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(54) Method for operating a railway line

(57) The invention relates to a method for operating a railway line comprising at least one track, wherein trains of a first type and trains of a second type are driven over the railway line with substantially the same normal running speed, in which the trains of the second type are formed by trains with a traction and braking charac-

teristic differing from that of the trains of the first type.

The invention also concerns a train for transporting road vehicles, comprising a loading area for road vehicles until a combined length of 25 m, drive means, a braking device and control means for automatic remote operation for the purpose of controlling the drive means and the braking device.

EP 1 170 190 A1

Description

[0001] The present invention relates to a method as set forth in claims 1-8.

[0002] The invention also relates to a train as set forth in claim 9 and to a railway line as according to claim 10 or 11, a rail network as according to claim 12, and in particular a control system as according to claims 13 and 14.

[0003] The present invention is particularly applicable to railway lines with the configuration of the so-called "Betuwe" line currently being laid in the Netherlands. This is a railway line which is specifically adapted for goods transport, which is predominantly at least double-track and is provided with an overhead line system for supplying the trains with a voltage of 25 kV.

[0004] The invention is however also applicable in principle to similar railway lines which are not provided with overhead lines and which are therefore only suitable for diesel traction. In respect of the huge investment involved in this project, a study has been made as to whether this railway line can be used for other applications, for instance to relieve the road traffic network in the area in question.

[0005] There therefore exists a need for a method of operating such a railway line, wherein trains of a first type are applied which are formed by conventional goods trains, for instance so-called block trains, for transporting large quantities of material of the same type and for trains of the second type formed by trains suitable for transporting truck trailers.

[0006] It is pointed out here that "conventional" goods trains are also understood to mean container trains, for instance also container trains with containers stacked in two layers.

[0007] Truck trailers are understood to mean not only trucks provided with a trailer or a semi-trailer, but also normal trucks with a single frame. The transport of trucks on goods trains is of course not new; reference is made here to diverse trains known in the alpine countries as "Rollende Landstraße".

[0008] These trains run only a few times a day however. In order to be able to represent a useful alternative to road transport for shorter distances, the frequency of trains for transporting truck trailers must be high and moreover flexible.

[0009] The measures according to claim 1 provide a train of the second type which has a traction and braking characteristic differing from that of trains of the first type. A greater acceleration and deceleration power is hereby obtained, thus resulting in a greater flexibility.

[0010] The measure that the trains of the second type are adapted to transport a maximum of eight truck trailers enables running with small units, so that the frequency can be high. Envisaged in the first instance are frequencies of several trains per minute. This requires a great accuracy of control, which is a secondary reason for a high traction and braking power. The high stand-

ards of precision at such a frequency are preferably fulfilled in that the trains of the second type are controlled automatically without human intervention.

[0011] It is not particularly relevant here whether the 5 trains of the first type, i.e. conventional goods trains with a slow traction and braking characteristic, are controlled automatically or not.

[0012] An attractive embodiment is obtained when the 10 trains of the second type are each adapted to transport road vehicles up to a combined length of 25 m. This provides the option of placing each truck trailer on a separate train. Two smaller truck trailers, for instance two separate trucks, could be placed together on one train.

[0013] This provides a further form of flexibility since 15 at different destinations along the railway line there is a short waiting time before a train departs for the desired destination; the destination can be determined for each train individually.

[0014] According to another preferred embodiment 20 more than one train of the second type is present on the track between a pair of trains of the first type. This is a consequence of the greater frequency of the trains of the second type. Owing to the different running characteristics of the trains of the second type the mutual spacing 25 between the trains of the second type is smaller than the spacing between the trains of the first type and trains of the second type. The trains of the second type do after all have modified characteristics, so that a shorter distance can be maintained here.

[0015] The railway line is of course provided with a starting station and an end station. It is however also possible that the railway line is provided with intermediate stations, and that the trains of the second type call into these stations by leaving the track and stop on an 30 auxiliary track forming part of a station, whereafter the truck can be loaded or offloaded, whereafter the trains can rejoin the track of the railway line.

[0016] The invention also relates to a train as set forth in claim 11.

[0017] The invention relates to a railway line, or the 40 infrastructure, which is formed as according to the measures of claim 12.

