageously, a central axis of each knuckle 13 of the first hinge leaf 3 is located off-axis with respect to a central plane of that leaf 3 and each respective first plate section 3A, 3B.

Besides, as follows from Figure 4, advantageously, a central axis of each knuckle 15 of the second hinge leaf 5 is located substantially in-line with (in the same plane as) each respective second outer plate section 5A.

In this way, the hinge can take up relatively little space when it is closed, e.g. it can be mounted in an embedded position between a panel and a frame, for pivotally connecting the panel to the frame.

Besides, advantageously, a width of each of the inner plate sections (measured in a direction Y that is normal to the X-axis) is substantially the same as the width of the respective outer plate section, providing sturdiness. In an alternative embodiment, an inner plate section have another width than the respective outer plate section.

In order to prevent unauthorized axial removal of the hinge pin 104, the known hinge 101 also includes blocking means a slidable, flat blocking finger (or platelet) 151. To that aim, the hinge pin 104 has a –e.g. circumferential- blocking recess for engagement of the blocking finger 151. One of the knuckles 15 of the hinge 101 includes an opening for lateral passage of the blocking finger 51 towards the pin 4. The opening is associated with a recess 52 of the inner plate section 5B adjoining that knuckle 15, the recess 52 slideably holding the blocking finger 151, such that the blocking means can slide laterally between a blocking position for engaging the pin 104 and a release position for releasing of the pin 104.

Nb: The present invention follows here:

Figures 5-13 depict a hinge example that can provide efficient assembly and disassembly. The hinge differs from the hinge embodiment of Figures 1-4 in that the blocking means include a blocking member 51 that has a first state for engaging a groove 4A of the hinge pin 4 and a second, deformed state (preferably an elastically deformed state) for release of the hinge pin 4 (the second state being different from said first state).

The deformable blocking member 4 as such can be configured in various ways. For example, according to an embodiment, the blocking member 51 includes or consists of at least one of:

-a metal or steel wire 51;

-a spring member, for example made of spring steel, in particular such that deformation of the blocking member 51, for example radial expansion, is counteracted by internal spring force of the blocking member 51);

-a leaf spring;

-at least two interconnected spring sections.

Further, preferably, the blocking member 51 can have a circular head section 51A for engaging a (circular, circumferential) groove 4A of the hinge pin 4 and a radially outwardly extending leg section 51b for adjusting a state of the head section 51A).

The first state of the blocking member 51 can be a radially contracted state for engaging a groove 4A of the hinge pin 4, wherein the second state of the blocking member is a radially expanded state for release of the hinge pin 4.

It is preferred that at least part 51A (i.e. the head part) of the blocking member 51 surrounds the hinge pin 4, and in particular engages the circumferential blocking groove 4A of the pin 4 when that head part is in

a radially contracted state. As follows from the drawings, the head part 51A of the blocking member can have a substantially circular shape (i.e. ring-shape), extending concentrically with respect to/around a center line of the hinge pin 4 after assembly. A radially contracted state of the head part 51A is shown in Figure 10A, whereas a radially expanded state of the head part 51A (to release the pin 4) is depicted in Figure 10B.

More particularly, the head part 51A can provide an elastically and radially expandable central section of the blocking member 51, and can be located within a hinge knuckle 15, for example a central knuckle 15.

For example, in inner contour of the blocking member (at least its head part 51A) can have a diameter that is the same as or larger than an outer diameter D1 of a main section of the hinge pin 4 when the blocking member is in its second state. Further, the blocking member (at least its head part 51A) can have an inner contour that is smaller than the outer diameter D1 of the main section of the hinge pin 4 and e.g. about the same as or optionally (slightly) larger than an outer diameter D2 of the groove 4A of the pin 4 when the blocking member is in its first state. For example, it is not required that an internal head part 51A of the blocking member spring-biasly engages the circumferential surface of hinge pin groove 4A.

Besides, optionally, the blocking member can have an initial state, before assembly of the pin 4 into the hinge knuckles, wherein the inner contour of the blocking member (at least its head part 51A) can have a diameter that is the substantially the same as (or slightly larger than) the outer diameter D2 of pin's groove 4A, but smaller than the diameter D1 of the pin itself. The blocking member's initial state can e.g. correspond to its first state.

The hinge pin 4 as such can be provided with a tapered tip 4B, allowing ease of assembly (see also Figures 11A, 11B), in particular for sliding the hinge pin into aligned hinge knuckles13, 15 and along the placed

blocking member 51 (which can be in an afore-mentioned initial state during the pin joining step).

According to an embodiment (see Figures 10A, 10B), the hinge 1 can include an internal (circumferential, e.g. ring-shaped) blocking member receiving slit 54 for receiving the blocking member 51 (e.g. for receiving its entire head section 51A) when that member 51 is in its second (in this case expanded) state, allowing displacement of the hinge pin 4 with respect to the blocking member. According to an embodiment, an outer contour of a head section 51A of the blocking member may adjoin/contact an opposite inner side of the blocking member receiving slit 54 when the blocking member is in its second state (see Fig. 10B). Also, an inner contour of the head section 51A of the blocking member may be entirely located within the blocking member receiving slit 54 when the blocking member is in its second state (see Fig. 10B as well).

Besides, the blocking member 51 (i.e. its head section 51A) is preferably located partly outside the internal blocking member receiving slit 54 (and engages the hinge pin 4, or at least partly extends within the circumferential slit 4A of the pin 4) when the blocking member 51 is in its first (e.g. contracted) state. According to an embodiment, an outer contour of a head section 51A of the blocking member may be radially separated from an opposite inner side of the blocking member receiving slit 54 when the blocking member is in its first state (see Fig. 10A), wherein that outer contour still substantially remains located within that blocking member receiving slit 54 (thereby locking the pin 4 in place).

According to an example, the afore-mentioned blocking member receiving slit can e.g. be provided in the respective knuckle 15 that surrounds the blocking groove 4A of the pin 4 after assembly. Alternatively, such a blocking member receiving slit 54 can be defined between opposite ends of hinge bearings 31, 32, if available.

For example, the hinge 1 can include a number of cylindrical bearing sections 31, 32 extending between the hinge pin 4 and at least one of hinge knuckles 15, the cylindrical bearing sections preferably fitting snuggingly between the pin 4 and the knuckle(s). In that case, the internal blocking member receiving slit 54 can be provided between opposite edges of two of said cylindrical bearing sections 31, 32). The respective bearing sections 31, 32 are made of steel, or a similar sturdy durable material, to allow firm axial engagement with the central section 51A of the blocking member 51 to axially lock the hinge pin in place.

The opposite surfaces 31A, 32A of the two cylindrical bearing sections 31, 32 can e.g. be substantially frusco-conical surfaces (see Figure 13, showing a conical end part 31A of one of the bearings 31), in particularly being tapered inwardly with respect to a central axis of the respective bearing section 31, 32). This allows for improved hinge pin locking, wherein a tapered bearing surface can guide the head section 51A of the blocking member 51 into a cramping position between the respective bearing end and the hinge pin in case of axial movement of the hinge pin 4 (and in case the blocking member is in its first -contracted- state).

Further, it is preferred that the blocking member 51 has an operating section 51B that extends radially outwardly, via an opening/passage 55 of/through that knuckle 15, in particular such that the operating section 51B of the blocking member 51 is displaceable with respect to the knuckle 15 (and respective hinge leaf 5 associated with that knuckle 15) for changing the state of the central section 51A of the blocking member 51 from a first state to a second, expanded, state. For example, the operating section 51B can extend substantially radially away from the central section 51A of the blocking member, e.g. by including an angle α with a tangent line at a respective intersection in the range of about 60 to 120 degrees (when viewed in transversal cross-section, see Fig. 9).

Figures 5, 8, 9 shows an example wherein the blocking member operating section 51B is in an initial (idle) state, e.g. having an outer end (tip) 51C located/resting onto or next to an inner surface of the respective leaf 5 of the hinge 1, so that the respective blocking member 51 provides its first (hinge pin blocking) state. In particular, the respective leaf 5 can include an opening, slit or aperture 53 (i.e. a receiving space) for receiving/embedding an external (operating) part 51B of the blocking member 51 when the blocking member 51 is in its initial (idle) state. In this way, the hinge 1 can be closed without the external part of the blocking member hindering such closure.

According to an embodiment, the blocking member 51 can be coupled to a user operating member 52 extending externally with respect to the knuckles 13, 15, the user operating member 52 being adjustable from a first position to a second position (and vice-versa) for changing the state of the blocking member. The user operating member 52 is preferably embedded within an operating member receiving space 53 in one or more of the hinge leaves 5 when that member 52 is in said first position (so that the operating member 52 does not hinder hinge closure when the operating member is in an initial, idle state).

