Feb. 4, 1969 F. PLASSER ET AL 3,425,360

MOBILE TRACK CORRECTING MACHINE

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Fig. 1

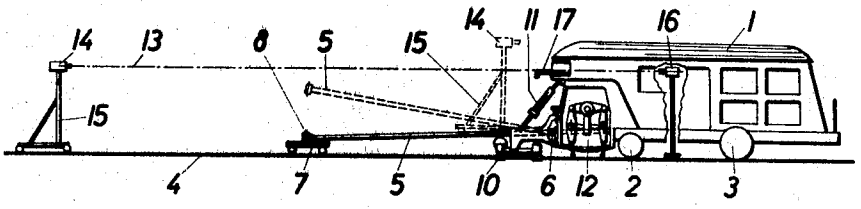
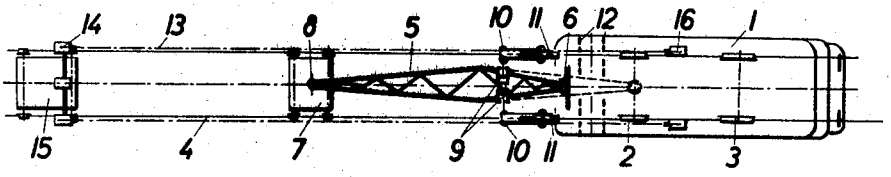


Fig. 2



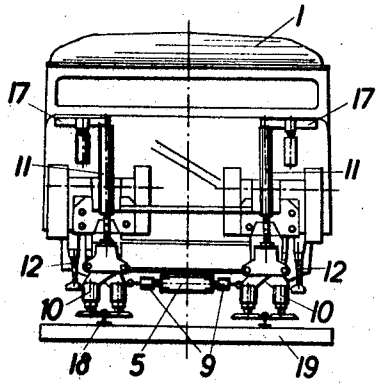
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MOBILE TRACK CORRECTING MACHINE

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Fig. 3



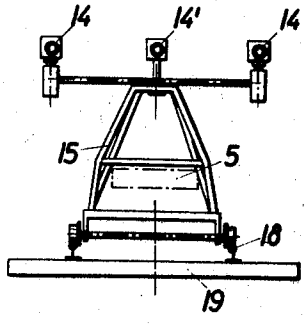
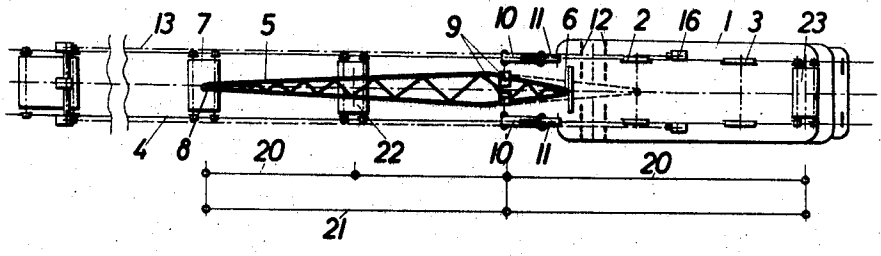


