



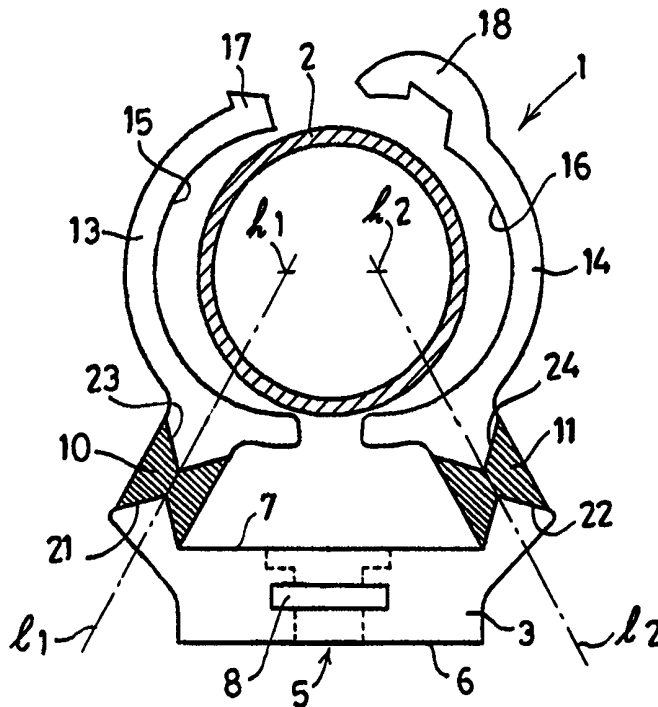
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<p>(21) International Application Number: PCT/NL98/00446</p> <p>(22) International Filing Date: 3 August 1998 (03.08.98)</p> <p>(30) Priority Data: 1006722 5 August 1997 (05.08.97) NL 1006723 5 August 1997 (05.08.97) NL</p> <p>(71) Applicant (for all designated States except US): J. VAN WALRAVEN B.V. [NL/NL]; Industrieweg 5, NL-3641 RK Mijdrecht (NL).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): VAN WALRAVEN, Jan [NL/NL]; Prins Bernhardlaan 6, NL-3641 GP Mijdrecht (NL).</p> <p>(74) Agent: BROOKHUIS, H., J., A.; Van Exter Polak & Charlouis B.V., P.O. Box 3241, NL-2280 GE Rijswijk (NL).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report. In English translation (filed in Dutch).</p>

(54) Title: PIPE CLIP

(57) Abstract

Pipe clip (1) for attaching a pipe (2) or the like to a support, comprising a base part (3) which is provided with attachment means for attaching the pipe clip (1) to the support, which base part bears two pivot joints (10, 11) which are situated at a distance from one another and have pivot axes which are substantially parallel to one another, each of the pivot joints (10, 11) pivotably connecting the base part (3) to a clip segment (13, 14) of the pipe clip (1), each clip segment (13, 14) having a bearing surface (15, 16), which is substantially semicircular and is directed away from the other clip segment, for the pipe (2) or the like, and the clip segments (13, 14) being pivotable away from one another and towards one another, for the purpose of placing the pipe (2) between them, and one of the clip segments (13) being provided, at its end which is remote from the base part (3), with an outwardly directed hook member (17) and the other clip segment (14) being provided, at its end which is remote from the base part (3), with an inwardly directed hook member (18), which hook members (17, 18) are able to engage inside one another for the purpose of hooking the relevant ends of the clip segments (13, 14) together, so that the pipe (2) surrounded by the clip segments (13, 14) is locked in position. The pivot joints (10, 11) are made from a different material from the clip segments (13, 14) and the base part (3).



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Pipe clip.

The present invention relates to a pipe clip according to the preamble of claim 1. Typically, for a pipe clip of this kind, the clip segments enclose the pipe and are hooked together by means of the hook members when a
5 pipe is placed between the clip segments and the pipe is pressed towards the base part of the pipe clip.

