

(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 199850409 B2**
(10) Patent No. **722775**

(54) Title
A wagon for drawing off long-welded rails stored on transport wagons

(51)⁶ International Patent Classification(s)
E01B 029/16 E01B 029/17

(21) Application No: **199850409** (22) Application Date: **1998 .01 .09**

(30) Priority Data

(31) Number (32) Date (33) Country
30/97 1997 .01 .10 AT

(43) Publication Date : **1998 .07 .16**
(43) Publication Journal Date : **1998 .07 .16**
(44) Accepted Journal Date : **2000 .08 .10**

(71) Applicant(s)
Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.

(72) Inventor(s)
Josef Theurer; Manfred Brunninger

(74) Agent/Attorney
PHILLIPS ORMONDE and FITZPATRICK, 367 Collins Street, MELBOURNE VIC 3000

(56) Related Art
US 3557703

ABSTRACT

A wagon (1), travelling on rails, for drawing off long-welded rails (3) stored on transport wagons (2) includes a wagon frame (6) supported on on-track undercarriages (5) and a rail pulling device (4) for gripping and displacing a long-welded rail (3) in the longitudinal direction of the wagon. The rail pulling device (4) is composed of a caterpillar track (7) equipped with a drive (11) and designed for guidance around two guiding pulleys (9) spaced from one another, the caterpillar track (7) having contact plates arranged one following the other in the pulling direction for application to the long-welded rail (3), and also an abutment (8) adjustable with respect to the caterpillar track (7) by means of a drive (23) and designed to roll on the long-welded rail (3).

(Fig. 1)

FRANZ PLASSER BAHNBAUMASCHINEN-
INDUSTRIEGESELLSCHAFT M.B.H.

AUSTRALIA

Patents Act

**COMPLETE SPECIFICATION
(ORIGINAL)**

Application Number: Class Int. Class
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority

Related Art:

Name of Applicant:

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.

Actual Inventor(s):

Josef Theurer
Manfred Brunninger

Address for Service:

PHILLIPS ORMONDE & FITZPATRICK
Patent and Trade Mark Attorneys
367 Collins Street
Melbourne 3000 AUSTRALIA

Invention Title:

**A WAGON FOR DRAWING OFF LONG-WELDED RAILS STORED ON
TRANSPORT WAGONS**

Our Ref : 512559
POF Code: 1203/1203

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

The invention relates to a wagon, travelling on rails, for drawing off long-welded rails stored on transport wagons, including a wagon frame supported on on-track undercarriages and a rail pulling device for gripping and displacing a long-welded rail in the longitudinal direction of the wagon.

A wagon of this kind for drawing off rails is known from EP 0 467 001 B1, wherein the rail pulling device is designed similar to a crane arm having guide rollers and a rail clamp. Said clamp, designed for gripping the long-welded rail to be drawn off, is longitudinally displaceable in the pulling direction by means of a drive. The long-welded rail is displaced step-by-step towards a pulling apparatus by being repeatedly grabbed by the rail clamp, followed by repeated return of the rail pulling device. By means of said pulling apparatus, the rail is shifted further towards the front end of a track laying train. Said known rail pulling device is not very efficient and, above all, requires a frictionless supporting of the long-welded rails on rollers in order to thereby minimize the resistance to being drawn off.

From DE 12 08 326 B or DE 27 34 748 B, rail loading trains are known which are composed of a plurality of rail transport wagons coupled to one another. For supporting the long-welded rails to be transported, rail supports having supporting rollers arranged one following the other in the transverse direction of the wagon are known, the rail supports being fastened to the wagon frame and spaced from one another in the longitudinal direction of the wagon or train. The wagon provided at the end of the train for drawing off the long-welded rails, also called a chute wagon, comprises, as do the adjoining rail transport wagons, crane rails extending in the longitudinal direction of the wagon in the region of each longitudinal side for mobility of a rail loading crane. By virtue of a gantry-like design, said

crane is able to move over the stored long-welded rails and, with the aid of two crane arms, grip two long-welded rails and displace them towards the chute wagon. The long-welded rails, which in this end region are guided by means of rollers, are then shifted until they touch the ground and are finally anchored to the track. The two long-welded rails are further drawn off by advancing the rail loading train.