Fig. 4

Fig. 5



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Fig. 6

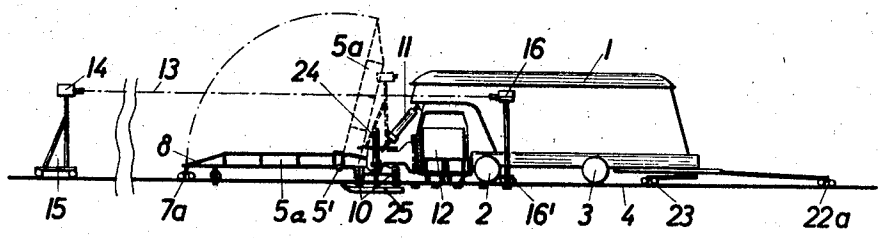


Fig. 7

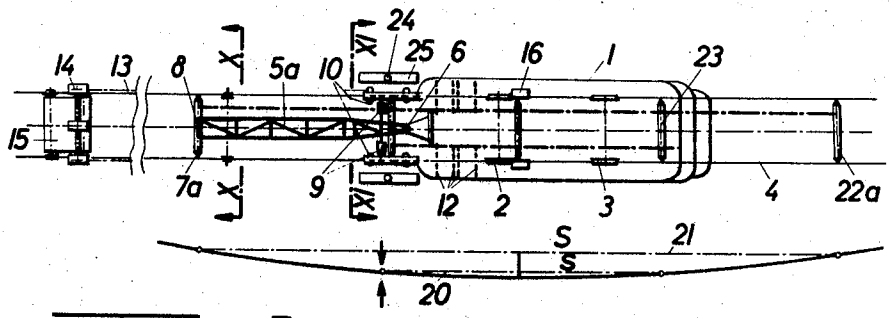


Fig. 8

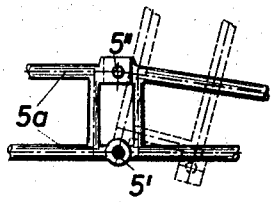


Fig. 9

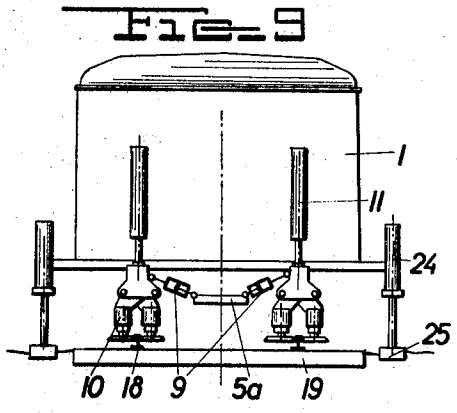
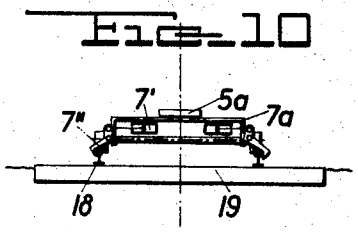


Fig. 10



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MOBILE TRACK CORRECTING MACHINE

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U.S. Cl. 104—8 14 Claims
Int. Cl. E01b 33/00, 29/20

ABSTRACT OF THE DISCLOSURE

The frame of a mobile track liner carries a means for exerting a lateral thrust against a selected rail, and an elongated element extends between the rails to receive the back pressure of the lateral thrust. One end of the thrust receiving element is connected to the machine frame and its other end to a truck arranged on the track at a point spaced from the machine frame.

The present invention relates to mobile track correcting machines, particularly the type of mobile track tamper carrying means for lifting the track and laterally moving the same so that the machine may be used for track lining and grading.

As is well known, we have developed such machines wherein a track section is continuously graded and/or lined by moving the machines along the track section. The machine has a front and a rear axle, with a front portion of the machine frame preferably extending forwardly of the front axle and thus overhanging a track section to be corrected while the heavy machine itself rests with its front and rear axles on a previously corrected track section. We prefer to mount the track lifting and lateral moving means, as well as track tamping means, on this overhanging front portion of the machine frame. In one embodiment, we arrange support jacks on this front portion laterally outside the track and designed to support the front portion on the ballast bed while the track is lifted and/or laterally moved.

Accurate track alignment is not possible with this arrangement because the heavy machine frame front portion with its track moving and tamping means is supported during alignment merely by the support jacks, thus keeping it in a rather labile position and making it an uncertain basis for determining the required alignment parameter. The lability is further enhanced by the fact that the strongly vibrating tamping means operate in the same ballast area as the support jacks so that the jacks have a tendency to move or sag.

Obviously, accurate alignment is possible only if the means for exerting a lateral thrust against a selected one of the track rails for moving the track laterally in the desired direction engages a substantially immobile thrust receiving means to which the back pressure of the thrust is transferred. This is particularly important if the track is laterally aligned while being graded since a lifted track cannot serve as a solid, immovable thrust bearing for the lateral thrust.

While the heavy machine resting on its axles on the previously corrected track section constitutes a substantially immovable reference point capable of receiving the back pressure of the lateral thrust, the front axle of the above-described type of machine lies relatively closely to the track correction point and the lateral thrust on the track may be so large that the track under the front axle and even as far back as the rear axle may be moved thereby, thus disturbing the previous correction of this track section. If the track is corrected at a point between the machine axles, this difficulty is avoided but, on the other

hand, it is difficult to mount the track correcting and tamping means on such a machine, the above-described arrangement of all operating parts of the machine on an overhanging front portion of the frame being preferred particularly in the equally well known arrangements wherein the track is corrected in respect of reference lines extending from a forward point spaced from the machine in a track section to be corrected to a rear point in a previously corrected track section.

It is a primary object of the present invention to provide a mobile track correcting machine of the above type with means associated with the lateral thrust exerting means for receiving the back pressure of the thrust.

In accordance with the invention, the thrust exerting means is mounted on the machine frame and the thrust receiving means is an elongated element extending between the track rails, with the thrust exerting means positioned between one of the track rails and the elongated element. One end of the elongated element is preferably pivotally connected to the machine frame and the other end of the elongated element is preferably pivotally and detachably connected to a truck arranged on the track at a point spaced from the machine frame. The lateral thrust is exerted against a selected one of the rails for moving the track in a desired lateral direction.

