Oct. 5, 1965 E. H. KRAUSE, JR 3,210,046

TIE BUTTING MEANS

Filed Jan. 18, 1963 4 Sheets-Sheet 1

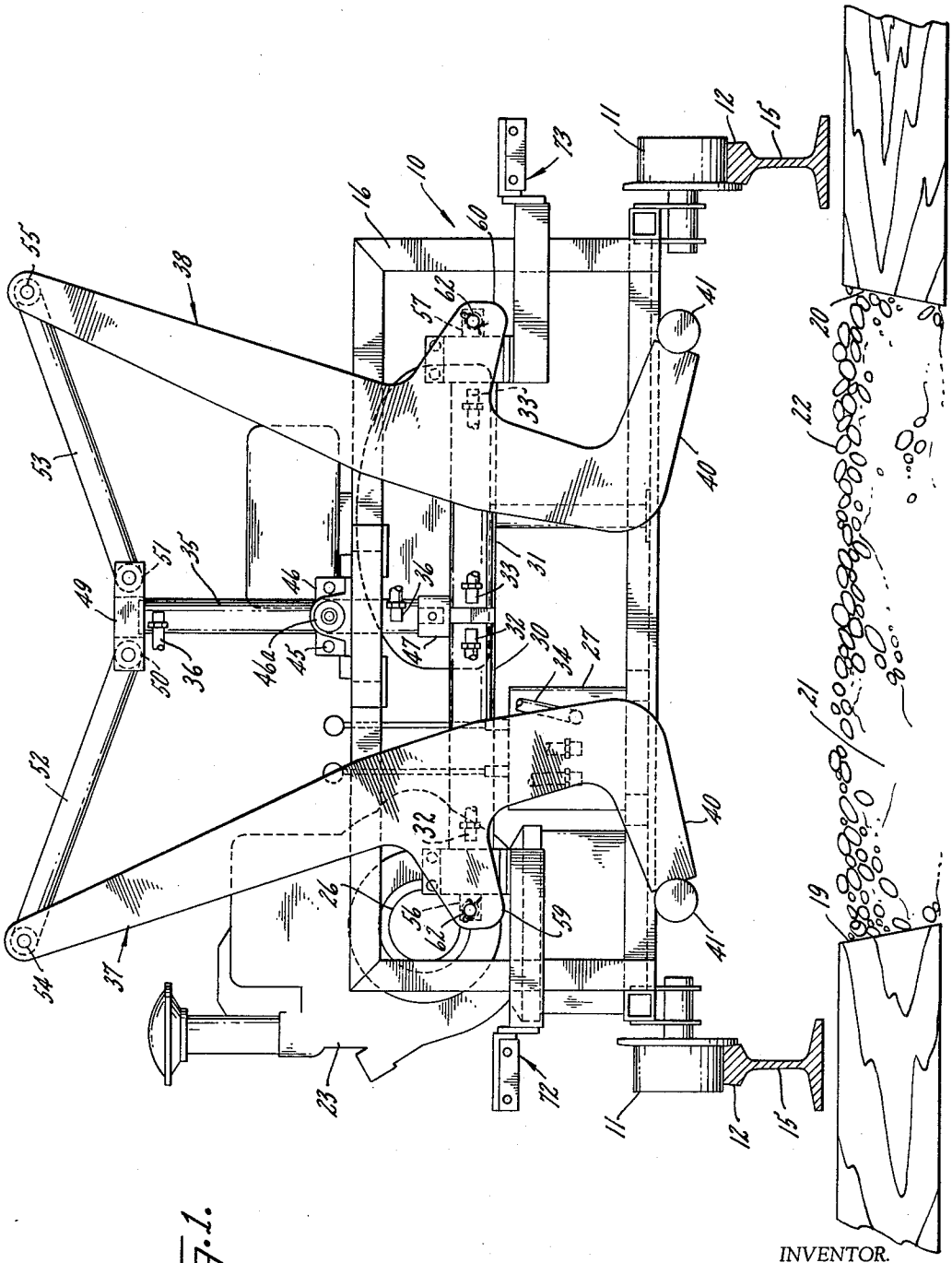


Fig. 1.

