

(19)



(11)

EP 2 568 092 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

13.03.2013 Bulletin 2013/11

(51) Int Cl.:

E04B 9/18 (2006.01)(21) Application number: **11180526.3**(22) Date of filing: **08.09.2011**

(84) Designated Contracting States:

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

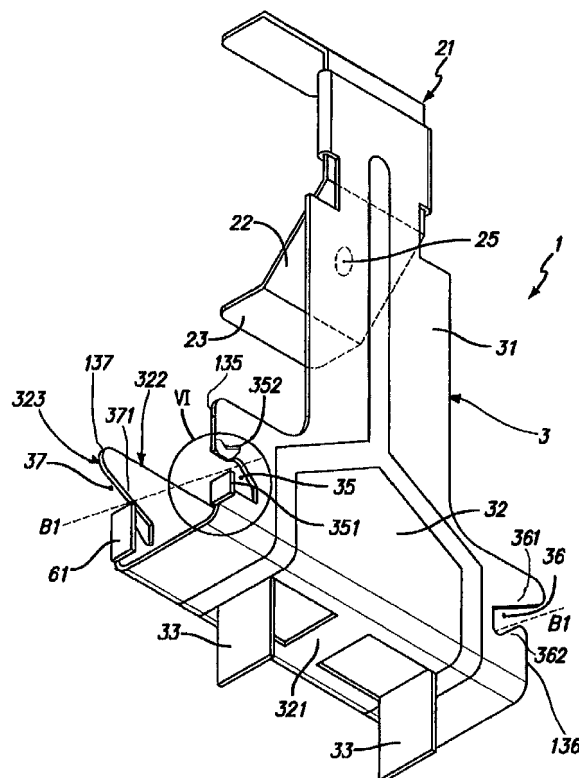
Designated Extension States:

BA ME(72) Inventor: **Cipriani, Giuseppe****38068 Rovereto (TN) (IT)**(74) Representative: **Manfrin, Marta et al****Società Italiana Brevetti****Stradone San Fermo, 21 sc. B****37121 Verona (IT)**(71) Applicant: **Cipriani, Giuseppe****38068 Rovereto (TN) (IT)**(54) **A connection article for a support structure for a false ceiling**

(57) The present disclosure relates to a connection article (1) for a support structure of a false ceiling (10), and to said support structure.

The article includes a sheet metal body (3) including at least four notches (35, 36, 37, 38) obtained on side edges (135, 136, 137, 138) of said sheet metal body (3),

said four notches (35, 36, 37, 38) being located in the region of vertexes of a quadrilateral, said connection article (1) comprising retaining means (352, 362, 372, 382), exerting a retaining action alternately the one from above and the other one from below an ideal plane (P) crossing the notches (35, 36, 37, 38).

**FIG. 3A****EP 2 568 092 A1**

Description

[0001] The present disclosure generally refers to support structures, or load-bearing structures, of false ceilings, i.e. support structures for walls or panels, which are placed underneath a regular ceiling.

[0002] Such support structures generally comprise a first element, which is adapted to be fixed to the ceiling rising above the false ceiling, wherein such first element is a so-called hanger, a steel rod, a threaded rod or a metal profile. A second element of the support structure is, e.g., a metal profile, preferably but not exclusively C- or U-shaped, which lies under the first element, and on which the false ceiling is mounted. Moreover, a connection article is provided which connects the first element with the second element of the support structure for false ceilings.

[0003] Even more specifically, the present disclosure relates to the above-mentioned connection article, a support structure of false ceilings comprising a combination of the connection article and the metal profile, and a method of fixing the connection article to the metal profile.

[0004] A known connection article comprises a properly shaped sheet metal intended, on one side, for connection with the hanger and comprising, in a zone opposite to the connection zone with the hanger, a coupling portion intended to be fixed to a metal profile.

[0005] For connection with the metal profile, the sheet metal comprises one or more notches obtained on opposite side edges of the sheet metal.

[0006] More specifically, the sheet metal is inserted in a cavity of the metal profile defined by opposite side walls or shoulders of the C- or U-shaped profile, and the notches are intended to receive respective edges of the lateral sides of the metal profile.

[0007] Even more specifically, first the sheet metal is inserted inside the cavity present in the metal profile, and then the sheet metal is rotated, of an adequate angle, until making a joint-type coupling between the notches in the sheet metal and the corresponding edge or projection of the metal profile.

[0008] Though advantageous under many points of view, the known connection article entails some drawbacks which are yet to be overcome.

[0009] A drawback lies, e.g., in the fact that it has been found that such a connection article does not always guarantee a constant connection with the metal profile.

[0010] The present disclosure stems from the technical problem of providing a connection article for a support structure for a false ceiling allowing to overcome the drawbacks mentioned above with reference to the known art, and/or to achieve further advantages and/or to have further features.

[0011] This is obtained by providing a connection article according to independent claim 1 and a method of fixing according to claim 16. Specific embodiments of the subject-matter of the present disclosure are set forth in the corresponding dependent claims.

[0012] The connection article, when installed on-site, is arranged with a substantially vertical orientation and lies inserted substantially vertical into the metal profile, so as to receive the edges of the metal profile into the respective notches. In the present description and in the claims, any spatial reference, such as, e.g., "above", "top", "below", "bottom", "horizontal", "vertical", "forward", "behind", is to be understood in a non-limitative way and merely by way of example, with reference to the above-mentioned substantially vertical orientation of the connection article when it is installed on-site.

[0013] In particular, the connection article according to the present disclosure includes a sheet metal body bent to a C or U shape, and four notches obtained on side edges of said sheet metal body. The four notches are located in the region of as many (four) angle zones or vertex zones of a quadrilateral arranged substantially horizontal. The connection article further comprises retaining means, each of which is associated to a respective notch of said four notches.

[0014] The retaining means is arranged so as to exert retaining on the edges of the metal profile, which retaining, following a perimeter of the quadrilateral, occurs alternately from above and from below a horizontal ideal plane passing through said notches. Such ideal quadrilateral is e.g., a rectangle.

[0015] From another point of view, and with different words, following the perimeter of said quadrilateral and passing for each angle zone or vertex zone of the quadrilateral, first retaining means lies in a top zone of the respective first notch, second retaining means lies in a bottom zone of the respective second notch, third retaining means lies in a top zone of the respective third notch and fourth retaining means lies in a bottom zone of the fourth notch.

[0016] The retaining means thus arranged alternately above and below the notches, that is at the zones receiving the edges of the metal profile, allow to contain, alternately above and below along said perimeter, the edges of the two lateral sides of the metal profile, when the latter is received into the respective notch.

[0017] In practice, the alternate arrangement causes, once associated the connection article to a respective metal profile, the following coupling to occur.

[0018] Two successive notches of the quadrilateral (e.g., the first notch and the fourth notch) are connected and associated to a first side of the metal profile, and the other two successive notches of the quadrilateral (e.g., the second notch and the third notch) are connected and associated to the other side of the metal profile. Each side of the metal profile is therefore contained from above and from below by the respective retaining means.

[0019] Therefore, a slight bending of each lateral side of the metal profile is created, caused by an elastic return of two couplings (above and below) pressing on the same lateral side of the metal profile. In other words, the metal profile is subjected to bending along its length.