[0018] Such a railway line can form part of a network 45 of such railway lines, but can of course be interlinked with the existing conventional rail network. Combined transport of trains of the first type and trains of the second type can take place particularly easily in this latter situation.

[0019] The invention also relates to a control system 50 as set forth in claims 15 and 16. The control system in particular is of the greatest importance in implementing the present invention. The demands on the control system are so high that these cannot be met by people. Different configurations are possible for driving the 55 trucks onto the trains.

[0020] According to a first configuration the track on which loading takes place is bounded on at least one side by a loading platform with the same height as the

loading floor of the train. By placing two trains one behind the other the truck can drive via the rear train onto the first train. This first train can then be loaded and depart. The rear train then moves to the position of the leading train and, once a subsequent loaded train has arrived, a truck on this train can then leave the trains via the leading train. The leading train can then be loaded again in the initially stated manner.

[0021] According to another configuration a platform rotatable on a vertical axis is placed on the train, which platform can be rotated such that it can be placed at an incline so that trucks can drive on and off.

[0022] Finally, it is possible to make use of movable ramps which are rotatable on a horizontal axis onto the surface of the loading platform above the railway line. The trains can then be loaded via these ramps. It is also possible to configure such ramps for tilting on a horizontal axis. A final solution provides platforms which can be displaced laterally between the loading platform and the train. The truck can then drive onto the platform which can then be placed on the train.

[0023] Loading and offloading of containers can take place with a container crane.

[0024] The invention is not however limited to such technical embodiments.

on the track at any time.

7. Method as claimed in claim 6, **characterized in that** more than one train of the second type is present on the track between a pair of trains of the first type.

8. Method as claimed in claim 7, **characterized in that** the mutual spacing between the trains of the second type on the track is smaller than the spacing between trains of the first type and trains of the second type.

9. Method as claimed in any of the foregoing claims, **characterized in that** the railway line comprises intermediate stations, and that the trains of the second type call into stations by leaving the railway line, stop on an auxiliary track forming part of a station and then rejoin the railway line.

10. Train for transporting road vehicles, **characterized by** a loading area for road vehicles up to a combined length of 25 m, drive means, a braking device and control means for automatic remote operation for the purpose of controlling the drive means and the braking device.

11. Train for transporting containers, **characterized by** a loading area for containers up to a total of 20 TEU, drive means, a braking device and control means for automatic remote operation for the purpose of controlling the drive means and the braking device.

12. Railway line adapted for trains of the first type and for trains of the second type, wherein stations are placed on the railway line which are adapted to load and offload trains of the second type, **characterized in that** the stations are provided with auxiliary tracks wherein loading and offloading devices for the trains of the second type are placed.

13. Railway line as claimed in claim 12, **characterized in that** the railway line forms part of a rail network comprising more such railway lines as claimed in claim 12.

14. Railway line as claimed in claim 13, **characterized in that** the rail network is connected to the rail network forming part of the known art.

15. Control system for controlling a railway line as claimed in claim 12 or 13, **characterized in that** the trains running on the railway line are controlled for operating of the railway line as claimed in any of the claims 1-9.

16. Control system as claimed in claim 15, **characterized in that** the control system is adapted to cause

Claims

1. Method for operating a railway line comprising at least one track, wherein trains of a first type and trains of a second type are driven over the railway line with substantially the same normal running speed, **characterized in that** the trains of the second type are formed by trains with a traction and braking characteristic differing from that of the trains of the first type.
2. Method as claimed in claim 1, **characterized in that** the trains of the second type are adapted to transport a maximum of eight truck trailers.
3. Method as claimed in claim 1, **characterized in that** the trains of the second type are adapted to transport containers up to a maximum of 20 TEU.
4. Method as claimed in claim 1, 2 or 3, **characterized in that** the trains of the second type are controlled automatically without human intervention.
5. Method as claimed in claim 1, 2, 3 or 4, **characterized in that** the trains of the second type are each adapted to transport road vehicles up to a combined length of 25 m.
6. Method as claimed in any of the claims 1-5, **characterized in that** a larger number of trains of the second type than trains of the first type are present

a train of the second type to depart from a station so that the train can join a series of trains running on the railway line, wherein use is made of the method as claimed in any of the claims 1-9.

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EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT									
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<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>26 September 2001</td> <td>Chlosta, P</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	26 September 2001	Chlosta, P
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CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document							
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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