Nov. 24, 1942. C. S. WEYANDT 2,303,245

RAILWAY TRACK TOOL

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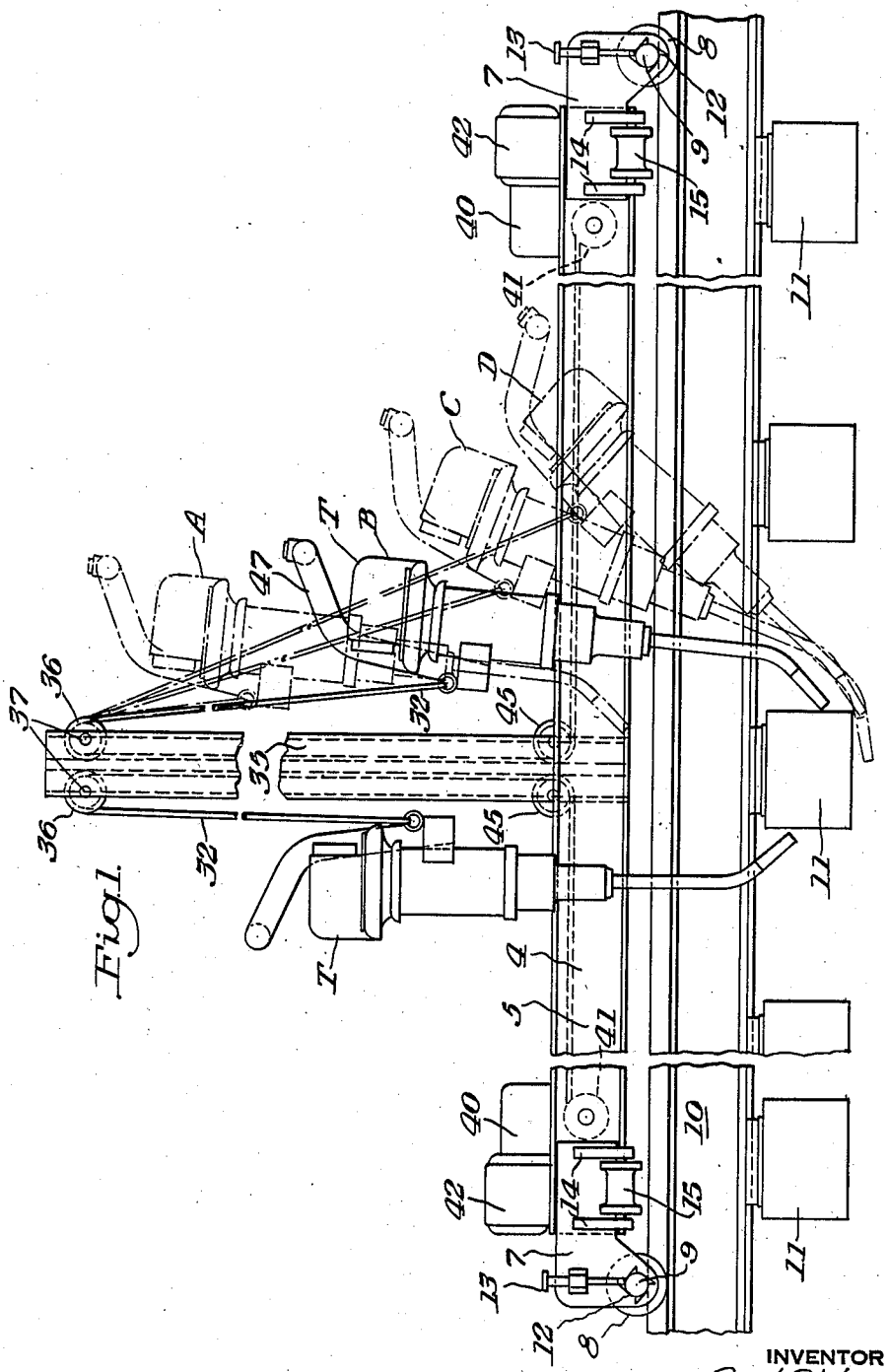


Fig. 1.

