(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 251 916 A1

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.12.2017 Bulletin 2017/49

(21) Application number: **17164777.9**

(22) Date of filing: **04.04.2017**

(51) Int Cl.:
B61L 9/04 *(2006.01)* ***B61L 23/06*** *(2006.01)*
B61L 29/28 *(2006.01)* ***E01B 26/00*** *(2006.01)*
F21S 4/28 *(2016.01)*

(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
Designated Validation States:
MA MD

(30) Priority: **03.06.2016 NL 1041906**

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(54) **IMPROVED LIGHTING FIXTURE FOR ILLUMINATING PART OF A TRACK ON A RAILWAY WITH I-TYPE RAILS**

(57) The present invention relates to a lighting fixture for illuminating part of a track on a railway of I-type rails, which lighting fixture is arranged for attachment to a rail, wherein the lighting fixture comprises an elongated housing, which housing has a mounting surface, which is arranged for attachment to the body of a rail in lengthwise direction of the rail, an array of light emitting elements which are distributed in lengthwise direction over the housing, and power connection means for connecting the lighting fixture to power means for powering the light emitting elements.

A lighting fixture according to the preamble is known in the state of the art and has been described in the German Gebrachmuster DE202007003150U1.

The known lighting fixture has to be bonded or screwed to the rail.

The known lighting fixture therefore has the disadvantage that installation and replacement is labour intensive.

The present invention has for its object to provide a lighting fixture stated in the preamble which obviates this drawback.

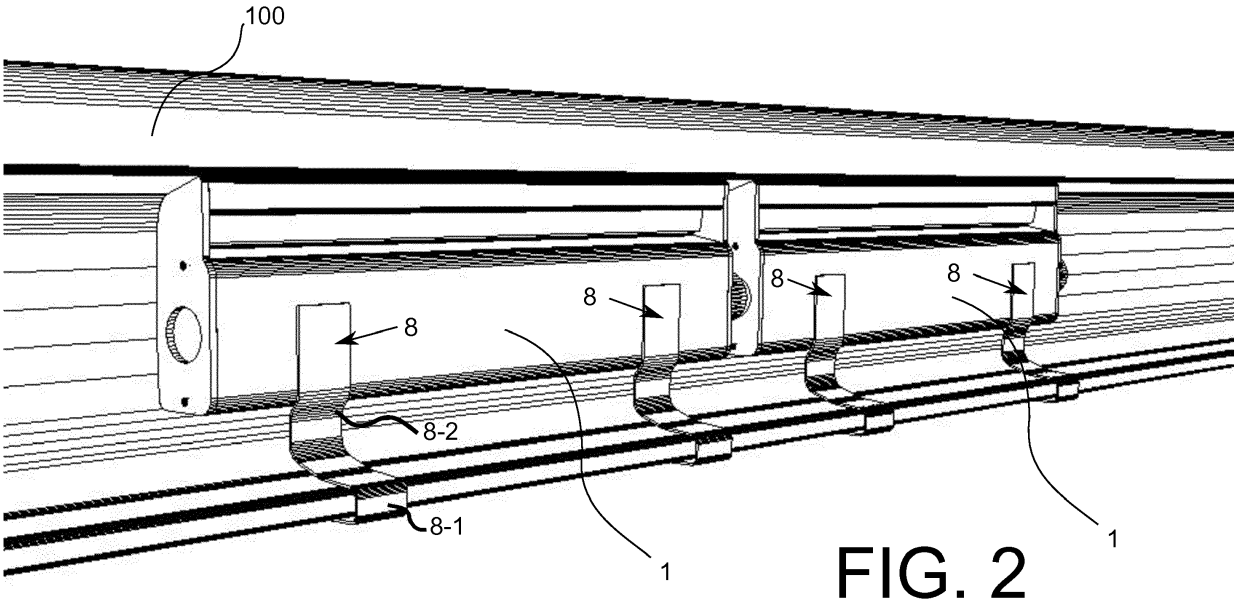

FIG. 2

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Description

[0001] The present invention relates to a lighting fixture for illuminating part of a track on a railway of I-type rails, which lighting fixture is arranged for attachment to a rail, wherein the lighting fixture comprises an elongated housing, which housing has a mounting surface, which is arranged for attachment to the body of a rail in lengthwise direction of the rail, an array of light emitting elements which are distributed in lengthwise direction over the housing, and power connection means for connecting the lighting fixture to power means for powering the light emitting elements.

