Jan. 28, 1969 F. L. STRIEBEL ET AL 3,424,101

METHOD FOR TRANSPOSING RAILROAD TRACK RAILS

Original Filed March 4, 1965 Sheet 1 of 5

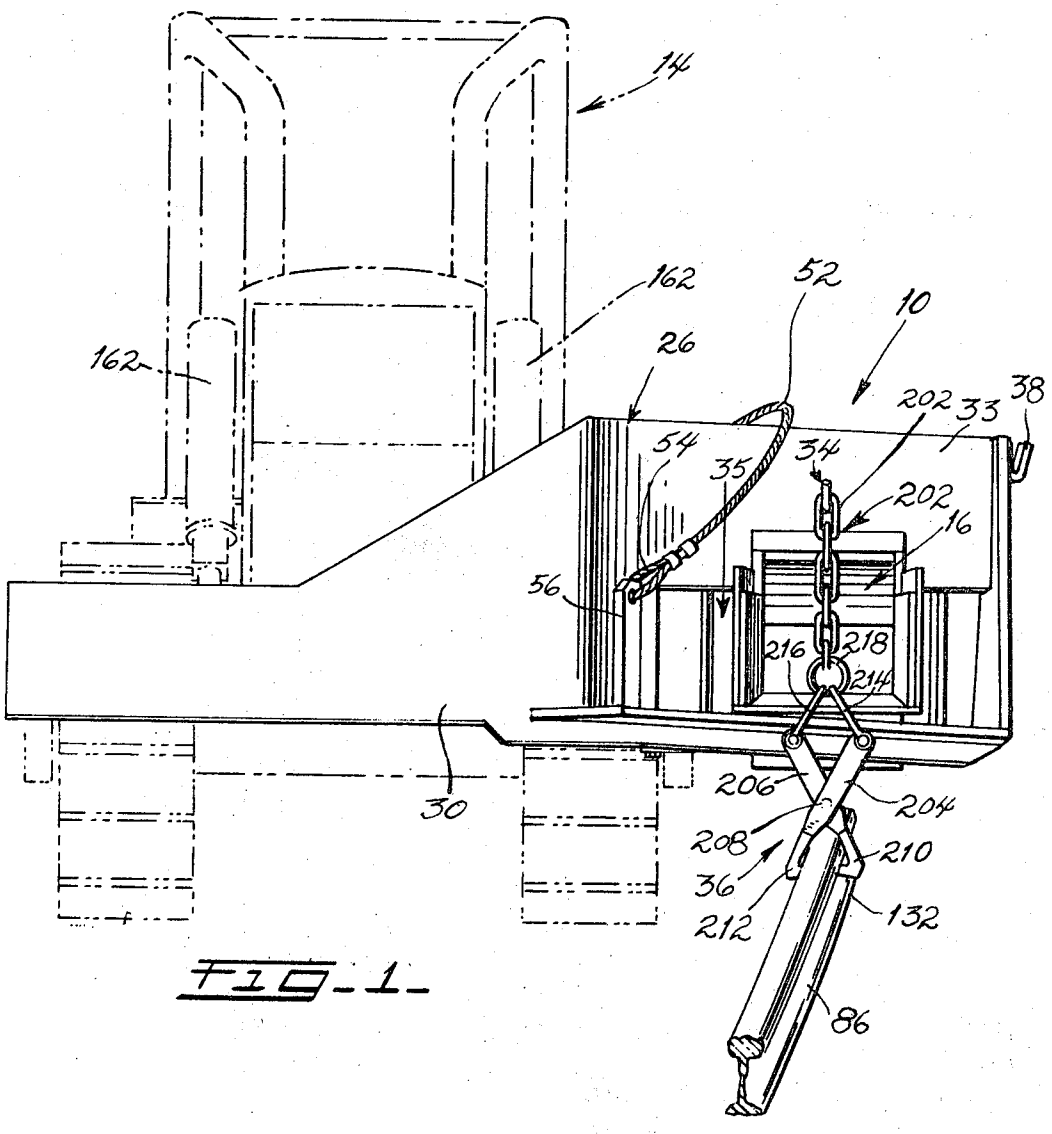

FIG. 1

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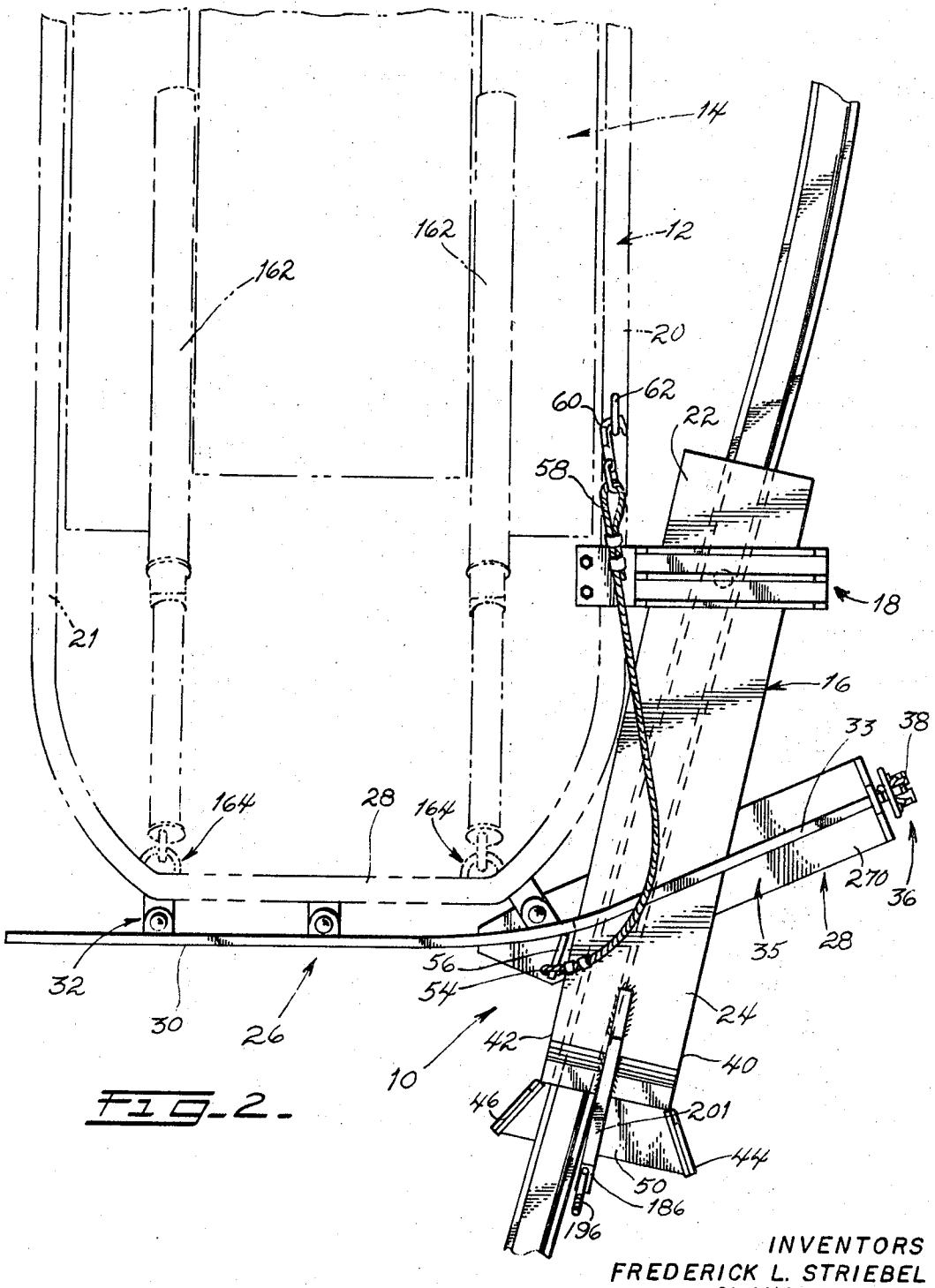

