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A WORK VEHICLE FOR IMPLEMENTING TRACK MAINTENANCE OPERATIONS

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(56) Prior Art Documents
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US 4257331
US 4165694

(57) Claim

1. A work vehicle, including a vehicle frame, supported on on-track undercarriages, with coupling devices provided at the ends for the detachable connection to a track vehicle, as well as a device for connecting hydraulic leads and a working device, equipped with drives, for implementing track maintenance operations, characterized by a hydraulic motor, fastened to the vehicle frame, which may be supplied with energy from the track vehicle by way of the hydraulic lead and which is connected by a driving shaft to a pump distributor gearbox and hydraulic pumps which for their part are provided for operating the various drives of the working device of the work vehicle, and in that an operator's cabin with a central control unit is mounted to the vehicle frame in the region of the working device, and that at least one working device is supplied from the group: tamping unit, stabilizer unit, ballast plough, sweeping broom, track lifting-lining unit, ballast suction device, track measuring system, sleeper exchanger, rail grinding device; and that the vehicle frame has an upper boundary line which is a maximum of 4 metres away from the top of a rail of a track supporting the on-track undercarriages in the vicinity of the hydraulic coupling and a maximum of 3 metres away from the top of the rail at the opposite end of the vehicle frame.

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Invention Title:

A WORK VEHICLE FOR IMPLEMENTING TRACK MAINTENANCE OPERATIONS

Our Ref : 439179
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The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

NA 436

ORIGINAL TEXT

Ma/sp

The invention relates to a work vehicle for implementing track maintenance operations.

A work vehicle for implementing track measuring operations is known through US 5 301 548. This work vehicle, supported on on-track undercarriages, is transferred to the site of use in conjunction with a track tamping machine and there is moved independently with the aid of its own motive drive. Detachably secured to the front end of the work vehicle is a further small vehicle which is equipped with a laser transmitter and is similarly mobile independently. To ensure an unobstructed view from a driver's cabin of the track tamping machine during transfer travel, the upper contour line of the vehicle is designed so as to extend at an angle to the track plane.

A track tamping machine is also known through AT 380 279 B, which is essentially composed of a main frame travelling continuously during operational use and a satellite frame travelling intermittently from one tamping location to the next. The said satellite frame has a vertically adjustable tamping unit and a track lifting-lining unit and, according to a design variant shown in Fig. 4, is arranged immediately preceding the main frame in the working direction. Both frames are joined together by means of a longitudinal displacement drive which imparts to the satellite frame the acceleration and deceleration forces for an intermittent operational advance, independently of the continuous operational advance of the main frame.

The object of the present invention is now to provide a

work vehicle which, with minimal constructional expense, is particularly suited to the rapid implementation of track maintenance operations which are scheduled to be of short duration and are limited with respect to the scope of the work.

This object is achieved with a work vehicle, including a vehicle frame, supported on on-track undercarriages, with coupling devices provided at the ends for the detachable connection to a track vehicle, as well as a device for connecting hydraulic leads and a working device, equipped with drives, for implementing track maintenance operations, characterized by a hydraulic motor, fastened to the vehicle frame, which may be supplied with energy from the track vehicle by way of the hydraulic lead and which is connected by a driving shaft to a pump distributor gearbox and hydraulic pumps which for their part are provided for operating the various drives of the working device of the work vehicle, and in that an operator's cabin with a central control unit is mounted to the vehicle frame in the region of the working device, and that at least one working device is supplied from the group: tamping unit, stabilizer unit, ballast plough, sweeping broom, track lifting-lining unit, ballast suction device, track measuring system, sleeper exchanger, rail grinding device; and that the vehicle frame has an upper boundary line which is a maximum of 4 metres away from the top of a rail of a track supporting the on-track undercarriages in the vicinity of the hydraulic coupling and a maximum of 3 metres away from the top of the rail at the opposite end of the vehicle frame.

The above work vehicle is particularly suited to being coupled to a permanent way motor wagon, dispensing with its own motive drive, and in this combination is quite particularly suited to the implementation of various short-duration and localized track maintenance operations which would not justify economically the use of a special, large-scale and high-performance machine. In combination with a permanent way motor wagon, its range of use can also be advantageously extended, for instance by transporting the new sleepers required for a sleeper exchanger of the work vehicle and the accumulating old sleepers on the loading surface of the permanent way motor wagon. Since the work vehicle is not

tied to a specific vehicle for energy supply and for transport, more versatile adaptation to track maintenance vehicles actually available at the point of use is possible. As an example, the work vehicle can also be used, without any impairment to its operability, in combination with a shunting locomotive which is actually available at the point of use.

