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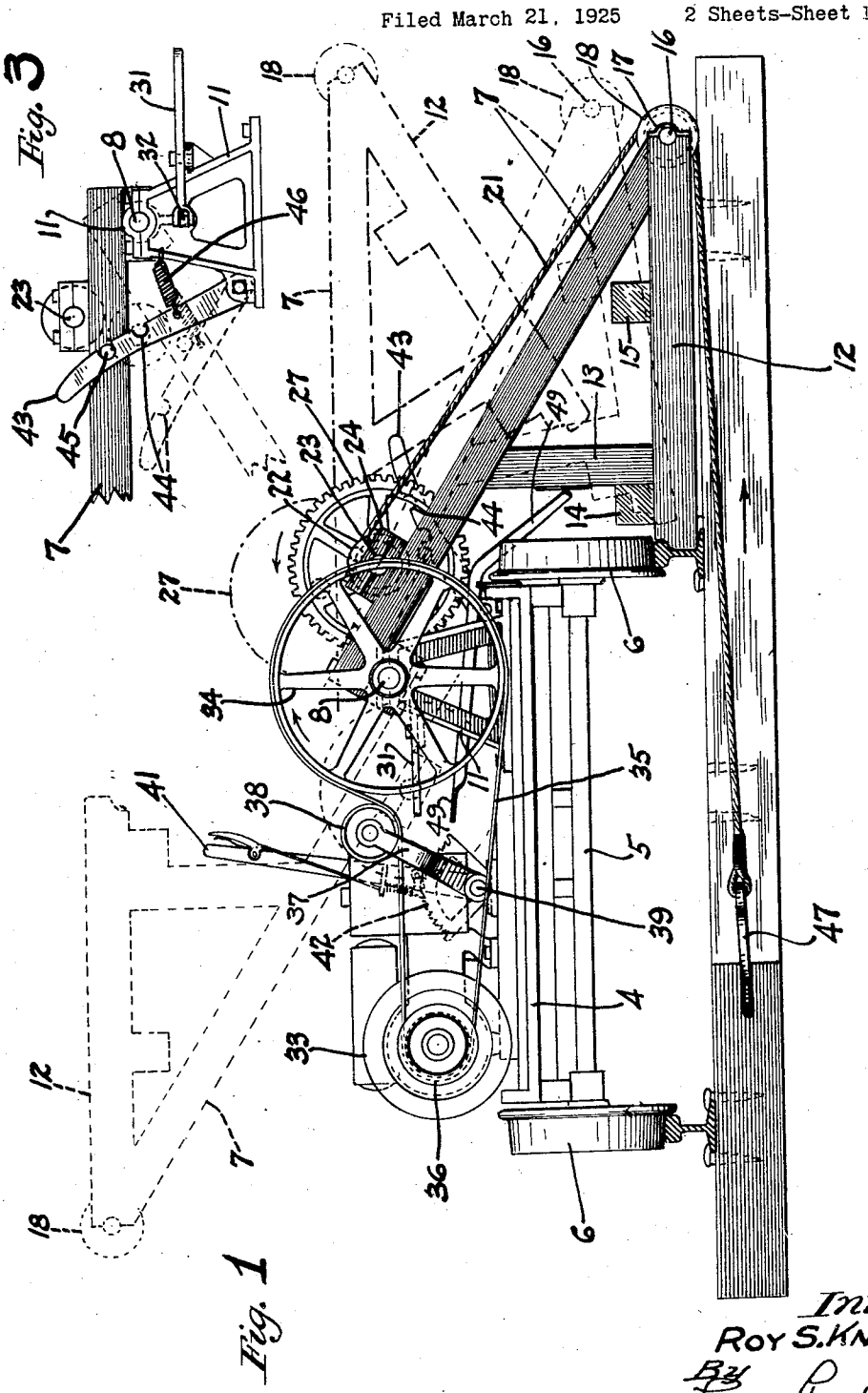