A pipe clip in accordance with the preamble of claim 1 is described in NL-B-174 294. This known pipe clip is a mass-produced product and is produced in particular as
10 a unitary object by means of injection-moulding of a single grade of plastic material, in an injection mould of suitable shape. The base part and the clip segments of a pipe clip of this nature have to be resistant to mechanical loads, so that they are usually made from a rigid plastic.
15 Owing to the single-component design of the known pipe clip, its pivot joints are made from the same material as the base part and the clip segments. In order to obtain the desired flexibility of the pivot joints, these pivot joints are designed as thin members and are approximately in the
20 form of a film hinge.

CH 643 338, which was published later, describes a similar pipe clip in which the pivot joints are also designed as film hinges. In the pipe clip in accordance with CH 643 338, however, those parts of the base part
25 which adjoin the film hinges are designed to be thin and easily bendable, so that a single size of pipe clip is suitable for various diameters of pipe.

In the publication EP 0 352 438, which appeared at a much later date, the pivot joints of the pipe clip which
30 this document describes are designed as thin, elongate members which project upwards from the base part and bend when the pipe is pushed into the pipe clip.

The object of the present invention is to propose measures which provide an improved pipe clip. In parti-
35 cular, the object of the present invention is to design the pivot joints of the pipe clip in such a manner that they are less fragile than in the case of the abovementioned

known pipe clips. A further object of the present invention is to design the pivot joints in such a way that the transmission of vibrations from the pipe which is held in the pipe clip to the support is limited.

5 The present invention provides a pipe clip according to the preamble of claim 1 which is characterized in that the pivot joints are made from a different material from the clip segments and the base part.

 In a preferred embodiment, which is advantageous
10 for mass production, the clip segments and the foot part are made from a first type of plastic and the pivot joints, made of a different plastic, are injection-moulded on the clip segments. This can be done using a generally known multi-component injection-moulding technique. It is also
15 possible, by way of example, firstly to produce the pivot joints and then to place these components in the injection mould for the pipe clip, after which the plastic material for the remaining parts of the pipe clip are injection-moulded, which plastic material adheres to the pivot
20 joints.

 The present invention will be explained in more detail below with reference to the drawing of a preferred embodiment of the pipe clip according to the invention. In the drawing:

25 Fig. 1 shows a side view of a pipe clip according to the invention in the open position, and

 Fig. 2 shows a side view of the pipe clip shown in Fig. 1 in the closed position,

 Fig. 3 shows a side view of a second preferred
30 embodiment of the pipe clip according to the invention, in the open position, and

 Fig. 4 shows a side view of the pipe clip shown in Fig. 3 in the closed position.

 The single-component pipe clip 1 illustrated, which
35 is produced by two-component injection-moulding, is used to attach a cylindrical pipe 2 or the like to a support, for example a wall or a support structure.

 The pipe clip 1 comprises a base part 3 which is

designed to attach the pipe clip 1 to the support. In the design illustrated, the base part 3 is provided with a recess 5 which extends between the underside 6 and the top side 7 of the base part 3, and a transverse slot 8, which extends transversely to the recess 5. The transverse slot 8 is designed to accommodate a plate-like metal nut (not shown), the threaded hole of which lies in line with the recess 5. A bolt which is arranged on the wall or support structure and can be screwed into the plate-like nut, can be inserted through the recess 5.

The base part 3 bears, on its top side, two pivot joints 10, 11 which are situated at a distance from one another and have pivot axes which are substantially parallel to one another and in this case lie perpendicular to the plane of the drawing. Each of the pivot joints 10, 11, which are to be explained in more detail below, pivotably connects the base part 3 to a clip segment, 13, 14 respectively, of the pipe clip 1. In this case, the pivot joints 10, 11 are solid bodies, each with two outer surfaces which run parallel to one another and parallel to the relevant pivot axis.