The object of the present invention is to create a wagon, travelling on rails, of the specified kind by means of which long-welded rails of particularly great length can also be drawn off without problems even if not supported on rollers.

According to the invention, this object is achieved with a wagon of the specified kind in that the rail pulling device is composed of a caterpillar track equipped with a drive and designed for guidance around two guiding pulleys which are spaced from one another and have an axis of rotation, the caterpillar track having contact plates arranged one following the other in the pulling direction for application to the long-welded rail, and also an abutment adjustable with respect to the caterpillar track by means of a drive and designed to roll on the long-welded rail.

Owing to this clamp-like action of the rail pulling device, a particularly strong pulling force is available so that even rails with a length of, for example, 120 meters can be drawn off without problems. With a correspondingly long design of the caterpillar track, the pulling forces can be increased to such a degree so as to make it possible to draw off even long-welded rails which are supported merely on intermediate layers and which inevitably put up an especially high frictional resistance to displacement. The contact plates, preferably designed with a width corresponding to at least that of the rail base, create a maximal contact or pressure area,

whereby damage to the long-welded rail can be reliably precluded even with particularly strong pressure forces of about 32 tons. A further, special advantage of the rail pulling device also lies in the fact that the pulling operation can be executed continuously, making it possible while drawing off the rails to also carry out, in cooperation with a track laying machine coupled to the wagon, continuous sleeper laying as well as laying the drawn-off long-welded rails onto the laid sleepers.

Further advantages of the invention become apparent from the sub-claims and the drawings.

The invention will be described in detail in the following with reference to embodiments represented in the drawing, in which

Fig. 1 shows a side view of a wagon, travelling on rails, for drawing off long-welded rails stored on transport wagons,

Fig. 2 shows a top view of the wagon according to Fig. 1,

Fig. 3 shows an enlarged side view of a rail pulling device,

Fig. 4 shows a top view of the rail pulling device,

Fig. 5 shows a view of the rail pulling device in the direction of arrow V in Fig. 4,

Fig. 6 shows a simplified cross section according to section line VI in Fig. 5, and

Fig. 7 shows a side view of a further embodiment of a rail pulling device.

A wagon 1, represented in Figs. 1 and 2, for drawing off long-welded rails 3 stored on transport wagons 2 is equipped with two independent rail pulling devices 4 for gripping and displacing the long-welded rails 3. The rail pulling devices 4 are fastened to a wagon frame 6, supported on on-track undercarriages 5, which, together with the adjoining transport wagon 2, is incorporated into a track laying train, not further shown, for continuously laying a new track composed of the long-welded rails 3 and new sleepers.

The two rail pulling devices 4 are arranged at a distance from one another in the transverse direction of the wagon and are each composed of a caterpillar track 7, extending approximately in the longitudinal direction of the wagon, and an abutment 8 positioned thereabove. Both rail pulling devices 4 are mounted for pivoting about a vertical as well as a horizontal axis 20, 46 extending perpendicularly to the longitudinal direction of the machine.

As can be seen particularly in the enlarged detail drawings of the rail pulling device 4 according to Figs. 3 to 6, the endless caterpillar track 7 is supported on guiding pulleys 9 spaced from one another in the longitudinal direction of the wagon, each of which is mounted for rotation about an axis of rotation 10 extending horizontally and perpendicularly to the longitudinal direction of the wagon. One of the two guiding pulleys 9 mounted on a support frame 13 is rotatable by means of a hydraulic drive 11. A plurality of smaller supporting rollers 12 for supporting the caterpillar track 7 are mounted on the support frame 13 between the two guiding pulleys 9. Said caterpillar track 7 consists of a plurality of contact plates 15, arranged one following the other in the pulling or conveying direction (according to arrow 14) and articulatedly connected to one another, which, for reasons of clarity, are only indicated in Figs. 4 and 5. In the upper region of the caterpillar track 7, said contact plates 15 form

a rail contact plane 16 (see especially Fig. 5) which extends parallel to a rail base plane 17 of the long-welded rail 3 to be drawn off.

