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European Patent Office
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(11) **EP 2 366 829 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.09.2011 Bulletin 2011/38

(51) Int Cl.:
E01B 7/24 *(2006.01)*

(21) Application number: **11158626.9**

(22) Date of filing: **17.03.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **17.03.2010 NL 2004420**
30.03.2010 NL 2004480

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(54) **Heating / cooling element for a railway switch**

(57) The invention relates to a heating element of elongated shape, mounted along a rail such that there is contact across a large surface between the surface of the heating element and the surface of one or more of the rail web, the top of the rail toe and the lower side of the rail head and through which heating element one or more separated liquid channels extend longitudinally to extend parallel to the rail, and with, related to the operating attitude in which the heating element is mounted against the rail, liquid channels located diagonally and separated by a diagonal partition wall(3) that remote from the top and lower side of the heating element, approximately halfway its height, extends and inside the heating element connects to the front and back wall, and which wall (3) makes an angle with the horizontal and vertical, viewed from the rail extending inclined upward, and there above a liquid channel and there below a liquid channel are present.

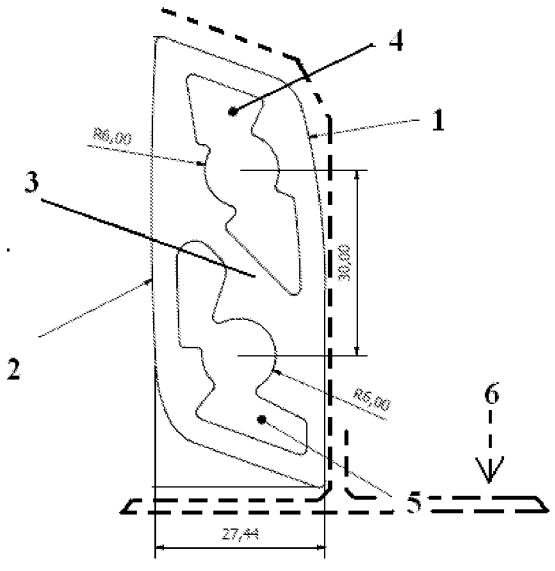

Fig. 1

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Description

[0001] It is known that switch heating has its purpose such that during winter the switch can be switched without problems: sticking of parts due to frost is prevented; similar problems can arise due to snow.

[0002] Prior art installations operate with a gas burner pipe mounted to the side wall (web) of the rail and gas flows within said pipe and is burned (see e.g. EP0014485A1 or NL1015323/Heatpoint). Or with a by a gas burner or geothermal heated liquid flows through an against the rail clamped channel (see e.g. NL1022069-C1/EP1262597B1/Railconsult or EP1645688A3/Scharrenbroich). Or an electrical heating lint is mounted to the rail (see e.g. AT10906U1/Scharrenbroich). In case of AT10906U1/Scharrenbroich (electrical heating lint) a cast object of aluminium is tightly fitting between the lower side of the rail head and the top side of the rail toe located against the rail web and through said cast object the supply and return of resistance wire extends. In case of EP1645688A3/Scharrenbroich (liquid heating) a to the shape of the rail adapted heating body is used (see fig. 2) which extends from closely above the top side of the rail toe along the rail web and along the rail head to just below the top side of the rail head and within it three liquid channels above each other, a first just above the rail toe, a second halfway the height/partly below the rail head and a third next to the rail head. In case of NL1022069C1/EP1262597B1/Railconsult (liquid heating) a liquid channel is provided by welding a vertical sheet to the top side of the rail toe and the lower side of the rail head (fig. 1/fig. 9) or two liquid pipes are mounted to the rail web, the one on top of the rail toe, the other against the lower side of the rail head (e.g. fig. 12). In case of NL1015323/Heatpoint (gas burner pipe) a heating body is provided by a thin walled, angular extrusion profile mounted partly against the side and partly against the lower side of the rail head.

[0003] WO2009/109664 A (Triple S) discloses an aluminium profile in which separate supply and exhaust channels of the switch heating are clamped within along the length extending grooves in the profile.

[0004] The object of the invention is versatile and relates to e.g. one or more of the following: optimised efficiency, optimised even transfer of heat/cold, applicable to two or more rail types (e.g. UIC60 or UIC 54), modular construction, simple coupling.

[0005] Thus the proposal is a heating / cooling element (further: heating element) of elongated shape, mounted along a rail such that there is contact across a large surface between the surface of the heating element and the surface of one or more of the rail web, the top of the rail toe and the lower side of the rail head and through which heating element one or more separated liquid channels extend longitudinally to extend parallel to the rail.

[0006] Further the heating element has one or more of the following features, preferably related to the operating attitude in which the heating element is mounted against the rail (the numbers refer to the drawing): fits tightly in the one attitude (side 1) to the one type and in the other attitude, e.g. upside down (side 2) to another rail type, wherein preferably in both attitudes a liquid channel (4) is located close to the rail web and/or rail head; fits below the rail head, next to the rail web and above the rail toe; fills substantially the space below the rail head that is sideways limited by the rail web and the vertical tangent to the rail head; is completely below the rail head; liquid channels are diagonally located and/or liquid channels are separated by a diagonal intermediate bulkhead; in side view two or more liquid channels at least partly overlap, wherein preferably in the overlap the top liquid channel is closer to the rail or rail web; one or each liquid channel (4, 5) is provided, viewed in the section perpendicular to the flow direction of the liquid through the channel (further: viewed in cross section), by a central part of simple shape, e.g. round or square and one or more from the central part extending branches of e.g. substantially triangular or rectangular shape, possibly widening in the direction away from the central part; is an extrusion or cast part; made of metal; thick walled; at least one supply and at least one exhaust liquid channel; flow through section of the liquid channels is substantially equal; the shape of the one liquid channel, viewed in cross section, is exactly equal to or differs considerably from the shape of the other liquid channel; 1, 2 or all liquid channels have a substantially symmetrical shape, viewed in cross section; has a modular construction from length pieces in mutual extension and coupled by intermediate couplings; a coupling seals the branches and connects only the central parts of the liquid channels; remote from its top and lower side, preferably approximately halfway its height, a body partition wall (3) extends which inside the heating element connects to the front and back wall, this wall (3) possibly makes an angle with the horizontal and vertical, preferably viewed from the rail inclined upward and preferably there above is a liquid channel and there below is a liquid channel; the wall thickness of the front and/or back wall varies considerably.