FIG. 2.

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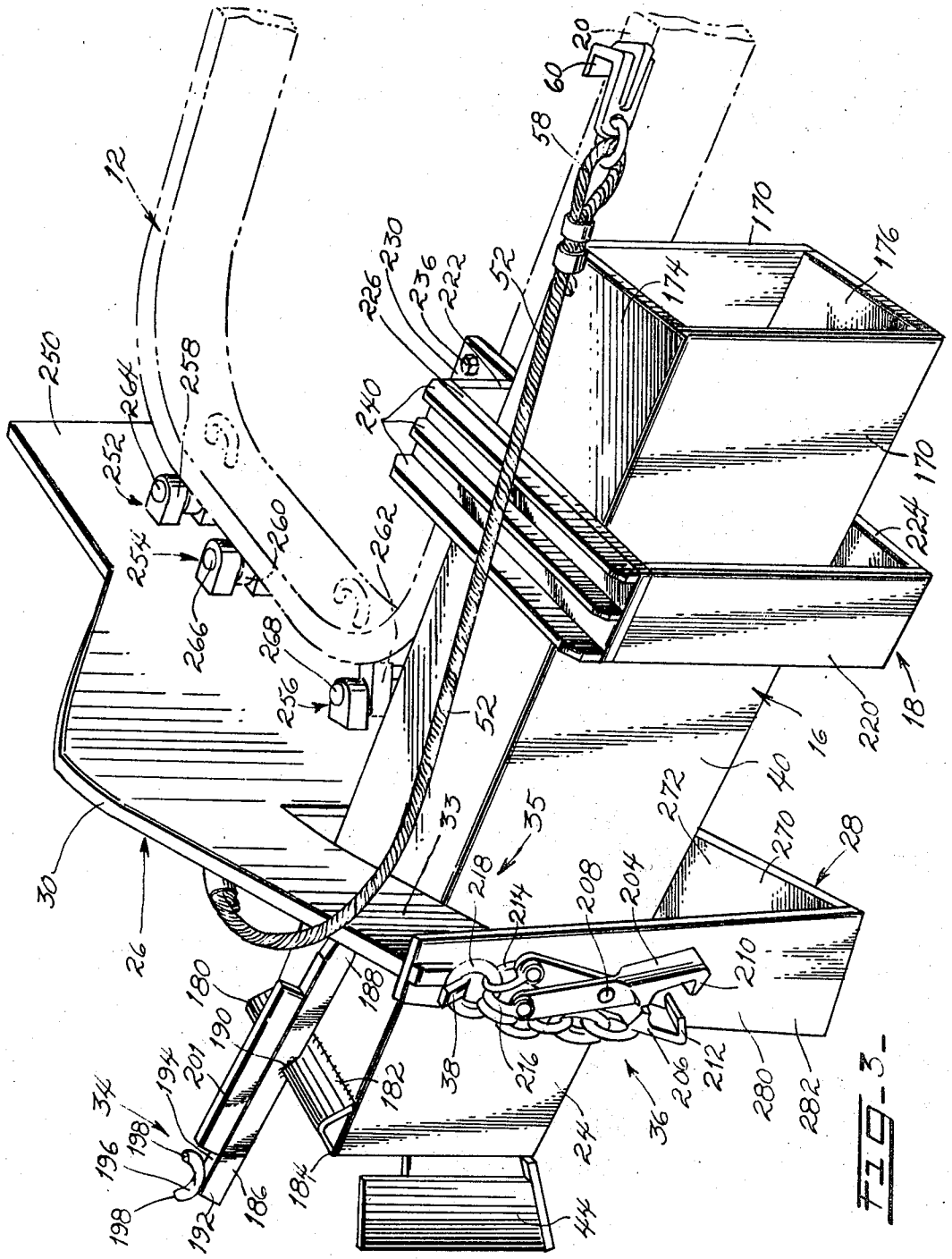

FIG. 3

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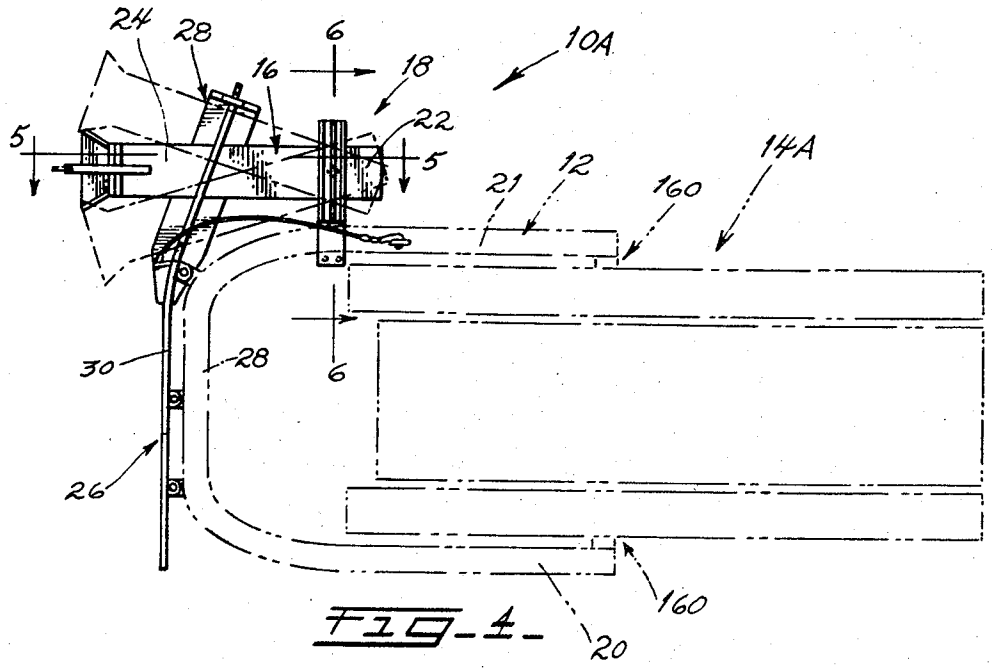

FIG. 4.