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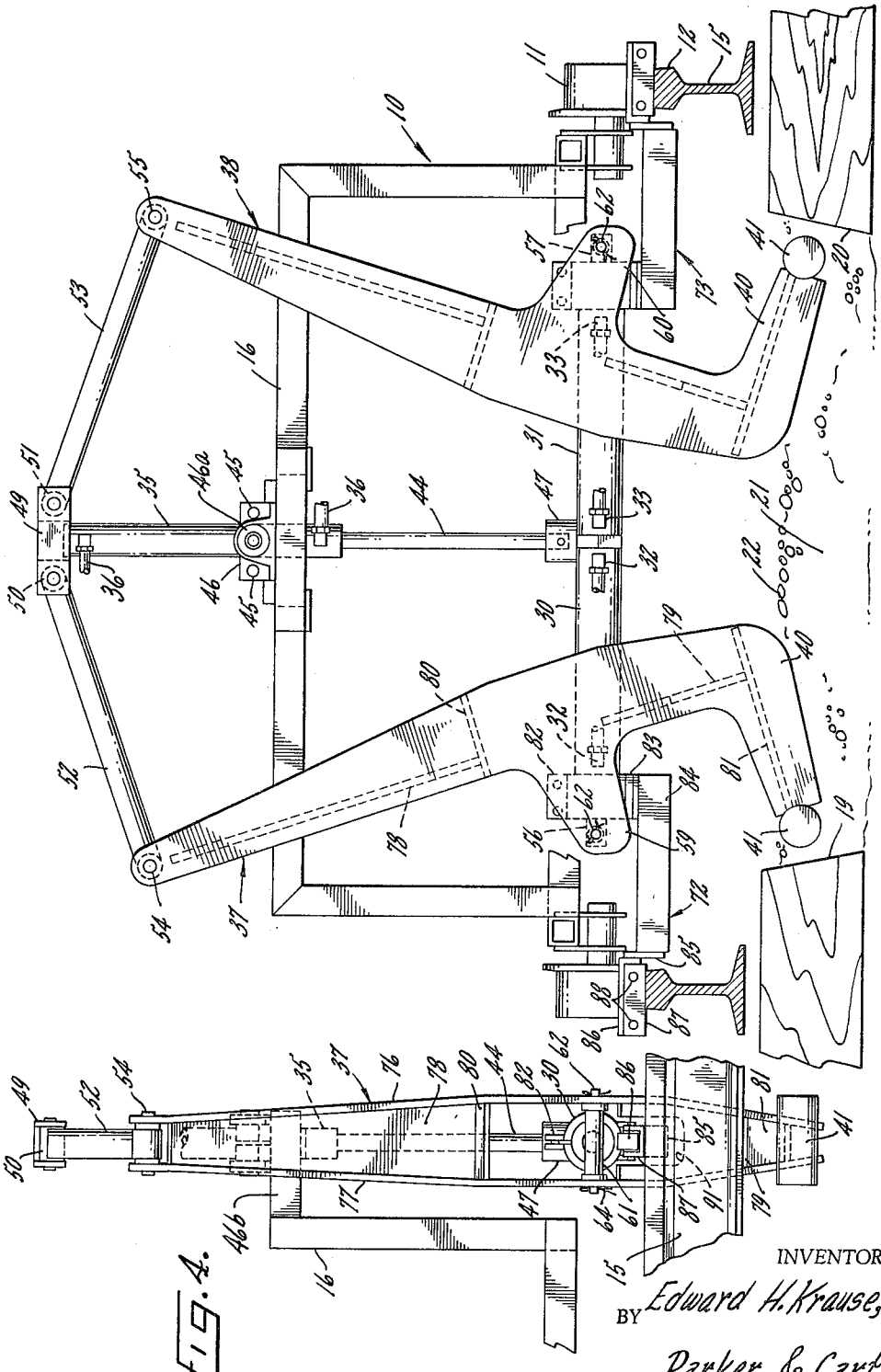


FIG. 2.

FIG. 4.

