

June 27, 1961

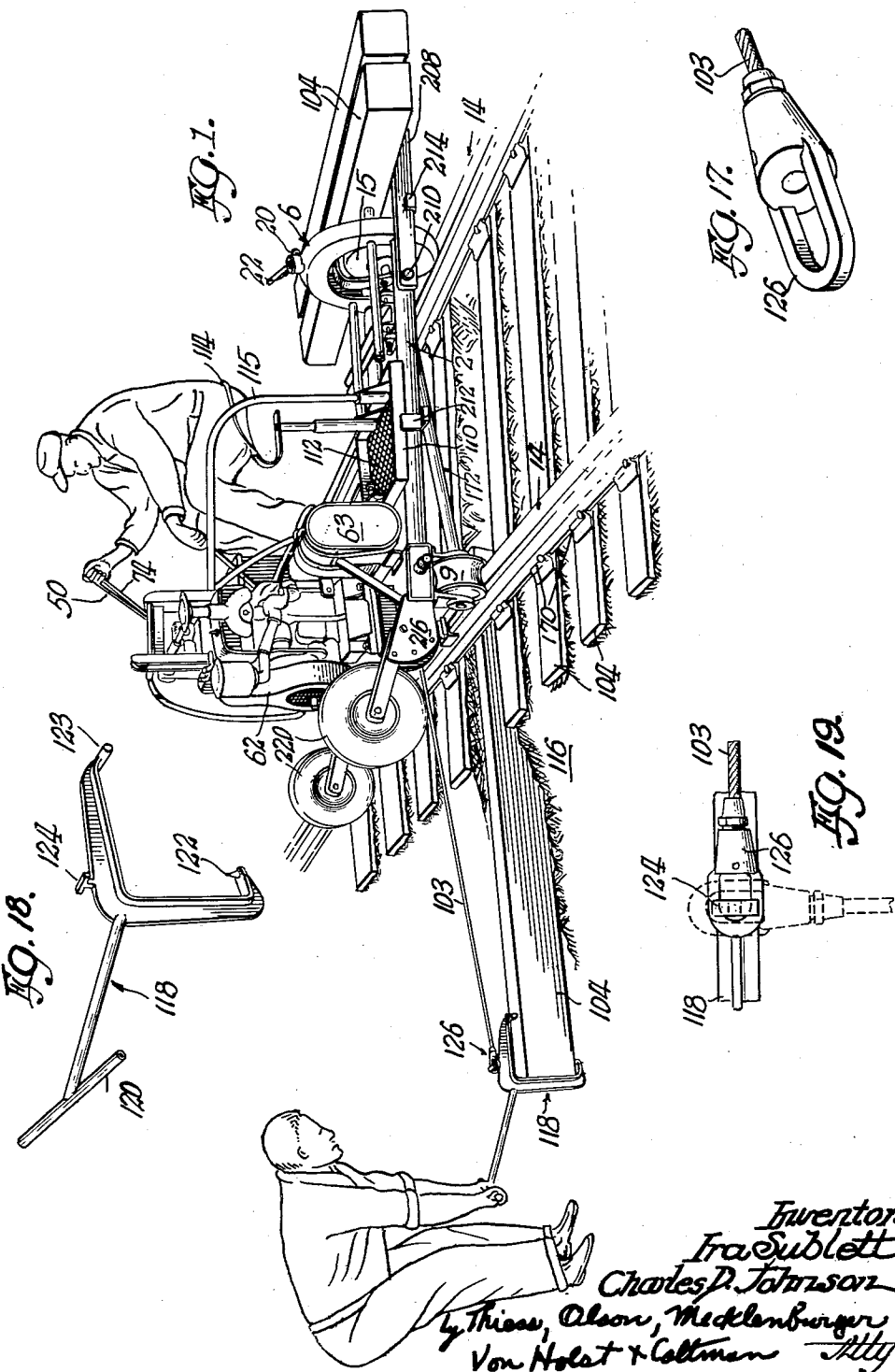
I. SUBLETT ET AL

2,989,926

RAILWAY TIE HANDLING APPARATUS

Filed Dec. 20, 1954

7 Sheets-Sheet 1



Inventors
Ira Sublett
Charles D. Johnson
by Thies, Olson, Mecklenburger
Von Holst & Collman Attys

June 27, 1961

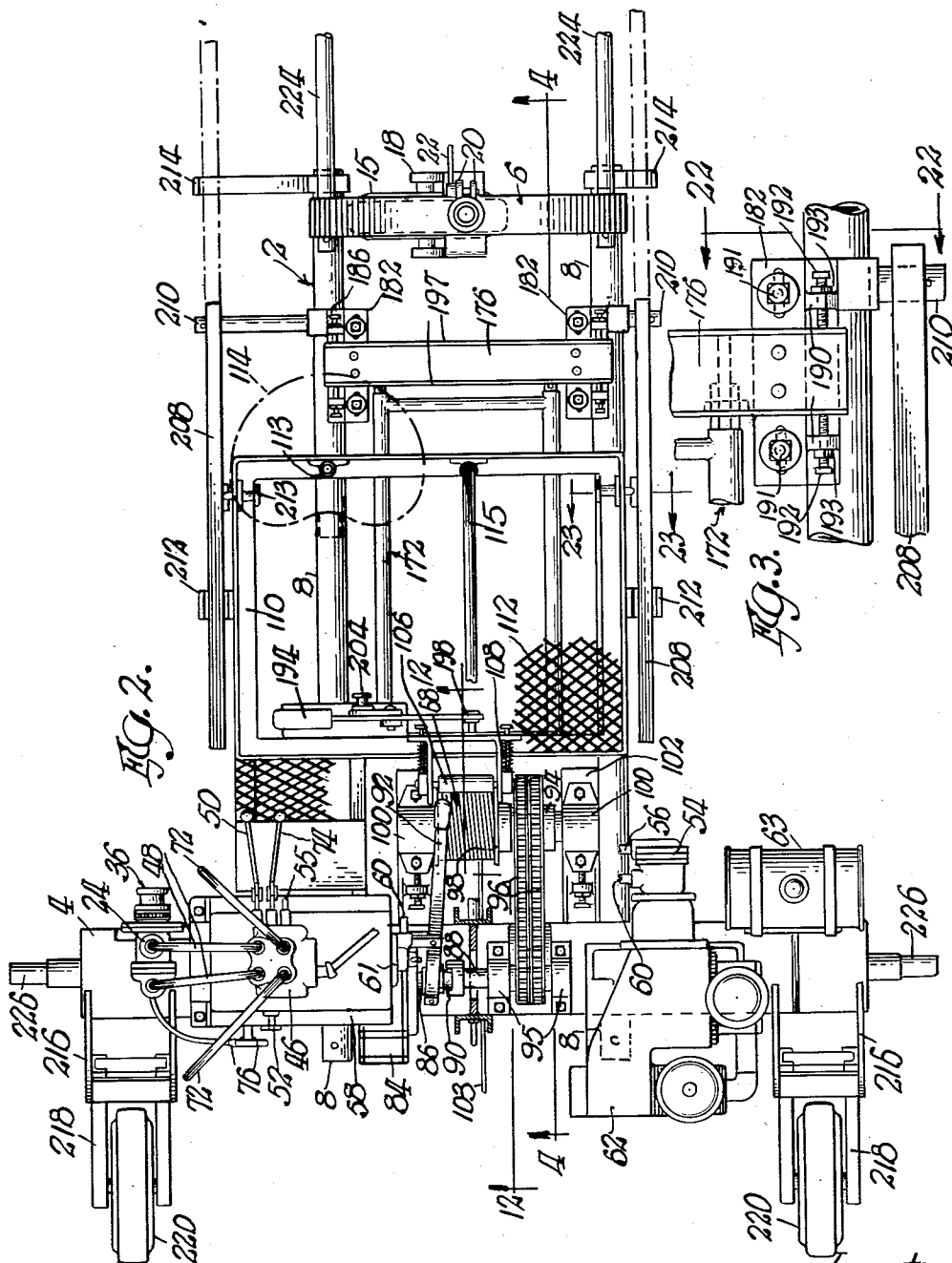
I. SUBLETT ET AL

2,989,926

RAILWAY TIE HANDLING APPARATUS

Filed Dec. 20, 1954

7 Sheets-Sheet 2



Inventors
Ira Sublett
Charles D. Johnson
by Thos. Olson
Charles D. Johnson
Von Holst + Coleman
Attys

