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(54) **HINGE FOR A WINDOW OR DOOR WITH HINGE LEAF WITH ASSOCIATED ACCESSORY WITH ADJUSTABLE THICKNESS FOR THE LATERAL ADJUSTMENT OF THE WINDOW OR DOOR**

(57) Hinge for a window or door with a hinge leaf (6) and associated accessory (11) intended to be mounted between the hinge leaf (6) and a profile (2,3) of a window or door on which the hinge leaf (6) is fastened, whereby the thickness (D) of the accessory (11) is adjustable and is composed of two essentially plate-shaped parts (11 a and 11b), which are affixed against one another by one side and on said sides are provided with interlocking complementary toothings (11c, 11d) which are such that when both parts (11a and 11b) are slid in a sliding direction in one or another direction relative to each other, the thickness (D) of the accessory (11) increases or decreases **characterised in that** the hinge leaf (6) and the plate-shaped first part (11a) of the accessory (11) on the facing sides in contact therewith are provided with protrusions (12) and complementary recesses (13) with which they interlock.

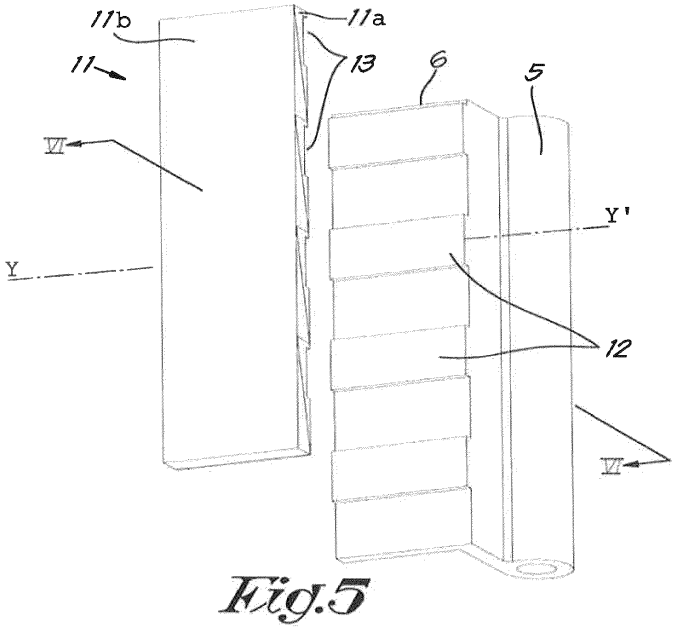

Fig.5

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Description

[0001] The invention relates to a window or door with hinge leaf with associated accessory with adjustable thickness for the lateral adjustment of the window or door.

[0002] The rest of the description will mostly discuss windows, with the knowledge that this also applies to doors and vice versa.

[0003] To mount a turnable leaf of a window in the fixed frame of the window, use is made of hinges, which as known, are formed by two hinge leaves with which the hinge is fastened to the leaf and the fixed frame, whereby the hinge parts are hingeably connected together by means of a hinge pin.

[0004] When mounting the leaf in the fixed frame, it is important that the lateral position of the leaf in the fixed frame can be adjusted to be able to easily open and close the door or window without snaring and to be able to easily operate the closing mechanism without pinching.

[0005] It is already known from BE 1.016.414 and BE 1.022.089, corresponding with EP 2.993.290, that an accessory with an adjustable thickness can be used for this, which when mounting the window or door is affixed between the hinge and the profile of the window or door to which the hinge is fastened, particularly between the profile and hinge leaf with which the hinge is mounted to the profile.

[0006] This accessory of the known type is composed of two plate-shaped parts that are affixed against one another by one side and which are each provided on this side with a wedge-shaped relief with wedge-shaped elements that are such that when both parts with their wedge-shaped teeth are moved with respect to one another in the longitudinal direction of the teeth, the plate-shaped parts move apart so to speak, such that the thickness of the accessory can be adjusted.

[0007] In this way the thickness of the accessory is adjustable between a minimum thickness whereby the wedge-shaped teeth interlock maximally, for example over the entire height or depth of the teeth, and a maximum thickness whereby the teeth interlock less deeply.

