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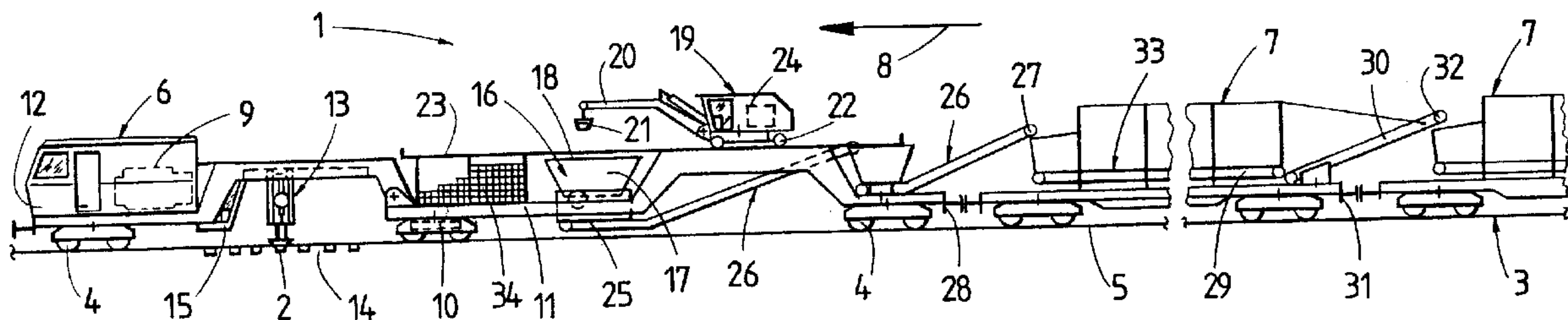
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(54) Title: A METHOD OF RENEWING SLEEPERS OF A TRACK



(57) Abrégé/Abstract:

In a method of renewing sleepers (2) of a track (3), damaged sleepers (2) are removed from the track and replaced by new sleepers (34). The sleepers (2) to be removed from the track (3) are comminuted and, by means of a conveyor device (26) extending in the longitudinal direction of the track, are discharged into a storage wagon (7). Thereafter, the comminuted sleepers (2) are transported onwards with the aid of a conveyor device (33), extending in the longitudinal direction of the track and stretching over a number of storage wagons (7) arranged one following the other, for filling the respective adjacent storage wagon (7).

ABSTRACT

In a method of renewing sleepers (2) of a track (3), damaged sleepers (2) are removed from the track and replaced by new sleepers (34). The sleepers (2) to be removed from the track (3) are comminuted and, by means of a conveyor device (26) extending in the longitudinal direction of the track, are discharged into a storage wagon (7). Thereafter, the comminuted sleepers (2) are transported onwards with the aid of a conveyor device (33), extending in the longitudinal direction of the track and stretching over a number of storage wagons (7) arranged one following the other, for filling the respective adjacent storage wagon (7).

A METHOD OF RENEWING SLEEPERS OF A TRACK

The invention relates to a method of renewing sleepers of a track, wherein damaged sleepers are removed from the track and replaced by new sleepers, as well as to an installation for lifting damaged sleepers from a track and storing them.

Known from US 6 089 162 is a work train, consisting of several vehicles, for renewing sleepers of a track, wherein old sleepers lifted by a crane vehicle mobile on the train are stored in a wagon. Broken old sleepers interfering with the transport are discharged into a separate storage container.

According to US 3 161 213, it is known to cut up the old sleepers, still resting in a ballast bed of the track, with the aid of a saw to facilitate the transport thereof.

Finally, it is known from US 3 701 483 to convey old sleepers, laying on the track, by means of a conveyor belt to a machine mobile on the track, and to comminute the sleepers by means of a device having rotating blades. By means of a conveyor belt extending perpendicularly to the longitudinal direction of the track, the comminuted wood parts are discharged upon a region laterally adjoining the track.

It is the object of the present invention to provide a method and an installation of the specified kind for a more efficient removal of the old or damaged sleepers.