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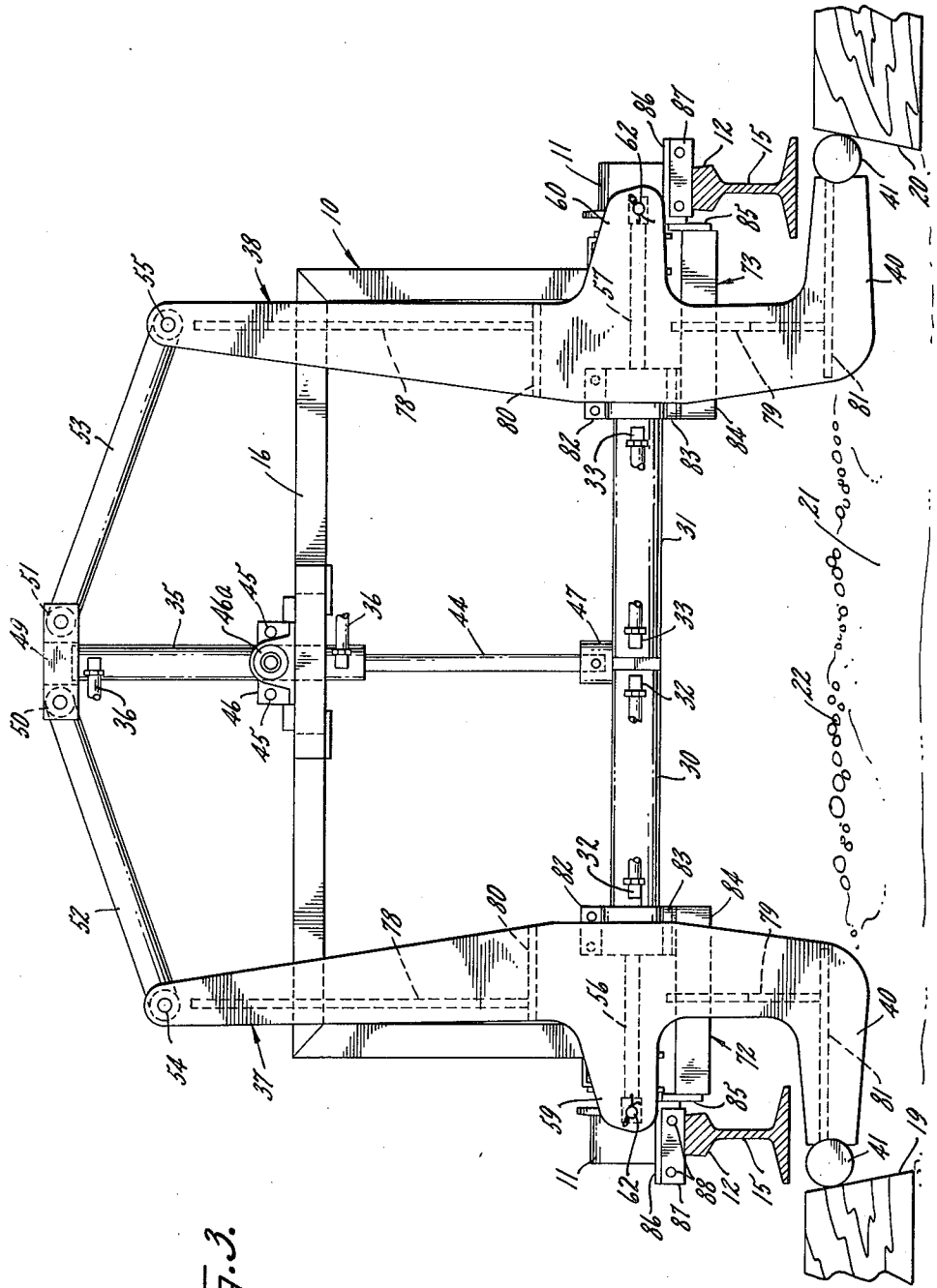


FIG. 3.