Other advantageous developments of the invention are revealed by the sub-claims.

The invention is described in more detail in the following with the aid of exemplary embodiments shown in the drawing, in which:

Fig. 1 shows a side view of a work vehicle for implementing track maintenance operations, coupled to a permanent way motor wagon,

Fig. 2 shows an enlarged side view of the work vehicle according to Fig. 1, and

Fig. 3 to 7 show various design variants of the work vehicle.

The machine combination shown in Fig. 1 is composed of a work vehicle 1 for implementing track maintenance operations and a permanent way motor wagon 2. The permanent way motor wagon 2 which is designed to travel on on-track undercarriages 3 on a track 4 has a vehicle frame 5 with a loading surface 6 and a crane 8 which is vertically and laterally adjustable by means of drives 7. The energy is supplied by an engine 9, of which the driving shaft is run to one on-track undercarriage 3 by way of a transmission 10. Also operable by the engine 9, alternatively, is a hydraulic pump 11 which can be connected via a hydraulic lead 12 and a hydraulic coupling 13 to a hydraulic lead 14 of the work vehicle 1. Located in a driver's cabin 15 arranged at the end is a control unit 16.

The work vehicle 1 which is designed to travel on the track 4 by means of on-track undercarriages 17 has a vehicle frame 18 which is designed so as to be upwardly recessed, with a longitudinal beam 19 arranged at an angle to the track plane or inclined. By way of the hydraulic coupling 13 and the hydraulic lead 14, energy generated by the engine 9 of the permanent way motor wagon 2 is supplied to a central hydraulic motor 20. The hydraulic motor 20 for its part operates a pump distributor gearbox 21 and hydraulic pumps connected thereto which supply the drives of various working devices 22 with the necessary energy.

In the exemplary embodiment shown in Fig. 2, there is provided a plurality of working devices 22 of various types which can be used in different combinations depending on the operational use of the work vehicle 1. For implementing track tamping, a tamping unit 23, a track lifting-lining unit 24 and a track measuring system 25 are provided as the working device 22. The tamping unit 23, which is vertically adjustable by means of a drive 26, is provided with tamping tines 28 which are squeezable together by means of squeeze drives 27 and vibratable. Coordinated with the track lifting-lining unit 24 are drives 29 for applying lifting and lining forces. The track measuring system 25 comprising a tensioned chord is provided with tracing rollers 30 which are designed to roll along the track 4.

As a further working device 22, a ballast plough 31 is connected to the vehicle frame 18. This ballast plough 31, which is vertically and laterally adjustable by means of drives 32, is composed of a central centre plough 33, provided for treating the track region, and two shoulder ploughs 34, spaced apart from each other in the transverse direction of the vehicle.

The longitudinal beam 19 of the vehicle frame 18 which is designed so as to be upwardly recessed is arranged inclined in

such a way that an upper boundary line 35 of the vehicle frame 18 is a maximum of 4 metres away from the top 36 of a rail of the track 4 at the end adjacent to the hydraulic coupling 13. At the opposite end 37 of the vehicle frame 18 to the hydraulic coupling 13, the boundary line 35 is a maximum of 3 metres away from the top 36 of the rail. Provided at either end of the vehicle frame 18 are coupling devices 38 for the incorporation in a train formation or for connection to a vehicle supplying energy and traction, a permanent way motor wagon 2 in the exemplary embodiment shown. Secured to an underside of the longitudinal beam 19, between the shoulder ploughs 34 and the track lifting-lining unit 24, is an operator's cabin 39 with a central control unit 40. Provided at the rear end 37 of the vehicle frame 18 as a further working device 22 is a sweeping broom 42 which can be vertically adjusted and set rotating by means of a drive 41 and which comprises a lateral conveyor belt 43.

In the further exemplary embodiments described in the following, parts which have the same functions are provided with the same reference numerals as in Fig. 1 and 2, for the sake of simplicity.