June 27, 1961

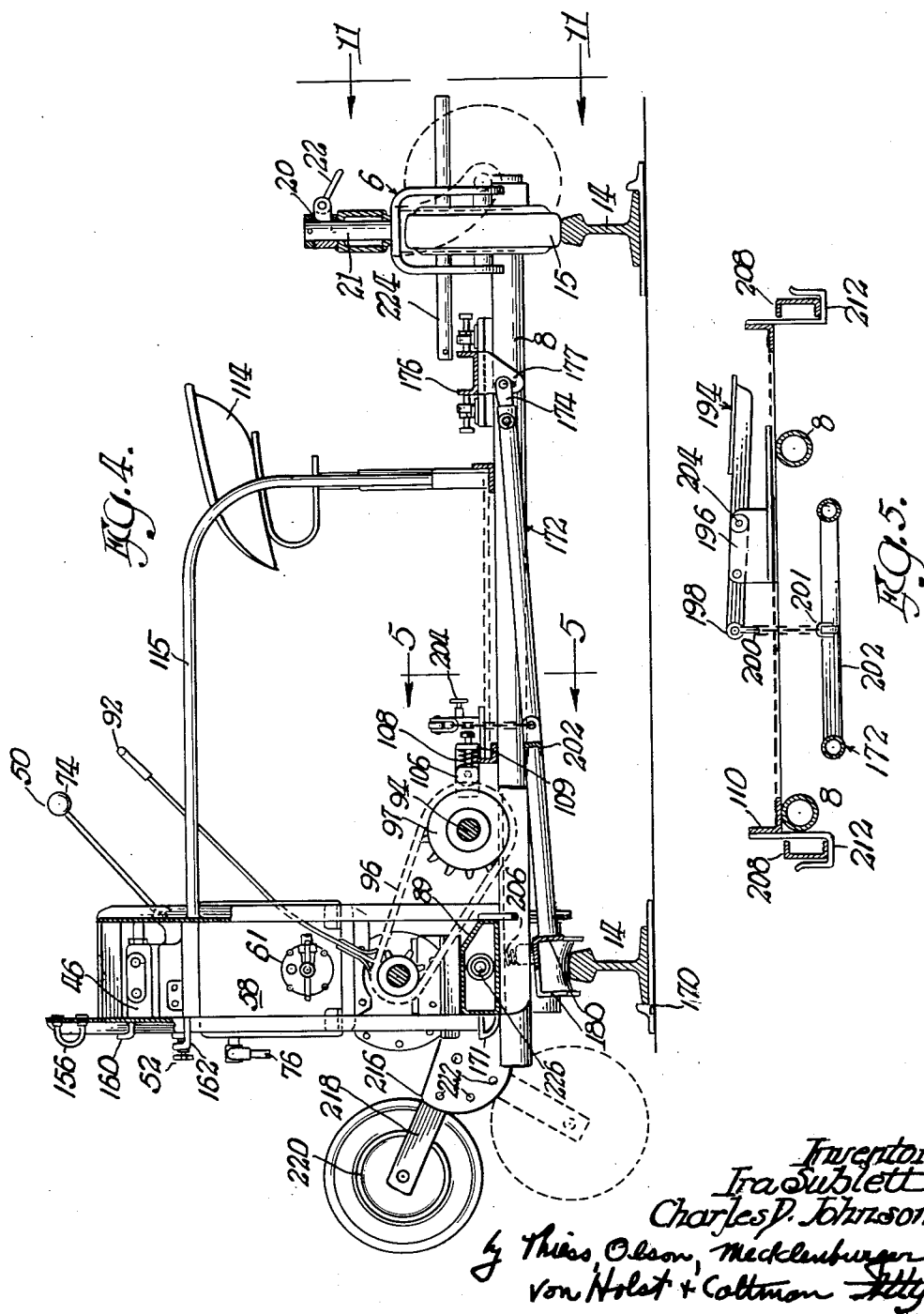
I. SUBLETT ET AL

2,989,926

RAILWAY TIE HANDLING APPARATUS

Filed Dec. 20, 1954

7 Sheets-Sheet 3



June 27, 1961

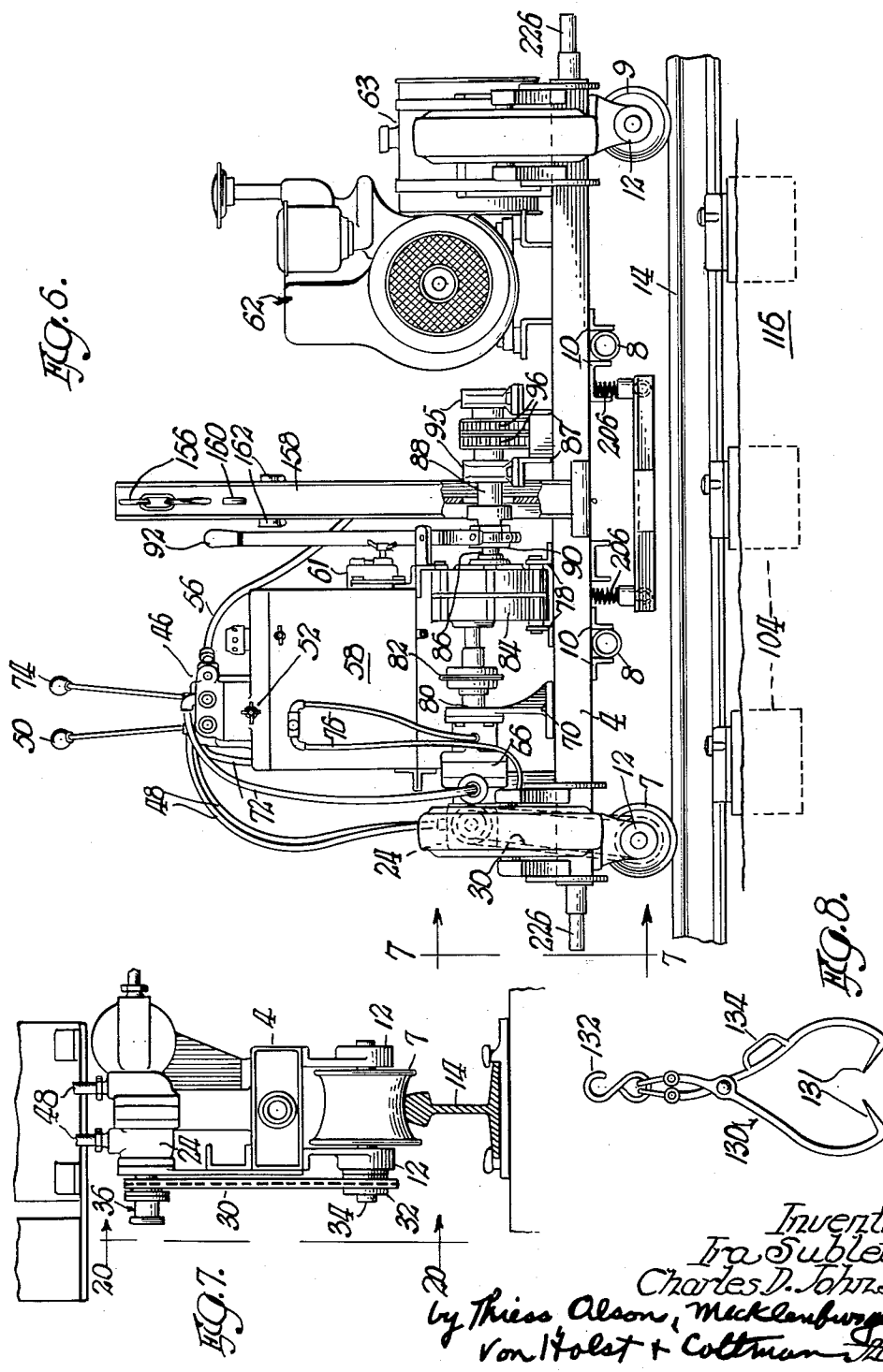
I. SUBLETT ET AL

2,989,926

RAILWAY TIE HANDLING APPARATUS

Filed Dec. 20, 1954

7. Sheets-Sheet 4



June 27, 1961

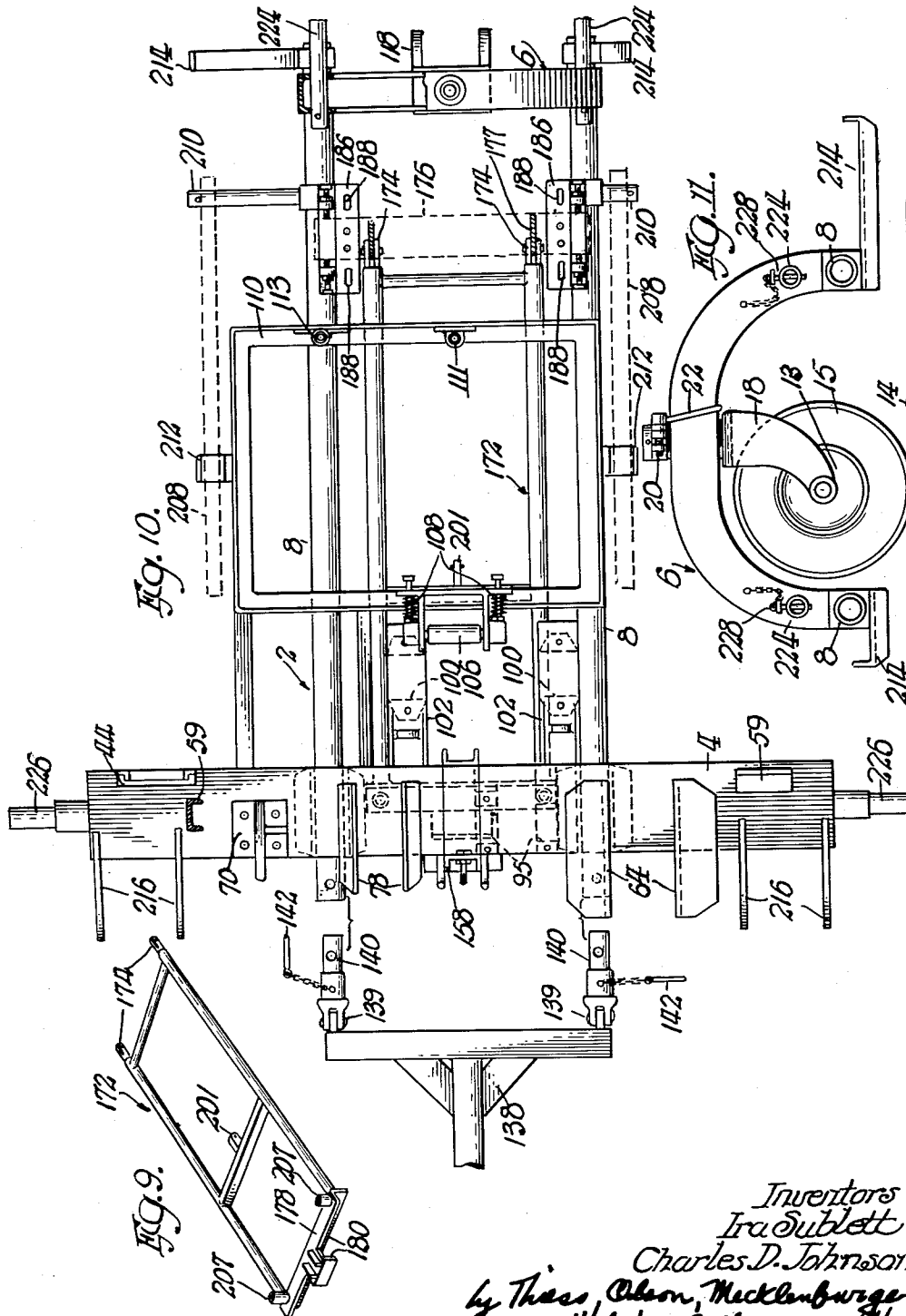
I. SUBLETT ET AL

2,989,926

RAILWAY TIE HANDLING APPARATUS

Filed Dec. 20, 1954

7 Sheets-Sheet 5



June 27, 1961

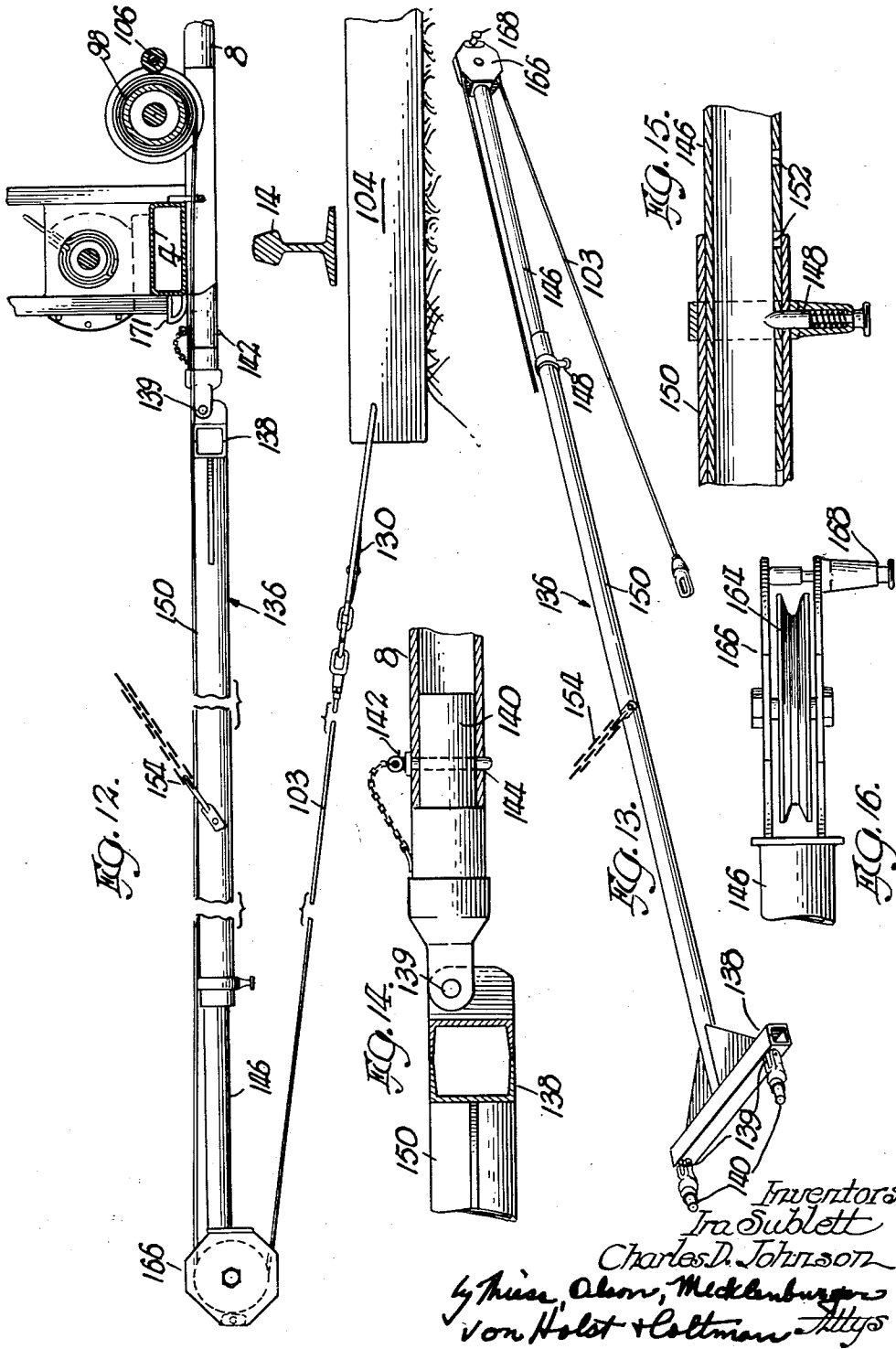
I. SUBLETT ET AL

2,989,926

RAILWAY TIE HANDLING APPARATUS

Filed Dec. 20, 1954

7 Sheets-Sheet 6



Inventors
Ira Sublett
