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(54) RETAINER FOR FIXING A HINGE ON METAL DOOR/WINDOW PROFILES, HINGE ASSEMBLY FOR METAL DOOR/WINDOW PROFILES AND METHOD FOR FIXING A HINGE ON METAL DOOR/WINDOW PROFILES

(57) Retainer for fixing a hinge on metal door/window profiles, wherein the hinge (10) is provided with two hinge bodies (11, 12) joined together by at least one articulation arm (13) and insertable in openings (101) made in the profiles (100). The retainer (1) comprises a shaped plate (2) provided with at least one bottom wall (3) intended to be fixed inside a metal profile (100) of a door/window facing the opening (101) to support a hinge body (11, 12) embedded in the opening (101). The retainer (1) also comprises at least two anchoring bodies (8), fixed to the bottom wall (3) of the shaped plate (2) and each provided with a first thread (83). Two adjustment bushes (84) are also provided, protruding within the containment tank of the shaped plate (2) and each provided with an abutment end (80) intended to receive the hinge body (11, 12) in abutment and mechanically associated with one of the anchoring bodies (8) by means of a second thread (86) adjustably engaged to the first thread (83) of the anchoring body (8). In this manner, it is possible to vary the height of the abutment end (80) with respect to the bottom wall (3) of the shaped plate (2).

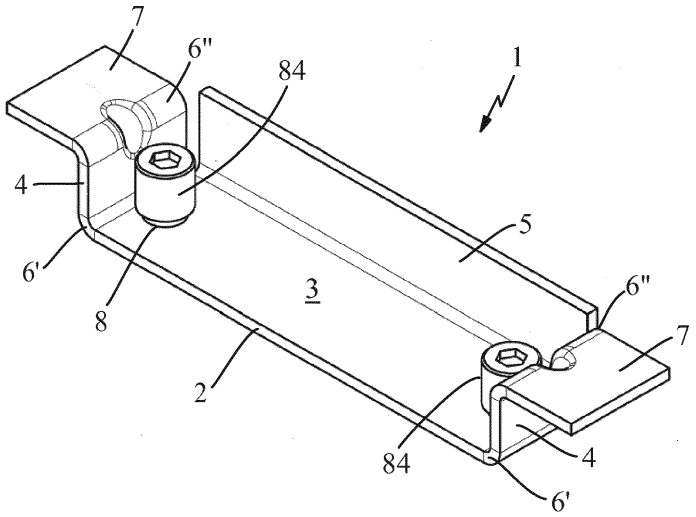

Fig. 1

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Description

Field of application

[0001] The present invention refers to a retainer for fixing a hinge, in particular concealable/retractable, on metal door/window profiles, to a hinge assembly for metal door/window profiles and to a method for fixing a hinge, in particular concealable/retractable, on metal door/window profiles, according to the preamble of the respective independent claims.

[0002] The present retainer is intended to be employed in the door/window field, or in the field of interior decoration/furnishing, in association with hinges mainly of concealable/retractable type (or also termed "invisible") for mounting movable members, such as wings in particular of doors, with respect to fixed structures such as the frame of a door integral with the walling.

[0003] The doors/windows for which the present invention is intended are of the type constituted, mainly perimetrically, by metal profiles and in particular by extruded metal profiles, while the hinges are as stated, mainly but not exclusively, of concealable/retractable type, i.e. not visible from the outside when the movable member is in a closed position, since all the elements that constitute them are substantially completely inserted within the door/window itself, on which they are mounted.

[0004] The present retainer, object of the invention, is therefore inserted in the field of metal doors/windows or in the field of production of accessories for metal doors/windows.

State of the art

[0005] As is known, for some time in the field of doors/windows, hinges are usually constituted by two hinge bodies, of which one is fixed to the fixed frame of the door/window (such as the frame of a door) and one fixed to the movable member of the door/window, such as a wing of a door, which are mechanically connected to each other by one or more articulation arms.

[0006] In the case of the present invention, reference will be mainly made to a hinge of concealable/retractable (or invisible) type, in which the bodies of the same hinge are embedded within the structure of the movable member and of the fixed frame, such that only portions of the articulation arms between the two bodies of the hinge itself project beyond the shape thereof.

[0007] More in detail, with reference for the sake of description simplicity to the most common door/window case considered herein, constituted by a door formed by a movable wing and by a fixed frame, the concealable/retractable hinges of known type generally provide that a first hinge body thereof is embedded in a first seat made in the thickness of the movable wing and that a second hinge body thereof is embedded in a second seat made in the fixed frame.

[0008] As is known in the case of wooden doors, each hinge body is fixed with screws to the same wooden structure of the wing and of the frame while in the case, of interest herein, of metal doors/windows it is necessary to arrange the retainers, i.e. shaped plates, behind the openings made in the metal profile, in order to allow the fixing of the hinge bodies to the same metal profile.

[0009] More clearly, the metal profiles which constitute the movable wing and the fixed frame are usually obtained with extruded metal sections, normally steel, which are substantially hollow and are joined at the corners for example with welds or brackets in order to attain the entire perimeter structure of the wing and of the frame. Therefore, in order to make the seats in which the hinge bodies are embedded, it is necessary make shaped openings in the metal profile and then fix, in a position facing the same openings, retainers usually made by means of the shaped plates which delimit the volume of the seats in which the hinge bodies are then embedded. In the production process, first the shaped openings are preferably frontally made by means of notching the plate, so as to make the seats for embedding the hinge bodies, and then the retainers are fixed by means of welding in the back, non-visible part of the frame.

[0010] More in detail, the shaped plate of the retainer defines a containment tank, which together with the shaped opening forms the containment seat for the hinge body. Such shaped plate is composed of a bottom wall, opposite the shaped opening on the metal profile and of a perimeter wall which rises from the bottom wall with two short lateral walls, opposite each other, and possibly joined by one or two elongated lateral walls. The two short lateral walls then continue by means of a bend, at the opening, with two flat wings, which are extended parallel to the bottom and are fixed, by means of rivets, welds or other equivalent means, internally in abutment against the metal profile of the door/window in opposite positions with respect to the opening in the plate.

[0011] The retainer also comprises two anchoring elements fixed to the bottom wall of the shaped plate and each provided with a nut screw directed towards the shaped opening of said metal profile.

[0012] Each hinge body in turn comprises an elongated hull-shaped body, which at its interior contains one or more articulation arms connected to the other hinge body, and two fixing flanges which are extended towards the exterior of the hull-shaped body along the direction of its main extension.

[0013] Each hinge body is embedded in the metal profile of the door/window with the hull-shaped body and the flanges which are provided with peripheral profile that is counter-shaped with respect to the opening made on the metal profile in order to be inserted to size at its interior; in addition, the flanges are in abutment against the two anchoring elements.

[0014] Screws are then provided which cross through provided through holes made in the flanges of the hinge body and which are engaged with nut screws made in the anchoring elements in order to fix the hinge body to

the metal profile of the movable wing or of the fixed frame.

[0015] The retainers for metal doors/windows of known type, briefly mentioned above, have in practice shown that they do not lack drawbacks.

[0016] As indicated above, the shaped plate of the retainer is welded in the back part of the metal profile of the fixed frame or of the movable wing, such that the plane between the outer visible surface of the door/window where the opening of the seat is made and the abutment plane defined by the ends of the anchoring elements is predefined and constant. The thickness of the hinge body, and in particular of the fixing flanges, therefore comes to determine the coplanarity of the visible side of the hinge on the surface of the metal profile of the door/window.

[0017] On the other hand, the thickness of the metal sections which compose the fixed frames and the movable wings can vary by several tenths of a millimeter, e. g. it can be comprised in the interval between 12-20 tenths of a millimeter.

[0018] Consequently, in order to ensure the perfect coplanarity of the visible side of the hinge bodies with respect to the surface of the door/window - a circumstance which is indispensable, especially in the provided worksite tests when the work advancement state is checked, i.e. the level of finish and installation of the doors/windows - it is necessary to provide retainers provided with different depth (or hinges provided with different thickness) or provide for a depth that is excessively increased in order to then fill the lack of coplanarity with spacers.

[0019] The provision of making different retainers for the different thicknesses of the doors/windows involves the drawback of a clear increase of the production costs, also for the storage of a greater number of products in a warehouse/store.

[0020] Otherwise, the selection of using a single retainer for the different thicknesses of metal profiles of doors/windows involves visible blemishes which are poorly tolerated by increasingly-demanding clients. In addition, in the case of concealable/retractable hinges, even in the case of closed wing, the opening which remains defined between the lateral edge of the wing and the frame allows appreciating the lack of coplanarity of the hinge body - even of only a few tenths of a millimeter - due to the visual comparison with the parallel walls of the frame and of the door. In an even more evident manner, with open wing it is in any case possible to appreciate the lack of coplanarity of the hinge with respect to the surface of the frame; such lack of coplanarity represents a clearly incorrect installation.

[0021] On other hand, attempting to collimate the surface of the hinge with that of the wing or of the frame, by adding thicknesses between the flanges of the hinge body and the anchoring elements of the retainer, involves long and complex implementation operations which depend on the ability of the operator and which in any case do not always allow attaining a perfect coplanarity of the hinge bodies with the metal profiles.