According to Fig. 3, the work vehicle 1 has a single working device 22 in the form of a track measuring system 25, already described. This is composed of two chords 44, extending in the longitudinal direction of the vehicle, for determining vertical position errors, and a further chord 45 for determining the lateral position errors. Three pairs of tracing rollers 30, spaced apart from one another in the longitudinal direction of the vehicle, are designed to roll along the track 4 and are vertically adjustably mounted on the vehicle frame 18. 46 denotes drives for vertically adjusting the tracing rollers 30. A measuring and recording device 47 serves to record the track geometry errors determined by the track measuring system 25. A loading surface 48 serves as a transporting facility. This work vehicle 1 which can be

employed for measuring purposes can be supplemented, if required, with various other track measuring devices, such as, for example, lateral inclination measuring devices, gauge measuring devices etc. The work vehicle 1 can be connected by means of the coupling devices 38 to any track vehicle, for instance a permanent way motor wagon 2, the energy being supplied by this permanent way motor wagon 2 via the hydraulic coupling 13.

The work vehicle 1 shown in Fig. 4 has various working devices 22 for ballast bed profiling, already illustrated in detail in Fig. 2. In addition, a rail grinding device 50 is provided at one end which is vertically adjustable by means of drives 49. Above the centre plough 33 is a crew cabin 51 and a loading crane 53 which is vertically and laterally adjustable by means of drives 52. A loading surface 48 may be used as a transporting facility.

The work vehicle 1 shown in Fig. 5 has a ballast suction device 54 as the working device 22, in addition to the tamping unit 23 and the track lifting-lining unit 24. A suction nozzle 56 of the ballast suction device 54 which is vertically and laterally adjustable by means of drives 55 is connected by means of a flexible suction pipe 57 to a vacuum device 58.

The work vehicle 1 shown in Fig. 6 has a stabilizer unit 60 which is vertically adjustable by means of drives 59 and which may be set vibrating. This working device 22 is expediently used in a final working pass, after the tamping of the track 4 is completed, to effect controlled lowering of the track.

A sleeper exchanger 61 as the working device 22 is associated with the work vehicle 1 shown in Fig. 7, in addition to a ballast suction device 54. A loading surface 62 serves to transport the old and new sleepers.

The claims defining the invention are as follows:

1. A work vehicle, including a vehicle frame, supported on on-track undercarriages, with coupling devices provided at the ends for the detachable connection to a track vehicle, as well as a device for connecting hydraulic leads and a working device, equipped with drives, for implementing track maintenance operations, characterized by a hydraulic motor, fastened to the vehicle frame, which may be supplied with energy from the track vehicle by way of the hydraulic lead and which is connected by a driving shaft to a pump distributor gearbox and hydraulic pumps which for their part are provided for operating the various drives of the working device of the work vehicle, and in that an operator's cabin with a central control unit is mounted to the vehicle frame in the region of the working device, and that at least one working device is supplied from the group: tamping unit, stabilizer unit, ballast plough, sweeping broom, track lifting-lining unit, ballast suction device, track measuring system, sleeper exchanger, rail grinding device; and that the vehicle frame has an upper boundary line which is a maximum of 4 metres away from the top of a rail of a track supporting the on-track undercarriages in the vicinity of the hydraulic coupling and a maximum of 3 metres away from the top of the rail at the opposite end of the vehicle frame.

2. A vehicle according to claim 1, characterized in that as the working device, a tamping unit and a track lifting-lining unit are arranged on the vehicle frame between the two on-track undercarriages, and in that a track measuring system is provided to determine the track geometry.

3. A vehicle according to claim 1 or 2, characterized by the following arrangement of working devices in the direction from the hydraulic coupling to the opposite end of the vehicle frame: the centre plough preceding the front on-track undercarriage, the two shoulder ploughs immediately following the front on-track undercarriage and preceding the operator's cabin, the track lifting-lining unit and the tamping unit between the operator's cabin and the rear on-track undercarriage, and the vertically adjustable and rotatable sweeping broom immediately following the rear on-track undercarriage.

4. A vehicle according to any one of claims 1, 2 or 3, characterized by a ballast suction device with a suction nozzle connected by means of a flexible suction pipe to a vacuum device.

5. A work vehicle for implementing track maintenance operations, substantially as hereinbefore described with reference to any one of the embodiments shown in the accompanying drawings.