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Fig. 2.

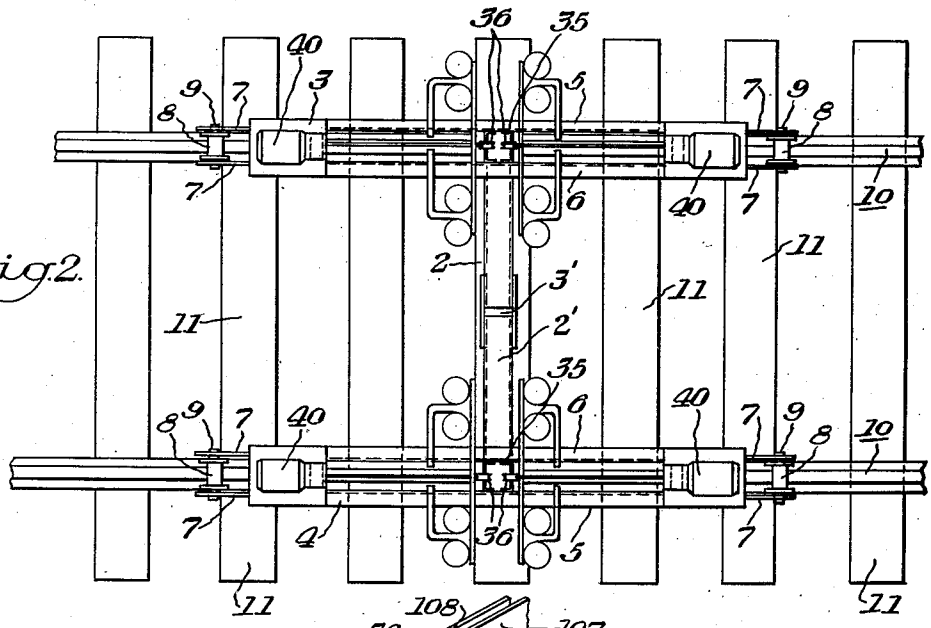
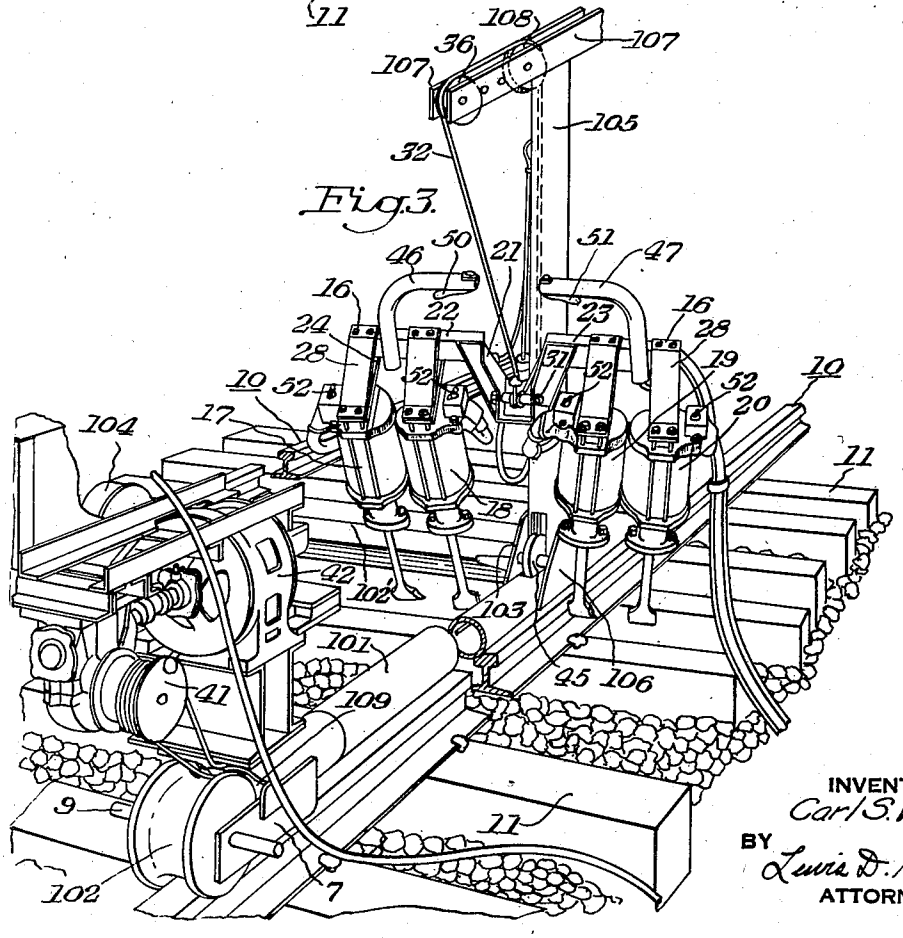


