April 3, 1951 D. M. PRAYTOR ET AL 2,547,596

TRACK STRIPPING MACHINE.

Filed Nov. 16, 1945 4 Sheets-Sheet 1

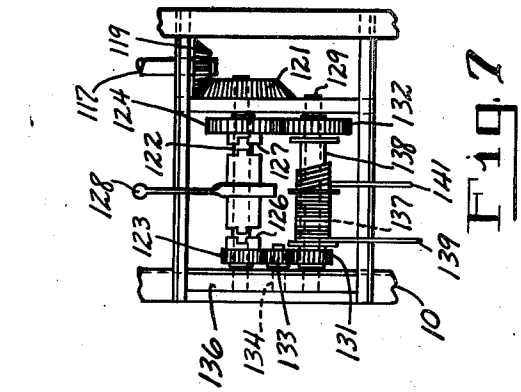


Fig. 2

Fig. 1

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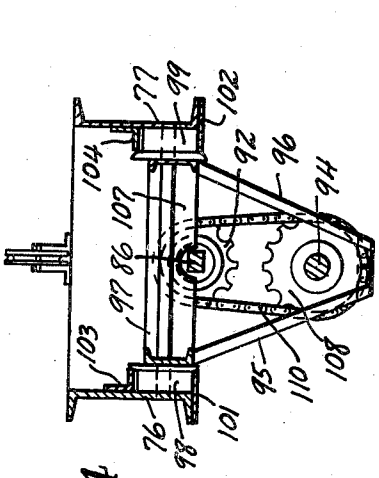


Fig. 4

Fig. 2

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TRACK STRIPPING MACHINE

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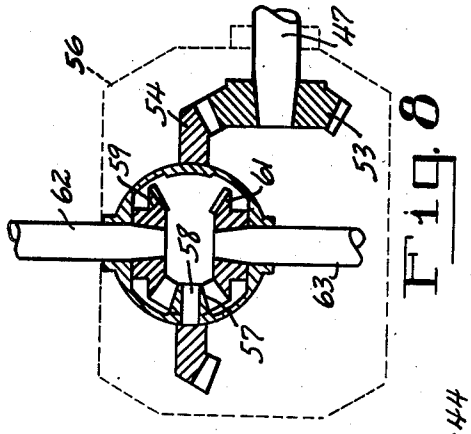


Fig. 8

Fig. 3

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TRACK STRIPPING MACHINE

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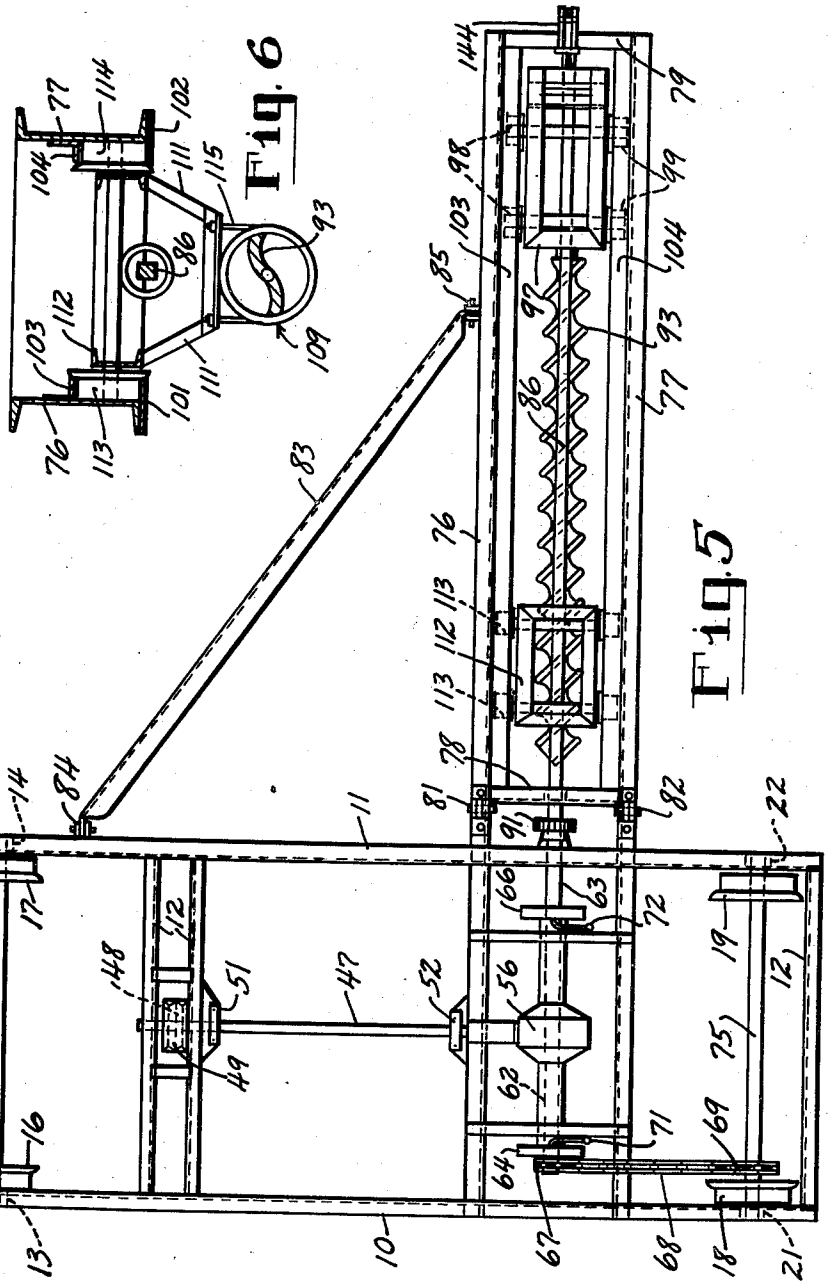


