Abstract: A clamping mechanism (1) for securing at least one object, preferably a barrier, to a rail (5) comprising a U-shaped lateral section. The clamping mechanism can be detachably to the rail, wherein the clamping mechanism can be adjusted from a first position, in which the clamping mechanism is positioned in the U-shaped lateral section of the rail with some play, to a second position, in which the clamping mechanism is clamped down in the U-shaped lateral section of the rail under the rail head (9) and vice versa.
Clamping mechanism for securing at least one object to a rail, as well as an assembly

The invention relates to a clamping mechanism for securing at least one object, preferably a barrier, to a rail comprising a rail head, which rail has a U-shaped lateral section, which clamping mechanism can be detachably attached to the rail.

The invention further relates to an assembly.

With such a clamping mechanism, which is known from EP-B1-0 768 429, the clamping mechanism is used for attaching and securing a safety barrier to a railway rail. The use of such a safety barrier is mandatory when carrying out maintenance work on a railway track that lies beside another railway track, so that the tracks are separated by the barrier. The clamping mechanism from the above-cited European patent is attached to the rail, which comprises a rail foot, by passing the clamping mechanism under the rail and clamping the clamping mechanism down on the two opposite longitudinal sides of the rail foot under spring force. It is therefore necessary to slide part of the clamping mechanism under the rail in order to fit the clamping mechanism, which is only possible at positions between evenly spaced sleepers on which the rail is mounted.

A drawback of the known clamping mechanism is the fact that it is relatively difficult to attach the clamping mechanism to the rail. Furthermore it is frequently necessary to remove the ballast layer under the rails so as to clear a space under the rail. This is a time-consuming, ergonomically demanding activity.

The object of the present invention is to provide a clamping mechanism which can be attached to the rail in a relatively simple manner.

This object is accomplished with the clamping mechanism according to the invention in that the clamping mechanism can be adjusted from a first position, in which the clamping mechanism is positioned in the U-shaped lateral section of the rail with some play, to a second position, in which the clamping mechanism is clamped down in the U-shaped lateral section of the rail under the rail head, and vice versa.

This clamping mechanism is relatively easy to fit, because the clamping mechanism only needs to be placed against one side of the rail in the U-shaped lateral section thereof, after which the clamping mechanism is clamped
down in the lateral section under the rail head by adjusting the clamping mechanism from the first position to the second position. Furthermore it is not necessary to remove the ballast layer for clamping down the clamping mechanism. The rail head is completely clear during use of the clamping mechanism, so that a device that moves over the rails will not be impeded by the clamping mechanism.

The term "lateral section of a rail" is understood to mean in particular the lateral section of a railway rail. The lateral section of a railway rail is substantially U-shaped, wherein the first leg of the U-shape is formed by a part of a rail head, the second leg is formed by a part of a rail foot and the bridge portion of the U-shape is formed by an intermediate portion that connects the rail head and the rail foot, which intermediate portion is also referred to as the rail web.

The use of the clamping mechanism according to the invention minimises the amount of work required for attaching a clamping mechanism to the rail, which reduces the cost of fixing a safety barrier, for example, to a railway rail.

One embodiment of the clamping mechanism according to the invention is characterised in that the U-shaped lateral section of the rail is fixed to a sleeper by means of a fixing element, with the clamping mechanism being clamped between the fixing element and the U-shaped lateral section.

Fixing the clamping mechanism to a sleeper has a number of advantages. A first advantage is the fact that the clamping mechanism can be clamped down firmly between one point of the U-shaped lateral section, for example the web portion and the fixing element for fixing the rail to the sleeper, which is normally positioned in the rail foot. The fixing element is a bolt and a nut or a spring, for example. A second advantage is the fact that no additional measuring work for determining the spacing between the clamping mechanisms needs to be carried out when an object such as a barrier is to be attached to the rail by means of at least two clamping mechanisms, because the standard spacing between the sleepers is used. A third advantage is the fact that no ballast needs to be removed for fitting the clamp, which means a significant saving of time and ergonomically demanding activities need not be carried out.

Another embodiment of the clamping mechanism according to the invention is characterised in that the clamping mechanism is provided with pivotally interconnected rods, which rods have been set to the first position under a spring force and which can be adjusted to the second position against said spring force.
3

As a result of said spring force, the clamping mechanism can readily be placed in the rail in the first position thereof, whilst a reliable fixation to the rail is ensured by adjusting the clamping mechanism to the second position. Moreover, adjusting such a clamping mechanism is easy to carry out when using such a linkage.