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ABSTRACT

A work vehicle (1) for implementing track maintenance operations has a vehicle frame (18), supported on on-track undercarriages (17), with coupling devices (38) for the detachable connection to a permanent way motor wagon (2). Provided at one end of the vehicle frame (18) is a hydraulic coupling (13) for the supply of energy to various working devices (22) in the form of a tamping unit and a ballast plough. An upper boundary line of the vehicle frame (18) is selected such that there is an unobstructed view from the driver's cabin (15) onto the track (4).

(Fig. 1)

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Fig. 1

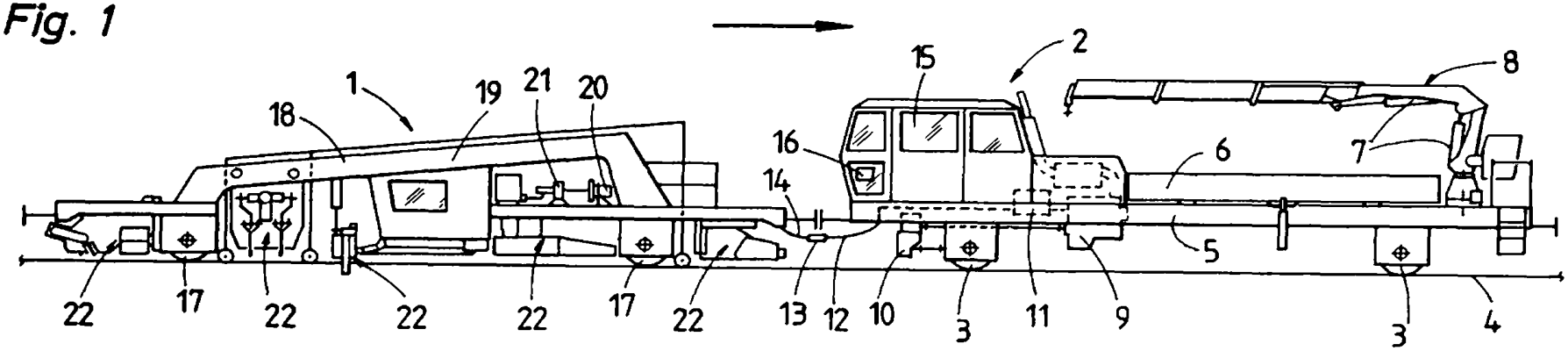
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Fig. 2

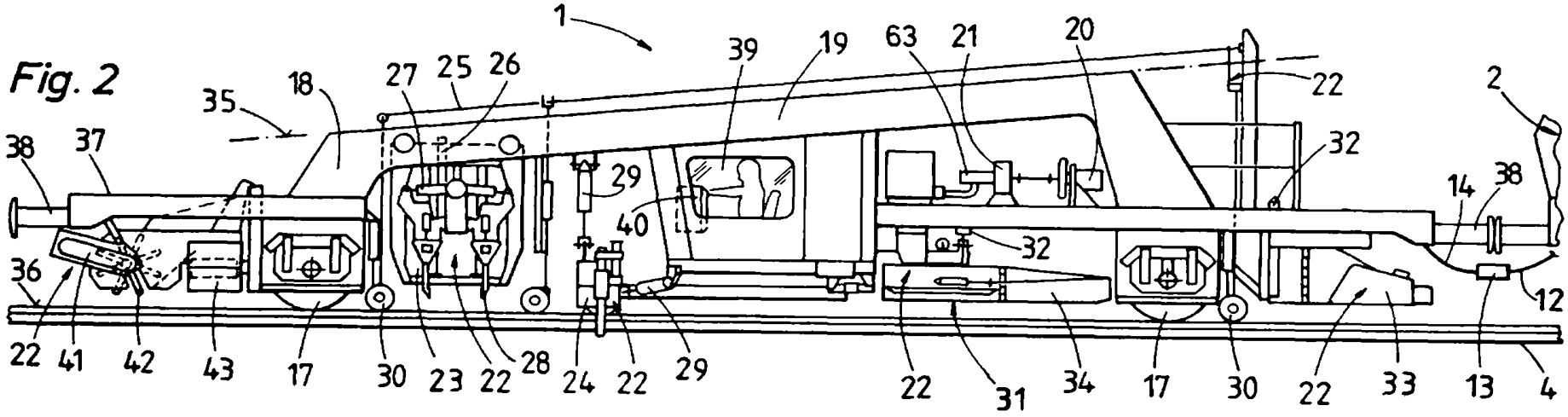
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Fig.3