Fig. 3.



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Fig. 4.

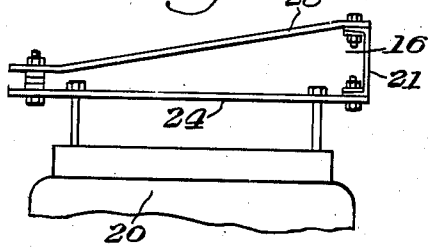


Fig. 5.

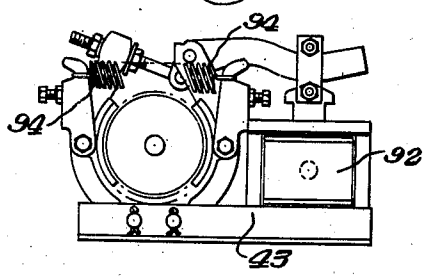
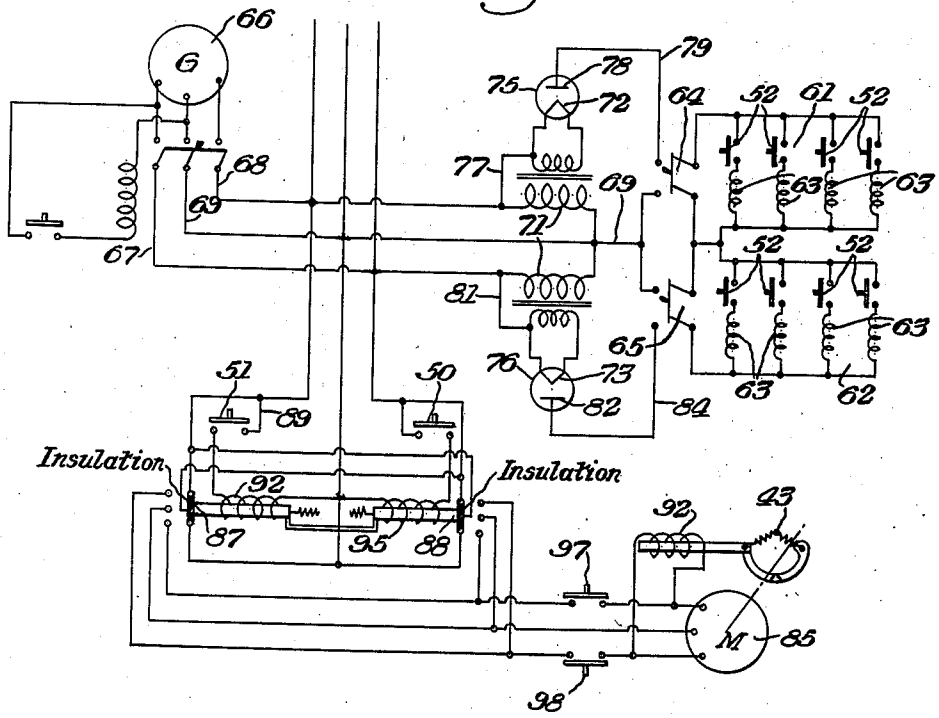


Fig. 6.