Another embodiment of the clamping mechanism according to the invention is characterised in that the clamping mechanism is furthermore provided with a pivotal locking rod that is connected to at least one of said rods, by means of which locking rod the clamping mechanism can be adjusted from the first position to the second position against said spring force.

The clamping mechanism can be adjusted from the first position to the second position in an effective and reliable manner by means of the locking rod. The locking rod is provided with recesses, for example, in which a rod can be secured against the spring force by pivoting the locking rod. In this way it is possible to adjust the clamping mechanism from the first position to the second position in steps.

Yet another embodiment of the clamping mechanism according to the invention is characterised in that the locking rod is a threaded rod, onto which a nut can be screwed, which nut can be screwed into contact with at least one of the spring-loaded rods for adjusting the clamping mechanism from the first position to the second position against the spring force.

Adjusting the clamping mechanism by means of a threaded rod and a nut is relatively simple. To adjust the clamping mechanism from the first position to the second position, the nut can be moved over the threaded rod by means of an electric power wrench, for example. An additional device may be placed over the screw thread, if desired, which device is positioned between the nut and the rod to be moved against the spring force, which device is used for increasing the contact area of the nut. Preferably, the threaded rod is accommodated with some play in a box beam that is attached to one of the rods, the diameter of which box beam must be smaller than the diameter of the contact area of the nut in order to be able to adjust the clamping mechanism.

Yet another embodiment of the clamping mechanism according to the invention is characterised in that the clamping mechanism is provided with an extension piece on a side remote from the rail, which extension piece comprises a
supporting arm, which supporting arm is provided with connecting elements for connecting the object to the supporting arm.

An object can be connected to the supporting arm in a relatively quick and easy manner by means of said connecting elements. It is advantageous if the supporting arm is oriented at an angle, so that an object to be connected to the supporting arm will extend substantially in a vertical plane.

Yet another embodiment of the clamping mechanism according to the invention is characterised in that the connecting elements are provided on the side of the supporting arm that faces towards the rail as well as on the opposite side of the supporting arm.

Such an arrangement of the quick-action connecting elements makes it possible to connect several objects, which may be in line with each other, to the supporting arm.

Yet another embodiment of the clamping mechanism according to the invention is characterised in that the connecting elements are hooks to which the object can be detachably connected.

From said hooks, an object such as a barrier or a panel of a barrier can be suspended in a simple manner, thus minimising the labour costs for placing such an object.

Yet another embodiment of the clamping mechanism according to the invention is characterised in that the extension piece can be connected to the supporting arm.

Because of this aspect, the dimensions of the clamping mechanism can be kept within relatively limited bounds, as a result of which the clamping mechanism can be separately transported and requires little space upon storage thereof.

Yet another embodiment of the clamping mechanism according to the invention is characterised in that the horizontal spacing between the object and the rail to which the clamping mechanism is attached can be adjusted by means of the extension piece.

A specific horizontal spacing may be required, depending on the object to be placed.

Yet another embodiment of the clamping mechanism according to the invention is characterised in that the extension piece is provided with openings,
which openings can be aligned with an opening in the supporting arm for adjusting
the horizontal spacing between the object and the rail, in which aligned openings at
least one safety catch can be placed for connecting the extension piece to the
supporting arm.

In this way the horizontal spacing between the object and the rail
can be adjusted in a simple manner.

Another object of the present invention is to provide an assembly
which enables easy attachment of a barrier to a rail.

This object is accomplished in that the assembly comprises a
barrier that can be detachably connected to a supporting arm which is connected to
a clamping mechanism as described in the foregoing.

Preferably, the supporting arm can be connected to the clamping
mechanism, so that the assembly can be disassembled into separate parts, which
separate parts are easy to transport and to store.

The invention will now be explained in more detail with reference to
the appended figures, in which:

Figure 1 is a perspective view of a clamping mechanism according
to the invention, which is clamped down in a U-shaped lateral section of a rail, by
means of which clamping mechanism a barrier is connected to the rail;

Figures 2a, 2b and 2c are schematic views of the attachment of the
clamping mechanism of figure 1 to a rail;

Figure 3 is a schematic plan view of the clamping mechanism of
figure 1, which is attached to the rail;

Figure 4 shows a first alternative embodiment of the clamping
mechanism according to the invention; and

Figure 5 shows a second alternative embodiment of the clamping
mechanism according to the invention.