Fig. 1

Fig. 3

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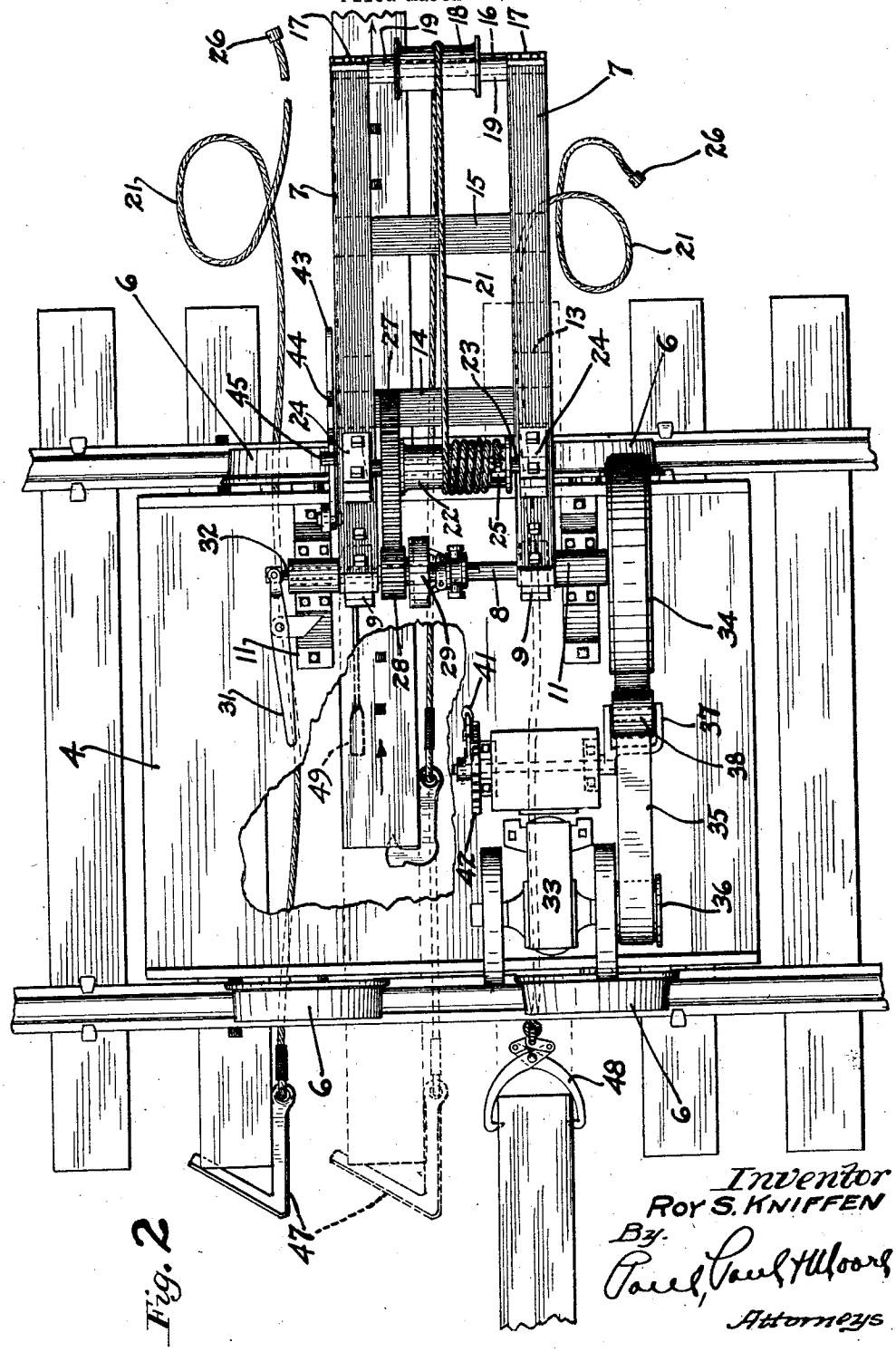


Fig. 2

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# UNITED STATES PATENT OFFICE.

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## MACHINE FOR REPLACING RAILROAD TIES.