Fig. 6

Fig. 5

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UNITED STATES PATENT OFFICE

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TRACK STRIPPING MACHINE

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Application November 16, 1945, Serial No. 629,180

9 Claims. (Cl. 37—104)

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This invention relates to a machine for removing or stripping ballast from a railway track and has for an object the provision of apparatus of the character designated which shall be simple and economical of design, reliable in operation and one with which ballast may be removed mechanically in a minimum of time.

A further object of our invention is to provide self propelled apparatus for removing ballast from between railway cross ties which shall include a power driven auger adapted to be reciprocated from one side of the track in the space between the ties, and means to mount the auger whereby it may be raised out of the way when the machine is being moved from place to place.

A further object of our invention is the provision of apparatus for removing ballast which shall embody a power operated auger adapted to be entered between the cross ties of a railway track and be reciprocated to remove the ballast therefrom.

As is well known in the art to which our invention relates the rock and ballast which is tamped around railroad ties is very difficult to remove manually especially after it has been in place for a sufficient time to settle and become packed down by traffic. This renders the manual removal of old cross ties a very laborious and expensive operation. In order to overcome this difficulty, we have provided a machine which is preferably self propelled and which embodies a power operated reciprocable auger adapted to be entered from the ends between the cross ties to remove the ballast therefrom. The auger is mounted in a frame pivoted to one side of the machine whereby it may be raised out of the way and moved from place to place with the machine.

Other important features of our invention are illustrated in the accompanying drawings, forming a part of this application, in which

Fig. 1 is a plan view of the apparatus omitting any showing of the superstructure for the sake of clarity;

Fig. 2 is an end elevation with certain parts broken away;

Fig. 3 is a side elevation;

Fig. 4 is a sectional view taken along the line IV—IV of Fig. 2;

Fig. 5 is a plan view of the frame of the apparatus with the power driving unit removed;

Fig. 6 is a sectional view taken along the line VI—VI of Fig. 2;

Fig. 7 is a detail plan view of the reversing mechanism for the auger; and

Fig. 8 is a detail view of the differential gear

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employed for selectively driving the auger or propelling the vehicle.

Referring now to the drawings for a better understanding of our invention, our improved apparatus embodies a main frame having longitudinal members 10 and 11, joined together by transverse members 12, a plurality of which may be employed. Mounted under the main frame in suitable bearings 13 and 14 are a pair of supporting wheels 16 and 17. A pair of driving wheels 18 and 19 are mounted under the frame at the opposite end thereof in suitable bearings 21 and 22. The apparatus is adapted to run on the usual railroad rails 23, and 24, mounted on cross ties 26, from between which the machine is designed to remove the rock and ballast.