Like parts are indicated by the same numerals in the various
figures.

Figure 1 shows a perspective view of a clamping mechanism 1
according to the present invention, by means of which a barrier 3 is attached to the
rail 5.

The rail 5 forms part of a railway track, only part of which is shown
for the sake of clarity. The rail 5 is mounted on sleepers 7, which are arranged in
evenly spaced-apart relationship. The rail 5 comprises a U-shaped lateral section. The rail comprises a rail head 9, which is connected to a rail foot 13 via a web portion 11. The first leg of the U-shape of the lateral section is formed by a part of the rail head 9, the second leg is formed by a part of a rail foot 13 and the bridge portion of the U-shape is formed by the web portion 11. The rail foot 13 of the rail 5 is fixed to the sleeper 7 by means of a fixing element 14, for example a bolt and a securing nut or a spring.

In the position that is shown in the figure, the clamping mechanism 1 is clamped down in the U-shaped lateral section of the rail 5 between the railhead 9, the web portion 11, the rail foot 13 and the fixing element 14.

On the side remote from the rail 5, the clamping mechanism 1 is provided with an extension piece 15. The extension piece 15 is provided with openings 17. A supporting arm 19 is connected to the extension piece 15. The supporting arm 19 is provided with at least one opening 21, which can be aligned with the openings 17 in the extension piece 15. To connect the extension piece 15 to the supporting arm 19, the opening 21 in the supporting arm 19 is aligned with one of the openings 17 in the extension piece 15, and a safety catch (not shown) is placed in the openings 17, 21 in the aligned position thereof, by means of which safety catch the extension piece 15 is connected to the supporting arm 19.

The supporting arm 19 has a first part 23, which is connected to the extension piece 15, as well as a second part 25. The first part 23 and the second part 25 include an angle \( \alpha \) with each other, so that the second part 25 can extend substantially in a vertical plane. The second part 25 of the supporting arm 19 is provided with connecting elements 27.

In figure 1 two clamping mechanisms 1 are used for attaching the barrier 3 to the rail 5. The clamping mechanisms 1 are attached to the sleepers 7 at spaced-apart positions, which spacing corresponds to the length of a barrier panel 29 to be provided. The barrier panel 29 is connected to the supporting arm 19 by means of the connecting elements 27. The connecting elements 27 are provided both on the side of the supporting arm 19 that faces towards the rail 5 and on the opposite side of the supporting arm 19. This arrangement of the connecting elements 27 makes it possible to connect several barrier panels 29 in line with each other to a single supporting arm 19.

The barrier 3 may consist of a single barrier panel 29, but it may
also comprise several barrier panels 29 arranged beside each other and/or above and below each other.

The barrier panel 29 comprises two outer longitudinal bars 31 extending substantially parallel to each other, as well as a central longitudinal bar 33 extending between the longitudinal bars 31, in parallel relationship therewith. The longitudinal bars 31, 33 are interconnected by means of cross rods 35 extending transversely thereto.

Figures 2a, 2b and 2c schematically show the attachment of the clamping mechanism 1 to the rail 5. Figure 3 furthermore shows a schematic plan view of the clamping mechanism 1 of figure 1, which is attached to the rail 5.

The clamping mechanism 1 is provided with pivotally interconnected rods 41, 43, 45, 47, 49, 51, 53, which assume a first shape (figure 2a) for placing the clamping mechanism 1 in the U-shaped lateral section of the rail 5. The rods 41, 43, 45, 47 are pivotable about the pins 55, 57, 59, 61.

The rods 41, 43, 45, 47 are connected, via connecting rods 63, 65, 67, 69 shown in figure 3, to an identical linkage 49, 51, 53 on an opposite side. The rod 41, the opposite rod 49 and the connecting rods 63, 67 interconnecting said two rods 41, 49 jointly form a rigid, square base. Positioned opposite said base is an upper surface, which is likewise rigid and of square shape, formed by two connecting rods 65, 69, the rod 45 and a rod 51 positioned opposite thereto.