Application filed March 21, 1925. Serial No. 17,410.

This invention relates to an improved device for removing old ties and replacing them with new ones, without disturbing the rails resting on the ties, and more particularly relates to such a device adapted to be mounted upon an ordinary hand car and may therefore be used or considered as an attachment therefor.

The particular object of the invention is to provide a machine for removing and replacing track-ties which will be simple and inexpensive in construction and which may readily and conveniently be shifted from inoperative to operate position in a minimum amount of time.

A further and more specific object of the invention is to provide such a device having a thrust member supported by a frame which is pivotally mounted on the car platform, and which thrust member is adapted to engage the rails to relieve the car of any unnecessary strain in the operation of pulling out an old tie from beneath the rails and replacing it with a new one.

Other objects of the invention will appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the drawings there has been disclosed a structure designed to carry out the various objects of the invention but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the accompanying drawings forming part of this specification,

Figure 1 is an end elevation of a railway hand car of the platform type showing the invention mounted thereon and in operative position;

Figure 2 is a plan view of Figure 1 with a portion of the car broken away to show the means provided for connecting the cable to the end of an old tie; and

Figure 3 is a detail view of the means provided for retaining the thrust member supporting frame in its adjusted positions.

In the selected embodiment of the invention here shown, there is illustrated a common form of railway hand car comprising the platform 4 mounted on the axles 5 carried by the usual wheels 6. This hand car may be of the ordinary type employing an internal combustion engine for motor power or, it may be an ordinary platform type employing no propelling motive power.

The novel feature of this invention resides in the provision of an attachment for such a car whereby it may readily be converted into a tie-removing and replacing machine for use in repairing railroad tracks.

As shown in Figures 1 and 2, the device preferably comprises a pair of spaced beams 7 having their upper ends pivitally mounted upon a shaft 8 by means of capped bearings 9. The shaft 8 is rotatably mounted in bearing pedestals or pillow blocks 11 which may be mounted upon and secured to the platform 4 of the car, as shown. A pair of substantially horizontal thrust members 12 are arranged beneath the beams 7 and have their outer ends suitably secured to the lower ends of the beams. Upright posts 13 are interposed between the beams 7 and the thrust members 12 thereby providing a substantial frame structure. Cross bars 14 and 15 are provided to retain the two thrust members and also the two supporting beams 7 in substantially spaced parallel relation. The inner ends of the two thrust members 12 are preferably shaped to conform to the contour of the rails so that when they are abutted thereagainst they will fit the rail as shown in Figure 1.

A rod or shaft 16 is mounted in the outer ends of the thrust members 12 and is secured thereto by suitable clamps 17 which are bolted to the ends of the thrust members. A flanged roller 18 is rotatably mounted upon the shaft 16 and is centrally retained between the two thrust members and the supporting beams 7 by suitable spacing collars 19 mounted on the shaft. A tie-pulling cable 21, having a suitable connecting means detachably secured to one end thereof, is adapted to pass under and over the flanged roller 18 to a winding drum 22 mounted upon a shaft 23 supported in bearing boxes 24 secured to the upper faces of the two supporting beams 7. A T-slot 25 is preferably provided in the periphery of the winding

drum 22 for detachably securing the tie-pulling cable 21 thereto. The tie-pulling cable preferably has a head 26 provided on one end thereof adapted to be inserted in the T-slot 25 in the winding drum to detachably secure it thereto, (see Figure 2).

The means provided for rotating the winding drum 22 preferably consists of a gear 27 secured to one end of the drum and which gear is adapted to mesh with a pinion 28, preferably loosely mounted upon the drive shaft 8. A suitable friction clutch 29, of ordinary construction, is also mounted on the drive shaft 8 to provide means for operatively connecting the pinion 28 with the drive shaft when it is desired to actuate or rotate the winding drum 22 in the operation of pulling a tie. A clutch-operating lever 31 may be provided for shifting the clutch 29 into and out of driving connection with the pinion 28. This lever may be mounted upon one of the bearing pedestals 11 supporting the drive shaft 8 and is connected to the movable member of the clutch by means of a rod 32.