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UNITED STATES PATENT OFFICE

2,303,245

RAILWAY TRACK TOOL

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Application July 18, 1940, Serial No. 346,094

14 Claims. (Cl. 104—12)

The present invention relates to railway tie tamping devices or the like.

In the tamping of railway ties in laying new track, as well as in repairing old track, there is a great lack of uniformity in the conditions encountered in the field. Thus, the ties are usually of non-uniform widths, are non-uniformly spaced, and in some instances are not even parallel. Also, there is no uniformity in the size of the ballast or its distribution under the tie. Furthermore, voids without ballast or with insufficient ballast may occur at irregular spacings underneath the tie so that some spots require more tamping than others, and the time required for tamping thus is not uniform.

It is the general or prevailing practice to employ a portable power operated tamper for this work. Such tampers comprise a tamper bar secured to and impacted or vibrated by a suitable motor, such as a pneumatic, electric or gasoline operated reciprocating motor, the motor and tamper bar constituting a portable assembly which may be lifted and positioned manually by the operator. Such tampers may be positioned and manipulated by the operator to follow the movement of the rock ballast under the tie and, therefore, is adaptable to the irregular conditions encountered in service. Also, the operator can feel when the ballast is firmly packed and can stop the tamping operation at the proper time to prevent crushing of the rock. However, tamping in this manner, i. e., one man operating one tamper, is very slow work and inefficient use of labor, as the amount of work accomplished is limited by the weight of the tamper, which must be such that it can readily be manipulated by one man.

Attempts heretofore have been made to develop tamping machines for easing the burden of the work and speed up the tamping operation, but so far as I am aware, none of the proposed machines have gone into general use, apparently because they have not been flexible enough in their handling or control to meet the exigencies of the non-uniform conditions encountered in service.

It is an object of the present invention to provide a tie tamping machine or the like which is entirely flexible in its operation so that it may be adapted to tamp ties under any condition found in the field.

A further object is the provision of a tie tamping machine or the like to lighten the burden of this type of work.

Still another object is the provision of a tie tamping machine or the like which will increase the speed of tamping for a given man power.

According to the present invention I provide a tie tamper consisting of a single unit or a multiple unit assembly which is supported in such manner that the tamper may be moved by the operator in any direction. This is preferably accomplished by means of a flexible cable, articulate connection or the like carried by a suitable mast or boom on a suitable chassis and controlled by a prime mover operated hoisting device for raising and lowering the tamper assembly, the operation of the hoisting device being controlled by remote control means preferably located on the tamper assembly and accessible to the operator. The chassis may be of any suitable construction which is self-propelled or propelled manually and is adapted to run on the track with means for removing from the track. I may also manipulate my tamper machine from a motor truck or "caterpillar" type tractor, which may carry the compressed air or electric power plant or other means for operation of the tamper assembly, equipped with any suitable type of crane for lifting the tamper mechanism bodily off of the track, this construction being preferable where it is necessary to quickly remove the apparatus upon approach of a train. A mast or movable boom mounted on the chassis carries the weight of the tamper assembly by a flexible cable, articulate suspension or the like, the cable being secured to the tamper assembly at the point above the center of gravity. Thus, the weight of the tamper may be employed to give the tamper the proper inclination required to work the ballast forward and under the tie. Also, by proper operation of the hoist device or by twisting or laterally moving the assembly, the operator can control the direction of the blows delivered by the tamper in accordance with the "feel" of the work. Preferably, the tampers are resiliently mounted on an assembly and are preferably mounted so as to provide a space for the rail at the middle of the assembly, and the tampers are inclined toward the middle so as to tend to drive the ballast under the tie adjacent the rail. With this apparatus it is possible to tamp a tie with one or more tamping units, each unit being controlled by one man, and thus greatly increase one man's speed in doing this work. For example, where sixteen men have heretofore been required to operate sixteen tampers, four men can do the equivalent with less fatigue with my machine.

