

[54] **MOBILE TRACK WORKING APPARATUS**  
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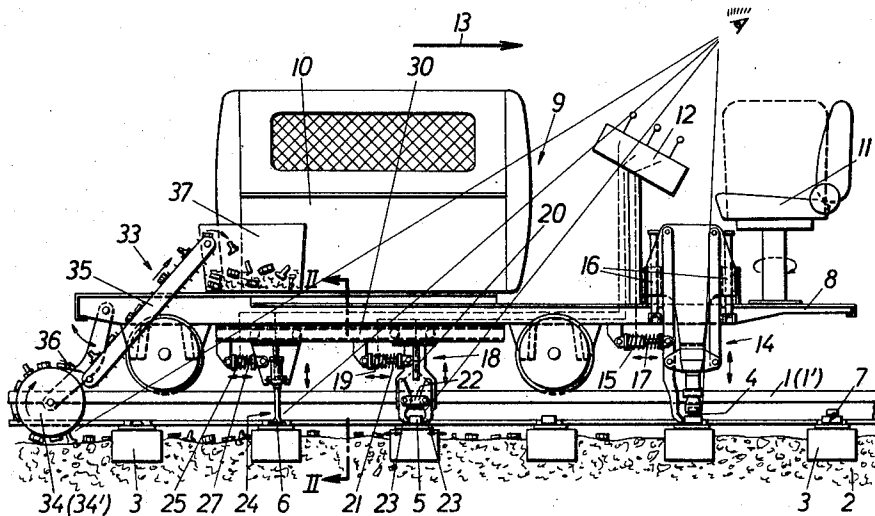
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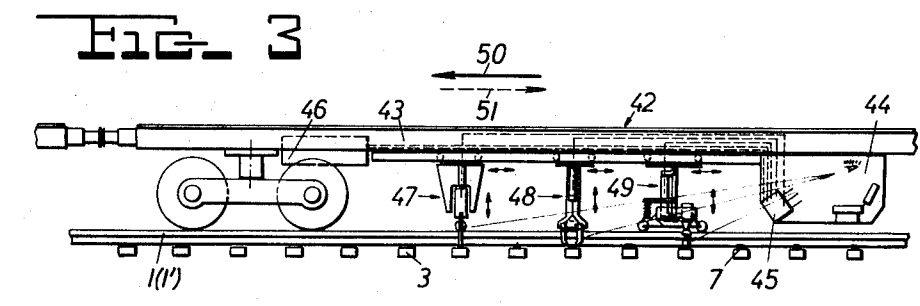
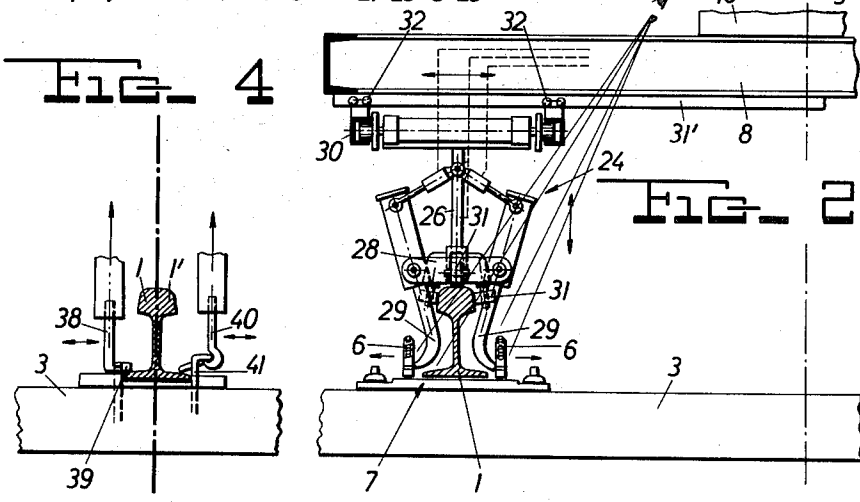
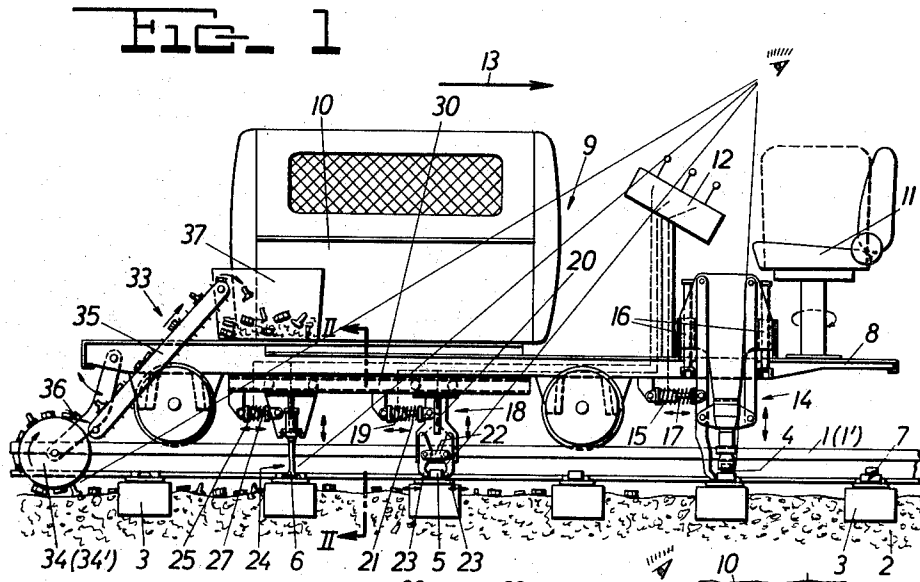
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[57] **ABSTRACT**  
 A mobile track working machine for assembling and disassembling tie plates comprises a car frame and a plurality of working tools mounted on and underneath the car frame, the tools being spaced from each other in the working direction of the machine, and each tool being associated with one of the connecting elements attaching the rails to the ties.