The drive shaft 8 may be conveniently driven by means of an internal combustion engine 33 mounted upon the car platform as shown in Figures 1 and 2. When such an engine is used, a pulley 34 is mounted on the drive shaft 8 adapted to receive a belt 35 which also is mounted on the pulley 36 on the engine shaft. When employing a belt drive as above described, the belt is usually of such length that when in normal inoperative position the frictional contact between the belt and the engine drive pulley will not be sufficient to cause the engine pulley to drive the belt. Means are, therefore, provided for tightening the belt to bring it into driving contact with the engine pulley. Such tightening of the belt may be accomplished by either slidably mounting the engine on a base secured to the car platform or by providing a belt take-up device such as shown in the drawings. The belt take-up or adjusting means here shown preferably consistss of a forked arm 37 having an idler pulley 38 mounted thereon adapted to be moved into driving contact with the belt. The arm 37 is mounted upon one end of a rock shaft 39 having a lever 41 mounted upon the opposite end thereof by means of which the pulley 38 may be moved into and out of contact with the belt. A ratchet device 42 is provided to retain the belt tightening lever 41 in its adjusted positions.

By reference to Figure 1, it will be noted that the supporting beams 7, to which the thrust members 12 are secured, are pivotally mounted upon the drive shaft 8 so that the thrust members 12 may be moved out of engagement with the rails as when moving from tie to tie or from place to place along the railroad track, and as indicated by the dotted line positions shown in this figure. Means are preferably provided for retaining the thrust members 12 and the beams 7 in such adjusted position. A latch 43 is therefore mounted upon one of the bearing pedestals 11 as shown in Figure 3, and this latch is provided with suitable notches 44 adapted to receive a pin or stud 45 secured to one of the supporting beams 7. A spring 46 is provided to yieldably hold the latch 43 against the pin 45 so that when the supporting beams 7 are lifted into the adjusted positions shown in dotted lines in Figure 1, the latch will automatically be moved into holding engagement with the pin 45 to retain the thrust members and beams 7 in such inoperative positions. When it is necessary to travel any great distance along the railroad track the supporting beams 7 and thrust members 12, may be swung to a position over the car platform, as also indicated by dotted lines.

A foot pedal 49 is preferably provided for moving the thrust member 12 out of working engagement with the track rails when moving from one tie to the next (see Fig. 1). This foot pedal is pivotally mounted on one side of the car platform and has its lower end-portion adapted to engage one of the upright posts 13 so that when downward pressure is applied to the opposite end of the pedal, the thrust members will be outwardly moved out of contact with the rail. The foot pedal 49 is also preferably demountably mounted on the car platform so that it may readily be detached therefrom when the tie pulling attachment is removed or detached from the car.

In the operation of this novel tie removing and replacing machine, a plurality of tie-pulling cables are usually provided in order to expedite the work of removing and replacing old ties. The cables used for removing the old ties may be provided with suitable hooks 47 adapted to engage the end of the tie as shown in Figure 2. The cables employed for pulling the new ties into the place of the removed tie are preferably provided with a suitable gripping device 48 as also shown in Figure 2, so that the cable will not interfere with the bottom of the rails when pulling the tie thereunder. When removing an old tie from beneath the rails, a plurality of cables 21 equipped with hooks 47 may be placed along the track between the ties as indicated in Figure 2. The workmen placing the cables between the ties in advance of the machine will position the hook 47 as shown, so that when the opposite end of one of the cables is inserted in the T-slot 25 of the winding drum and the latter is rotated by manipulation of the clutch lever 31, the cable will be wound thereon and the tie will be pulled from under the rails as also shown in this figure. As soon as the

old tie has been completely withdrawn from beneath the rails, the operator, or a workman walking alongside of the machine will remove the hook 47 from the withdrawn tie after which he will unwind the cable from the drum 22 so that the next cable may be secured thereto. As soon as the next cable has been connected to the winding drum the latter will again be started and the next tie pulled in a similar manner.