[0022] The patents WO 2017/065699 and DE 102015112640 describe some examples of concealable/retractable hinges of known type, wherein each hinge body comprises an elongated hull-shaped body intended to be fixed, by means of fixing screws, to the frame or to the wing of the door/window, and an adjustable insert inserted in the hull-shaped body and carrying, hinged thereto, the articulation arms of the hinge. In particular, the adjustable insert is connected to the corresponding hull-shaped body by means of adjustment screws, which have the head idly constrained in a shaped seat of the insert and the stem screwed in a corresponding hole of the hull-shaped body. Such adjustment screws are actuatable, after the installation of the door/window, in order to execute adjustment operations for the purpose of adjusting, horizontally and/or vertically, the position of the wing of the door/window.

[0023] The hinges of known type described in the aforesaid documents WO 2017/065699 and DE 102015112640 provide for rigidly fixing the hinge body directly to the frame and, therefore, are not suitable for use in metal doors/windows nor for resolving the problem of collimating the surface of the hinge with that of the wing or of the frame of the door/window.

Presentation of the invention

[0024] Therefore, in this situation, the problem underlying the present invention is to overcome the drawbacks of the abovementioned prior art, by providing a retainer for fixing a hinge, in particular concealable/retractable, on metal door/window profiles, which is employable with metal profiles of different thickness always ensuring a perfect coplanarity of the hinges with the same metal profiles.

[0025] A further object of the present invention is to provide a retainer for fixing a hinge, in particular concealable/retractable, on metal door/window profiles, and a hinge assembly for metal door/window profiles, which are simple to use and inexpensive to make.

[0026] A further object of the present invention is to provide a retainer for fixing a hinge, in particular concealable/retractable, on metal door/window profiles and a hinge assembly for metal door/window profiles, which are safe and entirely reliable in operation.

[0027] A further object of the present invention is to provide a method for fixing a hinge, in particular concealable/retractable, on metal door/window profiles, which allows easily reaching the perfect coplanarity between the visible side of the hinge bodies and the outer surface of the metal profile of the frame on which the hinge is fixed.

Brief description of the drawings

[0028] The technical characteristics of the invention, according to the aforesaid objects, can be clearly seen in the contents of the enclosed claims and the advantag-

es thereof will be more evident in the following detailed description, made with reference to the enclosed drawings, which represent several merely exemplifying and non-limiting embodiments of the invention, in which:

- figure 1 shows a first perspective view of a first embodiment of the retainer for fixing a hinge of concealable/retractable type considered in the preferred embodiment of the invention, on metal door/window profiles, object of the present invention;
- figure 2 shows a second perspective view of the retainer of figure 1, object of the present invention, with adjustment bushes provided in separate position, in exploded view above base elements projecting from the bottom wall of the retainer;
- figure 3 shows a longitudinal section view of the retainer of figure 1, object of the present invention, with the hinge body of a hinge reported above, still in section;
- figure 4 shows a detail of the retainer of figure 1, object of the present invention, in a perspective view and relative to a shaped plate;
- figures 5A, 5B and 5C respectively show in a perspective view, in a sectional view and in a plan view, a detail of the retainer of figure 1, object of the present invention, relative to an adjustment bush;
- figures 6A, 6B and 6C respectively show in a perspective view, in a sectional view and in a plan view, another detail of the retainer of figure 1, object of the present invention, relative to an anchoring element;
- figure 7 shows a side view of a portion of a second embodiment of the retainer for fixing a concealable/retractable hinge on metal door/window profiles, object of the present invention;
- figure 8 shows a side view of a portion of a third embodiment of the retainer for fixing a concealable/retractable hinge on metal door/window profiles, object of the present invention;
- figure 9 shows a first perspective view of an assembly comprising a portion with metal profile of a fixed frame of a door/window with the retainer, object of the present invention, fixed inside and illustrated mainly with dashed line, and with a hinge externally associated in exploded view;
- figure 10 shows the assembly of figure 9 with the hinge associated with the metal profile of the fixed frame of the door/window;
- figure 11 shows a cross section view of the fixed frame of figure 9 at the hinge body and of the retainer according to the invention;
- figure 12 shows a sectional view of the fixed frame with a hinge body associated therewith and a retainer according to the invention of figure 11, carried out along the trace XII-XII of the same figure 11;
- figure 13 shows an enlarged view of a detail of figure 12 in order to underline the coplanarity attained between the visible side of fixing flanges of a hinge body (with a coating plate) and the outer surface of the fixed frame.

Detailed description

[0029] With reference to the enclosed drawings, reference number 1 overall indicates the retainer, object of the present invention, which is adapted to make the fixing of hinges, in particular concealable/retractable, generically indicated with 10, on metal door/window profiles, generically indicated with 100.

[0030] The metal doors/windows are advantageously constituted by extruded metal profiles 100 joined together at the vertices, e.g. with angular brackets, to form the frames of a fixed frame (and possibly of a movable wing) in a manner *per se* known to the man skilled in the art of the field and thus not described in detail.

[0031] In particular, the metal door/window comprises a first profile 100' of the movable wing and a second profile 100" of the fixed frame.

[0032] The second profile 100" (of the fixed frame) is made of metal material, e.g. by means of one or more extruded sections.

[0033] The first profile 100' (of the movable wing) can also be made of metal, or of other materials such as wood (as in the example of figures 9 and 10).

[0034] Therefore, the metal profiles 100 of the door/window can comprise both the first and the second profile 100', 100", or otherwise only the second profile 100" of the fixed frame (as in the example of figures 9 and 10).

[0035] The retainer 1 according to the invention is intended to be employed for fixing mainly concealable/retractable hinges 10 of different type, whether they are for example constituted by two or more articulation arms, provided with two or more fulcra or able to allow the movable wing, e.g. a door, to rotate with respect to the fixed frame, e.g. the frame of the door, by an angle comprised between 0 and 180 degrees from the closed position of the door to the position of maximum opening of the door.

[0036] The concealable/retractable hinges - referred to by the preferred embodiment reported in the enclosed figures, in a *per se* entirely conventional manner, as is illustrated for example in figures 9 and 10 and as is known to the man skilled in the art - consist of two hinge bodies, including a first 11 intended to be associated with a metal profile 100 of the movable wing, and a second 12, intended to be fixed to the metal profile 100 of a fixed frame. The two hinge bodies 11 and 12 are joined together by at least one articulation arm 13, which, with closed wing, is nearly entirely inserted in the hinge bodies (in at least one hinge body) and is partially projecting therefrom with open wing, in a *per se* known manner.

[0037] Each hinge body 11 and 12 comprises an elongated hull-shaped body 14, preferably made of metal material, which appears as a box-like body provided with an open side defining a passage for the crossing of the articulation arms 13. The latter are pivoted within the elongated hull-shaped body 14 and serve to rotatably support

the movable wing with respect to the fixed frame. Each hinge body 11 and 12 is also provided with two flat fixing flanges 15, which are extended along the main extension direction of the hull-shaped body, outside the hull-shaped body and starting from the lateral flanks thereof, in opposite directions from each other. The flanges 15 are obtained integral with the hull-shaped body, e.g. via pressure die-casting in a mold of metal material in accordance with the figures of the considered embodiment, or they can be obtained as separate elements mechanically fixed to the hull-shaped body. The flat flanges 15 are coplanar with each other and define a visible side of each hinge body 11, 12. On the visible faces of the two flanges, through holes 150 are preferably made for the insertion of retaining screws 9 as specified hereinbelow.

[0038] Advantageously, each hinge body 11, 12 comprises an insert 14' inserted within the corresponding elongated hull-shaped body 14 and fixed to the latter, e.g. by means of connection screws 14". Such insert 14' carries, hinged thereto, the corresponding end of the articulation arm 13 of the hinge 10. Optionally, according to one possible embodiment, the position of the insert 14' can be adjusted within the elongated hull-shaped body 14 by means of adjustment means of known type (and hence not described in detail) in order to allow adjusting the position (e.g. vertical and/or horizontal) of the wing on the lying plane of the door/window.

[0039] The retainer 1 according to the invention comprises a shaped plate 2, which is intended to be fixed inside a metal profile 100 of the door/window (of the fixed frame and possibly of the movable wing) in a position facing a provided shaped opening 101 made in the same metal profile 100 by means of for example a plate cutting operation.

[0040] The hinge body 11, 12 is intended to be embedded within the metal profile 100 by inserting it through the shaped opening 101 such that its visible side is arranged in a manner coplanar with the outer surface 100A of the metal profile 100 of the door/window. For such purpose, the hinge body 11, 12, once inserted in such position embedded in the metal profile 100, is supported by the retainer 1 according to the invention, as will be better specified hereinbelow, such that its visible side attains perfect coplanarity with the outer surface 100A of the metal profile 100.

[0041] In accordance with that described above, even if two equivalent retainers 1 can be provided for each hinge 10, including one fixed to the metal profile 100 of the movable wing and one fixed to the metal profile 100 of the fixed frame, usually the hinge is fixed to the wing without having to use a retainer, for example since the hinge body is directly fixed to the profile of the wing in the frequent case of wooden doors (as in the example of figures 9 and 10).

[0042] Generally, at least two hinges 10 will be provided for each door/window and preferably three hinges 10 will be provided, so that, for example, in order to fix the hinges of a door to the upright of the frame three or six retainers 1 will be used.

