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(54) **Trailer mounted workplatform**

(57) The invention relates to an aerial access platform designed as rail/road lorry with a towing beam to couple to the towing hook of a passenger car and adapted to exclusively bear on the rail wheels while safely used as aerial access platform. The centre of gravity in each operating position of the vehicle is, seen in top view, within the area limited by the straight connection lines which

the supporting points of the rail wheels have with the subsurface. There is a jointed arm with at its free end a work platform. All heavy components for the drive of the jointed arm are mounted at both sides of the central longitudinal axis while there between the pivoting arm is mounted.

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## Description

**[0001]** This invention relates to an aerial access platform to work at the overhead wire system of a railway. This is an alternative to the known reform ladder which is unsafe and to modified rail/road excavators or onto heavy rail carriages based aerial access platforms for which special transport is required.

**[0002]** The invention is a rail/road vehicle with sufficient low weight (e.g. 1500 or 2000 or 2500 kilogram to a maximum) and centre of gravity and provided with a towing beam to be coupled behind an automobile for transport across the road. In operation, bearing on the rail wheels, the stability is independently provided, such that the vehicle does not have to be provided with side-ways or to the front/back extendable ground supports/supporting legs/dies. Thus the vehicle can exclusively bearing on the rail wheels be safely used as aerial access platform.

**[0003]** Preferably the centre of gravity in every operation position of the vehicle is, seen in top view, within the area that is delimited by the straight connection lines of the supporting legs of the rail wheels with the underground. In a safe working position the work box can be spaced outside said area, seen in top view.

**[0004]** The vehicle is integrally provided with a preferably jointed arm carrying at its free end a aerial access platform /work box and preferably centrally and/or around an upright axis turnable, e.g. over 300 or 360 degrees to a minimum, mounted. This arm preferably has at least 2 or 3 mutually pivoting connected elongated elements (members) which can be pivoted e.g. substantially in mutual elongation. Hydraulic piston cylinder assemblies are preferably applied to let the elements pivot. The jointed arm is preferably from its mounting point first upward extending designed. The pivoting is e.g. limited to a movability in a face or around a substantially horizontal axis, such that two parts can e.g. mutually rock. Preferably all members pivot in a mutual face. A member can be mounted pivoting or fixed to a not to the arm belonging part of the vehicle which is e.g. pivotably mounted to the frame.

**[0005]** The arm can be at least partly telescoping.

**[0006]** Preferably the jointed arm is designed to take a substantially completely extended attitude, substantially vertically extending and/or take an attitude in which the proximal (the part close to the mounting to the vehicle) part is substantially completely extended and extends substantially vertically while the distal (the part close to the work box) part extends substantially horizontal.

**[0007]** At least one, two, three or all members can pivot over 180 or 200 degrees to a maximum with respect to the member connected to it. An ultimate pivoted position is preferably in which the two members mutually connected with their ends extend substantially in extension. Preferably to the one and other end of a first member the end of a second and third, respectively, end is mounted with such limited pivoting ability, that from the extended attitude with all three members substantially in mutual

extension, the first and second members as well as the first and third member are forced to pivot in mutual opposite directions, such that the jointed arm fold zigzag like.

**[0008]** The work box is preferably provided with a operating panel to control the hydraulics for pivoting/turning of the jointed arm. The work box is preferably adapted for one or two persons at the most. Between the work box and the pivoting arm a so called jib can be present.

**[0009]** At a distance to a side or at both sides of its central longitudinal axis there is preferably a heavy component of the drive of the pivot arm of the vehicle present wherein said heavy component preferably extends over some height along the pivot arm. Preferably the pivot arm projects between two or more such components. A heavy component is e.g. a combustion motor or elector motor or a with fuel filled tank of accumulator to store electrical energy or a with hydraulic liquid filled tank or an e.g. by the motor driven pump in the hydraulic circuit. Preferably all heavy components are mounted at both sides of the central longitudinal axis while there between the pivot arm is mounted. The heavy components are preferably mounted in a housing with is preferably common to the heavy components at one of the sides of the central longitudinal axis. A heavy component can be located above or below the frame. Such a housing can have one or more compartments and/or preferably keeps a distance to the central longitudinal line of the vehicle, wherein said distance is preferably substantially constant along the housing, relative to the longitudinal direction of the vehicle.