According to the invention, this object is achieved with a method of the specified kind in that the sleepers to be removed from the track are comminuted and, by means of a conveyor device extending in the longitudinal direction of the track, are discharged into a storage wagon, after which the comminuted sleepers are transported onwards with the aid of a conveyor device, extending in the longitudinal direction of the track and stretching over a number of storage wagons arranged one following the other, for filling the respective adjacent storage wagon.

By gearing the entire sleeper transport system to a general comminution of the old sleepers and the transporting away thereof, the hitherto recurring impairment of the transport efficiency by brittle old sleepers is precluded since the entire transport and storage system is based exclusively on comminuted sleepers. By transporting and storing the sleepers in comminuted form, it is possible to achieve an increase in efficiency of the sleeper renewal process since time-consuming gripping, lining up and transporting, restricted due to the bulkiness, to the storage places is not necessary. Rather, by using the method according to the invention, the comminuted sleepers can automatically be transported onwards very simply in great bulk via conveyor belts to large-capacity storage wagons.

Additional advantages according to the invention will become apparent from the description of the drawing.

The invention will be described in more detail below with reference to embodiments represented in the drawing in which

Fig. 1 shows a schematized side view of an installation, designed according to the invention, for lifting damaged sleepers, and

Figs. 2 and 3 each show a greatly simplified side view of further variants of the installation according to the invention.

In the different embodiments and Figures, corresponding or functionally equivalent elements are denoted by the same reference numerals for the sake of simplicity.

In Fig. 1, an installation 1 is shown which is designed for lifting damaged sleepers 2 from a track 3 and storing them. The installation 1 essentially consists of a working vehicle 6, supported by undercarriages 4 on rails 5 of the track 3, and an optional number, dependent on storage demand, of storage wagons 7 coupled thereto, mobile together in an operating direction indicated by an arrow 8. A power source 9 serves to supply energy to a motive drive 10 and to further drives, yet to be described, of the installation 1.

The working vehicle 6 comprises a machine frame 11 designed in two parts or articulatedly because of its great length, with a driver's cab 12 arranged at the end. Located within the range of sight of an operator's cab 15, in a portion of the machine frame 11 following said cab in the operating direction and designed with an offset, is a lifting device 13 for gripping and raising the sleepers 2, damaged or to be replaced, from a ballast bed 14 of the track 3. The lifting device 13 is mounted on the machine frame 11 for vertical and transverse adjustment as well as for displacement in the longitudinal direction of the installation 1. (A detailed description of said device 13 is known, for example, from US 5 193 461.)

Further provided on the machine frame 11 is a comminuting device 16, formed by rotatable knives, which comprises a container 17 having a charging opening 18 for feeding the damaged sleepers 2. A transporting vehicle 19, equipped with a vertically and transversely adjustable cantilever arm 20 and a sleeper grab 21 fastened to the end thereof, is mounted by means of flanged rollers 22 on guide rails 23 connected to the machine frame 11. The transporting vehicle 19 is mobile by means of a motor 24 in the longitudinal direction of the installation 1 between the lifting device 13 and the comminuting device 16 and serves to transport or deliver damaged sleepers 2. Located underneath the comminuting device

16 is a receiving end 25 of a conveyor device 26 extending in the longitudinal direction of the installation 1, the conveyor device having a discharging end 27 positioned at the rear end 28 – with regard to the operating direction – of the working vehicle 6 and projecting over said end 28. The discharging end 27 is associated with the storage wagon 7 coupled immediately to the working vehicle 6.

Each storage wagon 7 comprises a bottom conveyor belt 29, extending in the longitudinal direction of the installation 1, and, adjoining the same, a transfer conveyor belt 30 which projects over a wagon end 31 distanced from the conveyor device 26 and has a discharging end 32 positioned higher than the said bottom conveyor belt 29. Thus, when several storage wagons 7 are coupled to one another, a continuous conveyor device 33 is created which stretches over all the wagons.