The invention will be described in greater detail in connection with the accompanying draw-

ings, wherein I have shown preferred embodiments of the invention by way of example, and wherein:

Figure 1 is a partly diagrammatic side elevation of a tamper apparatus mounted on a track,

Figure 2 is a plan view of Figure 1,

Figure 3 is a perspective view of a modification,

Figure 4 is a side elevation of a detail of Figure 3,

Figure 5 is an end view of a magnetic brake apparatus for the hoist motor, and

Figure 6 is a wiring diagram.

Referring to the drawings, Figures 1 and 2, wherein certain parts are diagrammatically shown, the chassis is made up of cross bars 2, 2' of channel iron separated and insulated at 3' so as not to interfere with the electrically operated train control mechanism, and connecting the side members 3 and 4, each of which is made of two oppositely facing channel iron members 5 and 6. The cross bar 2 is secured to the side members by angle plates or in any other suitable manner. At its ends the side members 3 and 4 have extension plates 7 welded or otherwise secured thereto, between which are journalled flanged wheels 8 on spindles 9 passing therethrough, whereby the chassis is portably mounted on the railway tracks 10 and on ties 11. If desired, a ratchet wheel 12 may be located on the spindle 9 of the wheels and a rod 13 suitably secured to the side members for axial movement may be brought into engagement with the ratchet wheel to prevent moving of the chassis along the track. Or a sprag or other suitable means may be employed to prevent movement of the chassis during tamping operation. Brackets 14 carrying cross rollers 15 may be provided to facilitate removal of the chassis from the track.

A tool assembly, indicated generally by the letter T, preferably comprises a frame 16, Figures 3 and 4, carrying four electrically operated tamper units 17, 18, 19 and 20, preferably constructed and operated as described in my Patent No. 1,819,009, issued August 18, 1931. However, it will be understood that any other type of tool adapted to the work to be done, such as a spike driver or the like, may be employed in my apparatus, and the tool may be operated by an air or gasoline motor or in any other suitable manner.

The frame 16 or supporting structure for the tamper units comprises a V-shaped channel bar 21 which may be formed of channel sections welded together and having arms 22 and 23 to which are secured bars 24 on either side of the center of the V. These bars each carry a tamper unit bolted or otherwise secured thereto, and they are braced at their ends by bracing straps 28 secured at one end to the arms of the V bar and at the other end to the bars 24 respectively. These bars 24 and 28 may be made of spring steel sufficiently flexible to permit each tamper to give or move independently of the others when sufficient resistance of ballast is encountered. At the center of the V is located a spindle 31 which preferably is above the center of gravity of the assembly, and to one side of the gravity axis of the assembly. A flexible cable 32 is looped about the spindle and has its end clamped by a suitable clamp. Preferably the tamper units are slightly inclined toward the center, as shown in Figure 3, so that in the tamping operation the ballast is driven toward the rails, and it will be seen that in each assembly preferably two units operate on the outside of the track and two units operate on the inside of the track.

At the center of the chassis and preferably at each side is located a mast 35 of channel iron which may be secured to the chassis by angle plates or in any other suitable manner, and at its top the mast carries sheaves or pulleys 36 journalled in suitable spindles 37 passing therethrough. A hoisting mechanism for each tool assembly, indicated generally by the numeral 40, is secured to the side members 3 and 4 and preferably comprises a winding drum 41 operated by a reversible electric motor 42 and a magnetic brake 43 (Figure 5) of known construction to prevent overrunning of the motor. Preferably, a separate hoisting mechanism is provided for each percussion tool assembly to be employed. While I have illustrated an electrically operated hoist mechanism, it will be understood that the invention is not limited thereto, and any suitable type of hoist mechanism may be employed, the type illustrated by outline in Figure 1 being of known construction.