[0043] More in detail, the shaped plate 2 is provided with a bottom wall 3 and with two flat wings 7, which are extended parallel to each other and to the bottom wall 3 from which they are spaced by the depth of the shaped plate 2. The flat wings 7 are intended to be fixed, by means of welds, rivets, screws or other similar means, in abutment against the metal profile 100 of the door/window. More in detail, considering a shaped opening 101 of the metal plate, with elongated shape, the flat wings 7 will be advantageously fixed at the inner edge of the metal profile 100 at the opposite ends of the elongated shape of the same shaped opening 101.

[0044] In this manner, the bottom wall 3 is able to face the opening 101 of the metal profile 100 in order to support a corresponding hinge body 11, 12 when the shaped plate 2 is fixed to the metal profile 100.

[0045] In accordance with the embodiment illustrated in the enclosed figures, the shaped plate 2 has an elongated shape, defines a containment tank in particular by means of the aforesaid bottom wall 3 as well as by means of a perimeter wall which rises from the bottom wall 3 and is formed by two opposite short lateral walls 4, preferably joined together by at least one elongated lateral wall 5.

[0046] The short lateral walls 4 and the elongated lateral wall 5 are made integral with the bottom wall 3 from which they are extended with a first orthogonal bend 6'.

[0047] The short lateral walls 4 preferably continue with a second orthogonal bend 6" with the abovementioned two flat wings 7.

[0048] For example, the shaped plate 2 with such bends is obtained with a production process that starts from a flat sheet, which is first cut and then bent again by means of multiple pressing operations in succession via cold molding.

[0049] Otherwise the same elongated plate with its abovementioned bends can be, still as an example, obtained with a drawing process.

[0050] The retainer 1, according to the present invention, thus comprises at least two anchoring bodies 8, which are fixed to the bottom wall 3 of the shaped plate 2, are each provided with a first thread 83 and are preferably arranged at the lateral ends of the containment tank of the shaped plate 2.

[0051] As will be better specified hereinbelow, in the case of the embodiments reported in figures 1-3 and 8, the two anchoring groups 8 are extended protruding towards the interior of the containment tank with a preferably cylindrical shape, with extension axis substantially orthogonal to the bottom wall 3 of the shaped plate 2. The first thread 83 is made, in accordance with such embodiment, outside the anchoring body 8. Otherwise, in the case of the embodiment of figure 7, the two anchoring groups 8 are extended projecting outwards of the containment tank and the first thread 83 is formed inside the anchoring body 8, or along a cylindrical hole made in the same anchoring body 8.

[0052] In accordance with the idea underlying the present invention, the retainer 1 comprises two adjustment bushes 84, each of which protruding inside the containment tank and provided with an abutment end 80 intended to receive the hinge body 11, 12 in abutment. In addition, each adjustment bush 84 is mechanically associated with a corresponding anchoring body 8 by means of a second thread 86 thereof, which is adjustably engaged with the first thread 83 of the same anchoring body 8 to vary the height of the abutment end 80 with respect to the bottom wall 3 of the shaped plate 2.

[0053] The abutment ends 80 of the two adjustment bushes 84 are intended to receive in abutment the two flat fixing flanges 15 of the hinge body 11, 12 and thus they determine the depth with which the hinge bodies 11, 12 can be embedded within the shaped openings 101 of the metal profiles 100, and consequently also determine the planarity or lack thereof of the fixing flanges 15 with respect to the outer surface 100A of the same metal profile 100.

[0054] More clearly, by adjusting such height of the abutment end 80 with respect to the bottom wall 3 of the shaped plate 2, the depth H (see figure 13) of the same abutment end 80 of the two adjustment bushes 84 is determined with respect to the outer surface 100A of the metal profile 100 with which the two flat fixing flanges 15 of the hinge body 11, 12 must be coplanar.

[0055] Above the fixing flanges 15, a covering plate 40 is advantageously provided for, aimed to improve the appearance of the hinge 10 by concealing from view the screws and the seat in the hinge body 11, 12 of the articulation arm 13. The adjustment of the bushes 84 on the anchoring bodies 8 will in this case have to account for the thickness S' of this plate 40 and thus the depth of the abutment end 80 of the two adjustment bushes 84 will have to be adjusted in order to not only account for the thickness of the fixing flanges 15.

[0056] Due to the engagement via screwing of the adjustment bushes 84 on the anchoring bodies 8, it is possible to vary through simple screwing and unscrewing operations of the bushes 84, the height of their abutment end 80 and hence the depth at which the hinge body 11, 12 is embedded. In this manner, it is always possible, upon varying the thickness of the metal profile 100, to obtain a perfect coplanarity between the visible side of the hinge body 11, 12 and the outer surface 100A of the metal profile 100, in which the opening 101 is made.

[0057] The anchoring bodies 8 and the adjustment bushes 84 are in the form of substantially cylindrical elements, mechanically engaged with each other in a relationship of screw/nut screw type which allows, by rotating adjustment bush 84, making the abutment end 80 thereof project to a variable extent, hence this is movable, with respect to the relative anchoring body 8, which instead is fixed and integral with the bottom wall 3 of the shaped plate 2.

[0058] The retainer 1 comprises screw fixing means 90 configured for fixing the hinge body 11, 12 in abutment against the abutment end 80 of the adjustment bushes 84, in particular in a manner such to retain the hinge body 11, 12 integral with the adjustment bushes 84 in the desired position defined by the abutment end 80 of the latter in accordance with that described above.

[0059] Suitably, the screw fixing means 90 are engaged with the anchoring bodies 8 or with the adjustment bushes 84 depending on the different embodiments described in detail hereinbelow.

[0060] In particular, the screw fixing means 90 allow fixing, in a stopped manner, the hinge body 11, 12 to the retainer 1, maintaining it firmly in abutment against the abutment ends 80 of the adjustment bushes 84, after the latter have been arranged at the suitable height for arranging the hinge body 11, 12 coplanar with the outer surface 100A of the metal profile 100.

[0061] Advantageously, each pair of elements formed by the anchoring body 8 and by the adjustment bush 84 defines an adjustment group with which a threaded hole 81, or nut screw, is associated (which thus, depending on the embodiment, can be made on the anchoring body 8 or on the adjustment bush 84) susceptible of receiving the engagement of a retaining screw 9 of the aforesaid screw fixing means 90 for the fixing of the hinge body 11, 12 to the retainer 1 and hence to the metal profile 100.

[0062] In accordance with a first embodiment of the present invention illustrated in figures 1-3, each of the two anchoring bodies 8 is fixed to the bottom wall 3 protruding towards the interior of the containment tank, and is internally provided with the threaded hole 81 and externally provided with the first thread 83.

[0063] In accordance with such embodiment, each of the two corresponding adjustment bushes 84 is provided with a through hole 85 susceptible of being crossed by the retaining screw 9 and at least one portion thereof covered by the second thread 86. The latter is engaged with the first outer thread 83 of the corresponding anchoring body 8 in an adjustable manner such that by rotating the adjustment bush 84 it is possible to easily vary the height of the free abutment end 80 of the bush 84 on which the fixing flanges 15 of the hinge body 11, 12 are intended to be set.

[0064] Each adjustment bush 84 is provided, for such purpose, with a female socket 87, for example obtained with a cavity of polygonal and in particular hexagonal shape, aligned with the through hole 85 thereof and susceptible of being engaged by a tool provided with a male head that is counter-shaped with respect to the female seat (e.g. an Allen wrench, not illustrated) in order to adjust by means of screwing/unscrewing the position of the adjustment bush 84 along the first thread 83 of the corresponding anchoring body 8, so as to consequently vary the height of the abutment end 80.

[0065] The anchoring bodies 8 can be advantageously fixed to the bottom wall 3 of the shaped plate 2 by means of welding (as illustrated in figure 3), riveting, pressure driving or by means of still other means, or they can be fixed to the bottom wall 3 since they are made integral

with the same bottom wall 3 of the shaped plate 2, as illustrated in figure 8. With the term "fixed" referred to the anchoring bodies 8, also anchoring bodies 8 must be intended which are not separate elements from the shaped plate 2, fixed to the bottom thereof, but rather are a portion thereof protruding internally or externally with respect to the tank of the shaped plate 2 as indicated in figures 7 and 8.

[0066] Indeed, in accordance with a different embodiment of the retainer 1 according to the present invention, illustrated in figure 7, each anchoring body 8 is extended projecting outwards of the containment tank. In accordance with this embodiment, the first inner thread 83 is in this case made within the anchoring body.

[0067] In this case, the threaded holes 81 for engaging the retaining screws 9 aimed to retain the hinge bodies 11, 12 are made on the same adjustment bushes 84 starting from their abutment ends 80.

[0068] In accordance with such embodiment, the adjustment bushes 84 are provided with a stem 82 externally provided with the second thread 86 and engaged in the first thread 83 formed inside the anchoring body 8 projecting externally with respect to the tank of the shaped plate 2.

[0069] Also in this case, the adjustment bush 84 defines, at a free end thereof, the abutment end 80 on which the fixing flanges 15 of the hinge body 11, 12 come to be set.

[0070] In addition, also in this case, each adjustment bush 84 is provided with a female socket 87 aligned with the threaded hole 81 and susceptible of being engaged by a tool provided with a male head that is counter-shaped with respect to the female seat in order to adjust, by means of screwing/unscrewing, the position of the adjustment bush 84 along the inner thread 83 of the corresponding anchoring body 8, so as to consequently vary the height of the abutment end 80.

