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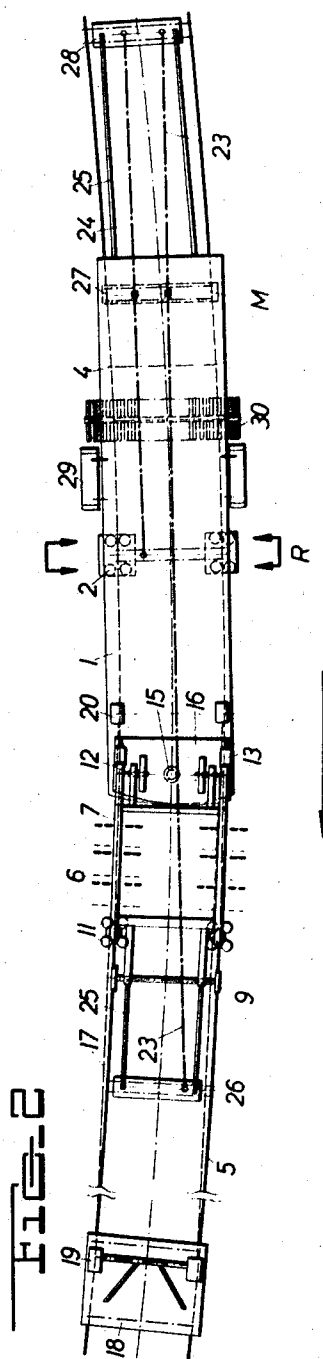
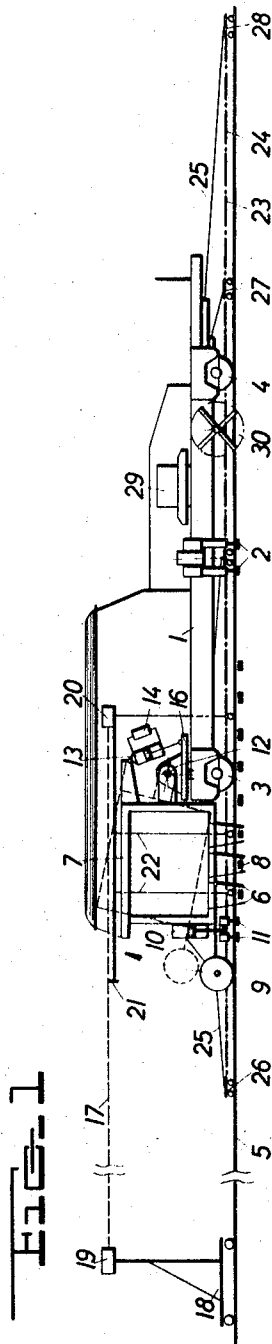
F. PLASSER ET AL