Charles D. Johnson
by *Thies, Olson, Mecklenburgers*
Von Holst & Coltman Attys

June 27, 1961

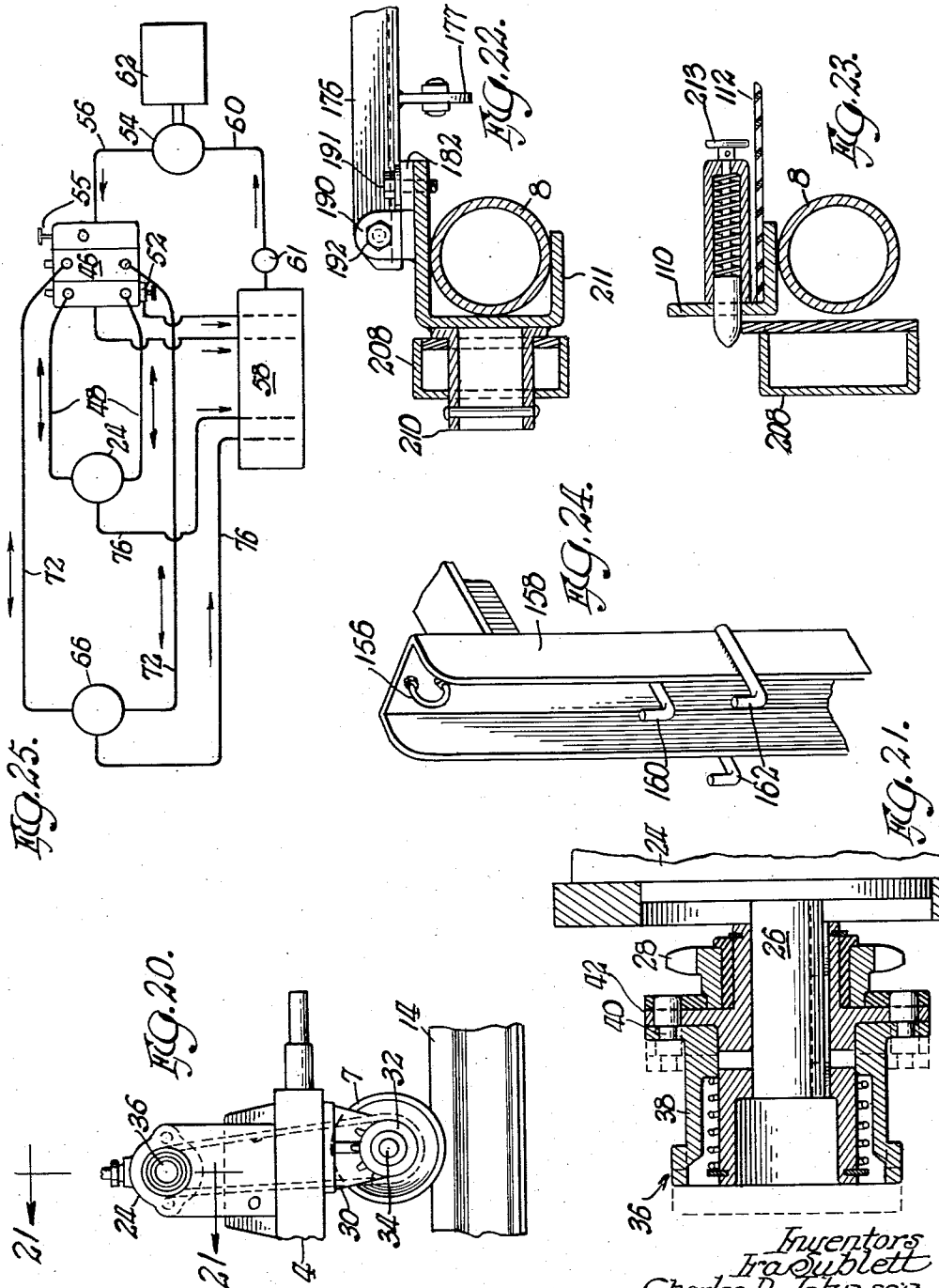
I. SUBLETT ET AL

2,989,926

RAILWAY TIE HANDLING APPARATUS

Filed Dec. 20, 1954

7 Sheets-Sheet 7



Inventors
Ira Sublett
Charles D. Johnson
by Thies, Olson, Mecklenburger
Von Holst & Colman Attys

1

2,989,926

RAILWAY TIE HANDLING APPARATUS

Ira Sublett and Charles D. Johnson, Fairmont, Minn.,
assignors to Fairmont Railway Motors, Incorporated,
Fairmont, Minn., a corporation of Minnesota

Filed Dec. 20, 1954, Ser. No. 476,388

1 Claim. (Cl. 104—9)

From time to time in connection with railroad beds, it is necessary to remove old ties which have deteriorated and replace them with new ties, in order to maintain the track structure in proper operating condition.

The present invention relates generally to tie-handling processes and apparatus, and relates, more particularly, to processes and apparatus for performing a number of different operations, including those of removing old ties from and inserting new ties into position in a railroad bed, as well as retrieving ties from areas adjacent the track.

Heretofore, certain machines and processes have been devised for tie-handling purposes, but they have all been open to one or more objections.

