

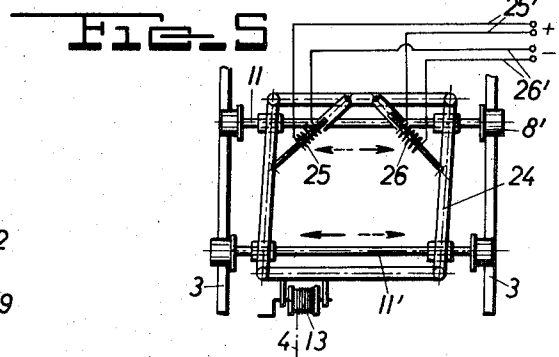
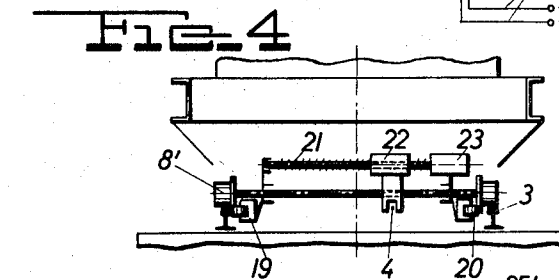
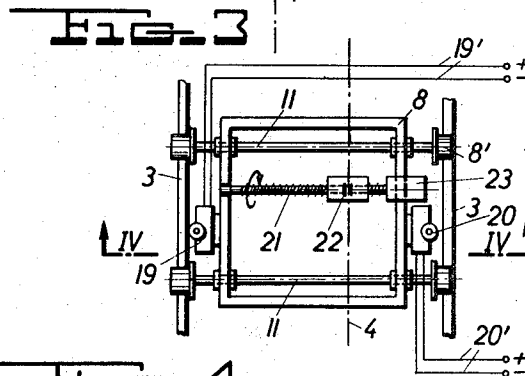
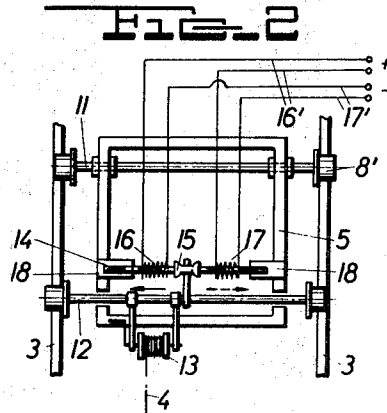
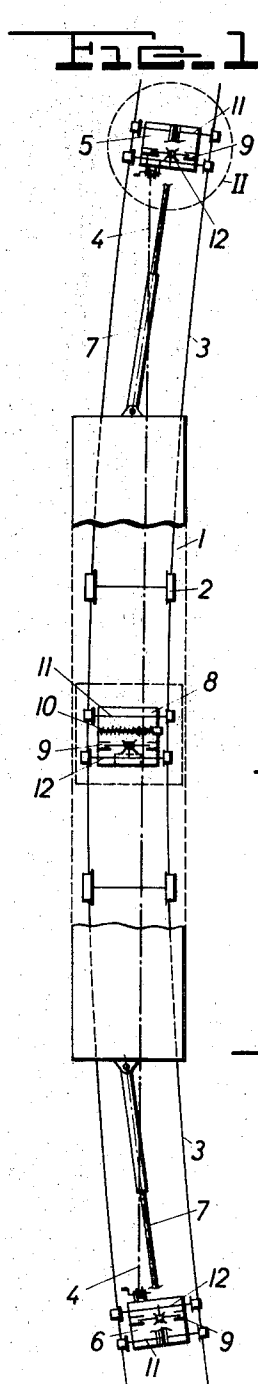
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3,557,459

TRACK POSITION INDICATING APPARATUS

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3,557,459

TRACK POSITION INDICATING APPARATUS

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7 Claims

ABSTRACT OF THE DISCLOSURE

In a mobile track liner comprising an element indicating the position of a selected grade rail of the track, electromechanical means moves the indicating element into flush engagement with the grade rail.

