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(54) Rail maintenance vehicle

(57) A mobile railway maintenance vehicle is provided with a shop to work at a railroad, carriages to ride at a car road and a railway track and means to adapt its length and/or width. In an embodiment, its frame has a central part of fixed dimensions, having at both ends extendable elongation parts. The centre of gravity is located close above the road. Its frame is near the carriages Z- or S-like shaped to have a central part extending at low level.

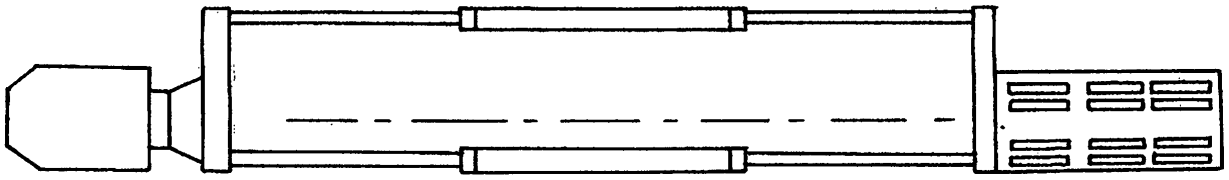

Fig.1

EP 1 867 544 A1

Description

[0001] The proposal is a shop to work at a rail road, such that safety is ensured while the adjacent track remains in operation. This rail maintenance vehicle is mobile, such that during operation it is movable along the track, such that activities that move along the track can be carried out efficiently. Thus it is for sure that no person comes (to close) to the adjacent track to be caught by a train passing by.

[0002] As a rule such verhicle will provide some physical barrier, suc as a fence (physical barrier means), suc that a person is obstructed somehow to come outside some area and is forced to stay in a safety zone (preferably single level).

[0003] Besides, the persons, equipment and the location are protected against the weather, e.g. by application of sheets or a cover. The shop can have substantially wind and/or water proof roof and/or side walls. The lower side is obviously open, to get unobstructed access to the rails, sleepers, ballast, etc.

[0004] With this type of shop compared to traditional manners of safe working at the track, a substantial time saving is possible, such that the regular traffic is hindered less.

[0005] The prior art has some proposals, e.g. EP-A1-1.369.330 and WO 2006/027030 A1, both in the name of Robel. Both are concerned with rail constricted vehicles with an image that roughly can be specified as a railway wagon having at both its ends a rail carriage and lacking the interior and floor, such that within the vehicle there is a large free space to stand/walk at the track.

[0006] The inventors have recognised, that particularly the flexibility and usability increase, if the shop can be transported across the road. Thus the train traffic is minimally obstructed while the shop is transported to the area of use. One has to realise, that such a shop as a rule has a substantial length of e.g. more than dan 15 of 20 meter and at the track can/may drive not faster than 60 km/u. Transport across the road will be a suitable alternative. Transport across the road takes e.g. place with as little limitations as possible (no "special transport"). EP1539513 provides background.

[0007] Thus this invention proposes to design the shop with features to adapt it to allow it to be transported across the road.

[0008] According an aspect, the shop is provided with one or more carriages for both driving accross a track and the road surface. Preferably one or more, preferably all carriages have wheels (such as with steel surface and side flange) to ride on the track and wheels (e.g. pneumatic tyres) to ride on the road surface. referably the one wheel type is retractable compared to the other, such that one can select which wheel type supports the shop onto the relevant surface (track or road surface). Preferably such carriage is present near each end of the shop. In that connection it is possible that at least one carriage can simply be uncoupled from and/or is mounted to pivot around an upright axis relative to the shop. Each carriage can be designed with single, double, triple or more shafts for each wheel type, wherein preferably one, two of all said shafts have pivoting wheels. The wheels can be designed for direction control and can each pivot around an own upright (vertical) axis, or they pivot around an axis common to some wheels of said carriages (this is e.g. the case for a bogy which is typical for a train wagon) . As an example, a carriage has two shafts, with all wheels pivoting, to ride at the car road, and a single shaft, of which not a single wheel can pivot, to ride at the track. In an example at least one carriage is provided by a different vehicle, e.g. a tractor, onto which e.g. the relative end of the shop bears. Preferably the wheels of track and/or car road type of at least one shaft of carriaget are driven to provide propulsion.

[0009] According to an alternative aspect the shop is designed such that its length is adaptable, preferably independent from a possible width adjustability. Thus the shop can have a shorter length during transport over the car road. For this the shop can have extendable or telescoping parts and/or a central (preferably having a fixed length) part that has extandable elongation parts at the front and/or back. The structure is preferably such that in the maximum elongated situation, a working space limited at both sides and elongated compared to the initial situation is provided, within which one can freely walk, meaning that one is not obstructed by crosswise extending structural elements.

[0010] According to another aspect the centre of gravity is at low level, such that high speed driving at the road is possible without fear for turning over when e.g. driving a curve. Compared to a railway track, a road has tighter curves, and besides a flat surface. While riding at the road, the centre of gravity is not more than 1, 1,5, 1,75 of 2 meter above it.

