

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 1 170 190 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:

**09.01.2002 Bulletin 2002/02**

(51) Int Cl.7: **B61L 27/00, B61C 17/12**

(21) Application number: **01202578.9**

(22) Date of filing: **05.07.2001**

(84) Designated Contracting States:

**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**

Designated Extension States:

**AL LT LV MK RO SI**

(30) Priority: **06.07.2000 NL 1015632**

(71) Applicant: **Aython B.V.**

**4818 SJ Breda (NL)**

(72) Inventor: **Van Haaren, Ruthgerus Johannes**

**Hendrikus**

**4818 GJ Breda (NL)**

(74) Representative: **Eveleens Maarse, Pieter**

**Arnold & Siedsma, Advocaten en**

**Octrooigemachtigden, Sweelinckplein 1**

**2517 GK Den Haag (NL)**

(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 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 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 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 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 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 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 infrastructure, which is formed as according to the measures of claim 12.

**[0018]** Such a railway line can form part of a network 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 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 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.

## 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 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

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.

5

10

15

20

25

30

35

40

45

50

55



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 01 20 2578

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 958 987 A (CIT ALCATEL) 24 November 1999 (1999-11-24) * column 4, line 30 - column 8, line 58; figures 1-4 * ---	1,10-12, 15	B61L27/00 B61C17/12
A	EP 0 554 983 A (WESTINGHOUSE BRAKE & SIGNAL) 11 August 1993 (1993-08-11) * column 3, line 1 - column 5, line 19; figures 1-6 * ---	1,10-12, 15	
A	US 5 740 046 A (ELESTEDT PETER) 14 April 1998 (1998-04-14) * column 3, line 5 - column 5, line 40; figures 1-3 * ---	1,10-12, 15	
A	US 5 828 979 A (POLIVKA ALAN L ET AL) 27 October 1998 (1998-10-27) * column 4, line 39 - column 9, line 15; figures 2-7 * ---	1,10-12, 15	
A	DE 296 19 192 U (TVT VERKEHRSTECHNOLOGIE THURI) 7 May 1997 (1997-05-07) * the whole document * -----	1,3,4,10	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B61L B61C B61B B61D
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>26 September 2001</b>	Examiner <b>Chlosta, P</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		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	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 20 2578

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  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-09-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0958987 A	24-11-1999	DE 19822803 A1	25-11-1999
		EP 0958987 A2	24-11-1999
EP 0554983 A	11-08-1993	GB 2263993 A	11-08-1993
		CA 2087701 A1	07-08-1993
		DE 69300168 D1	06-07-1995
		DE 69300168 T2	25-01-1996
		DK 554983 T3	31-07-1995
		EP 0554983 A1	11-08-1993
		ES 2072793 T3	16-07-1995
		HK 144695 A	22-09-1995
		US 5440489 A	08-08-1995
US 5740046 A	14-04-1998	SE 501095 C2	14-11-1994
		AU 4990093 A	29-03-1994
		EP 0656848 A1	14-06-1995
		SE 9202493 A	01-03-1994
		WO 9405536 A1	17-03-1994
US 5828979 A	27-10-1998	US 5623413 A	22-04-1997
		AU 734434 B2	14-06-2001
		AU 7386298 A	08-12-1998
		BR 9809831 A	27-06-2000
		WO 9851556 A1	19-11-1998
		AU 712538 B2	11-11-1999
		AU 3374695 A	22-03-1996
		BR 9509462 A	21-10-1997
		CA 2198855 A1	07-03-1996
		CN 1162290 A ,B	15-10-1997
		EP 0782521 A1	09-07-1997
		JP 10505036 T	19-05-1998
		PL 319030 A1	21-07-1997
		WO 9606766 A1	07-03-1996
		US 6154735 A	28-11-2000
		US 5794172 A	11-08-1998
		ZA 9507360 A	28-08-1996
DE 29619192 U	07-05-1997	DE 29619192 U1	07-05-1997