3,469,534

MOBILE TRACK LINER AND TAMPER

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4 Sheets-Sheet 1



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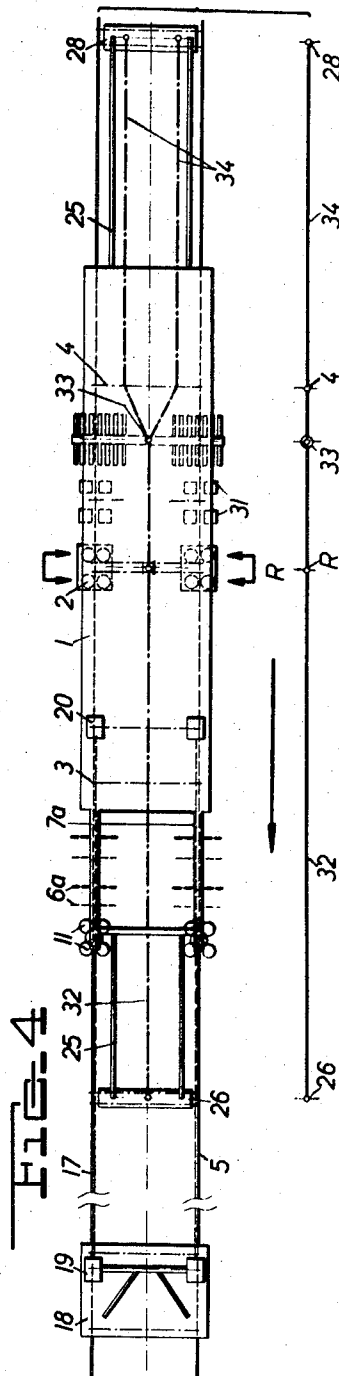
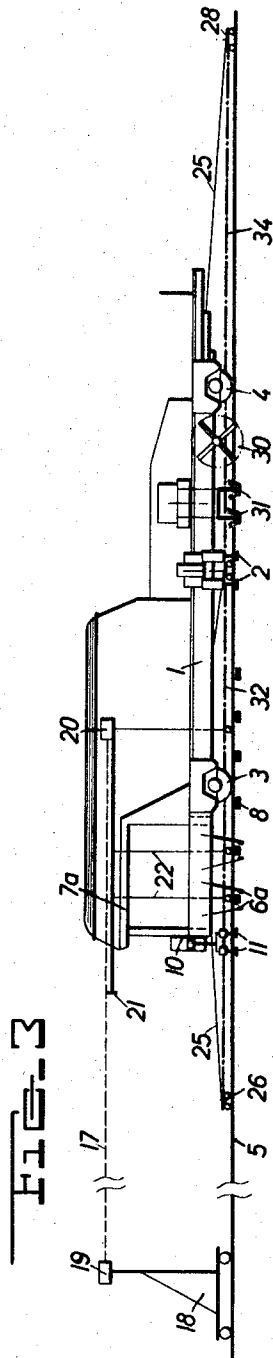
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4 Sheets-Sheet 2



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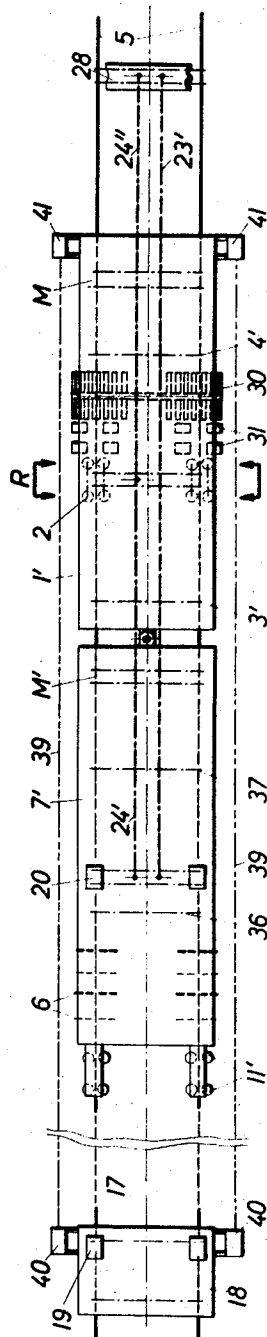
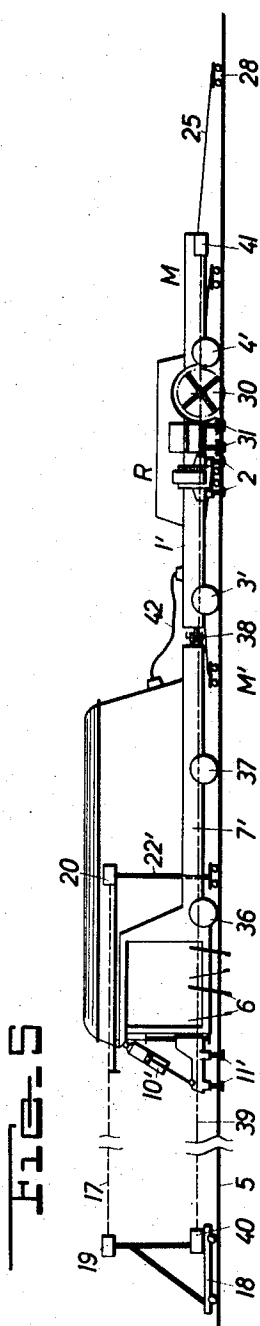
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MOBILE TRACK LINER AND TAMPER

