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A machine for dismantling an old track and laying a new track

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(12) PATENT ABSTRACT (11) Document No. AU-A-70500/96
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A MACHINE FOR DISMANTLING AN OLD TRACK AND LAYING A NEW TRACK

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(57) Claim

1. A machine for dismantling an old track and laying a new track, including a machine frame supported on undercarriages, a sleeper pick-up device, a sleeper-laying device and a grading means comprising a grading blade, characterized in that the grading means has two limiting blades associated with it which are located at a distance from one another with respect to the transverse direction of the machine and extend in the longitudinal direction of the machine, between which limiting blades is located the sleeper-laying device.

ABSTRACT

A machine (1) for dismantling an old track and laying a new track has a machine frame (8) supported on undercarriages (9,10,11), a sleeper pick-up device (12), a sleeper-laying device (17) and a grading means (35) comprising a grading blade (36). The grading means (35) has two limiting blades (44) associated with it which are located at a distance from one another with respect to the transverse direction of the machine and extend in the longitudinal direction of the machine, between which limiting blades is located the sleeper-laying device (17).

(Fig. 1)

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A MACHINE FOR DISMANTLING AN OLD TRACK AND LAYING A NEW TRACK

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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 456

ORIGINAL TEXT

Ma/Wi/sp

The invention relates to a machine for dismantling an old track and laying a new track, including a machine frame supported on undercarriages, a sleeper pick-up device, a sleeper-laying device and a grading means including a grading blade.

A machine of this kind for track renewal is already known through US 5 357 867, in which the old sleepers are removed during a continuous working advancing movement. The ballast within the exposed sleeper cribs is removed from the ballast bed by means of an endless chain. With the aid of a following grading means in the form of a vertically adjustable, V-shaped ballast plough, the surface of the ballast bed is graded and correctly prepared for laying new sleepers.

It is also known through EP-B1-0 085 790 to supply the ballast bedding, exposed after the removal of a track panel section, to a conveyor belt for removal by means of a rotating screw conveyor which precedes a grading blade.

The combination of a grading blade with a rotating screw conveyor is additionally known through DE-A1-35 28 152. With the track lifted, ballast is continuously transported by this device onto a conveyor belt extending in the longitudinal direction of the machine and is moved by the said conveyor belt in the longitudinal direction of the machine.

The object of the present invention is now to provide a machine of the type described in the introduction with which the ballast bed can be correctly graded with the minimum distance between the grading means and the sleeper-laying

device.

This object is achieved with a machine of the type previously defined in that the grading means has two limiting blades associated with it which are located at a distance from one another with respect to the transverse direction of the machine and extend in the longitudinal direction of the machine, between which limiting blades is located the sleeper-laying device.

This lateral limitation of the sleeper-laying device enables the surplus ballast caught by the grading blade to be moved only as far as the sleeper end region, reducing the transporting distance. The two limiting blades ensure that the ballast accumulated in the sleeper end region does not in any way spoil the surface which has been correctly graded for laying the new sleepers. Immediately after the new sleepers have been laid, the accumulated ballast can be used straightaway in a particularly advantageous manner to ballast the sleeper ends and thus to stabilize the newly laid track. This ballasting is performed automatically by the rear end of the two limiting blades. Thus, by means of the solution according to the invention, the ballast, lying above the grading plane and superfluous for the time being, can be moved in the transverse direction of the track only to the extent which is absolutely necessary for laying the sleepers without hindrance, so that, finally, the ballast can be immediately used again in the most simple manner to stabilize the track position, dispensing with separate transportation devices.

Further advantageous developments of the invention are evident from the sub-claims.

The invention is described in more detail in the following with the aid of an embodiment shown in the drawing, in which

Fig. 1 and 2 show a side view of a machine or arrangement for track renewal which is shown in two parts for reasons of space and is designed in accordance with the invention,

Fig. 3 shows an enlarged detailed side view of the grading means shown in Fig. 1,

Fig. 4 shows a simplified plan view of the grading means, and

Fig. 5 shows a partial view of the same in the longitudinal direction of the machine in the region of a limiting blade.

