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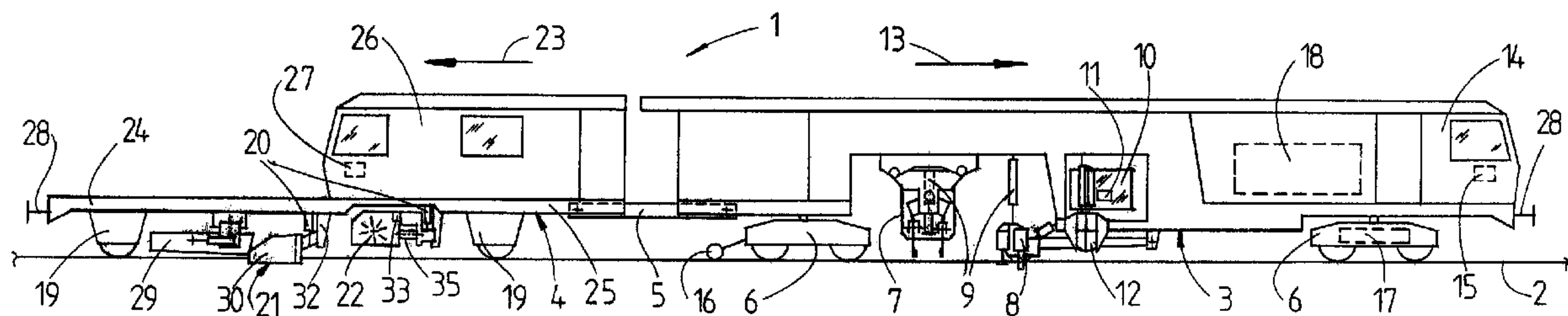
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(54) Title: A TRACK TAMPING MACHINE FOR TAMPING AND BALLASTING A TRACK



(57) **Abrégé/Abstract:**

A track maintenance machine (1) for tamping and ballasting a track (2) is provided with a first and a second machine frame (3,4) pivotally joined together by a pivotal connection (5) and designed for mobility on the track by means of on-track undercarriages (6,19). A tamping unit (7) adapted for vertical adjustment by means of drives (9) and a track lifting and lining unit (8) preceding it with respect to a working direction for tamping are associated with the first machine frame (3), while a ballast plough (21) for ballasting the track and a sweeping broom (22) are associated with the second machine frame (4). The sweeping broom (22) is arranged preceding the ballast plough (21) with respect to the said working direction.



ABSTRACT

A track maintenance machine (1) for tamping and ballasting a track (2) is provided with a first and a second machine frame (3,4) pivotally joined together by a pivotal connection (5) and designed for mobility on the track by means of on-track undercarriages (6,19). A tamping unit (7) adapted for vertical adjustment by means of drives (9) and a track lifting and lining unit (8) preceding it with respect to a working direction for tamping are associated with the first machine frame (3), while a ballast plough (21) for ballasting the track and a sweeping broom (22) are associated with the second machine frame (4). The sweeping broom (22) is arranged preceding the ballast plough (21) with respect to the said working direction.

A TRACK TAMPING MACHINE FOR TAMPING AND BALLASTING A TRACK

The invention relates to a track maintenance machine for tamping and ballasting a track, comprising a first and a second machine frame pivotally joined together by a pivotal connection and designed for mobility on the track by means of on-track undercarriages, a tamping unit adapted for vertical adjustment by means of drives and a track lifting and lining unit preceding it with respect to a working direction for tamping being associated with the first machine frame, and a ballast plough for ballasting the track and a sweeping broom being associated with the second machine frame.

A track maintenance machine of this kind is already known through European Patent 0 436 757 B1. Surplus ballast can be conveyed forwards by means of the sweeping broom and conveyor belts which precede it to the tamping unit and can there be discharged as required in the region of tamping tines in a targeted manner onto the track. Reprofilng of the ballast bed is also performed at the same time in the course of the track correction and tamping operations using the ballast plough which immediately precedes the sweeping broom in the working direction.

Another track maintenance machine for simultaneously tamping and ballasting a track is known through US Patent 4 165 694, the ballast plough being arranged at the front end and the sweeping broom at the rear end of the machine. A machine frame connected to the ballast plough in the form of a trailer is designed to travel continuously by means of a longitudinal displacement drive independently of another machine frame which follows and which is connected to the tamping units. The attempt was made with this known

construction to combine the technologies of track tamping and ploughing which differ with respect to their advancing movement.

European Patent 0 397 956 B1 describes a track maintenance machine for simultaneously tamping and ballasting a track, composed of a total of three machine frames pivotally joined together and designed to travel continuously during operation. Independently of this continuous advance, another machine frame designed in the form of a trailer and connected to the tamping units is moved intermittently from one sleeper to the next.

The object of the present invention is now to create a track maintenance machine of the type previously defined which can be used in a particularly efficient manner both for tamping and for ballasting a track.