The cable 32 passes over sheave 36 at the top of the mast down through the mast and under sheave 45 at the base of the mast to winding drum 41 of the hoisting mechanism, and it will be apparent that the tool assembly is pendulously supported by the mast and thus hangs from the mast by the cable with its axis inclined from the vertical. It will be understood that in place of the flexible cable any type of articulate suspension means may be employed which enables the tool assembly to be moved freely. Two curved handles 46 and 47 (Figure 3) are suitably secured to the V bar and enable the operator to control the movement and location of the tamping unit. These handles carry switches 50 and 51 for controlling the operation of the hoist motor, the left hand switch 50 causing the hoist motor to wind up the cable to raise the tamper assembly and the right hand switch 51, causing the motor to unwind the cable to lower the tamper assembly. The V bar also supports the wiring for the tamper motors for controlling the hoist motor. Each tamper carries a switch 52 for turning on the current for its operation. If desired, one switch only may be used to operate and control all the motors in one assembly.

Referring to Figure 6, there is shown a wiring diagram for operating an apparatus constructed according to the present invention. Two banks of tampers or tamper assemblies 61 and 62 are schematically shown with their individual control switches 52, which, if desired, may be omitted, the tamper motors being schematically represented by coils 63. These tampers are connected to the supply circuit by load switches 64 and 65. A generator 66 supplies two-phase alternating current of any suitable frequency by the main line conductors 67, 68 and 69 to an excitation transformer 71 which supplies heating current for the filaments 72 and 73 of the thermionic rectifiers 75 and 76. Current is supplied to the rectifier 75 through conductor 77 and passing across the space between the filament 72 and plate 78 is conducted by conductor 79 to the tamper load switch 64 for operating the bank of tampers 61, the current returning by the center conductor 69. The tube 75 supplies current impulses to the tampers 61 of like polarity separated by substantial zero intervals. Impulses of the same polarity as that passing through rectifier 75 are conducted by conductor 81 to rectifier 76 and passing across the space between

the filament 73 and plate 82 are conducted by conductor 84 to switch 65 for operating the second bank of tampers 62, the current returning through conductor 69. The bank of tampers 62 accordingly are actuated by current impulses of like polarity.

The hoist motor is diagrammatically shown at 85 and a magnetic brake for preventing overrunning of the motor is indicated at 43. The elevating control switches 50 and 51 are connected to the interlocked motor reversing switches 87 and 88 so as to reverse the direction of rotation of the hoist motor. Thus, upon closing switch 51 to lower the tamper assembly, current passes over conductor 89 and across the terminals of switch 51 to the solenoid 92 for closing the switch 87 and thus supplies current for rotating the hoist motor 85 in one direction. Immediately that current is supplied to the hoist motor the solenoid 92 is actuated to release the magnetic brake 43 so that the shaft of the motor may turn. When control switch 51 is opened, switch 87 opens and the current to the hoist motor is cut off, thus stopping the motor, and the solenoid 92 being no longer energized the springs 94 (Figure 5) apply the brake to the motor shaft to stop its rotation. To lift the tamper assembly the switch 50 is closed, thus supplying current to the solenoid 95 for operating switch 88 to supply current to the motor 85, causing it to rotate in the opposite direction, the operation of the magnetic brake being like that previously described. Limit switches 97 and 98 are provided in conjunction with the hoist motor to prevent overrunning of the motor between the desired limits of operation. Switches 87 and 88 are mechanically interlocked in any suitable manner known in the art to prevent both switches being closed at the same time.

The operation of the tamper now will be described. The tamper chassis having been placed on the track, the tamper assembly will be in the position A (Figure 1) shown by the dot and dash lines. The switches 52 are operated to start the operation of the tamper motors and then the operator grasps the two handles 46 and 47 of the unit and by means of the switch 51 in the right handle he operates the hoist motor to lower the tamper assembly so that the rail comes between the two outer units 19 and 20 and the two inner tamper units 17 and 18. The positioning of the assembly is accomplished without overrunning because of the magnetic brake attachment on the hoist which clutches the motor shaft when the current is cut off. It will be observed that the suspension of the tamper assembly is such that normally it is inclined somewhat to the vertical, as this permits easier operation of the tampers. The operator can thus move the tampers to any desired position while he stands erect and does not have to bend over the tamper assembly in an unbalanced position which he would have to assume if these tampers were erect. Also, this suspension has the advantage of allowing a large portion of the weight to be utilized for taking up the recoil of the tamper motor. The tamper is lowered to the position shown at B, where it engages the side wall of a cross tie 11 to be tamped. The tamping operation now starts, the tamping bar forcing its way down underneath the tie and as it goes down the hoist is operated permitting the assembly to move down to position C and as tamping progresses on down to position D, the hoist being let out a little at a time.