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to apparatus associated with a mobile machine for surveying and/or correcting the position of a track on which the apparatus moves, wherein one of the track rails is used as the datum and a track position indicating element is selectively pressed against the selected grade rail.

It is known to use track surveying bogies in mobile track liners, and the term "bogie," as used herein, describes all carriages or parts thereof which have running gears with wheels mounted for mobility on the two track rails, such as have been used not only to determine a track position at the point of alignment but also for carrying the ends of a reference line or reference lines remote from this point and cooperating with an indicator at this point for showing the track position there.

In our U.S. Pat. No. 3,334,592, we have disclosed and claimed a track surveying carriage with a pair of jack shoes selectively movable in a horizontal plane to press a selected jack shoe against one of the rails so as to move the carriage in this plane and force the carriage wheels mounted on the other rail into flush engagement therewith. With this apparatus, the carriage serves as a true indication of the position of the grade rail and thus can be the basis for determining the track position with the help of a cooperating reference line.

It is a primary object of the present invention to simplify apparatus designed to press a grade rail indicating element against the grade rail, and to make such apparatus more effective and accurate.

It is another object of this invention to provide an apparatus of this type which is light in weight, takes up little room, is simple and inexpensive to operate, and requires little servicing.

The above and other objects and advantages are accomplished in accordance with the present invention by the use of electromechanical means actuatable to produce an electrical field for moving the indicating element into flush engagement with the selected rail.

The solenoids used herein can be rapidly and accurately operated, a central control of the operation of a plurality of solenoids mounted on a plurality of successive bogies being readily available where such bogies are used for supporting a long reference line or lines for determining the track position. Electrical cables connected to the solenoids for their selective energization are cheap and can be readily installed. Furthermore, electric power is not only relatively inexpensive and dependable but electromagnetic pressure is uniform, readily controllable and, therefore, effective in assuring accurate engagement with the grade rail.

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Many variations are possible to practice the present invention.

For instance, if the running gear of a bogie is used to indicate the existing position of a track, at least one wheel of the running gear is pressed against the selected rail by the electromechanical means of this invention, with the steel rail itself forming part of the electrical field. This may be effected with a solenoid mounted on the bogie adjacent to the selected rail so that the running gear is moved against this rail.

However, indirect electromechanical actuation is also possible. For instance, the bogie may carry a solenoid-operated shoe which may be pressed against one rail to move the bogie against the other rail which serves as datum. In other words, the shoe of our U.S. Pat. No. 3,334,592 may be operated electromagnetically, instead of hydraulically. Such an electromagnetically operated shoe could also be used to press only such a part of the bogie, which carries a track position indicating element, against one or the other rail.

While electromechanical means may be mounted on both sides of the bogie so that the same may be selectively moved by such means in either direction transverse of the track elongation, it would also be possible to provide spring means biased to press the bogie or such part carrying its track position indicating element against one rail while the electromechanical means is arranged to press the bogie or said part only against the other rail.

BRIEF DESCRIPTION OF DRAWING

The above and other objects, advantages and features of the present invention will become more apparent in the following detailed description of certain now preferred embodiments thereof, taken in conjunction with the accompanying drawing wherein

FIG. 1 is a top view of a mobile track liner incorporating the apparatus of this invention;

FIGS. 2, 3 and 5 are schematic top views of three embodiments of the apparatus; and

FIG. 4 is a section along line IV—IV of FIG. 3.