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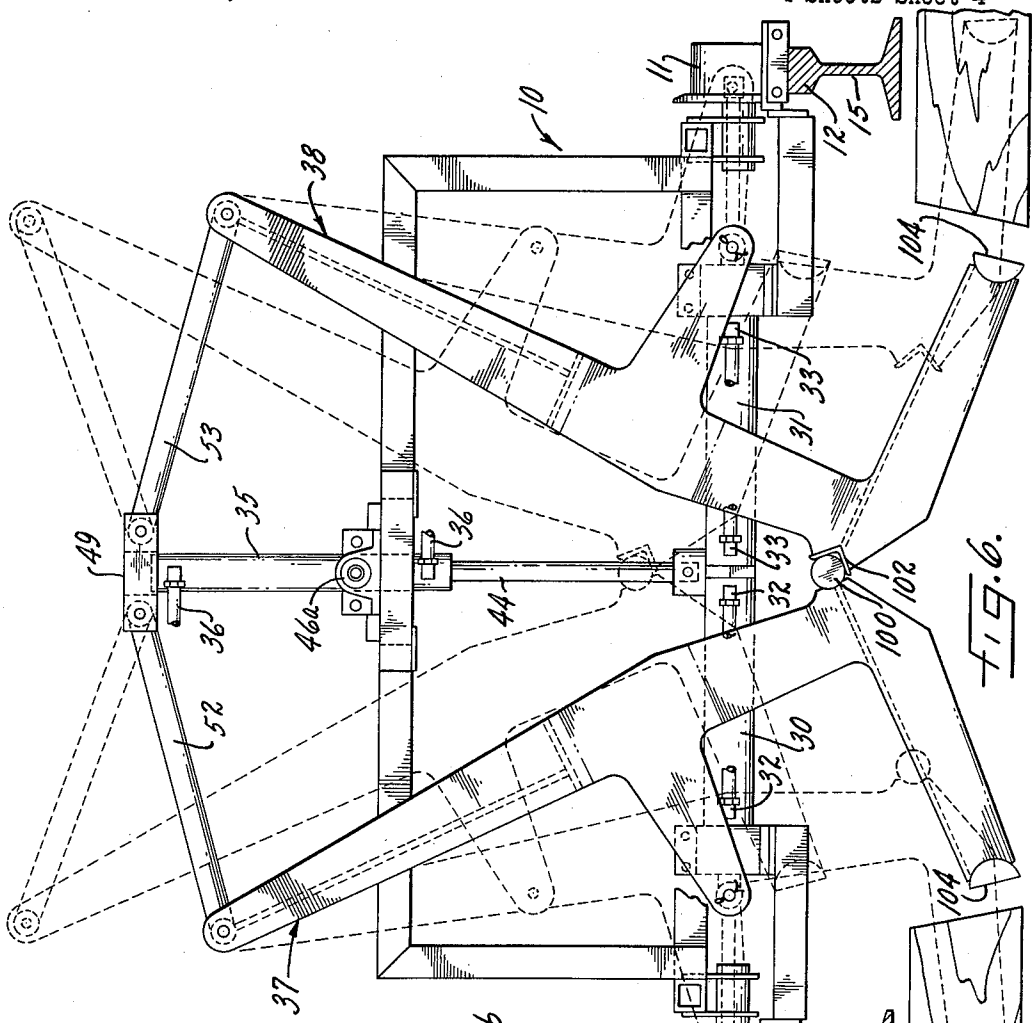


FIG. 6.

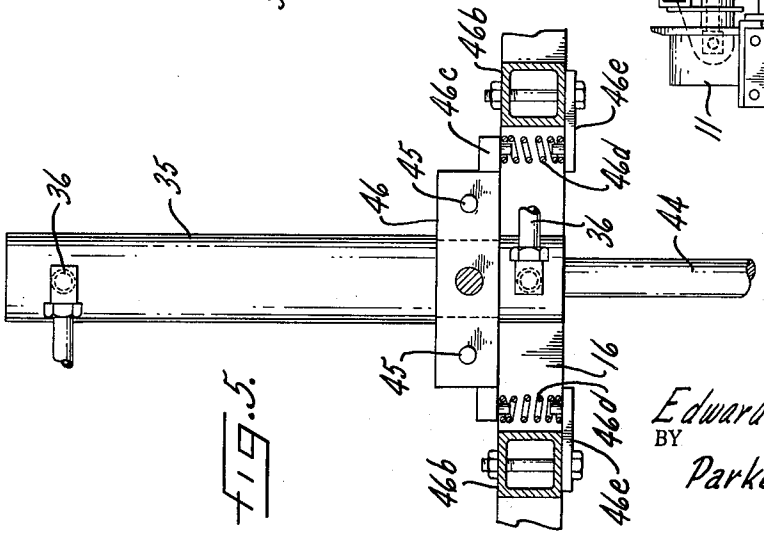


FIG. 5.

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3,210,046

TIE BUTTING MEANS

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Filed Jan. 18, 1963, Ser. No. 252,422
9 Claims. (Cl. 254—44)

This invention relates to means for removing severed tie portions beneath rails; it particularly relates to a method and means for directing thrusting forces against opposed tie portions under spaced rails.

An object of this invention is a method and apparatus which directs a generally simultaneous thrusting force against the inner ends of severed tie portions.

Another object is a method and apparatus with thrusting means which simultaneously remove severed tie portions from beneath spaced rails.