The operating member 52 can be configured in various ways, e.g. as a platelet or lifting finger, e.g. being directly manually operable or operable via a lifting tool (e.g. the tip of a screwdriver). According to an embodiment, the operating member 52 can be pivotally connected or coupled to the respective hinge leaf 5 and knuckle 15, a respective pivot axis 52B e.g. being in parallel with respect to a center line of the hinge pin 4, the pivot axis 52B e.g. being located at or near a blocking member passage 55 (see Figures 5, 6, 12).

The operating member 52 can be made in one piece with the blocking member 51, it can be integrated therewith, or it can be a separate component. For example, the operating member 52 can include a slit or

aperture 52A that receives an external part (e.g. a leg section 51B) of the blocking member 51, to embed that blocking member part within the operating member 52 (and within the respective receiving space 53 of the respective hinge leaf 5). Besides, the blocking member 51 and respective operating member 52 can cooperate or interact to hold the operating member 52 axially (and laterally) in place after assembly, e.g. optionally using an internal spring biasing force from the blocking member 51.

Figure 12A, 12B shows the operating section 51B being in a user operated state wherein its tip 51C has been moved or lifted away from the respective leaf 5 of the hinge, thereby (e.g. elastically) deforming the integral head section 51A so that the respective blocking member 51 provides its expanded (hinge pin release) state. For example, an inner end 51D of the blocking member can have a fixed position within the respective hinge knuckle 15 (e.g. via interaction with an internal stopping cam 56, protrusion or slit of the knuckle 15) so that circumferential movement of the outer end 51C (i.e. by lifting that outer end 51C away from the hinge leaf) leads to the expansion of the blocking member (at least its head section 51A).

According to an embodiment, a knuckle 15 of the hinge includes an opening/passage 55 (between or spaced-apart from respective axial knuckle ends) for the blocking member 51. The opening 55 is preferably covered by the hinge 1 when the hinge 1 is in a closed hinge state.

The knuckle opening 55 can e.g. have an axial length that is at most 50% of an axial length of the respective knuckle, wherein the knuckle opening 55 preferably extends along at most 50% of a circumference of the respective knuckle and more preferably along at most 25 % of that circumference viewed along a circumferential direction).

As in the example of Figures 1-4, it is preferred that the first leaf 3 of the hinge 1 includes a first outer plate section 3A, at least one first inner plate section 3B extending over an inner side S1 of the first outer plate

section 3A, and at least one first knuckle 13, the inner side S1 of the first outer plate section 3A being partly covered by the at least one first inner plate section 3B. However, the hinge 1 can also be configured differently, e.g. without dedicated outer and inner plate sections.

Also, in an alternative embodiment, various hinge plate sections and/or hinge knuckle sections can be integrally welded together, or joined differently, as will be appreciated by the skilled person.

Also, part 5B of the second leaf 5 of the hinge 1 preferably mates with or nests in the at least one first inner plate section 3B of the first leaf 3 when the hinge is in a closed condition, but that is not required. Also, the hinge 1 preferably includes at least two spaced-apart first inner plate sections 3B, in particularly spaced-apart viewed in a direction X in parallel with a hinge axis 4, the at least two spaced-apart first inner plate sections 3B defining an intermediate space there-between, wherein part 5B of the second leaf 5 is arranged to be received by the intermediate space between the spaced-apart first inner plate sections 3B when the hinge is in a closed state, wherein said intermediate space for receiving part 5B of the second leaf 5 is preferably defined between opposite edges of two inner plate sections 3B of the first leaf 3 (again, that is not required).

Use of the hinge 1 can involve hinge assembly and disassembly. As is shown in Figures 11A, 11B, during assembly, the following steps can be carried out, efficiently, and in particular when hinge leaves 3, 5 are in mutually closed states (and also in case they have been swiveled away from each other). The knuckles 13, 15 of the hinge leaves 3, 5 can be aligned, and the blocking member 51 can be provided in one of the knuckles 15, preferably such that the blocking member 51 is in an initial state, for example a radially contracted state wherein it provides an inner diameter that is smaller than an outer diameter D1 of the hinge pin 4. It is preferred that blocking member operating section 51B (if available) and respective -optional- operating member 52 are entirely embedded between the hinge

leaves, e.g. in the receiving aperture 53 in one of the leaves, both being e.g. in respective idle positions. Bearing sections 31, 32, 33, 34 (if available) are also provided in the knuckles. Next, the hinge pin 4 can enter the hinge pin receiving space that is defined by the aligned knuckles or bearing sections, preferably such that the pin slides towards and along the blocking member 51, wherein the head section 51A of the blocking member 51 deforms (expands) from its initial state to its second state first and subsequently snaps into the groove 4A of the hinge pin 4 to achieve its first state. It is preferred that the pin 4 is placed with the tapered tip 4B first, allowing smooth initial contact and sliding along the blocking member 51. Pin insertion is indicated by arrow H.

It follows that the method preferably further includes providing two (axially opposite) cylindrical bearing sections 31, 32 in one of the knuckles 15 (i.e. the knuckle that holds the blocking member 51) before joining the hinge pin 4 to the knuckles. It also follows that the blocking member 51 is preferably located at an axial position between opposite ends 31A, 32A of the two bearing members 31, 32.

Having positioned the pin 4 to its final position (see Fig. 11B), hinge assembly is finished. No further action is required for locking the pin 4, which is now being locked in axial position by the blocking member 51 (as shown in Figure 10A). Moreover, removal of the hinge pin 4 is not possible when the hinge is in its closed state -with the leaves 3, 5 being folded together- the leaves blocking access to the blocking member 52 and its operating member 52.

It follows e.g. that the hinge 1 can be assembled when the hinge leaves 3, 5 are already mounted to respective structures that are to be coupled by the hinge 1, e.g. a window, door, frame or panel, beam and/or the-like, assembly only requiring placement of the hinge pin 4.

On the other hand, hinge disassembly (shown in Figures 12A, 12B) can be achieved simply by:

-adjusting the blocking member 51 from its first state to its second state by (e.g. elastically) deforming the blocking member 51 (the deformation in particular being countered by an internal spring force of the blocking member 51); and

-removing the hinge pin 4 from the knuckles (indicated by arrow K).

For example, the adjusting can involve pivoting the operating member 52 out of the respective space 53, thereby pulling the external tip 51C of the blocking element 51 away from the receiving space 53 a well, which results in a substantial circumferential (tangent) force on the internal (ring-shaped) section 51A of the blocking element 51 (its other end 51D being in a fixed position) so that the internal section 51A expands and moves out of the groove 4A of the hinge pin 4. It is preferred that the blocking member 51 can only be adjusted in case the hinge 1 has been folded to an opened hinge state (see the drawings), so that an external part 51B of the blocking member is available to be pulled away from the respective hinge leaf 5 (e.g. by outwardly pivoting the respective operating member 52) to expand the internal head section 51A. Due to its preferred elasticity/resiliency the blocking member 51 can return to an initial or first position automatically (via internal spring force), moving e.g. the operating member 52 back to its embedded position as well, after user operation.

Thus, disassembly can also be achieved efficiently, without e.g. having to remove a dedicated fastener (e.g. screw) from the hinge 1.

It will be clear to the skilled person that the invention is not limited to the exemplary embodiments described. Various modifications are possible within the framework of the invention as set forth in the following claims.

For example, the hinge can have various dimensions and shapes, as will be appreciated by the skilled person. It is preferred that the hinge has rounded-off external edges (as in the depicted embodiment) but that is not

required. Also, a said blocking member can be entirely or partly elastically deformable.

Conclusies

1. Scharnier, omvattende een eerste blad (3) en een tweede blad (5) welke scharnierbaar aan elkaar zijn gekoppeld via respectieve knopen (13, 15) door een scharnierpen (4), waarbij het scharnier verder blokkeermiddelen (51, 61, 62) omvat om een axiale verwijdering van de scharnierpen (4) uit de knopen (13, 15) te voorkomen, met het kenmerk, dat de blokkeermiddelen een blokkeerdeel (51) omvatten dat een eerste toestand heeft voor aangrijping van een groef (4A) van de scharnierpen (4) en een tweede, gedeformeerde toestand voor vrijgave van de scharnierpen (4), waarbij de tweede toestand bijvoorbeeld een elastisch gedeformeerde en/or radiaal aangepaste toestand is.

2. Scharnier volgens conclusie 1, waarbij de eerste toestand van het blokkeerdeel (51) een radiaal samengetrokken toestand is voor het aangrijpen van een groef (4A) van de scharnierpen (4), waarbij de tweede toestand van het blokkeerdeel een radiaal uitgezette toestand is voor vrijgave van de scharnierpen (4).

3. Scharnier volgens conclusie 1 of 2, waarbij ten minste een deel (51A) van het blokkeerdeel de scharnierpen (4) omgeeft, waarbij de scharnierpen (4) in het bijzonder een omtrekkende blokkeergroef (4A) heeft voor het ontvangen van het blokkeerdeel (51) of blokkeerdeel-deel (51A).