Each clip segment 13, 14 has a bearing surface 15, 16, respectively, for the pipe 2, which bearing surfaces are substantially semicircular and are directed away from the other clip segment.

Clip segments 13, 14 are attached to the base parts 3, via the pivot joints 10, 11, in such a manner that the clip segments 13, 14 enclose the pipe 2 when the pipe 2 is pressed between the clip segments 13, 14 towards the base part 3.

It can be seen in the drawing that the clip segment 13 is provided, at its end which is remote from the base part 3, with an outwardly directed hook member 17 and that the other clip segment 14 is provided, at its end which is remote from the base part 3, with an inwardly directed hook member 18. When the pipe 2 is pushed into the pipe clip 1, the two hook members 17, 18 hook into one another.

The pivot joints 10, 11 are made from a different material, in this case a different injection-mouldable

plastic, from the clip segments 13, 14 and the base part 3 of the pipe clip 1. Making use of generally known multi-component injection-moulding techniques, in which two or more different plastic grades are injection-moulded in the same mould, makes this possible. It is also possible firstly to produce the pivot joints 10, 11 separately and then to place these components in an injection mould, after which the remaining parts of the pipe clip 1 are moulded onto the pivot joints 10, 11. Obviously, it is also possible to produce the base part 3 and the clip segments 13, 14 first of all and then to place these parts in a suitable mould, after which the pivot joints are moulded on. Thus it is also possible to produce the base part 3 or the clip segments 13, 14 from a metal, for example aluminium.

It is advantageous to use for the pivot joints 10, 11 a plastic which has favourable properties in the area of elasticity and restorative ability.

The pivot joints 10, 11 are preferably made from rubber or an elastomeric plastic.

Preferably, the pivot joints 10, 11 are made from a material which has a lower modulus of elasticity than the base part 3 and the clip segments 13, 14. This is because the base part 3 is used to attach the pipe clip 1 to the support and is therefore preferably made from a rigid material, for example a rigid plastic or possibly a metal, such as aluminium. Owing to the greater elasticity, it is possible to design the pivot joints 10, 11 as thicker members than in the known pipe clip, with the result that they become less fragile.

Furthermore, it is preferable for the pivot joints 10, 11 to be made from a material with a higher deformation at break, in percentage terms, than the base part 3 and the clip segments 13, 14. A higher deformation at break prevents the pivot joint 10, 11 from fracturing when the clip segments 13, 14 are pivoted further than usual.

Preferably, the pivot joints 10, 11 have a lower hardness than the base part 3 and the clip segments 13, 14. It has been found that a lower hardness of the material

results in a lower transmission of vibrations.

Advantageously, the pivot joints 10, 11 have a hardness which lies between 30 and 80 Shore A.

5 The damping of vibrations achieved by the material of the pivot joints 10, 11 can be optimized by making the pivot joints 10, 11 from a material which has a higher damping action (tg delta) than the base part 3 and the clip segments 13, 14.

10 Examples of materials which are suitable for the pivot joints are injection-mouldable plastic materials, such as EPDM or a mix of EPDM and PP. The base part and the clip segments may, for example, be injection-moulded from polypropylene or polyamide.

15 It can be seen from the drawing that at each of the pivot joints 10, 11, as seen in a plane perpendicular to the pivot axis of the relevant pivot joint, i.e. in the plane of the drawing, the base part 3 has an arched, in particular V-shaped, attachment surface 21, 22 which points towards the relevant clip segments 13, 14, for the material of the pivot joint 10, 11. Furthermore, each of the clip segments 13, 14 has an arched, in particular V-shaped, attachment surface 23, 24, which points towards the base part, for the material of the pivot joint 10, 11.

