TRACK LIFTING TRUSS


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3 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for lifting railroad track, which apparatus is mounted on a track travelling vehicle having a chassis and includes a pair of track lifting truss elements extending longitudinally of the vehicle chassis and overhanging the front end thereof, which trusses are pivotally mounted on trunnions concentric with the axles of the front wheels and extending outwardly of the wheels, the trusses carrying rail engaging magnets at their forward ends and hydraulic jacks being provided to pivot the trusses about the trunnions and lift the track, the forces created during the track lifting operations being transmitted directly to the ground through the trunnions and the rail engaging wheels.

Background of the invention

The invention relates to apparatus for lifting railway tracks.

In the levelling or initial grading of railway track, it is necessary to level the track at low points so that ballast can be inserted beneath a tie and then tamped down. Numerous devices have been proposed for lifting the track, and known forms of track lifting devices are commonly mounted on a wheeled vehicle adapted to run on the track itself. Such vehicles may carry tamping apparatus as well as the lifting device.

Early forms of track jacking apparatus often included jacking cylinders externally mounted of the vehicle and clamps on the vehicle which engaged the rails so that when the jacks were pressed into the ballast on either side of the track, the reaction forces created by the jacks caused the front part of the vehicle and the track engaged by the clamps to be jacked upward. In order to increase production of surfacing devices, it has been more recently proposed to engage the track in front of the vehicle by means of clamps and to raise the track by the action of hydraulic jacks which use the counterbalance of the weight of the vehicle itself as a reaction force. Such proposals have nearly all suffered from the disadvantage that in using the vehicle weight as a counteracting force to the weight of the track which is jacked, the forces were all transmitted to the ground through the wheel axles of the vehicle resulting in severe loading of the axles. This severe loading of the axles had many disadvantages, one of the greatest of which was that it caused high axle failure rate and thus a high maintenance cost.

Summary of the invention

It is an object of the present invention to provide a device for lifting track in which the jacking forces create a reduced loading of the wheel axles.

According to the invention there is provided a railway track lifting apparatus comprising a track travelling vehicle having a chassis; two pairs of longitudinally spaced wheels mounted on axles and supporting the vehicle chassis; trunnions on each pair of wheels; and track lifting means including a track lifting truss mounted on said trunnions through which forces produced during track lifting operations are transmitted directly to said one pair of wheels and thence to the earth.

The invention also consists in railway track lifting apparatus comprising a wheeled vehicle adapted to travel along the track having two pairs of longitudinally spaced wheels, trunnions on at least one of the pairs of wheels concentric with the axles and extending outwardly of the wheels, a beam pivotally mounted on the trunnion of one of the wheels, rail lifting means at or near a free end of the beam, and force applying means operative between the beam and the trunnion on the other wheel to raise and lower the lifting means by pivoting it about the first said trunnion, the forces produced by the track lifting operations being transmitted via the trunnions directly through the wheels of the vehicle to the track.

Modern developments in track levelling techniques make desirable the provision of track lifting apparatus which can operate whilst being moved continuously along the track, and to this end the rail lifting means of the apparatus according to the invention should comprise a member capable of lifting a rail whilst it is slid therealong. The member may for example achieve its lift through electromagnetic means.

Brief description of the drawings

An embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which:

FIGURE 1 is a side view of railway track lifting apparatus in accordance with the present invention and mounted on a railway track;

FIGURE 2 is a plan view of the arrangement shown in FIGURE 1;

FIGURE 3 is a view partially in section of a wheel and trunnion and a bearing and beam of the apparatus shown in FIGURE 1; and

FIGURE 4 is a view in section of an electromagnetic rail lifting member.

Description of the preferred embodiment

The track lifting apparatus shown in the drawings comprises a four-wheeled vehicle 1, the wheels 2 and 3 of which are carried by a pair of transverse axles 4 and 5 and are adapted to travel along the track 6 to be lifted. Each wheel 2 and 3 has integrally cast therewith an outwardly projecting trunnion member 7 concentric with the wheel axle opening and the vehicle carries on each side a beam 8 of elongated triangular form 9 being pivoted through a roller bearing 9 substantially at the centre of its base, to the trunnion 7 of one of the forward wheels 2. The beam 8 projects forwardly of the vehicle 1 and extends rearwardly to the rear wheels 3. At its forward end each beam 8 carries a rail lifter 9 in the form of an electromagnetic member 10 adapted to be engaged with the rail 11 in clamping relation, and which may be formed in section as an inverted W, the outer arms 12 travelling adjacent the opposite sides of a rail 11 with the central arm 13, around which the coil 14 is wound, on top of the rail 11.

The rear wheels 3 of the vehicle 1 mount on their respective trunnions 7 force applying means in the form of a hydraulic ram 15 connected between the beam 8 and the trunnion 7. To enable the beams 8 to take up a substantially horizontal position, the rams 15 are accommodated in recessed portions at the rear ends of the beam 8.

In operation when rail lifting is required whilst the vehicle 1 is moving down the track (right to left as seen in FIGURE 1), the electromagnetic lifter 9 for the rail 11 to be lifted is actuated as well as the ram 15 associated with the beam 8 on that side to pull the rear end of the beam 8 downwardly. The electromagnetic flux is
maintained at a value such that the lifter 9 is just on the point of break-away from the rail 11 (so that minimum tractive effort is required to maintain movement of the vehicle along the track) and to this end a flux control system as described in our copending United States patent application Ser. No. 567,636 may be used. Operation of the ram 15 effects pivoting of the beam 8 about its forward trunnion 7 and hence lifting of the rail 11 in advance of the vehicle 1. It will be appreciated that by this arrangement of pivoting the beams 8 and mounting the force applying means 15 of trunnions 7 formed integrally with the vehicle wheels 2 and 3, the forces produced during track lifting are transmitting directly to earth through the wheels.

What I claim as my invention is:

1. A railway track lifting apparatus comprising a track travelling vehicle having a chassis; front and rear pairs of wheels mounted on axles and supporting the vehicle chassis, trunnion means mounted on the leading pair of wheels concentric with the wheel axles and extending outwardly of the wheels; and track lifting means including a track lifting truss pivotally mounted intermediate its length on said trunnion means which provide a direct path to earth, through the front pair of wheels, for forces produced during a track lifting operation; rail engaging means located adjacent a leading end of the truss; and force applying means located adjacent a trailing end of said truss and connected thereto to pivot said truss on said trunnion means to lift the track.

2. Apparatus as claimed in claim 1 in which further trunnion means are mounted on the rear pair of wheels concentric with the axles thereof and in which the force applying means operates between said further trunnion means and a trailing section of the truss to pivot the truss about the trunnion means on the leading pair of wheels.

3. Apparatus as claimed in claim 1 in which the rail engaging means comprises an electromagnetic clamp.

References Cited
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