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(54) **Electrical insulation rail joint and rail with coating**

(57) Electrical insulation rail joint and rail (1) for a railway, provided with a coating of a synthetic rubber, wherein the coating can have one or more of the following mechanical properties: hardness Shore A of at least 85 or 90, such as between 92 and 95; a hardness Shore D of at least 30 or 35, e.g. between 38 and 42; a tension strength of at least 15 or 20, e.g. 21 N/mm², an elongation at failure of at least 300 or 350 or 400, e.g. 425%; and a rupture strength of at least 45 or 50 or 55, e.g. 58 kN/m. The coating can be made of a copolymer, preferably a polyol and an isocyanate, preferably such that an elastomeric polyurethane or polyurethane rubber is obtained.

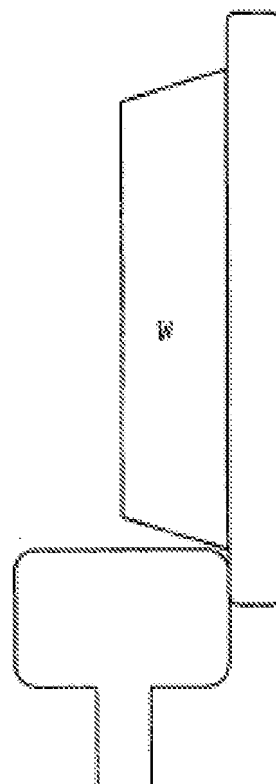


Fig. 3

Description

[0001] It is generally known to provide a rail for a railway for human traffic with a coating which protects against weather. Also the known electrical insulation joint, so called ES joint, is provided with a coating which also protects against the generally known, by iron dust caused galvanic short circuiting. Refer to, e.g., RU2203295.

[0002] From practice one learned that the known coating will come loose after a while. For the ES joint this means an increasing fear for failure due to iron dust, e.g. if the coating peels off at locations such as the foot of the rail adjacent the profile plate. Iron dust can then offer a bridge at the damaged foot, such that the ES joint causes a failure.

[0003] It is possible to locate a catching magnet to catch the iron dust, refer to, e.g., EpB1717125 and NL1018155. It has come out that this solution is far from optimum.

[0004] Intensive tests have resulted in a novel coating with long lasting elasticity, high wear resistance, high galvanic action and a long life. This has advantages, both for a generic rail and an ES joint, which latter is better and more durable protected against failure due to iron dust. Corrosion by stray current is avoided and it has come out that the coating isolates to 15 thousand Volts.

[0005] Apart from that the ES joint is better protected against the weather like sun and rain and one can reliably avoid that water penetrates between plate, glue and rail, such that corrosion is reliably avoided.

[0006] The coating is a synthetic rubber and has preferably one or more of the following mechanical properties: hardness Shore A of at least 85 or 90, such as between 92 and 95; a hardness Shore D of at least 30 or 35, e.g. between 38 and 42 (hardness Shore A and D measured according to DIN53505); a tension strength of at least 15 or 20, e.g. 21 N/mm², an elongation at failure of at least 300 or 350 or 400, e.g. 425% (tension strength and elongation at failure measured according to DIN53504); and a rupture strength of at least 45 or 50 or 55, e.g. 58 kN/m (measured according to DIN53515).

[0007] More preferably the coating is made of a copolymer, preferably a polyol and an isocyanate, preferably such that an elastomeric polyurethane or polyurethane rubber (AU or EU) is obtained.

[0008] A preferred coating is obtained by mixing equal volume parts of component A and component B, wherein component A contains 4,4'-methylene difenyl-diisocyanate (MDI) 10-90% and component B contains a mixture with polyetherdiamin, min 25% en diethylmethylbenzene diamin 10-25%. Immediately after mixing, the coating is applied.