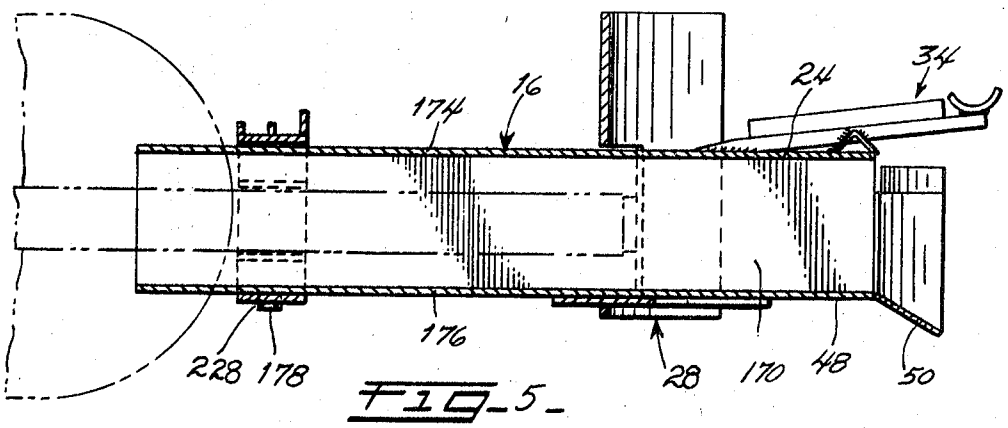

FIG. 5.

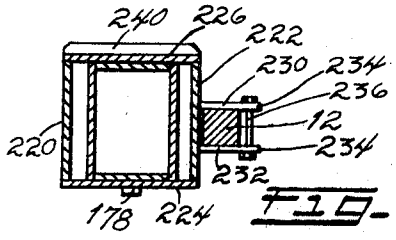

FIG. 6.

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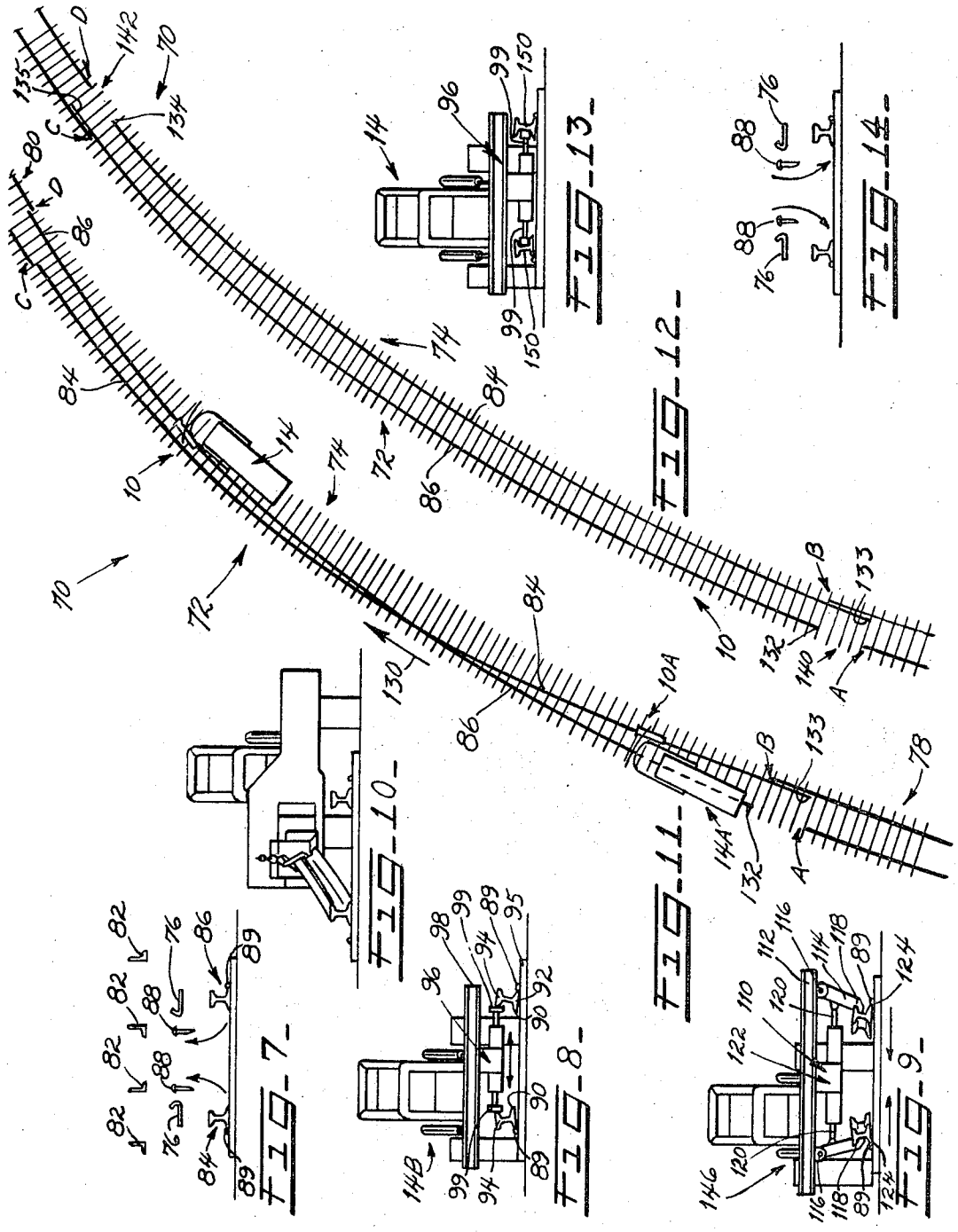

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3,424,101

METHOD FOR TRANSPOSING RAILROAD TRACK RAILS

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Original application Mar. 4, 1965, Ser. No. 437,222, now Patent No. 3,332,357, dated July 25, 1967. Divided and this application Feb. 28, 1967, Ser. No. 641,074
U.S. Cl. 104—2 6 Claims
Int. Cl. E01b 29/17, 33/00

ABSTRACT OF THE DISCLOSURE

The disclosure pertains to a method of reversing the positions of track rails at railroad track curves, in accordance with which the rail anchors along the curve are removed and the rail ends at the curve tangents are disconnected to form the curve rails into rail lengths consisting of a number of rails connected together, the spikes from the inside of the curve rails are removed between the disconnected rail length ends, the gauge of the curve rail lengths is narrowed sufficiently to draw the curve rails out from under the spikes along the outside of the curve rails, the curve high and low side rail lengths are simultaneously transposed to the opposite sides of the track, and then the transposed rail lengths are fitted into alignment with and connected to the tangent rails, the transposed rail lengths are moved outwardly into engagement with the outside spikes around the high and low sides of the curve, and the spikes along the insides of the transposed rail lengths and the rail anchors are reapplied.

