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(54) Title: NUT ARRANGEMENT

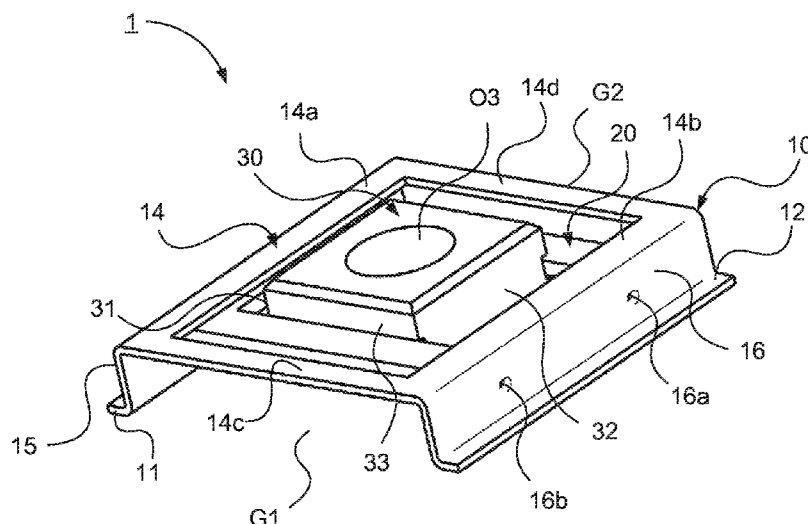


Fig. 1a

(57) Abstract: The present invention relates to a nut arrangement (1) that comprises a nut element (30) and a nut cage (10) in which the nut element (30) is arranged to be held. The nut element (30) is intended to be permitted to move in the nut cage (10) transverse to its axial direction. The nut cage (10) is arranged to be attached at a base and to offer access to a threaded opening (03) at the nut element (30). The nut element (30) is arranged to be mounted in and supported in a manner that allows it to be displaced by a slide element (20) that can be displaced in the nut cage (10) transverse to the axial direction of the nut element (30). The slide element (20) can be displaced in a first direction in the nut cage (10) and the nut element (30) can be displaced in the slide element (20) in a second direction that is perpendicular to the first direction.



NUT ARRANGEMENT

TECHNICAL AREA

The invention relates to a nut arrangement according to the introduction to
5 claim 1.

BACKGROUND

What are known as "weld nuts" are used in certain applications when
assembling by means of nuts and bolts, in situations in which it is difficult to
10 physically hold the nut in place. In this case, the weld nut is welded fixed to
the base. The weld nut is placed concentrically with a hole at the base, where
the position of the hole controls the placement of the weld nut.

One problem with such a weld nut is that it is not able to absorb tolerances
during assembly, since it is welded in place. Since the weld nut is fixed in
15 place by welding, the position of the nut cannot be adjusted during the
assembly of fittings.

WO2007101428, US20100034612, US20040081530 and US20040033121
reveal nut arrangements that consist of a nut cage or nut holder that is fixed
welded to the material and a nut that is held in the nut cage in a floating
20 manner. The level of tolerance during assembly is improved by such
solutions. Such solutions, however, entail relatively complicated
constructions and are relatively complicated to assemble.

PURPOSE OF THE INVENTION

One purpose of the present invention is to achieve a nut arrangement that makes it possible to improve the tolerance during assembly, that is simple to manufacture and simple to use during assembly.

5 SUMMARY OF THE INVENTION

These and other purposes, which are made clear by the description below, are achieved by means of a nut arrangement of the type described in the introduction, and that furthermore demonstrates the distinctive features specified in the characterising part of the attached independent patent claim.