A spring 71 is attached to the connecting rod 63 of the base that is connected to the extension piece 15, which spring 71 is connected to the connecting rod 69 of the upper surface that is to be placed under the railhead 9. Furthermore, a locking rod 75 that is pivotable about a pin 73 is connected to the connecting rod 63 of the base. A box beam 77 is attached to the connecting rod 65 of the upper surface that is present on the side of the extension piece 15. The locking rod 75 is connected to the connecting rod 65 by means of a the box beam 77, in which the locking rod 75 is accommodated with some play. The locking rod 75 is a threaded rod 75 provided with screw thread, onto which a nut 79 can be screwed. The diameter of the opening in the box beam 77 is smaller than the diameter of the contact area of the nut 79. An device such as a washer may be used for increasing the contact area of the nut 79.

In the first position of the clamping mechanism 1, the nut 79 has been screwed back completely, or it may even have been screwed off the screw
thread of the threaded rod altogether. In the first position, the clamping mechanism 1 is made to assume a first shape (figure 2a) by means of the spring 71. The spring 71 exerts a pulling force in the direction indicated by the arrow P1 on the connecting rod 69 of the upper surface. In the position of the clamping mechanism 1 that is shown in figure 2a, an equilibrium of forces has been obtained, because the spring force exerted on the linkage is eliminated by means of the threaded rod 75 that is connected to the linkage via the box beam 77.

To adjust the clamping mechanism 1, the connecting rod 67 of the base is placed in the first position on the rail foot 13, between the web portion 11 and the fixing element 14.

By screwing the nut 79 onto the threaded rod 75 in the direction indicated by the arrow P2, the nut 79 comes into contact with the box beam 77 attached to the connecting rod 65 (figure 2b). When the clamping mechanism 1 is adjusted from the first position to the second position by means of the nut 79, the threaded rod 75 is pivoted about the pin 73 in the direction indicated by the arrow P3. When the nut 79 abutting against the box beam 77 is tightened in the direction indicated by the arrow P2, the connecting rod 65 of the upper surface is pivoted against the spring force of the spring 71. The movement of the connecting rod 65 causes the rods 43, 45, 47, 51, 53 to pivot about the pins 55, 57, 59, 61 to the second position of the clamping mechanism (figure 2c). When the clamping mechanism 1 is adjusted from the first position to the second position, the connecting rod 67 is moved over the rail foot 13 towards the fixing element 14. In the second position that is shown in figure 2c, the clamping mechanism 1 is firmly clamped down between the fixing element 14 / the rail foot 13 and the web portion of the rail 5.

As shown in figure 2, an electric power wrench 81 may be used for tightening the nut 79, during which operation the operator may additionally place his foot 83 on one of the rods.

After the clamping mechanism 1 has been attached to the rail 5, the supporting arm 19 may be connected to the extension piece 15 in the above-described manner.

Figure 4 shows a further variant of the clamping mechanism 101 according to the present invention. The only difference between the clamping mechanism 101 and the clamping mechanism 1 that is shown in the preceding
figures is that the threaded rod 75 has been exchanged for a serrated fixing rod 103.

The serrated fixing rod 103 comprises saw teeth 105. The fixing rod 103 is retained with some play in a slot (not shown) provided in a plate (not shown) that is attached to the connecting rod 65. In said slot, a projection can be moved from a projecting position to a retracted position by means of a knob. The projection can be placed between two saw teeth 105 in the projecting position thereof. The serrated fixing rod 103 can pivot in the direction indicated by the arrow P5 and in the opposite direction via a door hinge 107.

When the clamping mechanism 101 is to be used, the projection to be operated with the knob is moved to the retracted position and the operator places his foot on the linkage, causing the linkage to pivot against the spring force. The moment the linkage is clamped down in the lateral section of the rail in the above-described manner, the knob is operated, has a result of which the projection is moved between the saw teeth 105. In this way the clamping mechanism 101 is adjusted from the first position to the second position.

Figure 5 shows a further adapted variant of the clamping mechanism 201 according to the present invention. The clamping mechanism 201 is different from the clamping mechanism 101 that is shown in figure 4 in that the door hinge 107 has been exchanged for a pin 203. A serrated fixing rod 205 is pivoted about the pin 203.

The connecting rod 65 is connected to a plate (not shown) provided with a slot (not shown). To set the clamping mechanism 201, the saw teeth 207 of the fixing rod 205 that is pivoted about the pin 203 are fixed in said slot.

