Aug. 28, 1956 R. G. KERSHAW 2,760,440

APPARATUS FOR RAISING RAILROAD TRACKS

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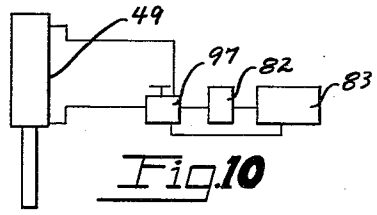


Fig. 10

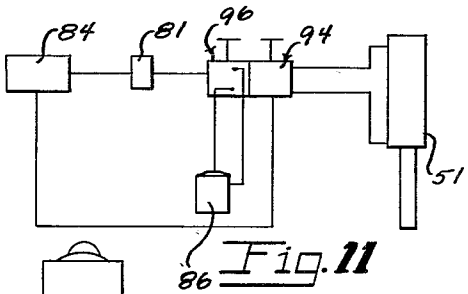


Fig. 11

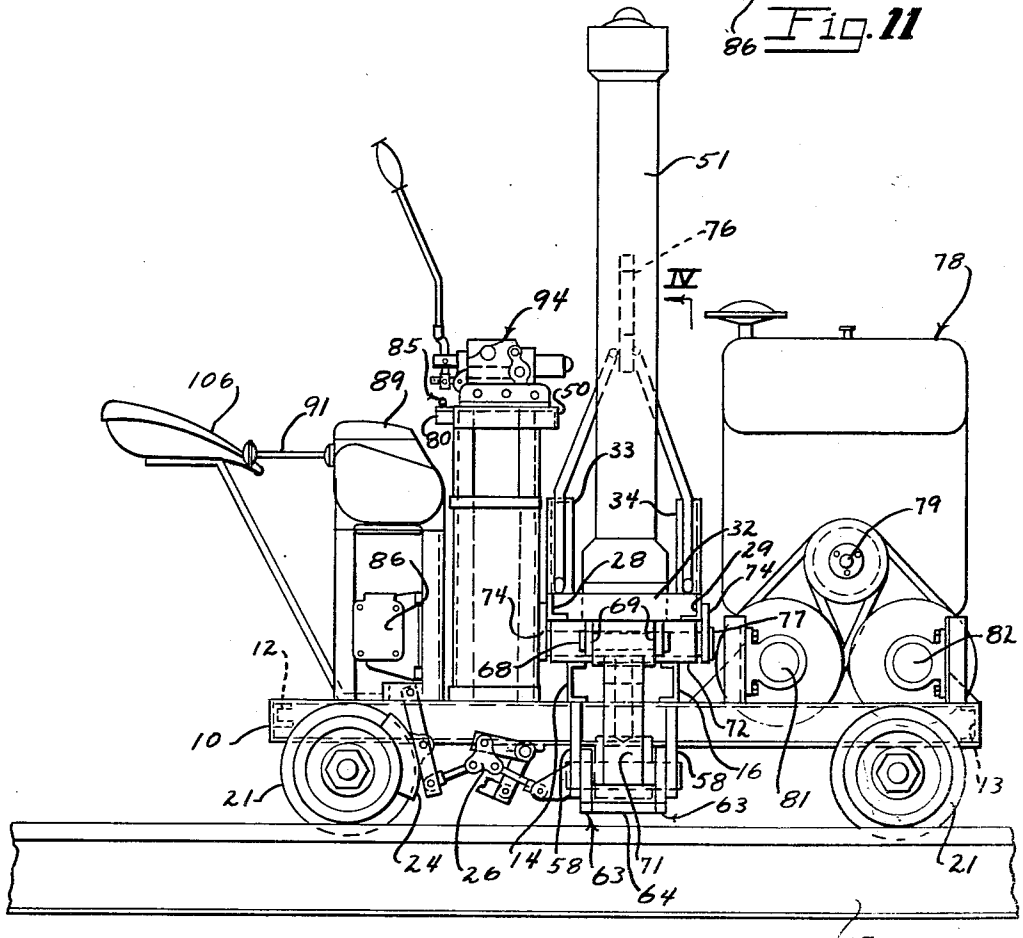


Fig. 1

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APPARATUS FOR RAISING RAILROAD TRACKS