[0011] According to yet another aspect the shop has (preferably at both sides of the safety zone) a longitudinal frame structure mounted to the carriages at the ends and preferably partly or completely elongatable and/or widthwise movable by the aid of convenient means. It preferably extends substantially straight and/or is near the carriages S- or Z-like curved. Preferably it extends completely or partly at low level compared to e.g. a carriage, for which it preferably extends from a carriage downward via a S- of Z-like curve or such. The lower and/or top side of this frame structure remains preferably below the axis or top of the wheels of one or all carriages. To this frame structure the side walls and/or roof are preferably mounted. This aspect provides in a prefered embodiment for, a.o., a low centre of gravity and/or a convenient accessibility for persons and loading/unloading of goods. The frame structure is preferably provided by a sheet work beam of e.g. rolled steel in the shape of e.g. a tube, I-, T- of H-profile.

[0012] Within the shop there is preferably a hoist and/or storage for a rail. The hoist is preferably movable

length and/or crosswise, possibly beyond the shop.

[0013] The shop preferably has an access for persons. It is preferably located at the longitudinal end, such that the working space can be neared from e.g. a carriage or the vehicle in front or at the back. The access feature has a door and/or stairs and/or ramp leading to the working space.

[0014] The shop is preferably provided with afrom the working space physically separated room for persons, e.g. to eat, within which e.g. a table and/or chair. The feature is e.g. completely or partly located on top of a carriage.

[0015] A the scope of protection not limiting embodiment is as follows:

[0016] The rail maintenance vehicle is based on a so called boiler bed trailer. This is an as trailer designed deep loader type, allowed to the car road. Between the wheels at the front and back, two longitudinal, mutually spaced beams of equal and fixed length (e.g. 10 meter) extend at both sides horizontally. Through adjustment means the spacing between these beams can be increased, such that the trailer is widened. On top of these beams, a cylindrical object, such as a boiler, is transported, with its axis longitudinally oriented, such that the curved lower side is located between or below these beams. The top of these two beams is located below the wheels at the front and back, such that the loading surface is accordingly located low.

[0017] At both ends, extension beams are longitudinally mounted such that they are movable between a position in which they elongate the beams only slightly or not, and a the beams substantially elongating position. Between said positions the elongation beams are stepped or steppless adaptable is different elongation positions. The beams can thus be elongated at both their ends approximately equally bu e.g. several meters. At the end opposite the beams the elongation beams are mutually coupled by a cross beam such that in top view there is a right angled, frame like carrier frame. The longitudinal, elongation and/or cross beams are tube, I, H, or T shaped in section. In all positions of these beams the sideways and to the front/back limited space is unobstructed to wal around.

[0018] At both ends of the carrier frame, to the extension and/or cross beams an upward extending structure (e.g. some type of S-or Z- shape) is mounted with which the carrier frame is coupled to the carriages at the fron and back. The front carriage is located in front of the carrier frame and is provided by the back schafts of a (lorry) pulling vehicle with driver cabin. The carrier frame is like a trailer releasably coupled by a pivot plate structure. The back carriage is located behind the carriage frame. The pulling vehicle has at its front a shaft for the car road (with pivoting wheels for direction control) and between it a shaft for the rail road. At the back this vehicle has a double, driven, shaft for the car road and a single, driven, shaft for the rail road. The back carriage has a double shaft for the car road (with pivoting wheels for auxiliary direction control in tight curves) and there between a shaft for the rail track. None of the shafts of the back carriage are driven.

[0019] The car road shafts of the front and/or back carriage have a preferably hydraulic or pneumatic level adaption to provide additional spacing during riding at the car road. The railway shafts are preferably pneumatic or hydraulic retractable. If retracted, their wheels keep sufficient spacing to the car road, also in the position of smallest spacing of the car road shafts. When riding at the track, the railway shafts are extended and the car road shafts are in the position for smallest spacing.

[0020] To the longitudinal beams and possibly the elongation beams the side walls and the roof above it are mounted. The roof is constructed such that it ca be widened according to the increasing distance between the longitudinal beams. Examples of it can be found in EP-A1-1.369.330 and WO 2006/027030 A1. Features can be provided to open the roof and/or side wall, or part of it, e.g. for loading/unloading. For that the roof or side wall can be e.g. mounted to be slidable or pivotable.

[0021] Thus a free working space of about 20 meter ca be created, while the combination of tractor and shop can be shortened to a length of 18 meter.

[0022] The enclosed drawing shows a maximum elongated boiler bed trailer in side and top view (the latter in the slender and wide, respectively, position).

[0023] Also different embodiments belong to the invention..g. wherein the front and/or back carriage of the railway part are provided by a bogie-set. The longitudinal beams can additionally e.g. between their ends be longitudinally adaptable by means of additional elongation beamsngs to be able to provide an even larger elongation.

[0024] All specified or in the drawing illustrated means provide in isolation or arbitrary combination the subject of this invention.