20 The shape of the attachment surfaces 21, 22, 23, 24 means that in each pivot joint there is a location with a minimum distance between the base part 3 and the relevant clip segment 13, 14. When a clip segment pivots about its associated pivot axis, the bending will concentrate in particular in that region of the pivot joint where the distance between the base part 3 and the clip segment is shortest. The shape of the attachment surfaces therefore aims in particular to determine the position of the pivot axis which is realized by a pivot joint. A further aim of the arched shape is to increase the attachment surface area. In order to achieve these aims, the arch shape of the attachment surfaces 21, 22, 23, 24 could also be semicircular, or something similar, instead of V-shaped.

35 In the undeformed state of the material of the pivot joints 10, 11, which state is shown in Figure 1, the

line "l1, l2" through the vertices of the V-shaped attachment surfaces of a pivot joint 10, 11 associated with a clip segment 13, 14 virtually intersects the axis h1, h2 of the bearing surface 15, 16 of the said clip segment 13, 14.

In the closed position of the pipe clip 1, which is shown in Figure 2, the pivot joints 10, 11 are deformed. In this position, the lines "l1" and "l2" point towards the centre of the circle which is formed by the clip segments 13, 14. The pivot joints 10, 11 are preferably disposed in such a way that lines "l1" and "l2", in the closed position of the pipe clip 1, between them include an angle which lies between 70° and 130°.

Figures 3 and 4 show pipe clip 30 which is largely similar to the pipe clip 1 which has been described with reference to Figures 1 and 2. Therefore, in the following description and in Figures 3 and 4, identical components are denoted by the same reference numerals and for a detailed description of these components reference is made to the above text.

The difference between the pipe clip 30 and the pipe clip 1 relates to the design of the two hook members. The outwardly directed hook member is denoted by the reference numeral 31, and the inwardly directed hook member is denoted by the reference numeral 32. Each of the hook members 31, 32 has an associated hook surface 31a and 32a, respectively, by means of which the hook members 31, 32 are able to hook fixedly together, so that a pipe which is surrounded by clip segments 13, 14 is locked in position. It can be seen in Figure 4 that the two clip segments 31, 32 are substantially prevented from moving apart by the fact that hook surface 31a bears against hook surface 32a.

It can be seen in Figure 4 that the line through the hook surfaces 31a, 32a which are bearing against one another is directed substantially radially with respect to the centre 20 of the circle which is delimited by the clip segments 13, 14. This position is advantageous for automatically hooking the two hook members 31, 32 together, in particular if the pipe is nondeformable. Furthermore,

the hook surfaces 31a and 32a are preferably disposed in such a way that, in the closed position of the pipe clip 30, the hook surfaces 31a and 32a are situated on the side of the clip segment 13 with respect to the perpendicular "l" which passes through the centre 20 and runs perpendicular to the line through the pivot axes 10, 11.

Each of the hook members 31, 32 furthermore has a stop surface 31b, 32b, respectively, which stop surfaces 31b, 32b, in the closed position of the pipe clip 30 shown in Figure 4, lie at a short distance from one another. In the undeformed state of the hook member 32, the smallest opening between the hook surface 32a and the edge of the stop surface 32b is substantially equal to the largest dimension, as seen in the same direction, of that section of the hook member 31 which comes to lie inside the hook member 32. As a result, the hook member 31 can pass into the hook member 32 without the hook member 32 having to be deformed.

If, with the pipe clip 30 in the closed position around a pipe with a soft covering, the clip segment 13 which is associated with the outwardly directed hook member 31 is pressed inwards, or if the other clip segment 14 is pressed inwards, the flat top side 35 of the hook member 31 slides along the flat boundary surface 36 of the inwardly directed hook member 32 until the stop surfaces 31b and 32b come to bear against one another. Owing to the fact that the stop surface 32b is directed in such a manner that it forms a stop for the other stop surface 31b in the direction parallel to the hook surfaces 31a, 32a, it is ensured that the reaction force on the outwardly directed hook member 31 has a component which is directed outwards and parallel to the hook surfaces 31a, 32a. This interplay of forces can be seen in Figure 4 by the fact that the perpendicular to the stop surface 32b includes an angle of less than 90° with a line, which extends towards the centre 20, through the associated hook surface 32a.