In pulling the new ties into place under the rails, the ties will first be placed along the track in alignment with the trenches in the ground left by the removal of the old ties. The cables employing the gripping devices 48, will then be placed under the rails of the track and after the hooks have been connected to the ties, as shown in Figure 2, each cable will be similarly connected to the winding drum and a new tie pulled under the rails after which the hooks 48 will be removed and the cable removed from the winding drum and the next successive cable be similarly attached to the winding drum. By thus employing a plurality of tie-pulling cables, a small crew of men may greatly reduce the amount of time ordinarily required to remove and replace a given number of ties along a railroad track, thereby greatly reducing the cost of such work. Also by the employment of the thrust members 12, very little strain will be exerted against the car when a tie is being pulled as practically all of such strain will be exerted against the adjacent rail providing the abutment for the thrust member 12.

If desired, the cable used in pulling into place the new tie may be passed over the tops of the rails instead of under as shown in the drawings, thereby eliminating the necessity of having to unwind and disconnect the other end of the cable from the winding drum each time a tie is pulled into place. When the cable is thus used a different type of hook must be used for engaging the tie as it will be necessary to secure the cable to the opposite or lagging end of the tie in pulling it into place. For this purpose a device similar to the hook 47, shown in Figure 2, may be used for securing the cable to the end of the tie.

This novel device is of simple and inexpensive construction and may be used either as an attachment for an ordinary hand car or it may be constructed as a part thereof and also, if desired, the drive shaft 8 may be hand-operated in place of the motive power herein shown. The hooks 37 and gripping devices 48 provided on the tie-pulling cables 21 may be of any suitable construction or form which will provide means whereby the tie-pulling cables may readily and quickly be connected to and disconnected from the ties.

The construction of this novel tie pulling attachment is such that it may be conveniently mounted upon any ordinary type of motor car and be connected to the motor power thereof. In the drawings the drive shaft 8 is shown operatively connected to the engine drive shaft by means of the belt drive 35. When thus operated the engine must necessarily be mounted transversely upon the car platform so that the axis of the engine crank shaft will be substantially parallel to the axis of the drive shaft 8. If desired, however, the engine may be operatively connected to the drive shaft 8 by means of a worm gear drive (not shown). When such a drive is employed, the usual engine provided upon the motor car for propelling it may also be used to provide power for the tie-pulling attachment without altering the location of the engine upon the car platform. Thus, it will readily be seen and understood that this novel tie pulling device is well adapted for use as an attachment for an ordinary railway motor car thereby providing means whereby such a car may readily and quickly be converted from a transportion car into a tie puller or tie renewing machine.

I claim as my invention:

1. A tie replacer comprising a thrust member adapted to horizontally abut a track rail and exert a thrusting pressure thereon and be moved to a raised non-working position, and flexible tie attaching means having a running connection with said thrust member.

2. A tie replacer comprising a thrust member pivotally supported and adapted to abut a track rail and exert a thrusting pressure thereon and be swung on its pivot to a raised non-working position, and a flexible tie attaching means having a running connection with said thrust member.

3. A tie replacer comprising a wheeled frame, a thrust member pivoted thereon and adapted to horizontally abut a track rail and exert a thrusting pressure thereon, said member being capable of swinging on its pivot to a raised non-working position on said frame, and flexible means having means for attachment to a tie and a running connection with said thrust member.

4. A tie replacer comprising a wheeled frame, a pair of beams pivotally supported at one end on said frame and adapted to swing down to an inclined position at one side of said frame and be raised to a non-working position above said frame, said beams having thrust members adapted to engage a track rail and exert a thrusting pressure thereon, and flexible means mounted on said beams and having means for connection with a tie.

5. A tie replacer comprising a wheeled frame, beams mounted thereon in an inclined position at one side of said frame,

the lower ends of said beams having horizontal members to abut the adjacent track rail and exert a thrusting pressure thereon, a winding drum, an idle drum mounted near the lower ends of said beams and a cable attached to said winding drum and having a running connection with said idle drum and provided with means for attachment to a tie.