Another object is a method and apparatus with opposed levers which remove opposed tie portions under spaced rails by separate butting forces.

Another object is a method and apparatus with opposed thrusting means adapted to be lowered into a trench opened by removal of a severed tie portion.

Another object is a method and apparatus for removing end tie portions with opposed thrusting means which are actuated by means above a trench opened by removal of a central tie portion.

Another object is a method and apparatus for removing end tie portions with opposed levers powered by means which at all times are spaced above the trench opened by removal of a central tie portion.

Another object is a method and apparatus with opposed thrusting means having a gauge member to determine the lowering of the thrusting means into a trench opened by the removal of a severed tie portion.

Another object is a method and apparatus having opposed levers powered to laterally thrust against inner ends of tie portions, and gauge members associated with the levers to determine the lowering of the levers when the gauge members contact spaced railheads.

Another object is a method and apparatus with upright levers which have lower lateral thrusting faces adapted to butt the inner ends of severed tie portions.

Another object is a method and apparatus with upright levers having lower lateral thrusting faces and means to lower the levers into a trench, which has been opened by removal of a severed central tie portion, so that a butting force may be directed against the inner ends of tie portions underneath spaced rails.

Such objects are realized along with other objects which will become apparent from reading the specification and the claims by the invention which will be described in detail and which is illustrated in the accompanying drawings wherein:

FIGURE 1 is a partly diagrammatic front view of thrusting means on a vehicle base;

FIGURE 2 is a partly diagrammatic front view with parts removed showing the thrusting means in a lowered position;

FIGURE 3 is a partly diagrammatic front view with parts removed showing the thrusting means removing tie parts;

FIGURE 4 is a side view of a thrusting lever with parts removed;

FIGURE 5 is an enlarged view, partly in section, of a portion of FIGURE 2; and

FIGURE 6 is similar to FIGURE 2 but of a variant form.

An embodiment for removing tie ends is shown in FIGURE 1 mounted on a vehicle base shown generally as **10**. The vehicle base may be a railway machine with

the usual flanged wheels **11** mounted on heads **12** of rails **15**. The rails, of course, are mounted on ties. The end portions **19** and **20** are shown in a trench **21** opened by removal of a central tie portion. The trench is formed by the ballast **22**. The usual tie plates below the rails have been omitted in the drawings although the tie ends may be removed in the manner set forth hereinbelow with the tie plates in place.

The vehicle base or railway machine will not be described in detail because such machines are well known in the art and are not essential to the practice of this invention. It may, however, be mentioned that a frame **16** is present to hold various units, and a gasoline engine **23** or the like may be mounted to run the machine. A hydraulic pump **26** may be driven by the engine to supply high pressure hydraulic fluid to various cylinders and drives through appropriate connectors, not shown in detail, controlled by a suitable lever operated valve unit **27**. The unit may be self propelled or otherwise. The details of the hydraulic circuit may be standard and are not important. Suitable hydraulic lines convey pressure fluid to and from thrusting cylinders **30** and **31** through connections **32**, **33** respectively. Line **34** provides pressure to a lift cylinder **35** through connections **36**.

The thrust cylinders are connected to thrust levers shown generally at **37** and **38**. The levers are shown mounted on one end of the vehicle base but it may be otherwise. The levers are shown with lower lateral outwardly disposed arms such as **40** with a butting face made of a bar **41** secured to the end thereof.

The thrust cylinders **30** and **31** are aligned and formed into a single unit which is lowered and raised by rams **44** of lift cylinders **35** connected to them by a pin joint **47**. The lift cylinder is clamped between trunnions or blocks **46**, one on each side and pulled together by bolts **45**. The blocks in turn are pivoted in aligned bearings **46***a*, one for each block, which are in turn mounted on an extension of the frame, as at **46***b* in FIGURE 4. The blocks **46** have extensions **46***c* which engage springs **46***d* carried by plates **46***e* mounted on the frame extension **46***f*, as shown in FIGURE 5. Thus, while the lift cylinder is free to pivot in bearings **46***a*, the springs resist or limit this movement. A plate **49** is shown fixed to the top of the lift cylinder. The opposed ends of the plate hold the pivoted inner ends **50**, **51** of links **52** and **53**. The outer ends of the links are pivoted to the top of the levers at **54** and **55** to form a composite linkage.