As evident particularly in Fig. 3, the abutment 8, composed of four double-flanged rollers 18 arranged one following the other in the conveying direction and having axes 19 extending parallel to the axis of rotation 10, is positioned above the caterpillar track 7 in vertical direction and is designed to be adjustable with respect thereto. Two each of the four double-flanged rollers 18 are mounted for pivoting about an axis 21, extending parallel to the axes 19, on a yoke 22 which, for its part, is pivotably hinged at one end to the support frame 13 and connected at its other end to a drive 23. As evident particularly in Fig. 4, two drives 23 spaced from one another in the transverse direction of the wagon are associated with each yoke 22 of the abutment 8, the drives 23 being attached at their lower ends to the support frame 13 of the rail pulling device 4. The double-flanged rollers 18 each comprise two flanges 24 spaced from one another in the direction of the axis 19, so that a rail head 25 of the long-welded rail 3 may be centered between the flanges 24.

The rail pulling device 4 is mounted to a telescopic beam 26 which is designed to be elongatable horizontally and perpendicularly to the longitudinal direction of the wagon by means of a drive 27 and is fastened to the wagon frame 6. Moreover, the beam 26 including the rail pulling device 4 is pivotable about the axis 46, extending horizontally and perpendicularly to the longitudinal direction of the wagon, with the aid of a pivot drive 28. Pivoting of the rail pulling device 4 about the vertical axis 20 relative to the beam 26 is achieved by means of a further pivot drive 29 (see Fig. 4).

As can be seen in Figs. 1 and 2, two cable winches 30 as well as a guide roller 32 for supporting the two long-welded

rails 3 to be drawn off are provided at an end of the wagon 1 adjacent to the transport wagon 2, the guide roller 32 extending perpendicularly and horizontally and being vertically adjustable by means of a drive 31. A pull cable 33 to be wound onto the cable winch 30 is connected at its end to a clamping hook 34 and a retraction cable 35. The latter may be wound onto a respective cable winch 36 shown only in Fig. 1. Two rail guides 38, mounted to the wagon frame 6 for vertical and lateral adjustment by means of drives 37, are provided between the two cable winches 30 and the rail pulling devices 4 with regard to the longitudinal direction of the wagon.

In the following, the operation of drawing off the long-welded rails 3, preliminarily stored on the transport wagons 2, by means of the two rail pulling devices 4 is described in detail.

With hydraulic actuation of the two cable winches 36, the retraction cables 35 are rolled up and, at the same time, each clamping hook 34 is moved towards the long-welded rails 3 to be drawn off. To that end, the two cable winches 30 are switched to free running. In order to be able to position the clamping hook 34 above the respective long-welded rail 3 to be drawn off, guiding pulleys 39 for diverting the two retraction cables 35 are mounted for transverse displacement on a support frame 40. After connecting each clamping hook 34, equipped with a quick locking mechanism, to a long-welded rail 3, the latter is drawn off in the pulling direction indicated by arrow 14 as soon as the respective cable winch 30 is actuated for winding up the pull cable 33. Parallel thereto, the associated cable winch 36 is switched to free running. As soon as the front end of the shifted long-welded rail 3 reaches the guide roller 32, the latter is lifted by actuation of drive 31 until the two long-welded rails 3 are supported. After further forward movement of the long-welded rails 3, the front ends thereof

are gripped by the rail guides 38 designed as clamps and, with actuation of the drives 37, are guided in such a way that the two front ends respectively come to rest on the rail contact plane 16 of the associated caterpillar track 7. At the same time, the rail pulling device 4 is pivoted or laterally adjusted, if required, by actuation of the drives 27, 28 and 29 in order to align the caterpillar track 7 and the associated abutment 8 respectively parallel to the longitudinal direction of the long-welded rail to be drawn off and to ensure a positioning of the rail head 25 between the flanges 24 of the double-flanged rollers 18.