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**8 Claims, 4 Drawing Figures**





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**MOBILE TRACK WORKING APPARATUS**

The present invention relates to mobile track working apparatus arranged to move on the track in a working direction, and more particularly to an apparatus for assembling and disassembling a plurality of individual connecting elements for rail attaching means for attaching the two rails of the track to a succession of ties.

In our U. S. application Ser. Nos. 865,886 and 865,929, both filed Oct. 13, 1969, we have proposed incorporating an apparatus of this general type in a track renewal apparatus which continuously advances while removing an old track and laying a new track, such as disclosed, for instance, in our U. S. Pats. No. 3,330,219, dated July 11, 1967, No. 3,521,565, dated July 21, 1970, and No. 3,604,358, filed Aug. 12, 1969. Since such a track renewal apparatus works like a moving conveyor band, the speed of the entire operation depends on the speed of each constituent machine thereof, including the apparatus for disassembling and assembling the rail attaching means which includes a plurality of connecting elements, such as tie plates and spikes or threaded bolts and nuts.

For assembling and disassembling the rail attaching means, it is necessary to place or pick up the tie plate and to remove or fasten the fastening element or elements, which may be a spike or a threaded bolt hook and nut. Frequently, work on the connecting elements is made more difficult by rust or accumulated dirt.

In normal track renewal work, many of the connecting elements may be re-used, for which purpose they are collected immediately after removal from the old track. Even in a relatively short track section, a considerable number of individual elements may thus be collected by hand. Obviously, manual collection of the elements is very time-consuming and leaves many such re-usable elements remaining on the ballast, which constitutes an economic loss.

It is accordingly the primary object of this invention to provide a mobile track working apparatus of the indicated type which overcomes the above and other disadvantages, and which enables rapid and dependable assembly and disassembly of the connecting elements to be obtained under all practical operating conditions whereby such apparatus may be readily incorporated into a fast-moving track renewal system.

The above and other objects and advantages are accomplished in accordance with the invention with an apparatus of this type which comprises a car frame and a plurality of working tools mounted on and underneath the car frame. The tools are spaced from each other in the working direction of the mobile apparatus, and each tool is associated with one of the connecting elements of the rail attaching means for assembling and disassembling the one element in the rail attaching means.

According to a preferred feature, the car frame is self-propelled, and control means is preferably provided for synchronizing the car frame movement in a selected working direction with the operation of the working tools.

Since each connection element is thus operated automatically by its associated tool in succession, the efficiency of the apparatus is considerably increased. When used during track renewal at the respective points where the old track is picked up and the new track is laid, the rapid disassembly and assembly of the

rail attaching means at these respective points tends to shorten the distance between these two points considerably. Thus, the track sections wherein the rails still rest on the ties but are not attached thereto are reduced to a minimal length. This, in turn, minimizes rail deformations due to temperature and other influences since such deformations can take place to a substantial extent only in those track sections where the rails are not fixed to the ties.