Figure 1 shows a machine 1 for dismantling an old track 2 and laying a new track 3 which, along with a wagon 4 for drawing rails together shown in Fig. 2, forms a track renewal arrangement 5. This arrangement additionally comprises a power wagon 7 preceding the machine 1 with respect to the working direction shown by an arrow 6, and also sleeper wagons which are not shown here.

The machine 1 has a machine frame 8 which is supported during operational use at its front end in the working direction on the old track 2 by way of an on-track undercarriage 9 belonging to the adjoining power wagon 7, while the rear end of the machine frame 8 is connected to a vertically adjustable caterpillar-tracked undercarriage 10 which has its own motive drive 41. Another on-track undercarriage 11, provided for transfer travel, is swivelled upwards during the operation into an inoperative position. Immediately preceding the caterpillar-tracked undercarriage 10 is a sleeper pick-up device 12 with which a first conveyor means 13 is associated for removing old sleepers 14. A second conveyor means 15 for delivering new sleepers 16 cooperates with a sleeper-laying device 17 located in the region

following the caterpillar-tracked undercarriage 10. A gantry crane 23 which is movable on the machine frame 8 by way of guide rails 22 is provided for transporting the old and new sleepers 14,16 respectively to and from the sleeper wagons.

The machine 1 is also provided with vertically and laterally adjustable rail guides 18,19 for the old rails 20 and new rails 21 respectively and also with operator's cabins 24 located in the working area for operators observing and controlling the sequence of operations. The control of the machine 1 with respect to its direction and height is effected with the aid of a sensing device 25 which has a sliding carriage 26 that follows the old track geometry and is vertically adjustable by way of a drive 27. This sliding carriage rides in the region preceding the sleeper pick-up device 12 on the old sleepers 14 which have already been freed of the old rails 20.

The wagon 4 for drawing rails together (Fig. 2), movable separately from the machine 1 during operational use and following a constant distance behind it in the working direction, comprises a machine frame 28 and rail guides 29 arranged thereon so as to be vertically and laterally adjustable for drawing the new rails 21 together, and also rail guides 30 by means of which the old rails 20 are deposited in the middle of the track. The two on-track undercarriages 31 of the wagon 4 for drawing rails together - which comprises a driver's cabin 32 and a material crane 33 - ride on the new rails 21 of the new track 3. A coupling 34 serves to join the machine frame 28 in an articulated manner to the machine frame 8 of the machine 1 for transfer travel. For operational use, a separate motive drive 54 is provided.

In the region between the sleeper-laying device 17 and the caterpillar-tracked undercarriage 10, there is provided immediately following the said caterpillar-tracked undercarriage a grading means 35 which is shown in Fig. 3 and

4 and partially also in Fig. 5 in detail. The grading means 35 has a grading blade 36 which extends in the transverse direction of the track and is arranged approximately vertically. Provided at the two ends of the grading blade 36 spaced apart from one another in the transverse direction of the machine are mountings 37 in which is fixed a screw conveyor 38 immediately preceding the grading blade 36 in the working direction. The said screw conveyor is rotatable around an axis 39 extending transversely to the longitudinal direction of the machine and horizontally and is symmetrical in design with respect to a vertical plane 40 of the machine 1 extending in the longitudinal direction of the machine and centrally of the machine. The length of the screw conveyor 38 in the transverse direction of the machine approximately corresponds to the length of the grading blade 36. As is particularly evident in Fig. 3, a lower boundary line 42 of the screw conveyor 38, extending at right angles to the longitudinal direction of the machine, is located at a distance in the upwardly vertical direction from a lower, approximately horizontally extending grading edge 43 of the grading blade 36.