In this arrangement, the back pressure of the lateral thrust is not transferred indirectly to the ballast bed by the support jacks which constitute a labile support for the heavy front portion of the machine frame but this pressure is transmitted by the elongated element to the track, with which the truck and the machine solidly connect it, and from the track to the ballast bed on which the track rests. This transmittal of thrust takes place at points sufficiently removed from the track correction point to remain uninfluenced by the correction operations, the elongation of the thrust receiving element being such that its ends are relatively far removed from the track correction point. Best results will usually be obtained if the lateral thrust exerting means is mounted about centrally between the ends of the thrust receiving element although variations of the spacing may be effected, according to individual operating conditions. If it is desired, for instance, to transmit less thrust to the track at the end of the thrust receiving element which carries the relatively light truck than at the end which is connected to the heavy machine itself, the lateral thrust exerting means may be arranged nearer the latter than the former end.

The one end of the elongated thrust receiving element may be connected to the machine frame at its front portion, near the front axle of the machine or even between the axles of the machine but, under all circumstances, the element must be long enough so that its other end is sufficiently far removed from the track correction point to remain uninfluenced by its movements.

To enable the elongated element to withstand the considerable back pressure and to increase its rigidity, it is preferably constituted by a spatial framework, which may include a lower and an upper truss.

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

FIG. 1 schematically shows a side view of a mobile track correcting machine according to one embodiment of this invention;

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

FIG. 3 is a schematic front view, partly in section, of the track lifting and aligning means;

FIG. 4 is a front view of the front bogie used with the machine;

FIG. 5 is a top view of a modified mobile track correcting machine;

FIG. 6 is a view similar to FIG. 1 of another embodiment of the machine;

FIG. 7 is a top view of FIG. 6;

FIG. 8 shows a detail of the carrier;

FIG. 9 is a section along line IX—IX of FIG. 7; and

FIG. 10 is a section along line X—X of FIG. 7.

Referring now to the drawing, and first to FIGS. 1 to 3, there is shown a mobile track correcting machine including a frame **1** mounted on truck **2** carrying the front axle and truck **3** carrying the rear axle of the machine. An elongated thrust receiving element **5** has a pivot **6** at one end and a pivot **8** at the other end, the pivot **6** pivotally connecting the one end to a front portion of the machine frame **1** for pivoting the element about an axis extending perpendicularly to the track and in a plane extending substantially parallel thereto, and the pivot **8** being forwardly spaced from the frame **1** and pivotally connecting a truck **7** to the other end of the elongated element for pivoting the truck **7** about a like axis and in a like plane.

Lateral thrust is exerted upon the track **4** in the direction of selected rail **18** by a hydraulic motor **9** mounted on the front portion of the machine frame on each side of the thrust receiving element and arranged to bear against the element **5** as well as rail engaging clamps **10, 10**, to which the rails **18** of the track may be mechanically or magnetically clamped in any conventional manner, so that selective operation of the one or other hydraulic motor will cause the track to be moved laterally in the one or the other direction. The track includes ties **19** and, as best shown in enlarged FIG. 3, the illustrated rail clamps are mechanically operated jaws carrying rollers continuously engaging the rails and clamping the same therebetween while the machine advances along the track. The hydraulic motors **9** constitute lateral track moving means and are linked to the element **5** and to the rail clamping means.

Equally conventional hydraulic motors **11, 11** are linked respectively to the front portion of the machine frame **1** and rail engaging clamps **10, 10** for lifting the track so that the track may be graded as well as laterally aligned during the correction operation.

As is also conventional, the corrected track is fixed in position by track tampers **12**, the track tamping means being mounted vertically adjustably in a known manner in the front portion of the machine frame extending forwardly of the front axle of the machine. Grading is effected in a known manner in relation to reference line **13** extending above each rail from a point forwardly of, and spaced from the machine in an ungraded track section to a point backwardly of the front axle in an adjacent, previously graded track section. In the illustrated embodiment, the reference line **13** is a beam of radiated energy, such as a light beam generated at one of the points and received at the other point. The beam sender (or receiver) **14** is shown mounted on a front bogie **15** while the receiver (or sender) **16** is mounted in the machine frame **1** on a vertical support rod resting on a respective one of the rails. A stop **17** is fixedly mounted on the overhanging front portion of the machine frame in the range of a vertical plane passing through the track lifting means and, as is well known in this type of track grading, when the stop interrupts the light beam **13** upon lifting of the track and the machine resting thereon, the hydraulic motor **11** is halted so as to discontinue lifting of the track.