[0008] In the known embodiments, the facing contact sides of the hinge leaf and of the accessory are flat to allow them to be shifted relative to each other for lateral adjustment.

[0009] In that case the minimum total thickness taken up by the hinge leaf together with the accessory in mounted condition in the rebate between the fixed frame and the leaf of the window equals the sum of the thickness of the hinge leaf and the aforementioned minimum thickness of the accessory.

[0010] The greater the minimum total thickness of the hinge leaf with accessory, imposed by a required strength of the hinge, the less the available adjustment distance of the lateral adjustment for a given depth of the rebate.

[0011] Reversely, the less the available depth of the rebate for a given adjustment distance, the less the minimum total thickness and thus the less the thickness of the hinge leaf and/or of the accessory and thus the weaker the hinge and the ensuing permitted maximum load of the hinge, for example due to the weight of the leaf of the window.

[0012] In the known hinges this results in the disadvantage that in the design a choice needs to be made between a bigger adjustment distance or a stronger hinge or a compromise between the two.

[0013] This difficult choice chiefly occurs in hinges with a shaft that is visible on the outside of the window and a fastening of the hinge leaves which in closed condition of the window is invisible in the rebate between the fixed frame and the leaf.

[0014] In this type of hinges the problem occurs that there is often not enough space for a sufficiently strong hinge, i.e. combined with the desired lateral adjustment range.

[0015] The purpose of the present invention is to offer a solution for one or more of the aforementioned and other disadvantages and problems.

[0016] To this end, the invention relates to a hinge for a window or door with a hinge leaf with associated accessory intended to be mounted between the hinge leaf and a profile of the window or door on which the hinge leaf is fastened, whereby the thickness of the accessory is adjustable for the lateral adjustment of the window or the door, said accessory being composed of two essentially plate-shaped parts, respectively a first part which in mounted condition is in contact with the hinge leaf and a second part, said parts which in use being affixed against one another by one side and being provided on said sides with interlocking complementary toothings which are such that when both parts are slid in a sliding direction longitudinally along the toothings in one or another direction relative to each other, the thickness of the accessory increases or decreases in a direction perpendicular to the hinge leaf, whereby in mounted condition of the hinge with the accessory between the hinge leaf and the profile, the hinge leaf and the plate-shaped first part of the accessory in contact therewith are provided on the facing sides with protrusions and complementary recesses with which they interlock, characterised in that the recesses in the first part of the accessory are provided within the thickness of the teeth of the toothing of the first part.

[0017] The hinge leaf and the accessory interlocking causes according to the invention the minimum total thickness of the hinge leaf together with the accessory in mounted condition to be less than in the known hinges which in mounted condition are mounted against one another by a flat side.

[0018] This means that, compared to the known hinges with accessory, for an unchanged adjustment range of the thickness of the accessory there is more room left in the rebate between the fixed frame and the leaf of the window, such that there is more space to be able to apply a thicker and thus stronger hinge.

[0019] In the same way, for an unchanged thickness

of the hinge leaf, an accessory can be applied with a greater adjustment range.

[0020] The freed up space can of course also be used in favour of a stronger hinge leaf together with a greater adjustment range.

[0021] Preferably, the protrusions and recesses are formed as ribs and grooves which extend breadthways perpendicular to the sliding direction of the accessory and preferably over the full width of the hinge leaf and of the accessory.

[0022] Preferably, the protrusions and recesses interlock fittingly without play or with only a limited play in the sliding direction, such that the hinge leaf and the first part of the accessory cannot unintentionally shift relative to each other during the lateral adjustment of the position and relative to the leaf of the fixed frame of the window.

[0023] According to the invention, the recesses in the first part of the accessory are provided within the thickness of the teeth of the toothing of the first part.

[0024] The greatest gain in space in favour of the strength of the hinge or of the adjustment range can be obtained with an accessory, wherein the height of the toothing of both plate-shaped parts is approximately equal or slightly less than the thickness of every part taken separately.