The grading means 35 is provided with two limiting blades 44, spaced apart from one another with respect to the transverse direction of the machine, which are arranged so as to extend in the longitudinal direction of the machine on either side of the sleeper-laying device 17, and the respective front ends 45 of which, in the working direction, are connected to the grading blade 36 or a mounting 37. In the region between the sleeper-laying device 17 and the grading blade 36, a consolidating unit 47 equipped with a vibrator 46 is provided between the limiting blades 44. The whole grading means 35 together with the screw conveyor 38 and the limiting blades 44 is secured at the rear end, in the working direction, of a supporting frame 48 extending in the longitudinal direction of the machine. The front end of the said supporting frame is mounted on a connecting base 49 which

is provided between the caterpillar-tracked undercarriage 10 and the machine frame 8. The supporting frame 48 is designed for displacement by means of a drive 50 around a perpendicular axis of rotation 51.

Also, each limiting blade 44 has a plough 52 associated with it or preceding it. These ploughs are mounted in the vicinity of the rear on-track undercarriage 9 of the power wagon 7, in each case vertically adjustably on the side of the said power wagon (see Fig. 1), and are limited to the respective sleeper end region 53.

Transfer travel of the track renewal arrangement 5 to the operating site takes place as a self-contained unit, the machine 1 being connected by means of the coupling 34 to the wagon 4 for drawing rails together. During this, the machine frame 8 of the machine 1 is supported on the lowered on-track undercarriage 11 and its rear end is supported on the on-track undercarriage 31 of the wagon 4 for drawing rails together, while the caterpillar-tracked undercarriage 10 is raised. At the operating site, the machine frame 8 is supported in the region of the on-track undercarriage 9 on the power wagon 7 and the on-track undercarriage 11 is swivelled upwards to extend the free working area. The rear end of the machine 1 now rests on the caterpillar-tracked undercarriage 10 - operated by way of the motive drive 41 - while the wagon 4 for drawing rails together is uncoupled and moved independently with the aid of its own motive drive 54. The rail fastenings of the old rails 20 have meanwhile already been released, and the new rails 21 have been pre-deposited on either side of the old track 2 on the ends of the old sleepers 14. The spreading of the old rails 20, removal by conveyor belt of the old sleepers 14 and laying of the new sleepers 16 as well as the drawing together of the new rails 21 by the wagon 4 for drawing rails together takes place in the known manner, so that detailed description of these procedures can be omitted.

As the machine 1 continuously advances together with the power wagon 7, ditches 55 are created on either side of the old track 2 with the aid of the lowered ploughs 52, the said ditches being dug parallel to the track in the sleeper end region 53 (see Fig. 5). The uneven ballast bed surface 56 cleared of the old sleepers 14 is levelled by the grading means 35 immediately following the caterpillar-tracked undercarriage 10. The grading edge 43 of the grading blade 36 acts like a plane and pushes along in front of it a pile of ballast which is moved transversely into the ditches 55 by means of the preceding screw conveyor 38. (Depending on the design of the screw conveyor 38, the ballast may either be divided in half between the two ditches 55 or all of it can be conveyed to one side of the track only. In this case only one ditch 55 is dug).

The two limiting blades 44 of the grading means 35 which are oriented in the longitudinal direction of the machine ensure that no ballast is able to flow from the ditches 55 or from the sleeper end regions 53 in the region of the consolidating means 47 and the sleeper-laying device 17 back onto the freshly graded ballast bed surface, ensuring unhampered laying of the new sleepers 16. Immediately following the laying of the sleepers, the ballast accumulated at the sides flows past the rear ends 57 of the limiting blades 44 onto the sleeper ends 58 of the new sleepers 16 which have just been laid, causing them to be fixed and stabilized in their position. Instead of a screw conveyor, the accumulated ballast could alternatively also be moved transversely by a V-shaped, snowplough-like design of the grading blade 36.

The claims defining the invention are as follows:

1. A machine for dismantling an old track and laying a new track, including a machine frame supported on undercarriages, a sleeper pick-up device, a sleeper-laying device and a grading means including a grading blade, characterized in that the grading means has two limiting blades associated with it which are located at a distance from one another with respect to the transverse direction of the machine and extend in the longitudinal direction of the machine, between which limiting blades is located the sleeper-laying device.