By comparison with the design of the hook members in the pipe clip which is known from NL-B-174 294, the stop surfaces therefore do not run parallel to the hook

surfaces, but rather are at an outwardly opening angle thereto. As a result of this measure, which is technically easy to implement, the reliability with which the hook members 31, 32 hook together is increased considerably and the pipe clip 30 can be used to hold sheathed pipes without there being any need to position a separate hard shell between the pipe and the pipe clip.

Figures 3 and 4 furthermore show that an outwardly directed locking projection 37 is arranged on boundary surface 35 and that an associated locking recess 38 is provided in boundary surface 36. The locking projection 37 and the locking recess 38 are, for example, respectively a rib lying in the circumferential direction of the pipe clip and a corresponding slot. The locking projection 37 and the locking recess 38 are designed in such a way that the two hooked-together hook members 31 and 32 cannot slide in the transverse direction with respect to one another, which transverse direction corresponds to the longitudinal direction of the pipe which is to be accommodated by the pipe clip. This locking reduces the risk of the two hook members unintentionally becoming detached from one another and therefore itself forms an improvement to the known pipe clip which is described in NL-B-174 294.

The figures 3 and 4 therefore disclose a pipe clip for attaching a pipe or similar object to a support, comprising a base part, which is designed for attaching the pipe clip to the support and which bears two pivot joints which are situated at a distance from one another and have pivot axes which are essentially parallel to one another, each of the pivot joints 10, 11 pivotably connecting the base part 3 to a clip segment 13, 14 of the pipe clip, each clip segment 13, 14 having a bearing surface 15, 16 which is substantially semicircular and is directed away from the other clip segment, for the pipe, and one of the clip segments 13 being provided, at its end which is remote from the base part, with a single outwardly directed hook member 31 and the other clip segment 14 being provided, at its end which is remote from the base part 3, with an inwardly directed hook member 32, each hook member having a hook

surface which is able to interact with the hook surface of the other hook member, which hook surfaces are arranged in such a way that they are able to hook fixedly together when a pipe is pressed towards the base part between the clip
5 segments, each of the hook members 31, 32 furthermore having a stop surface 31b, 32b which bears against the stop surface of the other hook member when the clip segment associated with the outwardly directed hook member is pressed inwards, characterized in that the stop surface 32b
10 associated with the inwardly directed hook member forms a stop, which extends in a direction transverse to the associated hook surface, for the other stop surface 31b when the stop surfaces bear against one another, so that, when the clip segment associated with the outwardly
15 directed hook member is pressed inwards, the reaction force on the outwardly directed hook member has a component which is directed outwards parallel to the hook surfaces.

Preferably the stop surfaces 31b, 32b lie at a distance from one another when the hook surfaces bear
20 against one another, which distance is such that the outwardly directed hook member 31 can be hooked into or disconnected from the inwardly directed hook member 32 substantially without deformation to the said inwardly directed hook member 32.

25 Preferably the inwardly directed hook member 32 has a planar boundary surface 35 which adjoins, at an acute angle, at one of its ends the associated hook surface 32a and at its other end the associated stop surface 32b. It is also preferred that the stop surface 32b extends as a flat
30 surface between the boundary surface 35 and the semicircular bearing surface 16.

The locking of the hook members as shown in figures 3 and 4 can be described as below.