[0025] With the intention of better showing the characteristics of the invention, a preferred embodiment of a hinge with associated accessory according to the invention is described by way of an example without any limiting nature, with reference to the accompanying drawings wherein:

figure 1 schematically shows a perspective view of a section of an opened window which is equipped with a hinge and an accessory as known from the past;
figure 2 shows a cross-section according to line II-II in figure 1 but in a closed condition of the window;
figure 3 shows a cross-section according to line III-III in figure 2;
figure 4 shows a cross-section as that of figure 3, but for a different adjustment setting of the accessory;
figure 5 shows a perspective view of a hinge with accessory according to the invention in partly disassembled condition;
figure 6 shows a cross-section as that of figure 4 but for the embodiment of figure 5;
figure 7 shows the cross-section of figure 6 in a different adjustment setting of the accessory,
Figure 8 shows a cross-section as that of figure 6, but for an alternative embodiment of the invention.

[0026] Figure 1 shows a section of a window 1 containing a profile 2 of the fixed frame of the window 1 and a profile 3 of the leaf of the window 1, said profiles 2 and 3 being hingedly connected by means of a hinge 4 that is composed of two hinge leaves 6 and 7 that are connected together by means of a hinge pin 8 on the level of a knuckle 5 of the hinge.

[0027] The hinge 4 is fastened on the profiles 2 and 3 by means of screws 9 which are screwed through passages in the screw leaves 7 and 8 in the aforementioned profiles 2 and 3.

[0028] In this case the window is of the type whereby the knuckle 5 with the hinge pin 8 of the hinges 4 is visible on the outside of the window 1 and the fastening of the hinge leaves 6 and 7 to the profiles 2 and 3 in a closed window 1 is hidden in the rebate 10 or enclosed space between the profile 2 of the fixed frame and the profile 3 of the leaf.

[0029] In the example of figure 1, the hinge leaf 7 is provided with a recess for the second hinge leaf 6 in the closed condition of the hinge 4.

[0030] The hinge 4 contains an essentially plate-shaped accessory 11 of the known type which in this case is mounted between the hinge leaf 6 and the profile 3.

[0031] The known accessory 11 is composed of two essentially plate-shaped parts 11a and 11b, respectively a first part 11a which in mounted condition is in contact with the hinge leaf 6 and a second part 11b with which the accessory 11 is affixed against the profile 3.

[0032] In use, the two parts 11a and 11b are affixed against one another by one side, whereby said sides are provided with interlocking complementary wedge-shaped toothings, respectively 11c and 11d that are such that when both parts 11a and 11 are slid in a sliding direction longitudinally (X-X') along the toothings in one or another direction relative to each other, the adjustable thickness D of the accessory 11 increases or decreases in a direction perpendicular to the plane of the hinge leaf 6 or in other words perpendicular to the flat underside of the accessory 11.

[0033] In the example, the accessory is oriented such that the sliding direction X-X' is parallel to the longitudinal direction of the profiles 2 and 3 and consequently also parallel to the shaft of the hinge pin 8.

[0034] Figure 4 shows a situation in which the toothings of the two parts 11a and 11b of the accessory 11 interlock maximally, which results in a minimum thickness Dmin of the accessory 11, whereas in the situation of figure 3 the parts 11a and 11b are slid maximally in the sliding direction X-X' relative to each other, which results in a maximum thickness Dmax of the accessory 11 whereby the toothings 11c and 11d of both parts must still sufficiently overlap in the sliding direction X-X' to have a sufficient support surface between the two.

[0035] This results in an adjustment range $\Delta D = Dmax - Dmin$.

[0036] The minimum thickness Dmin of the accessory 11 is chiefly determined in the case of the figures by the height or thickness of the toothing 11c and 11d measured in a direction perpendicular to the plane of the underside of the accessory 11.