2. A machine according to claim 1, characterized in that the respective front ends, in the working direction, of the two limiting blades are connected to the grading blade.

3. A machine according to claim 1 and 2, characterized in that a consolidating unit equipped with a vibrator is located between the sleeper-laying device and the grading blade.

4. A machine according to any one of claims 1, 2 or 3, characterized in that the grading blade is immediately preceded by a screw conveyor which is rotatable around an axis extending transversely to the longitudinal direction of the machine and horizontally and is symmetrical in design with respect to a vertical plane extending in the longitudinal direction of the machine and centrally of the machine.

5. A machine according to claim 4, characterized in that the length of the screw conveyor is designed to correspond to the length of the grading blade.

6. A machine according to any one of claims 1 to 5, characterized in that the grading means is arranged immediately following a caterpillar-tracked undercarriage which is connected vertically adjustably to the machine frame and has its own motive drive.

7. A machine according to any one of claims 1 to 6, characterized in that a lower boundary line of the screw conveyor, extending at right angles to the longitudinal direction of the machine, is arranged at a distance in the upwardly vertical direction from a lower grading edge of the grading blade.

8. A machine according to any one of claims 1 to 7, characterized in that the grading means is fixed on a

supporting frame extending in the longitudinal direction of the machine, the front end of which is secured to a connecting base provided between the caterpillar-tracked undercarriage and the machine frame, and is mounted so as to be displaceable by means of a drive around a vertical axis of rotation.

9. A machine according to any one of claims 1 to 8, characterized in that each limiting blade is preceded in the working direction by a plough which is limited to the sleeper end region.

10. A machine for dismantling an old track and laying a new track, substantially as hereinbefore described with reference to any one of the embodiments shown in the accompanying drawings.

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By Their Attorneys:

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David B Fitzpatrick

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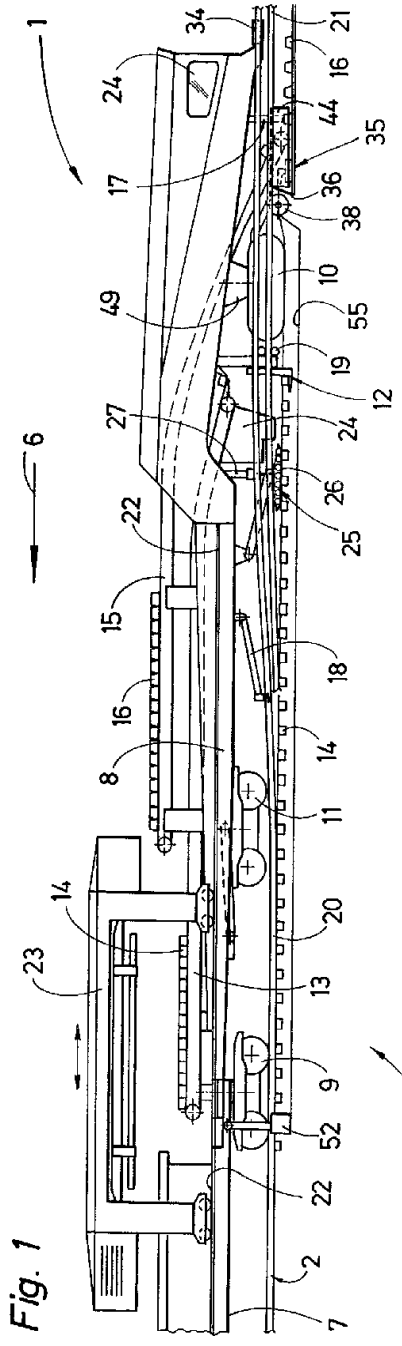


