A railway having rails with tapered ends. The tapered ends may lie flush with one another. A connector plate may connect the tapered ends of the rails together. The tapered ends and the connector plate may allow the railway to expand and contract due to temperature or high speed trains without misalignment or distortion.
TAPERED RAILWAY APPARATUS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of priority of U.S. provisional application No. 61/678,512, filed Aug. 1, 2012, the contents of which are herein incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to a tapered railway apparatus and, more particularly, to a tapered railway apparatus with a connector plate that allows for expansion.

[0003] The track on a railway or railroad, also known as the permanent way, is the structure consisting of the rails, fasteners, railroad ties and ballast (or slab track), plus the underlying subgrade. At high temperatures, rigid rails expand and buckle, causing rail bed damage, slow downs, and derailings. The rigid joints do not allow rails to adjust to temperature changes.

[0004] As can be seen, there is a need for a railway that allows for expansion and contraction.

SUMMARY OF THE INVENTION

[0005] In one aspect of the present invention, a railway apparatus comprises: a plurality of rails comprising a head, a web, a foot, a first side and a second side, and ends, wherein the plurality of rails comprises at least a first rail and a second rail, wherein the first rail comprises a taper from the first side to the second side and the second rail comprises a taper from the first side to the second side opposite the taper of the first rail; and a connector plate connecting the plurality of rails together, wherein the connector plate comprises a first side and a second side, wherein the first side is connected to the first rail and the second side is connected to the second rail, wherein at least one of the first side and the second side comprises expansion slots facilitating the lateral movement of the first rail and the second rail relative to the connector plate.

[0006] These and other features, aspects and advantages of the present invention will become more readily understood with reference to the following drawings, description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a perspective detail view of the present invention demonstrating a flashtail tapered joint;

[0008] FIG. 2 is a perspective detail view of the present invention demonstrating an expanded rail tapered joint;

[0009] FIG. 3 is a top view of the present invention demonstrating the tapering of joints;

[0010] FIG. 4 is a perspective detail of the present invention demonstrating the use of a flanged spike;

[0011] FIG. 5 is a perspective view of the flanged spike of FIG. 4;

[0012] FIG. 6 is a side view of the flanged spike of FIG. 4;

[0013] FIG. 7 is a section detail view of the present invention along line 7-7 in FIG. 4;

[0014] FIG. 8 is a perspective view of the present invention demonstrating use of the stepped flange; and

[0015] FIG. 9 is a section detail view of the present invention along line 9-9 in FIG. 8.

DETAILED DESCRIPTION OF THE INVENTION

[0016] The following detailed description is of the best currently contemplated modes of carrying out exemplary embodiments of the invention. The description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention, since the scope of the invention is best defined by the appended claims.

[0017] Broadly, an embodiment of the present invention provides a railway having rails with tapered ends. The tapered ends may lie flush with one another. A connector plate may connect the tapered ends of the rails together. The tapered ends and the connector plate may allow the railway to expand and contract due to temperature or high speed trains without misalignment or distortion.

[0018] The present invention may include a high speed rail system that is resistant to impact and heat distortion. The present invention may eliminate rail distortion due to temperature variations and prevents join impact at rail connections allowing for continuous high speed operations. The present invention may include rail ends having angled tapers instead of square butt-joined allowing continuous wheel support across the joint. In certain embodiments, the present invention may further include slippage plates to allow the expansion and contraction of the rails without distortion.

[0019] Referring to FIGS. 1 through 9. In certain embodiments, the present invention may include rails 10 with tapered end joints 12. The rails 10 may include a head 28, a web 30, a foot 14, a first side 32 and a second side 34. The taper may be from the first side 32 to the second side 34, which may mate with a rail with a taper from the second side 34 to the first side 32. The rail 10 with the tapered joint 12 may allow the wheels of a train to cross the tapered joints 12 smoothly. The tapered joints 12 may allow lateral movement of the rails to compensate for expansion and contraction.

[0020] The present invention may further include connector plates 16 that connect the tapered end joints 12 together. The connector plates 16 may be bolted onto the first side 32 and the second side 24 of the web 30. In certain embodiments, the connector plates 16 may have a first side that is securely fastened to the web 30 and a second side that may include expansion slots 18. The expansion slots 18 may have a larger width than the bolts 36 that secure the connector plates 16 to the rail 10. Therefore, the connector plates 16 may move along the bolts 36 and the connector plate 16 allows lateral movement between the tapered end joints 12.

[0021] As illustrated in FIG. 1, the tapered end joints 12 are connected. When temperature rises or the trains are running at high speeds, the rails 12 tend to expand and therefore become damages. However, as illustrated in FIG. 2, when the rails 12 expand, the connector plates 16 may shift. In particular, the expansions slots 18 may move along the bolts 36 and therefore the rails 12 may give with the expansion. Therefore, the present invention may prevent damage of the railway, which saves on the cost of repair.

[0022] The rails 10 of the present invention may be mounted to the cross ties 20 by flanged spikes 22. In certain embodiments, a stepped flange 24 may be used. The stepped flange 24 may include a first end and an elevated second end. The first end of the stepped flange 24 may be secured to the cross tie 20 by a spike 26. The elevated second end may be secured over the foot 14 of the rail 10. Therefore, the stepped flange 24 may secure the rail 10 to the cross tie 20 while allowing limited rail 10 slippage without distortion of the rail bed.
[0023] It should be understood, of course, that the foregoing relates to exemplary embodiments of the invention and that modifications may be made without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. A railway apparatus comprising:
   a plurality of rails comprising a head, a web, a foot, a first side and a second side, and ends, wherein the plurality of railways comprises at least a first rail and a second rail, wherein the first rail comprises a taper from the first side to the second side and the second rail comprises a taper from the first side to the second side opposite of the taper of the first rail;
   a connector plate connecting the plurality of rails together, wherein the connector plate comprises a first side and a second side, wherein the first side is connected to the first rail and the second side is connected to the second rail, wherein at least one of the first side and the second side comprises expansion slots facilitating the lateral movement of the first rail and the second rail relative to the connector plate.

2. The railway apparatus of claim 1, a bolt having a width smaller than the expansion slot connects the connector plate to the at least one of the first rail and the second rail through the expansion slot.

3. The railway apparatus of claim 1, further comprising flanged spikes, wherein the flanged spikes mount the foot of the rail to a cross tie.

4. The railway apparatus of claim 1, further comprising a stepped flange comprising a first end and an elevated second end, wherein the first end is mounted to a cross tie by a pike and the second end covers foot of the rail over the cross tie.

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