[0071] Also forming the object of the present invention is a hinge assembly 50 for metal doors/windows, illustrated in figures 9 and 10.

[0072] As indicated above, the door/window comprises a first profile 100' of the movable wing provided with at least one first opening 101', and at least one second profile 100" of the fixed frame provided with at least one second opening 101" aligned height-wise with the first opening 101'.

[0073] The second profile 100" (of the fixed frame) is made of metal, while the first profile 100' (of the movable wing) can be made of a non-metallic material, e.g. wood (as in the example of figures 9 and 10) or it too can be made of metal material.

[0074] The assembly 50 comprises at least one hinge 10, preferably concealable/retractable, provided with two hinge bodies 11, 12 joined together by at least one articulation arm 13, and respectively insertable in the first and in the second opening 101', 101" of the two profiles 100', 100" of the movable wing and of the fixed frame.

[0075] The assembly 50 also comprises at least one retainer 1 for each hinge 10 of the assembly 50 itself.

[0076] In particular, in accordance with the example of figures 9 and 10 (in which the first profile 100' of the movable wing is made of wood), the assembly 50 comprises, for each hinge 10, only one retainer 1 intended to be fixed to the second metal profile 100" of the fixed frame in order to connect the hinge body 12 to the latter, while the other hinge body 11 is connected directly to the first profile 100' of the movable wing. In accordance with a different non-illustrated embodiment, in which also the first profile 100' of the movable wing is metal, the assembly 50 comprises, for each hinge 10, two retainers 1, including a retainer 1 fixed to the second profile 100" of the fixed frame and the other retainer 1 fixed to the first profile 100' of the movable wing, in order to connect the hinge bodies 11, 12 to the corresponding profiles 100', 100".

[0077] The metal profiles 100" (and possibly 100'), the concealable/retractable hinge 10 and the retainers 1 with the anchoring groups 8 are of the type already described above, hence for the sake of description simplicity the same reference numbers will be maintained.

[0078] With reference to the example of figures 9 and 10, the shaped plate 2 of the retainer 1 is fixed inside the second metal profile 100" of the fixed frame at the second opening 101" for the embedded housing of the hinge body 12 of the hinge 10.

[0079] With reference to the (non-illustrated) embodiment in which both profiles 100', 100" are metal, the two shaped plates 2 of the two retainers 1 are as follows: one is fixed inside the first metal profile 100' of the movable wing and the other is fixed inside the second metal profile 100" of the fixed frame at the respective first and second opening 101', 101" for the embedded housing of the corresponding hinge body 11, 12 of the hinge 10.

[0080] For such purpose, the shaped plate 2 defines a containment tank for the corresponding hinge body 12 (and possibly 11) and is provided with a bottom wall 3 facing the corresponding opening 101" (and possibly 101').

[0081] The assembly 50 then provides for at least two anchoring bodies 8 for each shaped plate 2, fixed to the bottom wall 3 of the latter at the two lateral ends and each provided with a first thread 83.

[0082] According to the idea underlying the invention, the assembly 50 comprises two adjustment bushes 84 for each shaped plate 2, protruding within the containment tank and each provided with an abutment end 80, which supports the corresponding hinge body 11, 12 in abutment and is mechanically associated with one of the anchoring bodies 8 by means of a second thread 86 adjustably engaged with the first thread 83 of the anchoring body 8 to vary the height of the abutment end 80 with respect to the bottom wall 3 of the shaped plate 2.

[0083] In accordance with the examples already discussed above, each pair of elements formed by the anchoring body 8 and by the adjustment bush 84 defines an adjustment group with which a threaded hole 81 is associated (which thus, depending on the embodiment,

can be made on the anchoring body 8 or on the adjustment bush 84), which is engaged by a retaining screw 9 associated with the head to the flanges of the hinge body 11, 12 so as to fix the same hinge body to the retainer 1 and hence to the metal profile 100.

[0084] Advantageously, for a door, two or preferably three hinge assemblies 50 can be provided, placed at three different heights to rotatably support the door in a sufficiently distributed manner.

[0085] Finally, forming the object of the present invention is a method for fixing a hinge 10, in particular of concealable/retractable type, on profiles 100 of metal doors/windows, which will be described hereinbelow by employing, for the sake of description simplicity, the same reference numbers used above with reference to the retainer 1 and to the assembly 50.

[0086] The method, object of the invention, employs at least one retainer 1 in accordance with the above description and operates according to the steps described hereinbelow.

[0087] Initially, a step is provided for notching a metal profile 100 of a movable wing or of a fixed frame in order to make a shaped opening 101.

[0088] Then, a step takes place for fixing a shaped plate 2 within the metal profile 100 of the door/window at the shaped opening 101, with the bottom wall 3 of the shaped plate 2 which, through such fixing, comes to be situated embedded within the metal profile 100 facing the same shaped opening 101.

[0089] The fixing step and the notching step can also be reversed in order of execution.

[0090] At this point, there is a step for adjusting the screwing of the adjustment bush 84 on the anchoring body 8, fixed to the bottom wall 3 of the shaped plate 2, in order to arrange the abutment end 80 of each anchoring group 8 at a depth such to then allow the fixing flanges 15 of the hinge body 11, 12 - once the latter have been set on the abutment ends 80 of the adjustment bushes 84 - to have the visible side arranged perfectly coplanar with the outer surface 100A of the metal profile 100.

[0091] The visible side of the fixing flanges 15 of the hinge body 11, 12 is advantageously obtained with a covering plate 40 having the object of concealing the screws and having a thickness indicated in figure 13 with S'.

[0092] More in detail, this coplanarity is attained by means of the aforesaid adjustment step by varying the screwing of the adjustment bush 84 up to placing the abutment end 80 thereof at a depth H with respect to the outer surface 100A of the metal profile 100 equal to the thickness S of the fixing flanges 15 of the hinge body 11, 12 and possibly added with the thickness S' of the covering plate 40 if present.

[0093] Then, the hinge body 11, 12 is inserted through the shaped opening 101 of the metal profile 100, in the containment tank of the shaped plate 2, with the fixing flanges 15 which are laid on the abutment ends 80 of the adjustment bushes 84 and with the visible side of the hinge body 11, 12 which is aligned with the outer surface 100A of the metal profile 100 of the door/window, due to the preceding adjustment step with the above-described screw/nut screw engagement between the adjustment bushes 84 and the anchoring bodies 8.

[0094] Finally, there is the fixing of the hinge body 11, 12 to the retainer 1 by means of the screwing of at least two corresponding retaining screws 9 in threaded holes 81 made in the adjustment bushes 84 or in the anchoring bodies 8, passing through the holes 150 of the fixing flanges 15 of the hinge body 11, 12.

[0095] In accordance with the retainer embodiment illustrated in figures 1-3, the method in particular provides that the adjustment occurs by varying the screwing of the second threads 86 of the adjustment bushes 84 on the first threads 83 of the anchoring bodies 8 and the fixing of the hinge body 11, 12 to the retainer 1 occurs by means of the screwing of retaining screws 9 which cross through the through holes 150, 85 of the flanges 15 of the hinge body 11, 12 and of the adjustment bushes 84 up to being engaged in the threaded holes 81 of the anchoring bodies 8.

[0096] The finding thus conceived therefore attains the pre-established objects.

Claims

1. Retainer (1) for fixing a hinge body of a hinge on a metal door/window profile, wherein said hinge (10) is provided with two hinge bodies (11, 12) joined together by at least one articulation arm (13), said retainer (1) being insertable in a shaped opening (101) formed in said profile (100),
said retainer (1) comprising:

    - a shaped plate (2), which defines a containment tank, is provided with at least one bottom wall (3) and is intended to be fixed inside a metal profile (100) of a door/window with said bottom wall facing said opening (101) to support a hinge body (11, 12) embedded in said opening (101);
    - at least two anchoring bodies (8), fixed to the bottom wall (3) of said shaped plate (2) and each provided with a first thread (83);

    said retainer (1) being **characterized in that** it comprises:

    - two adjustment bushes (84) protruding within said containment tank and each provided with an abutment end (80) intended to receive in abutment said hinge body (11, 12) and mechanically associated with one of said anchoring bodies (8) by a second thread (86) adjustably engaged to the first thread (83) of said anchoring body (8) to vary the height of said abutment end (80) with respect to the bottom wall (3) of said shaped plate (2);

- screw fixing means (90) configured for fixing said hinge body (11, 12) in abutment against the abutment ends (80) of said adjustment bushes (84).

2. Retainer (1) according to claim 1, **characterized in that** each pair formed by said anchoring body (8) and by the corresponding said adjustment bush (84) defines an adjustment group with which a threaded hole (81) is associated, which receives the engagement of a retaining screw (9) of said screw fixing means (90) for fixing said hinge body (11, 12) to said retainer (1).

3. Retainer (1) according to claim 1, **characterized in that** each said anchoring body (8) is fixed to said bottom wall (3) protruding towards the interior of said containment tank, is externally provided with said first thread (83) and is internally provided with a threaded hole (81) adapted to be engaged by a retaining screw (9) for retaining a hinge body (11, 12); each said adjustment bush (84) being provided with a through hole (85) aligned with said threaded hole (81), susceptible of being crossed by said retaining screw (9) and provided for at least an adjustment portion thereof with said second thread (86), which is engaged to the first thread (83) of said anchoring body (8).