A convenient coating can e.g. be obtained by 3M (Minnesota Mining & Manufacturing Company) sold as Copon Hycote 165XF or Scotchkote Urethane Coating (e.g. 3M United Kingdom plc, Northallerton, North Yorkshire)

[0009] For the coating preferably one or more of the

following applies: lacks solvent; is applied by spraying, e.g. wherein during spraying two mutually separated components are mutually mixed within the spray jet such that the coating material is obtained; is applied in a single layer; is applied onto a completely prefabricated ES joint; covers the bridging joint plate of the ES joint completely; is applied such that the rail or completed fabricated ES joint is covered with coating all around; completely covers the sole and foot, both below and above; covers the rail head completely, except from the tread (BS) and the upper part of the side; has a layer thickness of at least 0.1 or 0.5 millimetres and preferably not more than 3 millimetres; the top of the rail (BS), thus the tread, remains substantially completely free from coating or is substantially completely cleaned from coating; the top part of the side of the rail head, thus the part of the side immediately connecting to the tread (BS), remains substantially completely free from coating or is substantially completely cleaned from coating, wherein said top part preferably extends to not more than 10 or 12 or 14 or 18 or 20 millimetre below BS.

[0010] As an example fig. 1 and 2 show an end view and a side view of an ES joint.

[0011] The rail 1 is provided by the head 1a, the soul 1b and the foot 1c. Two in mutual elongation located rails 1 are mutually galvanically separated by a galvanic isolating plate 2. Via at both sides of the soul 1b a the isolation 2 bridging metal joint plate 3 the rails 1 are mutually mechanically coupled. The joint plate 3 is provided with a Shell 4 of galvanic isolating material. Through holes 5 in the joint plate 3 and the soul 1b bolts are inserted. The bolts are by isolation material galvanically separated from the rail 1 and the joint plate 3.

[0012] Fig. 3 shows an end view of the rail 1 which supports a wheel of a train. The Wheel flange bears against the side of the head.

[0013] With a spray gun the coating is sprayed onto the rail of fig. 1-3, such that a coating with a completely contiguous surface is obtained with which the lower and upper side of the foot and also the soul and head are completely covered. The tread (BS) and the upper 14mm -BS of the side of the head 1a are treated with an en anti-adhesive such that the coating after curing can be easily removed from said surfaces. The completed rail is then all around completely coated, apart from the tread (BS) and the top part, to a level 14mm -BS, from the side of the head 1a.

Claims

1. ES joint or rail for a railway for civil traffic, provided with a coating of a synthetic rubber.
2. Rail according to claim 1, wherein the coating has one or more of the following mechanical properties: hardness Shore A of at least 85 or 90, such as between 92 and 95; a hardness Shore D of at least 30

or 35, e.g. between 38 and 42 (hardness Shore A and D measured according to DIN53505); a tension strength of at least 15 or 20, e.g. 21 N/mm², an elongation at failure of at least 300 or 350 or 400, e.g. 425% (tension strength and elongation at failure measured according to DIN53504); and a rupture strength of at least 45 or 50 or 55, e.g. 58 kN/m (measured according to DIN53515). 5

3. Rail according to claim 1 or 2, wherein the coating is made of a copolymer, preferably a polyol and an isocyanate, preferably such that an elastomeric polyurethane or polyurethane rubber (AU or EU) is obtained. 10

4. Rail according to any of claims 1-3, wherein the coating is obtained by mixing equal volume parts of component A and component B, wherein component A contains 4,4'-methylene difenyl-diisocyanate (MDI) 10-90% and component B contains a mixture with polyetherdiamin, min 25% en diethylmethylbenzenediamin 10-25%. 15 20