[0037] By adjusting the thickness D of the accessory

11 it is possible to adjust the lateral distance E of the profile 3 of the leaf relative to the profile 2 of the fixed frame, as indicated with the double arrow P in figure 2, and this between:

- a minimum distance Emin, as shown in figure 4,
- and a maximum distance Emax as shown in figure 3,

whereby Emax is equal to the joint maximum total thickness of the hinge leaf 6 and the accessory 11:

$$Emax = Dmax + F$$

[0038] The maximum total thickness Emax of the hinge leaf 6 and the accessory 11 is limited by the available space 10 between the profile 2 of the fixed frame and the profile 3 of the leaf, more specifically the available distance A between the profiles 2 and 3, such that in the design with the known applications of the figures 2 to 4 a choice needs to be made between:

- either limiting the maximum thickness Dmax of the accessory 11 at the expense of the adjustment range of the accessory 11;
- limiting the thickness F of the hinge leaf 6 at the expense of the strength of the hinge leaf 6 and thus the bearing capacity of the hinge 4;
- or a combination thereof.

[0039] The invention is intended to create more space in favour of a greater adjustment range ΔD and/or of a greater thickness F of the hinge leaf 6.

[0040] This is achieved through a combination of a hinge leaf 6 with an accessory 11 according to the invention as shown in figures 5 to 8, whereby in this case, in mounted condition of the hinge 4, the hinge leaf 6 and the plate-shaped first part 11a of the accessory 11 in contact therewith interlock over a certain depth K as shown, this unlike the known situation of figures 1 to 4 in which the hinge leaf 6 and the accessory 11 are affixed against one another by a flat side.

[0041] In the embodiment of figures 5 to 8 this is realised by providing the hinge leaf 6 and the first part 11a of the accessory 11 on the facing sides with protrusions 12 in the form of ribs which fit in complementary recesses 13 in the form of grooves in the first part 11a of the accessory 11.

[0042] The ribs 12 and grooves 13 extend breadthways in a direction Y-Y' perpendicular to the sliding direction X-X' of the accessory 11 along the breadth of the hinge leaf 6 and the accessory 11.

[0043] In the example, the ribs 12 have a thickness corresponding with the thickness K of the overlapping section between hinge leaf 6 and accessory 11 and a breadth B practically corresponding with the breadth of the grooves 13.

[0044] The grooves 13 in the accessory 11 are provided in the material of the teeth of the toothing 11c of the first part 11a of the accessory, more specifically within the thickness or height of said toothing 11c, whereby preferably a groove 13 is provided in every tooth of the toothing 11c.

[0045] Preferably, the thickness of the toothings 11c and 11d of both plate-shaped parts 11a and 11b, except for a small thickness, is approximately equal to the thickness of each separate part and preferably approximately equal to the minimum thickness Dmin of the accessory 11.

[0046] The protrusions 12 in the form of ribs in figure 6 create a bulge and thus a strengthening of the hinge leaf 6, at least to the extent that the protrusions create an extra thickness K relative to the hinge leaf 6 of figure 4 without protrusions.

[0047] The recesses 13 in the accessory 11 create a weakening of the accessory 11 in the case of an unchanged thickness Dmin, but in combination with the strengthened hinge leaf 11 sufficient support is still obtained.

[0048] For one and the same minimum thickness Dmin of the accessory 11 and one and the same minimum total thickness Emin, the invention still offers the advantage of a strengthened hinge 4.

[0049] Figure 8 shows an alternative embodiment whereby in this case the minimum total thickness Emin of the hinge leaf 6 and the accessory together is the same as that of figure 4, but this time in combination with an accessory 11 with a greater minimum thickness Dmin and with a greater adjustment range ΔD, this slightly at the expense of the strength of the hinge leaf 11 because in this case the protrusions 12 are obtained by a locally reduced thickness of the hinge leaf 6 relative to figure 4.

[0050] Preferably, a guide, which is not shown in the figures, is provided in the sliding direction X-X' of the accessory 11, said guide being provided on the level of the hinge 4 or of the accessory 11 or of the profile 2.

[0051] According to an embodiment, which is not shown, the accessory 11 can be provided with several complementary toothings 11c and 11d which extend breadthways of the accessory 11 next to each other in the sliding direction X-X' and which are slid lengthways X-X' relative to each other over a distance that is less than the pitch of the toothings 11c, 11d, such that an aforementioned guide can be realised on the level of the accessory 11 itself.

[0052] It is understood that the hinge leaf 6 and the accessory 11 can be provided with passages for the aforementioned screws 9 in the form of slotted holes to allow a mutual shift of the parts 11a and 11b of the accessory 11 relative to each other during the lateral adjustment of the leaf.

