Feb. 9, 1937. E. C. NEAL 2,069,769

RAILWAY TIE PULLER

Filed May 6, 1935 2 Sheets-Sheet 1

Fig. 1

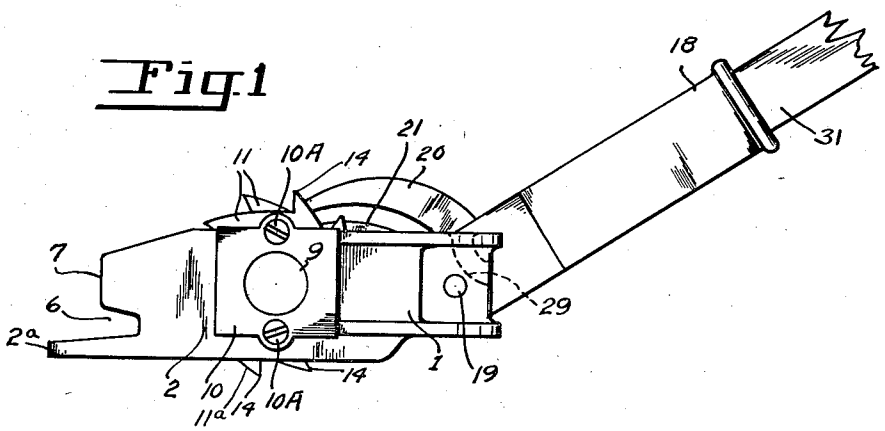


Fig. 2

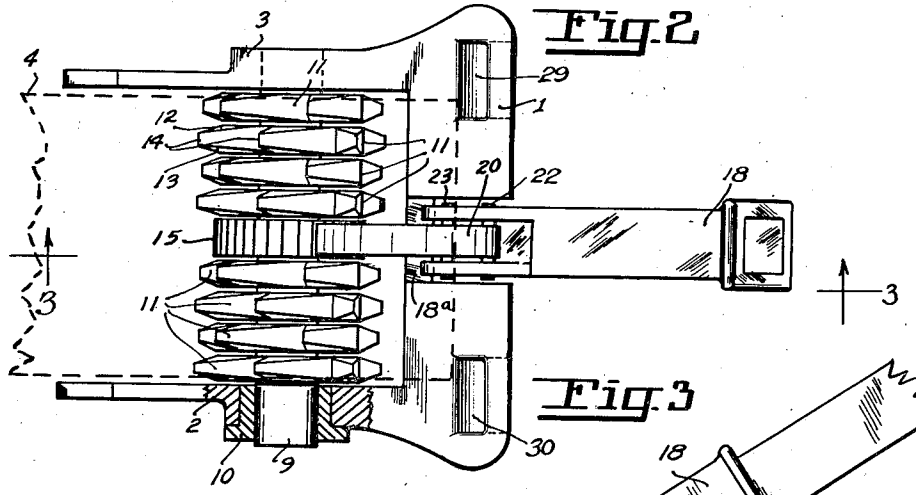


Fig. 3

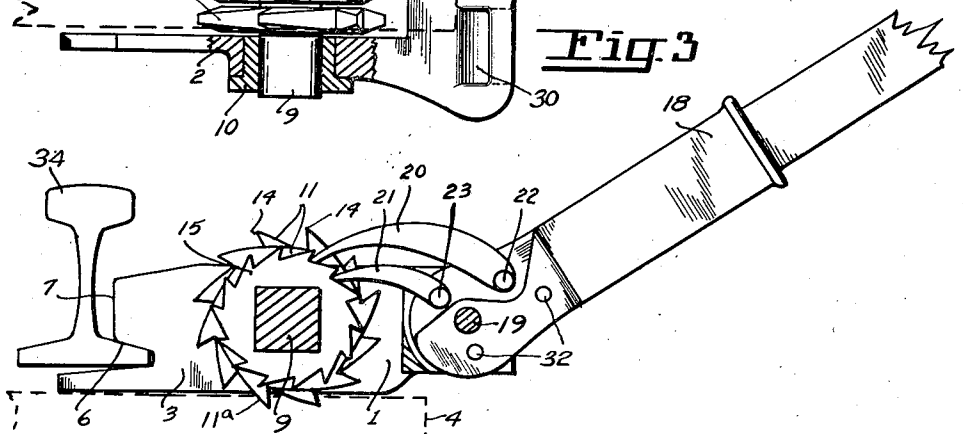
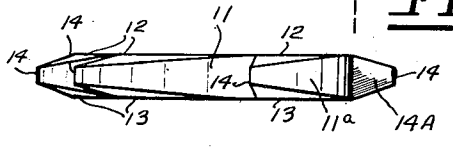