10 Preferred embodiments of the nut arrangement are defined in the attached non-independent claims.

According to the invention, the purposes are achieved with a nut arrangement that comprises a nut element and a nut cage in which the nut element is arranged to be held, whereby the nut element is intended to be
15 permitted to move transverse to its axial direction in the nut cage, where the nut cage is arranged to be fixed attached at a base and to offer access to a threaded opening at the nut element, whereby the nut element is arranged to be mounted in and supported in a manner that allows it to be displaced by a slide element that can be displaced transverse to the axial direction of the nut
20 element.

In this way, a nut arrangement is achieved that makes possible an improved tolerance during assembly, that is simple to manufacture and simple to use during assembly. By using in this manner a slide element in a displaceable manner, the nut element can be essentially fully locked with respect to
25 rotation while at the same time it can permit a tolerance, which facilitates assembly. The slide element and the nut element can be easily mounted after the nut cage has been welded at the base, whereby any relevant surface treatment of the base can take place before the slide element and

the nut element are applied, such that the surface treatment does not influence the adjustment function.

According to one embodiment of the nut arrangement, the slide element can be displaced in a first direction in the nut cage and the nut element can be
5 displaced in the slide element in a second direction that differs from the first direction. The tolerance is in this way further improved, where the nut element is allowed in a controlled manner to be adjusted in all directions transverse to its axial extend by displacing the nut element by the desired amount in at least one direction. Furthermore, the nut element is permitted to
10 be essentially fully locked with respect to rotation.

According to one embodiment of the nut arrangement, the first direction and the second direction are essentially perpendicular. In this way, a simple design of the nut arrangement is facilitated.

According to one embodiment of the nut arrangement, the slide element is
15 supported by means of and between opposite wall elements of the nut cage. In this way, a simple design and simple mounting of the slide element are made possible.

According to one embodiment of the nut arrangement, the relevant wall elements comprise internal protuberances for the support of the slide
20 element. In this way, a simple design for the support of the slide element that does not require any further part for the support is obtained.

According to one embodiment of the nut arrangement, the wall elements together form opposite gable openings. In this way, the introduction of the slide element through the gable openings is made possible for the simple
25 mounting of the slide element, which can thus take place after the nut cage has been welded onto the base.

According to one embodiment of the nut arrangement, the nut cage has an essentially U-shaped cross-section and comprises outwardly directed flange

parts intended for the attachment of the nut cage at the base. In this way, simple manufacture of the nut cage in one piece is made possible, where the cross-sectional profile can be achieved through folding or equivalent operations.

- 5 According to one embodiment of the nut arrangement, the nut cage is intended to be fixed at the base by means of welds. Welds are strong and robust joins and thus they ensure that the mounting is simple.

According to one embodiment of the nut arrangement, the nut cage comprises an opening intended to face away from the base, which opening
10 forms a frame at the nut cage. It is in this way made possible for the nut element to protrude through the opening and thus prevent the slide element from sliding out of the nut cage when in its mounted condition.

According to one embodiment of the nut arrangement, the nut element and slide element are arranged to be joined through the nut element being
15 pressed into an opening at the slide element, and whereby a certain amount of flexibility is present at at least one of the nut element and the slide element. Simple mounting of the slide element, which can be mounted after the nut cage has been attached at the base and the slide element has been introduced into the nut cage, is in this way made possible.

- 20 According to one embodiment of the nut arrangement, the nut element is supported by the slide element intended to retain the slide element in the nut cage. No further fittings are required in this way to retain the slide element in the nut cage, which consequently leads to a simple design.

25 DESCRIPTION OF DRAWINGS

The present invention will be better understood with reference to the following detailed description read together with the attached drawings,

where the same reference numbers refer to the same parts throughout the several views, and where:

Figure 1a illustrates schematically a perspective view of a nut arrangement according to one embodiment of the present invention;

- 5 Figure 1b illustrates schematically a plan view from below of the nut arrangement in Figure 1a;

Figure 2a illustrates schematically a first cross-sectional view of the nut arrangement in Figure 1a;

- 10 Figure 2b illustrates schematically a second cross-sectional view of the nut arrangement in Figure 1a; and

Figure 3 illustrates schematically a perspective view of the nut arrangement in Figure 1 attached at a base.