This application is a division of our copending application Ser. No. 437,222, filed Mar. 4, 1965, now Patent No. 3,332,357, granted July 25, 1967.

Our invention relates to a method and apparatus for transposing railroad track rails of both the conventional jointed rail and welded rail types, and more particularly, to a method and apparatus for reversing track rails between the high and low sides of curves or on tangents, or for moving both types of rails from temporary positions at the shoulder or center of the truck to their permanent location.

A desirable practice in prudent track maintenance procedures is to reverse, at the appropriate time, the positions of the track rails at railroad curves, as this permits a significant increase in the useful life of the rails. The rails on the low side of the curve, in use, tend to flatten out due to the increased proportion of the train weight that the low side rails carry, while the rails on the high side of the curve tend to narrow down due to the wearing action on the rails that is caused by contact therewith of the truck wheel flanges under the action of centrifugal force as the train rounds the curve. By transposing the high and low side rails about the curve the same action acts in reverse on the respective rails and permits further use of them for extended periods of time.

Our invention is particularly suited for performing the rail transposing at track curves.

Heretofore the transposing of rails at curves has been done by disconnecting each individual rail from the ties and from adjacent rails and then using either a crane or a work crew employing lining bars to individually move and set the rails in place. Obviously, these are time-consuming and laborious procedures (especially since the rails from one side of the track have to be lifted over the rails from the other side), but they are long-standing practices that have defied improvement because of the bulk and unwieldiness of track rails.

A principal object of this invention is to provide a method and apparatus for transposing rails that permits the transposition of long lengths of conventionally connected rails or welded rail with a minimum of equipment and work force.

Another principal object of the invention is to provide a method and apparatus for transposing rails which effects rail transposition at the heretofore unheard of rate of on the order of one standard rail length per minute.

A further object of the invention is to provide a rail threader device for use in transposing rails that permits long sections of conventionally connected rail or welded rail to be simultaneously transposed at the same time.

Other objects of the invention are to provide a simplified and sturdy rail threader arrangement that may be attached to standard off the track equipment such as bulldozers, front end loaders, cranes, tractors, and other self propelled equipment, to provide a method of transposing rails that is of universal application insofar as railroad track curves are concerned, and to provide a track transposing device that is economical of manufacture, convenient in use, and readily adapted for application to a wide variety of standard track maintenance equipment.

Other objects, uses, and advantages will be obvious or become apparent from a consideration of the following detailed description and the application drawings.

In the drawings:

FIGURE 1 is a front elevational view showing a rail transposing device arranged in accordance with this invention applied to the front end of an endless track type bulldozer, showing the apparatus involved as it may be employde in processing the track rails for exchange between opposite sides of track curves;

FIGURE 2 is a plan view of the apparatus shown in FIGURE 1, showing the front end of the bulldozer in outline form;

FIGURE 3 is a rear perspective view of the apparatus shown in FIGURES 1 and 2, as it is applied to the C-frame of the bulldozer;

FIGURE 4 is a plan view similar to that of FIGURE 2 but on a smaller scale and showing a rail threader unit of the general type shown in FIGURES 1 and 3 applied to the other side of the bulldozer C-frame;

FIGURE 5 is a cross-sectional view substantially along line **5—5** of FIGURE 4 and on a slightly enlarged scale;

FIGURE 6 is a cross-sectional view substantially along line **6—6** of FIGURE 4; and

FIGURES 7–14 are diagrammatic views illustrating the method of this invention for transposing rails along curves.

However, it to be clearly understood that the specific drawing illustrations provided are supplied primarily to comply with the requirements of 35 U.S.C., and that the invention may take other specific embodiments coming within the scope of the appended claims.

General description

Reference numeral **10** of FIGURES 1, 2 and 3 generally indicates a rail threader device arranged in accordance with this invention applied to the conventional C-frame or bar **12** of endless track type bulldozer **14**. As indicated in FIGURES 2 and 3, the threader device **10** is positioned on one side of the bulldozer **14**, while in the arrangement of FIGURES 4 and 5, a similar threader device **10A** is applied to the other side of a similar bulldozer **14A**. The devices **10** and **10A** are identical except that they are arranged to be applied to opposite sides of equipment such as bulldozer **14**, and in accordance with this invention, two off-track pieces of equipment, such as bulldozers **14** and **14A** are employed to practice the method of this invention, with one of the bulldozers **14** carrying the threader device **10** and the other bulldozer

14A carrying the threader device 10A (see FIGURE 11).

The threader device 10 generally comprises a threader tube 16, having a generally quadrilateral cross-sectional configuration, which is pivotally mounted on a generally quadrilateral bracket structure 18 that is affixed to the side 20 of the C-frame 12.

The bracket structure 18 supports the rear end 22 of the threader tube 16 while the forward end 24 of the threader tube is supported by a bracket structure 26 that is secured to the forward or bite portion 28 of the C-frame 12 and includes a shelf structure 23 on which the forward end 24 of the threader tube 16 rests.

The bracket structure 26 comprises a vertically disposed plate structure 30 secured to the C-frame by appropriate knuckle type securing devices 32 and having an angled end portion 33 formed with a window opening 35 through which the forward end 24 of the threader bar extends. The shelf structure defines the under or bottom portion of the window opening 35 that is affixed to the plate 30.

As indicated in FIGURES 1, 2 and 5, the forward end 24 of the threader tube 16 carries a hook structure 34 to which a pair of rail tongs 36 are connected in practicing one phase of this invention. When the rail tongs are not in use, they may be suspended from the hook 38 at the outer ends of the bracket structure 26.

Further in accordance with this invention, the forward end 24 of the threader tube is provided at its sides 40 and 42 with funnelling side flange portions 44 and 46 (see FIGURE 2), respectively, and at its bottom or floor portion 48, with a funneling flange portion 50 (see FIGURE 5).