In working operation for renewing sleepers 2 of a track 3, the installation 1 is used to remove from the track damaged sleepers 2 which subsequently are replaced by new sleepers 34. During this, the installation 1 moves continuously along the track 3 in the operating direction (arrow 8), while individual damaged sleepers 2 are taken out of the ballast bed 14 by means of the lifting device 13 displaceable in the longitudinal direction of the installation 1. For the purpose of loading the sleepers 2, these are then seized with the sleeper grab 21 of the transporting vehicle 19, transported in the longitudinal direction of the installation 1 to the charging opening 18 of the comminuting device 16, and dropped therein. In further order, the material produced during the comminuting of the damaged sleepers 2 arrives at the conveyor device 26, extending in the longitudinal direction of the installation 1, and is discharged by the same into the first storage wagon 7.

With the aid of the conveyor device 33, extending in the longitudinal direction of the track and stretching over the storage wagons 7 arranged one following the other, the comminuted sleepers 2 are then transported onward in the direction opposite to the operating direction for filling the

respective adjoining storage wagons 7. By way of varyingly regulating the transport speed of the individual bottom conveyor belts 29 and transfer conveyor belts 30 extending in the longitudinal direction of the wagon, the comminuted sleepers 2 can be either stored in the respective storage wagons 7 or transported through the same to the next wagon, as needed.

In the embodiment shown in Fig. 1, new sleepers 34 can be seen stacked on the machine frame 11 between the lifting device 13 and the comminuting device 16, having been deposited there temporarily before the start of working operations of the installation 1. This affords the possibility of employing the correspondingly designed installation 1 also for installing new sleepers 34. Said new sleepers 34 can be gripped by means of the sleeper grab 21 of the transporting vehicle 19 and laid on the track 3 within reach of the lifting device 13, after which they are seized by the device 13 - with reversal of the operating movements carried out previously - and inserted laterally into the ballast bed 14 under the rails 5 of the track 3. Alternatively thereto, the new sleepers 34 can also be installed in the track 3 by means of a separate working unit (not shown here) following behind the installation 1.

In Fig. 2, an installation 35 can be seen which is composed of a working vehicle 36 and - similar to the installation 1 - a number of storage wagons 7 coupled thereto. The storage wagons 7 correspond to the embodiment already described in Fig. 1. The working vehicle 35, equipped with a driver's cab 12, has a machine frame 11 of recessed design on which are arranged a comminuting device 37 and a lifting device 38 following the same in the operating direction (arrow 8). In this case, the comminuting device 37 is designed as a sleeper saw 40, vertically adjustable with the aid of a drive 39, by means of which the damaged sleeper 2 still lying in the ballast bed 14 is sawed into several, for example three, parts. (A comminuting device of this kind is known from US 3 161 213.)

The parts of the sleeper 2 comminuted in this way are subsequently gripped by the lifting device 38 which, just like the comminuting device 37,

is mounted on the machine frame 11 for mobility in the longitudinal direction of the installation 35, and placed on the receiving end of a conveyor device 26. The latter extends in the longitudinal direction of the installation 35 all the way to the frontmost coupled storage wagon 7 and discharges the comminuted sleeper 2 therein. The comminuted sleeper 2 is then transported onwards or stored, as needed, by means of the bottom conveyor belt 29 and transfer conveyor belt 30 arranged in the storage wagon 7.

Shown in Fig. 3 is another variant of an installation 41 for lifting damaged sleepers 2 from a track 3, consisting of a working vehicle 42 and a number of storage wagons 43 coupled thereto. The working vehicle 42 differs from the vehicle 6 described in Fig. 1 in that no transporting vehicle and no guide rails associated therewith are provided in this case. Instead, the working vehicle 42 comprises a depositing station 44, arranged in the area of a lifting device 13, which serves for intermediate storage of the sleepers 2 taken up from the track. These are deposited by the transversely, vertically and longitudinally adjustable lifting device 13 on the depositing station 44 which is connected to a sleeper conveyor 45 extending in the longitudinal direction of the installation 41. By means of the latter, the damaged sleepers 2 are now transported to a comminuting device 16 in which they are comminuted and subsequently discharged onto a conveyor device 26 and transported onwards to the storage wagons 43.