The thrust cylinders have rams **56** and **57** which are connected at their outer ends to upper lateral arms **59** and **60** of the levers. Each ram is fixed to a collar **61** which receives a transverse pin **62** held in the upper arms **59** and **60** by means such as cotter pins **64**.

Gauge members generally shown as **72** and **73** are associated with each lever. FIGURE 4 shows the details of this connection as well as other details of one lever. This lever is seen to have spaced side walls **76** and **77**, and the lever is made structurally rigid by connecting vertical walls **78**, **79** and horizontal connecting walls such as **80** and **81**.

The trust cylinders such as **30** have an upper flange connection **82** and a lower flange **83** to which is connected extending member **84** of the gauge member **72**. The connection is not shown but may be conventional welds, bolts or the like. The extending member has a vertical plate **85** to which is fixed a horizontal bar or finger **86**. The horizontal bar is shown seated, insulated and secured in horizontal channel **87** by bolts or the like **88**. The vertical connecting plates such as **79** have a clearance **91** through which extending member **84** may pass when the lever moves laterally against the tie ends. The upper and lower lateral arms of the levers are sufficiently spaced apart so that the gauge member and rail may enter such

space when the thrust face of the lower lateral arm butts against the inner end of the tie portions.

The use, operation and function of the invention are as follows:

As is well known, ties in track require frequent replacement due to wear, rot, vermin, etc. Cutting worn ties in three parts and removing the center and end pieces separately is old. Removing the ends, under each rail, has been troublesome. The spikes are usually removed, but the tie plates may be left in place.

Basically the present invention is concerned with providing a generally horizontal outward thrust between the tie ends which will be effective against both at the same time, so that the tie end offering the least resistance will not use or absorb all of the force. This is to say that both tie ends will be ejected or kicked out at approximately the same time even though one of them may and will offer less resistance than the other.

It is inevitable that the tie ends will offer different resistance. Thus, if the outward thrust is only counterbalanced by or between the tie ends themselves, one tie end will be kicked out—the one offering the least resistance—while the other will stay in place, until the first one is completely out.

This invention has the advantage that the thrust mechanism, be they hydraulic cylinders or otherwise, is coordinated so that both tie ends are pushed out at about the same time, thus substantially reducing the time required for the machine to go through a full cycle.

In the form shown, the abutments **85** on the gauge members **72** and **73** are a fixed distance apart, slightly less than the distance between the gauge faces of the rails. For example, standard gauge in the United States is 56½ inches, so the faces **85** may be 55½ inches apart, allowing ½ inch clearance on each side. This is only an example. They should be of sufficient clearance so that no difficulty is encountered in lowering the mechanism into the trench.

The mechanism may be carried by a separate wheel car, either self propelled or otherwise. Or it may be carried on another unit, for example, a tie cutter or on a separate mobile ground contacting unit.

The arrangement shown has the advantage that the lift cylinder may be used to raise the entire mechanism well above the rails during travel. Also, during operation, the push cylinders **30** and **31** are not lowered in the ballast but remain well above it. Thus, the piston rods will not be scored or damaged by the ballast.

When the mechanism is lowered into a trench, each of the push cylinders is energized. If, for example, the tie end on the left, designated as **19** in FIGURE 2, has the least resistance, it will start moving first. As both push cylinders extend, the cylinders and gauge members will shift to the left until the gauge face **85** abuts the left rail. This is almost instantaneous. Thereafter, the tie end on the right, designated **20** in FIGURE 2, will start to move. At the same time the left tie end continues its movement.

Had this been reversed, with the right tie end **20** offering the least resistance, it would start to move first until gauge member **73** contacted the right rail. Thereafter, left tie end **19** will begin to move. Again, the time involved from the movement of the first tie end until the second one starts to move is quite small. The result is that, in effect, both tie ends are pushed out at the same time.

It should be emphasized that the push cylinders **30** and **31** are separately connected to power source so that each will extend or retract at the same time. One will not rob or hog all of the high pressure fluid.

While the gauge members are shown as having fingers **86** in FIGURE 2, this is not absolutely necessary. Since the lowest position of the mechanism may be determined by the levers **37** and **38** hitting the bottom of the trench, these depth gauge fingers may not be necessary.