Fig. 7



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RAILWAY TIE PULLER

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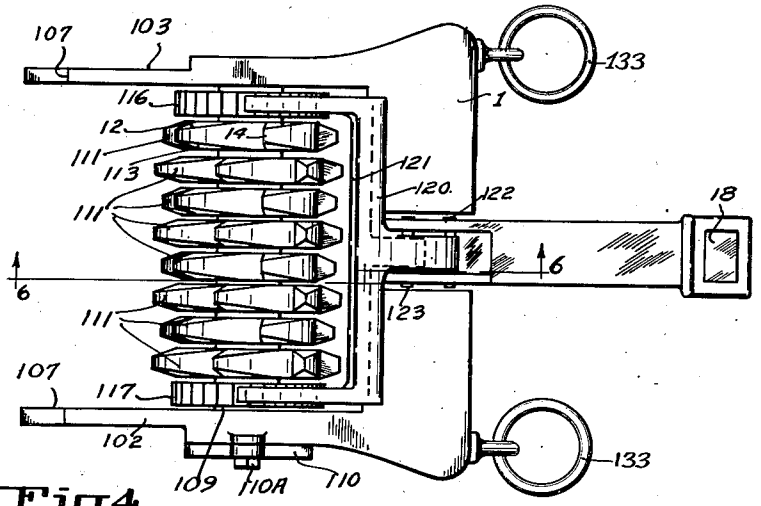