[0002] A lighting fixture according to the preamble is known in the state of the art and has been described in the German Gebrauchmuster DE202007003150U1.

[0003] The known lighting fixture has to be bonded or screwed to the rail.

[0004] The known lighting fixture therefore has the disadvantage that installation and replacement is labour intensive.

[0005] The present invention has for its object to provide a lighting fixture stated in the preamble which obviates this drawback. The device according to the invention has for this purpose the feature that the cross-sectional shape of the mounting surface at least partially corresponds to a curved section of the cross-sectional shape of the rail, such that the housing can be form-fittingly attached in the curved section of the rail and that the lighting fixture comprises mounting means for mounting the lighting fixture to the rail.

[0006] The lighting fixture according to the invention can be easily installed by positioning the lighting fixture with its mounting surface to the body of the rail and the curved section of the rail. The mounting means are designed to hold the lighting fixture in this position. The lighting fixture is in this position protected from the wheels of a train or any other impacting force. The mounting surface preferably comprises an electrically insulated layer in order to prevent any disruption in signalling systems of the railway system.

[0007] In a preferred embodiment of the lighting fixture according to the invention the mounting means comprises one or more mounting brackets to releasably couple the lighting fixture to the rail. Preferably a first end of the mounting brackets is arranged for clamping to an underside of the rail and a second end of the mounting brackets is arranged for pushing the lighting fixture towards the part of the rail having, seen in cross-section, the curved section.

[0008] In the preferred embodiment of the lighting fixture according to the invention the cross-sectional shape of the mounting surface at least partially corresponds to a head section of the rail and the second end of the mounting brackets is arranged for pushing the lighting fixture towards the head section of the rail.

[0009] In a practical embodiment of the lighting fixture according to the invention the housing comprises one or more elongated recesses in lengthwise direction of the housing, wherein each recess comprises one or more light emitting elements. Due to these features the light emitted from the light emitting elements is experienced as oblique illumination. Also the light emitting elements are protected from weather influences and dust.

[0010] Each recess is preferably formed by a floor part, wall part and ceiling part and the light emitting elements are attached to the wall part.

[0011] In order to focus the emitted light, the floor part has a reflective surface. To further increase the focussing of the emitted light, the ceiling part also has a reflective surface.

[0012] In an even more practical embodiment of the lighting fixture according to the invention the housing comprises an elongated cavity for passage of the power connection means. The cavity protects the power connection means, like cables etc.

[0013] In an economical advantageously embodiment of the lighting fixture according to the invention the housing preferably has a fixed cross-sectional profile, more specifically an extrusion profile.

[0014] The lighting fixture according to the invention preferably comprises coupling means for coupling the lighting fixture to a further lighting fixture. In this way lighting fixtures can be connected to form a combined lighting fixture of significant length without great effort.

[0015] The light emitting elements of the lighting fixture according to the invention can be any known electronic element able to emit light, but for practical reasons the light emitting elements are LED's.

[0016] In an advanced embodiment of the lighting fixture according to the invention the lighting fixture comprises motion detection means which motion detections means are arranged for controlling the light emitting elements. In this way the track along the rail can be illuminated when a person walks by.

[0017] In a more advanced embodiment of the lighting fixture according to the invention the lighting fixture comprises vibration detection means for detection of incoming trains. The vibration detection means comprise vibration sensors to detect vibrations from an incoming train using the doppler effect. After detection of an incoming train the light emitting elements will be enabled to give an advance visual warning to people near the track.

[0018] The lighting fixture according to the invention will now be further described in more detail with reference to the figures, in which

Figure 1A shows a side view of the lighting fixture according to the invention, showing a long side of the lighting fixture;

Figure 1B also shows the lighting fixture from Figure 1A showing a short side and the elongated front side of the lighting fixture;

Figure 1C shows the lighting fixture from Figure 1A showing a short side and the elongated back side of the lighting fixture;

Figure 2 shows lighting fixtures of Figure 1A attached to an I-type rail;
Figure 3 shows a cross sectional view of the lighting fixture 1A of Figure 2 and the rail;
Figure 4 shows the lighting fixtures of Figure 2 without the rail in order to show the brackets.

[0019] The same components are designated in the different figures with the same reference numerals.