In FIGURE 6 a variant form has been shown in which the structure is basically the same except that the inner portions or heels of the levers carry a free socket composed of a round **100** welded or otherwise secured on one lever, and an angle iron **102** on the other. These are positioned and proportioned such that when the push cylinders fully retract bringing the levers together, the round fits in the angle. Thus, the levers are vertically interlocked and tend to stay together. This has the advantage that on a curve where one rail is higher than the other, the mechanism would tend to pivot about the lift cylinder bearing against the resistance of springs **46***d*. The joints **100** and **102** prevents one lever from dropping and the other rising. The joints, however, do not hinder the operation of the device in kicking or pushing the tie ends out but merely keeps the over-all linkage properly disposed when the device is working on super elevated track.

The springs allow a limited degree of pivoting of the lift cylinder, but not much. Just enough to prevent the over-all structure from being rigid and thereby protecting it, but without in any way affecting its basic operation.

As shown in FIGURE 6, the pushing or contacting faces **104** may be half rounds with the blunt face outward and disposed at an angle corresponding somewhat to the angle of the cut face normally encountered on the tie ends. This angle will depend somewhat upon the type of equipment used to cut the tie into three pieces. The angle shown on the ends of the inside of the tie ends of the drawings normally result from using the machine and method disclosed in application Serial No. 161,546, filed December 22, 1961.

While the machine has been disclosed as usable primarily for pushing out the tie ends in a tie replacing operation, it should be understood that it may have other uses. For example, it may be used to remove ballast in the crib from under the rail base so that snow, water, etc. does not collect. The toes or feet at the bottom may be somewhat elongated for this purpose, and it will be noted that the feet at the bottom of the levers in FIGURE 6 are somewhat longer than those in FIGURE 2.

While the preferred form and one modification has been shown and described, it will be understood that suitable additional modifications, changes, substitutions and alterations may be made without departing from the invention's fundamental theme. It is therefore wished that the invention be unrestricted except in view of the prior art.

I claim:

1. A method for removing tie portions remaining under rails after a trench has been opened by removal of a severed central tie portion, which includes the steps of lowering opposed thrusting means into the trench in general alignment with the inner ends of the tie portions, moving said thrusting means into contact with the inner ends, separately actuating the opposed thrusting means, and then laterally actuating the thrusting means generally simultaneously against the inner ends of the tie portions to push the tie portions from beneath the rails.

2. A device for removing tie parts from beneath the rails of a track which includes a base, means to move the base along the track, an opposed pair of levers, means to thrust the levers against the tie parts, means to lower the levers into a trench opened by removal of a cut central tie portion and in general alignment with the tie parts, and gauging means associated with the levers and adapted to contact the rails to thereby determine the lowering of the levers.

3. A device for removing tie parts from beneath spaced rails of a track which includes, a base, means to move the base along the track, opposed levers on the base, means to lower the levers into a trench opened by removal of a cut central tie portion, thrusting cylinders having a ram connected to each lever, gauging means associated with the cylinders to intercept each rail, the span of the gauging means being less than the distance between the rails,

the gauging means adapted to intercept the adjacent rail and stop the travel of the cylinder, but not the ram, by the thrusting force when one tie portion offers less resistance than the other tie portion to the ram, and each cylinder supplied by an independent thrusting force.

4. In a device for removing tie portions from beneath the rails of a track including a base, means to position the base over a trench opened by removal of a central tie portion, separated thrusting means on said base, said separated thrusting means including a plurality of levers having lower ends formed and adapted to engage the inner ends of said tie portions, and separated means for generally simultaneously exerting a thrust outwardly against said levers, whereby the tie portions are moved outwardly generally simultaneously from beneath the track rails.

5. The structure of claim 4 further characterized by and including hydraulic means for actuating said levers.

6. A device for removing tie portions from beneath the rails of a track which includes, in combination, opposed levers, a working face on each lever, means to generally simultaneously thrust the levers outwardly so the said faces push against the tie parts, and means to lower the levers into general alignment with the tie parts.

7. A device as in claim 6 further characterized by and including hydraulic means to actuate the levers.

8. A device as in claim 6 further characterized in that the levers are disposed in a generally vertical manner and the working faces extend laterally from each lever.

9. A device for removing tie portions from beneath the rails of a track which includes, in combination, a base, means to move the base along the track, opposed levers on the base, means to lower the levers into a trench opened by removal of a central tie portion, said levers being in general alignment with the opposed tie portions in the trench, each lever having a lower lateral pushing surface and a hydraulic cylinder and ram above the trench to move each of the levers laterally, and each lever being hydraulically actuated independently of the other lever.

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