5. Rail according to any of claims 1-4, wherein for the coating preferably one or more of the following applies: lacks solvent; is applied by spraying, e.g. wherein during spraying two mutually separated components are mutually mixed within the spray jet such that the coating material is obtained; is applied in a single layer; is applied onto a completely prefabricated ES joint; covers the bridging joint plate of the ES joint completely; is applied such that the rail or completed fabricated ES joint is covered with coating all around; completely covers the sole and foot, both below and above; covers the rail head completely, except from the tread (BS) and the upper part of the side; has a layer thickness of at least 0.1 or 0.5 millimetres and preferably not more than 3 millimetres; the top of the rail (BS), thus the tread, remains substantially completely free from coating or is substantially completely cleaned from coating; the top part of the side of the rail head, thus the part of the side immediately connecting to the tread (BS) remains substantially completely free from coating or is substantially completely cleaned from coating, wherein said top part preferably extends to not more than 10 or 12 or 14 or 18 or 20 millimetre below BS. 25 30 35 40 45

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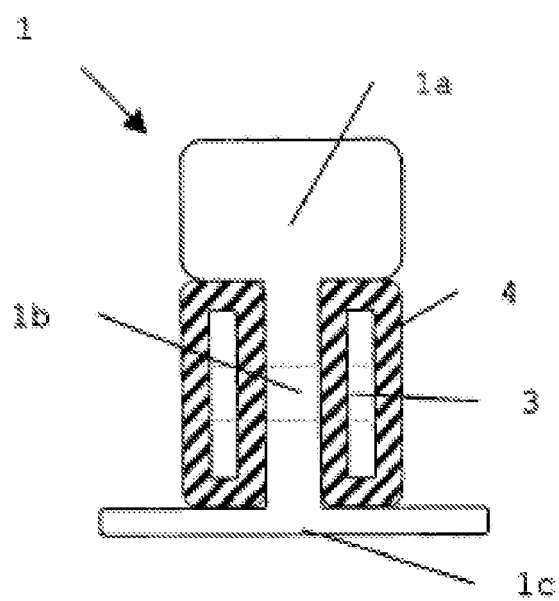


Fig. 1

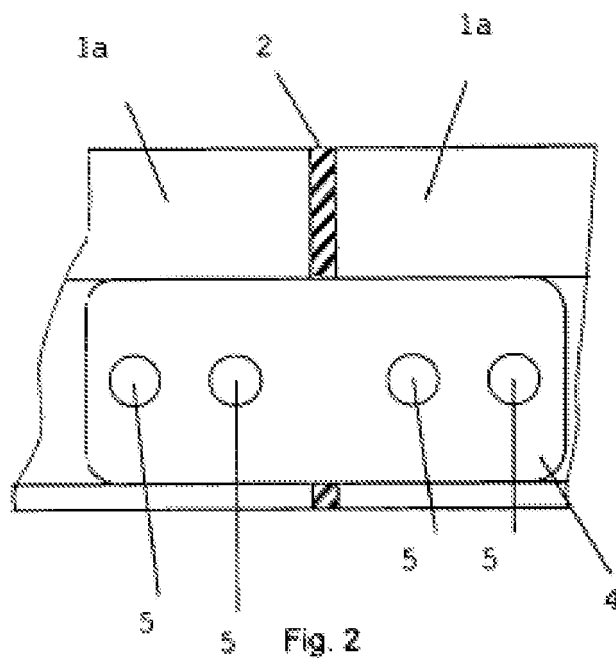


Fig. 2

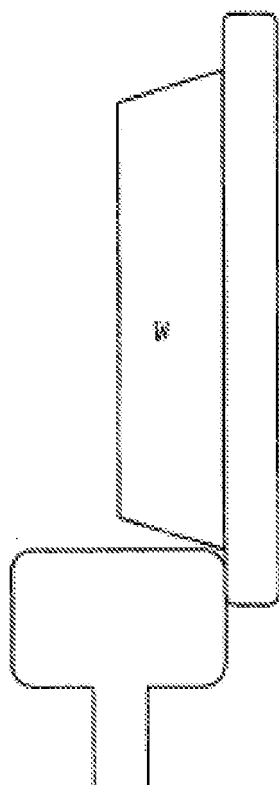


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- RU 2203295 [0001]
- NL 1018155 [0003]