The threader devices 10 and 10A each are provided with a pull cable 52 having one end 54 thereof affixed to an anchor plate 56 that is in turn made fast, as by welding to the bracket structure 26.

The other end 58 of the pull cable 52 is provided with a hook 60 to hold the cable in its inoperative position, as indicated in FIGURE 2 (wherein the hook 60 is applied under a link 62 affixed to the C-frame), or to secure the cable to a rail joint for pulling the rail in the manner described hereinafter in connection with the method of this invention.

The components of the device 10A that correspond to those of device 10 are given similar reference numerals, as the parts are identical though reversed. However, the bracket structure 18 of device 10A is secured to side 21 of C-frame 12, and bracket structure 26 reversed in configuration accordingly.

The devices 10 and 10A are applied to separate bulldozers 14 or other similar self propelled equipment and employed in the manner indicated in FIGURES 7–14 to practice the method of this invention. FIGURES 5 and 6 illustrate corresponding parts of both devices 10 and 10A.

Rail transposing method

Referring now to FIGURES 7–14, assuming that it is desired to transpose the conventionally joined track rails of a particular curve, such as the curve shown at 70 in FIGURES 11 and 12, between the high and low sides 72 and 74 of the curve 70, the track rail anchors (shown in diagram form at 76 in FIGURE 7) are removed along the curved rails to be transposed, and this includes all such anchors 76 up to the first rail joints in the tangent track portions 78 and 80 at either end of the track curve 70.

For convenience of description, these said first joints are indicated at A, B, C and D in FIGURES 11 and 12.

Also, the joint bars (shown diagrammatically at 82 in FIGURE 7) are removed from the rail joints A, B, C and D, thus disconnecting the curve rails from the tangent rails and forming continuous lengths of connected rails, that prior to transposition form the high and low sides of the curve, respectively, and thus define rail sectors 84 and 86 on either side of the track bed.

In practice, it is also desirable to divide the sectors 84 and 86 comprising the original high and low side track rails into subsections of approximately ten rails in length, and this is done by disconnecting joint bars 82 at every tenth rail joint along the high and low sides of the track.

Also, at all rail joints between joints A and C, and between joints B and D, respectively, the signal bond wires should be knocked off or removed in any convenient manner.

The rail joints that are to be removed may be conveniently removed by employing conventional bolt machines that disconnect the nuts from the ends of the joint bolts involved, or in any other suitable manner.

In addition, the track spikes along the inside of the rail sectors 84 and 86, between the rail joints A and C along the track sector 84, and between the rail joints B and D along the track sector 86 are removed. These spikes are indicated at 88 in FIGURE 7, and as indicated in FIGURE 7, the outside track spikes 89 are left in place in accordance with this invention.

The spike removal may be done by hand using the usual hand tools, or it may be done more conveniently by employing a conventional mechanical spike puller of any suitable type.

The foregoing procedures may be affected in any convenient order. Similar procedures are used to prepare welded rail for transposing except that the rails are cut at joints A, B, C and D to form the rail sectors 84 and 86, and the lack of joint bars eliminates the handling pertaining to same that is mentioned.

The next step of the method is diagrammatically illustrated in FIGURE 8 and calls for tilting the rails of the rail sectors 84 and 86 outwardly of the track to raise and block the inside edge 90 of each rail base 92 sufficiently so that when the rail sectors 84 and 86 are further processed in accordance with this invention, they will not strike the inner tie plate shoulders and displace the ties. This step is not necessary where the tie plates along the curve do not have inner shoulders.

This tilting and blocking action may be conveniently performed by pressing the heads 94 of the rails involved outwardly of the track as required to lift the inside edges 90 of the rail bases high enough to insert a railroad spike or a track anchor between the rail bases and their underlying ties 95. We prefer to do this at about every half rail length lengthwise of the individual subdivisions of sectors 84 and 86 that are formed as previously described.

The rail tilting action referred to may be performed in any suitable manner, and purely for illustrative purposes FIGURE 8 shows a power unit 96 mounted on an attachment bar 98 that is secured to the C-frame of bulldozer 14B, which bulldozer may be considered the same as the bulldozer 14 previously described, although any other suitable piece of equipment will do. The power unit 96 is shown to include a pair of ram members 99 that are operated in any suitable manner to force the rail heads outwardly in the manner suggested in FIGURE 8.

The showing of unit 96 is provided purely for purposes of illustration as any comparable piece of equipment may be employed which will have suitable power means for serving the purposes of rams 99 to tilt the rails outwardly sufficiently to permit a rail anchor 76 or a rail spike 88 to be inserted between the rail base and the underlying cross tie plate, after which the power unit 96 is actuated to retract the rams 99 so that the rail bases will be resting on the blocking rail spikes on anchors. The blocking spikes or anchors are preferably placed at about every twelfth tie on top of the inner tie plate shoulder, and, of course, under the inside base of the rails.

In practice, the machine employed for this purpose may be a conventional Wollery tie end pusher, made by the Wollery Machine Company of Minneapolis, Minnesota,

which has its tie end pusher bar modified at each end to engage against the gauge sides of the rail sectors **84** and **86**. Obviously, in perfoming the steps illustrated in FIGURE 8, the rails of the respective rail sectors may be tilted outwardly either simultaneously or consecutively, depending upon the type of device used, and as indicated in FIGURE 8, the outside spikes **89** prevent the rails from sliding laterally of the track while performing this part of our method.

After the rail sectors **84** and **86** have been tilted outwardly, and blocked in the manner described immediately above, they are moved toward the center of the track sufficiently to position their bases out from under the outside track spikes **89** (see FIGURE 9) and over the inside shoulders of the tie plates.

In the diagrammatic showing of FIGURE 9, power unit **110** has been illustrated to achieve this purpose comprising an attachment bar **112** that may be affixed in any suitable manner to the C-frame of a bulldozer **14C** (or to the C-frame of bulldozer **14B** in place of the unit **96**). Attachment bar **112** carries a pair of rail engaging arms **114** that may be pivotally secured in place as at **116** and formed at their lower ends **118** to engage the outside of the respective rail heads **94**. The arms **114** are connected by appropriate links **120** to a suitable thrust applying mechanism **122** that may employ hydraulics or the like to draw the arms **114** inwardly of the track rails (and thus toward each other) to position the track sectors at the narrowed gauge necessary for them to have the outside edges **124** of the rail sector bases positioned inwardly of the tie plates (not shown). Once this gauge setting of arms **114** is set, the bulldozer **14C** may be moved down the track to in effect cam the track rails to the narrowed gauge indicated for the full length of the respective track sectors **84** and **86** or the subdivisions thereof that are mentioned above.