[0053] It is also clear that the protrusions 12 and recesses 13 do not necessarily have to be executed as ribs and grooves but can have any interlocking forms.

[0054] It goes without saying that the accessory can also be mounted on the profile 2 of the fixed frame instead of on the profile 3 of the leaf.

[0055] The present invention is by no means limited to the embodiment described as an example and shown in the figures, however, such hinge with associated accessory can be realised according to different variants, without departing from the scope of the invention.

Claims

1. Hinge for a window or door with a hinge leaf (6) with associated accessory (11) intended to be mounted between the hinge leaf (6) and a profile (2,3) of the window (1) or door on which the hinge leaf (6) is fastened, whereby the thickness (D) of the accessory (11) is adjustable for the lateral adjustment of the window (1) or the door, said accessory (11) being composed of two essentially plate-shaped parts (11a and 11b), respectively a first part (11a) which in mounted condition is in contact with the hinge leaf (6) and a second part (11b), said parts (11a,11b) in use being affixed against one another by one side and said sides being provided with interlocking complementary toothings (11c,11d) which are such that when both parts (11a and 11b) are slid in a sliding direction longitudinally (X-X') along the toothings in one or another direction relative to each other, the thickness (D) of the accessory (11) increases or decreases in a direction perpendicular to the hinge leaf (6), whereby in mounted condition of the hinge (4) with the accessory (11) between the hinge leaf (6) and the profile (2,3), the hinge leaf (6) and the plate-shaped first part (11a) of the accessory (11) in contact therewith are provided on the facing sides with protrusions (12) and complementary recesses(13) with which they interlock, **characterised in that** the recesses (13) in the first part (11a) of the accessory (11) are provided within the thickness of the teeth of the toothing (11c) of the first part (11a).

2. Hinge according to claim 1, **characterised in that** the protrusions and recesses (12,13) are formed as ribs and grooves which extend breadthways (Y-Y') perpendicular to the sliding direction (X-X') of the accessory (11).

3. Hinge according to claim 1 or 2, **characterised in that** the protrusion and recesses (12.13) in the form of ribs and grooves extend over the full width of the hinge leaf (6) and of the accessory (11).

4. Hinge according to any one of the previous claims, **characterised in that** the protrusions and complementary recesses (12,13) of the hinge leaf (6) and of the first part (11a) of the accessory (11) fittingly interlock.

5. Hinge according to any one of the previous claims, **characterised in that** in every tooth of the toothing (11c) of the first part (11a) of the accessory (11) a recess (13) is provided and for each recess (13) the hinge leaf (6) is provided with a complementary protrusion (12).

6. Hinge according to any one of the previous claims, **characterised in that** the thickness or height of the toothings (11c,11d) of the plate-shaped parts (11a,11b) is approximately the same or slightly less than the thickness of each separate part.

7. Hinge according to any one of the previous claims, **characterised in that** the hinge (4) and/or the accessory (11) is provided with a guide to slide one or both parts (11a,11b) of the accessory (11) relative to each other in the sliding direction (X-X') during the lateral adjustment of the window (1) or of the door.

8. Hinge according to any one of the previous claims, **characterised in that** the accessory (11) is provided with several toothings (11c,11d) which extend breadthways next to each other according to the sliding direction (X-X') and which are slid in the sliding direction (X-X') relative to each other over a distance that is less than the pitch of the toothings (11c,11d).