The storage wagons 43 are also designed differently from the already described storage wagons 7 and, in place of bottom and transfer conveyor belts, comprise a conveyor device 46 extending as a whole above the storage wagons 43 in the longitudinal direction thereof. Additionally associated with each storage wagon 43 is a deflecting member 47 which is connected to the respective conveyor device 46 for adjustment in the longitudinal direction of the wagon and with the aid of which the stream of comminuted sleeper material can be deflected, as needed, into the storage wagon 43 located thereunder for the systematic filling thereof.

C l a i m s

1. A method of renewing sleepers (2) of a track (3), wherein damaged sleepers (2) are removed from the track (3) and replaced by new sleepers (34), **characterized in that** the sleepers (2) to be removed from the track (3) are comminuted in one of the phases selected from the group consisting of before removal of the damaged sleepers (2) and after removal of the damaged sleepers (2) and, by means of a conveyor device (26) extending in the longitudinal direction of the track, are discharged into a storage wagon (7;43), after which the comminuted sleepers (2) are transported onwards with the aid of a conveyor device (33;46), extending in the longitudinal direction of the track and stretching over a number of storage wagons (7;43) arranged one following the other, for filling the respective adjacent storage wagon (7;43).
2. A method of loading damaged sleepers (2) lifted from a ballast bed (14) of a track (3), wherein the damaged sleepers (2) are comminuted and, by means of a conveyor device (26) extending in the longitudinal direction of the track, are discharged into a storage wagon (7), after which the comminuted sleepers (2) are transported, by means of a bottom conveyor belt (29) situated in the storage wagon (7) and extending in the longitudinal direction thereof, to a transfer conveyor belt (30), projecting over a wagon end (31), and from there into a further adjoining storage wagon (7).
3. A method of loading damaged sleepers (2) lifted from a ballast bed (14) of a track (3), wherein the sleepers are comminuted in the ballast bed (14) and, by means of a conveyor device (26) extending in the longitudinal direction of the track, are discharged into a storage wagon (7), after which the comminuted sleepers (2) are transported, by means of a bottom conveyor belt (29) situated in the storage wagon (7) and extending in the longitudinal direction thereof, to a transfer conveyor belt (30), projecting over a wagon end (31), and from there into a further adjoining storage wagon (7).

4. A method of loading damaged sleepers (2) lifted from a ballast bed (14) of a track (3), wherein the sleepers are lifted from the ballast bed (14) of the track, comminuted in a comminuting device (16;37) and discharged into a storage wagon (7) by means of a conveyor device (26) extending in the longitudinal direction of the track, after which the comminuted sleepers (2) are transported, as required, by means of a bottom conveyor belt (29) situated in the storage wagon (7) and extending in the longitudinal direction thereof, to a transfer conveyor belt (30), projecting over a wagon end (31), and from there into a further adjoining storage wagon (7).

5. A method according to claim 1, characterized in that the comminuted damaged sleepers (2) are transported above the storage wagons (43) in the longitudinal direction thereof and discharged, as required, into the storage wagon (43) situated thereunder.

6. An installation for lifting damaged sleepers (2) from a track (3) and storing them, **characterized by**

a) a lifting device (13;38) for gripping and lifting the damaged sleeper (2) from a ballast bed (14) of the track (3),

b) a depositing station (44) for intermediate storage of the damaged sleepers (2),

c) a comminuting device (16) having a charging opening (18) for feeding the intermediately stored sleepers (2),

d) a conveyor device (26) extending in the longitudinal direction of the installation (1;35;41) and having a discharging end (27) for transporting away the comminuted sleepers (2), and

e) at least one storage wagon (7;43) having a bottom conveyor belt (29) extending in the longitudinal direction of the installation (1;35) and a transfer conveyor belt (30) projecting over a wagon end (31) distanced from the said conveyor device (26), the transfer conveyor belt (30) comprising a discharging end (32) positioned higher than the bottom conveyor belt (29).

7. An installation according to claim 6, characterized by a device (13) for gripping new sleepers (34) and for laterally inserting them under rails (5) of the track (3).
8. An installation according to claim 6 or 7, characterized by a transporting vehicle (19) provided for the transport of new sleepers (34), the transporting vehicle being mobile on the installation (1), mobile on the track, in the longitudinal direction thereof.