[0020] Thus, it may be prevented that the coupling ar-

article be subjected to accidental release from the metal profile, e.g. as a result of vibrations, noises, earthquake shocks or settlements of the building, various stresses, wrong couplings or manufacturing tolerances, as well as of any assembly not done in a workmanlike manner, i.e. as a result of an incomplete or incorrect assembly.

[0021] In other words, the presence of retaining means alternately arranged from opposite sides, above and below an ideal plane passing for the notches, allows to obtain four points of coupling to the respective metal profile, which work in an alternate sequence, and therefore a firm joint.

[0022] Thanks to said firm joint, a so-called non-return locking or definitive locking is obtained. In fact, once coupled in position, the article is not released anymore if not by unthreading it along the longitudinal sense of the metal profile or with a rotation in the opposite sense, forcing the coupling.

[0023] In an embodiment, the retaining means are defined by the shape or outline of the notches. That is, the notches are configured and shaped so as to stably contain and hold the edges of the metal profile that are received into the notches.

[0024] In particular, in an embodiment, the first notch includes a recess, e.g. saddle-shaped, said recess being part of said first retaining means, and being arranged for instance above the above-mentioned plane, so as to act from above or rise above an edge of the metal profile that is received into the recess. The second notch has the shape of an oblique louver, defining an oblique portion of the sheet metal body underlying the respective notch, said oblique portion being part of said second retaining means.

[0025] The third notch includes a recess, e.g. saddle-shaped, said recess being part of said third retaining means, and being located, e.g., above the above-mentioned plane, so as to act from above or rise above an edge of the metal profile that is received into the recess. The fourth notch has the shape of an oblique louver, defining an oblique portion of the sheet metal body underlying the respective notch, said oblique portion being part of said fourth retaining means.

[0026] In practice, the first notch receives the edge of the profile into the respective saddle or recess, the oblique portion underlying the second notch pushes from below, or exerts a pressing contact against, the edge of the profile, the third notch receives into the saddle or recess the edge of the profile, the oblique portion underlying the fourth notch pushes from below, or exerts a pressing contact against, the edge of the profile.

[0027] Therefore, a trapping of the metal profile among four alternate coupling points, recess/oblique edge/recess/oblique edge is obtained.

[0028] It has also to be observed that, thanks to the four alternate couplings, and due to the geometry described above, the two lateral sides of the metal profile are stressed in a diametrically opposite way, i.e., with respect to the length of the metal profile, one side is

stressed, e.g., from below in a front zone and from above in a rear zone, whereas the other side is stressed from below in a rear zone and from above in a front zone.

[0029] This configuration causes the first retaining means and the third retaining means, being placed in diagonally opposite zones of the above-mentioned quadrilateral, to push and exert a retaining action from above an edge of a side of the metal profile and an edge of the other side (opposite side) of the metal profile, whereas the second retaining means and the fourth retaining means, being placed in diagonally opposite zones of the above-mentioned quadrilateral, push and exert a retaining action from below an edge of a side of the metal profile and an edge of the other side (opposite side) of the metal profile. Thus, the metal profile is induced also to a slight bending along the diagonal (therefore a slight torsion) at the moment of coupling, and to a further elastic return into a coupled condition, fostering the locking.

[0030] In a further embodiment, the first retaining means and the fourth retaining means respectively comprise a fin lying beside the respective recess of the first notch, and a fin lying beside the respective recess of the third notch. The fins serve as a further side retaining element for the metal edge, and prevent a rotation return of the metal profile when the latter is received into the four notches.

[0031] Other features and the operation modes of the subject-matter of the present disclosure will be made evident from the following detailed description of preferred embodiments thereof, given by way of a non-limiting example.

[0032] It is also to be understood that all possible combinations of features and embodiments described with reference to the following detailed description fall within the scope of the present disclosure.

[0033] Reference will be made to the figures of the annexed drawings, wherein:

- Figure 1 shows a front view of the connection article according to the present disclosure;
- Figure 2 shows a side view of the connection article according to the present disclosure;
- Figure 3A shows a perspective view of a connection article according to the present disclosure;
- Figure 3B shows a view of a detail of a connection article according to the present disclosure;
- Figure 4 shows a perspective view of a connection article during a step of inserting into a metal profile;
- Figure 5 shows a perspective view of a connection article inserted inside the metal profile in a further inserting step;
- Figure 6 shows a view of a detail VI of Figure 3A in enlarged scale.
- Figure 7 shows a view of a detail VII of Figure 5 in enlarged scale.

[0034] With reference to the annexed figures, a connection article for a support or load-bearing structure for

false ceilings according to the present disclosure is denoted by reference number 1. A support structure for supporting a false ceiling is denoted by number 10.

[0035] More specifically, the connection article 1 according to the present disclosure is intended to connect, by a spring coupler 2, a first element of the support structure 10, such as a hanger, a steel rod, an iron wire, a nonius-type coupling, a threaded rod or alike element (not illustrated in the drawings), and a second element, such as in the example a metal profile 4, also known as C profile or U profile.

[0036] Therefore, on-site the connection article 1 is interposed between the hanger and the metal profile 4.

[0037] The connection article 1 includes a sheet metal body 3 extending, at least partially, along a longitudinal direction or longitudinal axis, identified in the figures by a dashed line denoted by reference letter K, and on-site coincident with a vertical axis.

[0038] The connection article 1, when installed on-site, is arranged with an orientation like that visible in Figure 1, i.e. the spring coupler 2 faces upwards for connection to the hanger.

[0039] As previously anticipated, any spatial reference in the present description and in the following claims, such as, e.g., "above", "top", "below", "bottom", "horizontal", "vertical", is to be understood as merely by way of example, with reference to the above-mentioned orientation.

[0040] A plane substantially containing the above-mentioned longitudinal axis K and dividing the connection article 1 into two lateral zones, or right and left sides, is referred to hereinafter in the description by the expression "median plane". With respect to such median plane, in the present description, "sides", "side edges", or "lateral zones" of the sheet metal body 3 are singled out, i.e. zones or regions of the sheet metal body 3 lying on opposite sides with respect to the median plane.

[0041] The sheet metal body 3 includes a main part extending longitudinally between a first end portion 30 and a second end portion 32. A plane portion, or plane shank, 31 is interposed between the first end portion 30 and the second end portion 32.

[0042] Moreover, in the exemplary embodiment, to the connection article 1 a coupler is associated, for coupling to the hanger; in example it is the above-mentioned spring coupler 2 associated to the first end portion 30.

[0043] The connection article 1 further includes a sheet metal portion 322 connected to the main part of the sheet metal body 3 and arranged facing the end portion 32.

[0044] In practice, the sheet metal portion 322 and the end portion 32 are two sheet metal walls or parts facing, and in the example substantially parallel to, each other.

[0045] Even more specifically, in the illustrated embodiment and according to an aspect of the present disclosure, the sheet metal portion 322 is connected as one piece to the main part of the sheet metal body 3 by means of a bottom wall 321. More specifically, in the exemplary embodiment visible in Figure 2, in the region of the sec-

ond end portion 32, the sheet metal body 3 is bent into a U shape, like a hook or a clevis, and includes a first bend P1, separating the end portion 32 from the bottom wall 321, and a second bend P2, separating the bottom wall 321 from the sheet metal portion 322.