4. Retainer (1) according to claim 3, **characterized in that** each adjustment bush (84) is provided with a female socket (87) aligned with said through hole (85) susceptible of being engaged by a male tool to adjust the screwing of said adjustment bush (84) on the first thread (83) of said anchoring body (8).

5. Retainer (1) according to claim 3, **characterized in that** said anchoring bodies (8) are fixed to the bottom wall (3) of said shaped plate (2) by means of at least one weld.

6. Retainer (1) according to claim 3, **characterized in that** said anchoring bodies (8) are integral with the bottom wall (3) of said shaped plate (2).

7. Retainer (1) according to claim 1, **characterized in that** each said anchoring body (8) is fixed to said bottom wall (3) projecting outwards of said containment tank and is provided at its interior with said first inner thread (83); each said adjustment bush (84) being provided with a threaded hole (81) at its interior, adapted to be engaged by a retaining screw (9) for retaining a hinge body (11, 12) and a stem (82) externally provided with said second thread (86) engaged to the first thread (83) of said anchoring body (8).

8. Retainer (1) according to claim 7, **characterized in that** each adjustment bush (84) is provided with a female socket (87) aligned with said threaded hole (81) thereof adapted to be engaged by a male tool to adjust the screwing of said adjustment bush (84) on the first thread (83) of the corresponding said anchoring body (8).

9. Hinge assembly (50) for a metal door/window, such door/window comprising:

- at least a first profile (100') of a movable wing provided with at least a first opening (101');
- at least a second metal profile (100") of a fixed frame provided with at least a second opening (101') aligned height-wise with said first opening (101');

wherein said hinge assembly (50) comprises:

- at least one hinge (10) provided with two hinge bodies (11, 12), joined together by at least one articulation arm (13), and intended to be inserted into the first and second opening (101', 101") of said first and second profile (100', 100");
- at least one retainer (1) according to any one of the preceding claims, wherein the shaped plate (2) of said retainer (1) is intended to be fixed inside said second metal profile (100") at said second opening (101") for the housing of the corresponding said hinge body (12) of said hinge (10), the containment tank of said shaped plate (2) housing the corresponding said hinge body (12) and the bottom wall (3) of said shaped plate (2) being intended to be facing said second opening (101");

wherein said at least two anchoring bodies (8) of said retainer (1) are fixed to the bottom wall (3) of said shaped plate (2), and are each provided with said first thread (83); wherein the two adjustment bushes (84) of said retainer (1) are protruding within said containment tank and are each provided with said abutment end (80) which supports in abutment the corresponding said hinge body (12) and is mechanically associated with one of said anchoring bodies (8) by means of said second thread (86) adjustably engaged to the first thread (83) of said anchoring body (8) to vary the height of said abutment end (80) with respect to the bottom wall (3) of said shaped plate (2).

10. Method for fixing a hinge on metal door/window profiles, which uses at least one retainer (1) according to any one of claims 1 to 8, and wherein said hinge (10) is provided with two hinge bodies (11, 12) joined together by at least one articulation arm (13), each of said hinge bodies (11, 12) being provided with two fixing flanges (15) each having at least one through

hole (150),
said method being **characterized in that** it comprises:

- notching the metal profile (100) of said door/window for forming at least one shaped opening (101);
- fixing at least one said shaped plate (2) inside the metal profile (100) of said door/window at said shaped plate (2) with said bottom wall (3) facing said shaped opening (101);
- adjusting the screwing of said adjustment bush (84) on said anchoring body (8) to arrange the abutment end (80) of each said anchoring group (8) at a depth (H) with respect to the outer surface (100A) of said metal profile (100) equal to the thickness (S) of the fixing flanges (15) of said hinge body (11, 12), possibly increased with the thickness (S') of a covering plate (40) of said fixing flanges (15);
- inserting the hinge body (11, 12) of said hinge (10) through the shaped opening of said metal profile (100) in the containment tank of said shaped plate (2) with said fixing flanges (15) lying on the abutment ends (80) of said adjustment bushes (84) and with the visible side of said hinge body (11, 12) aligned with the outer surface (100A) of the metal profile (100) of said door/window;
- fixing said hinge body (11, 12) to said retainer (1) by means of the screwing of screw fixing means (90) which act on said hinge body (11, 12), fixing it in abutment against the abutment ends (80) of said adjustment bushes (84).

11. Method for fixing a hinge on metal door/window profiles, according to claim 10, **characterized in that** said fixing of said hinge body (11, 12) to said retainer (1) is obtained by means of screwing at least two corresponding retaining screws (9) of screw fixing means (90) in threaded holes (81) of said adjustment bushes (84) or of said anchoring bodies (8) passing through the holes of the fixing flanges (15) of said hinge body (11, 12).

12. Method for fixing a hinge on metal door/window profiles, according to claim 11, which uses at least one retainer (1) according to claim 3, wherein said adjustment is made by varying the screwing of the second threads (86) of the adjustment bushes (84) on the first threads (83) of said anchoring bodies (8) and the fixing of said hinge body (11, 12) to said retainer (1) is done by screwing said retaining screws (9) which cross the through holes (150, 85) of the flanges (15) of said hinge body (11, 12) and of said adjustment bushes (84) up to being engaged in the threaded holes (81) of said anchoring bodies (8).

13. Method for fixing a hinge on metal door/window profiles, according to claim 11, which uses at least one retainer (1) according to claim 7, wherein said adjustment occurs by varying the screwing of the second threads (86) of the stems (82) of the adjustment bushes (84) on the first threads (83) of said anchoring bodies (8), and the fixing of said hinge body (11, 12) to said retainer (1) occurs by means of the screwing of said retaining screws (9) which cross through the through holes (150) of the flanges (15) of said hinge body (11, 12) up to being engaged in the threaded holes (81) of said adjustment bushes (84).