Fig. 1

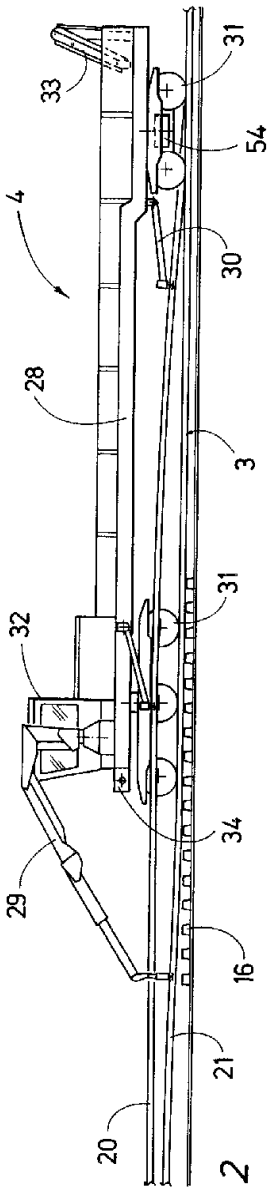


Fig. 2

Fig. 3

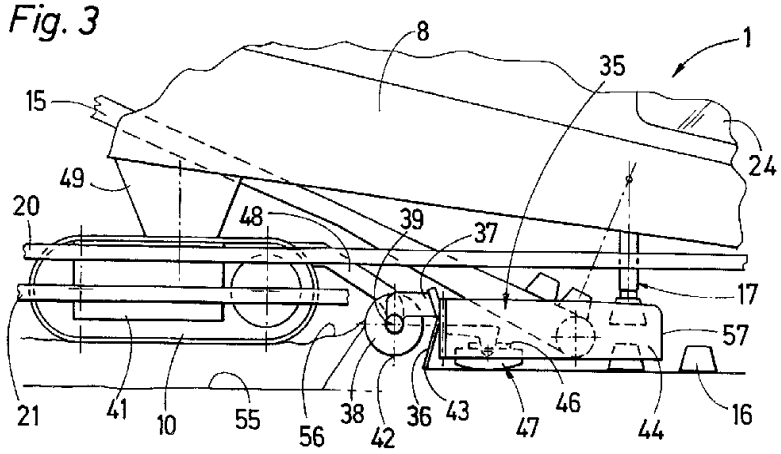
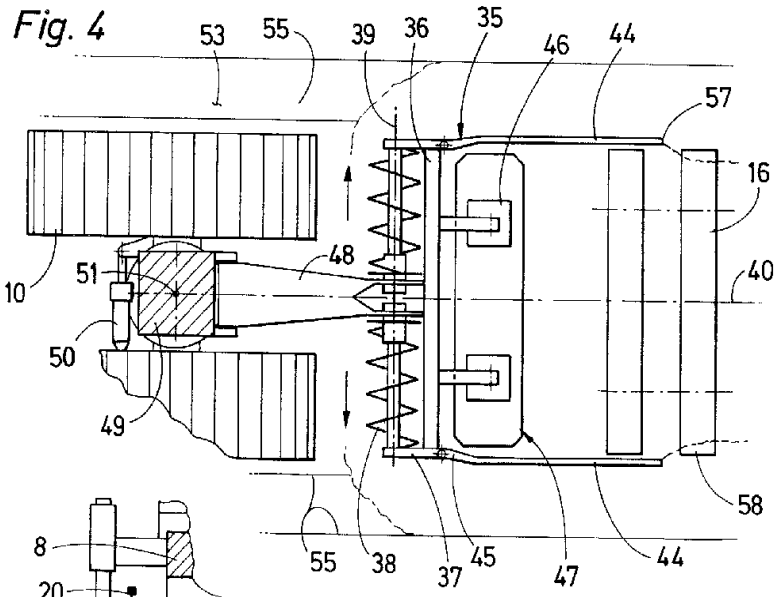


Fig. 4



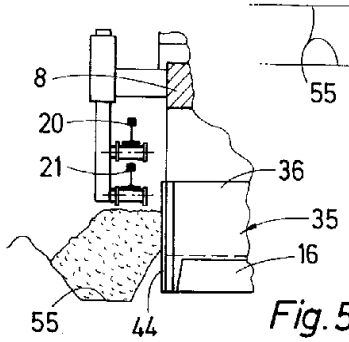


Fig. 5