[0020] Figure 1A shows a side view of the lighting fixture 1 according to the invention, showing a long side of the lighting fixture 1. Figure 1B also shows the lighting fixture 1 from Figure 1A showing a short side and the elongated front side of the lighting fixture 1. Figure 1C shows the lighting fixture 1 from Figure 1A showing a short side and the elongated back side of the lighting fixture 1. The lighting fixture 1 comprises an elongated housing 2 with preferably a fixed cross-sectional profile. The housing 2 can be manufactured from plastic of metal and is preferably an extrusion profile. The housing 2 comprises an elongated recess 3 in lengthwise direction of the housing 2. The recess 3 is substantially formed by a floor part 3-1, wall part 3-2 and ceiling part 3-2. Light emitting elements 4, embodied as one or more LED-arrays, are attached to the wall-part 3-2. After attachment of the lighting fixture 1 to the rail the wall part 3-2 will be slightly inclined so that the emitted light coming from the light emitting elements 4 is directed downwardly and experienced as oblique illumination. The floor part 3-1 and the ceiling part 3-3 both have a reflective surface in order to focus the light originating from the light emitting element 4. The heat generated by the light emitting elements 4 generate a whirl between the floor part 3-1 and the ceiling part 3-1, which prevents dirt particles to enter the recess 3 and settle on the light emitting elements 4. The housing 2 also comprises an elongated cavity 5 for passage of the power connection means. The elongated cavity 5 extends between the extreme ends of the light fixture 1. The lighting fixture 1 comprises coupling means 6A;6B for coupling the lighting fixture 1 to a further lighting fixture 1, wherein the coupling means 6A;6B are arranged for coupling the power connection means of the lighting fixture 1. The coupling means 6A;6B are also arranged for creating a weather proof connection in order to prevent moisture to enter the cavity 5. The shown coupling means 6A;6B are an example of suitable coupling means. The housing 2 has a mounting surface 7 formed by the elongated back side. The mounting surface 7 is arranged for attachment to the body of a rail in lengthwise direction of an I-type rail. The cross-sectional shape of the mounting surface 7 corresponds to the upper curved section of the cross-sectional shape of the rail formed by the head of the rail. Also the cross-sectional shape of the mounting surface 7 corresponds to the section of the cross-sectional shape of the rail formed by the body of the rail. As a result of the cross-sectional shape of the mounting surface 7, the housing 2 can be form-fittingly attached in the upper curved section of the rail, which is shown in Figure 2.

[0021] Figure 2 shows lighting fixtures 1 of Figure 1A attached to an I-type rail 100. Each lighting fixture 1 is attached to the rail by at least two resilient mounting brackets 8, wherein a first end of the mounting brackets 8 is arranged for clamping to an underside of the rail 100 and a second end of the mounting brackets 8 is arranged for pushing the lighting fixture 1 towards the head of the rail 100 having, seen in cross-section, the curved section.

[0022] Figure 3 shows a cross sectional view of the lighting fixture 1A of Figure 2 and the rail 100. The mounting surface 7 lies against the body and the head of the I-type rail 100. Also the housing 2 is pressed against the head of the rail 100 by the brackets 8. This figure also clearly shows the downward directed lighting elements 4 in recess 3. The rail 100 is formed by a head (section) 101, body (section) 102 and foot (section) 103.

[0023] Figure 4 shows the lighting fixtures 1 of Figure 2 without the rail 100 in order to show the brackets 8. Each bracket 8 comprises the first end 8-1, which engages both elongated sides of the rail 100 by clips 8-3 and 8-4 formed in the bracket 8. Each bracket 8 also comprises the second end 8-2, which is arrange to push the lighting fixture 1 by the resilient nature of the bracket 8 towards the body and the head section of the rail 100. The bracket 8 is preferably made of spring steel.

[0024] Further examples wherein the lighting fixture according to the invention can be deployed are:

a) Placement near a crossing. The light emitting elements can be controlled to emit red light as an additional warning. In order to detect a nearing train the lighting fixture can be suited with sensors for registering movement of vibration of the nearing train.
b) Indication of end of decommissioning of a section of a track.
By placing lighting fixture with a green of red LED array near sections of a track, one can easily mark the beginning or end of a safe area.
c) Marking an escape route. The light emitting elements can be controlled in such a way, that the light slides in a particular direction for marking the escape route.
d) The lighting fixture can also be used for mounting to a guardrail.
e) Dynamical dimming of the light emitting elements. By applying a dynamic movement sensor per (group of) light emitting element(s), the lighting fixture can illuminate the track at full power during detection of movement of passively illuminate with reduced power when no movement is detected.
f) Placement near switchpoint heating systems. By connecting the light fixture to the switchpoint heating system, the correct operation of the switchpoint heating system can be detected from a distance.
g) Light/dark switching. By using a twilight switch the light emitting elements can be turned automatically.