In practice, the step illustrated by FIGURE 9 may be performed by employing a conventional bulldozer and applying on its earth moving blade a pair of depending bars that are spaced apart to provide the gauge desired when such bars are cammed against the outside of the rails. At like ends of the sectors **84** and **86** the rail sector ends are moved toward each other by lining bars sufficiently to position them within or between the depending bars of the bulldozer blade, after which the bulldozer is moved the length of the rail sectors with the bars in engagement with the outer heads of the rail sectors and this effects a continuous re-gauging of the rail sectors along the lengths thereof.

These procedures leave the rail sectors **84** and **86** disposed between the tie plates ready for the actual rail transposition process, which brings into use the threader devices **10** and **10A** on their respective bulldozers **14** and **14A**. The transposition process will be described with reference to the showing of FIGURE 11, and in this connection, it is pointed out that in the showing of FIGURE 11 the transposition procedure is well along in process.

The bulldozer **14** carrying the threader device **10** is then positioned adjacent joint B and oriented so that its front end faces in the direction of the arrow **130** of FIGURE 11. The bulldozer **14** should be positioned with respect to the track bed to dispose its threader device **16** adjacent the rail sector **84** side of the track, and the end **132** of the track sector **86** at joint B is moved sidewise of the track bed into substantial alignment with the threader **16** longitudinally of the track.

The rail tongs **36** are then applied to the hook structure **34** of the threader **14** in the manner indicated in FIGURE 1 and the C-frame of bulldozer **14** is lowered to permit the rail tongs to be engaged with the rail end **132** of sector **86** in the manner indicated in FIGURE 1, after which the bulldozer power mechanism is actuated to lift the C-frame as required to dispose the rail end **132** within the vertical operating range of the threader tube **16**; rail end **132** is then blocked up in this elevated position by placing a piece of tie or the like underneath the rail end and resting the rail end on it.

After the rail end is lowered onto the blocking arrangement provided for it, the rail tongs are removed and replaced onto hook **38**. The bulldozer is then maneuvered to align the forward end of threader tube **16** horizontally and vertically with the rail end **132**, and then the bulldozer **14** is moved in the direction **130** with respect to the rail sectors **84** and **86** to slide the rail threader **10** along the rail sector **86**.

The bulldozer **14** at its starting position is thus adjacent joint B and is disposed so that its threader device **16** will be aligned with and receive the rail end **132** of rail sector **86** in the manner indicated. As the bulldozer **14** moves in the direction of arrow **130** to its position shown in FIGURE 11, the rail sector **86** feeds through the threader device **10** and drops down to a position on the track side outwardly of the rail sector **84**. We prefer that the operator of the bulldozer **14** operate his machine to drop the rail end **132** on the tie plates (and inwardly of spikes **89** thereof) that were formerly occupied by the rail sector **84** prior to the rail sector **84** having been moved inwardly towards the rail sector **86**.

As soon as the bulldozer **14** is moved down the track curve sufficiently towards the rail joints C and D to be out of the way, bulldozer **14A** is moved into position to dispose its rail threader device **10A** adjacent the track rail joint A, although the threader device **10A** should be positioned on the track side where sector **86** originally lay (and thus adjacent the tangent rail that was formerly connected to the rail sector **86**). The end **133** of the rail sector **84** that formed part of rail joint A is then moved sidewise of the track into substantial alignment with the rail threader device **10A**, after which this rail end is blocked up in the manner previously described in connection with rail end **132** for reception into threader device **10A**. The bulldozer **14A** is then maneuvered to start the threader device **10A** along the rail sector **84** by moving the bulldozer **14A** in the direction of arrow **130** to feed the end of the rail sector **84** under consideration through the threader **10A**, with the bulldozer operator maneuvering his device to drop the end **133** of the rail sector **84** at the rear of the bulldozer **14A** as closely as possible to the tangent rail at joint B. As the bulldozer **14A** moves on in the direction of the arrow **130**, the bulldozer operator maneuvers his vehicle so that the rail forming sector **84** drops on top of the tie plates that were formerly occupied by the rail sector **86** (but inwardly of the spikes **89** of such tie plates).

Both bulldozers **14** and **14A** then move consecutively around the track curve and thus simultaneously feed and thereby transpose the low side rail sector **86** to the curve high side and the high side rail sector **84** to the curve low side with rail sector **86** passing over rail sector **84**. Where the rail sectors **84** and **86** are subdivided, as suggested above, these subdivisions are handled consecutively starting at one end of the curve and moving towards the other end, with each new sector subdivision being started by employing the rail end aligning and blocking steps described in connection with rail end **132**.

After the rail sectors **84** and **86** have been transposed, the next step of our method involves fitting the ends of the respective sectors **84** and **86** up with the respective tangent rail ends of joints A, B, C and D, and providing the necessary adjustments as to the length to accomplish this (which are required due to the fact that length of railage around a curve high side is longer than the railage around the low side).

After the threader devices **10** and **10A** have been operated by the respective bulldozers **14** and **14A** to transpose the rail sectors **84** and **86**, respectively, the rail sectors **84** and **86** if processed as described will be positioned somewhat as diagrammatically illustrated in FIGURE 12, wherein there is a gap at **140** between the tangent rail at joint A and the end **132** of rail sector

86, while at the other end 135 of the rail sector 86, there is an overlapping of the rail sector 86 with the adjacent tangent rail at joint C. Also, there is a gap at 142 between the tangent rail at joint D and the corresponding end 137 of the rail sector 84, and the rail sector 84 overlaps the tangent rail at joint B.

It is necessary that the rail sectors 84 and 86 be pulled lengthwise thereof to bring end 132 of sector 86 up into abutting relation with the tangent rail end at joint A, and to bring end 137 of sector 84 up into abutting relation with the tangent rail at joint D.

When this has been done, it will be found that the sector 84 still overlaps the tangent rail at joint B; and the sector 84 is then trimmed at this end as required to secure properly sector 84 to the rail tangent at joint B.

It will be found that rail sector 86 will require an additional length of rail to complete a gap between its end 135 and the tangent rail at joint C, and this may be supplied in any convenient manner. If the rail portion removed to make rail sector 84 fit is carefully formed, this portion may be employed to fill the gap at joint C.

The movement of the rail sectors 84 and 86 may be accomplished in any suitable manner, as by securing pull cable 52 of either of the rail threader devices to a convenient rail joint adjacent the respective ends 132 and 137 of the respective rail sectors, and then actuating the bulldozer involved to pull the rail sector the distance required.