This object is achieved according to the invention with a track maintenance machine described in the introduction in that the sweeping broom is arranged so as to precede the ballast plough with respect to the said working direction.

Because of this specific arrangement of the sweeping broom, it is now possible for the first time, keeping a constructionally simple design of the machine frame, to use the machine in one working direction for tamping while ballasting the track in the other, opposite working direction. This extended capability of the machine to be used in two different working directions enables the necessary track possession prohibiting normal train traffic to be used particularly efficiently in that the track is tamped during the outward journey and is ploughed at great speed during the subsequent return journey. By separating the two technologically very different operations, the working speed can also be optimally adapted to the prevailing operating conditions. Also, this bilateral operation also enables

intermittent tamping particularly in switch sections to be combined with continuous use of the plough which produces a better work result.

In a further development the ballast plough is arranged in the region of a half of the second machine frame which is situated further away from the pivotal connection in the longitudinal direction of the machine, while on the top of the other half of the second machine frame closer to the pivotal connection there is provided a driver's cab with a central control unit for operating drives associated with the ballast plough and the sweeping broom - also located on the second machine frame. This arrangement has the advantage that from the driver's cab which is set back - relative to the end of the second machine frame - improved observation of the ballast plough is ensured to achieve rapid diversion of the ballast flow in accordance with the various ballasting conditions.

In another advantageous development the second machine frame is designed in the form of a trailer with a single on-track undercarriage situated at a distance from the pivotal connection, and the pivotal connection is designed as a separable coupling. This enables the second machine frame, with its constructionally very simple design, to be rapidly coupled if required to the first machine frame or to be uncoupled therefrom. Tamping machines which are already in service can thus also be refitted for operation according to the invention.

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In yet a further development associated with the second machine frame is a ballast hopper with discharge openings located between the ballast plough and the rearmost on-track undercarriage - with respect to the said working direction. This provides for advantageous temporary storage of surplus ballast which in turn can be supplied to the track if required by way of the discharge openings.

Finally, the further construction of the machine involving a constructionally simple design of the ballast plough, wherein the ballast plough is composed of two shoulder ploughs, transversely and vertically adjustable independently of one another and located on respective longitudinal sides of the machine, and two centre ploughs, arranged side by side in the transverse direction of the machine and vertically adjustable independently of one another by means of drives and further wherein a working surface of the ballast plough which is provided for diverting the ballast and which may be brought into contact with the ballast to be ploughed, is provided on a side of the centre ploughs facing away from the pivotal connection, while an articulation connected to the machine frame is fixed on the adjoining, opposite side provides for optimum adaptation to different ballasting conditions.

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

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Fig. 1 shows a side view of a track maintenance machine for tamping and ballasting a track,

Fig. 2 shows a simplified plan view of a part of the

machine, and

Fig. 3 and 4 show respective partial side views of other embodiments of a track maintenance machine.

A track maintenance machine 1, evident in Fig. 1, for tamping and ballasting a track 2 has a first and a second machine frame 3,4, pivotally joined together by means of a pivotal connection 5 and designed for mobility on the track 2 by means of on-track undercarriages 6,19. Associated with the first machine frame 3 is a tamping unit 7 and a track lifting and lining unit 8, in each case vertically and transversely adjustable by means of drives 9, specifically for tamping switch sections. Also provided in the region of an operator's cab 10 comprising a central control unit 11 is an additional lifting unit 12 for lifting rail lengths of a branch track extending laterally adjacent to the machine 1. A driver's cab 14 with a control unit 15 is arranged at the front end of the first machine frame 3, with respect to the working direction shown by an arrow 13 for tamping the track 2 - this working direction being determined by the positioning of the track lifting and lining unit 8 in front of the tamping unit 7. The machine 1 also has a levelling and lining reference system 16 for track geometry correction, an axle drive 17 and a central power unit 18.

The rear, second machine frame 4, with respect to the working direction for tamping the track 2 (arrow 13), is supported on two on-track undercarriages 19 arranged at the ends thereof and is pivotally connected to the first machine frame 3 by the pivotal connection 5 designed in the form of a rod. Situated beneath the second machine frame 4, between the two on-track undercarriages 19, are a ballast plough 21 which is vertically adjustable by means of drives 20 and a similarly vertically adjustable sweeping broom 22. The latter is arranged immediately following the ballast plough 21 with respect to a working direction shown by an arrow 23 for

ballasting the track 2 or preceding the ballast plough 21 with respect to the working direction for tamping the track 2.

The ballast plough 21 is arranged in the region of a half 24 of the second machine frame 4 which is situated further away from the pivotal connection 5 in the longitudinal direction of the machine, while on the top of the other half 25 of the second machine frame 4 closer to the pivotal connection 5 there is provided a driver's cab 26 with a central control unit 27 for operating drives 20 associated with the ballast plough 21 and the sweeping broom 22. Provided at the two ends of the machine 1 are respective buffer and draw gear 28 for its incorporation in a train formation.