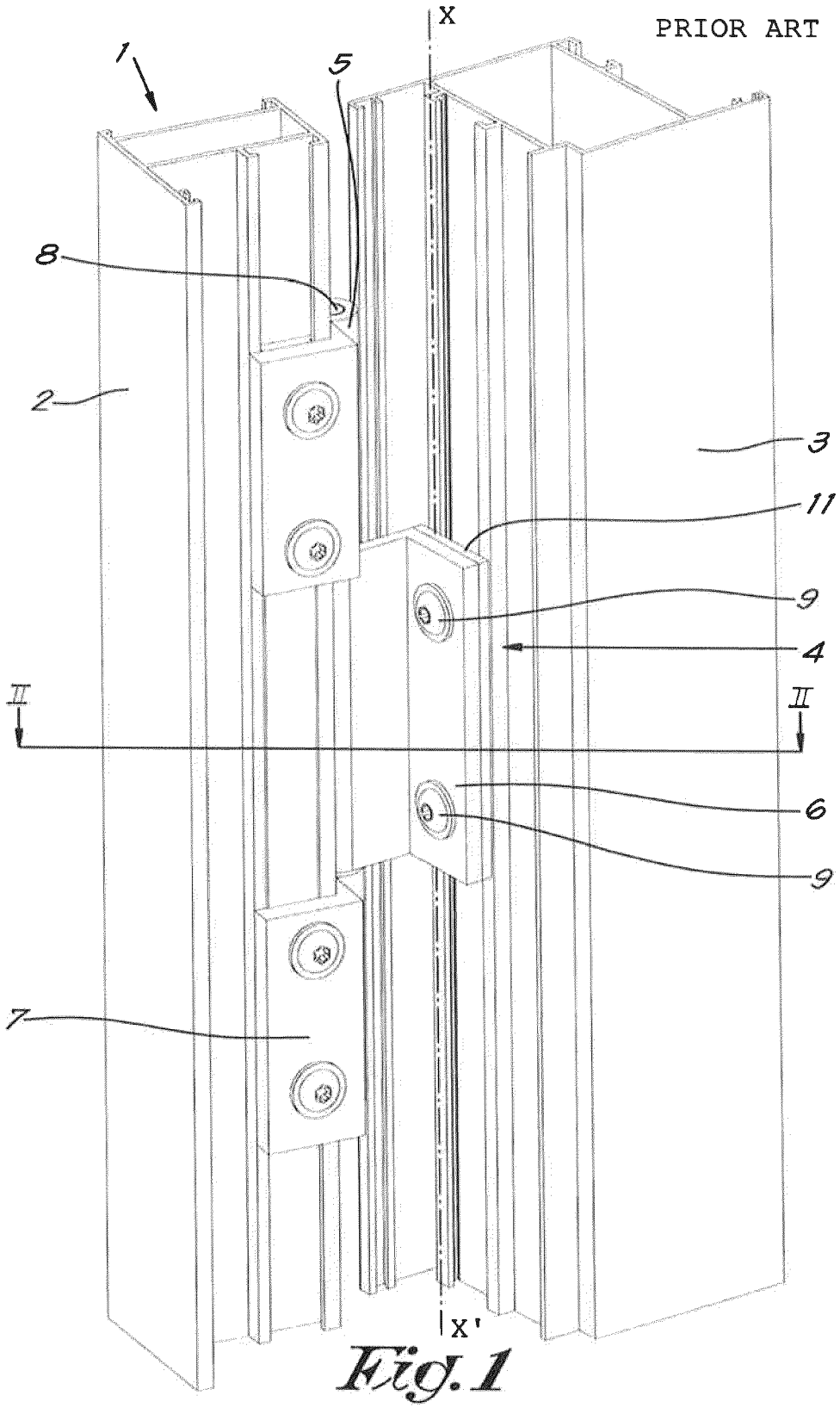

Fig. 1

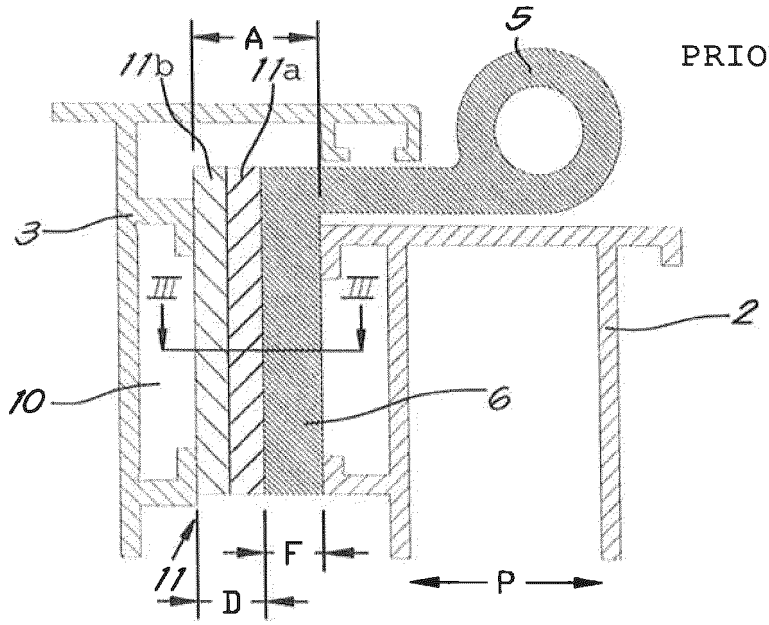

Fig.2

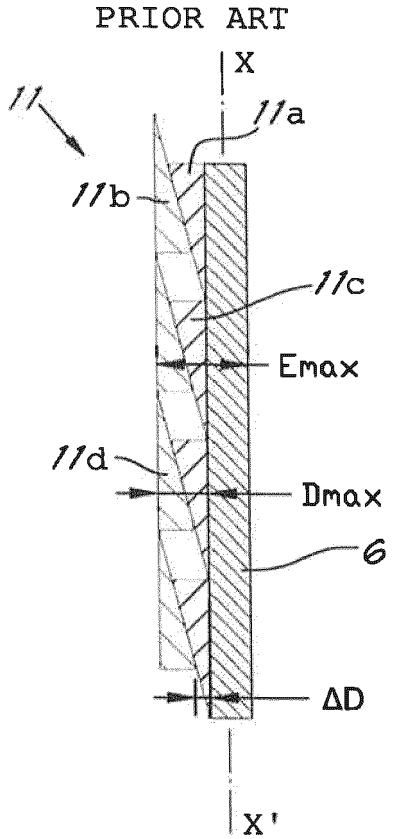

Fig.3

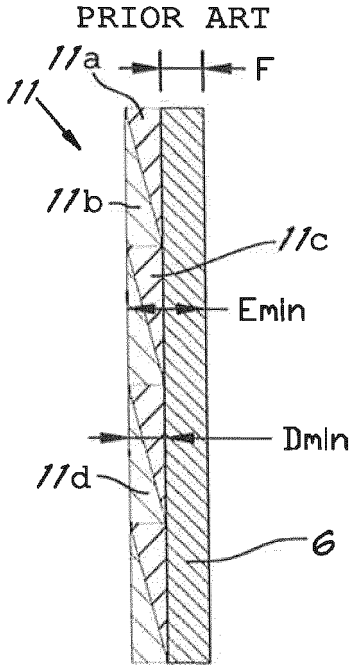

Fig.4