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4 Sheets-Sheet 3



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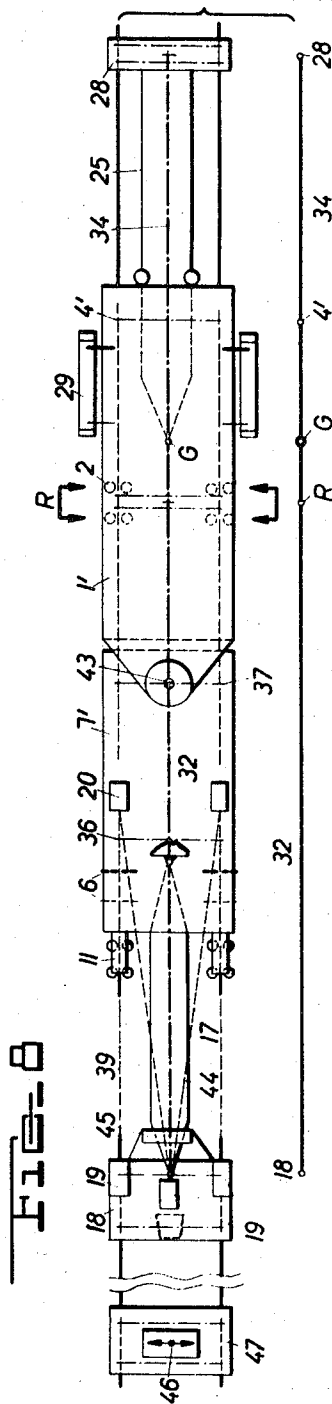
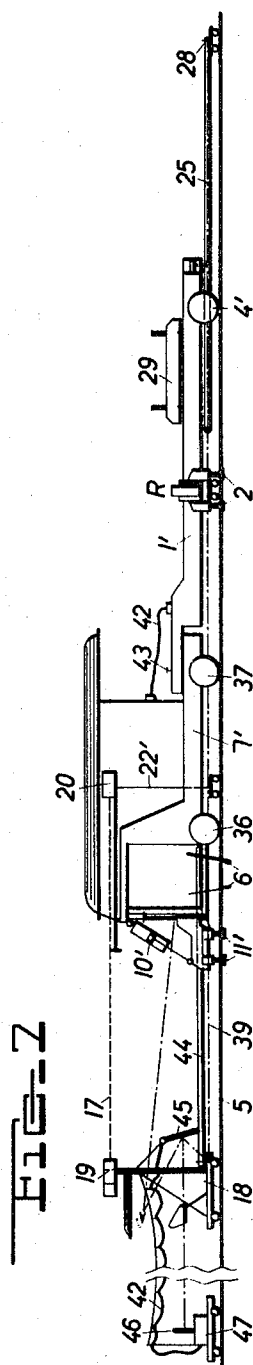
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MOBILE TRACK LINER AND TAMPER

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3,469,534

MOBILE TRACK LINER AND TAMPER

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A 8,974/66, A 8,970/66

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U.S. Cl. 104—7

9 Claims

ABSTRACT OF THE DISCLOSURE

A mobile track liner and tamper comprising two frames mounted on wheels for mobility on the track, track shifting means being mounted on one frame and tamping means being mounted on the other frame.

Background and summary of the invention

The present invention relates to a mobile track tamper and liner.

Mobile and highly sophisticated machines of this type have recently been developed, which combine track lifting means, tamping means for fixing the graded track in position after it has been lifted to a desired grade, and track shifting means positioned in front of or behind the tamping means in the direction of operation of the machine. It has also been proposed to mount the track shifting means on a separate carrier frame connected to the track tamper. This type of machine has the advantage that the track lining is effected on the previously graded and compacted ballast bed, thus ostensibly avoiding the danger that the lateral alignment is changed by subsequent lifting of the track and tamping. However, in known machines of this type, the structure and interconnection of the track shifting means carrier and the track tamper were such that subsequent lateral track movements were not altogether excluded since the rearwardly extending carrier arm transferred some of the force exerted during lateral track alignment to the previously surfaced track section upon which the track tamper rested.