As indicated in broken lines in FIG. 1, the forwardly extending thrust receiving element **5** may be slightly lifted so that the front bogie **15** may be pulled in and carried on the element when the machine is driven from one place of operation to another, i.e., when it is not working on track correction.

FIG. 4 illustrates front bogie **15** carrying three senders

(or receivers) **14, 14'** of beams of radiant energy. In the grading of arcuate track sections, the sender (or receiver) **14** above the inner rail of the track section is used while the central sender (or receiver) **14'** is used in straight track sections. As shown in chain-dotted lines, the configuration of support element **5** is such that it may be fitted into the frame of bogie **15**. In this manner, the truck **7** may be detached from the forward end of support element **5** and the bogie may be moved onto the support element, being carried thereby while this element is slightly lifted (see broken line position in FIG. 1). The detachable truck **7** may also have a frame fitting over the element **5** so that it may be similarly carried thereby when the machine is not operating but being driven from one operating site to another.

In the modified apparatus of FIG. 5 and as more clearly illustrated in FIG. 7, like reference numerals designate like parts operating in a like manner to avoid redundancy in the description. Two reference lines **20** and **21** are schematically shown to extend laterally spaced from the track and capable of forming chords of different lengths in an arcuate section of the track to be aligned. Many such curve alignment methods have been developed and the present invention is not concerned with any particular aligning method but may be applied to all of them. The forward truck **7** on element **5** serves as the forward anchor point of the reference lines if element **5** is of sufficient length, thus eliminating the need for special trucks for this purpose. Preferably vertically movable truck **23** mounted in a rear portion of the machine frame **1** serves as the rear anchor point of the longer reference line **21**, thus establishing a sufficient length of this reference line to assure accurate alignment in respect thereto, the front anchor point lying in a track section to be aligned and the rear anchor point lying in the previously aligned track section adjacent thereto. If the rear truck **23** is vertically movably mounted on the machine frame, it may be raised out of engagement with the track when the machine is not used for track alignment.

An intermediate truck **22** is mounted on thrust receiving element **5**. It is similar to truck **7** and, when not in use, may be similarly mounted on the element **5** out of engagement with the track. One or more such intermediate trucks may be mounted on the elongated element **5** to constitute intermediate reference or anchor points at which, for instance, the arc height may be measured. As indicated hereinabove, various curve aligning methods using chords and arc heights are known and the invention is not concerned therewith.

It will be obvious to those skilled in the art that the illustrated machine may be structurally modified in many ways wihout changing the essential function thereof, as described herein. Thus, for instance, while illustrated in full lines near end **6**, the lateral track moving means **9** may be arranged substantially centrally between the support element ends **6** and **7** whereby the lateral thrust during movement of the track is transmitted to the track equally at both ends of the element **5**. This backward extension of the element **5** to the front axle is shown in dotted lines in FIGS. 2 and 5.

Also, while hydraulic motors for lifting and laterally moving the track have been shown, any other suitable track moving means may be used. Furthermore, while the illustrated embodiment shows the track moving means mounted on the overhanging front portion of the machine frame so that the track is moved in relation to the machine and constitutes a heavy load on the front axle of the machine, arrangements are also well known wherein a support jack cooperates with the track moving means to support the weight of the machine during lifting of the track.

Furthermore, the track moving and fixing means **9, 11, 12** need not be mounted in an overhanging front portion of the machine frame, as illustrated, and the rear end of the element **5** may extend even beyond the front axle of the machine as far back as its rear axle.

The embodiment of FIGS. 6–10 is similar in many respects to that of FIG. 5, like reference numerals being used to indicate like parts operating in a like manner so as to eliminate redundancy in description. In this embodiment, the thrust receiving element **5***a* includes a hinge means **5'**, **5''** (see FIG. 8) arranged intermediate the ends **6** and **7***a* of the element so that the forward portion of the element **5***a* may be pivoted upwardly in the manner shown in broken lines in FIG. 6 about a horizontal axis, thereby making its length extending along the track variable.

As shown, the element **5***a* is constituted by a framework and the lower truss of the framework carries the pivot **5'** with a horizontally extending fulcrum about which the framework may be swung upwardly. The upper truss of the framework carries a removable bolt **5''** to fix the element **5***a* in its horizontal or upwardly extending position, as indicated in broken lines in FIG. 8. For this purpose, the upper truss carries suitably registering bores in the vertical plane of the pivot **5'** to receive the bolt for fixing the support element in its horizontal position. When the element **5***a* is to be swung upwardly, the bolt is removed and is then inserted again to engage the lower truss from below and thus to prevent movement of the upwardly swung element.