Next, the clamping hooks 34 are detached, the drives 23 for pressing the double-flanged rollers 18 onto the long-welded rail 3 and the drives 11 for rotating the caterpillar tracks 7 are actuated. Parallel thereto, the drives 28, 29 are switched to zero pressure. In order to draw off, for example, long-welded rails with a length of 120 meters, a pressing force of 32 tons is required for the double-flanged rollers 18 in accordance with experience. The pulling force required for drawing off the long-welded rails 3 is about 8 tons. The pulling force to be transmitted by the contact plates 15 of the caterpillar track 7 may be increased even further by corresponding selection of the plate material and the length of the caterpillar track 7. The two rail pulling devices 4 should expediently be positioned at the end of the wagon distanced further from the cable winches 30, so that a suitable deflection curve can form between the transport wagon 2 and the rail pulling devices 4.

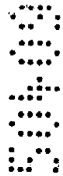
In further succession, the two long-welded rails 3 are transported onwards on a track laying train, which is already known, for example, from EP 0 467 001 B1 described at the beginning, to the front end thereof by actuation of the two drives 11. As soon as the rear ends of the two long-welded rails 3 drawn off by the rail pulling devices 4 come to lie

immediately in front of the caterpillar tracks 7 (see Fig. 1), the pulling operation is temporarily stopped. Next, another two long-welded rails 3 are drawn off the transport wagon 2 in the described manner with the aid of the clamping hooks 34 and cable winches 30 until the front ends of said long-welded rails 3 touch the rear ends of the long-welded rails 3 already gripped by the two rail pulling devices 4. As soon as the two immediately adjacent ends of the long-welded rails 3 are connected to one another by means of a detachable fish-plated joint 41, the two clamping hooks 34 are detached and the operation of drawing off the elongated long-welded rails 3 by actuation of the drives 11 with the aid of the rail pulling devices 4 is resumed. In doing so, preceding long-welded rails 3 are also pushed onto corresponding rail guides over a length of about 500 meters parallel to drawing off long-welded rails 3 from the transport wagon 2. As soon as the two rear ends of the long-welded rails 3 drawn off the transport wagon 2 come to lie immediately in front of the two caterpillar tracks 7, another two long-welded rails 3 are again connected in the already described manner by means of a fish-plated joint 41.

The described wagon 1 including the rail pulling devices 4 can, of course, also be employed in connection with already known rail loading trains, which are mentioned in the introduction to the description (DE 12 08 326 B), for drawing off the long-welded rails transported to the construction site.

In the further embodiment of a rail pulling device 4 shown in Fig. 7, parts having the same function are, for simplicity's sake, denoted by the same reference numerals as in the embodiment described in Figs. 1 to 6. In said embodiment, shown in Fig. 7, the abutment 8 is also designed as a caterpillar track 42 which may optionally also comprise a separate drive for rotation. The upper caterpillar track 42 contacts the rail head of the long-welded rail 3 during the pulling thereof and is pressed towards the lower caterpillar track 7 by means of the drives 23. To that end, the upper

caterpillar track 42 is vertically displaceably mounted in a support frame 43 which is fastened to a lower support frame 44, connected to the wagon frame 6, for pivoting about an axis 45 extending horizontally and perpendicularly to the longitudinal direction of the wagon.



The claims defining the invention are as follows:

1. A wagon, travelling on rails, for drawing off long-welded rails stored on transport wagons, including a wagon frame supported on on-track undercarriages and a rail pulling

5 device for gripping and displacing a long-welded rail in the longitudinal direction of the wagon, characterized in that the rail pulling device is composed of a caterpillar track equipped with a drive and designed for guidance around two guiding pulleys which are spaced from one another and have an
10 axis of rotation, the caterpillar track having contact plates arranged one following the other in the pulling direction for application to the long-welded rail, and also an abutment adjustable with respect to the caterpillar track by means of a drive and designed to roll on the long-welded rail.