Pipe clip 30 for attaching a pipe or similar object
35 to a support, comprising a base part 3, which is designed for attaching the pipe clip to the support and which bears two pivot joints 10, 11 which are situated at a distance from one another and have pivot axes which are essentially parallel to one another, each of the pivot joints 10, 11

pivotably connecting the base part 3 to a clip segment 13, 14 of the pipe clip, each clip segment 13, 14 having a bearing surface 15, 16 which is substantially semicircular and is directed away from the other clip segment, for the pipe, and one of the clip segments 13 being provided, at its end which is remote from the base part, with a single outwardly directed hook member 31 and the other clip segment 14 being provided, at its end which is remote from the base part 3, with an inwardly directed hook member 32, each hook member having a hook surface which is able to interact with the hook surface of the other hook member, which hook surfaces are arranged in such a way that they are able to hook fixedly onto one another when a pipe is pressed towards the base part between the clip segments, each of the hook members 31, 32 furthermore having a stop surface 31b, 32b which bears against the stop surface of the other hook member when the clip segment associated with the outwardly directed hook member is pressed inwards, characterized in that one of the hook members 31 is provided with a locking projection 37 and the other hook member 32 is provided with an associated locking recess 38 for preventing a mutual displacement of the hooked-together hook members 31, 32 in a direction substantially parallel to the longitudinal axis of the pipe which is to be accommodated by the pipe clip.

CLAIMS

1. Pipe clip (1) for attaching a pipe (2) or similar object to a support, comprising a base part (3), which is designed for attaching the pipe clip to the support and which base part (3) bears two pivot joints (10, 11) which
5 are situated at a distance from one another and have pivot axes which are essentially parallel to one another, each of the pivot joints (10, 11) pivotably connecting the base part (3) to a clip segment (13, 14) of the pipe clip (1) at a distance from both ends of the relevant clip segment,
10 each clip segment having a bearing surface (15, 16) which is substantially semicircular and is directed away from the other clip segment, for the pipe or the like, and one of the clip segments (13) being provided, at its end which is remote from the base part, with one or more outwardly
15 directed hook members (17) and the other clip segment being provided, at its end which is remote from the base part, with one or more inwardly directed hook members (18), which hook members are able to engage inside one another for the purpose of hooking together those ends of the clip segments
20 which are remote from the base part when a pipe is pressed between the clip segments towards the base part, characterized in that the pivot joints (10, 11) are made from a different material from the clip segments (13, 14) and the base part (3).
- 25 2. Pipe clip according to claim 1, in which the pivot joints (10, 11) are made from rubber or an elastomeric plastic.
3. Pipe clip according to claim 1 or 2, in which the pivot joints (10, 11) are made from a material which has a
30 lower modulus of elasticity than the base part and the clip segments.
4. Pipe clip according to one or more of the preceding claims, in which the pivot joints (10, 11) are made from a material with a higher deformation at break, in percentage
35 terms, than the base part and the clip segments.
5. Pipe clip according to one or more of the preceding claims, in which the pivot joints (10, 11) have a lower

hardness than the base part and the clip segments.

6. Pipe clip according to claim 5, in which the pivot joints (10, 11) have a hardness which lies between 30 and 80 Shore A.

5 7. Pipe clip according to one or more of the preceding claims, in which the pivot joints (10, 11) are made from a material which has a higher damping action (tg delta) than the base part and the clip segments.

8. Pipe clip according to one or more of the preceding
10 claims, in which the clip segments (13, 14) are made from plastic and the pivot joints (10, 11) are injection-moulded on the clip segments.

9. Pipe clip according to one or more of the preceding claims, in which the base part (3) is made from plastic and
15 the pivot joints (13, 14) are injection-moulded on the base part.

10. Pipe clip according to one or more of the preceding claims, in which, at each of the pivot joints (10, 11), as seen in a plane perpendicular to the pivot axis of the
20 pivot joint, the base part (3) has an attachment surface (21, 22), which is arched towards the clip segment (13, 14) and is preferably approximately V-shaped, for the material of the pivot joint, and the clip segment (13, 14) has an attachment surface (23, 24), which is arched towards the
25 base part (3) and is preferably approximately V-shaped, for the material of the pivot joint.