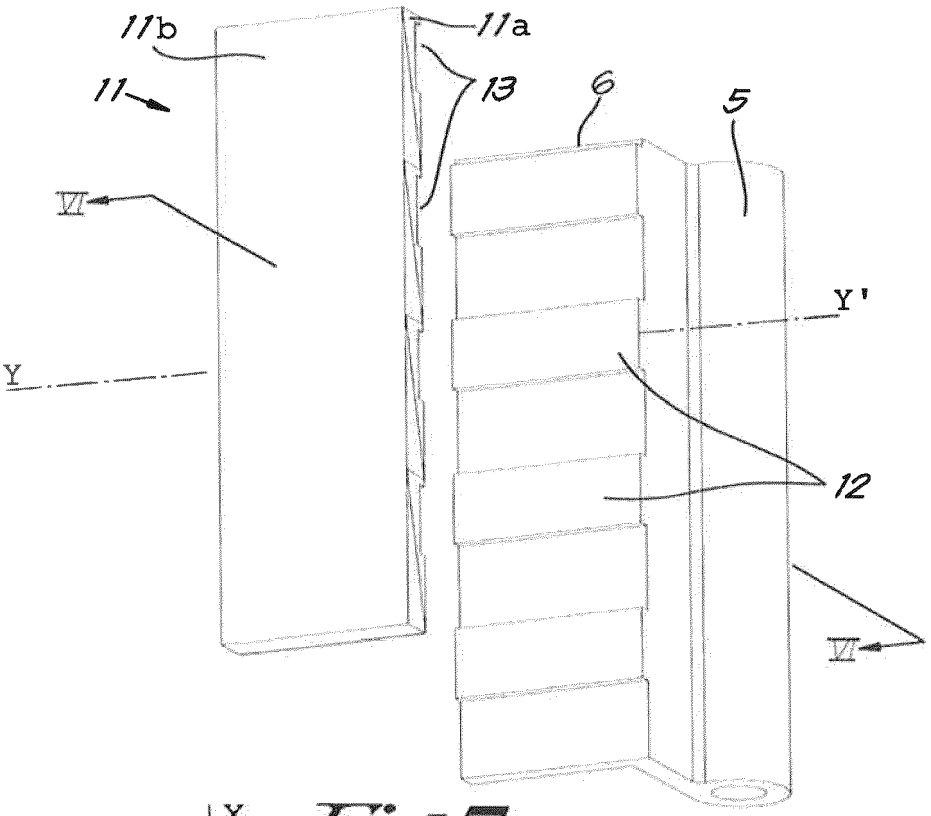

Fig.5

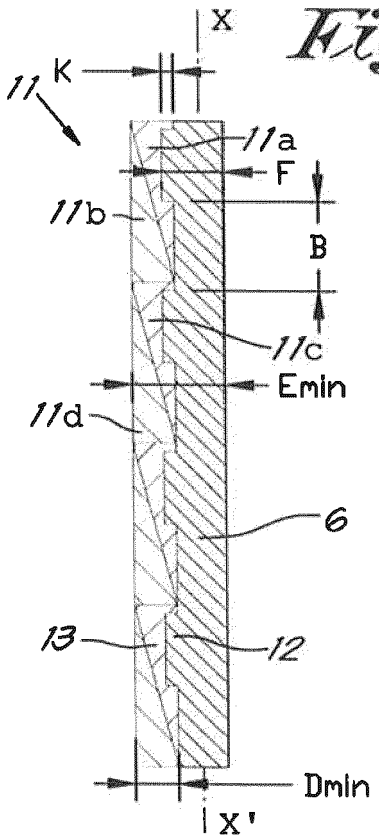

Fig.6

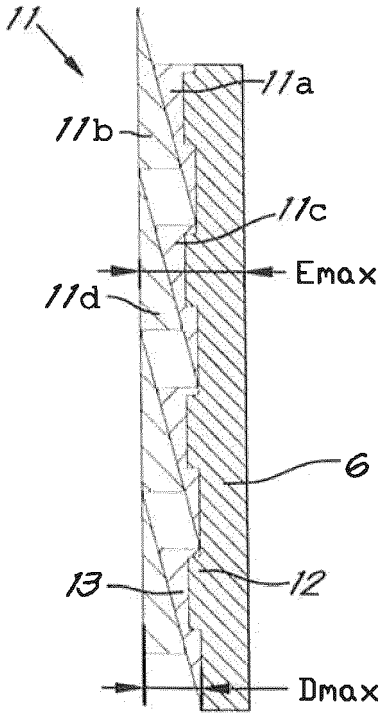

Fig.7

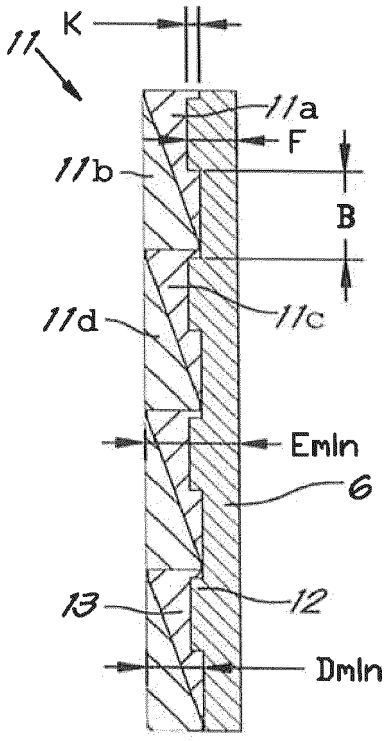

Fig.8

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	2 September 2022	Berote, Marc

CATEGORY OF CITED DOCUMENTS

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

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