[0046] The end portion 32, the first bend P1, the bottom wall 321, the second bend P2 and the sheet metal portion 322 define an internal zone I of the connection article 1.

[0047] According to an aspect of the present disclosure, the connection article 1 comprises four notches 35, 36, 37, 38. A first notch 35 and a second notch 36 are associated to the second end portion 32 of the sheet metal body 3, i.e. are recesses or housings obtained on respective side edges 135, 136 of the end portion 32 and are intended to receive, as it will be detailed hereinafter, respective edges 42 of lateral sides 45 of the metal profile 4; a third notch 38 and a fourth notch 37 are associated to the sheet metal portion 322, that is, are recesses or housings obtained on respective side edges 137, 138 of the sheet metal portion 322 and are intended to receive, as it will be detailed hereinafter, respective edges 42 of lateral sides 45 of the metal profile 4.

[0048] More specifically, the fourth notch 37 is aligned to and facing the first notch 35, and the third notch 38 is aligned to and facing the second notch 36.

[0049] The four notches 35, 36, 37, 38 are therefore located each in the region of a respective angle zone or vertex zone of an ideal quadrilateral, in the example a rectangle. It can be understood that a horizontal ideal plane, schematically depicted by a dashed line and denoted by reference letter P in Figure 1, crosses the four notches 35, 36, 37, 38.

[0050] The alignment is further indicated in Figure 3A by dashed lines B1 crossing the notches 35 and 37, and the notches 36 and 38.

[0051] According to an aspect of the present disclosure, the connection article 1 comprises retaining means 352, 35a, 382, 38a, 362, 372, each of which is associated to a respective notch 35, 36, 37, 38 of said four notches. The retaining means 352, 35a, 382, 38a, 362, 372 are arranged so as to exert a retaining action alternately from above and from below with respect to the ideal plane P crossing said notches 35, 36, 37, 38.

[0052] From another point of view, and with different words, following the perimeter of said quadrilateral, first retaining means 352, 35a lie in a top zone of the respective first notch 35, therefore exert a retaining action from above the ideal plane P, second retaining means 362 lie in a bottom zone of the respective second notch 36, therefore exert a retaining action from below the ideal plane P, third retaining means 382, 38a lie in a top zone of the respective third notch 38, therefore exert a retaining action from above the ideal plane P, and fourth retaining means 371 lie in a bottom zone of the respective fourth notch 37, therefore exert a retaining action from below the ideal plane P.

[0053] Therefore, it can be understood that, with reference to a same side of the connection article 1, right

or left side in the figures, the connection article 1 comprises retaining means acting from above (first retaining means 352, 35a or third retaining means 382, 38a), and retaining means acting from below (second retaining means 362 or fourth retaining means 371).

[0054] In the embodiment illustrated, with regard to the above-mentioned retaining means, it is further observed that said retaining means are at least partly defined by the shape or form (configuration) of the four notches 35, 36, 37, 38, which, in fact, have an alternately different form.

[0055] In particular, in the example illustrated, the first notch 35 includes a recess 35a, e.g. saddle-shaped, said recess 35a being part of said first retaining means, and being arranged, e.g., above the above-mentioned plane, so as to act from above an edge 42 of the metal profile 4 which is received into the recess 35a. The second notch 36 has the shape of an oblique louver, defining an oblique portion 362 of the sheet metal body underlying the respective notch 36, said oblique portion 362 being part of said second retaining means.

[0056] The third notch 38 includes a recess 38a, e.g. saddle-shaped, said recess being part of said third retaining means, and being arranged, e.g., above the above-mentioned plane, so as to act from above an edge 42 of the metal profile 4 which is received into the recess 38a. The fourth notch 37 has the shape of an oblique louver, defining an oblique portion 372 of the sheet metal body underlying the respective notch 37, said oblique portion 372 being part of said fourth retaining means.

[0057] Each oblique louver or slit 36, 37 extends from the side edge 136, 137 respectively of the end portion 32 and of the sheet metal portion 322.

[0058] In other words, the first retaining means and the third retaining means include the above-mentioned recesses 35a, 38a, defined in the respective notches 35, 38 of the end portion 32 and of the sheet metal portion 322 which delimit from the top the notch 35 and 38, respectively.

[0059] In practice, the first notch 35 receives the edge 42 of the metal profile 4 into the respective saddle or recess 35a, the oblique portion 362 underlying the second notch 36 pushes from below the edge 42 of the metal profile 4, the third notch 38 receives into the saddle or recess 38a the edge 42 of the metal profile 4, the oblique portion 372 underlying the fourth notch 37 in the bottom zone pushes from below the edge 42 of the metal profile 4.

[0060] In practice, the second retaining means 362 and the fourth retaining means 372 are bottom shaped portions, substantially oblique, respectively of the end portion 32 and of the sheet metal portion 322 which delimit bottomwise the notch 36 and 37, respectively. The top portions of the respective notches 36, 37 are denoted by reference numbers 361 and 371.

[0061] Both such bottom and top portions 361 362; 371, 372 define tilted planes.

[0062] Therefore, a trapping of the metal profile 4

among four alternate coupling points is obtained.

[0063] In the exemplary embodiment, the first retaining means and the third retaining means further include V- or U-shaped fins, with a concavity facing upwards from the opposite side with respect to the respective notch 35, 38. Such fins project orthogonally with respect to an external face 320, 323 of the end portion 32 and of the sheet metal portion 322, respectively, and lie each adjacent to the respective recess 35a, 38a, in a zone proximal to the recess 35a, 38a, i.e. on the side of insertion into the notch 35, 38.

[0064] Even more specifically, the fins are edges or cutouts of sheet metal piece-formed with the end portion 32 and the sheet metal portion 322, and which are bent with respect to the second end portion 32 and the sheet metal portion 322 by respective bends.

[0065] The connection article 1 further comprises a projection 351 and a projection 381.

[0066] The projection 351 projects flush with the respective side edge 135 of the second end portion 32, from the external face 320. In the exemplary embodiment, the projection 351 is located orthogonal to the face 320. It can be observed that the projection 351 and the fin 352 therefore face towards the same external side of the second end portion 32.

[0067] More specifically, the projection 351 and the fin 352 are in a spaced relationship to each other and on opposite sides with respect to the notch 35, and between them an opening or aperture is provided, for receiving the edge 42 of the metal profile 4.

[0068] Moreover, it is observed that the projection 351 is oriented parallel with respect to the median plane, and is therefore vertical.

[0069] The projection 381 and the fin 382 are arranged between each other with the same mutual arrangement described above, existing between the projection 351 and the fin 352.

[0070] As it will be better explained hereinafter, the projections 351 and 381 are so-called "end-of-rotation" elements.

[0071] According to another aspect of the present disclosure, the connection article 1 comprises further load-bearing reinforcements 61, 62 associated to the notches 36, 37.

[0072] The load-bearing reinforcements 61, 62 are arranged level or flush with the side edge of the end portion 32 and with the sheet metal portion 322 below the respective notch 36, 37.