[0025] The lighting fixture can be connected to solar panels or wind turbines for powering the light emitting elements in order to obviate to placing of power cables.
[0026] The lighting fixture can also be fitted with an internal or external battery for standalone operation.
[0027] Alternative, although not preferable, mounting means for mounting the light fixture to the rail are:

glue, double-sided tape, a screw and bolt connection(s), magnet(s).

[0028] The invention is of course not limited to the described and shown preferred embodiments but extends to any embodiment falling within the scope of protection as defined in the claims and as seen in the light of the foregoing description and accompanying drawings.

Claims

1. Lighting fixture (1) for illuminating part of a track on a railway of I-type rails (100), which lighting fixture (1) is arranged for attachment to a rail (100), wherein the lighting fixture (1) comprises
an elongated housing (2), which housing (2) has a mounting surface (7), which is arranged for attachment to the body (102) of a rail (100) in lengthwise direction of the rail (100),
an array of light emitting elements (4) which are distributed in lengthwise direction over the housing (2), and power connection means for connecting the lighting fixture (1) to power means for powering the light emitting elements (4),
characterized in that the cross-sectional shape of the mounting surface (7) at least partially corresponds to a curved section of the cross-sectional shape of the rail (100), such that the housing (2) can be form-fittingly attached in at least the curved section of the rail (100) and the lighting fixture (1) comprises mounting means for mounting the lighting fixture (1) to the rail (100).

2. Lighting fixture (1) according to claim 1, wherein the mounting means comprises one or more mounting brackets (8) to releasably couple the lighting fixture (1) to the rail (100).

3. Lighting fixture (1) according to claim 2, wherein a first end of the mounting brackets (8) is arranged for clamping to an underside of foot section (103) of the rail (100) and a second end of the mounting brackets (8) is arranged for pushing the lighting fixture (1) towards the part of the rail (100) having, seen in cross-section, the curved section.

4. Lighting fixture (1) according to claim 1, 2 or 3, wherein the cross-sectional shape of the mounting surface (7) at least partially corresponds to a head section (101) of the rail (100).

5. Lighting fixture (1) according to any of the previous claims, wherein the housing (2) comprises one or more elongated recesses (3) in lengthwise direction of the housing (2), wherein each recess (3) comprises one or more light emitting elements (4).

6. Lighting fixture (1) according to claim 5, wherein the recess (3) is formed by a floor part (3-1), wall part (3-2) and ceiling part (3-3) and the light emitting elements (4) are attached to the wall part (3-2).

7. Lighting fixture (1) according to claim 6, wherein the floor part (3-1) has a reflective surface.

8. Lighting fixture (1) according to claim 6 of 7, wherein the ceiling part (3-3) has a reflective surface.

9. Lighting fixture (1) according to any of the previous claims, wherein the housing (2) comprises an elongated cavity (5) for passage of the power connection means.

10. Lighting fixture (1) according to any of the previous claims, wherein the housing (2) has a fixed cross-sectional profile.

11. Lighting fixture (1) according to any of the previous claims, wherein the lighting fixture (1) comprises coupling means (6A;6B) for coupling the lighting fixture (1) to a further lighting fixture (1).

12. Lighting fixture (1) according to any of the previous claims, wherein the light emitting elements (4) are light emitting diodes or LED's.

13. Lighting fixture (1) according to any of the previous claims, wherein the lighting fixture (1) comprises motion detection means which motion detections means are arranged for controlling the light emitting elements (4).

14. Lighting fixture (1) according to any of the previous claims, wherein the lighting fixture (1) comprises vibration detection means for detection.