[0007] In the drawing is the heating element shown in an attitude wherein the rail 6 is located to the right of the heating element. In the central part of a liquid channel 4, 5 a stud as part of a coupling can be easily clamped.

Claims

1. A heating / cooling element (further: heating element) of elongated shape, mounted along a rail such that there is contact across a large surface between the surface of the heating element and the surface of one or more of the rail web, the top of the rail toe and the lower side of the rail head and through which heating element one or more separated liquid channels extend longitudinally to extend parallel to the rail, and with, related to the operating attitude in which the heating element is mounted against the

rail, at least one of the following:

- the liquid channels are located diagonally and the liquid channels are separated by a diagonal partition wall(3) that remote from the top and lower side of the heating element, approximately halfway its height, extends and inside the heating element connects to the front and back wall, and which wall (3) makes an angle with the horizontal and vertical, viewed from the rail extending inclined upward, and there above a liquid channel and there below a liquid channel are present;
- in side view two or more liquid channels overlap at least partly, wherein in the overlapping part the top liquid channel is closer to the rail head and rail web of the rail;
- each liquid channel (4, 5) is provided, viewed in the section perpendicular to the flow direction of the liquid through the liquid channel (the cross section), by a central part of simple, e.g. round or square, shape and one or more from the central part extending branches of e.g. substantially triangular or rectangular shape, possibly widening in the direction away from the central part;
- the flow through section of the liquid channels is substantially equal;
- all liquid channels have a substantially symmetrical shape in cross section;
- the one liquid channel is connected to a liquid supply and the other liquid channel is connected to a liquid exhaust.

2. The element according to claim 1, snugly fitting in the one attitude (side 1) to the one type and in the other attitude, upside down (side 2), to the other rail type below the rail head, next to the rail web and above the rail toe, the space below the rail head sideways limited by the rail web and the vertical tangent to the rail head substantially completely filling and completely below the rail head, wherein in both attitudes a liquid channel (4) is located close to the rail web and rail head.

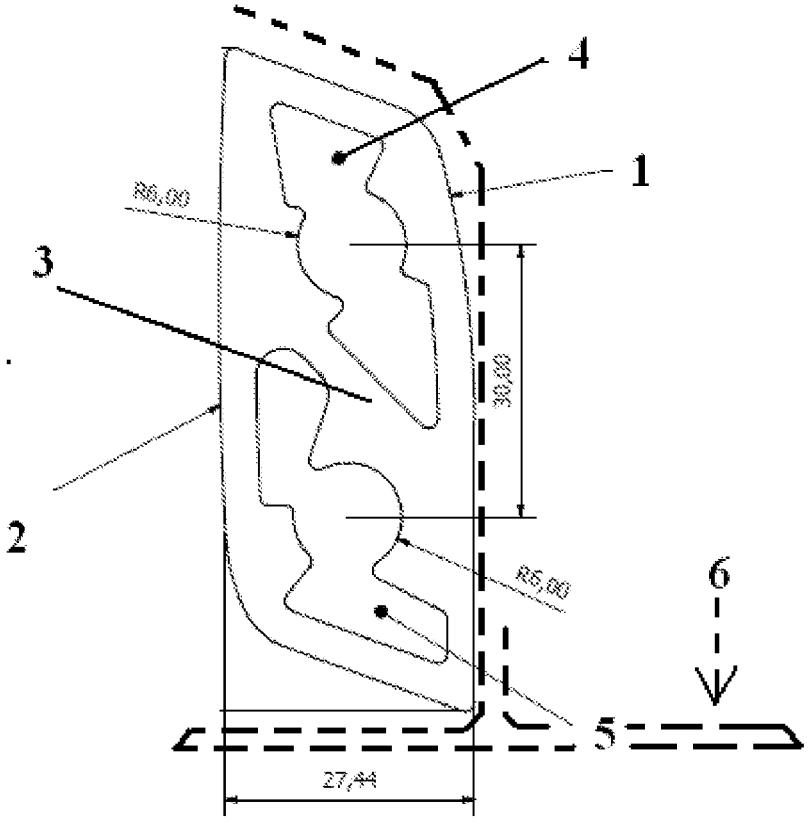

Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 11 15 8626

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	WO 2009/109664 A1 (TRIPE S GMBH [DE]; FUNKE MICHAEL [DE]; FRENZEL TIM [DE]) 11 September 2009 (2009-09-11) * page 7, last paragraph - page 10, paragraph 2; figures * -----	1,2	INV. E01B7/24
			TECHNICAL FIELDS SEARCHED (IPC) E01B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 June 2011	Movadat, Robin

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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T : theory or principle underlying the invention
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& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 15 8626

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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21-06-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009109664 A1	11-09-2009	EP 2260149 A1	15-12-2010
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REFERENCES CITED IN THE DESCRIPTION

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- NL 1015323, Heatpoint **[0002]**
- NL 1022069 C1 **[0002]**
- EP 1262597 B1 **[0002]**
- EP 1645688 A3, Scharrenbroich **[0002]**
- AT 10906 U1, Scharrenbroich **[0002]**
- WO 2009109664 A **[0003]**