4. Scharnier volgens een der voorgaande conclusies, waarbij het blokkeerdeel (51) omvat of bestaat uit ten minste een van:
-een metalen of stalen draad;
-een veerdeel, bijvoorbeeld vervaardigd van verenstaal, in het bijzonder zodanig dat deformatie van het blokkeerdeel (51), bijvoorbeeld radiale expansie, wordt tegengewerkt door interne veerkracht van het blokkeerdeel (51);

-een bladveer;

-twee onderling verbonden veersecties.

5. Scharnier volgens een der voorgaande conclusies, waarbij het blokkeerdeel (51) een cirkelvormig kopdeel (51A) heeft om een groef van de scharnierpen (4) aan te grijpen en bij voorkeur een zich buitenwaarts uitstrekkend beendeel (51B) om een toestand van het kopdeel (51A) bij te stellen.

6. Scharnier volgens een der voorgaande conclusies, waarbij het blokkeerdeel (51) een (bij voorkeur elastisch en radiaal) expandeerbaar centraal deel (51a) omvat dat zich binnen een scharnierknoop (15) bevindt en een bedieningsdeel (51B) dat zich radiaal naar buiten toe uitstrekt via een opening (55) van die knoop (15), in het bijzonder zodanig dat het bedieningsdeel (51B) van het blokkeerdeel (51) verplaatsbaar is ten opzichte van de knoop (15) om de toestand van het centrale deel (51A) van het blokkeerdeel (51) te wijzigen van de eerste toestand naar een tweede, uitgezette toestand.

7. Scharnier volgens een der voorgaande conclusies, waarbij een knoop (15) van het scharnier een opening (55) omvat tussen axiale knoopeinden voor het blokkeerdeel (51), waarbij de opening (55) bij voorkeur wordt bedekt door het scharnier (1) wanneer het scharnier (1) zich in een gesloten scharnierstand bevindt, waarbij de knoopopening (55) bij voorkeur een axiale lengte heeft die ten hoogste 50% bedraagt van een axiale lengte van de respectieve knoop, waarbij de knoopopening (55) zich bij voorkeur uitstrekt over ten hoogste 50% van een omtrekt van de respectieve knoop en meer bij voorkeur over ten hoogste 25% van die omtrek (gezien in een omtreksrichting).

8. Scharnier volgens een der voorgaande conclusies, waarbij het blokkeerdeel (51) is gekoppeld aan een gebruikerbedieningsdeel (52) dat

zich buiten de knopen (13, 15) uitstrekt, waarbij het gebruikerbedieningsdeel (52) instelbaar is van een eerste positie naar een tweede positie ten behoeve van het wijzigen van de toestand van het blokkeerdeel, waarbij het gebruikerbedieningsdeel bij voorkeur is ingebed in een bedieningsdeelontvangstruimte (53) in een of meer van de scharnierbladen (5) wanneer het zich in de genoemde eerste positie bevindt.

9. Scharnier volgens een der voorgaande conclusies, omvattende een interne blokkeerdeel ontvangende spleet (54) om het blokkeerdeel (51) te ontvangen wanneer dat deel (51) zich in de tweede toestand bevindt, waarbij het blokkeerdeel (51) zich bij voorkeur deels buiten de interne blokkeerdeel ontvangende spleet (54) bevindt wanneer het blokkeerdeel (51) zich in de eerste toestand bevindt.

10. Scharnier volgens conclusie 9, waarbij het scharnier (1) een aantal cilindrische lagerdelen (31, 32) omvat die zich uitstrekken tussen de scharnierpen (4) en ten minste een van de scharnierknopen (15), waarbij de cilindrische lagerdelen bij voorkeur met weinig speling passen tussen de pen (4) en de knoop/knopen, waarbij de interne blokkeerdeel ontvangende spleet (54) is voorzien tussen tegenoverliggende randen van twee van genoemde cilindervormige lagerdelen (31, 32), waarbij de respectieve lagerdelen bij voorkeur van staal zijn vervaardigd.

11. Scharnier volgens conclusie 10, waarbij tegenoverliggende oppervlakken van de twee cilindervormige lagerdelen (31, 32) in hoofdzaak frusco-conische oppervlakken zijn, in het bijzonder zijnde taps inwaarts ten opzichte van een centrale as van het respectieve lagerdeel (31, 32).

12. Scharnier volgens een der voorgaande conclusies, waarbij het eerste blad (3) een eerste buitenplaatdeel (3A), ten minste een eerste binnenplaatdeel (3B) dat zich uitstrekt over een binnenzijde (S1) van het eerste buitenplaatdeel (3A), en ten minste een eerste knoop (13) omvat,

waarbij de binnenzijde (S1) van het eerste buitenplaatdeel (3A) deels is bedekt door het ten minste ene eerste binnenplaatdeel (3B),
waarbij een deel (5B) van het tweede blad (5) bij voorkeur past of nest in het ten minste ene eerste binnenplaatdeel (3B van het eerste blad (3) wanneer het scharnier zich in een gesloten stand bevindt,
waarbij het scharnier (1) bij voorkeur ten minste twee zich op afstand van elkaar bevindende eerste binnenplaatdelen (3B) omvat, in het bijzonder op afstand van elkaar gezien in een richting (X) evenwijdig aan een scharnieras (4), waarbij de ten minste twee zich op afstand van elkaar bevindende binnenplaatdelen (3B) een tussenliggende ruimte daartussen definiëren,
waarbij een deel (5B) van het tweede blad (5) is uitgevoerd om door de tussenliggende ruimte tussen de op afstand van elkaar opgestelde eerste binnenplaatdelen (3B) te worden ontvangen wanneer het scharnier zich in een gesloten stand bevindt, waarbij genoemde tussenliggende ruimte voor het ontvangen van deel (5B) van het tweede blad (5) bij voorkeur is gedefinieerd tussen tegenoverliggende randen van twee binnenplaatdelen (3B) van het eerste blad (3).

13. Scharnier volgens conclusie 12, waarbij een genoemd binnenplaatdeel (5B) een bedieningsdeel-ontvangstruimte (53) omvat voor het ontvangen van een deel van een gebruikerbedieningsdeel (52), waarbij het gebruikerbedieningsdeel (52) zich buiten de knopen (13, 15) uitstrekt, waarbij het gebruikerbedieningsdeel (52) instelbaar is van een eerste positie naar een tweede positie ten behoeve van het wijzigen van de toestand van het blokkeerdeel (51).

14. Scharnier volgens conclusie 12 of 13, waarbij de scharnierpen (4) zich in een X-richting uitstrekt, waarbij de plaatdelen (3A, 5A, 3A, 5B) een dikte hebben gemeten loodrecht door het blad en een breedte, gemeten in een richting Y welke normaal is ten opzichte van de X-richting, waarbij de

breedte van elk van de binnenplaatdelen (3B, 5B) in hoofdzaak gelijk is aan een breedte van het respectieve buitenplaatdeel (3A, 5A).

15. Scharnier, bijvoorbeeld een scharnier volgens een der voorgaande conclusies, omvattende een eerste blad (3) en een tweede blad (5) welke scharnierbaar aan elkaar zijn gekoppeld via respectieve knopen (13, 15) door een scharnierpen (4), waarbij het scharnier verder blokkeermiddelen (51, 61, 62) omvat om een axiale verwijdering van de scharnierpen (4) uit de knopen (13, 15) te voorkomen, met het kenmerk, dat de blokkeermiddelen een blokkeerdeel (51) omvatten dat een eerste, radiaal samengetrokken toestand heeft voor aangrijping op een groef (4A) van de scharnierpen (4) en een tweede, radiaal uitgezette toestand voor vrijgave van de scharnierpen (4).

16. Werkwijze voor assemblage van een scharnier volgens een der voorgaande conclusies, omvattende:

-op elkaar uitlijnen van de knopen (13, 15) van de scharnierbladen (3, 5) en voorzien van het blokkeerdeel (51) in een van de knopen (15), bij voorkeur zodanig dat het blokkeerdeel (51) zich in een initiële toestand bevindt, bijvoorbeeld een radiaal samengetrokken toestand waarbij het een binnendiameter verschaft die kleiner is dan een buitendiameter (D1) van een hoofddeel van de scharnierpen (4);

-de scharnierpen (4) de op elkaar uitgelijnde knopen (13, 15) inschuiven, bij voorkeur zodanig dat het blokkeerdeel (51) eerst van de initiële toestand deformeert naar de tweede toestand en vervolgens de groef (4A) van de scharnierpen (4) inklikt om de eerste toestand te bereiken.

17. Werkwijze volgens conclusie 16, omvattende voorzien van twee cilindervormige lagerdelen (31, 32) in een van de knopen (15) voorafgaande aan samenvoegen van de scharnierpen (4) met de knopen, waarbij het

blokkeerdeel (51) zich bij voorkeur bevindt op een axiale positie tussen tegenoverliggende einden van de twee lagerdelen (31, 32).