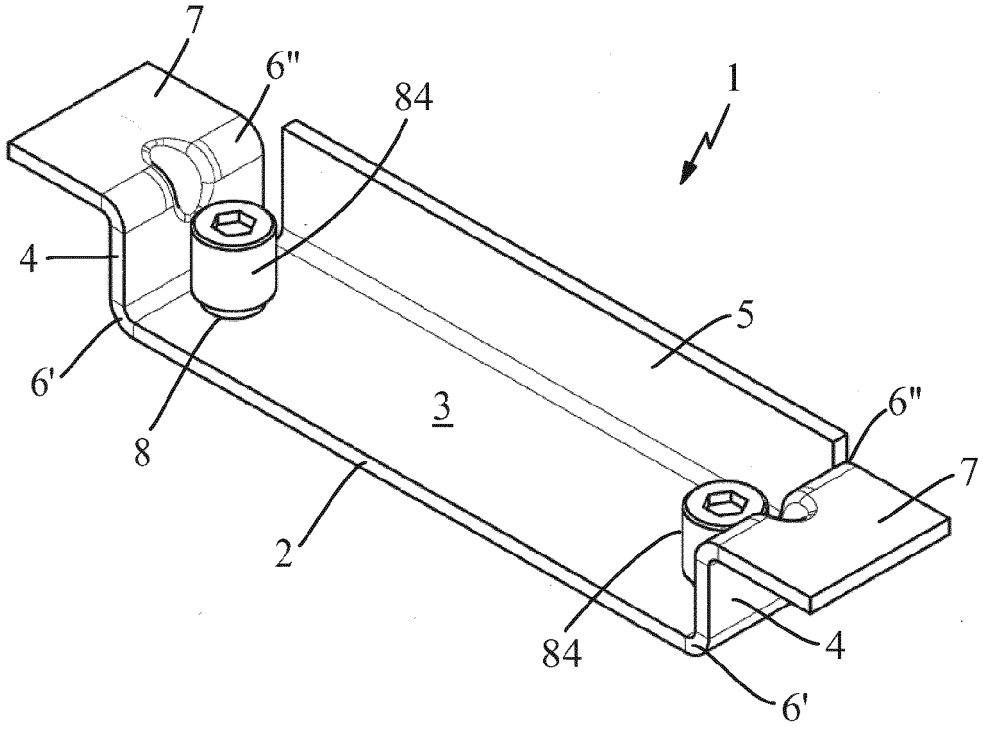

Fig. 1

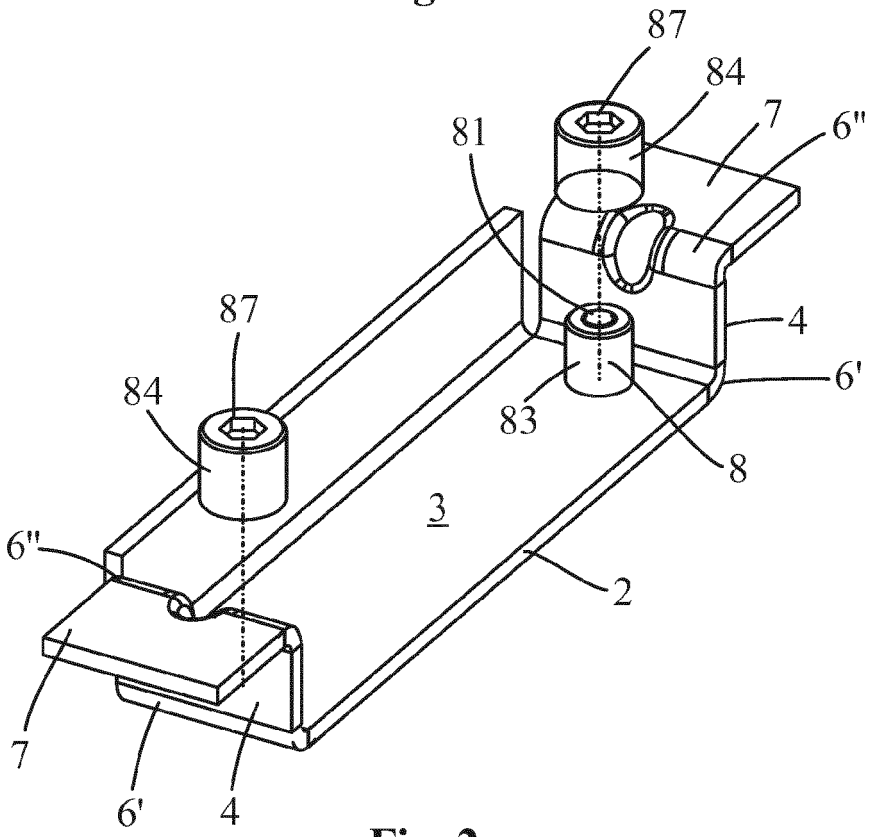

Fig. 2

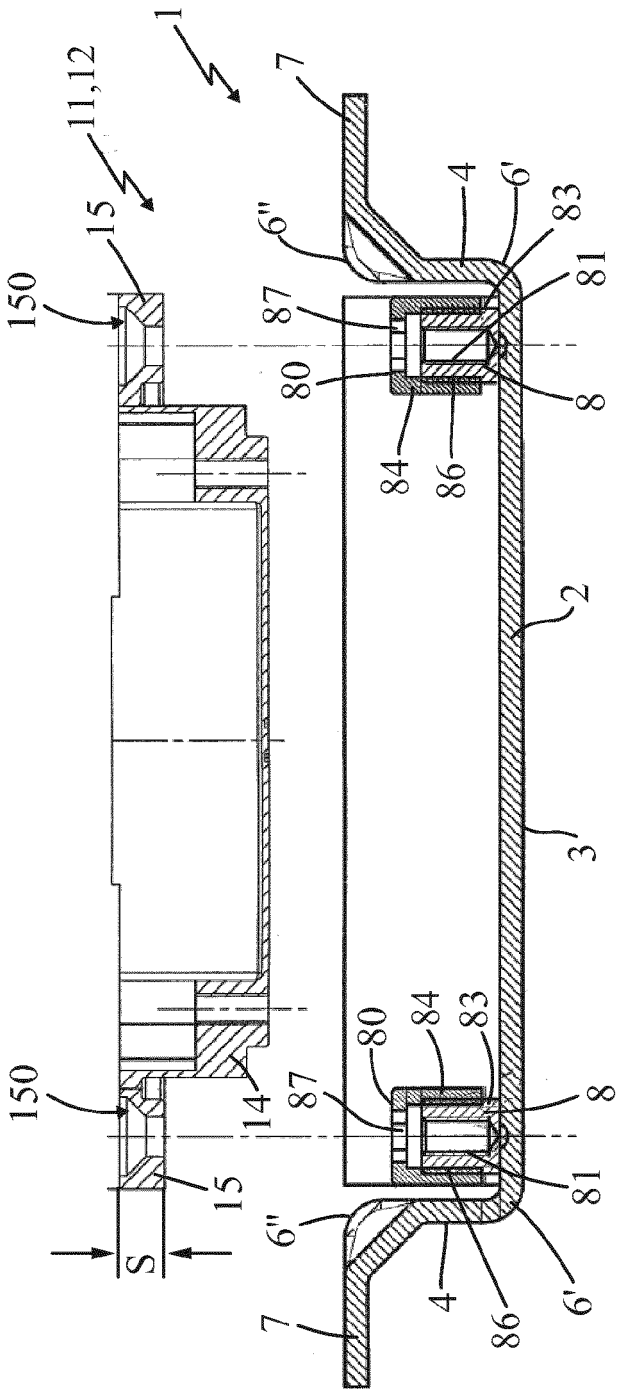

Fig. 3

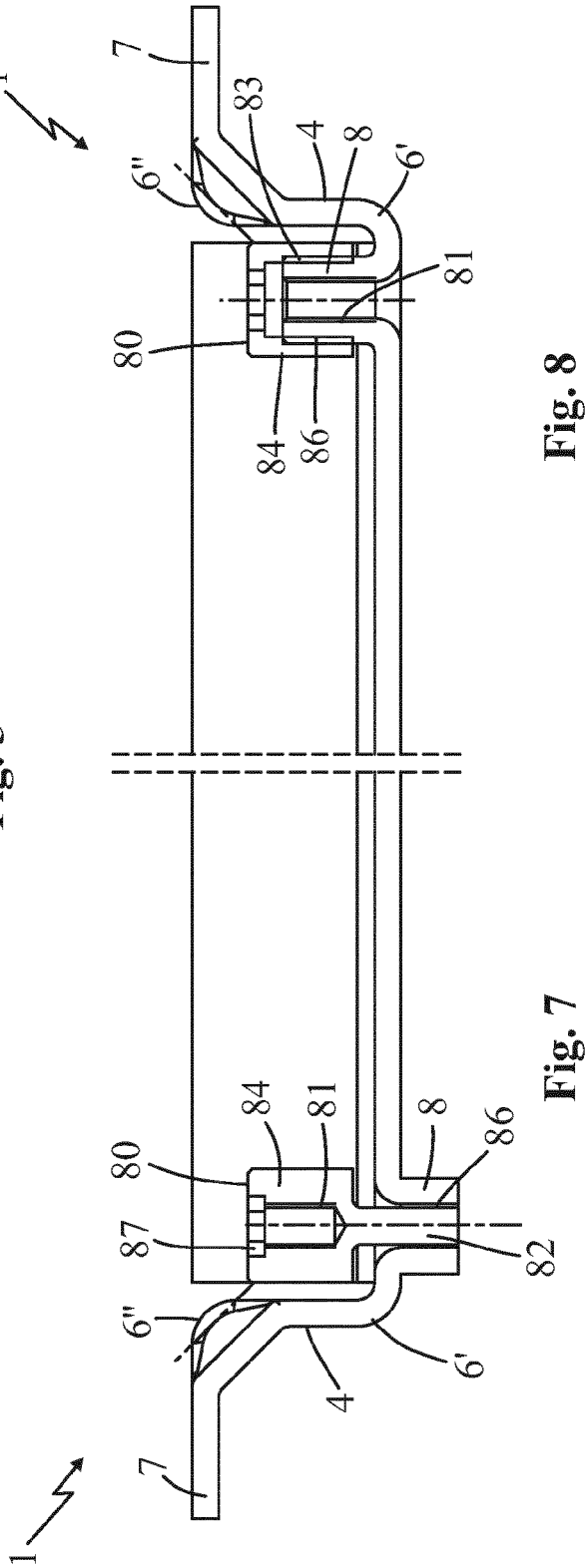

Fig. 8

Fig. 7

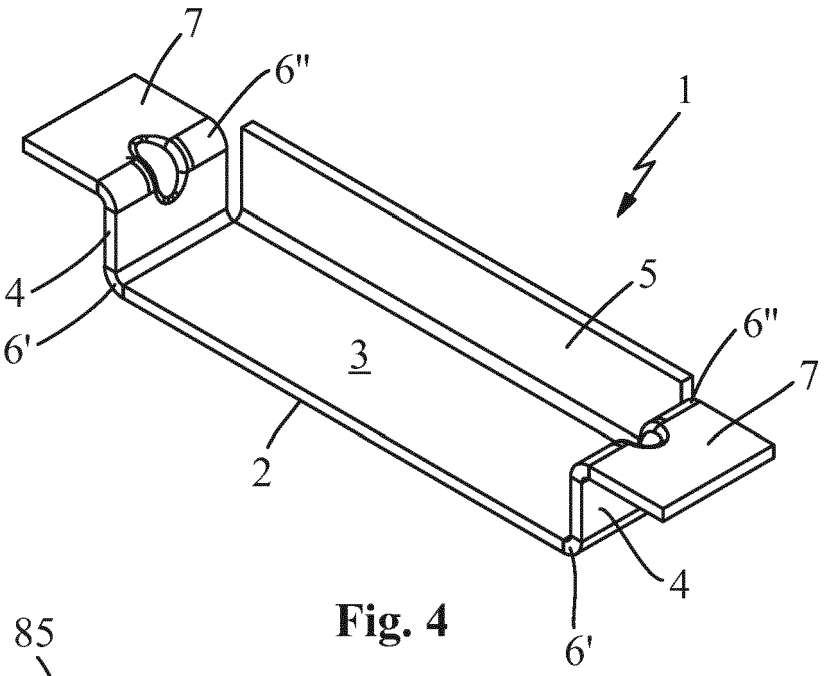

Fig. 4

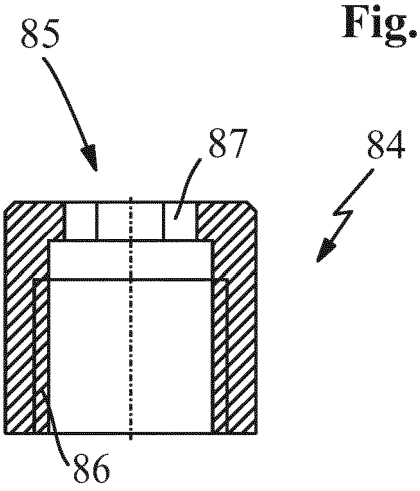

Fig. 5B

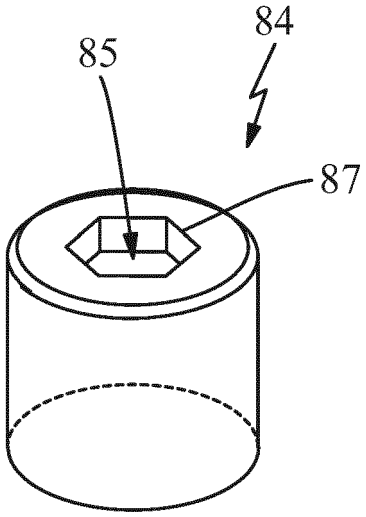

Fig. 5A