At 27 and 28 we show longitudinally extending foundation beams which are mounted on the main frame over the transverse members 12. Mounted on the foundation beams just described is a power unit 29 which, in the example shown, is an internal combustion engine. Connected to the power unit 29 through a clutch 31 is the usual three-speed and reverse transmission 32 employed in motor vehicles and having the usual gear shift lever 33. The power shaft is shown at 34, mounted in suitable bearings 36 and 37. Adjacent the transmission unit 32 is a V belt pulley 39, mounted on the power shaft 34. At 41 we show a second clutch and at 42 a second three-speed and reverse transmission similar to the transmission 32 from which power is transmitted through a shaft 35. The clutch 31 is controlled by a lever 43 and the clutch 41 is controlled by a lever 44. It will be seen that, by the means shown, the drive shaft 34 may be driven at a variety of speeds and that further variation in drive may be accomplished through the drive shaft 35.

At 46 we show a second V belt drive pulley, mounted on the shaft 35. The pulley 46 drives a propeller shaft 47 through a pulley 48 and V belt 49. The propeller shaft 47 is mounted in bearings 51 and 52. On the end of the propeller shaft 47 is a bevelled gear 53 that meshes with a bevel gear 54 on the conventional differential gear case 56. On the inside of the gear case 56 are the usual bevel gears 57 mounted on studs 58 that hold them in the gear case. The gears 57, in turn, mesh with bevelled gears 59 and 61 mounted on the ends of counter shafts 62 and 63, respectively. As is well understood, when both gears 59 and 61 meet with the same resistance, the small bevelled gears 57 do not turn on their bearings; but if one of the gears 59 or 61 is held

against turning, power is transmitted from the bevelled gear 53 through the gear 54 and small gears 57 to the other gear 59 or 61, as the case may be, causing it to turn. At 64 and 66 we show conventional brakes adapted to hold the shafts 62 and 63 against turning. When the shaft 63 is held against turning by the brake 66, the shaft 62 is turned to propel the apparatus along the track through a sprocket wheel 67, sprocket chain 68, and sprocket 69 mounted on the axle 75 of the wheels 18 and 19. The brakes 64 and 66 may be selectively operated by means of levers 71 and 72 as shown in Fig. 2. When the shaft 62 is held against turning by the brake 64, the shaft 63 will turn. A gear 91 on the end of the shaft 63 serves to drive the stripping auger in a manner to be described later.

The stripping mechanism comprises an auger frame having side channel members 76 and 77 joined together at the ends by end members 78 and 79. The frame is hinged to the longitudinal frame member 11 by means of hinges 81 and 82 and is further stayed with respect to the main frame by means of a diagonal brace 83 pivoted to the main frame at 84 and to the longitudinal member 76 at 85.

Extending longitudinally of the auger frame is a drive shaft 86 which is rectangular in cross section and is mounted at the ends of the frame in bearings 87 and 88. Adjacent the main longitudinal frame member 11, the shaft 86 is provided with a gear 89, which, when the auger frame is in the horizontal position shown in Figs. 1 and 2 is in mesh with the gear 91 mounted on the end of the counter shaft 63. The outer end of the shaft 86 carries a gear sprocket 92 which is slidingly mounted on the shaft.

At 93 we show an auger, mounted on a shaft 94 which, at its outer end, is supported by a carriage comprised of frame members 95 and 96 and transverse frame member 97, supported by wheels 98 on one side and 99 on the other, which run on tracks formed by plates 101 and 102 welded to the lower flanges of the frame members 76 and 77. As shown in Figs. 4 and 6 of the drawings, we provide angle members 103 and 104, which are welded to the side frame members 76 and 77, above the carriage wheels, to prevent them being raised up in their travel. As may be seen in Fig. 2 of the drawings, the shaft 86 extends through the auger carriage and transverse members 106 and 107 of the carriage are disposed on opposite sides of the sprocket 92 whereby as the carriage moves in its frame it moves the sprocket 92 on the shaft 86. On the outer end of the shaft 94 is a sprocket 108, which is connected with the sprocket 92 by a chain 110. At 109 we show a guide for supporting the inner, or free end of the auger 93, which is composed of hoops 115, supported in stirrups 111 carried by a frame 112, similar to the supporting frame of the outer end of the auger and which is mounted on wheels 113 on one side and 114 on the other, which bear on the tracks 101 and 102. The guide 109 is free to move with the auger in entering the space between the ties and may be held manually in a suitable position, or by engagement with the ground.