18. Werkwijze voor demontage van een scharnier volgens een der conclusies 1-15, omvattende:

-aanpassen van het blokkeerdeel (51) van de eerste toestand naar de tweede toestand door deformeren van het blokkeerdeel (51), bijvoorbeeld door elastisch en/af radiaal aanpassen van ten minste een deel van het blokkeerdeel (51); en

-verwijderen van de scharnierpen (4) uit de knopen.

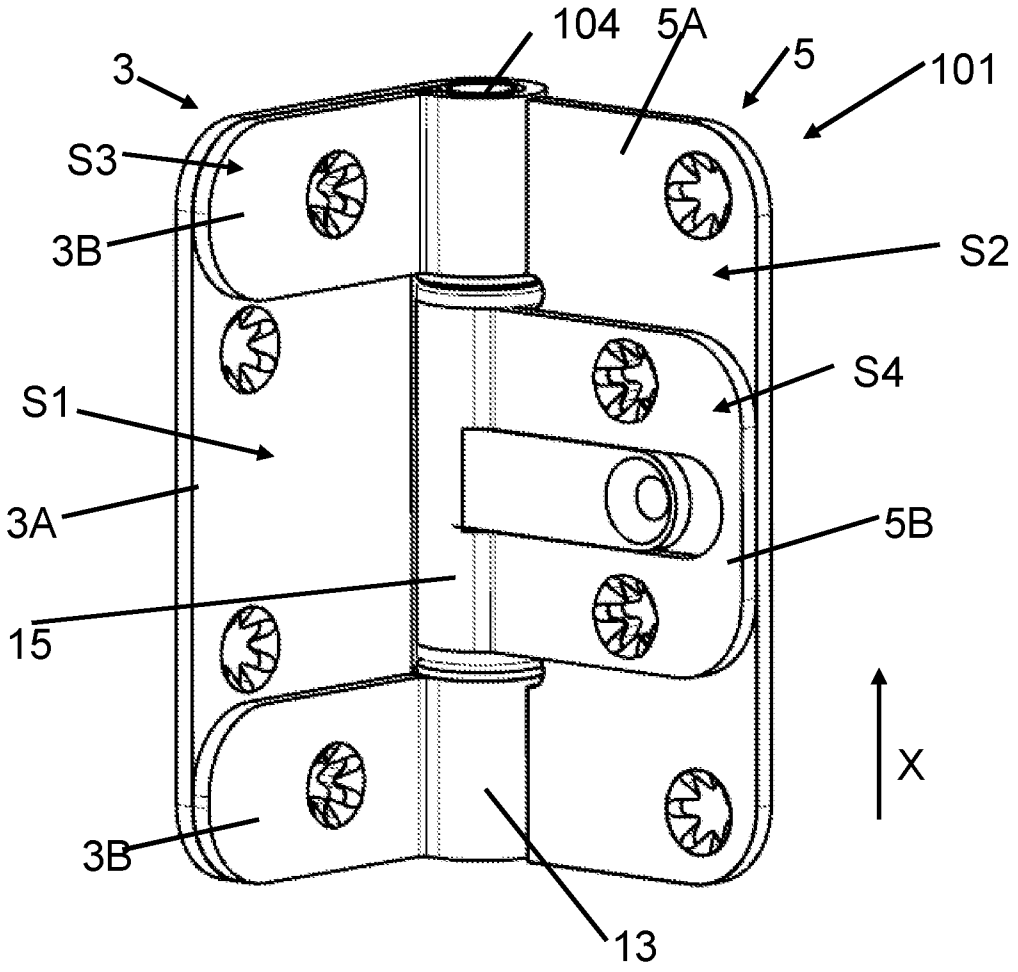

FIG. 1

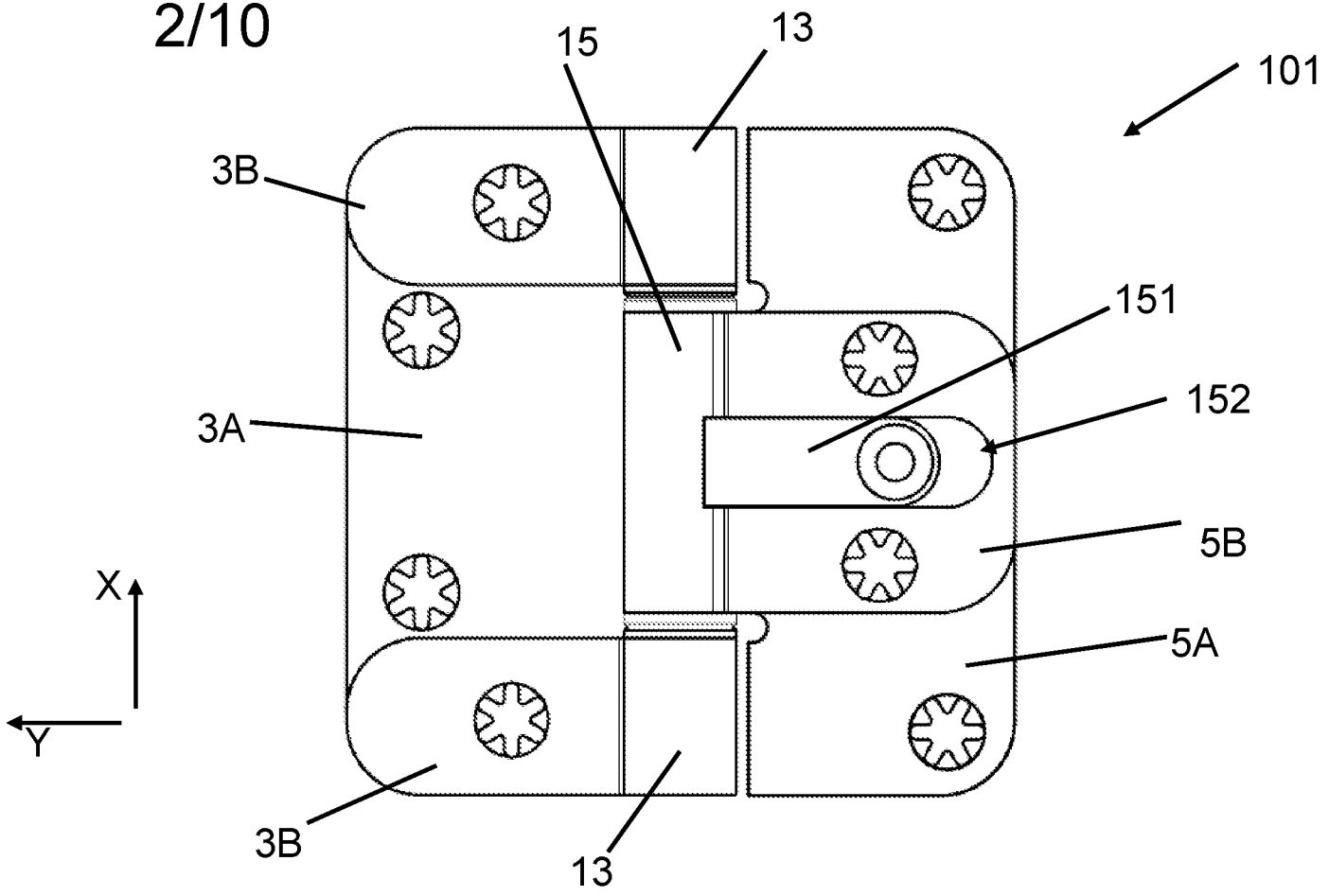

FIG. 2

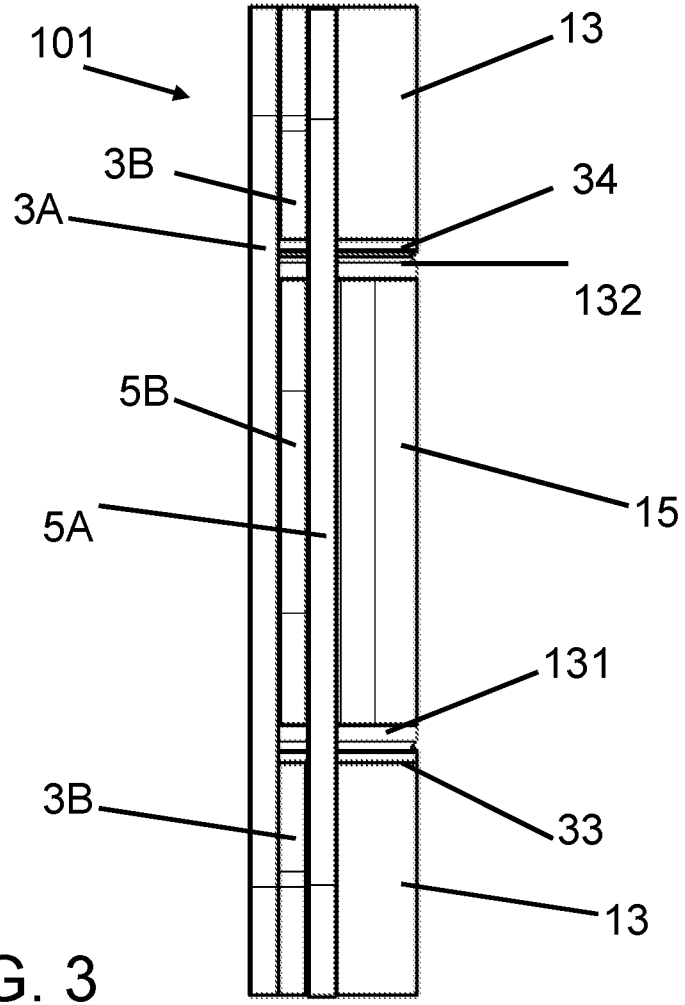

FIG. 3

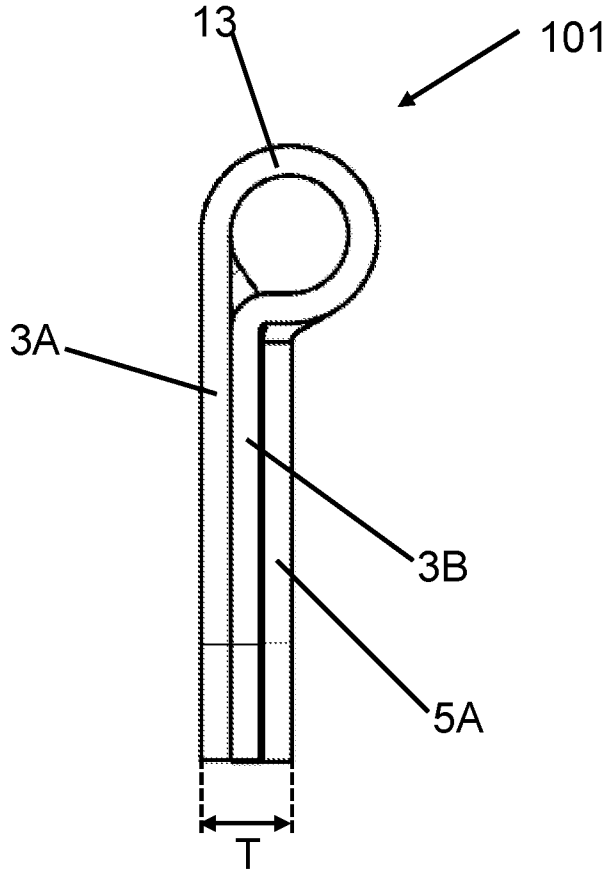

FIG. 4

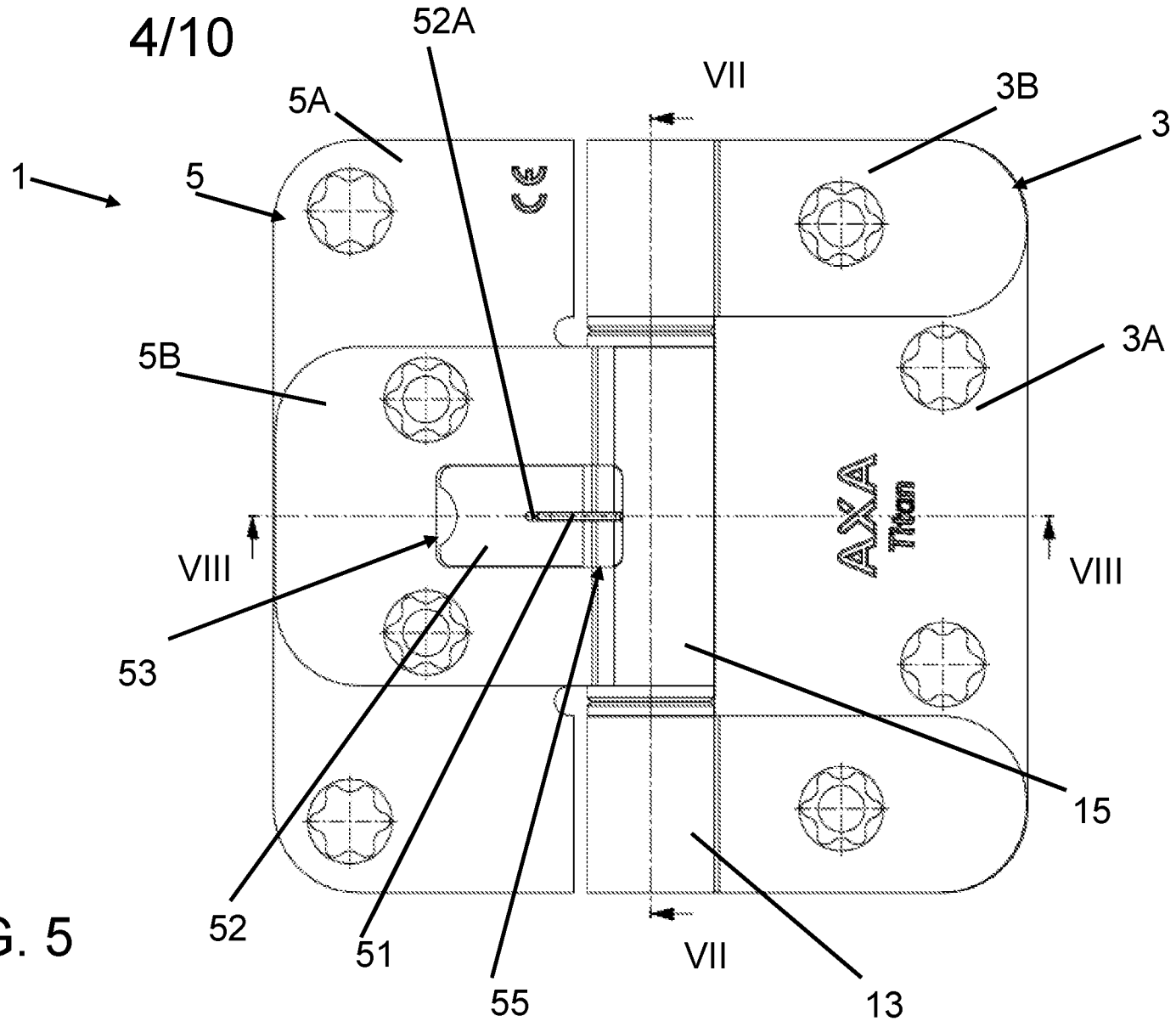
52A
VII
5A
3B
3
1
5
CE
5B
3A
AXA
Titan
VIII
VIII
53
15
52
51
55
VII
13