DETAILED DESCRIPTION

Referring now to the drawing and first to FIG. 1, the apparatus of the invention has been illustrated in association with a mobile track liner wherein a machine frame 1 is mounted for mobility on the track by wheels 2, 2 engaging the track rails 3, 3. We have previously disclosed a number of methods and machines designed to line a track as the machine moves continuously along the track, for instance in U.S. Pat. Nos. 3,292,557, 3,314,154, 3,314,373, 3,343,496, 3,345,746 and 3,353,249. The present invention is not concerned with any particular lining method or apparatus, and is illustrated merely by way of example in connection with a single reference line moving along the track with the machine frame during lining. It may be used in such apparatus as described in our concurrently filed application Ser. No. 74,708, but it need not be used in direct association with a track position correction apparatus at all but may also be used merely to indicate and/or record a track position, in addition to being useful when track positioning tools are to be controlled by the track position parameters resulting from a track survey with the apparatus.

In the illustrated machine, the difference between the existing and desired position of the track at any given point is determined in relation to a reference line 4 which is shown herein, by way of example, to be constituted by a tensioned wire forming a chord in an arcuate track section. The ends of the tensioned wire are carried by front and rear bogies 5, 6 mounted for mobility on the track at points spaced from the machine frame. The bogies

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5 and 6 are coupled to the machine frame 1 by telescoping rods 7, 7 which may be extended or reduced in length to vary the distances between the bogies and machine frame. As shown, the ends of the wire 4 are attached to tensioning reels 13 on the bogies so that the length of the wire may be accordingly varied to keep it tensioned at all times.

At the point where the track position is to be surveyed, recorded and/or corrected, a similar bogie 8 is mounted under the frame 1 for mobility on the track together with the frame. Each of the bogies carries electromechanical means 9 for moving at least one of the wheels 8' of the running gears of the bogies against a selected track rail 3 so that this wheel indicates the position of the selected rail. The bogie 8 also carries a suitable means 10, shown only schematically and taking any conventional form, cooperating with the reference line 4 to show the position of the track at the surveyed point. The specific means illustrated in FIGS. 3 and 4 is that described and illustrated in our U.S. Pat. No. 3,314,373.

One embodiment of the present invention is shown in FIG. 2 in connection with bogie 5 shown at II in FIG. 1. The frame of this bogie is mounted on two running gears, the axle 11 of one of the running gears being fixedly journaled in the bogie frame while the axle 12 of the other running gear is glidably mounted in the frame for movement transversely to the track elongation in the direction of a selected one of the track rails 3, 3 on which the flanged wheels 8' of the running gears run. The transversely movable axle 12 fixedly carries the tensioning reel 13 for the reference wire 4. Thus, the axle 12 forms the required datum for the one end of the reference wire in respect of the existing position of selected track rail 3.

In this embodiment, the electromechanical means for moving a selected one of the flanged wheels 8' on axle 12 into flush engagement with the adjacent track rail 3 comprises a pair of solenoids including a core 14 supported in guide sleeves 18, 18 and movable within two selectively actuatable windings 16, 17, the control circuits 16', 17' connected to these windings being selectively energized to move the core 14 into one or the other transverse directions indicated by the arrows. A bracket 15 rigidly and fixedly mounts the solenoid core 14 on axle 12 so that the axle moves with the core. In the position illustrated in FIG. 2, winding 16 has been supplied with electric current so that the flanged wheel of axle 12 adjacent the left rail has been pressed thereagainst. In this manner, the end of reference wire 4 on reel 13 has a fixed relation to the left rail and its existing position so that the left rail may serve as the datum for surveying and/or correcting the track alignment. The bogie 5 uses the opposite (right) rail as counter-support, the flanged wheel 8', in the upper right corner of FIG. 2 being in flush engagement with the right rail.

Bogies 8 and 6 may be similarly constructed and electric current is supplied to all windings 16 concurrently under central control so that all movable bogie axles are simultaneously pressed against the same rail. The parts of the bogies which cooperate with the reference line or determine its position are rigidly and fixedly connected with the movable axles. Thus, in bogie 8, the means 10 cooperating with reference line 4 is fixedly connected with movable axle 12.