Claims

1. Mobile railway maintenance shop, provided with one or more carriages, preferably near each end, such that it is adapted to ride at both the rails of a railway and the surface of a car road, to provide a floor less vehicle.

2. Device according to claim 1, with means to adapt its length and/or width, preferably mutually independent, preferably designed such that with the maximum length and width dimension a at both sides limited, enlarged working space is created within which on can freely walk around, meaning not obstructed by e.g. crosswise extending structural elements.

3. Device according to claim 2, comprising extendable or telescoping parts and/or a central part of preferably fixed dimensions, having at the one and/or op-

posite side extendable elongation parts.

4. Device according to any of claims 1-3, with the centre of gravity at a level to protect against turning over while taking a curve; preferably the centre of gravity is located not more than 1, 1,5, 1,75 of 2 meter above the road.

5. Device according to any of claims 1-4, comprising a longitudinally extending frame structure mounted to the carriages at its ends and preferably completely or partly extendable by convenient means and/or movable widhtwise, which frame structure extend spreferably substantially straight and/or is near the carriages Z- or S-like shaped.

6. Device according to claim 5, wherein the frame structure completely or partly extends at low level compared to a carriage for which it from a carriage e.g. extends downward through e.g. a Z- or S-like shape.

7. Device according to claim 5 of 6, wherein the lower and/or top side of at least a part of this frame structure remains below the axis or top of the wheels of one or all carriages, and/or to this frame structure the side walls and/or roof are mounted.

8. Device according to any of claims 1-7, wherein one or more, 5 preferably all carriages have on the one hand wheels to ride at rails and on the other hand wheels to ride at a car road, and wherein preferably the one wheel type is retractable relative to the other, such that one can select which wheel type supports the shop.

9. Device according to any of claims 1-8, wherein at least one carriage is mounted to be easily uncoupled from and/or can pivot around an upright axis relative to the shop and/or for each wheel type is provided with one, two, three of more shafts, preferably wherein one, two or all said shafts are provided with (following) pivoting wheels which are possibly driven.

10. Device according to any of claims 1-9, wherein the wheels for the direction control or follower wheels can pivot around an own upright (vertical) axis, or they pivot around an axis common to a plurality of wheels of the carriage.

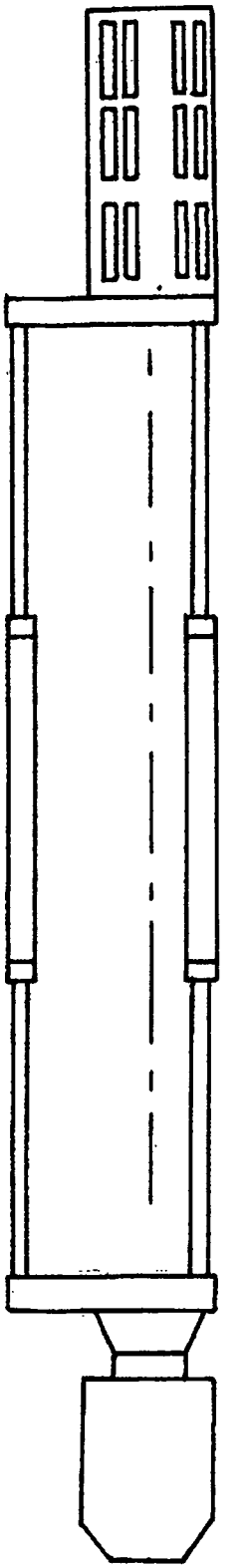

Fig.1

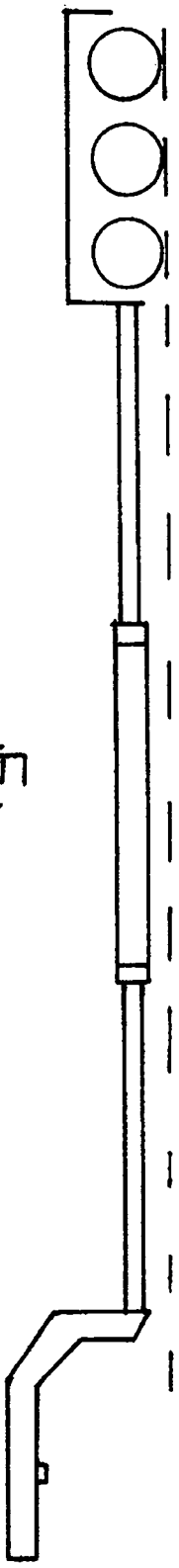

Fig.2

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EUROPEAN SEARCH REPORT

Application Number
EP 07 01 1426

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	FR 2 786 148 A1 (POUGET ETS [FR]) 26 May 2000 (2000-05-26) * abstract; figures 1-3 *	1,5,6,8	

TECHNICAL FIELDS SEARCHED (IPC)

E01B
B61D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 October 2007	Fernandez, Eva

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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12-10-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- EP 1539513 A **[0006]**