The auger 93 may be reciprocated by the mechanism now to be described. A V belt 116 on the pulley 39 drives a shaft 117 having a pulley 118 mounted thereon. A gear 119 on the end of the shaft 117 meshes with a gear 121 mounted on a clutch shaft 122. See Fig. 7. The

shaft 122 has gears 123 and 124 mounted to turn thereon and which are controlled by means of clutches 126 and 127 turning with the shaft and operated by means of a clutch lever 128. At 129 we show a counter shaft mounted in suitable bearings and having gears 131 and 132 mounted thereon. The gear 132 meshes at all times with the gear 124 and the gear 131 meshes with an idler gear 133 carried by a stub shaft 134 mounted in the side frame member 136. The idler gear 133 meshes at all times with the gear 123, whereby when the clutch 127 is engaged to drive the gear 124, the shaft 129 is driven in one direction through the gear 132 and when the clutch 126 is engaged to drive the gear 123 the shaft 129 is driven in the opposite direction through the idler gear 133 and the gear 131. Mounted on the shaft 129 are drums 137 and 138 on which are reversely wound cables 139 and 141. The cables 139 and 141 pass downwardly around a sheave 142 and thence over a sheave 143, mounted on the frame adjacent the hinges 81 and 82. From the sheave 143 the cable 139 extends outwardly to the end of the auger frame over a sheave 144 and thence downwardly to be joined at 146 to the outer end of the auger carriage frame. The cable 141 passes downwardly from the sheave 143 under a sheave 147 and thence outwardly and is joined at 148 to the inner end of the auger carriage. It will be seen that by the means shown, when the shaft 129, with its drums 137 and 138, is rotated in one direction, the carriage with its auger 93 will be pulled outwardly and that when the shaft 129 is rotated in the opposite direction, the carriage with the auger 93 will be pulled inwardly.

The auger frame and carriage as hereinbefore described are supported in a horizontal direction and may be raised when required to a vertical position, by means of a cable 151, secured at 152 to the top of an A frame 153, mounted on the longitudinally extending frame members 10 and 11 as shown in Fig. 2. The A frame 153 is joined at the top to a similar A frame 154, secured to the side frame members at the other end of the vehicle. The A frame 154, as shown in Figs. 1 and 3, inclines downwardly from the top, where it is joined to the A frame 153, to the opposite end of the main frame, thereby forming a very sturdy support. The cable 151 passes around a sheave 156 mounted in a yoke 157 secured to the auger frame at 158 and thence passes upwardly over a sheave 159 mounted toward the upper end of the A frame 153 and thence downwardly over a windlass 161 which may be manually operated as by means of a crank 162.

From the foregoing description, the operation of our improved apparatus will be readily understood. Whenever it is desired to move the machine from place to place, the brake 66 is applied to hold the counter shaft 63 against turning, whereupon the machine is driven through the sprocket chain 68, sprockets 67 and 69, and through the driving wheels 18 and 19. The change speed transmissions 32 and 42 provide means whereby the speed and power applied to the shaft 62 may be varied. When on location, the apparatus is positioned so that the auger 93 is directed between ties where the ballast is to be removed, as shown in Fig. 3 of the drawing. The auger frame is let down to the horizontal position shown in Fig. 2, and the shaft 62 is held against turning by means of the brake 64 and the brake 66 is released. The power and speed applied to

the shaft 47 is regulated by the transmission means shown and the rectangular shaft 86 is driven at the appropriate speed for driving the auger 93 through the sprockets 92 and 108. As the auger advances between the ties, it removes the ballast therefrom, being supported on its inner end by means of the guide 109. When the ballast has been removed from between a pair of ties, the auger is withdrawn by causing the shaft 129 to rotate in the appropriate direction to wind up the cable 139 and let off on the cable 141 thereby pulling the auger outward. The apparatus is then positioned to locate the auger between another pair of ties and the auger is pulled inwardly by rotating the shaft 129 in the proper direction to wind on the cable 141 and let off on the cable 139.

From the foregoing it will be apparent that we have devised an improved apparatus for removing ballast from between the cross ties of a railway track which is simple of design, economical of operation, and one which obviates the necessity of a great deal of heavy manual labor.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and we desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What we claim is:

1. Apparatus for removing ballast from between railroad ties comprising a railroad vehicle, a power driven auger pivotally mounted on the side of the vehicle, means for reciprocably supporting the pivoted auger in working position, and means to reciprocate the auger between the ties to remove the ballast therefrom.