In accordance with one preferred feature of the present invention, the apparatus comprises a conveyor means associated with the working tools, the conveyor means being arranged to convey the connecting elements from and to the tools. The conveyor means is preferably mounted rearwardly of the working tools in the working direction and comprises a conveyor band having two ends and a rotating magnet means usefully consisting of a plurality of separate magnetic rollers adjacent each rail and one of the conveyor band ends while a receptacle for the connecting elements is mounted on the car frame adjacent the other conveyor band end.

In this manner, the individual ferrous connecting elements will be rapidly collected by the magnetic rollers after removal so that no such elements remain on the ballast bed, and the ballast will be free of such ferrous parts during the usual cleaning at this stage of the track renewal operation. Otherwise, an intermediate operation is needed, i.e. the separation of the ferrous parts from the ballast rocks. The entire operation is fast, dependable and very simple.

Two series of the working tools may be provided, each being associated with a respective rail. A common drive means for all the working tools may be synchronized with the propelling means for the car frame so that the entire track renewal operation may proceed at maximum efficiency. An operating and control stand is preferably arranged on the car frame for visual observation of the tools and the actuation thereof.

According to a preferred embodiment, the working tools and the conveyor means are vertically and longitudinally adjustably mounted on the car frame, with each tool being independently and separately replaceable whereby different tools may be inserted for different connecting elements, such tools being, for instance, wrenches, spike pullers or drivers, etc.

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

FIG. 1 is a side view of a self-propelled mobile track working apparatus according to the invention;

FIG. 2 is a transverse cross section of the apparatus along line II—II of FIG. 1, showing only the arrangement associated with one track rail (the non-illustrated arrangement associated with the other track rail being identical therewith);

FIG. 3 is a side view of a mobile track working apparatus according to the present invention which is adapted for incorporation into a track renewal train; and

FIG. 4 is a detailed view of specific connecting elements of rail attaching means in connection with which the apparatus may work.

Referring now to the drawing, the track is shown to comprise a succession of ties 3 resting on ballast 2 and two rails 1, 1'. The rails are attached to the ties by a plurality of connecting elements, those shown in FIGS. 1 and 2 by way of example including tie plates 5, threaded bolt hooks 6 and nuts 4. The elements 4-6 constitute the rail attaching means 7, when assembled, and they must be disassembled when the rails are to be detached from the ties during a track renewal operation, for instance.

As shown in FIGS. 1 and 2, the mobile track working apparatus 9 comprises a car frame 8 which has running gears moving the car frame on the track rails. A propelling means 10 on the car frame moves the same along a selected working direction 13. An operating and control stand 11 is arranged on the car frame platform for visual observation of all the tools and the conveyor, as indicated by the eye and sight lines, so that an operator placed on the stand may actuate the same under visual observation. The control panel 12 is placed in front of the operator and includes conventional control means for synchronizing the actuation of the propelling means 10 and of the individual working tools, the control circuits being indicated by broken lines.

A plurality of working tools 14, 18 and 24 are mounted on and underneath the car frame 8. The tools are spaced from each other in the working direction or the direction of track elongation, and each tool is associated with one of the connecting elements of the rail attaching means 7 for assembling and disassembling the associated element.

Thus, the first tool 14 is a wrench for loosening or driving home a nut 4. The tool is vertically and longitudinally adjustably mounted on the car frame by means of hydraulic motors 16 and 15, respectively, the longitudinal adjustment in relation to the car frame being preferably resilient under the bias of a spring 17 to provide a yielding fine adjustment of the wrench in relation to the nut. The tool 18 for positioning the tie plate 5 is similarly vertically and longitudinally adjustably mounted by means of hydraulic motors 20 and 19, respectively, spring 21 making the longitudinal adjustment resilient. The tool 18 includes a lever arrangement 22 and two laterally pivotal gripping parts 23 for gripping the tie plate for either removing or positioning it.

The enlarged section of FIG. 2 shows a specific tool 24 for laterally displacing a threaded bolt hook 6 used in one type of rail attaching means. This tool is also vertically and longitudinally adjustably mounted on the car frame by means of hydraulic motors 26 and 25, the longitudinal adjustment again being resilient under the bias of spring 27. The tool 24 comprises a pair of two-armed operating levers 29, 29 pivotal about fulcrums on support arm 28 under the action of pressure fluid motors linked to one arm of the operating levers while the other arm of these levers engages the bolt hook 6 for lateral displacement thereof. The actuating mechanism is quite similar to that of the tie positioning tool 18.