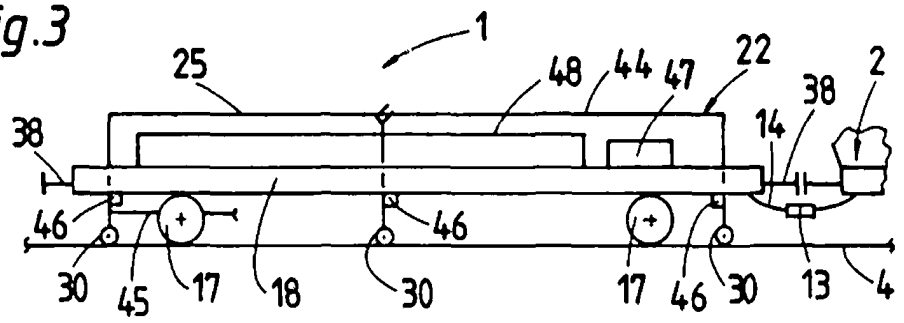

Fig.4

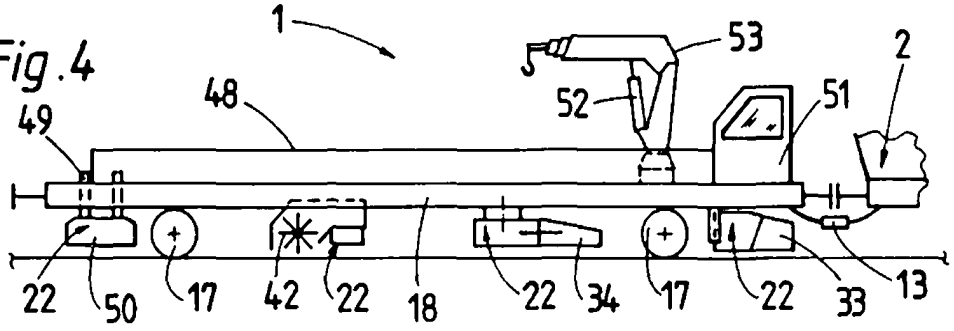

Fig.5

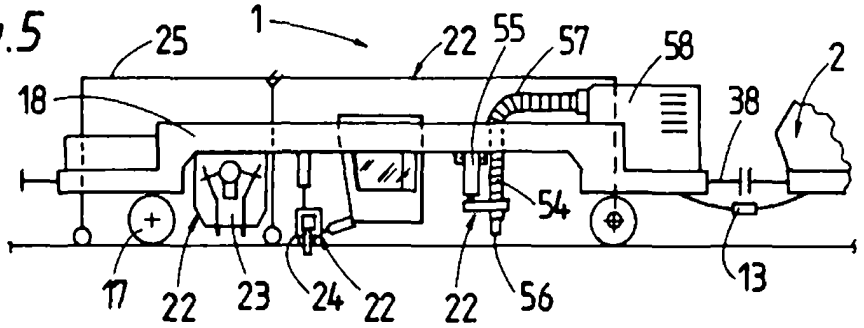

Fig.6

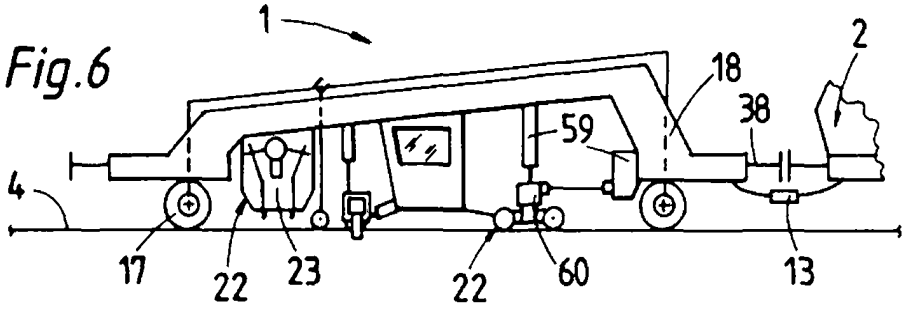

Fig.7