In this embodiment, use is made of hydraulic support jacks **24**, **25** to support the heavy machine frame on the ballast bed while the track is being lifted.

FIG. 10 shows a specific embodiment of front truck **7***a* wherein rail clamps **7''** are movable into engagement with the rails by hydraulic motors **7'**.

In the track alignment method schematically shown in FIG. 7, the shorter chord *s*, designated **20**, and the longer chard S, designated **21**, are parallel chords in a circularly arcuated track section extending from a previously aligned section behind front axle **2** to an adjacent track section to be aligned between the front axle and forward anchor point **8**. The long chord extends from point **8** to a rear truck **22***a* which is coupled to the rear end of the machine frame at a chosen distance therefrom. The forward end of the shorter chord is at the point of the track moving means **9**, **10**, where the track is to be aligned, and this chord extends to the rear truck **23** mounted on the machine frame.

At the center point of the arc, where the arc height is to be measured, it will be advantageous to arrange a further truck **16'** on the machine frame which may be used simultaneously to carry the support rod for the end point **16** of the grading reference line **13**.

While the last-described embodiment shows the shortening of the elongated support element by making the same foldable, any other suitable means may be used for changing the length thereof, such as telescoping, folding, etc. All structural obvious modifications and variations of the illustrated apparatus derived by those skilled in the art from the present teaching are within the scope of the present invention as defined by the appended claims.

We claim:

1. In a mobile track correcting machine comprising a machine frame, and means mounted on the machine frame for engagement with a selected one of the track rails and for exerting a lateral thrust against the selected track rail, the improvement of

(1) an elongated thrust receiving element associated with the thrust exerting means for receiving the back pressure of said thrust,

(a) the elongated element extending between the track rails, with the thrust exerting means being positioned between the selected track rail and the elongated element,

(b) one end of the elongated element being connected to the machine frame, and

(2) a truck arranged on the track at a point spaced from the machine frame,

(c) the other end of the elongated element being connected to the truck.

2. The mobile track correcting machine of claim **1**, further comprising means for lifting the track and means for tamping ballast to fix the corrected track in position whereby the machine is useful for track lining and grading.

3. The mobile track correcting machine of claim **1**, wherein at least one of the elongated element ends has a pivotal connection.

4. The mobile track correcting machine of claim **1**, the machine having a front axle and a rear axle, and a front portion of the machine frame extending forwardly of the front axle, the one elongated element end being connected to the front portion.

5. The mobile track correcting machine of claim **1**, the elongated element being constituted by a spatial framework producing increased rigidity and resistance to the back pressure.

6. The mobile track correcting machine of claim **1**, wherein the lateral thrust exerting means includes a pair of hydraulic motors, one of said motors being positioned between each of the track rails and the elongated element, each motor having a laterally movable and a fixed element, the laterally movable motor element being arranged for moving the selected rail and the fixed element being connected to the thrust receiving element.

7. The mobile track correcting machine of claim **6**, further comprising rail clamping means, and the laterally movable motor element being pivotally connected to the rail clamping means.

8. The mobile track correcting machine of claim **1**, further comprising a reference line in respect of which the track is lined by exerting the lateral thrust against the selected rail, one end of the reference line being on said truck.

9. The mobile track correcting machine of claim **1**, wherein the truck is detachably connected to the other end of the elongated element and has a configuration enabling it to be carried by the elongated element.

10. The mobile track correcting machine of claim **1**, wherein the length of the elongated thrust receiving element extending along the track is variable.

11. The mobile track correcting machine of claim **10**, wherein a hinge means is arranged on the elongated element intermediate its ends, the hinge means having a horizontally extending fulcrum about which a forward portion of the element extending towards the other end thereof may be pivoted upwardly.

12. The mobile track correcting machine of claim **11**, wherein the elongated element is constituted by a framework including an upper and a lower truss, the hinge means being mounted in the lower truss and the upper truss having bores for receiving a bolt for fixing the elongated element in a first position substantially parallel to the track and in a second postion extending vertically upwardly from the track.

13. The mobile track correcting machine of claim **1**, further comprising rail clamping means mounted on the truck and operable to clamp the truck to the track rails.

14. The mobile track correcting machine of claim **1**, wherein the lateral thrust exerting means is mounted on the machine frame substantially centrally between the ends of the thrust receiving element.

References Cited

UNITED STATES PATENTS

860,761	7/1907	McCullough	104—8
2,693,769	11/1954	Herlehy	104—8
3,150,608	9/1964	Brown et al.	104—7
3,170,410	2/1965	Christoff	104—7
3,176,625	4/1965	Plasser et al.	104—8

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