As is evident in Fig. 2 in particular, the ballast plough 21 is composed of two shoulder ploughs 29, arranged side by side in the transverse direction of the machine and transversely and vertically adjustable independently of one another and situated on respective longitudinal sides of the machine, for the purpose of profiling the ballast bed shoulders, and two centre ploughs 30, arranged side by side in the transverse direction of the machine and vertically adjustable independently of one another by means of drives 20. A working surface 31 of the ballast plough 21 or of the centre ploughs 30, which is provided for diverting the ballast and which may be brought into contact with the ballast to be ploughed, is provided on a side facing away from the pivotal connection 5. On the opposite side adjoining the working surface 31, each centre plough 30 is connected to an articulation 32 fixed to the machine frame 4. Associated with the sweeping broom 22 which is rotatable by means of a drive 33 around an axis of rotation 34 extending at right angles to the longitudinal direction of the machine and horizontally is a lateral conveyor belt 35. Surplus ballast removed by the sweeping broom 22 from the track 2 may be discharged by this lateral conveyor belt onto the ballast bed shoulders.

The machine 1 is expediently driven to the track worksite in the direction shown by the arrow 13. After arrival at the track worksite, tamping and track geometry correction of the track 2 is performed with an intermittent working advancing movement and with the lowering of the tamping and track lifting-lining units 7,8. After the track 2 has been completely tamped in the worksite section, the machine 1 is operated in the opposite direction shown by arrow 23, the devices and working units located on the first machine frame 3 being raised into the inoperative position. At the same time the ballast plough 21 and the sweeping broom 22 are lowered into the working position. Then, with continuous operation of the axle drive 17 to produce a continuous working advancing movement, the prescribed ballasting of the track 2 is performed. Alternatively, it would of course also be possible to carry out the ballasting in the first procedure and then to carry out the tamping operation afterwards.

In the other embodiments shown in Fig. 3 and 4, for the sake of simplicity components having the same function have been provided with the same reference numerals as in Fig. 1 and 2. In the embodiment shown in Fig. 3, the second machine frame 4 is designed in the form of a trailer with only a single on-track undercarriage situated at a distance from the pivotal connection 5. The pivotal connection 5 is composed of a separable coupling. The second machine frame 4 can thereby be coupled or uncoupled as required.

According to the embodiment shown in Fig. 4, a ballast hopper 36 is associated with the second machine frame 4. This has a base conveyor belt 37 with discharge openings 38 located between the ballast plough 21 and the on-track undercarriage 19 situated further away from the pivotal connection 5.

Departing from the embodiments shown, the second machine frame - with respect to the working direction for tamping - could also be arranged preceding the first machine frame.

Claims

1. A track maintenance machine (1) for tamping and ballasting a track (2), the machine being movable along the track in a first operating direction and in a reverse direction opposite thereto, comprising a first and a second machine frame (3,4) pivotally joined together by a pivotal connection (5) and designed for mobility on the track by means of on-track undercarriages (6,19), a tamping unit (7) adapted for vertical adjustment by means of drives (9) and a track lifting and lining unit (8) preceding it with respect to a working direction for tamping being associated with the first machine frame (3), and a ballast plough (21) for ballasting the track and a sweeping broom (22) being associated with the second machine frame (4), characterized in that the sweeping broom (22) is arranged so as to precede the ballast plough (21) with respect to the said working direction.

2. A machine according to claim 1, characterized in that the ballast plough (21) is arranged in the region of a half (24) of the second machine frame (4) which is situated further away from the pivotal connection (5) in the longitudinal direction of the machine, while on the top of the other half (25) of the second machine frame (4) closer to the pivotal connection (5) there is provided a driver's cab (26) with a central control unit (27) for operating drives (20) associated with the ballast plough (21) and the sweeping broom (22) - also located on the second machine frame (4).

3. A machine according to claim 1 or 2, characterized in that the second machine frame (4) is designed in the form of a trailer with a single on-track undercarriage (19) situated at a distance from the pivotal connection (5), and the pivotal connection (5) is designed as a separable coupling.

4. A machine according to any one of claims 1, 2 or 3, characterized in that associated with the second machine frame (4) is a ballast hopper (36) with discharge openings (38) located between the ballast plough (21) and the rearmost on-track undercarriage (19) - with respect to the said working direction.

5. A machine according to any one of claims 1 to 4, characterized in that the ballast plough (21) is composed of two shoulder ploughs (29), transversely and vertically adjustable independently of one another and located on respective longitudinal sides of the machine, and two centre ploughs (30), arranged side by side in the transverse direction of the machine and vertically adjustable independently of one another by means of drives (20).

6. A machine according to claim 5, characterized in that a working surface (31) of the ballast plough (21) which is provided for diverting the ballast and which may be brought into contact with the ballast to be ploughed, is provided on a side of the centre ploughs (30) facing away from the pivotal connection (5), while an articulation (32) connected to the machine frame (4) is fixed on the adjoining, opposite side.