15

2. A wagon according to claim 1, characterized in that the rail pulling device is mounted on the wagon frame for pivoting about a vertical axis.

20

3. A wagon according to claim 1 or 2, characterized in that the abutment, designed in the shape of at least two double-flanged rollers arranged one following the other in the
20 pulling direction and having axes extending parallel to the axis of rotation, is positioned above the caterpillar track in vertical direction.

25

4. A wagon according to claim 3, characterized in that a total of four double-flanged rollers are provided centrally between the two axes of rotation of the caterpillar track.

30

5. A wagon according to any one of claims 1 to 4, characterized in that the rail pulling device is mounted on a beam which is designed to be elongatable horizontally and
30 perpendicularly to the longitudinal direction of the wagon by means of a drive and is fastened to the wagon frame.

6. A wagon according to claim 5, characterized in that the beam is mounted on the wagon frame for pivoting about an axis extending horizontally and perpendicularly to the longitudinal
35 direction of the wagon and is connected to a pivot drive.

7. A wagon according to any one of claims 1 to 6, characterized in that provided at one end of the wagon is a cable winch as well as a guide roller, vertically adjustable by means of a drive, for supporting the long-welded rail.

40

8. A wagon according to claim 7, characterized in that two independent rail pulling devices are arranged at the end of the wagon distanced further from the cable winch.

5 9. A wagon, travelling on rails, for drawing off long-welded rails stored on transport wagons, substantially as hereinbefore described with reference to any one of the embodiments shown in the accompanying drawings.

DATED: 4 December 1997

FRANZ PLASSER BAHNBAUMASCHINEN-INDUSTRIEGESELLSCHAFT m.b.H.

10 BY THEIR ATTORNEYS:

PHILLIPS ORMONDE & FITZPATRICK

BY:

David P Fitzpatrick

15

20

25

30

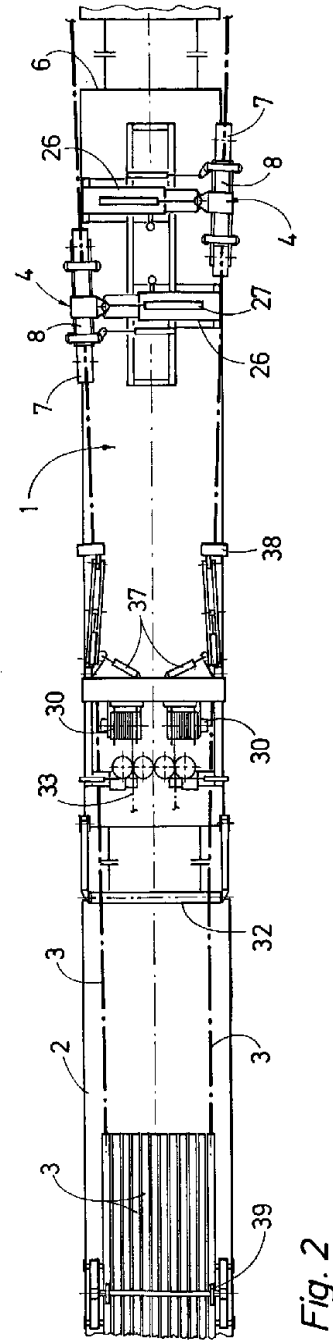
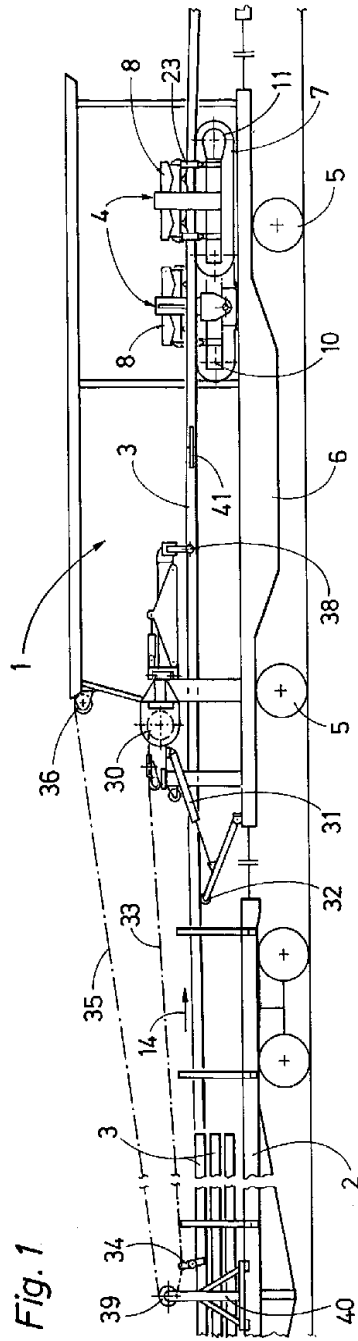
35