One of the objects of the invention is to provide a tie-handling vehicle and process which operate more efficiently than machines and processes which heretofore have been devised to perform such functions.

Another object of this invention is to provide an apparatus adapted for movement along the railroad track together with control means for accurately positioning the apparatus at the desired site at which the tie-handling operation is to be effected.

Still another object of this invention is to provide a tie-handling apparatus adapted for movement along a railroad track, together with means for quickly and easily moving the apparatus from the track when necessary.

Another object of this invention is to provide a tie-handling apparatus utilizing a novel reaction frame whereby stable positioning of the apparatus on the track is assured in the course of all tie-handling operations.

Again, it is an object of the invention to provide a process for facilitating the placement of a new tie in a tie bed which has been conditioned to receive the tie.

Further objects and purposes of the invention will be appreciated from the following description and the accompanying drawings which illustrate a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a perspective view of the improved machine and illustrating the operation of inserting a new tie under the rails of a railway track and into the prepared tie bed.

FIG. 2 is a top plan view of the machine, certain of the parts being omitted and others shown in section for illustrative purposes.

FIG. 3 is a fragmentary detail top plan view, on an enlarged scale, of parts appearing in FIG. 2.

FIG. 4 is a transverse vertical sectional view through the machine, as taken on the line 4—4 of FIG. 2.

FIG. 5 is a detail longitudinal sectional view through a part of the machine, as taken on the line 5—5 of FIG. 4 and on a scale enlarged over that of FIG. 4.

FIG. 6 is a view in elevation of the engine and hydraulic motor side of the machine with the head end of the reaction frame in its raised "out of use" position, as when the machine is being propelled along the track from one position of use to another.

FIG. 7 is a fragmentary view in end elevation of parts of the propelling end of the machine, as viewed in the direction of the arrows 7—7 and on a scale enlarged over that of FIG. 6.

FIG. 8 is a view in elevation of a tie-gripping tongs used with the machine, as when pulling a tie from the track or when retrieving a tie disposed at some distance from one side of the track, thus avoiding the necessity of

2

manually carrying the tie to a position for insertion into the tie bed.

FIG. 9 is a perspective view on a reduced scale of the reaction frame of the machine.

FIG. 10 is a top plan view of the frame of the machine and showing the inner end of a boom (later mentioned) positioned adjacent the engine and the hydraulic motor side of the machine ready for attachment to transversely extending parts of the machine.

FIG. 11 is a view in elevation of the caster wheel arch side of the machine, as viewed in the direction of the arrows 11—11 and on a scale enlarged over that of FIG. 4.

FIG. 12 is a transverse fragmentary sectional view through parts of the machine associated with the cable winch thereof, as taken on the line 12—12 of FIG. 2, as when a boom (later described) has been detachably applied to certain frame parts of the machine, and it is desired either to pull a tie from its position in the track.

FIG. 13 is a perspective view, on a reduced scale, of the boom mentioned in connection with and shown in an end-for-end reversed position in FIG. 12.

FIG. 14 is a fragmentary detail sectional view, on a scale enlarged over FIG. 12, through certain frame parts of the machine and the cross head of the boom, better showing the detachable connection therebetween.

FIG. 15 is a fragmentary longitudinal sectional view through the telescopically engaged parts of the staff of the boom, on the scale of FIG. 14, showing how the said parts may be actuated to adjust the length of the staff and how they may be locked in adjusted position.

FIG. 16 is a detailed plan view of the cable pulley end of the boom, including a spring loaded pin that prevents the cable from escaping from the pulley when the cable is being pulled by the helper, as may be necessary to unwind the desired amount of cable from the winch, the pin being retractable for ease in threading the cable about the pulley.

FIG. 17 is a perspective view of a certain clevis-like eye secured to the free end of the cable, before mentioned, and which will be more fully referred to later.

FIG. 18 is a perspective view of a certain hook-like tool used by the helper, in connection with the cable, in the process of inserting a tie in the tie bed of the track.

FIG. 19 is a fragmentary view in plan showing how the eye on the free end of the cable may be detachably engaged with the hook-like tool appearing in FIG. 18, as will be later described.

FIG. 20 is a tail view in elevation of parts shown in FIG. 7 when viewed in the direction of the arrows 20—20 therein.

FIG. 21 is a vertical sectional view through parts appearing in FIG. 20, as taken on line 21—21 therein and on a scale enlarged over that of FIG. 20.

FIG. 22 is a detail sectional view as taken on the line 22—22 and on a scale enlarged over that of FIG. 3.

FIG. 23 is another detail sectional view, on the scale of FIG. 22, as taken on the line 23—23 of FIG. 2.

FIG. 24 is a perspective view, on an enlarged scale, of a certain post forming a part of the machine frame and which will be more fully described later, and

FIG. 25 is a diagrammatic view illustrating the hydraulic fluid circuit of the machine.

General description of the apparatus

The specific apparatus illustrated includes a vehicle having a suitable frame structure comprising a box beam and an oppositely disposed caster wheel arch connected thereto by two transverse tubular members. The box beam is supported or mounted on two metal, double-flanged, rail-engaging wheels, whereas the oppositely disposed arch is mounted on a pneumatic rubber-tired wheel

which may be locked in a fixed position for travel on the rails, or which may be freely, pivotally movable when on normal terrain, as when being taken off the track.

Adjacent the box beam and supported partially thereby and partially by the transverse tubular members is a winch which engages a cable utilized in the various tie-handling operations, hereinafter to be described. Positioned at one side of the winch on the box beam is a prime mover in the form of an internal combustion engine.

The prime mover drives a hydraulic pump which provides fluid under pressure for operating a hydraulic motor for propelling the vehicle and also for operating a hydraulic motor which imparts rotation to the winch. By means of suitable valves, conduits, control levers, and other mechanisms, the hydraulic motors may be caused to run in either direction.

The vehicle frame structure also supports a reaction frame pivotally movable on the underside of the transverse tubular members. The reaction frame pivotally engages a spanning channel member which is supported by the transverse tubular members and adjustable relative thereto for purposes of properly positioning a head or rail-engaging reaction frame portion which straddles a track member in the normal course of operation. The reaction frame member assures stable positioning of the entire vehicle upon the rails in the course of any tie-handling operation, such as retrieving, removing, or inserting a tie.

For removing ties, the apparatus employs a boom that extends approximately horizontal from the winch side of the vehicle, and which is detachably mounted at one end limit of the transverse tubular members. Tongs, such as illustrated in FIG. 8, are attached to the end of the cable which has been threaded over the pulley member affixed to the end of the boom and return 180° for purposes of extracting a tie underlying the apparatus.

When the apparatus is deadheading or merely moving from one location to another along the track, it is propelled by a hydraulic motor, the reaction frame member being in an elevated position relative to the track members, as is illustrated in FIG. 6.

Upon the arrival of the apparatus at the track site where it is desired to remove a tie from the underlying road bed, the apparatus is first accurately positioned by means of the propelling motor. The operator who occupies a seat on the apparatus then lowers the reaction frame by retracting a spring loaded pin which locks the reaction frame in an elevated position.

With the apparatus properly located, a helper engages the underlying tie member to be extracted by means of the tongs. The operator then allows fluid pressure from the hydraulic pump to actuate the winch hydraulic motor; as the cable is wound on the revolving winch drum, an outward extracting or removing force is exerted on the tie member, removing it from the road bed. It is, of course, obvious that, preliminary to any tie-extraction operation, the tie plates are first disengaged from the rail member by removing the spikes. It should also be noted that, although the apparatus will function most efficiently when a track portion is raised, it will function to advantage when the track is in an unraised position.