FIG. 5

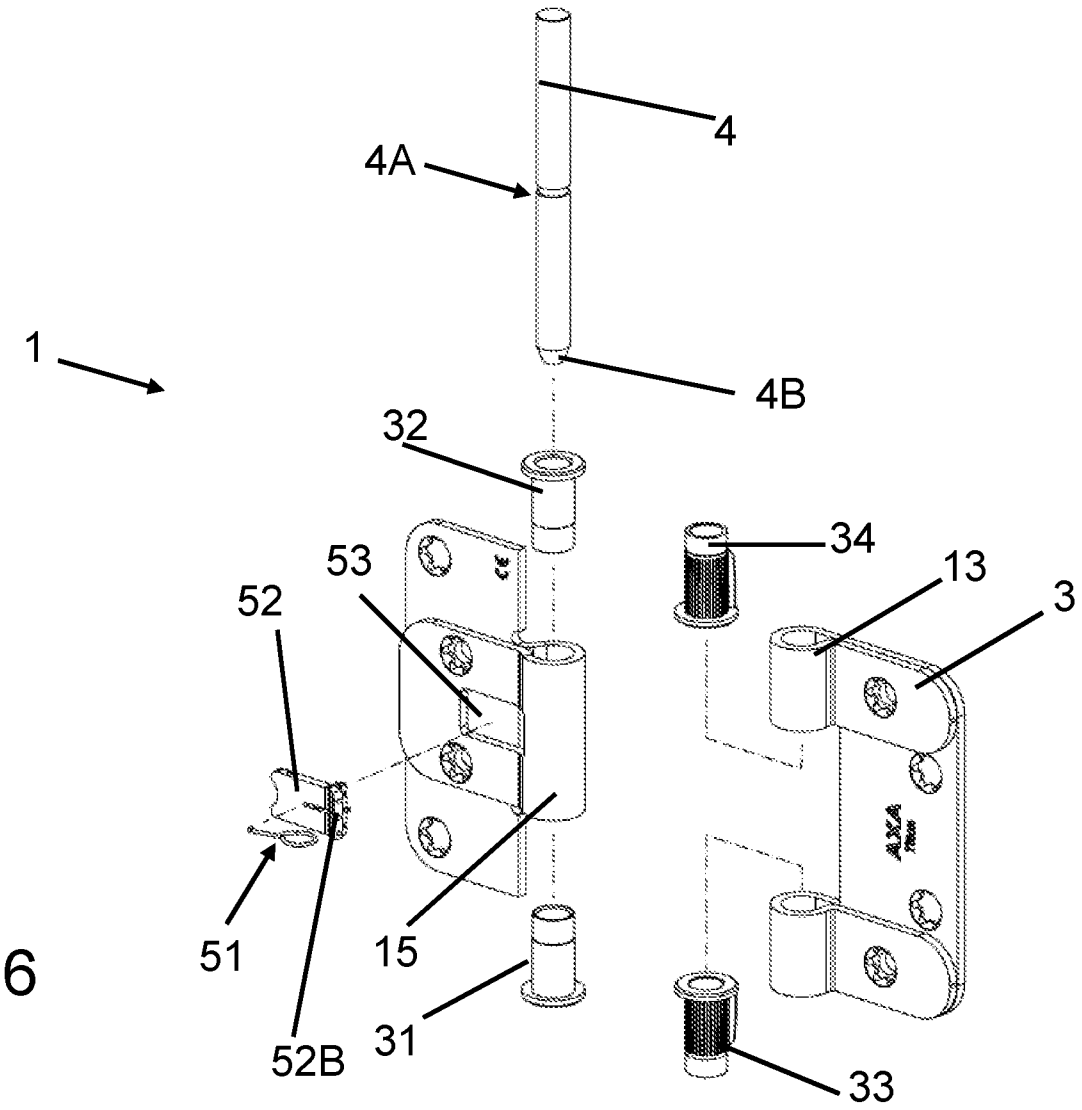

FIG. 6

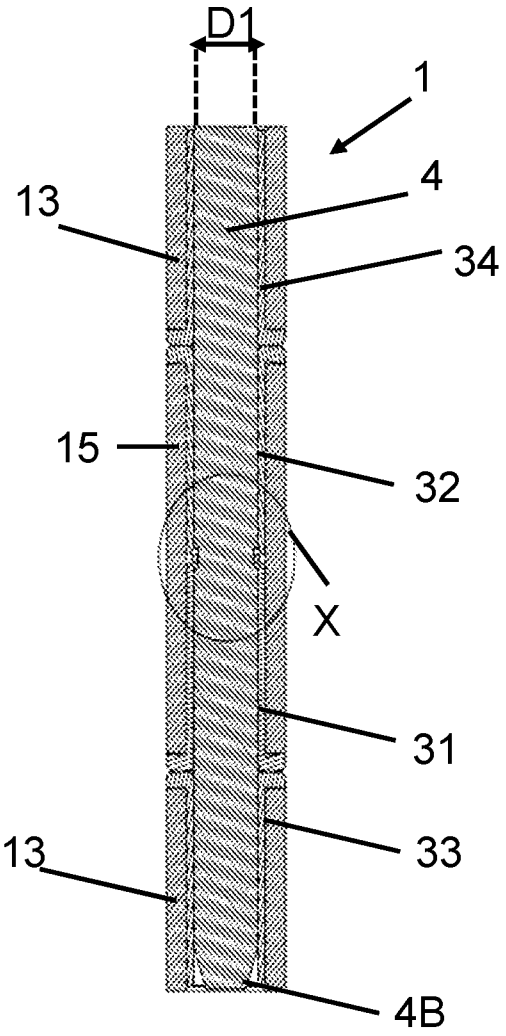

FIG. 7

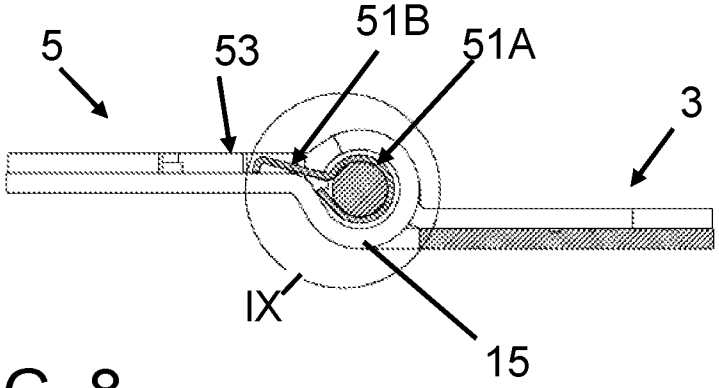

FIG. 8

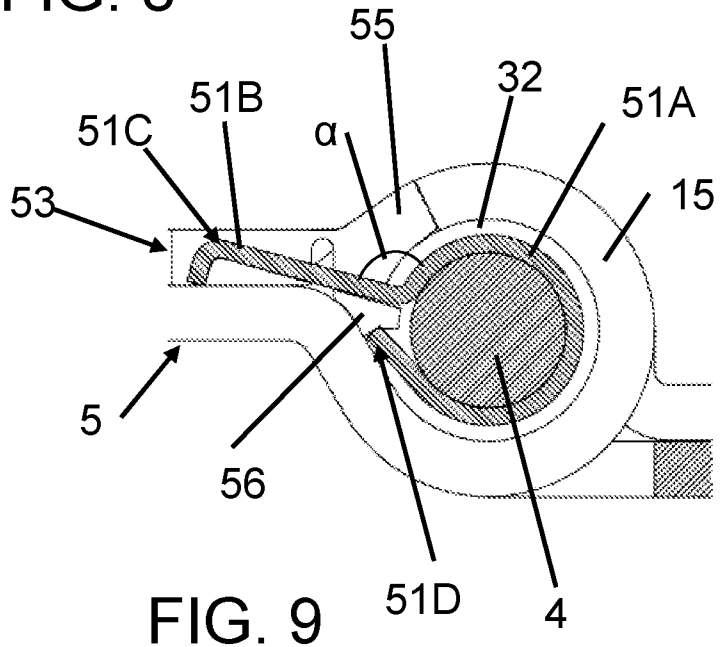

FIG. 9

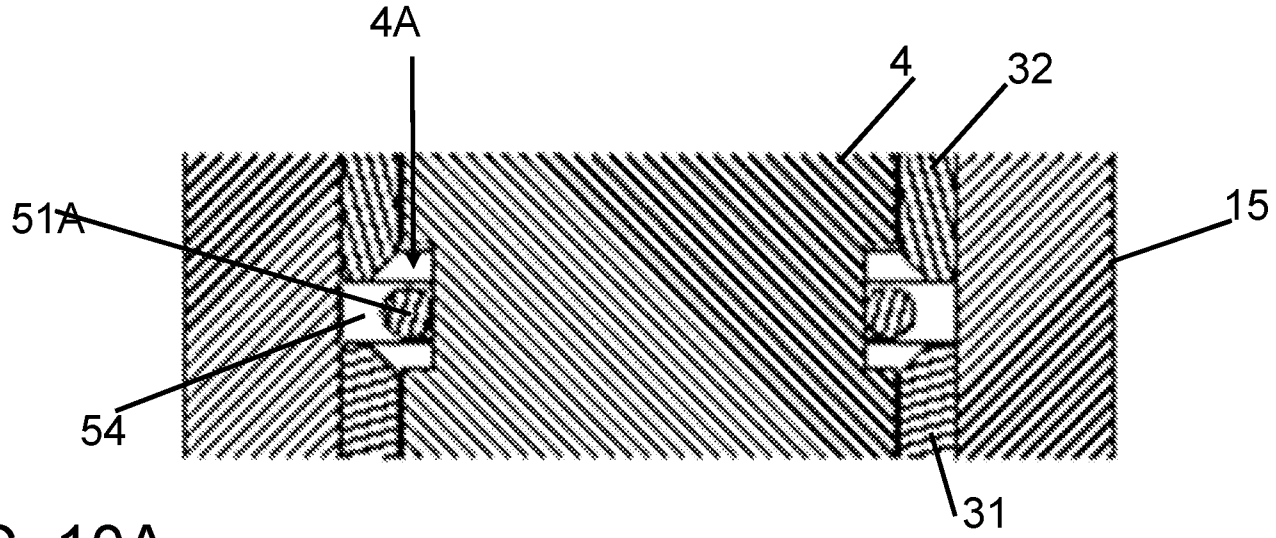

FIG. 10A

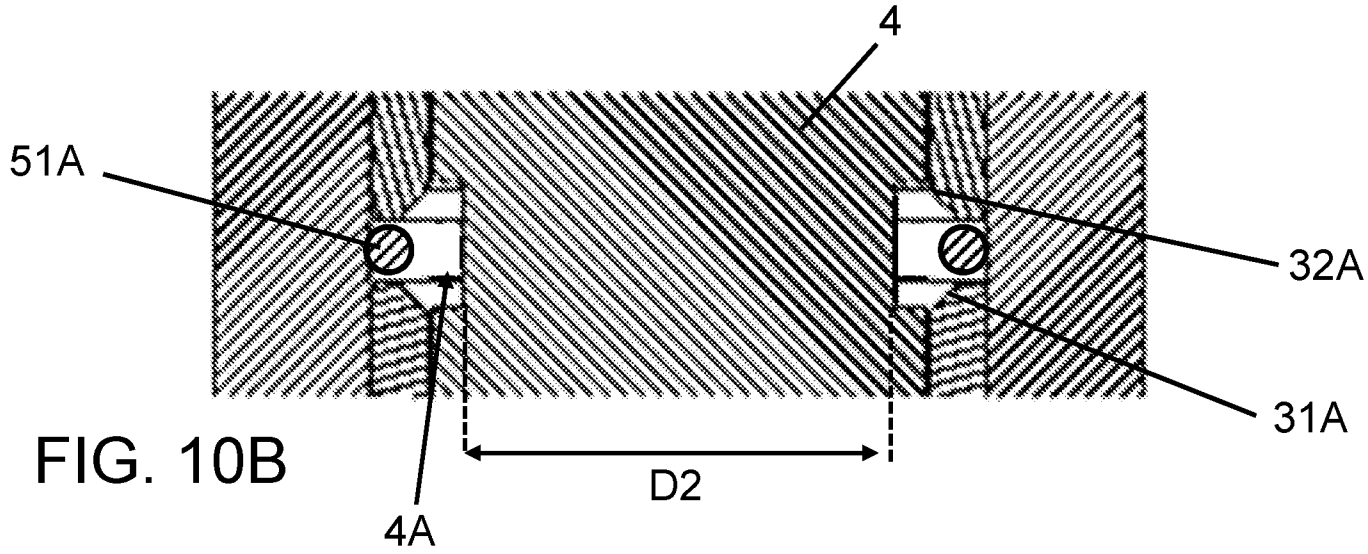

FIG. 10B

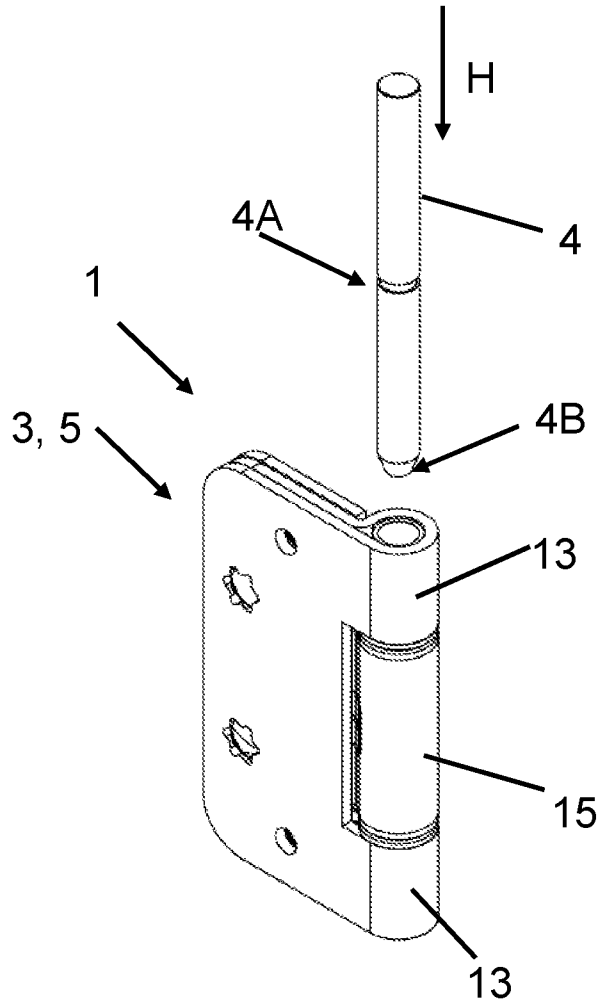

FIG. 11A

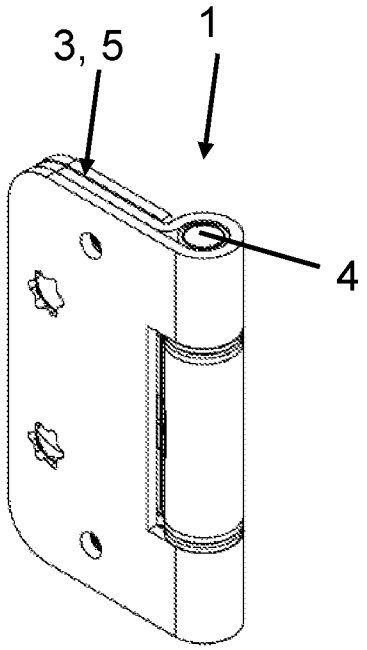

FIG. 11B

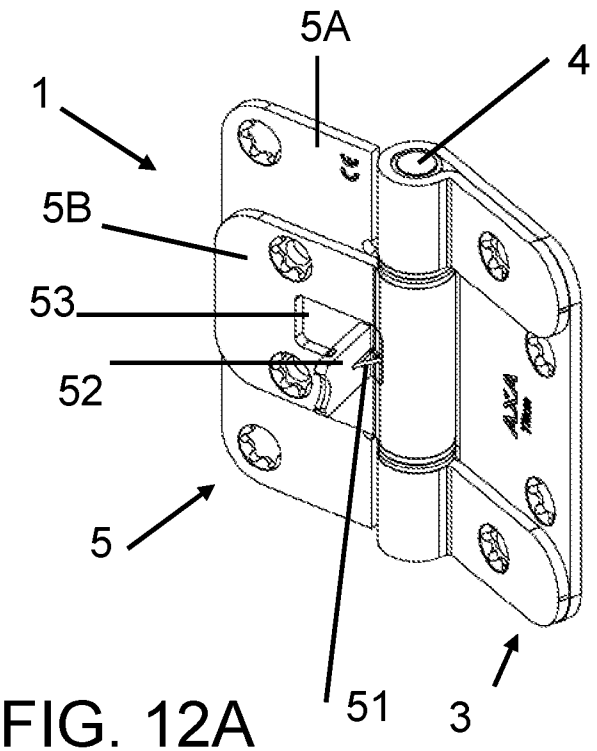

FIG. 12A