40

9 01 98 30409

50409/98

1/3



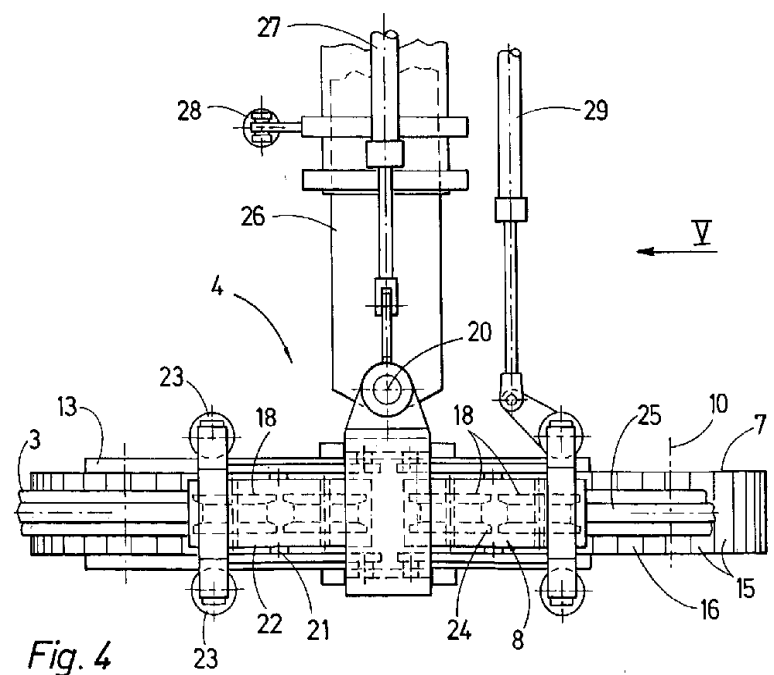


Fig. 5

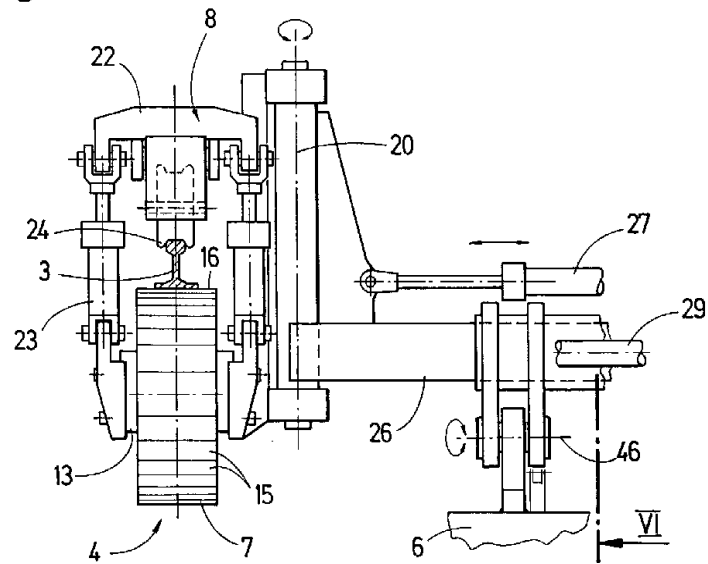


Fig. 6