When it is desired to move the apparatus a short distance along the track, a manually operated spring clutch may disengage the propelling motor from the drive wheel, thereby allowing the machine to be moved without turning or starting the propelling motor. Also, if the apparatus is to proceed a short distance only, the reaction frame need not be raised from its rail engaging position, but may trail along the track without difficulty.

In the operation of inserting a tie in a tie bed, such as is illustrated in FIG. 1, the operator actuates the hydraulic winch motor, causing the cable to retract, pulling therewith the attached hook and engaged tie. A helper is needed to assist the operator for purposes of guiding the tie member against lateral or vertical movement as

the free end of the tie proceeds into the tie bed, which has been prepared in the road bed to receive the tie.

The facility with which ties lying some distance from a road bed may be retrieved is obvious. The tongs of FIG. 8 engage one end of the tie to be retrieved, the operator then proceeding to actuate the winch motor, thereby drawing the tie into the proximate vicinity of the track.

The apparatus may be readily removed from the track by means of lowering the adjustable pneumatic "set off" wheels affixed on the box beam member to a ground-engaging position. Extension handles, telescopically received within the oppositely disposed caster arch, are then gripped and the machine is raised from the track and pushed to one side.

It is believed that this general description of the apparatus will be helpful to an understanding of the specific mechanism disclosed in the drawings and which illustrates the preferred form of the invention.

Detailed description of the apparatus

Referring now to the drawings, the apparatus comprises a vehicle having a frame structure 2 composed of a box-like beam 4 which, when the vehicle is operating on the rails, is disposed parallel to one rail and an oppositely disposed caster wheel arch or frame 6 disposed parallel to the other rail (see FIG. 10). The beam 4 and the arch 6 are connected by transverse tubular members 8 which are welded or otherwise suitably attached to the angle members 10, which are, in turn, suitably attached to the underside of the beam 4, as illustrated in FIG. 6. The tubular members 8 are similarly welded or suitably affixed to the end limits of the arch 6, as noted in FIG. 11. Disposed beneath each end of the beam 4 are the supporting double-flanged wheels 7 and 9, see FIGS. 6 and 7, which are journaled in the bearings 12 affixed to the underside of the beam 4.

As illustrated in FIG. 11, caster wheel 13 is pivotally movable on a vertical pivot in the arch or frame 6 and has the pneumatic tire 15 positioned thereon. The rubber tire 15 which rides on one of the rails 14 insulates the apparatus from any signal circuit and thereby obviates any interference with normal circuit operation. The wheel 13 is pivotally movable with its bifurcated frame member 18 in the arch 6. The pintle 21 (see FIG. 4) of the frame member which is journaled in the central portion of the wheel arch 6, has its upper end limit in contact with the split collar 20. The split collar 20 frictionally engages the periphery of the upper end limit of the frame member pintle when handle 22 is moved upwardly. By so locking the frame member 18, wheel 13 is assured of a nonrotatable position parallel to the track 14, on which it travels, as is illustrated in FIG. 1.

Hydraulic motors and hydraulic circuits

Mounted above the double-flanged drive wheel 7 is the hydraulic motor 24, which propels the vehicle (see FIG. 20). As is illustrated in FIG. 21, the motor drives shaft 26 which has the sprocket wheel 28 mounted thereon. Wheel 28 engages sprocket chain 30, which in turn engages gear member 32. As will be noted in FIGS. 7 and 20, gear 32 is mounted on the same axle 34 as drive wheel 7.

It may at times be desirable in the normal course of operation to move the apparatus small distances without desiring to operate the propelling motor 24. Therefore, to disengage the drive wheel 7 from the motor 24, the clutch 36 (see FIG. 21) is provided.

The clutch (see FIG. 21) comprises a spring loaded sleeve 38. Affixed to the sleeve are pins 40 which are insertable in apertures in both the sprocket wheel 28 and the hub ring 42, the latter being keyed to the motor shaft 26. It is thus seen that the sprocket wheel 28 rotates by virtue of the pinned engagement with the spring loaded sleeve 38. Therefore, to disengage the sprocket

5

wheel from the motor shaft 26, the sleeve pins 40 are withdrawn from the hub and sprocket apertures and rotated so that they rest and abut the surface of the hub ring 42, as shown in dotted lines. The vehicle may then be pushed and drive wheel 7 allowed to rotate without rotation of the hydraulic motor shaft 26. The propelling motor 24, which is supported on the box beam 4 by means of a suitable bracket 44 (see FIG. 10), is supplied with hydraulic fluid maintained under pressure from the valve block 46 by means of the interconnecting hoses 48 (see FIGS. 2 and 6).

As illustrated in FIG. 2, lever 50 operates a spool valve (not shown), positioned in the valve block 46, which regulates the direction of fluid flow and, consequently, regulates the direction in which the propelling motor 24 and the connected drive wheel 7 are rotated. Speed control valve 52 positioned on the front of the valve block 46 regulates the flow of the hydraulic fluid through the propelling motor spool valve and, as a result, regulates the motor speed.

The hydraulic fluid is supplied to the valve block 46 from the hydraulic pump 54 by means of the connecting hose 56. Relief-valve adjustment 55, positioned on the valve block 46, obviates the attainment of unsafe fluid pressure in the valve block. The hydraulic fluid is supplied to the pump 54 from the reservoir 58, which is partially supported by the bracket 59, more clearly seen in FIG. 10, which is affixed to the box beam 4. The interconnecting hose 60 conveys the fluid from the reservoir 58 to the pump 54 and is fragmentarily shown in FIG. 2. The reservoir 58 has the strainer 61 positioned at one side thereof (see FIG. 4) and assists in the removal of contaminants from the hydraulic fluid.

Referring a gain to FIG. 2, 62 is an internal combustion engine of the conventional design which drives the hydraulic pump 54. Tank 63, which is supported by bracket 59 (see FIG. 10) suitably affixed to the box beam 4, supplies the fuel for the engine operation. Brackets 64 similarly affixed to the beam 4 support engine 62.

Positioned adjacent the propelling motor 24 is the hydraulic motor 66 which drives the winch 68 (see FIG. 2). The latter winch is of prime importance in all tie-handling operations hereinafter to be described. The hydraulic winch motor 66 is supported by the bracket member 70 (see FIGS. 6 and 10). Hoses 72 supply the hydraulic fluid under pressure from the valve block 46 to the propelling motor 34 (see FIG. 2). Winch motor 66 is operated by means of the lever 74 which regulates a spool valve (not shown) positioned in the valve block. It will be noted that drain lines 76 return any hydraulic fluid leaking from either motor to the reservoir 58 (see FIG. 2).

FIG. 25 is a diagrammatical view of the above-mentioned hydraulic circuits in the apparatus. The double arrows signify flow in either direction and, therefore, the reversibility of both hydraulic motors.

Winch and mechanism for retrieving and inserting ties in a road bed

The winch hydraulic motor 66 rotatably drives shaft 80 which is coupled at 82 to the speed reducer 84, the latter member being affixed to beam 4 by means of the brackets 78 (see FIG. 6). The power take-off shaft 86 connected to the speed reducer 84 engages jack shaft 88 by means of the jaw clutch 90 (more clearly shown in FIG. 6). The latter clutch member is manually operated by means of the lever 92, which is readily accessible to the operator positioned on seat 114 (see FIG. 4).