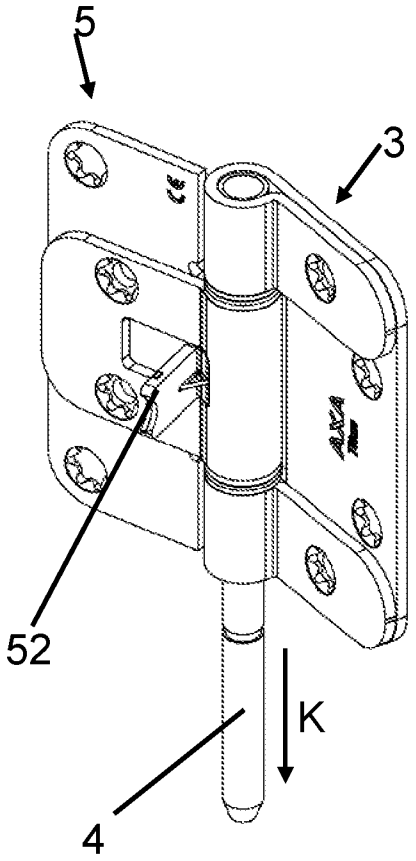

FIG. 12B

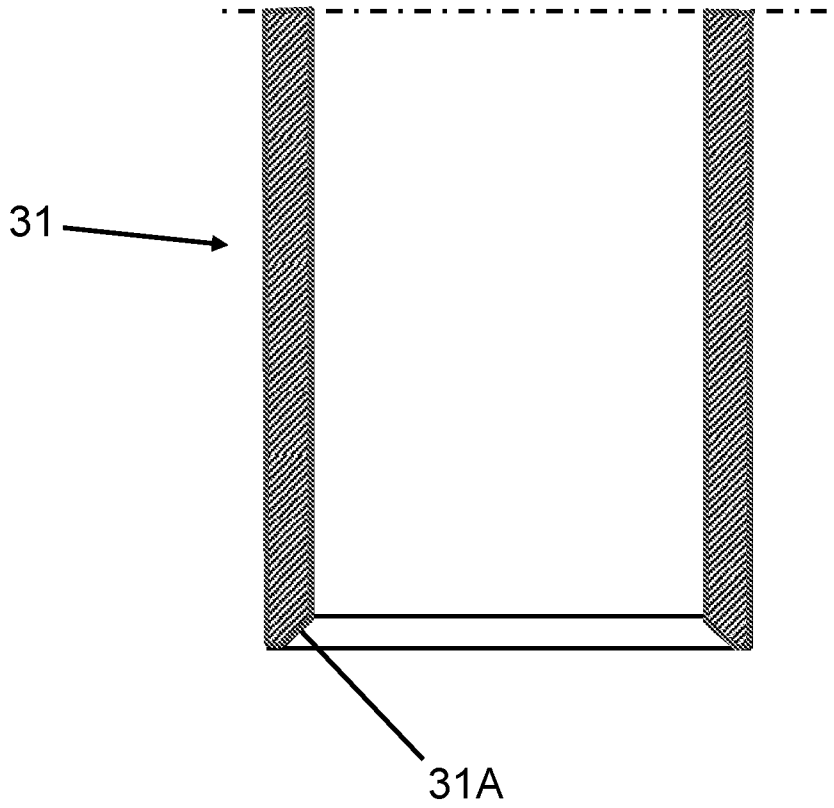

FIG. 13

Rijksdienst voor Ondernemend Nederland

RAPPORT BETREFFENDE HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK

Octrooiaanvrage 2031766

Classificatie van het onderwerp[1]: E05D5/12; E05D11/10; E05D3/04	Onderzochte gebieden van de techniek[1]: E05D
Computerbestanden: EPODOC, WPI	Omvang van het onderzoek: Volledig
Datum van de onderzochte conclusies: 14 juni 2022	Niet onderzochte conclusies: -