DESCRIPTION OF EMBODIMENTS

- 15 Figures 1a-b and Figures 2a-b illustrate schematically different views of a nut arrangement 1 according to the present invention, and Figure 3 illustrates a nut arrangement 1 attached at a base S.

- 20 The nut arrangement 1 comprises a nut cage 10. The nut cage 10 is intended to be attached at a base S, shown in Figure 3, that has an opening for a screw element.

- 25 The nut cage 10 has an essentially U-shaped cross-sectional profile and comprises outwardly directed first and second flange parts 11, 12 intended for the attachment of the nut cage 10 at the base S. The base S illustrated in Figure 3 has an attachment side Sa, against which the nut cage 1 is arranged to be attached, and an opposite side Sb.

The nut cage 10 comprises an essentially rectangular opening O1 intended to face away from the base S, which opening O1 forms a framework 14 at the nut cage 10. The framework 14 has an essentially rectangular form. The framework 14 forms a plane intended to be essentially parallel to the base S.

- 5 The framework 14 at the nut cage has a first framework part 14a and an opposite second framework part 14b that is essentially parallel to and separated by a distance from the first framework part 14a. The framework 14 has a third framework part 14c and an opposite fourth framework part 14d that is essentially parallel to and separated by a distance from the third
10 framework part 14c, uniting the first and second framework parts 14a, 14b in order to form the framework 14.

The nut cage 10 has a first wall element 15 and an opposite second wall element 16 that is parallel to and separated by a distance from the first wall element 15.

- 15 The first wall element 15 is arranged to run essentially perpendicular to and along the first framework part 14a. The first wall element 15 constitutes a perpendicularly protruding transition from the first framework part 14a.

- The second wall element 16 is arranged in an equivalent manner to run essentially perpendicular to and along the second framework part 14b. The
20 second wall element 16 constitutes a perpendicularly protruding transition from the second framework part 14b.

- The first flange part 11 at the nut cage 10 is arranged to run essentially perpendicular to and along the first wall element 15. The first flange part 11 constitutes a perpendicularly protruding transition from the first wall element
25 15.

The second flange part 12 at the nut cage 10 is arranged in an equivalent manner to run essentially perpendicular to and along the second wall

element 16. The second flange part 12 constitutes a perpendicularly protruding transition from the second wall element 16.

Each flange part 11, 12 has an attachment side intended to be attached at the base, as is made clear by Figure 3. The nut cage 10 is intended to be
5 attached at the base by means of welds.

The nut cage 10 is formed in one piece where the wall elements 15, 16 and the flange parts 11, 12 with a cross-section through the longitudinal extent of the third or fourth framework part form the U-shaped cross-sectional profile with outwardly directed first and second flange parts 11, 12.

10 The wall elements 15, 16 form between them opposite gable openings G1, G2.

Each wall element 15, 16 has internal protuberances 15a, 15b, 16a, 16b. In this case, the first wall element 15 has two internal protuberances 15a, 15b that are separated by a distance from each other and are arranged at
15 essentially the same level at the first wall element 15. In a corresponding manner, the second wall element 16 has two internal protuberances 16a, 16b that are separated by a distance from each other and at essentially the same level at the second wall element 16, and arranged at essentially the same level as the internal protuberances 15a, 15b at the first wall element 15.

20 The nut cage 10 can in this case be manufactured simply in one piece through punching out a rectangular aperture in a rectangular piece of metal and forming to a U-profile with the protruding flange parts 11, 12 by, for example, bending.

The nut arrangement further comprises a slide element 20 intended to be
25 arranged in the nut cage 10 such that it can be displaced.

The slide element 20 has an essentially rectangular form. The slide element 20 is designed as a framework with an essentially rectangular opening O2.