FIGS. 3 and 4 illustrate by way of example a suitable track position indicating means which includes a transversely extending threaded axle carrying a nut 22 movable thereon upon rotation of the axle by motor 23. The moving nut carries a forked contact encompassing reference wire 4, the structure and operation of this device being more fully described and illustrated in our U.S. Pat. No. 3,314,373.

FIG. 3 also illustrates another embodiment of the electromechanical means of this invention. In this embodiment, this means comprises a pair of solenoids 19, mounted on each side of the bogie adjacent the track

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rails, the control circuits 19', 20' being selectively actuatable to energize the one or the other solenoid to move the flanged wheels 8' on one side of the bogie into flush engagement with a selected track rail. Each solenoid 19 carries a friction-reducing element 20, illustrated as a roller, for reducing the friction between the solenoid and the selected rail when they are in pressure contact. In this case, both running gear axles 11, 11 are fixedly mounted on the bogie frame, as in the track position indicating means 21, 22, 23 so that the latter can use the fixed datum provided by the rail against which the bogie is pressed. In the illustrated position, solenoid 19 is energized.

Another embodiment is illustrated in FIG. 5. The frame of the bogie is a parallelogram linkage 24 and two solenoids 25, 26 are linked with one of their ends to one of the frame links extending transversely of the track while the other ends of the solenoids are linked to respective ones of the bogie frame links extending in the direction of track elongation. The running gear axles 11, 11' of the bogie are fixedly journaled in the frame for movement with the latter frame links when one or the other of solenoids 25, 26 is energized by respective control circuit 25', 26'. In this manner, the flanged wheels 8' mounted on the axles can be pressed into flush engagement with a selected rail. In the illustrated position, solenoid 26 has been energized so that the left flanged wheel on axle 11' is in flush engagement with datum rail 3 on the left side of the drawing, the position of axle 11' being decisive for the position of reference line reel 13.

The electromechanical actuating means of the invention have been illustrated in connection with specific embodiments but it will be obvious to those skilled in the art that many variations and modifications of the illustrated means are possible without departing from the spirit and scope of this invention. For instance, the electromechanical means could be combined with other means for pressing the bogies or parts thereof against a datum rail and/or for returning the same to the original position, for instance by spring means.

We claim:

1. In an apparatus mounted for mobility on two track rails and comprising a running gear of a bogie indicating the position of a selected one of said rails, said running gear having a wheel selectively movable into flush engagement with the selected rail, the improvement of electromechanical drive means actuatable by an electrical field for moving said wheel into said flush engagement with the selected rail.

2. In the apparatus of claim 1, further comprising a reference line associated and cooperating with the indicating element to produce a parameter indicative of the track position determined by the relative position of the reference line and indicating element to each other.

3. In the apparatus of claim 2, further comprising a carrier for the indicating element and said carrier being movable into flush engagement with the selected rail.

4. In an apparatus mounted for mobility on two track rails and comprising an element indicating the position of a selected one of said rails and means for selectively pressing said element into flush engagement with the selected rail, the improvement of a solenoid actuatable by an electrical field for moving said element into said flush engagement with the selected rail, and a bogie carrying the indicating element and said solenoid, the solenoid being mounted on and in fixed relation to the bogie adjacent the selected rail.

5. In the apparatus of claim 4, wherein the bogie is mounted on a running gear having wheels mounted for mobility on the track rails, a selected one of the wheels in flush engagement with the selected rail constituting the indicating element.

6. In the apparatus of claim 4, further comprising a friction-reducing element mounted on the solenoid for

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reducing the friction between the solenoid and the selected rail when they are in contact.

7. In an apparatus mounted for mobility on two track rails and comprising an element indicating the position of a selected one of said rails and means for selectively pressing said element into flush engagement with the selected rail, the improvement of electromechanical drive means actuatable by an electrical field for moving said element into said flush engagement with the selected rail, a plurality of bogies, each of said bogies carrying one of said indicating elements and said electromechanical drive means for moving said indicating elements into said flush engagement with the selected rail, and a single control for actuating all of said electromechanical means.

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104—8