It has also been proposed to mount the tamping and track shifting means on a frame mounted on front and rear trucks for mobility on a track. Machines of this type, wherein the tamping and track shifting means are mounted intermediate the front and rear trucks, have the advantage that the transfer of moving force to the track is effected at the front and rear trucks, i.e. at points spaced apart a considerable distance if the frame is long. However, they have the disadvantage that accurate lateral alignment is not possible if the track is simultaneously graded, lined and tamped, because lifting and tamping make simultaneous faultfree lateral alignment impossible.

It is one object of the invention to provide a mobile track liner and tamper having the above advantage, i.e. a long mobile frame whereon track shifting means are mounted intermediate the front and rear axles of the frame, while mounting the tamping means on a relatively short frame connected to the first frame. Such a short frame for support of the tamping means may be used even if the tamping means includes a group of spaced tampers for simultaneously tamping two or three adjacent ties.

It is another object of this invention to mount the track grading, tamping and lining tools in such a manner that a single operating stand on the machine may be used to control all tools.

It is also an object of the present invention to connect the two frames detachably so that the frame supporting the tamping means may be built onto an existing track liner frame of the indicated type.

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It is a further object so to arrange the tamping and track shifting means on a mobile track surfacing machine that track alignment is effected at a track point which has previously been graded and tamped, with track shifting means mounted on an elongated frame supported on rear and front wheels.

The above and other objects and advantages of the present invention are accomplished by the provision of a first frame mounted on wheels for mobility on the track and shifting means mounted on the first frame between the wheels for laterally moving the track. A second frame is connected to the first frame and tamping means is mounted on the second frame. Preferably, the second frame extends forwardly of the first frame, and it is supported thereon, pivotally coupled thereto or integral therewith.

Brief description of drawing

The above and other objects, advantages and features of the present invention will become better understood by reference to the following detailed description of certain preferred embodiments of a mobile track liner and tamper constructed according to the invention, taken in conjunction with the accompanying drawing wherein

FIG. 1 is a side view of one embodiment of the track liner and tamper;

FIG. 2 is a top view of FIG. 1;

FIG. 3 is a side view of a modification of this embodiment;

FIG. 4 is a top view of FIG. 3;

FIG. 5 is a side view of another embodiment of the machine;

FIG. 6 is a top view of FIG. 5;

FIG. 7 shows a modification of the other embodiment in side view; and

FIG. 8 is a top view of FIG. 7.

To avoid redundancy in the description, like reference numerals have been applied in all figures of the drawing to like parts operating in a like manner so that a single description of such parts and operation will serve for all figures.

Referring now to the drawing and first to FIGS. 1 and 2, there is shown a mobile track liner and tamper which includes a first frame 1 mounted on front wheels 3 and rear wheels 4 for mobility on track 5. The wheels are part of conventional trucks supporting carriages on tracks. Track shifting means 2, which includes rail gripping rollers in the illustrated embodiment, is mounted centrally in respect of the ends of frame 1. As is conventional, such rail gripping rollers are mounted on clamps constituting means for selectively engaging the gripping rollers with the rails and disengaging them therefrom. Desirably and as is also conventional, a vibratory drive is arranged to move the rail gripping rollers laterally.

A second frame 7 is supported on frame 1 and, in the illustrated embodiment, extends forwardly of the frame 1 so that the frame 7 overhangs a track section to be surfaced in front of the front wheels 3. In this preferred embodiment, the second frame 7 is movable in respect of first frame 1, being pivotally connected to the first frame for pivoting movement in a horizontal and in a vertical plane. The pivoting movement in a horizontal plane is particularly useful for operation of the machine in track curves. Vertical pivoting permits lifting of the second frame 7, with the tamping means 6 mounted thereon, either for vertical adjustment during tamping, for moving the machine over crossings, and/or for raising the track lifting means 10, 11, which are also mounted on the frame 7, during grading operations.