The slide element 20 has a first framework part 21 and an opposite second framework part 22 that is essentially parallel to and separated by a distance from the first framework part 21. The slide element 20 has a third framework part 23 and an opposite fourth framework part 24 that is essentially parallel to and separated by a distance from the third framework part 23, uniting the first and second framework parts 21, 22 in order to form the framework that constitutes the slide element 20.

The external distance between the first and second framework parts 21, 22 at the slide element 20 corresponds essentially to the internal distance between first and second wall elements 15, 16 at the nut cage 10.

The external distance D1 between the third and fourth framework parts 23, 24 at the slide element 20 is shorter than the internal distance D2 between the third and fourth framework parts 14c, 14d at the nut cage 10.

The nut arrangement 1 comprises a nut element 30. The nut element 30 has a penetrating threaded opening O3 in order to receive a screw element. The threaded opening O3 has a direction X of axial extension that constitutes the axial direction X of the nut element 30.

The nut element 30 has an entry side 35 from which the screw element is intended to be inserted, and an opposite outlet side 36.

The nut element 30 has an essentially rectangular cross-section. The nut element 30 has, according to this variant, an essentially square cross-section.

The nut element 30 is essentially formed as a regular block and is limited by a first side 31, an opposite second side 32, and a third side 33 and an opposite fourth 34 side that are perpendicular to the first and second sides 31, 32, and to the entry side 35 and the outlet side 36.

The third side 33 and the opposite fourth side 34 at the nut element 30 have an indentation 33a, 34a that runs transverse to the axial direction of the nut

element 30. The indentations form central parts 33a, 34a at the nut element 30.

The external distance between the third side 33 and the opposite fourth side 34 at the nut element 30 is somewhat larger than the internal distance
5 between the third and fourth framework parts 23, 24 at the slide element 20.

The distance between the indentations 33a, 34a at the third and opposite fourth sides 33, 34 at the nut element 30 is somewhat smaller than the internal distance between the third and fourth framework parts 23, 24 at the slide element.

10 The internal protuberances 15a, 15b, 16a, 16b at the first and second wall elements 15, 16 are arranged such that they can support the slide element 20 in a manner that allows it to be displaced. The slide element 20 is arranged to be inserted through one of the gable openings G1, G2 during mounting of the nut arrangement 1 such that the slide element 20 rests on
15 the protuberances 15a, 15b, 16a, 16b in a manner that allows it to be displaced.

In this case the first framework part 21 at the slide element 20 is arranged to be supported by the protuberances 15a, 15b at the first wall element, and the second framework part 22 at the slide element 20 is arranged to be
20 supported by the protuberances 16a, 16b at the second wall element 20, such that the slide element can be displaced in the nut cage in the direction A1 of the arrow between the third and fourth framework parts 14c and 14d at the nut cage.

The nut element 30 is arranged to be mounted in and supported in a manner
25 that allows it to be displaced by means of the slide element 20 that is arranged such that it can be displaced in the nut cage 10. The nut element 30 is in this case arranged such that it can be displaced in the slide element 20 in a direction that is transverse to the axial direction X of the nut element 30.

The slide element 20 is in this case arranged such that it can be displaced in the nut cage 10 in a direction that is transverse to the axial direction X of the nut element 30. The slide element 20 can be displaced in a first direction A1 in the nut cage 10, illustrated by the arrow A1, and the nut element 30 can be
5 displaced in the slide element 20 in a second direction A2 that is perpendicular to the first direction A1, where the second direction A2 is illustrated by the arrow A2.

In this case the nut element 30 is arranged to be supported in a manner that allows it to be displaced by the third and fourth framework parts 23, 24 at the
10 slide element 20 in the central parts 33a, 34a at the nut element 30. The nut element 30 can be displaced in the slide element 20 in the direction A2 of the arrow between the first and second framework parts 21, 22 at the slide element 20.