[0073] Moreover, the load-bearing reinforcements 61, 62 are arranged inside the connection article 1, i.e. in the internal zone I defined by the bends P1, P2.

[0074] Referring to Figures 1-3, it is further observed that the bottom wall 321 includes two tabs 33 or edges, piece-formed from the bottom wall 321 itself by bending said sheet metal edges or portions downward. As it will be better explained hereinafter, such tabs 33 act as reference locators for the height of the connection article at the time of insertion into the metal profile 4, and at rotation

start.

[0075] The connection article 1 further comprises a reinforcing rib 60, extending along the sheet metal body 3 from the first end portion 30 and along the central shank 31 towards the second end portion 32.

[0076] The reinforcing rib 60 has the shape of an upturned Y and divides into two branches 60a, 60b along the second portion 32, the bottom wall 321 and the sheet metal portion 322.

[0077] From the opposite side with respect to the second end portion 32, the connection article 1 comprises the above-mentioned spring coupler 2, which is formed by a foil 21 bent to define a plurality of sections 22, 23, 24, including a central section 24, two end sections 23 and two oblique sections 22. Each oblique section 22 is interposed between an end section 23 and the central section 24. Such foil 21 has a substantially C-like shape. Holes 25, coaxial to each other and having a vertical axis, are obtained on the oblique sections 22 of the foil 21. The holes 25 are sized to receive the above-mentioned hanger, or a supporting steel bar.

[0078] The spring coupler 2 is connected to the sheet metal main body 3, in the example permanently, e.g. by bending of fixing edges 301 of the first end portion 30 on the central section 24 of the spring coupler 2. In particular, the fixing is made, e.g., through a locking half-shearing and allows a permanent coupling between the spring coupler 2 and the sheet metal main body 3.

[0079] Note that such a method of fixing the spring coupler 2 in the top part of the connection article 1 according to the present disclosure, though being an aspect of particular relevance for an effective operation of the article, will not be further described in greater detail, it being a method essentially already known to a technician in the field.

[0080] Referring to Figure 4 and to Figure 5, hereinafter it is described the metal profile 4, extending along a respective longitudinal axis Z. In particular, the metal profile 4 has an upturned C-like shape, or a U-like shape, from which the above-mentioned "C profile" or "U profile" name derives, with a bottom wall 43 and two lateral sides 45 or lateral shoulders, i.e. a first lateral side and a second lateral side, opposed to the first one. In the exemplary embodiment, the metal profile has the cavity 50 of the "C" or "U" facing upwards.

[0081] The bottom wall 43 connects to the lateral sides 45 by means of angles 47.

[0082] Each lateral side 45 ends with an edge 42, which, in the example, is oblique (also called "oblique fin") or rounded. In particular, the edge 42 is obtained by bending the lateral side 45 onto itself. More specifically, the bending faces towards the cavity 50 of the metal profile 4. It follows that, in the exemplary embodiment, the edges 42 define a projection oriented towards the cavity 50 of the metal profile 4.

[0083] The bottom wall 43 includes a central rib 44. Such central rib 44 extends along the longitudinal axis Z of the metal profile 4 and divides the bottom wall 43 into

two portions, at the sides of said central rib 44.

[0084] Referring to Figure 4, to Figure 5 and to Figure 7, hereinafter it is described a step of connecting and fixing between the connection article 1 and the metal profile 4.

[0085] In particular, referring to Figure 4, the connection article 1 is inserted inside the metal profile 4. In particular, to allow insertion, the sheet metal body 3 is arranged angularly oriented, or rotated, about the longitudinal axis K. In particular, at the time of the insertion, the above-mentioned median plane defines an angle, e.g. an angle of about 45° with the longitudinal axis Z of the metal profile 4. The connection article is inserted until resting the tabs 33 on the bottom wall 43 as starting reference.

[0086] From this position, a rotation is then performed until the second notch 36 and the fourth notch 37 receive the edges 42 of the two lateral sides 45, so that the oblique portion 362 and the oblique portion 372 interfere and push from below the respective edges 42 of the two lateral sides 45 of the metal profile 4.

[0087] Thanks to the oblique profile of the oblique portion 362 and of the oblique portion 372, by continuing the rotation, the connection article 1 rises in position, until rotation is completed, and the edges 42 of the two lateral sides 45 of the metal profile 4 are received into the first notch 35 and into the third notch 38, passing over the respective fins 352, 382 and being received into the recesses 35a, 38a (which in particular lie above the edges 42).

[0088] It has to be noted that the radiate shape of the fin 352 and of the fin 382 acts as a pilot section for the edge 42 during the motion of rotation, in order to drive the edge 42 into the recesses 35a, 38a.

[0089] The end of the rotation is guaranteed by the presence of the above-mentioned projections 351, 381, which act as stopping element against the respective lateral sides 45 of the metal profile.

[0090] The above-described coupling mode causes each lateral side 45 of the metal profile 4 to be contained from above, e.g. by the recess 35a which is part of the first retaining means and lies behind in the longitudinal direction Z, and from below, e.g. by the oblique portion 372, which is part of the fourth retaining means and lies ahead in the longitudinal direction Z. Likewise, the other lateral side 45 of the metal profile 4 is contained from below, e.g. by the oblique portion 362 which lies behind in the longitudinal direction Z and is part of the second retaining means, and from above by the recess 38a, which is part of the third retaining means and lies ahead in the longitudinal direction Z.

[0091] This coupling allows to obtain a slight bending in the longitudinal sense and diagonally (therefore a slight torsion) of the metal profile 4; hence, a spring effect or an elastic return effect of the metal profile 4 in the two coupling zones, in a coupling condition can be obtained.

[0092] Accordingly, on the basis of the above-described geometry of the parts, rotation occurs to an in-

interference fit between the notches 35, 36, 37, 38 and the edges 42, preventing a return and constituting an end-of-rotation locking. A coupled configuration is shown in Figure 5.

[0093] It is pointed out that, in the exemplary embodiment, when each notch 35, 36, 37, 38 is coupled to the respective edge 42, a peculiar sound ("click") is heard, which can confirm that the rotation of the connection article 1 into the metal profile 4 has been completed, and the coupling has been successfully concluded. To an operator, such a sound can also be the indicator of a correct and safe coupling.

[0094] The connection article for a false ceiling according to the present disclosure, described hereto by way of example, can contribute to prevent a rotation, and therefore an undesired release of the article, thanks to the presence of retaining means to form four coupling points.

[0095] Such a configuration of the article for a false ceiling can enable to avoid that knocks or vibrations or plays due to the weight of the false ceiling cause an undesired rotation of the article for a false ceiling, with the entailed accidental release of the metal profile.

[0096] The article for a false ceiling according to the present disclosure can obviate to another problem based on the grades and the construction tolerances of article for a false ceiling and metal profile.

[0097] In fact, support structures for false ceilings are formed by sheet metal elements, or lattens which are light carpentry elements; there is the risk that such components, though being manufactured in a workmanlike manner, could exhibit edges or notches with tolerances or punctual defects linked to the production process or to the transport. This condition might entail each coupling having slightly different plays or interferences, and therefore plays being created between article for a false ceiling and metal profile, or wrong assembling, with consequent noises and vibrations and therefore lack of comfort.