Fig. 4

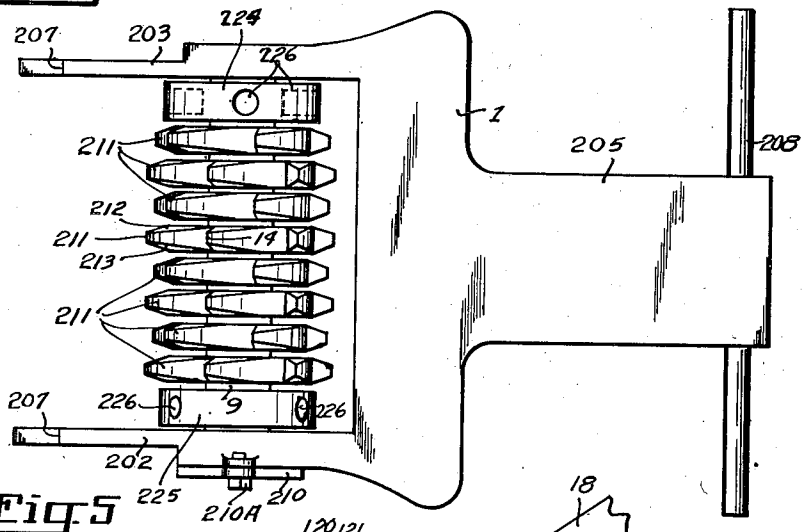


Fig. 5

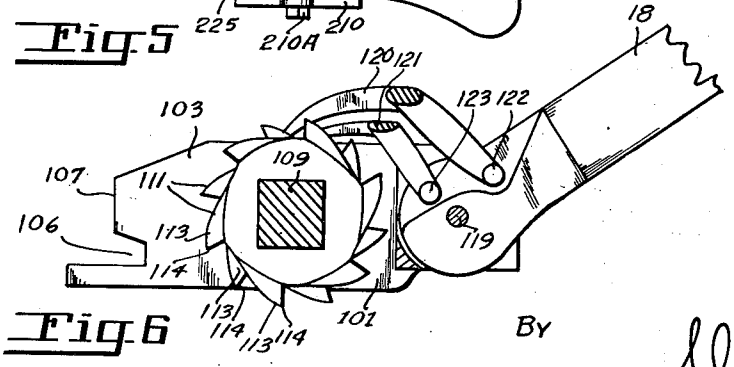


Fig. 6

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2,069,769

RAILWAY TIE PULLER

Ernest C. Neal, Chicago, Ill.

Application May 6, 1935, Serial No. 19,966

7 Claims. (Cl. 254—43)

The present invention relates to a tie puller.

The essential feature of the invention is the provision of an improved means for pulling a railroad tie from beneath rails that it supports, without the necessity for excavating around the tie to facilitate either its withdrawal or to permit of the application and use of the herein described device.

The objects of the invention include, among others, the provision of the following:

A simplified, convenient, readily operable device which may be anchored over the body of a tie and operated to move such tie longitudinally from a road bed so that the removed tie may be replaced by another tie without disturbing the contour and compactness of the road bed ballast.

An improved device which, for purposes of operation, may be laid directly upon a tie and anchored against the base of a rail with the excavation of a minimum amount of ballast, and which is effective for the purpose of moving the tie transversely of the rail without seriously affecting the contour of the ballast beneath and at the sides of the withdrawn tie.

A new, improved, and simplified apparatus which may be conveniently handled by a section hand and with which the section hand may withdraw from a road bed ties one at a time with great rapidity and with a minimum of physical effort.

These objects, and others which will hereafter appear, are obtained by the novel arrangement, combination and construction of elements hereinafter described and claimed.

Several embodiments of the invention are illustrated in devices shown in the accompanying two sheets of drawings, hereby made a part of this application, and in which:

Figure 1 is a side elevation of a device embodying one form of the invention;

Figure 2 is a plan view of the device shown in Figure 1;

Figure 3 is a sectional view of the same device on the line 3—3 of Figure 2;

Figure 4 is a plan view of a modified form of device embodying the invention;

Figure 5 is a plan view of another modified form of device embodying the invention;

Figure 6 is a longitudinal section of the device of Figure 4 taken on the line 6—6 of Figure 4; and

Figure 7 is a slightly enlarged edge view of one of the toothed wheels.

Like reference characters are used to designate similar parts in the drawings and in the following description.

Basically, the present invention relates to a device that may be placed upon a tie forming a part of a railroad bed, and wedged against one of the rails to withdraw such tie. Toothed wheels or their equivalents are in position over the tie to be withdrawn and in contact with the tie top. The toothed wheels are suitably rotated. The teeth on the wheels dig into the tie, pulling the tie from under the rails as the toothed wheels are rotated.

The foundation of the device is a substantially U-shaped frame 1. Two arms 2 and 3 of the frame are separated by a distance sufficient to allow them to straddle a tie.

The toe or end of each arm is shaped to fit against base of a rail. An extension 2*a* is adapted to fit under the base of a rail 34. A notch 6 receives the opposite sides of the base of such rail. A nose piece 7 may press against the web of the rail but generally the nose is spaced from the web of the rail. The under face of the notch 6 is oblique (see Figures 3 and 6). The upper face of the notch 6 is adapted to impinge upon the top face of the base of rail 34, the notch being wedged upon such base and maintaining the nose 7 away from the web of the rail. On a few rails where the base is shallow and narrow the nose 7 may contact the web but this is not usual.