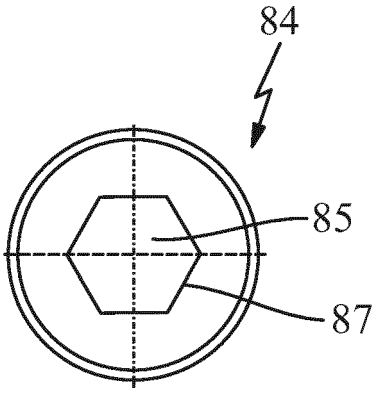

Fig. 5C

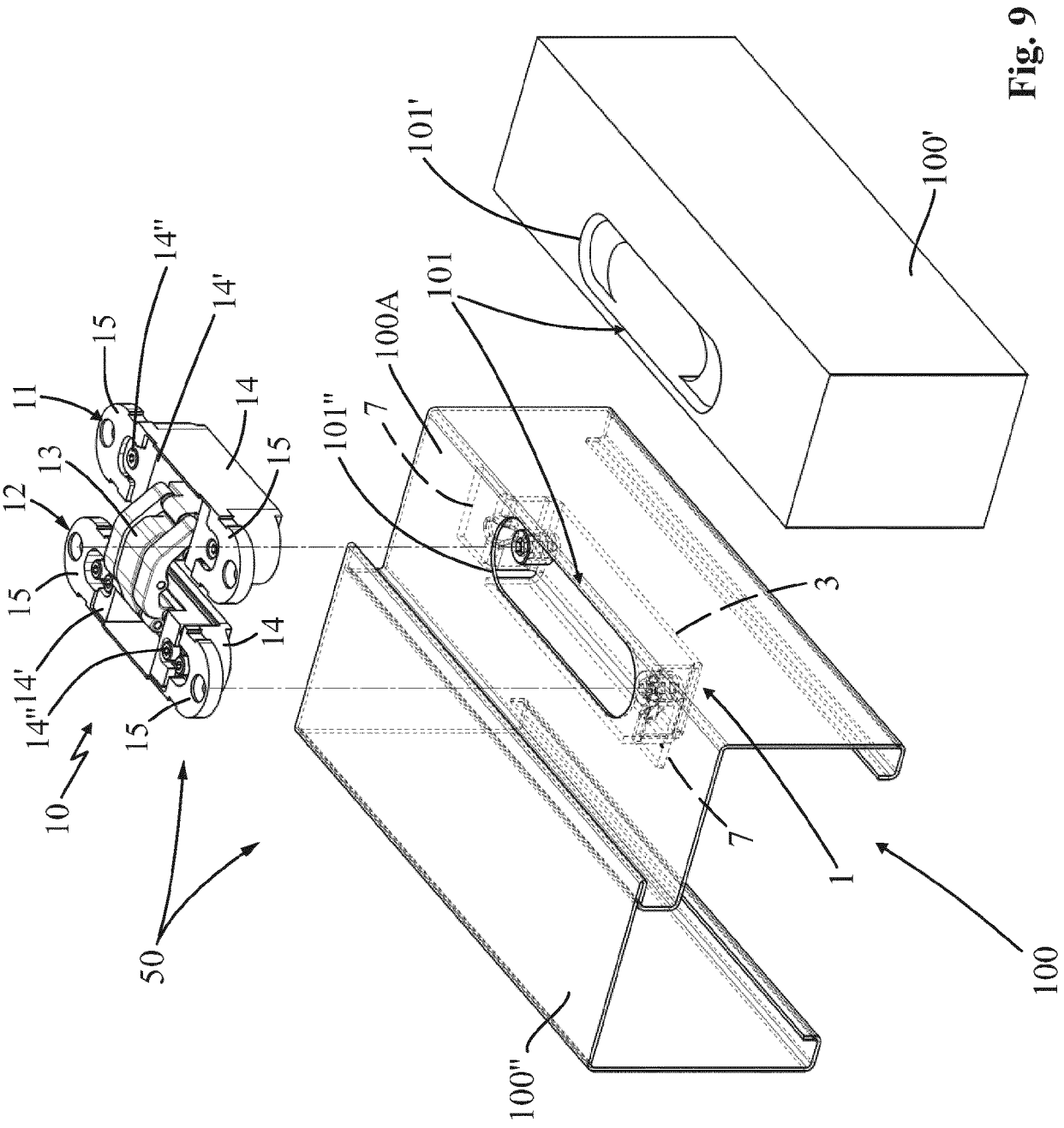

Fig. 9

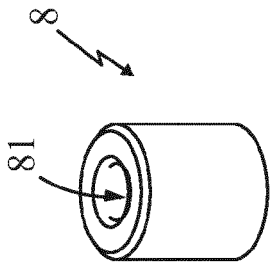

Fig. 6A

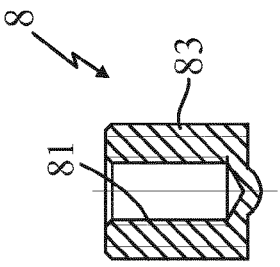

Fig. 6B

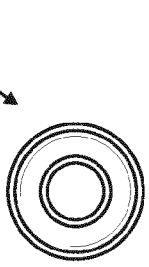

Fig. 6C

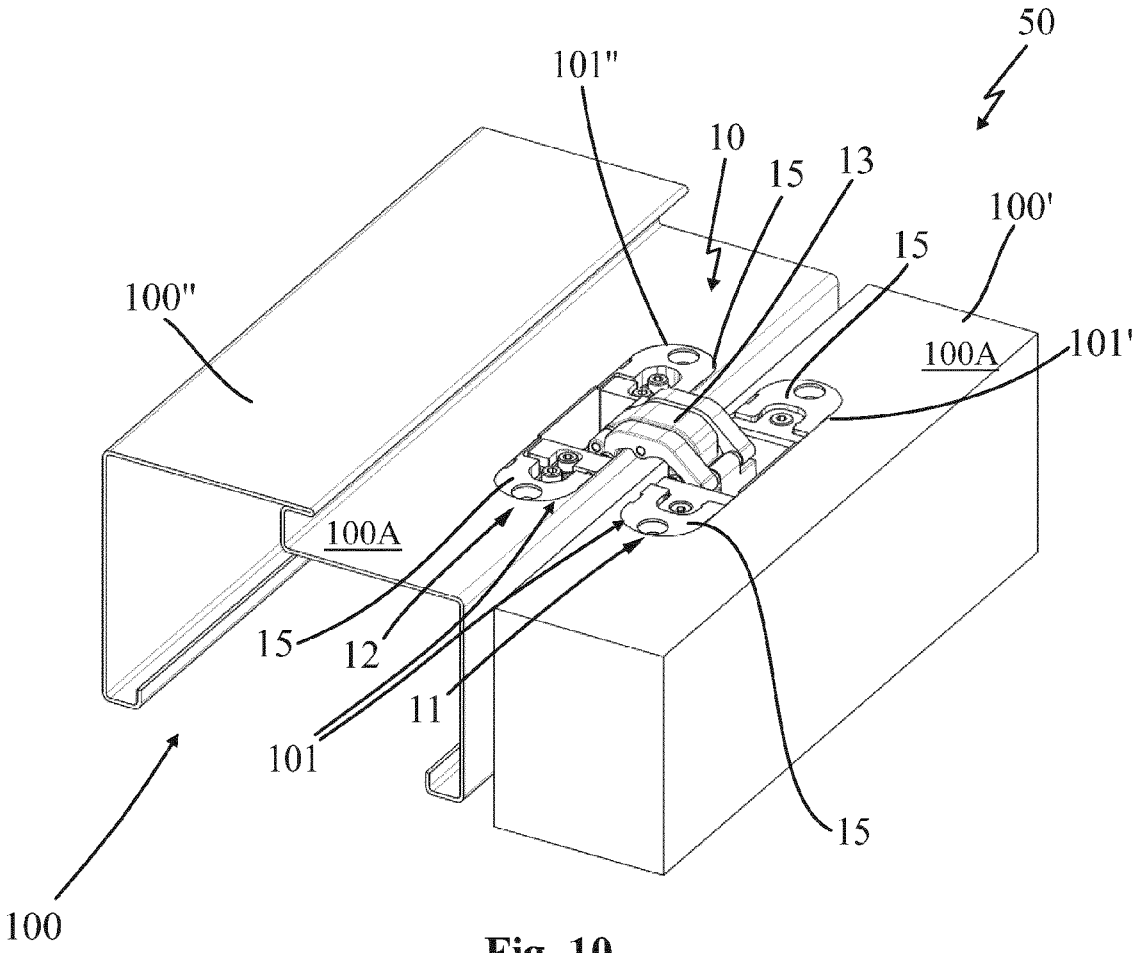
50
101"
10
15
13
100'
15
100"
100A
101'
100A
15
12
11
101
15
100