The jack shaft 88 drives the winch shaft 94 by means of the interconnecting sprocket chains 96, as is more clearly shown in FIG. 2. The jack shaft 88 is journaled in bearings 95, which are, in turn, fixedly attached to the brackets 87 (see FIG. 6). The latter members 87 are welded or otherwise suitably affixed to box beam 4.

It will be noted in FIG. 4, that box beam 4 has been

6

bevelled or cut out immediately below the interconnecting sprocket chains 96 at 89 to allow unobstructed chain movement.

The sprocket wheel 97 is mounted on the winch shaft 94 (see FIG. 4) which supports the rotating drum 98, as is shown in FIG. 2. Shaft 94 is journaled at either end limit in the bearings 100, which are suitably affixed to the metallic plates 102. The latter plates are welded or otherwise suitably affixed to both the box beam 4 and the transverse tubular members 8 (see FIG. 2).

The drum 98 engages a flexible rope or cable 103, which is employed in the handling of ties 104, as illustrated in FIGS. 1 and 12. To prevent fouling of the cable 103, in the processes of being wound or unwound on drum 98, the reciprocally movable idle roller 106, shown in FIGS. 4 and 2, is provided. The coil spring members 108 abut against the idle roller bearings at one end limit and against a supporting bracket 109 at the oppositely disposed end limit (see FIG. 4). As illustrated in FIG. 2, the latter bracket is in turn suitably affixed to a frame 110, upon which is positioned an expanded metal covering 112. The covering or operator's platform 112 is positioned beneath the operator's seat 114, which is affixed at its lower end limit to a bracket 113 which is, in turn, affixed to frame 110. Railing member 115 is affixed at one end limit to bracket 111 which is also affixed to frame 110.

In the normal course of inserting a tie 104 in a railroad tie bed 116, such as is illustrated in FIG. 1, the following procedure is effected. A tie hook 118, such as is illustrated in FIG. 18, is engaged to the clevis eye 126 (see FIG. 17) which is attached to the free end of the cable 103. The hook 118 has handle portion 120, which is grasped by a helper in the process of guiding a tie against lateral and vertical movement for insertion in a tie bed formed in the road bed 116. The prong or tooth 122 facilitates grasping of the tie, and the oppositely disposed arm 123 assists in effecting tie control. A T head is provided atop the hook for purposes of engaging the eye 126. As is indicated in FIG. 19, the clevis 126 is first slipped over the T head 124, as shown in dotted lines, and is rotated 90° to the solid line position, thereby obviating the possibility of the eye 126 slipping off the T head 124. Having engaged a hook 118, which is fixedly attached to the more distant end limit of a tie 104, the operator actuates the winch motor 66 (see FIG. 6) causing the cable 103 to be wound about the drum 98 and forcing the free end limit of the tie 104 to proceed into its trench in the road bed 116. During this operation, a helper is necessary, as above mentioned, for purposes of guiding the tie member into its bed.

In retrieving a tie from an embankment or other area not immediately adjacent the track, the following procedure is effected. The tongs 130, illustrated in FIG. 8, are affixed to the clevis eye 126 of the cable 103 (see FIG. 17) by means of the S hook 132. The handle portion 134 facilitates handling of the tongs by the helper. The prongs 131 of the tongs are imbedded in oppositely disposed sides of a tie 104. The operator once more, by means of the lever 74, actuates winch motor 66 and draws in cable 103, attached tongs and tie, until the tie reaches the desired proximity to the rails 14.

Apparatus for removing ties

In removing a tie from a railroad bed 116, there is employed with the apparatus laterally extending telescopic boom 136 (see FIG. 12), which may be connected to the end limits of the transverse tubular members 8 disposed on the box beam 4 side of the apparatus (see FIG. 10). As will be noted in FIG. 14, the end portion of the boom 138 is pivotally connected at 139 to its supporting tubular insert members 140 adapted to be telescopically received in the aforementioned end portions of the transverse tubular members 8. FIG. 10

depicts end portion 138 prior to insertion. FIG. 14 depicts end portion 138 after insertion in the tubular members 8.

The boom-supporting inserts 140 may be removably attached to the tubular members 8 by means of the pins 142 which are inserted through mating aligned apertures 144 (see FIG. 14) which are positioned in both the tubular members 8 and inserts 140. The length of the movable telescopic boom arm 146 is fixed by means of the spring loaded pin 148, illustrated in FIG. 15, which is affixed to the larger boom arm 150. Having arrived at the desired boom length, the pin 148 engages the appropriate aperture 152 in the movable arm 146, fixedly maintaining the relative positioning of the two boom arms.

The boom is provided with a clevis 154 (see FIG. 12) which is adapted to engage one end of a supporting cable or chain; the opposite end limit of the chain or cable is connected to an eye 156 positioned on supporting post 158 (see FIGS. 6 and 24). An enlarged detail of the post is fragmentarily shown in FIG. 24. The post is fixedly attached to the box beam 4 and also has positioned thereon hook 160 for supporting the tongs 130 and the paired hooks 162, which support the handle 120 of tie hook 118.

The outer end of the boom carries a pulley 164 which is journaled in a housing 166, as shown in FIG. 16. In the normal course of an operation for removing a tie 104, such as is illustrated in FIG. 12, the winch cable 103 passes over the pulley 164, after first retracting the spring loaded pin 168, which acts to lock the cable to the boom and prevent backlash of a broken cable, which may cause serious injury to either the operator or the helper. Having been locked in the pulley groove, the cable is turned approximately 180° and is affixed to an underlying tie 104 by means of the tongs 130, as illustrated in FIG. 12. After the helper has engaged the tie by means of the tongs, the operator once more actuates the winch hydraulic motor which in turn rotates the drum 98, drawing in cable 103 above the boom and pulling the cable outwardly with the attached tie below the boom. Although the rails 14 are preferably raised from the ties, as illustrated in FIG. 12, the apparatus will work to advantage if the rail 14 is merely disengaged from the underlying tie plates 170, depicted in FIG. 1. It will also be noted in FIG. 12 that the guide fixture is suitably affixed to the box beam 4 to prevent abrasion and wear of the cable member 103 on an edge or corner of the box beam in the course of cable movement during tie extraction.

The reaction frame

It is obvious that, in the extraction of an old tie or the insertion of a new tie, a reaction force on the illustrated apparatus tends to pull it laterally from the rails, as a result of the pull exerted on cable 103. To overcome this reaction, the following structure is provided:

An open frame-like member 172, illustrated in FIG. 9, is pivotally attached by means of apertured bifurcated end limits 174 to depending apertured plates 177, which are affixed to the underside of the channel 176 (see FIGS. 4 and 22). The latter channel is supported by the tubular transverse members 8. The opposite end of the frame-like member 172 comprises a head portion 178, having opposed flange surfaces 180, which straddle the rail positioned beneath the box beam 4 when the frame head portion is in the lowered position. It is these opposed flange surfaces 180 (see FIGS. 4 and 9) which react to the pull exerted on the apparatus by virtue of their stabilizing abutting contact with the engaged rail 14.

The bar 176, to which the pivotal end of the reaction frame 172 is connected, has at either end limit a bolt and slot adjustable connection with the transverse tubular members 8. Either end limit of the bar or channel 176

is welded or otherwise suitably affixed to plates 182 (see FIGS. 10 and 22).