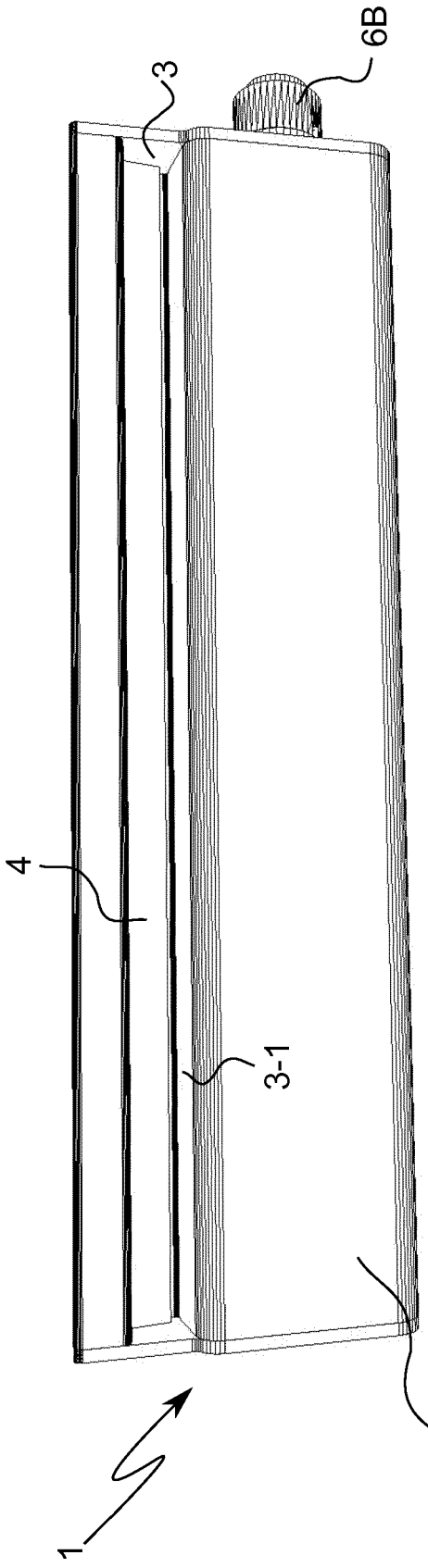

FIG. 1A

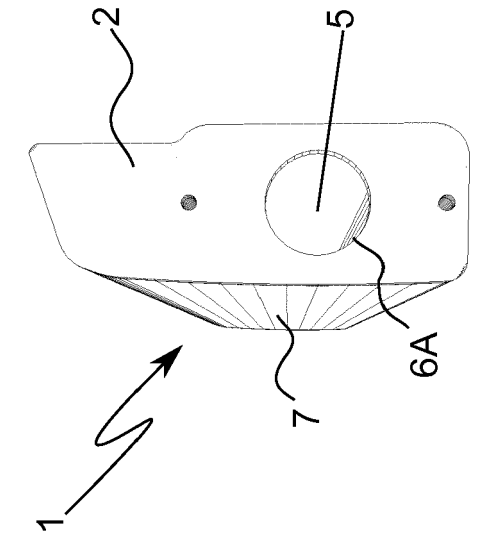

FIG. 1C

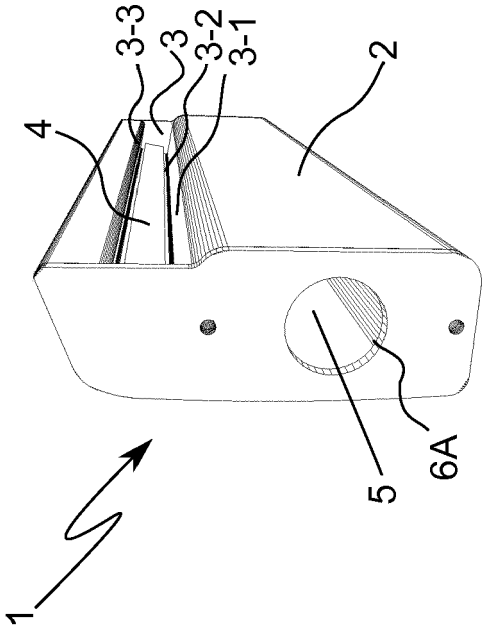

FIG. 1B

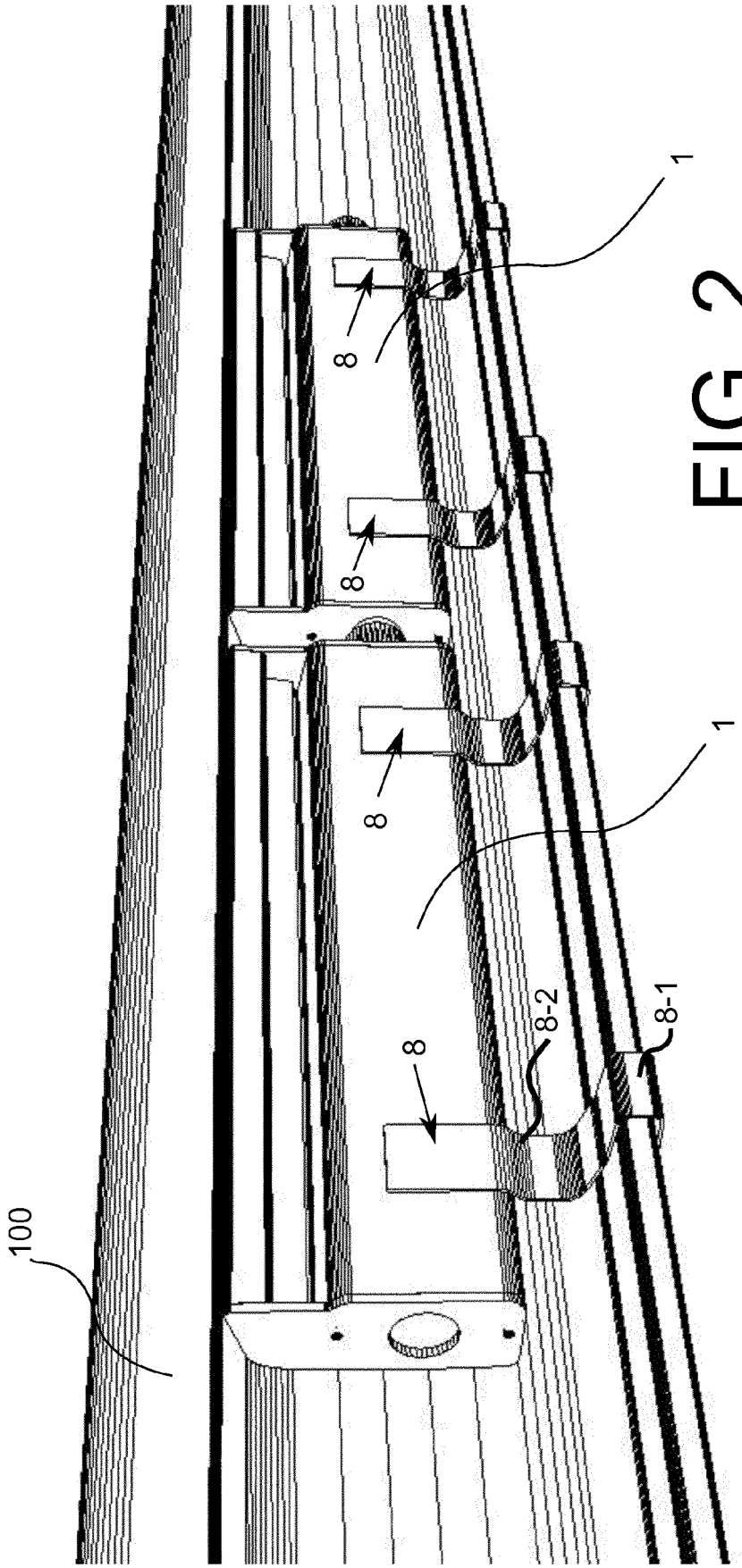

FIG. 2

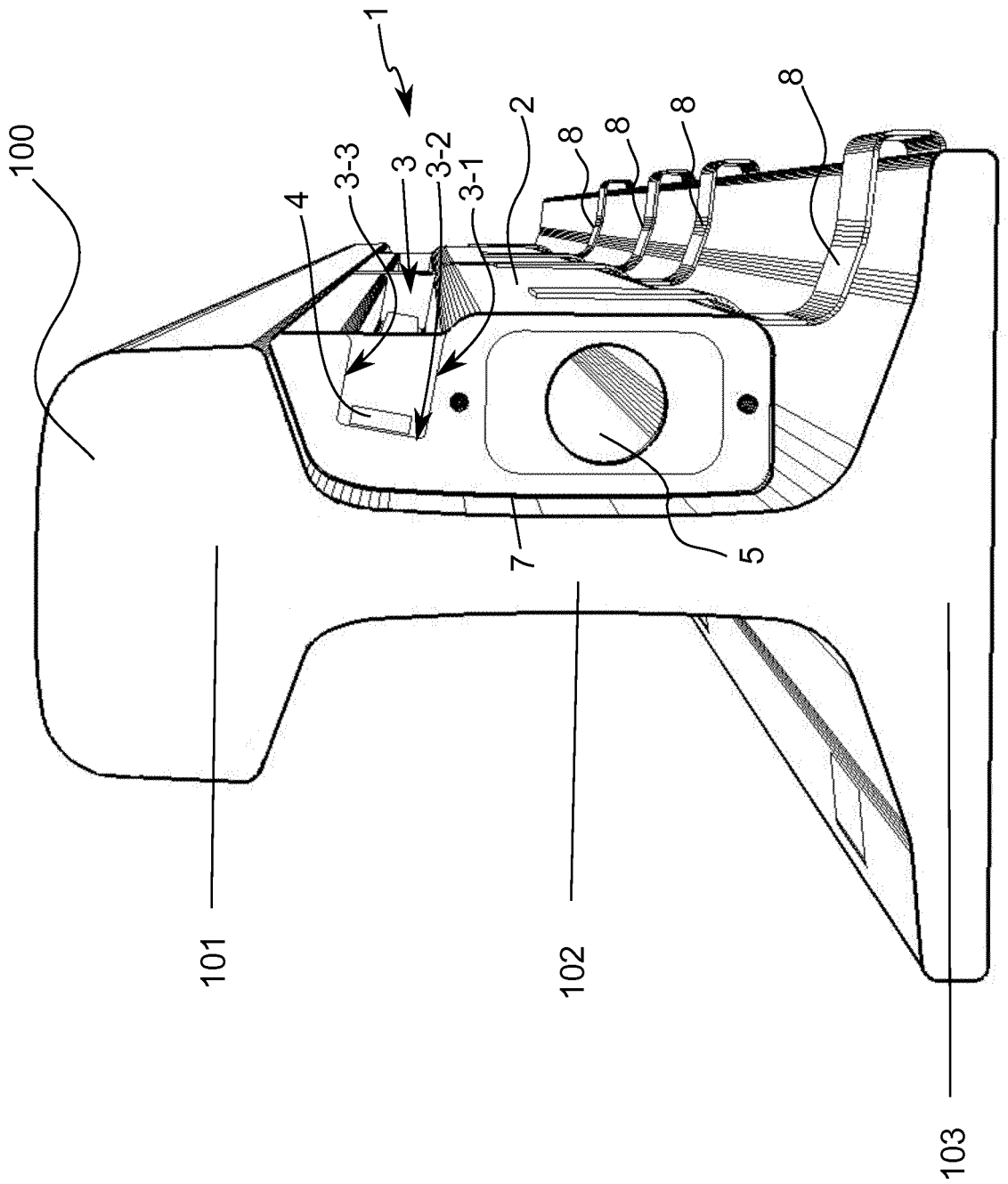

FIG. 3

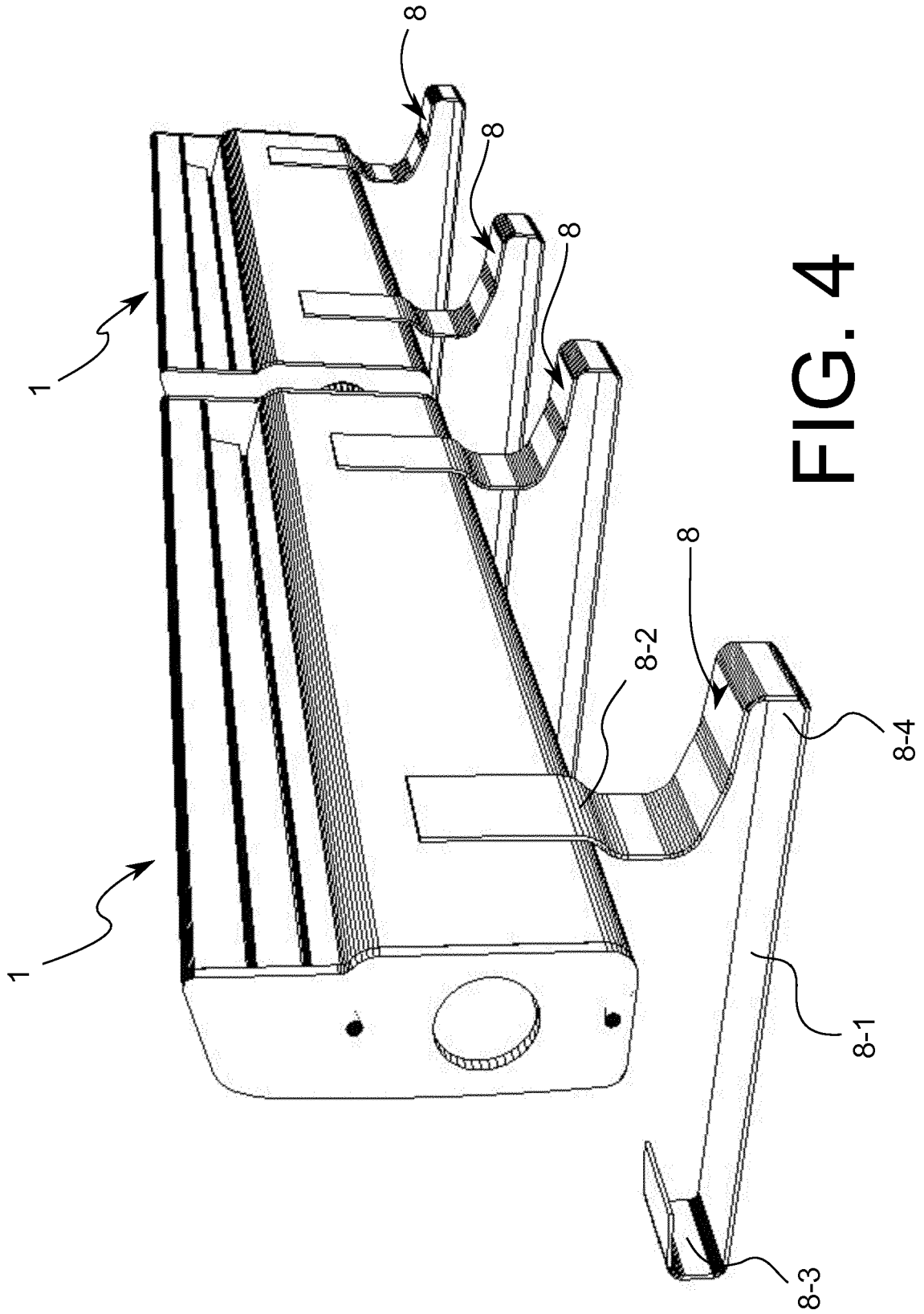

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 17 16 4777

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	DE 10 2005 038083 A1 (HOEGER ANDREAS S [DE]) 15 February 2007 (2007-02-15) * paragraphs [0005], [0006], [0008], [0009], [0012], [0013], [0018], [0019]; figure 2 *	1,2, 12-14 3-11	INV. B61L9/04 B61L23/06 B61L29/28 E01B26/00 F21S4/28