In the case of a railway track comprising two rails 5, the clamping mechanism 1, 101, 201 according to the present invention is preferably clamped down in a U-shaped lateral section facing away from the other rail 5. When such an arrangement of the clamping mechanism 1, 101, 201 is used, the rail 5 to which the clamping mechanism 1, 101, 201 is attached can still be used, because the clamping mechanism 1, 101, 201 leaves the rail head 9 completely clear, so that a device moving over the railway track will not be impeded thereby.

Furthermore, the present invention is not limited to the placement of a safety barrier or a fence 3, but to the placement of an object. Said object may be a warning sign to engineers to be temporarily provided, or it may form a frame for erecting a covering over the railway track on which the maintenance work is to be
carried out.

The clamping mechanism 1 is preferably placed on a sleeper 7. Sleepers 7 are generally spaced a standard distance apart, so that no additional measuring operations for determining the required spacing between the clamping mechanisms 1, 101, 201 are needed if an accordingly measured barrier 3 or barrier panel 29 is used.

In spite of that which is shown in the illustrated embodiments of the clamping mechanism 1, 101, 201, it is not necessary to place the clamping mechanism 1, 101, 201 on a sleeper. Thus, the construction of the linkage as shown may be adapted in such a manner that an adequate clamping effect is obtained by clamping the clamping mechanism 1, 101, 201 between the rail head 9 and the rail foot 13 in a force-locked manner.

The force-locked fixation in the U-shaped lateral section is advantageous because the clamping mechanism is only clamped down between the rail head and the rail foot in the second position, as a result of which the force-locked fixation can be realised in a quick and simple manner. The force-locked fixation is obtained as a result of the frictional forces between the clamping mechanism and the respective contact points in the lateral section of the rail.

It is also possible to adapt the configuration of the clamping mechanisms such that the clamping mechanism 1, 101, 201 is clamped down in the U-shaped lateral section behind the fixing element 14 in a form-locked manner. The term "form-locked fixation" is understood to mean that the clamping mechanism, because of its shape, is hooked or clamped behind the fixing element 14 and the railhead 9 in the second position and that said fixation can only be released by changing the form either of the clamping mechanism 1, 101, 201 or, although less likely, of the U-shaped lateral section of the rail 5. In this way a reliable fixation is realised as well.

Preferably, all parts are made of a material that is light in weight, such as aluminium, for example.

Furthermore, the supporting arm 19 may be made in one piece, i.e. not being detachable, with the extension piece 15.

Preferably, the total angle between the supporting arm 19 and a supporting surface is approximately 90 degrees, wherein the supporting arm 19 may comprise a single angle (the angle $\alpha$) or a number of kinks or a bend in order to
realise said 90° angle with the supporting surface.
CLAIMS

1. A clamping mechanism for securing at least one object, preferably a barrier, to a rail comprising a rail head, which rail has a U-shaped lateral section, which clamping mechanism can be detachably attached to the rail, characterised in that the clamping mechanism can be adjusted from a first position, in which the clamping mechanism is positioned in the U-shaped lateral section of the rail with some play, to a second position, in which the clamping mechanism is clamped down in the U-shaped lateral section of the rail under the rail head, and vice versa.

2. A clamping mechanism according to claim 1, characterised in that the U-shaped lateral section of the rail is fixed to a sleeper by means of a fixing element, with the clamping mechanism being clamped between the fixing element and the U-shaped lateral section.

3. A clamping mechanism according to claim 1 or 2, characterised in that the clamping mechanism is provided with pivotally interconnected rods, which rods have been set to the first position under a spring force and which can be adjusted to the second position against said spring force.

4. A clamping mechanism according to claim 3, characterised in that the clamping mechanism is furthermore provided with a pivotable locking rod that is connected to at least one of said rods, by means of which locking rod the clamping mechanism can be adjusted from the first position to the second position against said spring force.

5. A clamping mechanism according to claim 4, characterised in that the locking rod is a threaded rod, onto which a nut can be screwed, which nut can be screwed into contact with at least one of the spring-loaded rods for adjusting the clamping mechanism from the first position to the second position against the spring force.

6. A clamping mechanism according to any one of the preceding claims, characterised in that the clamping mechanism is provided with an extension piece on a side remote from the rail, which extension piece comprises a supporting arm, which supporting arm is provided with connecting elements for connecting the object to the supporting arm.

7. A clamping mechanism according to claim 6, characterised in that the connecting elements are provided on the side of the supporting arm that faces
towards the rail as well as on the opposite side of the supporting arm.

8. A clamping mechanism according to claim 6 or 7, characterised in that said connecting elements are hooks to which the object can be detachably connected.