11. Pipe clip according to claim 10, in which, in the undeformed state of the pivot joint (10, 11), the line (l1, l2) through the vertices of the attachment surfaces of a
30 pivot joint associated with a clip segment virtually intersects the axis (h1, h2) of the bearing surface (15, 16) of the said clip segment.

12. Pipe clip according to claim 11, in which the two lines (l1, l2), which each run through the vertices of the
35 attachment surfaces of a pivot joint, in the closed position of the pipe clip between them include an angle which lies between 70° and 130°.

13. Pipe clip according to one or more of the preceding claims, in which one of the hook members (31) is provided

with a locking projection (37) and the other hook member (32) is provided with an associated locking recess (38) for preventing a mutual displacement of the hooked-together hook members (31, 32) in a direction substantially parallel
5 to the longitudinal axis of the pipe which is to be accommodated by the pipe clip.

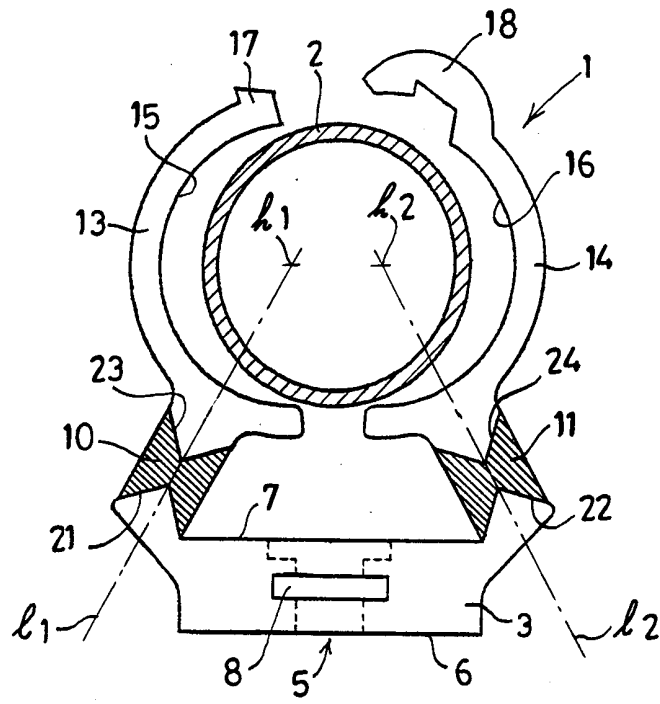


FIG. 1.

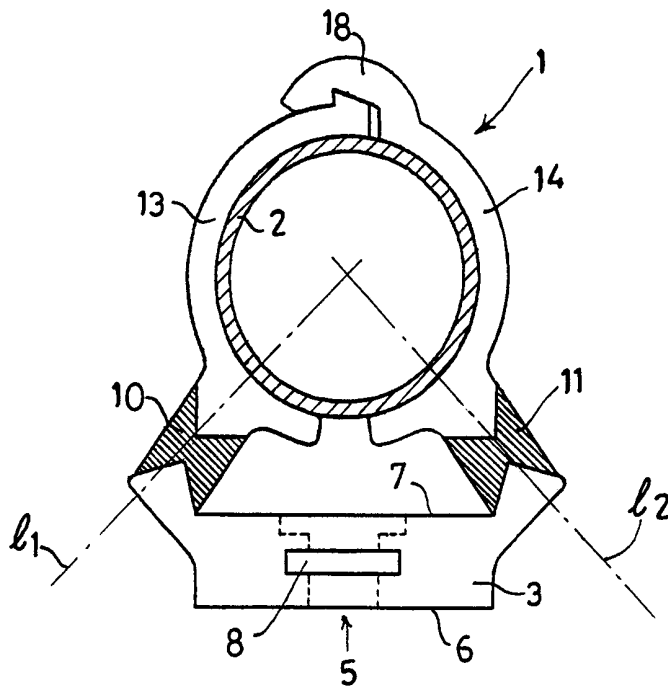


FIG. 2.