Van belang zijnde literatuur

Categorie[2]	Vermelding van literatuur met aanduiding, voor zover nodig, van speciaal van belang zijnde tekstgedeelten of figuren	Van belang voor conclusie(s)
D, A	NL 2021911 A (AXA STENMAN NEDERLAND B V) 16 januari 2019 * samenvatting; figuren 1 – 9 * – – –	1 – 18
A	NL 8304033 A (JOHANNES BERNARDUS MARIA TENTE) 17 juni 1985 * figuren 1 – 6; pagina 1, regels 6 – 20; pagina 2, regels 27 – 31 * – – – – –	1 – 18

Datum waarop het onderzoek werd voltooid: 12 oktober 2022	De bevoegde ambtenaar: ir. J.J. van Dijk **Octrooicentrum Nederland** **onderdeel van Rijksdienst voor Ondernemend Nederland**

1, 2 Zie toelichting volgend blad.

Toelichting:

[1] Classificatie gebieden van de techniek:
gedefinieerd volgens International Patent Classification (IPC).

[2] Categorie van de vermelde literatuur:

X: op zichzelf van bijzonder belang zijnde stand van de techniek

Y: in samenhang met andere geciteerde literatuur van bijzonder belang zijnde stand van de techniek

A: niet tot de categorie X of Y behorende van belang zijnde stand van de techniek

O: verwijzend naar niet op schrift gestelde stand van de techniek

P: literatuur gepubliceerd tussen voorrangs- en indieningsdatum

T: niet tijdig gepubliceerde literatuur over theorie of principe ten grondslag liggend aan de uitvinding

E: octrooiliteratuur gepubliceerd op of na de indienings-datum van de onderhavige aanvrage en waarvan de indieningsdatum of de voorrangsdatum ligt voor de indieningsdatum van de onderhavige aanvrage

D: in de aanvrage genoemd

L: om andere redenen vermelde literatuur

&: lid van dezelfde octrooifamilie; corresponderende literatuur

Rijksdienst voor Ondernemend Nederland

AANHANGSEL

Behorende bij het Rapport betreffende het Onderzoek naar de Stand van de Techniek

Octrooiaanvrage 2031766

Het aanhangsel bevat een opgave van elders gepubliceerde octrooiaanvragen of octrooien (zogenaamde leden van dezelfde octrooifamilie), die overeenkomen met octrooigeschriften genoemd in het rapport. De opgave is samengesteld aan de hand van gegevens uit het computerbestand van het Europees Octrooibureau per 12 oktober 2022. De juistheid en volledigheid van deze opgave wordt noch door het Europees Octrooibureau, noch door Octrooicentrum Nederland gegarandeerd; de gegevens worden verstrekt voor informatiedoeleinden.

In het rapport genoemd octrooigeschrift		Datum van publicatie	Overeenkomende octrooigeschriften	Datum van publicatie
NL 2021911	A	16-01-2019	(geen)	
NL 8304033	A	17-06-1985	(geen)	

Rijksdienst voor Ondernemend Nederland

SCHRIFTELIJKE OPINIE

Octrooiaanvrage 2031766

Indieningsdatum: 3 mei 2022	Voorrangsdatum:
Classificatie van het onderwerp[1]: E05D5/12; E05D11/10; E05D3/04	Aanvrager: Allegion Netherlands B.V.

Deze schriftelijke opinie bevat een toelichting op de volgende onderdelen:

☑ Onderdeel I	Basis van de schriftelijke opinie
☐ Onderdeel II	Voorrang
☐ Onderdeel III	Vaststelling nieuwheid, inventiviteit en industriële toepasbaarheid niet mogelijk
☐ Onderdeel IV	De aanvrage heeft betrekking op meer dan één uitvinding
☑ Onderdeel V	Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid
☐ Onderdeel VI	Andere geciteerde documenten
☐ Onderdeel VII	Overige gebreken
☐ Onderdeel VIII	Overige opmerkingen

De bevoegde ambtenaar:
ir. J.J. van Dijk

Octrooicentrum Nederland
onderdeel van Rijksdienst voor Ondernemend Nederland

1 Gedefinieerd volgens International Patent Classification (IPC).

Schriftelijke Opinie

Octrooiaanvrage 2031766

Onderdeel I Basis van de schriftelijke opinie

Deze schriftelijke opinie is opgesteld op basis van de op 14 juni 2022 ingediende conclusies.

Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid

1. Verklaring

Nieuwheid	Ja: conclusie(s)	1 – 18
	Nee: conclusie(s)	-
Inventiviteit	Ja: conclusie(s)	1 – 18
	Nee: conclusie(s)	-
Industriële toepasbaarheid	Ja: conclusie(s)	1 – 18
	Nee: conclusie(s)	-

2. Literatuur en toelichting

In het rapport betreffende het onderzoek naar de stand van de techniek worden de volgende publicaties genoemd:

D1: NL 2021911 A (AXA STENMAN NEDERLAND B V) 16 januari 2019
D2: NL 8304033 A (JOHANNES BERNARDUS MARIA TENTE) 17 juni 1985

D1, tevens genoemd in onderhavige aanvrage, vormt de meest nabij gelegen stand van de techniek. D1 openbaart een scharnier (‘hinge 1’) en een productiemethode daarvoor (zie D1: samenvatting; figuren 1 – 9), omvattende een eerste blad (‘3’) en een tweede blad (‘5’) welke scharnierbaar aan elkaar zijn gekoppeld via respectieve knopen (‘13, 15’) door een scharnierpen (‘4’), waarbij het scharnier verder blokkeermiddelen omvat om een axiale verwijdering van de scharnierpen uit de knopen te voorkomen, waarbij de blokkeermiddelen een blokkeerdeel (‘51’) omvatten (zie figuur 2).
Het scharnier in conclusie 1 van de aanvrage verschilt in ieder geval met die van D1 in de kenmerken dat het scharnier in de aanvrage (zie figuur 6) omvat:
– een eerste toestand voor aangrijping van een groef (4A) van de scharnierpen (4), en
– een tweede, gedeformeerde toestand voor vrijgave van de scharnierpen (4), waarbij de tweede toestand (bijvoorbeeld) een elastisch gedeformeerde en/of radiaal aangepaste toestand is.
Conclusie 1 is derhalve nieuw ten opzichte van D1.

De maatregelen in de aanvrage hebben ten doel om een scharnier te realiseren die stevig en betrouwbaar te vergrendelen is, ook met het oog op inbraakpreventie. Deze maatregelen, met als voordeel dat de bedoelde scharnier op een eenvoudige, efficiënte en economische manier kan worden gerealiseerd, zijn niet gevonden in de geciteerde literatuur en worden daarin ook niet gesuggereerd. Conclusie 1 is daarmee ook inventief.
In afhankelijkheid van conclusie 1 zijn de conclusies 2 – 15 eveneens nieuw en inventief.

Schriftelijke Opinie

Octrooiaanvrage 2031766

Conclusie 16 is een werkwijzeconclusie. Zij omvat in essentie dezelfde maatregelen als genoemd in conclusie 1. De genoemde werkwijze is gebaseerd op deze maatregelen. Aangezien de maatregelen in conclusie 1 nieuw en inventief zijn, is daarmee conclusie 16 eveneens nieuw en inventief.
Conclusie 17, die afhankelijk is van conclusie 16, is daarmee ook nieuw en inventief.
Conclusie 18, die afhankelijk is van conclusie 1, is eveneens nieuw en inventief.

D2

D2 openbaart een scharnier (zie D2: figuren 1 – 6). De maatregelen in D2 hebben ten doel een scharnier te realiseren die niet of verminderd inbraakgevoelig is (zie D2: pagina 1, regels 6 – 20).
Het scharnier volgens D2 omvat een eerste blad (‘1’) en een tweede blad (‘2’) welke scharnierbaar aan elkaar zijn gekoppeld via respectieve knopen (‘ogen 3, 4’) door een scharnierpen (‘5’), waarbij het scharnier verder blokkeermiddelen (‘borgorgaan’) (zie figuur 3; pagina 2, regels 27 – 31) omvat om een axiale verwijdering van de scharnierpen uit de knopen te voorkomen. Hierbij wordt opgemerkt dat het borgorgaan aangrijpt in ‘rondlopende groef 10’. Dit document bevat voor het overige geen kenmerken ten opzichte van de aanvrage die bezwarend zijn voor wat betreft nieuwheid en inventiviteit.