Fig. 10

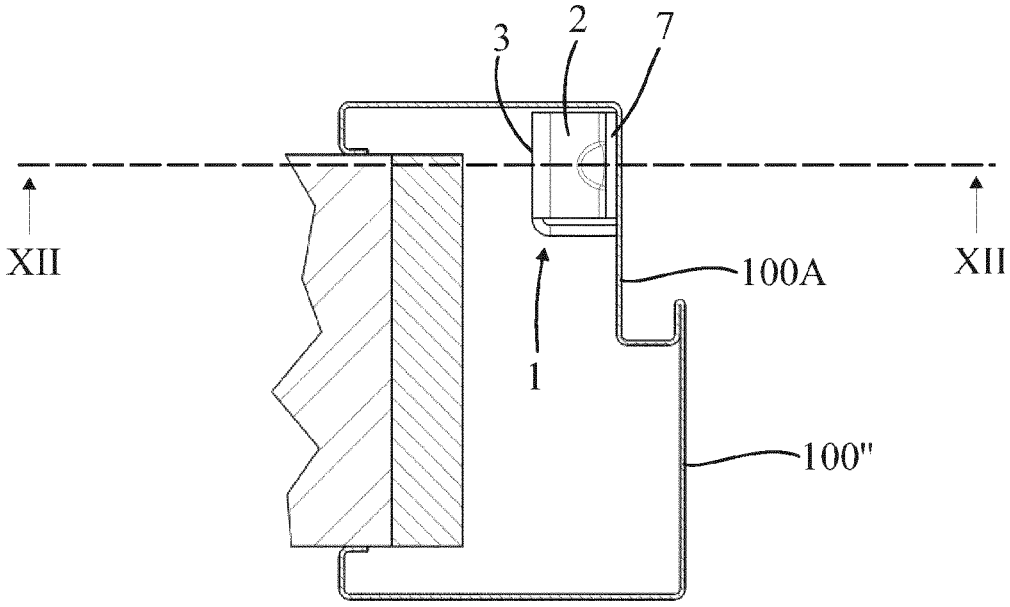
3
2
7
XII
XII
100A
1
100"

Fig. 11

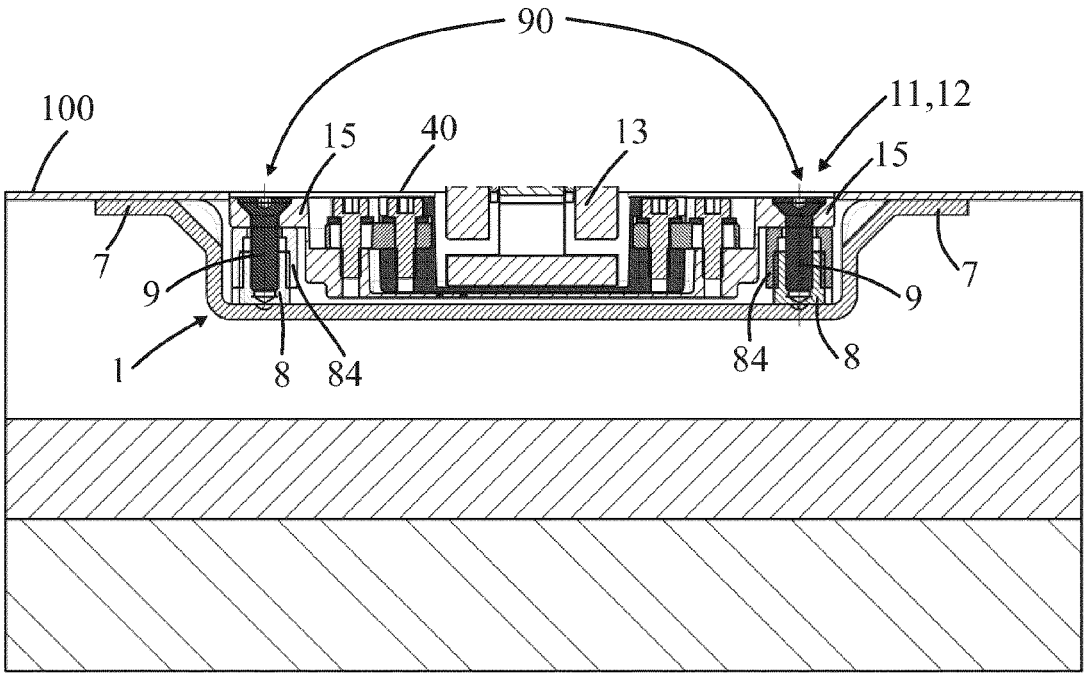
90
100
11,12
15
40
13
15
7
9
1
8
84
84
8
9
7

Fig. 12

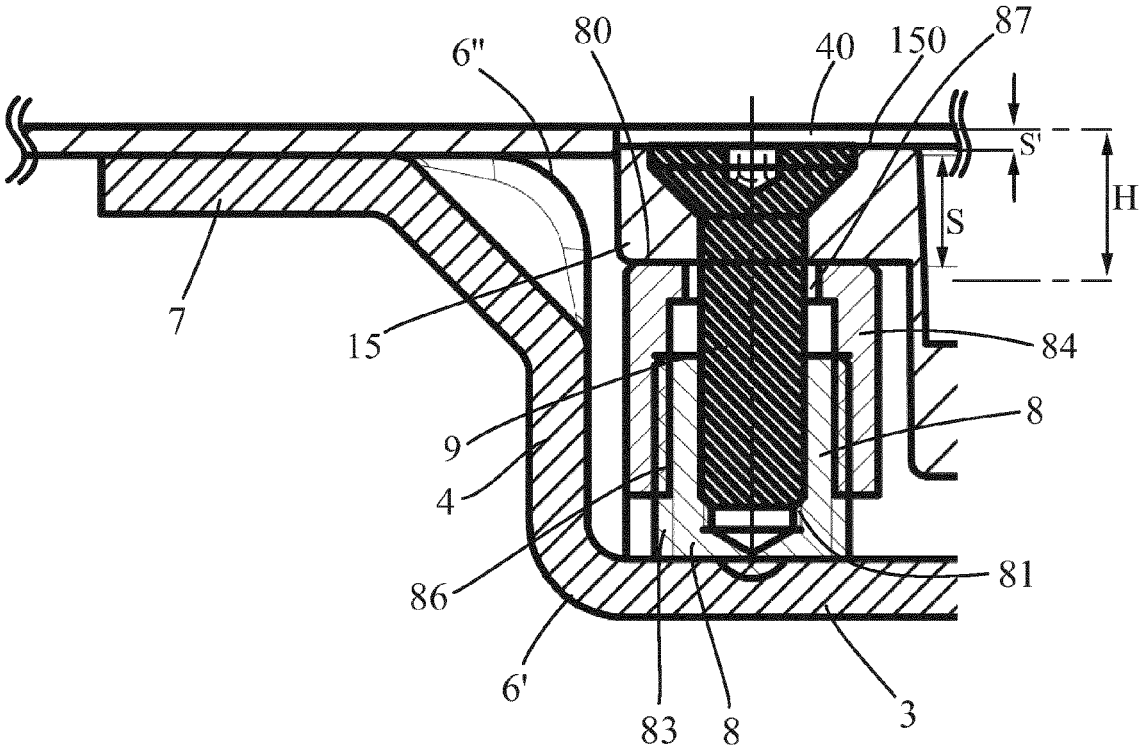
6"
80
40
150
87
S'
H
S
7
15
84
9
8
4
86
81
6'
83
8
3

Fig. 13

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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 4123

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2017/065699 A1 (KUANTICA S R L [SM]) 20 April 2017 (2017-04-20)	1,9,10	INV. E05D7/04
A	* figures 3,4,6,7,13,28 * * page 11, line 28 - page 13, line 14 * * page 35, line 6 - page 36, line 13 *	2-8, 11-13	E05D5/02 ADD. E05D3/06
X	DE 10 2015 112640 B3 (SIMONSWERK GES MIT BESCHRÄNKTER HAFTUNG [DE]) 21 January 2016 (2016-01-21)	1,9,10	
A	* paragraph [0031] - paragraph [0037]; figures 1-4 *	2-8, 11-13	

TECHNICAL FIELDS SEARCHED (IPC)

E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 September 2018	Rémondot, Xavier

CATEGORY OF CITED DOCUMENTS

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20-09-2018

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- DE 102015112640 **[0022] [0023]**