A guide rail 30 on the underside of the car frame platform supports roller for mounting the working tools 14, 18 and 24 for longitudinal adjustment in relation to the car frame. Furthermore, for positional adjustment of the tools in track curves, transversely extending

guide rails 31' support rollers 32 for adjusting the lateral position of the work tools in relation to the car frame, a pair of rollers 31 engaging the rail head to guide the tool along the rail.

A conveyor means 33 is mounted rearwardly of the working tools in the working direction and is associated therewith to convey connecting elements 4, 5 and 6 from and to the tools. The illustrated conveyor means comprises a conveyor band 35 having two ends and a rotating magnet means 34. In the embodiment shown herein, this magnet means consists of a plurality of separate magnetic rollers 34', etc. adjacent each rail and one conveyor band end. Thus, after the connecting elements have been disassembled and rest on the ballast bed, the advancement of the machine in the working direction will bring the magnetic rollers into operative contact with the ferrous elements, pick them up and move them onto the conveyor band which transports them to a receptacle 37 adjacent the other conveyor band, where the connecting elements are collected for possible re-use. FIG. 1 also shows a doctor blade cooperating with the magnetic rollers to remove the ferrous elements from the rollers and place them on the conveyor band.

If desired, the magnetic rollers may be replaced by pivotal gliding magnets, the magnetic means preferably being yieldably mounted to bridge the individual ties and/or uneven ballast bed portions during the advancement of the apparatus along the track.

It is preferred to mount the tools and possibly also the conveyor means replaceably so that they may be readily exchanged for different connecting elements and/or for assembling and disassembling such elements.

FIG. 4 schematically shows on the left side an exchangeable spike puller 38 for removing a spike 39 while the right side illustrates an exchangeable tool 40 for removing a hooked spike 41.

The mobile apparatus 42 of FIG. 3 is designed for incorporation into a track renewal train where the car frame 43 of the apparatus is coupled to other cars of the train. In this embodiment, the operating stand 44 is mounted on and underneath the platform of the car frame so that an operator may actuate the working tools 47, 48 and 49 from control panel 45 whose control circuits (broken lines) lead to the respective tools, a common drive means 46 being provided for all tools. The exchangeable tools 47, 48 and 49 operate in the same manner as hereinabove described for removing the connecting elements of the rail attaching means of the old track and for assembling these elements for attachment of the rails to the ties of the new track. Arrows 50 and 51 show the selected working directions of the apparatus.

The present invention is not limited in respect to the nature of the working tools or the specific rail fastening elements whereon suitably selected tools operate. Such working tools may accordingly include suitable stop and/or centering means for properly positioning the tools in relation to the element whereon they work. The invention is useful in connection with any suitable and conventional track working tool as it may be required or chosen to handle any rail attaching means.

We claim:

1. A mobile track working apparatus arranged to move on the track in a working direction, the track comprising a succession of spaced ties, two rails and means for attaching the rails to the ties, each rail attaching means being constituted by an assembly of a plurality of individual and different connecting elements, the apparatus comprising a car frame and a corresponding plurality of different working tools mounted on and underneath the car frame, the tools being spaced in succession from each other in the working direction at distances corresponding substantially to the spacing of the ties and in a sequence corresponding to the sequence of assembly and disassembly of the rail attaching means elements, and each tool being associated with a respective one of the connecting elements for assembling and disassembling the one associated element.

2. The mobile track working apparatus of claim 1, further comprising propelling means for moving the car frame in a selected one of the working directions, and control means for synchronizing the car frame movement with the operation of the working tools.

3. The mobile track working apparatus of claim 1, further comprising a common drive means for all of said working tools, and a common operating and control stand on the car frame for actuating each of the tools and arranged for visual observation of the tools.

4. The mobile track working apparatus of claim 1, wherein the connecting elements are ferrous and one of the elements is a tie plate, another one of the elements being a fastening element for attaching the tie plate to a respective one of the ties.

5. The mobile track working apparatus of claim 4, wherein said working tools are independently and separately replaceable.

6. The mobile track working apparatus of claim 4, further comprising a conveyor means associated with said working tools, said conveyor means being arranged to convey said connecting elements from and to the tools.

7. The mobile track working apparatus of claim 6, wherein the conveyor means includes a magnet means.

8. The mobile track working apparatus of claim 7, wherein the conveyor means is mounted rearwardly of the working tools in the working direction, the conveyor means comprises a conveyor band having two ends and the magnet means, the magnet means consisting of a plurality of separate magnetic rollers adjacent each of said rails and one of the conveyor band ends, and a receptacle for the connecting elements is mounted on the car frame adjacent the other conveyor band end.

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