The tamping is done first immediately adjacent the tie so that the rock ballast can be compacted underneath the tie to make room for additional ballast, the position D illustrating the extent to which the tamper may be manipulated to tamp under the tie. When the initial tamping operation is finished, the tamper is withdrawn by the hoist under control of the operator and is set back somewhat further from the base of the tie to force additional ballast under the tie, the tie being fully tamped when no more rock ballast can be forced under it, as determined by the "feel" of the operator.

In tamping ties it is not feasible to attempt to force the rock ballast under the tie into a predetermined position. Because of the irregular shape and size of the rock, the tendency of the tamper is to force the rock into whatever position it is free to move and thus the rock may be forced laterally as well as toward the center of the tie, and it is necessary that the operator be able to feel the way the rock ballast is yielding and direct the tamper blows in the proper direction. The pendulous suspension of the tamper in the manner described enables the operator to control the direction of the blows to follow the rock ballast in any direction and makes it unnecessary for the operator to lift the weight of the tamper or to use his body to resist the recoil of the tamper motor. Thus, little physical effort on the part of the operator is required, so that he can handle a four tamper assembly easier than a single free tamper. Also, it is possible, with the tamper assembly, to tamp directly underneath the rails because the suspension of the assembly allows the assembly to be rotated or twisted slightly by twisting the cable so as to bring either of the inside tamper bars under the track. As soon as one tie is tamped the assembly is raised by closing switch 50 and the apparatus is ready to be moved to the next tie and located in position for the next tamping operation.

In the modification shown in Figure 3, wherein like parts are correspondingly numbered, the chassis comprises a pipe 101 having wheels 102 suitably mounted on its ends to fit a rail and having a cross bar 102' suitably secured to its middle by means of angle plate 103. At its opposite end the cross bar 102' has a wheel 104 adapted to run on the other rail and is suitably insulated from pipe 101. The cross bar 102' preferably is clamped to the track during operation in any suitable manner, and a sprag may be employed to prevent movement of the chassis along the track. A mast 105 extends upward from the middle of pipe 101 being secured thereto by an angle plate 106, and at its top the mast carries a horizontal bar 107 having sheaves 36 journalled at its ends. As shown in Figure 3, one tamper assembly is suspended by the cable 32 which passes over a sheave 36 at the end of bar 107, over sheave 108 at the middle of mast 105, down through the mast and under sheave 45 at the bottom of the mast, through pipe 101 and under idler roller 109 at its end, and over the winding drum 41. The winding drum 41 is operated by the reversible motor 42 and an electromagnetic brake of known construction (Figure 4) holds the motor shaft to prevent drift. Although I have shown only one tamper assembly suspended from the mast 105, it will be understood that another tamper assembly may be suspended from the mast on the opposite side thereof, and a separate hoisting apparatus provided for rais-

ing and lowering the second assembly. This modification is of advantage in that the chassis is of light weight and is easily removable from the track, so that, upon approach of a train the tamper assemblies may be lowered and laid alongside the track and the chassis tilted over and moved out of the way.

While I have shown and described my invention applied to a tie tamper, it will be understood that the invention is also applicable to a spike driver, in which case a motor driven spike hammer is employed in place of the tamper bar and motor assembly, or other percussion tool.

What I claim as my invention and desire to secure by United States Letters Patent is:

1. In combination, a support, an assembly comprising a frame, and a plurality of tie tamper tools mounted on said frame, means pendulously supporting said frame for universal movement at a point above the gravity axis of said assembly, means to raise or lower said assembly, and means accessible to the operator to selectively operate said raising and lowering means.