The nut element 30 and the slide element 20 are arranged to be joined
15 through the nut element 30 being pressed into the opening O2 at the slide element 20. The slide element 20 in this case has a certain flexibility, according to one variant. The third and fourth framework parts 23, 24 at the slide element 20 are, according to one variant, so dimensioned that they spring out from each other when the nut element 30 is pressed into the
20 opening O2 such that the nut element 30 is permitted to be pressed down to such a level that the third and fourth framework parts 23, 24 at the slide element come to be located in the central parts 33a, 34a at the nut element 30 in order to support the same in a manner that allows it to be displaced.

The nut element 30 supported by means of the slide element 20 is intended
25 to retain the slide element 20 in the nut cage 10. The nut element 30 is in this case arranged to protrude through the opening O2 at the slide element 20 and thus to prevent the slide element 20 from sliding out of the nut cage 10 during displacement of the slide element 20 in the direction A1 of the arrow.

The nut cage 10 at the nut arrangement 1 mounted in this manner is arranged to offer access to the threaded opening O3 at the nut element 30. The nut cage 10 is arranged to be fixed over an opening at the base S over which the nut element 30 can be displaced through displacement of the slide element 20 in the first direction A1 and of the nut element 30 itself in the second direction A2. A screw element can thus be simply inserted through the opening and adapted for introduction into the threaded opening O3 at the nut element 30 for appropriate connection.

The nut cage 10 is, according to one variant, arranged to be attached at the base S by welds.

Protuberances at the opposite wall elements 15, 16 at the nut cage for the support of the slide element 20 in a manner that allows it to be displaced have been described above. The slide element 20 may be supported in association with the wall elements 15, 16 by any appropriate method.

According to one alternative variant, the relevant wall element has a groove that runs in the longitudinal extent of the wall element, in which groove the slide element is arranged to be supported such that it can be displaced; alternatively the wall element has a corresponding protrusion in order to support the slide element in a manner that allows it to be displaced. The slide element may be supported in a manner that allows it to be displaced also by means of a separate means that are arranged to protrude internally from the relevant wall element, such as two or more screws, pegs or similar, arranged at the same level and separated by a certain distance.

The description above of the preferred embodiments of the present invention has been given for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the variants that have been described. Many modifications and variations will be obvious for one skilled in the arts. The embodiments have been selected and described in order to best describe the principles of the invention and its practical

applications, and thus to make it possible for one skilled in the arts to understand the invention for various embodiments and with the various modifications that are appropriate for the intended use.

CLAIMS

1. A nut arrangement (1) that comprises a nut element (30) and a nut cage (10) in which the nut element (30) is arranged to be held, whereby the nut element (30) is intended to be permitted to move transverse to its axial
5 direction in the nut cage (10), where the nut cage (10) is arranged to be fixed attached at a base (S) and to offer access to a threaded opening (O3) at the nut element (30), **characterised in** that the nut element (30) is arranged to be mounted in and supported in a manner that allows it to be displaced by a slide element (20) that can be displaced transverse to the axial direction of
10 the nut element (10).
2. The nut arrangement according to claim 1, whereby the slide element (20) can be displaced in a first direction (A1) in the nut cage (10) and whereby the nut element (30) can be displaced in the slide element (20) in a second direction (A2) that differs from the first direction.
- 15 3. The nut arrangement according to claim 2, whereby the first direction (A1) and the second direction (A2) are essentially perpendicular.
4. The nut arrangement according to any one of claims 1-3, whereby the slide element (20) is supported by means of and between opposite wall element (15, 16) at the nut cage (10).
- 20 5. The nut arrangement according to claim 4, whereby the relevant wall element (15, 16) comprises internal protuberances (15a, 15b, 16a, 16b) for the support of the slide element (20).
6. The nut arrangement according to claim 4 or 5, whereby the wall elements (15, 16) form between them opposite gable openings (G1, G2).
- 25 7. The nut arrangement according to any one of claims 1-6, whereby the nut cage (10) has an essentially U-shaped cross-section and comprises outwardly directed flange parts (11, 12) intended for the attachment of the nut cage at the base (S).