2. Apparatus for removing ballast from between railroad ties comprising a railroad vehicle, a power driven auger pivotally mounted on the side of the vehicle, means for reciprocably supporting the pivoted auger in working position, means to reciprocate the auger between the ties to remove the ballast therefrom, and selective power transmission means for driving the vehicle.

3. A machine for removing ballast from between railway ties comprising a railway vehicle, a power unit mounted on the vehicle, a ballast removing reciprocable auger for entering the space between the ties, a frame for the auger pivoted to the side of the vehicle, means to lower the frame into position to insert the auger between the ties and to raise it out of the way, and power transmission means between the power unit and the auger.

4. A machine for removing ballast from between railway ties comprising a railway vehicle, a power unit mounted on the vehicle, a ballast removing reciprocable auger for entering the space between the ties, a frame for the auger pivoted to the side of the vehicle, means to lower the frame into position to insert the auger between the ties and to raise it out of the way, and power transmission means for driving the auger including gears engageable upon lowering the auger frame and disengaged upon raising the auger.

5. A machine for removing ballast from between railway ties comprising a railway vehicle, a power unit mounted on the vehicle, a ballast removing reciprocable auger for entering the space between the ties, a frame for the auger

pivoted to the side of the vehicle, means to lower the frame into position to insert the auger between the ties and to raise it out of the way, a driving gear on the side of the vehicle operatively connected to the power unit, a driven gear mounted on a shaft carried by the auger frame, a gear slidably mounted on the shaft, a reciprocable carriage mounted in the auger frame and supporting the outer end of the auger, a gear on the end of the auger meshing with the sliding gear on the shaft, and means on the carriage for engaging the sliding gear and holding it in mesh with the gear on the auger.

6. A machine for removing ballast from between railway ties comprising a railway vehicle, a power unit mounted on the vehicle, a ballast removing reciprocable auger for entering the space between the ties, a frame for the auger pivoted to the side of the vehicle, means to lower the frame into position to insert the auger between the ties and to raise it out of the way, a driving gear on the side of the vehicle operatively connected to the power unit, a driven gear mounted on a shaft carried by the auger frame, a gear slidably mounted on the shaft, a reciprocable carriage mounted in the auger frame and supporting the outer end of the auger, a gear on the end of the auger meshing with the sliding gear on the shaft, means on the carriage for engaging the sliding gear and holding it in mesh with the gear on the auger, and a reciprocable guide for supporting the inner end of the auger.

7. A machine for removing ballast from between railway ties comprising a railway vehicle, a power unit mounted on the vehicle, a ballast removing reciprocable auger for entering the space between the ties, a frame for the auger pivoted to the side of the vehicle, means to lower the frame into position to insert the auger between the ties and to raise it out of the way, a driving gear on the side of the vehicle operatively connected to the power unit, a driven gear mounted on a shaft carried by the auger frame, a gear slidably mounted on the shaft, a reciprocable carriage mounted in the auger frame and supporting the outer end of the auger, a gear on the end of the auger meshing with the sliding gear on the shaft, means on the carriage for engaging the sliding gear and holding it in mesh with the gear on the auger, a reciprocable guide for supporting the inner end of the auger, and means to reciprocate the carriage.

8. A machine for removing ballast from between railway ties comprising a railway vehicle, a power unit mounted on the vehicle, a ballast removing reciprocable auger for entering the space between the ties, a frame for the auger pivoted to the side of the vehicle, means to lower the frame into position to insert the auger between the ties and to raise it out of the way, a driving gear on the side of the vehicle operatively connected to the power unit, a driven gear mounted on a shaft carried by the auger frame, a gear slidably mounted on the shaft, a reciprocable carriage mounted in the auger frame and supporting the outer end of the auger, a gear on the end of the auger meshing with the sliding gear on the shaft, means on the carriage for engaging the sliding gear and holding it in mesh with the gear on the auger, a reciprocable guide for supporting the inner end of the auger, cables attached to the opposite ends of the carriage, a sheave on the end of the auger frame around which one of the cables passes, a double drum windlass on which the other ends of the cables

are wound, and reversible means for driving the windlass to reciprocate the carriage.

9. In a machine for removing the ballast from between railway ties, a horizontally disposed auger mounted to enter the space between the ties endwise thereof and remove ballast therefrom, a horizontally disposed auger frame, a carriage reciprocable in the frame and supporting one end of the auger, means to reciprocate the carriage, and a movable guide for the other free end of the auger movably supported in the frame.

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