The tamping means may also be conventional and may include the illustrated three groups of tampers

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schematically indicated in FIG. 1 to tamp three adjacent ties 8 simultaneously.

A truck 9 is mounted at the forward end of tamping means supporting frame 7 to support the frame on the track 5 when the frame is lowered into engagement with the track.

The illustrated track lifting means is a conventional hydraulic motor 10 fixedly mounted at the forward end of frame 7, such motor being arranged to move the rail gripping rollers 11 vertically. However, the rail gripping rollers may also be held fixed in relation to frame 7 and raised simply by actuating hydraulic motor 13 which is linked to frame 7 and may raise the entire frame with the track lifting means and the tampers about horizontal pivots 12 mounting frame 7 on brackets supported on platform 16. Slide valve 14 controls hydraulic fluid flow to hydraulic motor 13. Furthermore, as is also well known, the track tampers 6 may be mounted for vertical adjustment on frame 7 so that they may be raised and lowered therein, independently of the raising and lowering of the frame itself. It will be useful if means is provided for holding the piston of hydraulic motor 10 and/or 13 in a predetermined position in the hydraulic motor cylinder to fix the frame 7 and/or the rail gripping elements 11 in a desired vertical position so as to avoid undesired lifting of the track, which may destroy the correct track grade. The hydraulic fluid delivery to hydraulic motor 13 and to the hydraulic motors 10 associated with the rail gripping elements for each rail is preferably independent from each other so that each rail may be lifted independently, if desired, to produce a desired superelevation during grading operations in a curve, for instance.

The platform 16 extending from frame 7 is shown to be pivotally mounted about vertical pivot 15 for pivoting movement in a horizontal plane (see particularly FIG. 2).

As is known, the track grading by means of the track lifting means is controlled by a pair of reference lines 17, 17 associated with the track rails and defined by a beam of radiant energy emitted from a sender 19 and received by a receiver 20. The beam emitter is mounted on a front bogie 18 which precedes the machine in the direction of operation shown by the horizontal arrow in FIG. 2. The beam receiver is mounted on a wheeled support on the previously surfaced track section behind the front wheels of the machine frame 1. The spotboard 21, which rises with the track, indicates when the desired grade is obtained, all of this structure and the concomitant operations being well known per se and forming part of the present invention only inasmuch as combined with the lining and tamping mechanisms thereof. As is also known, the spotboard is mounted on a pair of support rods 22, 22 which are spaced along the rail on which they rest, to compensate for grade errors.

As is also conventional and described, for instance, in Austrian Patent No. 227,749, the lateral alignment of the track is controlled by a reference chord system including two chords of different length, the longer chord 23 extending from a front carriage 26 to a rear carriage 28. The carriages 26 and 28 are coupled to the machine by spacing rods 25, 25. The chord 23 passes through track point R at which the track is to be lined and track point M at which the ordinates of the long chord 23 and the short chord 24 are measured and compared for purposes of determining the proper alignment parameters in accordance with known surveying methods, as exemplified in the above-mentioned Austrian patent.

The shorter chord 24 extends from point R to carriage 28. A small measuring carriage 27 is arranged at point M, carriages 26, 27 and 28 being readily retractable from the track into the machine.

In the illustrated embodiment, the machine frame 1 also carries surface ballast tampers 29 for compacting the sides of the ballast bed adjacent the track rails, and

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ballast broom 30 for leaving the ballast bed in perfect condition after the surfacing operation has been completed. Such ballast working tools may readily be mounted on the frame 1 which otherwise carries only the track shifting means.

In the modification of FIGS. 3 and 4, the frame 7a supporting the tamping means 6a is integrally connected to track shifting means supporting frame 1. Also, additional surface tamping means 31 is mounted on frame 1 for compacting the ballast between the ties, all of these additional ballast working tools being mounted behind the track shifting means.