8. The nut arrangement according to any one of claims 1-7, whereby the nut cage (10) is intended to be attached at the base by means of welds.
9. The nut arrangement according to any one of claims 1-8, whereby the nut cage (10) comprises an opening (O1) intended to face away from the base
5 (S), which opening forms a frame (14) at the nut cage (10).
10. The nut arrangement according to any one of claims 1-8, whereby the nut element (30) and the slide element (20) are arranged to be joined through the nut element (30) being pressed into an opening (O2) at the slide element (20), and whereby a certain amount of flexibility is present at at least one of
10 the nut element (30) and the slide element (20).
11. The nut arrangement according to any one of claims 1-9, whereby the nut element (30) supported by means of the slide element (20) is intended to retain the slide element (20) in the nut cage (10).

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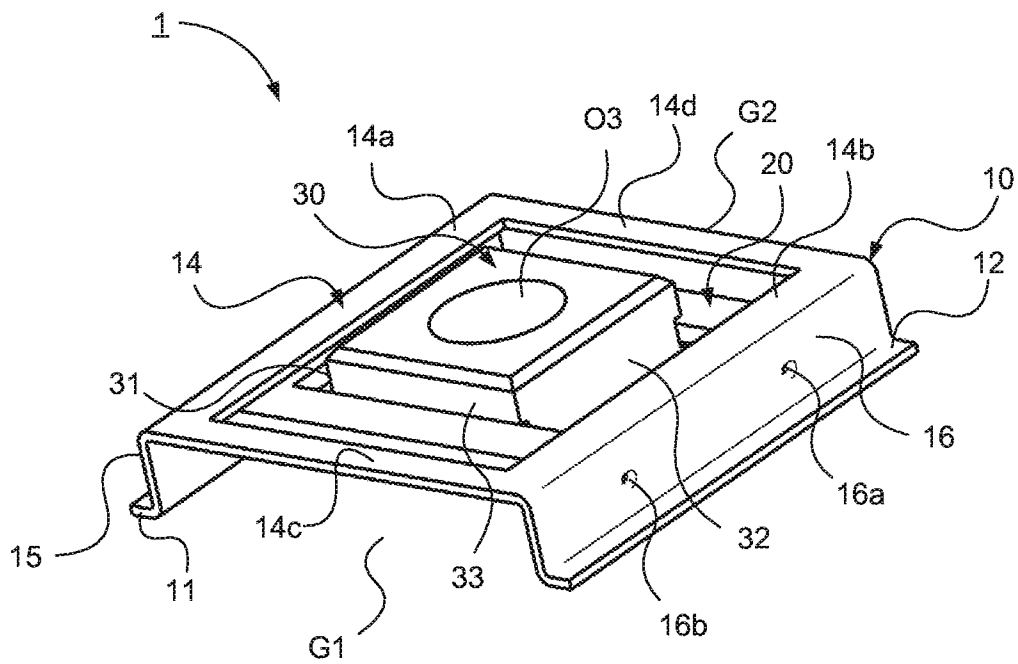