[0098] Moreover, though remaining coupled in a stable and vibration-free manner, a displacement of the connection article is allowed along the length of the metal profile, by application of a light pressure on the connection article 1 by an operator.

[0099] The subject-matter of the present disclosure has hereto been described with reference to preferred embodiments thereof. Is to be understood that there may be other embodiments referable to the same inventive concept, all falling within the protective scope of the claims set forth hereinafter.

Claims

1. A connection article (1) for a support structure of a false ceiling, said article comprising a sheet metal body (3) including at least four notches (35, 36, 37, 38) obtained on side edges (135, 136, 137, 138) of said sheet metal body (3), said four notches (35, 36,

37, 38) being located in the region of angle zones of a quadrilateral, said connection article (1) comprising retaining means (352, 35a, 362, 372, 382, 38a), each of said retaining means (352, 35a, 362, 372, 382, 38a) being associated to a respective notch of said four notches (35, 36, 37, 38), and wherein, following a perimeter of said quadrilateral, first retaining means (352) lies in a top zone of a respective first notch (35), second retaining means (362) lies in a bottom zone of a respective second notch (36), third retaining means (382) lies in a top zone of a respective third notch (38) and fourth retaining means (372) lies in a bottom zone of a respective fourth notch (37).

2. The connection article (1) according to claim 1, wherein said retaining means (352, 35a, 362, 372, 382, 38a) are at least partly defined by a configuration or shape of the respective four notches (35, 36, 37, 38).

3. The connection article (1) according to claim 1 or 2, wherein the second notch (36) and the fourth notch (37) have the shape of an oblique louver or slit, and said second retaining means (362) and fourth retaining means (372) are defined by a lower oblique portion of the sheet metal body (3) underlying respectively said second notch (36) and the fourth notch (37).

4. The connection article (1) according to any one of the preceding claims, wherein said first retaining means (352, 35a) and third retaining means (382, 38a) include a saddle or recess (35a, 38a).

5. The connection article (1) according to claim 4, wherein said first retaining means (352, 35a) and third retaining means (382, 38a) include each a fin (352, 382), said fin (352, 382) being placed adjacent to the respective recess (35a, 38a) on the side of insertion of the respective notch (35, 38).

6. The connection article (1) according to claim 5, wherein said fin (352, 382) has a V- or U-like shape or a radiate shape with a curvature facing towards the respective notch.

7. The connection article (1) according to any one of the preceding claims, wherein the sheet metal body (3) includes a main part (31) extending between a first end portion (30) and a second end portion (32) and wherein the sheet metal body (3) includes a sheet metal portion (322) connected to the second end portion (32) of said sheet metal body (3) by means of a bottom wall (321) and arranged facing said second end portion (32), said sheet metal main body (3) including a first bend (P1) separating the second end portion (32) from the bottom wall (321), and a second bend (P2) separating the bottom wall

- (321) from the sheet metal portion (322), and wherein said second end portion (32) comprises said first notch (35) and said second notch (36), and said sheet metal portion (322) comprises said third notch (38) and said fourth notch (37). 5
8. The connection article (1) according to claim 7, wherein said first notch (35) is facing and aligned to the fourth notch (37) and said second notch (36) is facing and aligned to the third notch (38). 10
9. The connection article (1) according to claim 7 or 8, wherein each of said first notch (35) and second notch (36) are recesses obtained from respective side edges (135, 136) of the second end portion (32), and wherein each of said third notch (38) and fourth notch (37) are recesses obtained from respective side edges (137, 138) of the sheet metal portion (322). 15
10. The connection article (1) according to claim 7, 8 or 9, comprising at least one locator tab (33) associated to said bottom wall (321) and projecting with respect to said bottom wall (321). 20
11. The connection article (1) according to any one of the preceding claims, including at least one end-of-rotation projection (351, 381) associated to the one and/or the other one of said first notch (35) and third notch (38). 25
12. The connection article (1) according to claim 11 in combination with claim 5 or 6, wherein each end-of-rotation projection (351, 381) is arranged on the opposite side of the respective notch (35, 38) with respect to the fin (352, 382) of the respective first notch (35) or third notch (38). 30
13. The connection article (1) according to any one of the preceding claims, wherein said retaining means (352, 362, 372, 382) are adapted to exert a retaining action alternately the one from above and the other one from below a horizontal plane (P) crossing said notches (35, 36, 37, 38). 35
14. A structure for supporting a false ceiling (10) including a combination of a connection article (1) as defined in any one of the preceding claims 1 to 13, and a metal profile (4), wherein the metal profile (4) is a body extending along a longitudinal axis (Z) and including a bottom wall (43) and a first lateral side (45) and a second lateral side (45), wherein said bottom wall (43), first lateral side, and second lateral side (45) define a cavity (50), and wherein said notches (35, 36, 37, 38) of the connection article (1) receive respective edges (42) of the first lateral side (45) and of the second lateral side (45), and wherein the first retaining means (352, 35a) passes over the edge (42) of the first lateral side (45), the second retaining means (362) is in pressing contact from below the edge (42) of the second lateral side (45), the third retaining means (382, 38a) passes over, from above, the edge (42) of the second lateral side (45) and the fourth retaining means (372) is in pressing contact from below the edge (42) of the first lateral side (45). 40
15. The structure for supporting a false ceiling (10) according to claim 14, wherein, with respect to said longitudinal direction (Z), the first retaining element (352) lies facing the fourth retaining element (372) and the second retaining element (362) lies facing the third retaining element (382). 45
16. A method of fixing a connection article (1) as defined in any one of the preceding claims 1 to 13, and a metal profile (4), wherein the metal profile (4) includes a bottom wall (43) and lateral sides (45), wherein said bottom wall (43) and lateral sides (45) define a cavity (50), said method comprising the steps of: 50
- inserting the second end portion (32) of the sheet metal main body (3) into the cavity (50) of the metal profile (4) along a longitudinal direction (K);
 - rotating the sheet metal main body (3) about a longitudinal axis (K) until the respective edges (42) of the two lateral sides (45) of the metal profile (4) are received into the respective second notch (36) and fourth notch (37) and interact with said second retaining means (362) and fourth retaining means (372);
 - completing a rotation of the connection article (1) when the edges (42) of the two lateral sides (45) of the metal profile (4) are received into the first notch (35) and into the third notch (38), and are passed over by said first retaining means (352, 35a) and third retaining means (382, 38a). 55
17. The method according to claim 16, wherein the second notch (36) and the fourth notch (37) have the shape of an oblique louver forming a tilted plane, whereby, when the edges (42) of the two lateral sides (45) of the metal profile (4) are received into the respective second notch (36) and fourth notch (37), by continuing the rotation, the connection article (1) rises. 55
18. The method of fixing according to claim 16 or 17, wherein the connection article (1) includes tabs (33), wherein the sheet metal body (3) is inserted into the cavity (50) until the tabs (33) abut onto the bottom wall (43) of the metal profile (4) in an initial step of inserting into the cavity (50) of the metal profile.