6. The combination with a car having a platform and carrying wheels, of a frame mounted on said platform in an inclined position at one side of the car and having thrust members for horizontally abutting the adjacent track rail, a source of motive power mounted on said platform, a winding drum operatively connected with said source of motive power and a cable for said drum having means for connection to a tie and a running connection with said frame.

7. The combination with a car having a platform and carrying wheels and a shaft mounted in bearings on said platform, of a frame journaled on said shaft and adapted to extend downwardly and laterally therefrom and having thrust members to abut the adjacent track rail, a winding drum mounted on said frame, a cable for said drum having means for connection with a tie, said frame being adapted to swing to a raised non-working position above said platform.

8. The combination with a car having a platform and carrying wheels and a shaft mounted in bearings on said platform, of a frame journaled on said shaft and adapted to extend downwardly and laterally therefrom and having thrust members to abut the adjacent track rail, a winding drum mounted on said frame, a cable for said drum having means for connection with a tie, said frame being adapted to swing to a raised non-working position above said platform, and means for locking said frame in its raised inoperative position.

9. A tie replacer comprising a platform having track wheels, a frame hinged on one side of said platform to swing down to a point near the ground line and having a substantially horizontal thrust member, a cable having a running connection with said frame and means for connection to a tie, the pull of said cable being taken up by said thrust member, and said frame being adapted to swing to a raised non-working position above said platform.

10. A tie replacer comprising a thrust member adapted to horizontally abut a track rail and exert a thrusting pressure thereon, a car having a platform and carrying wheels and whereon said thrust member is supported, a winding drum, a cable adapted to be connected to said drum and having a running connection with said thrust member and provided with means for attachment to a tie.

11. A car having a platform and carrying wheels and standards mounted on said platform, in combination with a tie replacer frame having a shaft adapted to be removably supported on said standards, said frame including beams supported on said shaft and adapted to swing downwardly to an inclined position near the ground line and having thrust members adapted to be seated against the adjacent track rail, a winding drum mounted in said frame and having a suitable driving mechanism and a cable connected to said drum and having a running connection with the lower portion of said frame and provided with means for attachment to a railroad tie.

12. A tie replacer comprising a frame having a thrust member adapted to horizontally abut a track rail and exert a thrusting pressure thereon, a winding drum mounted in said frame and having a driving mechanism, a cable attached to said drum and having means for connection to a railroad tie, said frame being adapted for mounting on one side of the platform of a railway car, and readily removable therefrom.

13. A tie replacer comprising a frame having a thrust member to engage a track rail, a car platform having carrying wheels and a support on said platform whereon said frame is pivoted for vertical oscillation and a cable mounted on said frame and having means for connection with a tie, and means mounted on said platform for tilting said frame and forcing said thrust member out of engagement with the track rail.

14. In combination with a track, a truck thereon, a frame pivoted to the upper side of the truck and having spaced frame members having portions abuttingly engaging with the outer side of one of the rails when the frame is in working position, a winding drum upon the frame and a cable attached to the drum and guidingly supported upon and passing beneath frame and rails and adapted for attachment with a tie, said frame being adapted to be swung to an idle position above the truck.

15. A tie replacer comprising a horizontal thrust member adapted to abut the web of a track rail at one side of the track and exert a lateral thrusting pressure thereon, a truck and winding drum thereon, and flexible tie-attaching means connected to said drum and having a running connection with said thrust member.

16. A tie replacer comprising a horizontal thrust member adapted to laterally abut a track rail and exert a thrusting transverse pressure thereon, an inclined member secured to said thrust member and adapted to be mounted on a car, and flexible tie-attach-

ing means having a winding mechanism on the car, and a running connection with said thrust member.

17. A tie replacer comprising a substantially triangular frame having lower horizontal members to abut a truck rail and exert a lateral pressure thereon, upper inclined members connected to said lower members and having means for mounting them on a car, and flexible tie-attaching means having a running connection with said lower thrust members and a winding means on the car.

In witness whereof, I have hereunto set my hand this 18th day of March 1925.

ROY S. KNIFFEN.