The pulling operation in practice is preferably done on the respective rail sectors while the rail remains in the threader tube. In the case of rail sector 86, as soon as bulldozer 14 has moved sufficiently in the direction of arrow 130 to dispose sector end 132 adjacent the track tie plates (after being fed through threader 16) pull cable 52 may be applied to a convenient rail joint in front of device 16 and the bulldozer backed up the amount required to bring end 132 up to proper fit with the tangent rail at joint A. In the case of rail sector 84, when bulldozer 14A nears the end 137, the cable 52 of device 16A may be attached to a convenient rail joint rearwardly of device 16A and the bulldozer 14A moved forwardy to slide rail sector 84 the amount required to make the required fit at joint D.

Where further adjustment is required after the rail sectors have dropped from the respective threader devices, the pull cable 52 may be employed to pull the rail sector in question either forwardly or rearwardly of the direction of movement of the bulldozers that is diagrammatically shown in FIGURE 11. Rearward movement may be accomplished by stretching the pull cable 52 out forwardly of the bulldozer and hooking the hook 60 onto a convenient rail joint, after which the bulldozer is moved rearwardly thereof; forward movement of the rail may be accomplished by positioning the pull cable 52 over the back of blade structure 26 along the lines suggested in FIGURE 2 and then attaching it to a convenient rail joint, after which the bulldozer is moved in a forward direction.

After the ends of the respective rail sectors 84 and 86 have been properly aligned with and fitted in between the tangent rail ends at joints A, B, C and D, the joint bars 82 are reapplied, and this may be done in any conventional manner, and preferably a suitable bolt machine is employed to handle the joint bolt nuts.

It may be pointed out that in this position of the rails about the curve 70, the rail sectors 84 and 86 will be positioned somewhat inwardly of the standard gauge, and the adjacent ends of the tangent rails may also have to be moved inwardly of the track slightly to make the joints required at joints A, B, C and D. This may require removal of some spikes at the tangents for a short distance away from the curve at joints A, B, C and D.

In the meantime, the spike holes of the inner spikes about the curve that have been removed should be plugged in a conventional manner to insure a firm anchorage for reapplication of the spikes. This may be done at any convenient time when the spike holes are available for processing.

The next step in the procedure is diagrammatically illustrated in FIGURE 13, and this involves pushing the track rails about the curve against the outside spikes 89 to seat same in the tie plates. For this purpose, the diagrammatically illustrated device 96 of FIGURE 8 may be employed for this purpose, with the rams 99 of device 96 engaging the webs 150 of the respective rails, as shown in FIGURE 13. To perform this operation, the bulldozer 14D which is shown as carrying device 96 mounted on its C-frame, may start at one end of the curve 70 and engage the curve rails in the manner indicated at about every half track length or more as required to firmly seat the rails between the tie plate shoulders and under and against the outside spikes 89.

Alternately, the Wollery machine of the general type above described and having its tie end pusher bar ends appropriately modified to engage the rail webs may be employed to perform this operation.

After this, the inside spikes 88 are reapplied along the inside edges of both the track sectors and the rail anchors 76 are reapplied in the usual manner as indicated by FIGURE 14. Also, new signal bond wires are applied across joints A, B, C and D and elsewhere as required.

Specific description

As previously indicated, the bulldozers 14 and 14A may be of any conventional type, and in a practical application of this invention two model D–6 Caterpillar tractors were used as bulldozers 14 and 14A.

In this type of equipment, the C-frame 12 is pivotally connected to the tractor frame as at 160 (see FIGURE 4), and the C-frame is raised and lowered by telescoping hydraulic jack devices 162 that are operably secured to the tractor frame and to the C-frame as at 164 in any convenient and conventional manner for the purpose of actuating the C-frame. Hydraulic jack devices 162 are extensible and contractable in nature and the extensing and contracting movement is provided by functioning of appropriate hydraulic equipment under the control of suitable hydraulic controls, all of which are well-known in the art.

However, the bracket structures 18 and 26 may also be arranged for mounting on other types of off-track equipment, as will be obvious to those skilled in the art, although they should be mounted to permit the threader tube 16 to be raised and lowered as described above. Where the off-track equipment does not have a C-frame or other lever type mounting structure equivalent to the illustrated C-frame 12, it is preferable to provide one, or some other equivalent mechanism on which to mount the threader devices 16.

As indicated in FIGURES 1–5, the threader tube 16 has an open ended box-like configuration of generally quadrilateral transverse cross-sectional configuration and may be formed by side plates 170 and 172 affixed to top and bottom plates 174 and 176 in any suitable manner as by welding. The bottom plate 176 has affixed thereto a stub shaft 178 which is journalled in the bracket structure 18 for the above described pivotal movement of the threader tube.

The funneling flange portions 44, 46 and 50 at the forward end 24 of the threader tube may be formed by welding in place appropriately shaped plate segments, substantially as shown in the drawings.

The hook structure 34 in the specific forms illustrated comprises an angle member 180 positioned to extend transversely of the threader tube and having its longitudinally extending edges 182 and 184 welded to the top plate 174 of the threader tube. A cantilever bar 186 has one end 188 thereof affixed to the top plate 174 of the threader tube and rests against the angle member 180 as at 190, the bar being affixed in place as by welding at

the places indicated. The forwardly extending end **192** of the bar **186** has affixed to its top surface **194** a loop segment **196** which is positioned to have its ends **198** extend upwardly, and it is proportioned to be received through the end link **200** of a short chain **202** that forms a part of the rail tong device **36**. Bar **186** may be appropriately reinforced, as by welding a stiffner bar **201** along its top surface.

The rail tong device **36** comprises in addition to the chain **202** a pair of levers **204** and **206** that are pivotally connected by pin **208** and are provided with jaws **210** and **212**, respectively, that are proportioned to engage under either side of rail heads. Pivotally secured to each lever **204** and **206** are links **214** and **216** that are received in link **218** of chain **202**.

The jaws **210** and **212** of the rail tong device **36** tend to close over and against the rail head when the chain **202** is lifted. The lifting action on the chain **202** effects a pivotal action on the respective levers **204** and **206** tending to swing them about pin **208** to close the jaws on the rail head, as will be immediately apparent to those skilled in the art.

The bracket structure **18** in the specific form illustrated comprises a pair of side plate members **220** and **222** affixed as by welding to a bottom plate member **224** and a top plate member **226**.

The bottom plate member **224** is perforated as at **228** to receive the stub shaft **178** for purposes of journalling the threader tube **16** for its indicated pivotal movement.

The side plate **222** has affixed thereto as by welding a pair of laterally extending bracket members **230** and **232** (see FIGURE 6) that are spaced apart to receive between them the side **20** of the C-frame **12**. The bracket members **230** and **232** should be proportioned to overhang the C-frame sufficiently as at **234** to permit the formation of bolt holes in them for receiving suitable locking bolts **236** for the purpose of clamping bracket members **230** and **232** to the top and bottom surfaces of the C-frame side **20**.