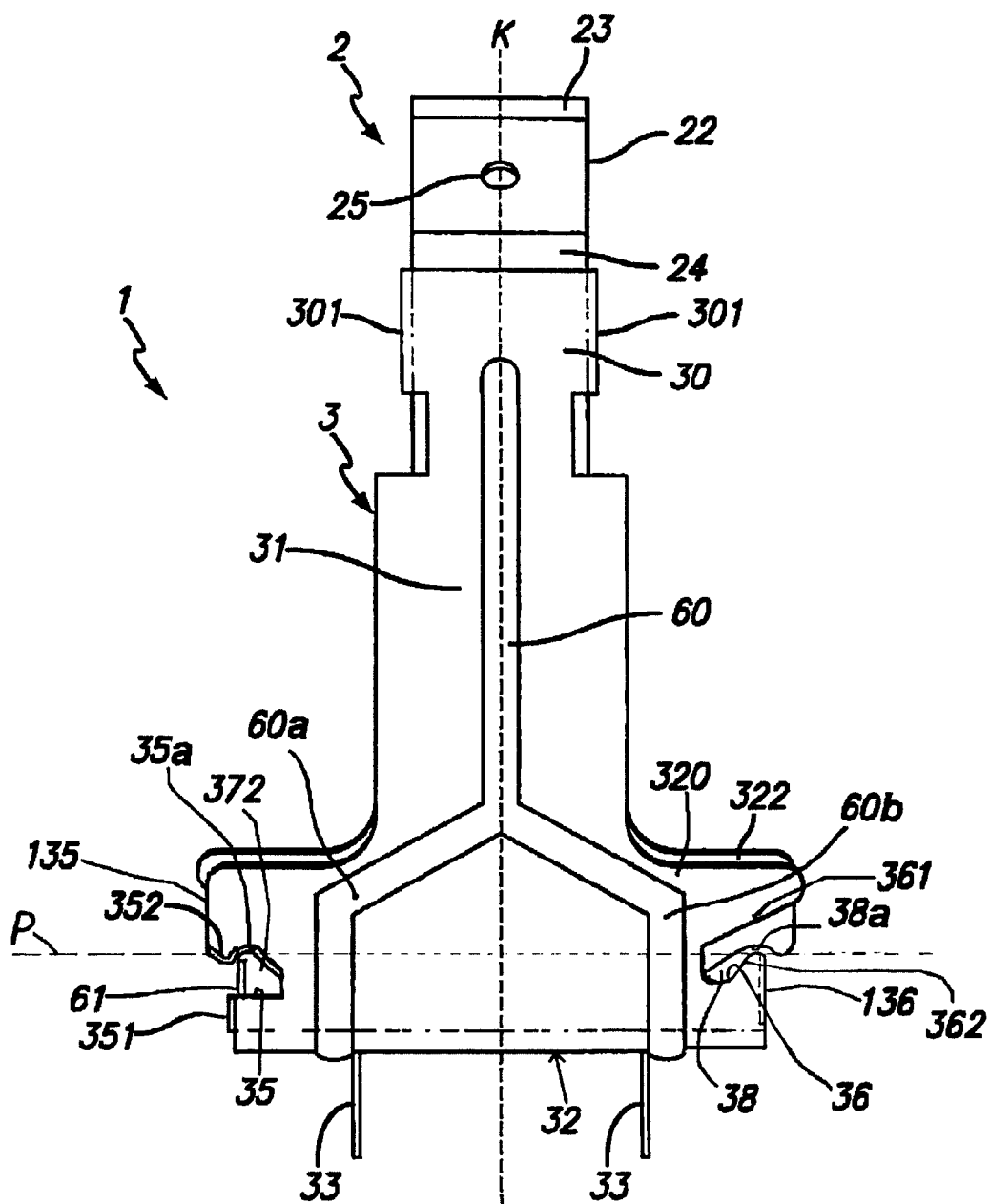


FIG. 1

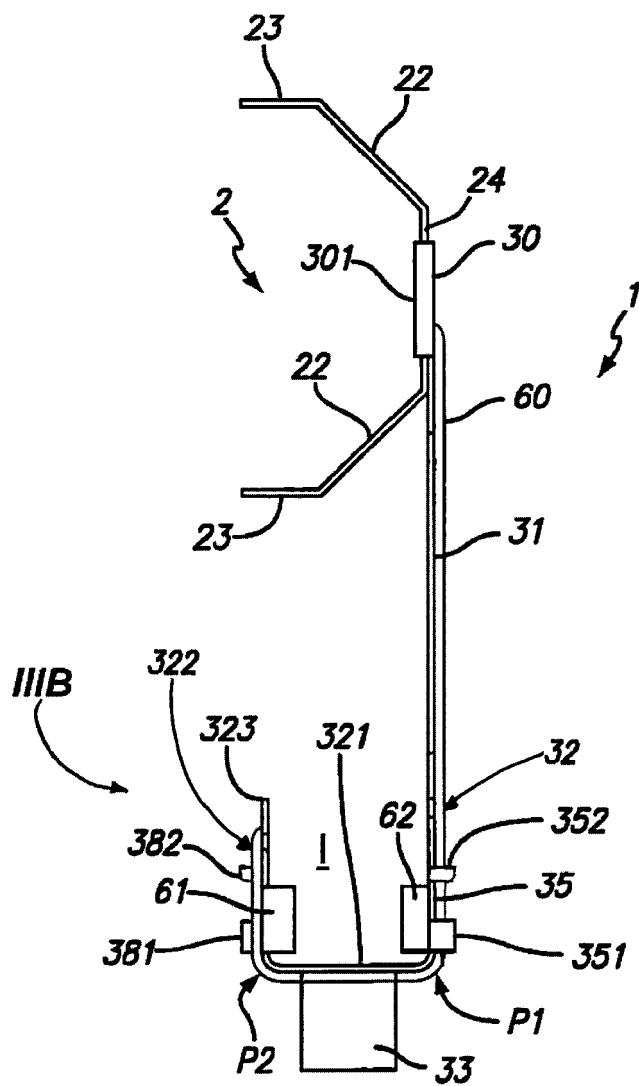


FIG. 2

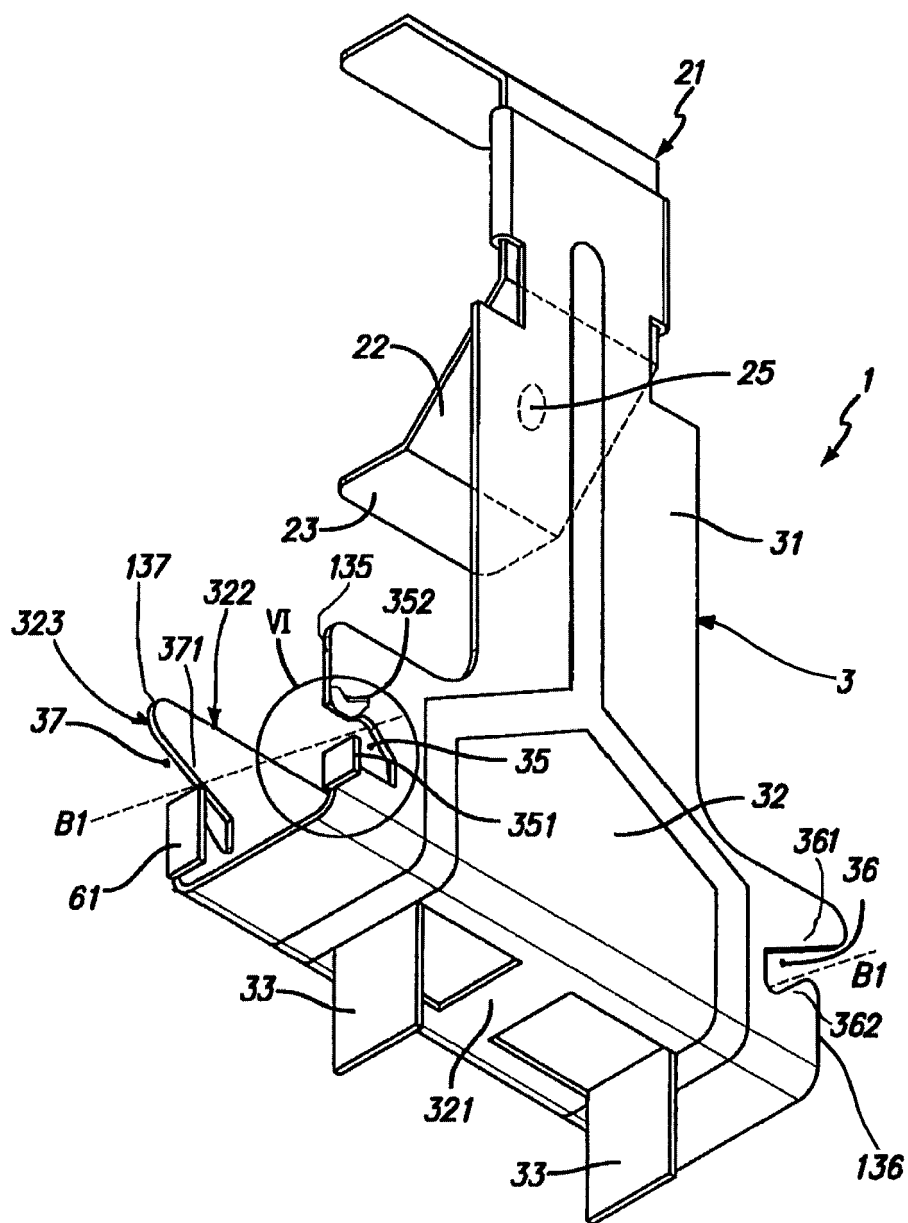


FIG. 3A

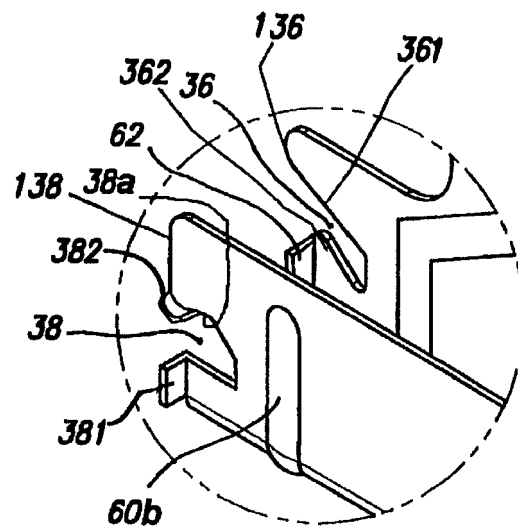


FIG. 3B

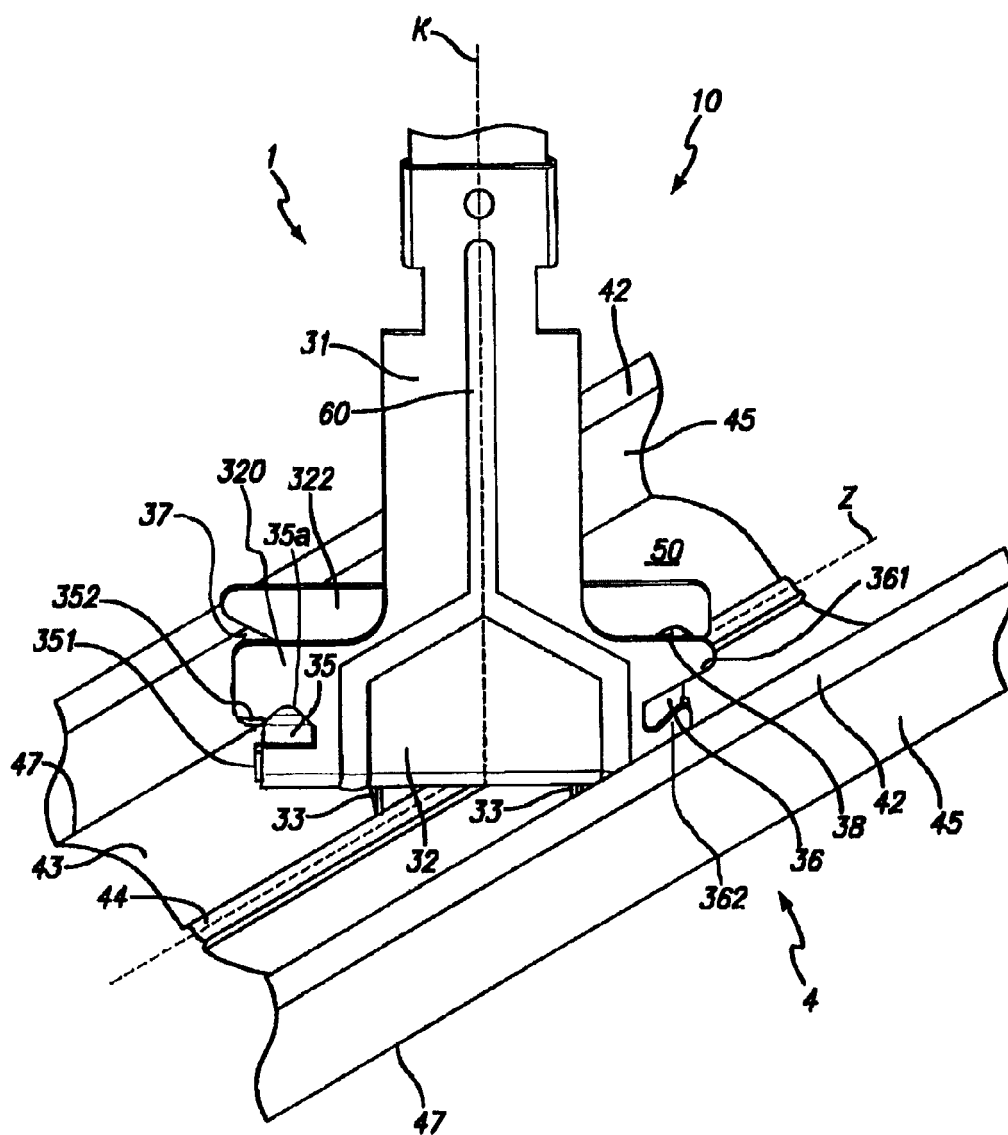


FIG. 4

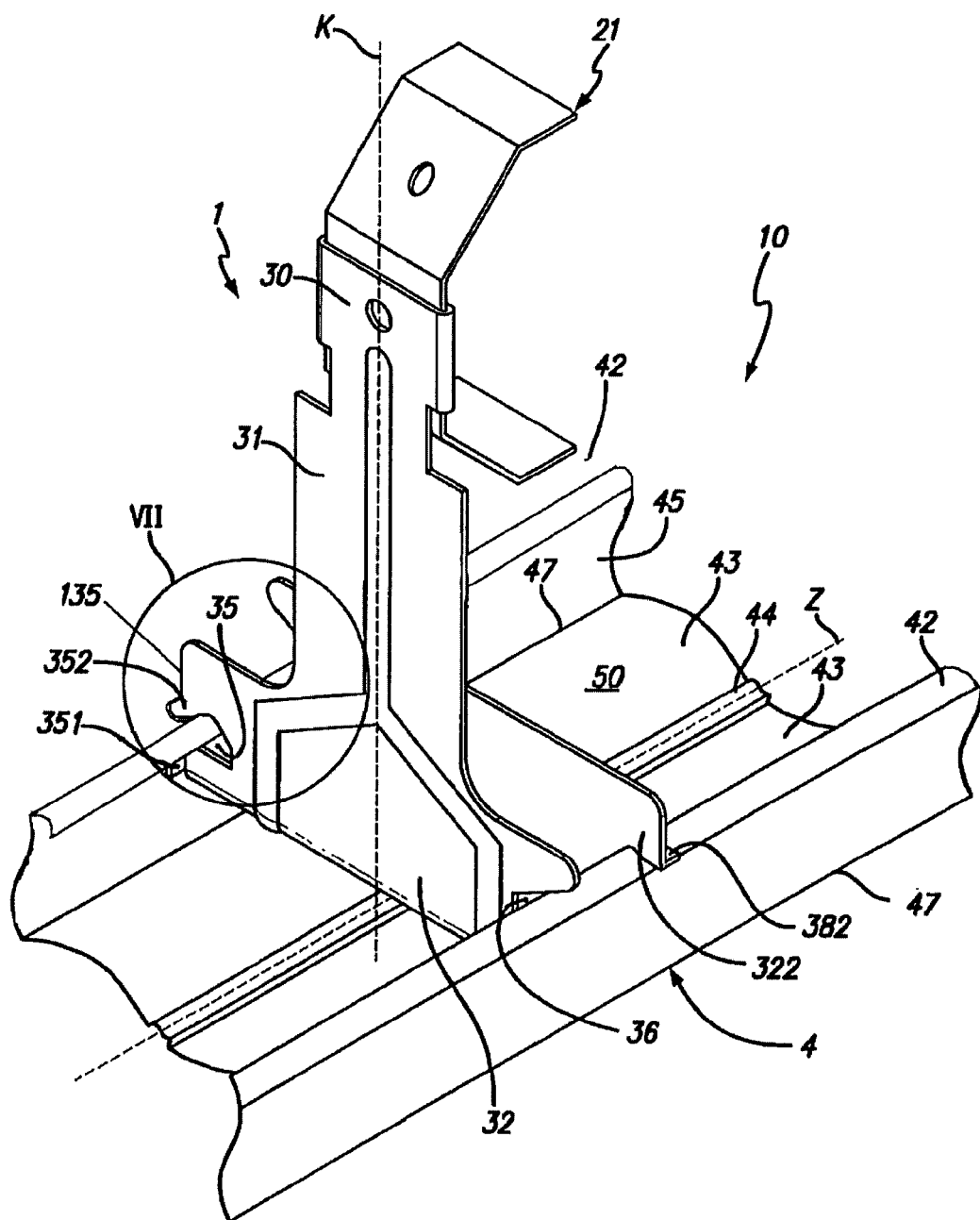


FIG. 5

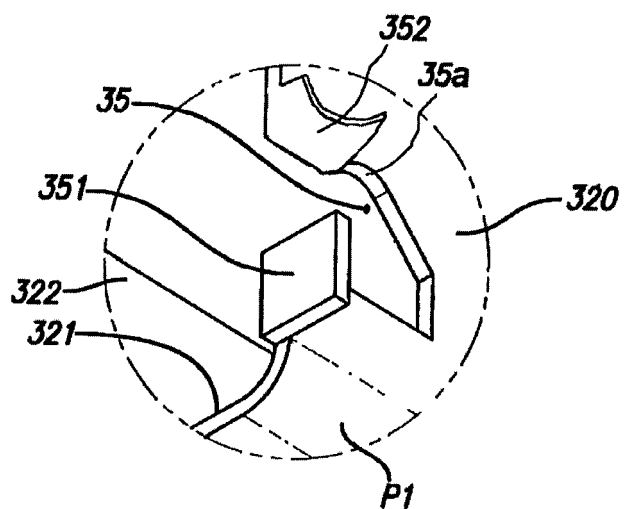


FIG. 6

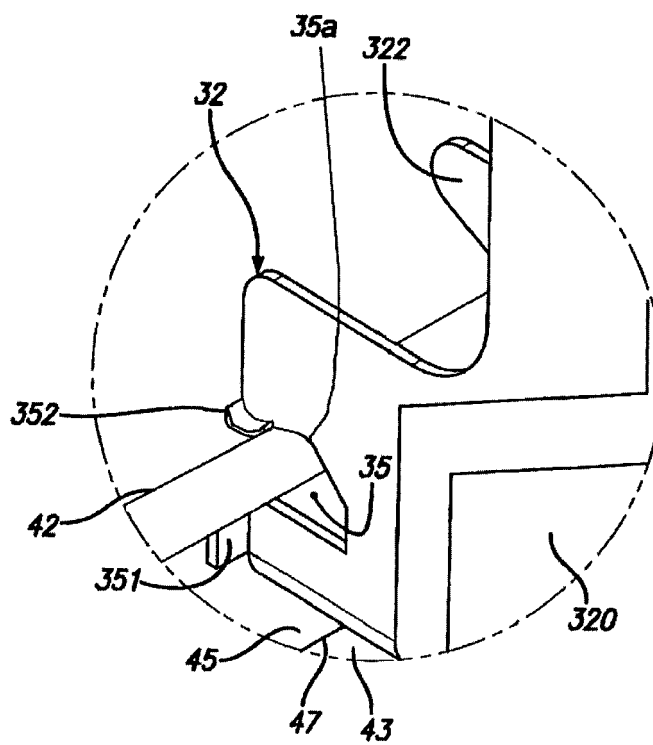


FIG. 7



EUROPEAN SEARCH REPORT

Application Number
EP 11 18 0526

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 295 00 930 U1 (VOGL ERICH R [DE]) 2 March 1995 (1995-03-02) * the whole document *	1-18	INV. E04B9/18
A	DE 296 17 249 U1 (RICHTER SYSTEM GMBH & CO KG [DE]) 6 February 1997 (1997-02-06) * page 4, line 17 - page 6, line 24; figures 1-4 *	1-3,10, 14-18	
A	BE 900 449 A2 (CHICAGO METALLIC CONTINENT NV) 17 December 1984 (1984-12-17) * figure 4 *	4,5	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 July 2012	Examiner Khera, Daljit
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 18 0526

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-07-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29500930	U1	02-03-1995	NONE
DE 29617249	U1	06-02-1997	NONE
BE 900449	A2	17-12-1984	NONE