Fig. 1a

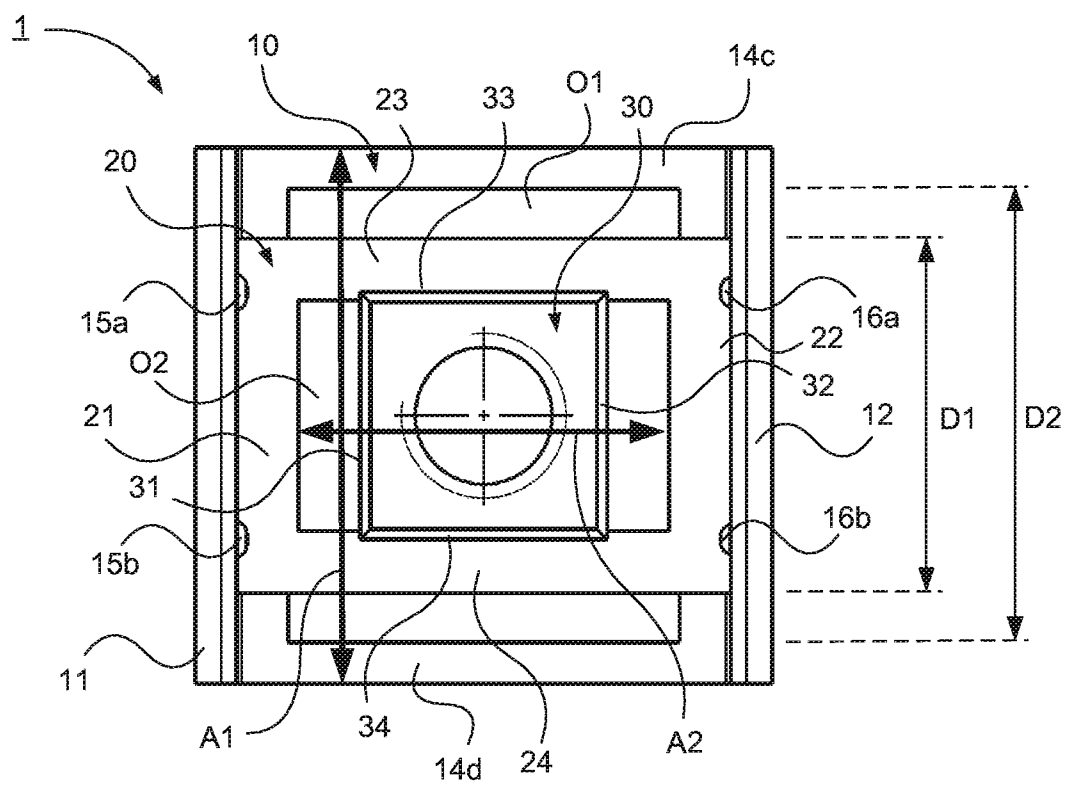


Fig. 1b

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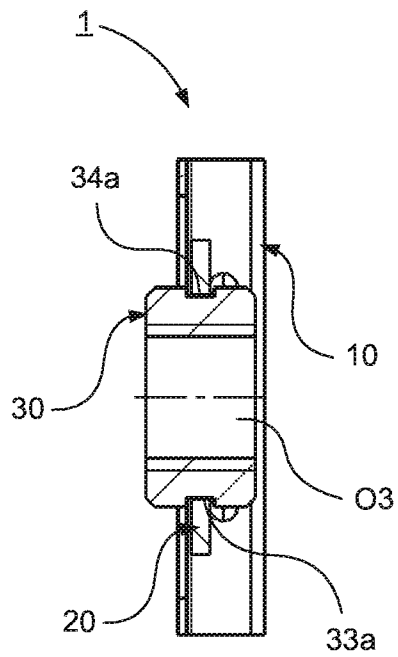