Obviously, frame 7a could also be mounted for pivotal movement in a horizontal plane on a kingpin, somewhat like a trailer on a tractor.

The track alignment control differs from that in the first-described embodiment and is of the type fully described and illustrated in copending U.S. patent application Serial No. 444,354, filed March 31, 1965, by Adolph Warnick, for "Method for Lining Curves," now Patent No. 3,343,496. In this reference chord system, the longer reference chord 32, which may be a tensioned wire, extends from front carriage 26 to a pivot point 33 on frame 1, passing the track point R at which the track is to be lined. At point 33, the longer chord is connected with a shorter chord constituted by a pair of parallel fixed rods 34, 34 extending to carriage 28. The shorter chord is fixed to the rear truck 4 of the machine frame 1 and thus has a fixed position in respect of track 5. This forces the longer chord 32 at point R into a position indicating to which side the track must be moved for proper alignment, the distances of the chord end points having been chosen in a predetermined ratio, as indicated on the bottom of FIG. 4 and explained in detail in the above-identified patent to Warnick.

In the embodiment of FIGS. 5-8, the frame 7' supporting the tamping and track lifting means includes front wheels 36 and rear wheels 37 for mobility on the track, this portion of the machine being a generally well known type of track tamping and grading machine with an overhanging portion extending forwardly of the front wheels over the track section to be surfaced. The track lifting means is of the type including a hydraulic motor 10' linked respectively to the overhanging frame portion and to a vertically movable bracket carrying a pair of rail grippers 11', 11'. The reference beam receiver 20 is mounted on a wheeled carriage 22' in the graded track section behind the front wheels.

Referring now to FIGS. 5 and 6, the machine frame 1' is coupled to the mobile tamper frame at 38 and carries the track shifting means 2. This includes two pairs of spaced rail engaging rollers for gripping each rail at point spaced along the elongation of the track and movable in respect of the supporting frame 1' which supports them. The machine frame 1' is also mounted for mobility on track 5 on front wheels 3' and rear wheels 4'.

The reference chord system for controlling the work of the track shifting means includes chords 24', 24'' and 23' for work in track curves, and a pair of reference lines 39, 39 extending adjacent each rail in straight track section. The reference lines 39 are beams of radiant energy sent from emitters 40, 40 on front bogie 18 to receivers 41, 41 at the rear end of frame 1'. A useful and preferred structure for operating such a lateral alignment control system has been described and claimed in our copending U.S. patent application Serial No. 662,180, filed August 21, 1967, entitled "Apparatus for Indicating and/or Producing Lateral Track Alignment."

The curve alignment control system includes the longer chord 23' extending from the support rod 22' to rear carriage 28. A shorter chord 24' extends from carriage 28 to track point R to be lined and passes through measuring point M where the ordinates of the chords 23' and 24'' are compared, such an aligning system being fully

described in our above-mentioned Austrian Patent No. 227,749.

To enable the operation to proceed in either direction, a second shorter chord 24' extends from track point R to the forward end point of the longer chord at 22' and passes through a second measuring point M', thus providing a symmetrical control system in respect of track point R. Depending on the direction of operation of the machine, the longer chord 23' cooperates with either of the shorter chords 24' or 24'.

The operator of the machine is preferably located on front bogie 18 whence he may control the operation of the tamping and track grading tools, as well as that of the track alignment and associated ballast working tools, a cable 42 connecting the control console with all the tools on frame 1'.

In the modification of FIGS. 7 and 8, the frame 1' has a platform which is connected to the rear of frame 7' by a kingpin 43 in the manner of a trailer, the pivotal connection of the frame 1' to frame 7' being vertically above the rear axle of the frame 1'. In this manner, the front of the track shifting means supporting frame is connected to the rear of the tamping and track lifting means supporting frame, whereby the rear truck of the mobile track tamper serves as the front truck for the mobile track liner frame, and the latter needs to be supported on the track only by its own rear truck 4'.