The arms 2 and 3 support a shaft 9. One end of shaft 9 is journalled directly in arm 3. A bushing 10 is set into arm 2 and held in place by bolts or screws 10*a* and provides a journal for the other end of shaft 9. Within the journals shaft 9 is rounded. Between the arms 2 and 3 and journals, the shaft 9 may be square to receive nonrotatively thereon the tie pulling part or parts. These parts may comprise a series of toothed wheels 11 and a ratchet wheel 15. They may be a toothed cylinder, if preferred.

The toothed wheels 11 have teeth 11*a* which are all slanted in the same direction relative to the rotation of the wheels 11. The sides of each tooth are cut to a slant as at 12 and 13 so that the points of the teeth are narrower than the wheel 11. Each tooth is provided with a broad, flat front face 14 which slants forwardly with respect to the rotation of the wheel.

Each wheel has an aperture of the same shape and size as the cross section of the square section of the shaft 9 and is adapted to fit onto the shaft. The apertures on adjacent wheels are set differently with respect to the teeth 11*a* so

that the teeth on adjacent wheels are staggered with respect to one another.

A ratchet wheel **15** is provided with a center aperture the same as the toothed wheels **11**. In the form of the device shown in Figures 1, 2, and 3 the ratchet wheel **15** is placed on the shaft between two equal groups of toothed wheels **11**, four in each group. Such number of toothed wheels **11** may be varied to suit any particular case.

A recess **18***a* is provided in the rear of the frame **1** to receive a handle socket member **18**. Socket member **18** is bifurcated at its lower end and is pivoted on a shaft **19**. Two pawls **20** and **21** are mounted between the bifurcations and are adapted to cooperate with the teeth on the ratchet wheel **15**. Pawl **20** is pivoted to the socket member **18** by a pin **22** and pawl **21** is similarly fastened by a pin **23**.

Pivot **22** for pawl **20** is placed away from shaft **19** towards the handle end of the socket member **18**. Pivot **23** for pawl **21** is placed between the shaft **19** and the ratchet wheel **15**. Socket member **18** is for a handle **31** to provide leverage for operating the toothed wheels **11**.

Two hand holes **29** and **30** in the frame **1** near its lower corners provide for hand grips in transporting the device and in handling it in use.

Where so desired the bifurcated portion of socket member **18** may be strengthened by placing tie rivets or bolts **32** below the pivot **19**, as indicated in Figure 3.

Reference will now be had to Figure 4. The reference characters therein generally comprise the same as in Figures 1, 2, and 3 save that **100** is added thereto.

In place of a single ratchet wheel **15**, two ratchet wheels **116** and **117** are used, one at each side of a group of toothed wheels **111**. Ratchet wheels **116** and **117** are narrower than wheel **15** of the earlier described device but otherwise are substantially the same. In place of the pawls **20** and **21**, bifurcated pawls **120***a* and **121***a* are mounted in the bifurcated portion of socket member **18** by pins **122** and **123** in the same way as pawls **20** and **21**. Figure **6** shows the bifurcated pawls **120** and **121** in section.

In place of the hand holes **29** and **30** as shown in Figure 2 rings **133** may be secured to the back edge of frame **101** to provide handle means.

Another type of machine is shown in Figure 5. Ratchet, pawls, handle socket, and handle are omitted. In place of the two ratchet wheels of the device of Figures 4 and 6, two wheels or drum heads **224** and **225** are provided. Each wheel **224** and **225** is fitted to the square part of shaft **209**. At intervals about the periphery of wheels **224** and **225** are bar receiving sockets **226**. A bar may be inserted into a socket **226** to act as a lever, turning the wheel assembly in the manner of a windlass. The reference characters in Figure 5 are like those in preceding figures save that **200** is added thereto.

In the form of the device shown in Figure 5, a tail piece **205** extends backwardly from the frame **1**. A bar **208** may be inserted through a suitable aperture near the end of the tail piece **205**. The bar **208** may be withdrawn for insertion into one of the holes **226** to turn the wheel assembly. When in place in the tail piece, the bar **208** adds convenience in the transportation of the device.