The top plate **226** of bracket structure **18** may be provided with suitable reinforcing plates **240**.

The bracket structure **26** comprises the aforementioned plate structure **30** which may be in the form af a plate **250** of a suitable gauge (boiler plating gauge will be satisfactory) which is provided with spaced pairs of lugs **252**, **254** and **256** that are spaced apart to receive between them lugs **258**, **260** and **262** that are affixed to the C-frame **20**.

The respective pairs of lugs **252**, **254**, **256**, and the lugs **258**, **260**, **262** that they cooperate with form the knuckle type securing devices **32** and said lugs are formed with suitable holes that are aligned to receive both the respective bolts **264**, **266** that secure the respective lugs together.

The shelf structure **28** comprises a plate **270** extending across the bottom of the window **35**, and the top surface **272** of plate **270** forms a wear surface for the threader tube **16**.

The anchor or mounting plate **56** of pull cable **52** is affixed in place between plate structure **26** and its shelf forming plate **270** in any suitable manner as by welding.

At the other side of the window opening **35**, a vertically disposed plate **280** is fixed between plate **270** and the upper portion of plate structure **26**. The plates **56** and **280** define the side limits of the horizontal swinging action of the threader tube **16**, which as indicated in the drawings should be on the order of 20 degrees toward either side of the vehicle.

The hook **38** on which the rail tongs **36** hang is affixed to the outwardly facing surface **282** of the side plate **280** in any suitable manner, as by welding.

It will therefore be seen that we have provided a method and device for transposing curve rails which effects the changeover of the curve rails between the high and low sides of the curve with a minimum of labor and equipment while at the same time holding to a minimum the amount of dismantlement of the track and permitting the use of conventional types of maintenance equipment that may be available. The threader device is simplified but effective, and is adapted for attachment to a wide variety of off-track equipment for use in accordance with the method.

While rail threaders have been employed for other purposes heretofore, they have not been considered successful in threading long lengths of connected rails because of the difficulty of getting the rail joints through the threader. The device of our invention readily receives the rail joints as well as the rail lengths and even though no rollers or other antifriction type devices are employed as part of our rail threader, the gravel and pebbles that are carried into the threader by the rail tend to serve the same purpose between the rail flange and the bottom plate of the threader. The threader tube funnelling side portions **44** and **46** guide the rail joints into the bore of the threader in the event that the rail comes into close adjacency with one side of the threader tube.

Where the track in question uses welded rail construction, it is preferred that the entire rail segment about the curve be fed through the threader, rather than dividing the rail segment into sections. However, suitable joints will have to be made in the tangents adjacent the curve.

Apparatus arranged as described herein in practice has been found to perform the rail transposing step at a rate on the order of a rail length per minute (assuming a normal rail length of thirty-nine feet).

While the invention has been described and illustrated in connection with transposing rails at curves, the same apparatus and methods may be applied to the transposing of tangent rails, although the fact that the lengths of tangent rail on both sides of the track will ordinarily minimize, if not eliminate, the rail trimming and adding that will be involved.

The foregoing description and the drawings are given merely to explain and illustrate our invention and the invention is not to be limited thereto, since those skilled in the art who have our disclosure before them will be able to make modifications and variations therein without departing from the scope of the invention.

We claim:

1. The method of servicing track rails which includes:

removing the rail anchors from the track rails to be serviced and disconnecting the ends of the track rails to be serviced at both ends of such rails,

removing the rail spikes from the inside of the rails being serviced between their disconnected rail ends,

narrowing the gauge of the rails being serviced sufficiently to move the rails being serviced out from under the spikes along the outside of such rails,

transposing the disconnected rails of one side of the track to the operative position of the rails on the other side of the track and transposing the rails of said other side of the track to the operative position of the rails formerly on said one side of said track,

fitting the transposed rails into alignment with the track rails adjacent each and securing the transposed rails to their adjacent rails,

moving the transposed rails into engagement with the outside spikes along the track rails being serviced,

and applying spikes along the inside of the rails being serviced and applying rail anchors to the rails being serviced.

2. The method of servicing track rails at curves which includes:

removing the rail anchors from the rails along the curve and disconnecting the rail ends at the curve tangents at both ends of the curve to form the curve rails into rail lengths consisting of a number of rails connected together,

removing the rail spikes from the inside of the curve rails between the disconnected rail ends,

narrowing the gauge of the curve rails sufficiently to

draw the curve rails out from under the spikes along the outside of the curve rails,

simultaneously transposing the curve high and low side rail lengths to the opposite sides of the track about the curve,

fitting the transposed rail lengths into alignment with the tangent rails and securing the transposed rail lengths to the tangent rails,

moving the transposed rails into engagement with the outside spikes around the high and low sides of the curve,

and applying spikes along the inside of the transposed rails and applying rail anchors to the curve rails.

3. The method set forth in claim 2 wherein:

said transposing step includes moving rail threaders lengthwise of respective rail lengths to feed the respective rail lengths from their original positions to their transposed positions.

4. The method set forth in claim 2 wherein:

for long curves the rail lengths at the high and low sides of a curve are divided into segments of approximately 10 rails each, and said length segments are consecutively subjected to said transposing step about the curve.

5. The method set forth in claim 2 wherein:

prior to the gauge narrowing step, the curve rails are tilted outwardly of the track bed.

6. The method of servicing track rails at curves employing a pair of vehicles each having secured thereto a rail threader on opposite sides thereof, which method includes:

removing the rail anchors from the rails along the curve and disconnecting the rail ends at the curve tangents at both ends of the curve to form the curve rails into rail lengths consisting of a number of rails connected together,

removing the rail spikes from the inside of the curve rails between the disconnected rail ends,

narrowing the gauge of the curve rails sufficiently to draw the curve rails out from under the spikes along the outside of the curve rails,

positioning one of the vehicles adjacent like ends of the rail lengths and applying to the threader of said one vehicle the rail end of the rail length that is on the side of said vehicle which is opposite to said sides thereof, moving the said one vehicle along the track to transpose the rail length being threaded to the opposite side of the track,

moving the other vehicle to said rail length like ends and applying to its threader the adjacent rail end of the other rail length, move the other vehicle along the track to transpose the rail length it is threading to the opposite side of the track,

fitting the transposed rail lengths into alignment with the tangent rails and securing the transposed rails to the tangent rails,

moving the transposed rails into engagement with the outside spikes around the high and low sides of the curve,

and applying spikes along the inside of the transposed rails and applying rail anchors to the curve rails.

References Cited

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