2. In combination, a chassis, a mast extending from said chassis, a reversible hoisting apparatus mounted on said chassis including an electric motor, a winding drum and magnetic brake, a percussion tool, a cable extending from said winding drum to said mast and pendulously supporting said percussion tool, and switches carried by said percussion tool to selectively operate said hoisting apparatus to raise or lower said tool.

3. A railway tie tamping apparatus comprising a chassis adapted to be mounted on a railway, a mast extending from said chassis, a reversible hoisting mechanism mounted on said chassis, a percussion tool, a cable extending from said hoisting mechanism to said mast and pendulously supporting said percussion tool from a point substantially vertically over a rail, said cable being secured to said percussion tool at a point above and offset from the center of gravity thereof, whereby said percussion tool assumes an inclined position, control means accessible to the operator for said hoisting mechanism to raise or lower said percussion tool, and brake means to prevent overrunning of said hoisting means.

4. In combination, a support, a percussion tool pendulously supported therefrom, electrically operated means to raise or lower said percussion tool, a handle for manipulating said tool, and switch means on said handle to selectively operate said first mentioned means.

5. A railway tie tamping apparatus comprising a chassis adapted to be mounted on a railway, a mast extending from said chassis, a reversible hoisting mechanism mounted on said chassis, a percussion tool, means extending from said hoisting mechanism to said mast and pendulously supporting said percussion tool from a point substantially vertically over a rail, control means on said percussion tool for said hoisting mechanism to raise or lower said percussion tool, and means to prevent overrunning of said hoisting means.

6. In combination, a support, a suspension means for a percussion tool secured to said support for universal movement, a percussion tool adapted to be manipulated by an operator secured to said suspension means for universal movement, means to raise or lower said percussion tool, and control means accessible to the operator to selectively operate said latter means.

7. In combination, a support, a suspension means for a percussion tool secured to said support for universal movement, a tamping apparatus secured to said suspension means for universal movement, means to raise or lower said tamping apparatus, and control means carried by the tamping apparatus to selectively operate said latter means.

8. In combination, a support, a suspension means for a percussion tool secured to said support for universal movement, a percusssion tool secured to said suspension means for universal movement at a point above and offset from the center of gravity thereof, whereby said percussion tool assumes an inclined position, a handle for manipulating said tool above its center of gravity, means accessible to the operator to raise or lower said percussion tool, and means to selectively operate said latter means.

9. In combination, a support, a percussion tool, pliable suspension means for supporting said percussion tool for universal movement, a handle for manipulating said tool, hoist means for raising or lowering said tool, and control means associated with the tool accessible to the operator for controlling said hoist means.

10. In combination, a portable chassis, a mast or the like mounted thereon, a percussion tool, pliable suspension means for supporting said percussion tool from the mast at a point above and offset from the center of gravity thereof, whereby said tool assumes an inclined position, a handle for manipulating said tool, hoist means for raising or lowering said tool, and control means carried by the tool accessible to the operator for controlling said hoist means.

11. In combination, a support, a suspension means for a tie tamper tool adapted to be manually manipulated secured to said support for universal movement, a tie tamper tool secured to said suspension means for universal movement above the center of gravity thereof, a handle for manipulating said tool above its center of gravity, means to raise or lower said tie tamper tool, and means accessible to the operator to selectively operate said latter means.

12. In combination, a support, suspension means for a tamper tool assembly secured to said support for universal movement, a tamper tool assembly including a plurality of tamper tools secured to said suspension means for universal movement, means to raise or lower said assemblies, and control means accessible to the operator to selectively operate said latter means.

13. In combination, a support, a pair of tamper tool assemblies adapted to be manually manipulated, means adapted to pendulously support said tamper tool assemblies on opposite sides of a tie, means to raise or lower said assemblies, and means accessible to the operator to selectively operate said raising and lowering means.

14. In combination, a support, a suspension means for a percussion tool secured to said support for universal movement, a percussion tool adapted to be manually manipulated and secured to said suspension means for universal movement, hoisting mechanism to raise or lower said percussion tool, hoist control means accessible to the operator, and brake means to prevent overrunning of said hoisting means.

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