**[0010]** Preferably a heavy component, more preferably all heavy components are mounted above or below the frame of the vehicle. Preferably a heavy component, more preferably all heavy components are mounted between two rail shafts in the situation that the vehicle in operation is supported by the rail wheels at said shafts. Preferably none of the heavy components is mounted to the central longitudinal axis in front of or behind the vehicle.

**[0011]** Preferably the vehicle has at least, more preferably exactly, one road shaft to ride across the road and at least two rail shafts with wheels to ride across a rail, which are preferably present in front of and behind the road shaft. At least one of the road shaft and rail shafts is retractable such that at wish the wheels of the road shaft can project below the wheels of the rails shafts. Preferably the rails shafts are pivotable and the road shafts is fixedly mounted. Both the wheels of each road shaft and each rail shaft keep a fixed orientation relative to the vehicle, i.e. can not turn around a vertical axis.

**[0012]** The vehicle is preferably provided with an own drive for advancement, for which the wheels at a rail shaft and/or road shaft can be driven. Such a drive can however be absent.

**[0013]** The vehicle preferably has a substantial flat chassis/frame at/to which there are mounted one or more of: the jointed arm; heavy components; the road wheels;

the rail wheels; the towing beam; at the back a holder for a license plate. The frame can at least partly be a space frame to save weight.

**[0014]** The jointed arm is preferably substantially centrally mounted between at least two rail shafts.

**[0015]** The enclosed drawing shows in perspective and side view, respectively, a possible embodiment of the invention, illustrated in the almost folded transport position with extended rail wheels to ride on rails. Illustrated are the retractable, pivotably mounted rail wheels (flange wheels) in front of and behind road wheels (pneumatic tires) and above the wheels a horizontal chassis/frame/platform with at the front of it the towing beam with coupling to couple with the towing hook of a passenger vehicle. The wheels project above and below the frame. A spare wheel mounted above the frame is also shown.

**[0016]** A jointed arm is mounted to the frame centrally relative to the longitudinal axis of the vehicle and between the rail shafts in the extended operational position This arm can turn around its vertical body axis and is made of three members, at the end of the last of which a work box is mounted. The first member is mounted to the frame in a fixed upright attitude.

**[0017]** At both sides of the mounting location of the jointed arm to the frame, a housing is mounted to the frame and the heavy components are housed in it. In the operational position as shown, each housing is provided substantially behind the front and in front of the backward rail shaft (relative to the advancing direction during towing by a car). The housings mutually keep a space of substantially constant width, into which the lower end of the pivot arm projects.

**[0018]** It will be appreciated that the members have the ability to pivot limited relative to each other such that from the illustrated (almost) retracted position to the vertical, mutually extending position, the member to which the work box is mounted, pivots in the direction opposite the direction into which the (central) member connected to it pivots, while the same is applicable between the central member and the member connected to it and to the frame.

**[0019]** The jointed arm can be extended so far such that the Floor of the work box can reach to approximately 8 metres above the ground (members all substantially vertically oriented). In another safe operation position the lower two members are substantially vertically oriented and the member mounted to the work box is substantially horizontally oriented, such that the work box can project sideways beyond the vehicle, e.g. at least one or two meters. The work box can contain 120 kg for one person at the most, or 250 kg for two persons at the most.

**[0020]** Different embodiments also belong to the invention.

## Claims

1. Aerial access platform, designed as rail/road trailer

with a towing beam to couple to the towing hook of a passenger car and adapted to exclusively bear on the rail wheels while safely used as aerial access platform.

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2. Device according to claim 1, wherein the centre of gravity in each operating position of the vehicle is, seen in top view, within the area limited by the straight connection lines which the supporting points of the rail wheels have with the subsurface.

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3. Device according to claim 1 or 2, integrally provided with a jointed arm which from its mounting point First extends upward and carries at its free end a work platform for two persons at the most and is turnably over at least 360 degrees centrally around an upright axis mounted, which arm has at least 2 of 3 mutually pivoting mounted elongated members which can be pivoted in mutual extension and wherein the pivoting ability of all members is limited to a common face and to 180 degrees at the most.

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4. Device according to any of claims 1-3, with at both sides of its central longitudinal axis a heavy component of the drive of the pivot arm at the vehicle, wherein said heavy component extends over some height along the pivot arm and the pivot arm projects between two or more such components.