The operator on bogie 18 faces a mirror 45 enabling him to view the reference lines 32 for the lateral alignment of the track. A small carriage 47 precedes the front bogie 18 in the direction of operation and carries a laterally movable marker 46. A control cable 42 leads from the operator to the marker to enable the operator to adjust the lateral position of the marker which he views through mirror 45. This enables the operator to judge on the basis of the position of marker 46 whether the reference lines 32 are in the correct position. If necessary, he may adjust the position of the reference line end on bogie 18 or of marker 46 until they are in register.

While the invention has been described and illustrated in connection with certain preferred embodiments, it will be clearly understood that many variations and modifications may readily occur to those skilled in the art, particularly after benefiting from the present teaching, without departing from the spirit and scope thereof.

We claim:

1. A mobile track liner and tamper, comprising
 - (1) a first frame;
 - (2) a second frame pivotally connected to the first frame for pivoting movement in a horizontal plane and having an overhanging portion over a track section to be surfaced, the overhanging frame portion being substantially shorter than the first frame, and the second frame preceding the first frame in the working direction of the track liner and tamper;
 - (3) a plurality of wheel assemblies whereon both frames are mounted for mobility on the track, said wheel assemblies being spaced from each other in the direction of track elongation;
 - (4) track shifting means mounted on the first frame centrally in respect of the frame ends between two of said spaced wheel assemblies for laterally moving the track,
 - (a) the track shifting means including rail gripping rollers, means for selectively engaging the gripping rollers with the rails and disengaging them therefrom, and a vibratory drive for laterally moving the rail gripping rollers,
 - (5) tamping means mounted on the overhanging portion of the second frame;
 - (6) track lifting means mounted on the second frame; and

(7) a reference system associated with the track liner and tamper for movement therewith on the track and extending along the track elongation for controlling the track shifting and lifting.

2. A mobile track liner and tamper, comprising

- (1) a first frame;
- (2) a second frame supported on the first frame and having an overhanging portion over a track section to be surfaced, the overhanging frame portion being substantially shorter than the first frame, and the second frame preceding the first frame in the working direction of the track liner and tamper;
- (3) a plurality of wheel assemblies whereon both frames are mounted for mobility on the track, said wheel assemblies being spaced from each other in the direction of track elongation;
- (4) track shifting means mounted on the first frame between two of said spaced wheel assemblies for laterally moving the track;
- (5) tamping means mounted on the overhanging portion of the second frame;
- (6) track lifting means mounted on the second frame; and
- (7) a reference system associated with the track liner and tamper for movement therewith on the track and extending along the track elongation for controlling the track shifting and lifting.

3. The mobile track liner and tamper of claim 2, wherein the second frame is pivotally connected to the first frame for pivoting movement in a horizontal and in a vertical plane.

4. The mobile track liner and tamper of claim 2, wherein the first frame includes front and rear wheels for mobility on the track, and the track shifting means being mounted therebetween.

5. The mobile track liner and tamper of claim 2, further comprising means for vertically moving the second frame, and said track lifting means includes track gripping elements vertically movable with the second frame.

6. The mobile track liner and tamper of claim 5, wherein the means for vertically moving the second frame includes a hydraulic motor comprising a piston glidable in a cylinder, and means is provided for holding the piston in a predetermined position in said cylinder to fix the second frame in a desired vertical position.

7. The mobile track liner and tamper of claim 6, further comprising a platform extending from the second frame and pivotally connected to the first frame for pivoting movement of the second frame in a horizontal plane, and said hydraulic motor is mounted on the platform.

8. The mobile track liner and tamper of claim 2, wherein the second frame includes front and rear wheels for mobility on the track, and the first frame is coupled to the second frame behind the rear wheels of the second frame.

9. The mobile track liner and tamper of claim 8, wherein one of the wheel assemblies is mounted at the rear of the first frame, and the front of the first frame is mounted on the second frame at the rear wheels of the second frame.

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U.S. Cl. X.R.

104—8, 12