X Y A	DE 20 2007 003150 U1 (HAAG WERNER [DE]) 10 July 2008 (2008-07-10) * paragraphs [0005] - [0011], [0017] - [0022]; figures 1,2 *	1,12 2-11 13,14	
Y	EP 2 182 114 A2 (HEATPOINT B V [NL]) 5 May 2010 (2010-05-05) * paragraphs [0049] - [0063]; figures 1-4 *	2-4	
Y	DE 20 2012 102037 U1 (KLOECKNER PAUL GMBH [DE]) 3 July 2012 (2012-07-03) * paragraphs [0030] - [0040]; figures 1-5 *	5-8	
Y	US 6 145 996 A (SHIMADA TAKEHIKO [US]) 14 November 2000 (2000-11-14) * column 3, line 44 - column 4, line 52; figures 1-4 *	5-8	TECHNICAL FIELDS SEARCHED (IPC) B61L E01B F21S
Y	US 2015/241034 A1 (DANKELMANN ANDREAS [US] ET AL) 27 August 2015 (2015-08-27) * paragraphs [0034] - [0040], [0045], [0054] - [0060]; figures 3-6,11,17 *	9-11	
Y	US 5 221 138 A (BOSTJANCIC PAUL [US] ET AL) 22 June 1993 (1993-06-22) * column 2, line 54 - column 3, line 24; figures 1,2 *	7-11	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 October 2017	Massalski, Matthias

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
EP 17 16 4777

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	FR 2 951 425 A1 (AIT EL HADJ MOHAMED [FR]) 22 April 2011 (2011-04-22) * the whole document *	1	
A	DE 20 2009 001016 U1 (PROBITRON GMBH [DE]) 18 June 2009 (2009-06-18) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 October 2017	Massalski, Matthias

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20-10-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102005038083 A1	15-02-2007	NONE	
DE 202007003150 U1	10-07-2008	NONE	
EP 2182114 A2	05-05-2010	DK 2182114 T3 EP 2182114 A2	24-06-2013 05-05-2010
DE 202012102037 U1	03-07-2012	NONE	
US 6145996 A	14-11-2000	NONE	
US 2015241034 A1	27-08-2015	NONE	
US 5221138 A	22-06-1993	NONE	
FR 2951425 A1	22-04-2011	NONE	
DE 202009001016 U1	18-06-2009	NONE	

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Patent documents cited in the description

- DE 202007003150 U1 **[0002]**