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5. Device according to any of claims 1-4, wherein all heavy components are mounted at both sides of the central longitudinal axis while in between the pivot arm is mounted.

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6. Device according to any of claims 1-5, wherein all heavy components are mounted between two rail shafts in the situation that the vehicle in operation is supported by rail wheels mounted to said rail shafts.

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7. Device according to any of claims 1-6, wherein the jointed arm is designed to take a completely extended attitude, substantially vertically extending.

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8. Device according to any of claims 1-7, wherein the jointed arm is designed to take an attitude in which the proximal part is substantially completely extended and extends substantially vertical, while the distal part extends substantially horizontal.

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9. Device according to any of claims 1-8, wherein to the one and other end of a first member the end of a second and third, respectively, end is mounted with such limited pivoting ability, that from the extended attitude with all three members substantially in mutual extension, the first and second members as well as the first and third member are forced to pivot in mutual opposite directions, such that the jointed arm folds zigzag like.

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10. Device according to any of claims 1-9, with exactly one road shaft with wheels to ride across the road and at least two rail shafts with wheels to ride over rail, provided in front of and behind the road shaft.

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11. Device according to any of claims 1-10, with a substantially flat chassis/frame on/to which are mounted one or more of: the jointed arm; the heavy components; the road wheels; the rail wheels; the towing beam; at the back a holder for a license plate.

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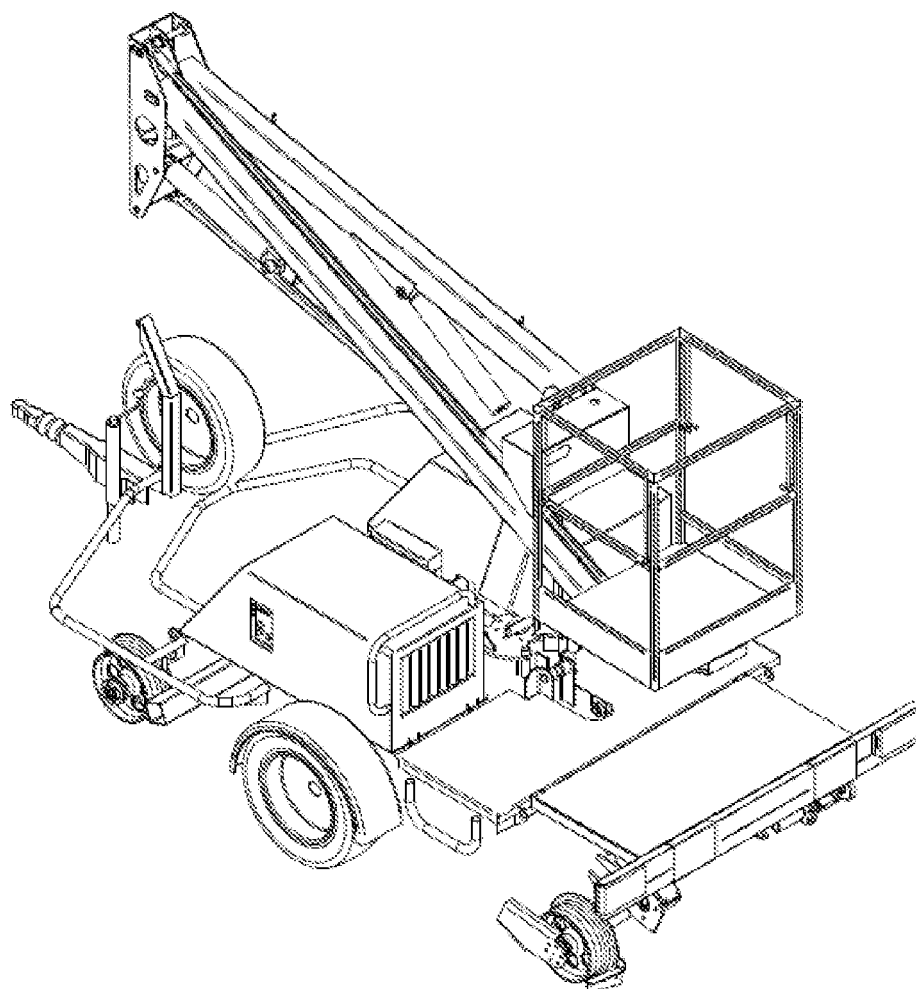