The operation of the device is as follows. The frame **1** (**101** or **201**) is placed on a tie which is to be removed, with the toothed wheels **11** (**111** or **211**) bearing on the top of the tie and with arms **2** (**102** or **202**) and **3** (**103** or **203**) at the sides of the tie **4**. (See Figure 2.) The extension **2***a* is slipped under the rail **34**. Notch **6** admits of the insertion of the base of the rail **34** to a limited extent. The edge of the base seldom presses against the end of the notch. The nose **7** is over the base but seldom presses against the side of the web of the rail. The device pivots about a point in the top of the base of the rail.

Handle **31** in socket **18** is then worked upwardly. It is retracted downwardly after each up stroke. Through the medium of the pawls, ratchet wheel and shaft, the toothed wheels **11** are rotated so that the teeth **11***a* dig into the tie **4**. As the rotation of the toothed wheels continues, the tie **4** is drawn from beneath rails **34**.

In the device illustrated in Figure 5, after it is in place on a tie, the bar **208** is withdrawn from the tail piece **205** and inserted into a socket **226**, and the wheel assembly turned by means of the bar **208**.

Where desired, modifications may be made in the shape of the shaft **9** or in the shape or number of the toothed wheels or ratchets without departing from the invention.

What is claimed as new and is desired to be secured by Letters Patent of the United States is:

1. A tie puller comprising a plurality of discs, tie penetrating means for engaging the top face of a tie mounted on said discs, and means for moving said discs and tie penetrating means to move the tie.

2. A puller for extracting a tie from beneath a rail, comprising a plurality of discs, penetrating means for engaging the top face of such tie mounted on said discs, means for coaction with the base of such rail, and means for moving said discs and engaging means to withdraw such tie from beneath such rail by the reaction of said coacting means and such rail.

3. A tie puller comprising a frame having a pair of arms, alined bearings in said arms, a plurality of toothed wheels for engaging the top face of a tie mounted in said bearings, and ratchet means mounted in said bearings on opposite sides of said toothed wheels for rotating said wheels to move such tie.

4. A puller for extracting a tie from beneath a rail, comprising a frame having arms adapted to coact with the base of such rail, a toothed wheel for engaging the top face of a tie and journalled between said arms, a drum head having a plurality of sockets in the periphery thereof and rigidly associated with said toothed wheel, and a lever insertable in the sockets for moving the said drum head to rotate said toothed wheel, said toothed wheel when rotated pressing said arms against the base of the rail and pulling the tie from beneath the rail.

5. A puller for extracting a tie from beneath a rail, comprising a frame having arms, each arm having a portion adapted to fit beneath the rail, and a portion adapted to press upon the top of the base of the rail, a toothed wheel for engaging the top face of the tie and journalled in said frame between said arms, a ratchet wheel associated with said toothed wheel, a handle pivoted to said frame, and a pawl pivoted to said handle and coacting with said ratchet wheel, movement of said handle rotating said ratchet wheel and said toothed wheel, and said toothed wheel advancing said frame to a position against the rail and pulling the tie from beneath the rail.

6. A tie puller comprising a frame, a toothed

wheel journalled in said frame for engaging the top face of the tie, two ratchet wheels associated with said toothed wheel, a bifurcated pawl each side of which is adapted to coact with one ratchet wheel, and means for moving said pawl to rotate said ratchet wheels and said toothed wheel.

7. For use in a tie puller operable to engage the top face of a tie, a wheel having teeth about the periphery thereof, said wheel being intended for rotation in one direction, said teeth having tapered sides and ends all being slanted forward in the direction of rotation, and each tooth having a flat front face slanted forward from inside to outside with respect to such rotation and forming a cutting edge at the outside and substantially parallel to the axis of rotation of the wheel.

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