Frame plates 186, which allow for adjustment of the reaction frame 172 relative to the engaged rail 14, are welded or otherwise suitably affixed to the tubular members 8, as shown in FIG. 10. The plates 186 are slotted at 188 so as to enable slight adjusting movement of the entire reaction frame 172 to be effected, in order to more positively position the head 178 and more exactly straddle the opposed flanged surfaces 180 on a rail member 14. The channel 176 is bolted to the plates 186 at either end limit by means of the bolt members 191 (see FIG. 22). Since plates 186, to which the plates 182 are bolted, have elongated openings to provide for adjustable positioning of channel 176, positive means for preventing movement parallel to the slots 188 must be provided. This means comprises the ears or lugs 190, which are formed integral with the frame plates 186 and which are tapped for threadedly engaging bolt 192, as shown in FIG. 3. Upon proper positioning of the head portion 178 of the reaction frame, the pivotal engagement of the reaction frame to channel member 176 is fixedly positioned relative to the frame 2 by means of the bolt member 192, which abut the oppositely disposed flanges 197 (see FIG. 2) of channel 176. It is thus apparent that lateral movement of channel 176 and attached bar 182 by virtue of the bolted engagement to the slotted plate 186 is obviated. Lock nuts 193 assure fixed positioning of the bolts 191.

On the operator's platform is located a pivotally movable, foot operated lever 194 fulcrumed on bracket 196 (see FIG. 5). The lever 194 has an eye end portion 198 which engages one end limit of a chain 200. The opposite end limit of the chain is engaged to an eye 201 formed integral with a cross bar 202 of the reaction frame 172. The pedal or lever 194 and the depending frame 172 are locked in an elevated position, as shown in FIG. 5, by the spring loaded pin latch 204. When the apparatus is in proper position for a tie-handling operation, pin latch 204 is retracted allowing the reaction frame 172 to drop, thereby enabling the opposed flange surfaces 180 of the head 178 to straddle rail 14. Coil springs 206, shown in FIGS. 4 and 6 and housed in the frame pipe portions 207 (see FIG. 9), forces the head to immediately drop to the underlying rail. To retract the reaction frame, the operator merely steps on the pedal portion oppositely disposed to the eye 198.

Other features

Also, to assist the apparatus in opposing the pull effected by the cable 103 in tie-handling operations, extension arms 208 are provided (see FIGS. 1, 2 and 10). As will be noted in FIG. 22, the extension arms 208 pivotally engage a projecting arm or rod 210, which is securely affixed to a clamp member 211, which in turn engages the tubular member 8. When not in use, the extension arms 208 rest in brackets 212 (see FIG. 2), which are affixed to the frame 110, as is clearly seen in FIG. 5. In the latter position, the arms are prevented from pivoting about members 21 by virtue of the spring loaded pins 213, which act to lock the arms 208 against arcuate movement, as illustrated in FIG. 23.

However, when it is desirable to brace the apparatus against the pull of the tie-engaging cable, the arms 208 are arcuately moved 180° until they rest in brackets 214, attached at the arch 6, as is clearly shown in FIG. 1. In this position, one or more ties may be positioned astraddle the arms, thereby weighing down the side of the apparatus oppositely disposed to the winch. It is readily apparent that the ballast effect of the ties 104 on the extension arms 208 counteract the pull effected at the point of the cable engagement with the winch.

When it is desired to remove the apparatus from the track, or effect a "setoff," the setoff wheels 220 are utilized, see FIGS. 1 and 2. The box beam is provided

with brackets 216 (see FIGS. 1 and 10), which engage the bifurcated frames 218 (see FIG. 4) of the setoff wheels. The brackets 216 are provided with a plurality of accurately aligned apertures 222, which enable the frames 218 of the setoff wheels to assume various angular positions relative to the brackets. The brackets 218 have a transverse aperture which enables the brackets to be pinned to any pair of oppositely disposed apertures 222 by means of a traversing rod, not shown.

In the normal course of apparatus operation on the rails 14, the setoff wheels are in the position shown in FIGS. 1 and 4. However, when it is desired to remove the apparatus from the track, the frames 218 and attached wheels are lowered to the position shown in dotted lines in FIG. 4. Extension handles 224, slidably engaging the caster wheel frame 6, are then grasped and the rear portion of the apparatus elevated until the setoff wheel tires 220 engage the ground. The machine is then pushed off to one side of the track and the caster wheel lowered to the ground. Handle 22 is then lowered allowing the pintle 21 of the caster wheel frame 18 to freely pivot in the frame 6. Extension handles 226 are also provided in the box beam 4 to facilitate removal of the front portion of the apparatus from the track. The extension handles 224 are maintained in the retracted position by the pins 228, as illustrated in FIG. 11.

The vehicle is also provided with hand rail 115 (see FIG. 1) which can be grasped by the operators to facilitate movement on and off the machine.

While the invention has been described in connection with vehicles having apparatus for use in handling railroad ties, for which the vehicle is more particularly designed, it should be understood that certain features of the invention are adapted for use in other vehicles adapted to travel on the rails.

We claim:

For a railway tie-handling vehicle adapted to travel on rails, the vehicle having a main frame with supporting bar affixed thereto, an unflanged wheel having a rail-engaging periphery of electrically nonconductive material supporting one side portion of said frame disposed over a rail, said unflanged wheel being substantially centrally disposed on said side portion, cable means mounted on said frame for handling ties, the cable means exerting forces on said vehicle that extend outwardly therefrom in a direction opposite to and in substantial alignment with said unflanged wheel, said forces tending to pivot said

vehicle about the side portion oppositely disposed to the unflanged wheel thereby moving the unflanged wheel from the rail, a reacting means for reacting to such forces comprising a plurality of elongate frame members positioned transversely to the rails and pivotally affixed at one of their ends to the underside of the supporting bar, a head portion fixedly attached to the other ends of said elongate frame members, said head portion having parallel opposed flange surfaces for straddling a rail, said opposed flange surfaces straddling the rail opposed to the rail supporting the unflanged wheel when said reacting means is pivotally lowered, said opposed flange surfaces engaging said rail in a sufficiently snug manner so as to prevent transverse movement of the main frame relative to the rail in the normal course of tie-handling operations, and the opposed flange surfaces gripping the straddled rail as the forces exerted on the vehicle tend to pivot the unflanged wheel from the rail.

References Cited in the file of this patent

UNITED STATES PATENTS

206,590	Lynn et al.	July 30, 1878
929,440	Iliff	July 27, 1909
1,186,002	Jones	June 16, 1916
1,212,583	Tanner	Jan. 16, 1917
1,333,012	De Puydt	Mar. 9, 1920
1,389,353	Hendershott	Aug. 30, 1921
1,466,850	Owen	Sept. 4, 1923
1,466,851	Owen	Sept. 4, 1923
1,613,037	Kniffen	Jan. 4, 1927
1,732,568	Robb	Oct. 22, 1929
1,939,480	Wilson	Dec. 12, 1933
2,009,113	Landis et al.	July 23, 1935
2,283,929	Hughes	May 26, 1942
2,487,572	McKee et al.	Nov. 8, 1949
2,575,535	Talboys et al.	Nov. 20, 1951
2,718,197	Bock et al.	Sept. 20, 1955
2,760,440	Kershaw	Aug. 28, 1956
2,762,313	Sublett	Sept. 11, 1956
2,781,002	Talboys	Feb. 12, 1957
2,786,426	Brosnan	Mar. 26, 1957
2,797,064	Abbott	June 25, 1957
2,923,253	Geier et al.	Feb. 2, 1960

OTHER REFERENCES

Nordberg Bulletin 201, published by Nordberg Mfg. Co., Milwaukee, Wis., 1953, 2 pages, 104-9.