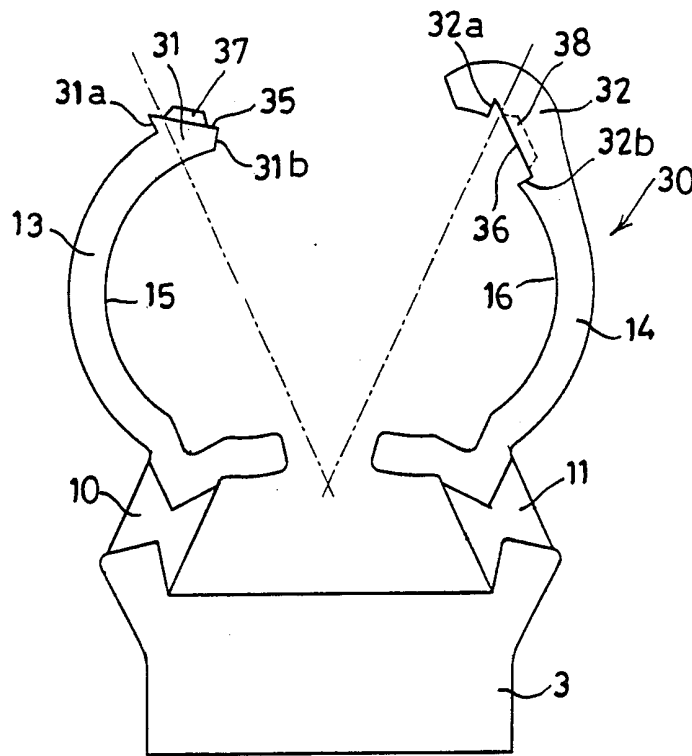


FIG. 3.

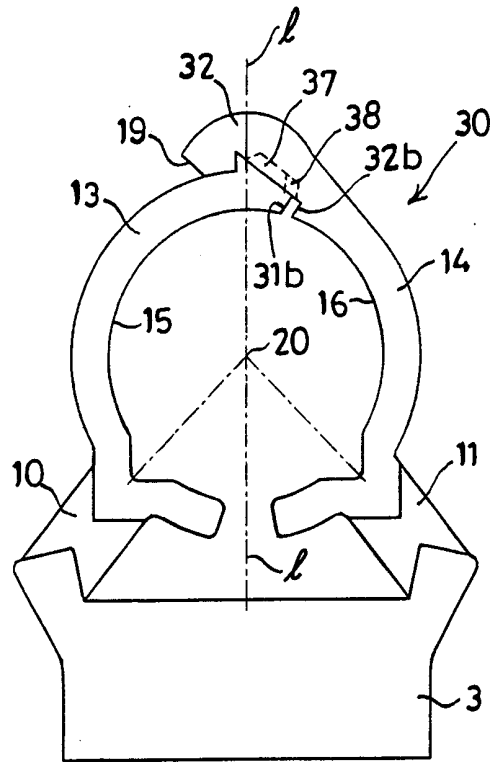


FIG. 4.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 98/00446

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 F16L3/12

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 6 F16L

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	NL 7 702 656 A (EGLI FISCHER & CO) 19 September 1977 cited in the application see figure 1 ---	1-13
A	US 5 312 081 A (MARTIN GORDON C) 17 May 1994 see figure 11 ---	1-13
A	US 4 624 432 A (SALACUSE FRANK) 25 November 1986 see figures ---	1-13
A	DE 41 23 430 C (TRW UNITED-CARR GMBH & CO KG) 17 June 1992 see figures 1,3 -----	1-13

Further documents are listed in the continuation of box C.

Patent family members are listed in 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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- "P" document published prior to the international filing date but later than the priority date claimed

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- "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
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Date of the actual completion of the international search

18 November 1998

Date of mailing of the international search report

01/12/1998

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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