Fig.1

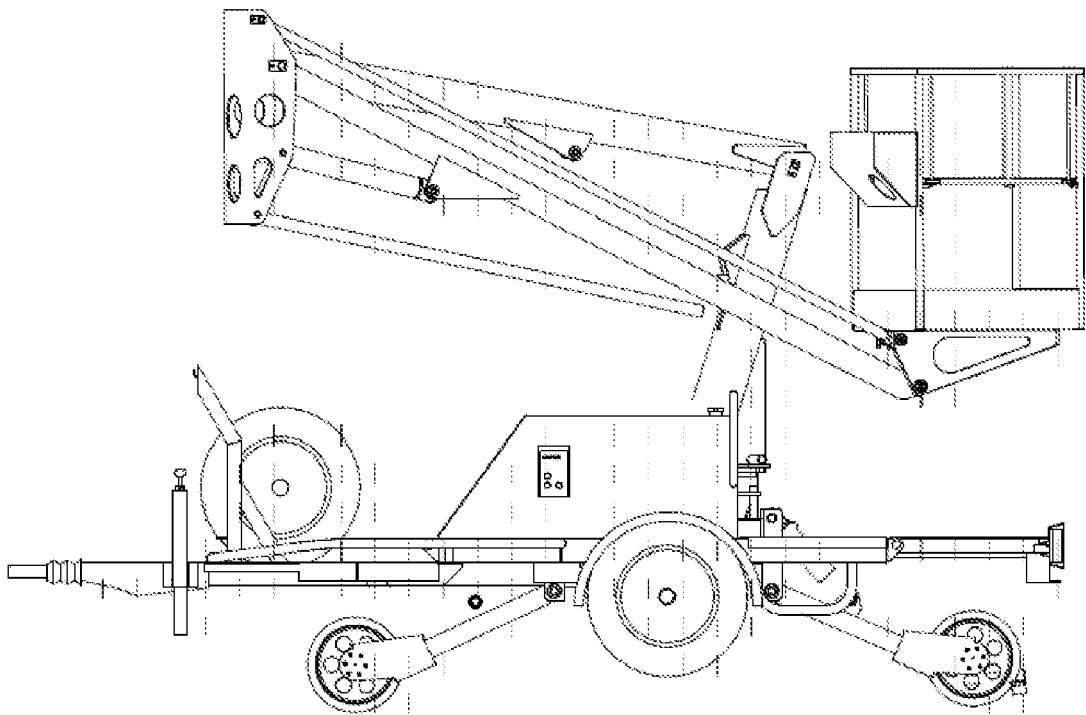


Fig. 2



## EUROPEAN SEARCH REPORT

Application Number  
EP 09 10 0176

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                       |                                                         |                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Citation of document with indication, where appropriate, of relevant passages                                                                                                                                                                                                                                                                         | Relevant to claim                                       | CLASSIFICATION OF THE APPLICATION (IPC) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ANONYMOUS: "Trailer for Rails"<br>VERTIKAL.NET, [Online]<br>21 November 2007 (2007-11-21), pages 1-2,<br>XP002531916<br>Retrieved from the Internet:<br>URL: <a href="http://www.vertikal.net/en/stories.php?id=4971">http://www.vertikal.net/en/stories.php?id=4971</a> > [retrieved on 2009-06-12]<br>* the whole document *                        | 1-11                                                    | INV.<br>B66F11/04                       |
| T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ANONYMOUS: "Eurotrailer 120-1"<br>RIEL RAIL SYSTEM, [Online] 2007, pages<br>1-2, XP002531963<br>Retrieved from the Internet:<br>URL: <a href="http://www.rielrailssystems.nl/riel_rail_eurorailer_factsheet_en.pdf">http://www.rielrailssystems.nl/riel_rail_eurorailer_factsheet_en.pdf</a> ><br>[retrieved on 2009-06-12]<br>* the whole document * | 1-11                                                    |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                       |                                                         | TECHNICAL FIELDS<br>SEARCHED (IPC)      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                       |                                                         | B66F<br>B66C<br>E02F                    |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                       |                                                         |                                         |
| Place of search<br><b>The Hague</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                       | Date of completion of the search<br><b>15 June 2009</b> | Examiner<br><b>Serôdio, Renato</b>      |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>.....<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                                                                                                                                                                                                                       |                                                         |                                         |

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