9. A clamping mechanism according to any one of the claims 6-8, characterised in that the extension piece can be connected to the supporting arm.

10. A clamping mechanism according to claim 9, characterised in that the horizontal spacing between the object and the rail to which the clamping mechanism is attached can be adjusted by means of the extension piece.

11. A clamping mechanism according to claim 10, characterised in that the extension piece is provided with openings, which openings can be aligned with an opening in the supporting arm for adjusting the horizontal spacing between the object and the rail, in which aligned openings at least one safety catch can be placed for connecting the extension piece to the supporting arm.

12. An assembly comprising a barrier that can be detachably connected to a supporting arm that is attached to a clamping mechanism according to any one of the preceding claims.

13. An assembly according to claim 12, characterised in that the supporting arm can be connected to the clamping mechanism.
**INTERNATIONAL SEARCH REPORT**

**International application No**
PCT/NL2006/000463

### A. CLASSIFICATION OF SUBJECT MATTER

**INV.** E01B26/00  
**ADD.** F16B7/04

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

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

- EOB  F16B

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)

- EPO-Internal , PAJ

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
</tr>
</thead>
</table>
| X        | GB 182 593 A (GEORGE ALFRED JULIUS)  
13 July 1922 (1922-07-13)  
figure 6 | 1-5 |
| X        | GB 2 353 065 A (DORMAN TRAFFIC PRODUCTS LTD) 14 February 2001 (2001-02-14)  
page 4, line 26 - page 6, line 7; figure 1 | 1-5 |
| X        | DE 203 00 537 U1 (AGRAR-TECHNIK MANGELSDORF GMBH)  
18 June 2003 (2003-06-18)  
figures 1,2 | 12,13 |
| A        | FR 2 500 088 A (ART TECHNIQUE DECORATION SARL) 20 August 1982 (1982-08-20)  
page 2, line 12 - page 3, line 16; figures 1-3 | 3-9,12 |

[X] Further documents are listed in the continuation of Box C

[X] See patent family annex

- **X** Special categories of cited documents
- **A** document defining the general state of the art which is not considered to be of particular relevance
- **E** earlier document but published on or after the international filing date
- **L** document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- **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
- **A** document member of the same patent family

Date of the actual completion of the international search: 18 December 2006

Date of mailing of the international search report: 28/12/2006

Name and mailing address of the ISA/  
European Patent Office, P B 5818 Patentlaan 2  
NL-2280 HV RUSWIJK  
Tel (+31-70) 340-2040, Tx 31651 epo nl  
Fax (+31-70) 340-3016

Authorized officer: Gallego, Adoración
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>DE 94 16 670 U1 (LEONHARD WEISS GMBH &amp; CO NIEDERLASSUNG CRAILSHEIM, 74564)</td>
<td>1,6-13</td>
</tr>
<tr>
<td>A</td>
<td>DE 299 02 477 U1 (THIEME, HANS-JOERG;} GAUTSCH, TOBIAS)</td>
<td>1,5,6,12</td>
</tr>
<tr>
<td></td>
<td>24 February 2000 (2000-02-24) figures 1-3</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>EP 0 882 840 A (URLINGS)</td>
<td>1,12</td>
</tr>
<tr>
<td></td>
<td>9 December 1998 (1998-12-09) figures 1-4</td>
<td></td>
</tr>
<tr>
<td>Patent document cited in search report</td>
<td>Publication date</td>
<td>Patent family member(s)</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>GB 182593</td>
<td>13-07-1922</td>
<td>NONE</td>
</tr>
<tr>
<td>GB 2353065</td>
<td>14-02-2001</td>
<td>NONE</td>
</tr>
<tr>
<td>DE 20300537</td>
<td>18-06-2003</td>
<td>NONE</td>
</tr>
<tr>
<td>FR 2500088</td>
<td>20-08-1982</td>
<td>NONE</td>
</tr>
<tr>
<td>DE 9416670</td>
<td>19-01-1995</td>
<td>NONE</td>
</tr>
<tr>
<td>DE 29902477</td>
<td>24-02-2000</td>
<td>NONE</td>
</tr>
<tr>
<td>EP 0882840</td>
<td>09-12-1998</td>
<td>AT 233348 T</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 69811567 D1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 69811567 T2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DK 882840 T3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NL 1006248 C2</td>
</tr>
</tbody>
</table>