Fig. 2a

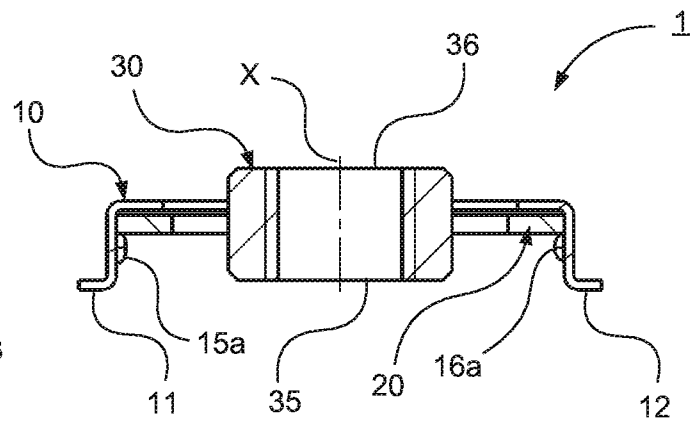


Fig. 2b

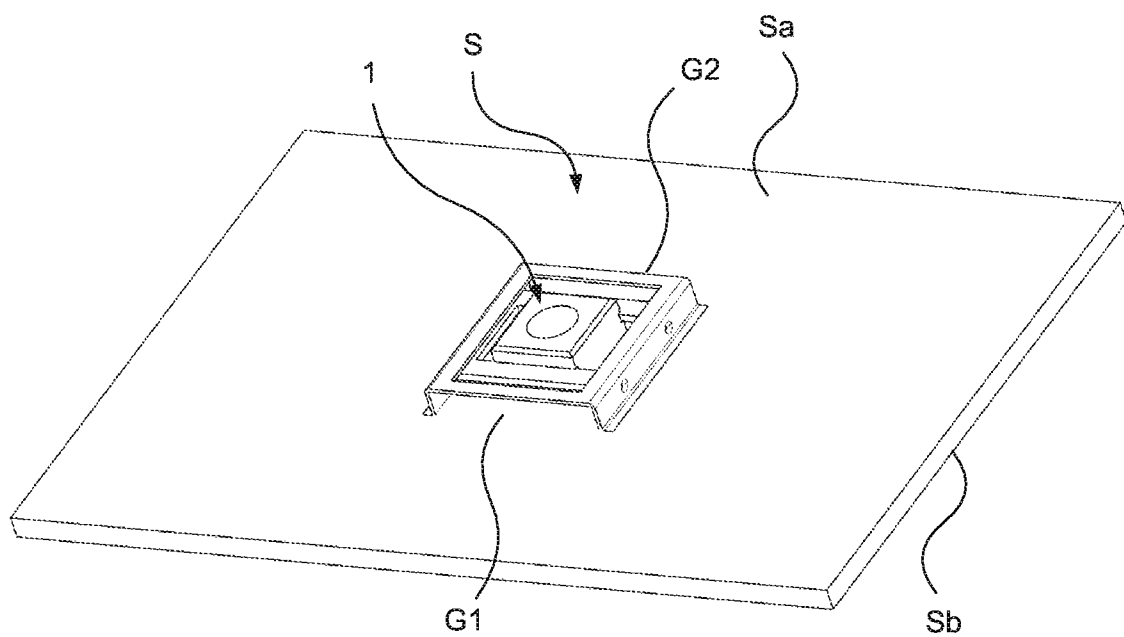


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2014/050649

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: F16B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 20090129885 A1 (CSIK TERRENCE ET AL), 21 May 2009 (2009-05-21); abstract; paragraphs [0004], [0006], [0062], [0063], [0074], [0077]-[0081], [0089]-[0091]; figures 1-12, 21a-d,28; claim 42 --	1-11
X	US 20050121574 A1 (WINKER ALEXANDER), 9 June 2005 (2005-06-09); abstract; paragraphs [0001]-[0005], [0010], [0027]-[0034]; figures 1,6 --	1-9
A	FR 2554522 A1 (RENAULT), 10 May 1985 (1985-05-10); abstract; figures 1-4 --	1-11



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

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“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

02-09-2014

Date of mailing of the international search report

03-09-2014

Name and mailing address of the ISA/SE

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2014/050649

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2702808 A1 (COMET), 23 September 1994 (1994-09-23); abstract; figures 1-6 --	1-11
A	US 7309200 B2 (SCHMIEDER HANSJOERG ET AL), 19 January 2006 (2006-01-19); abstract; figures 1-4 -- -----	1-11

Continuation of: second sheet

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F16B 37/04 (2006.01)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SE2014/050649

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