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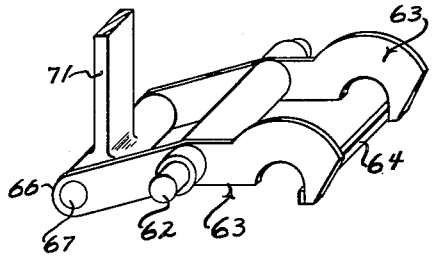


Fig. 9

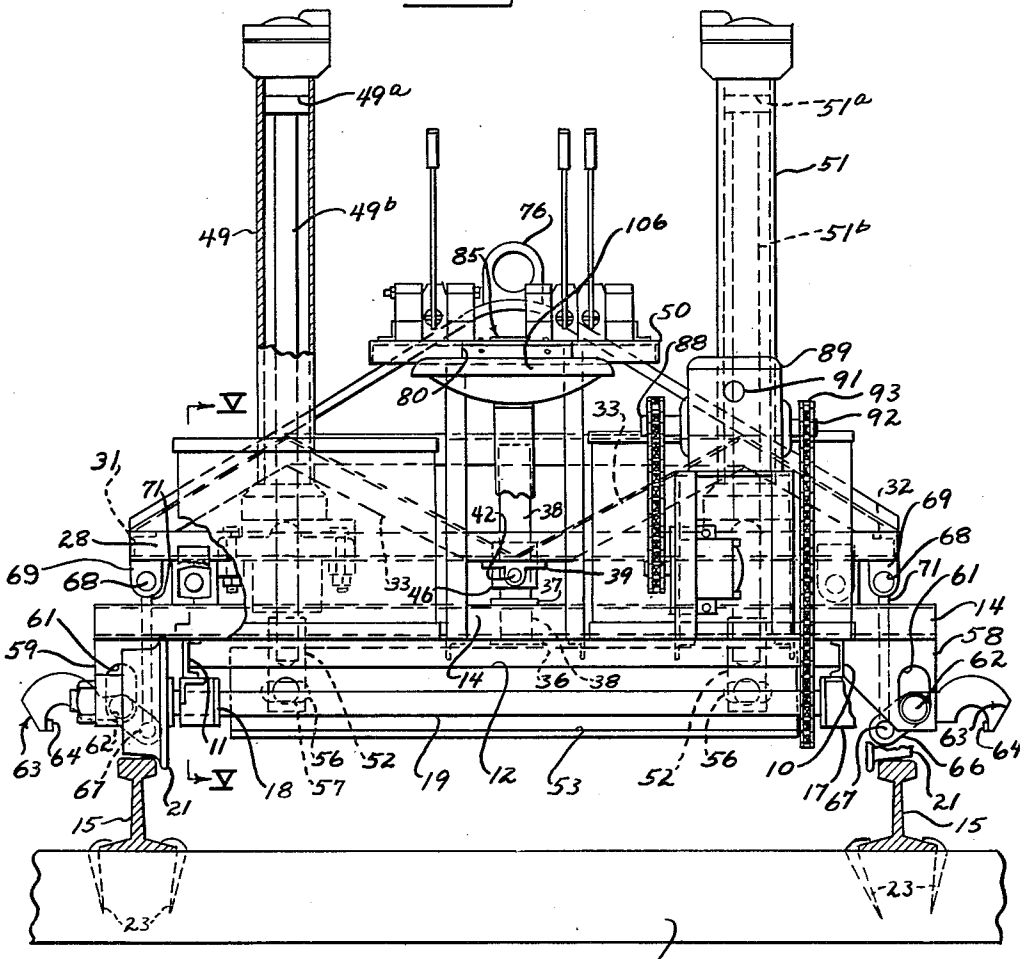


Fig. 2

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APPARATUS FOR RAISING RAILROAD TRACKS

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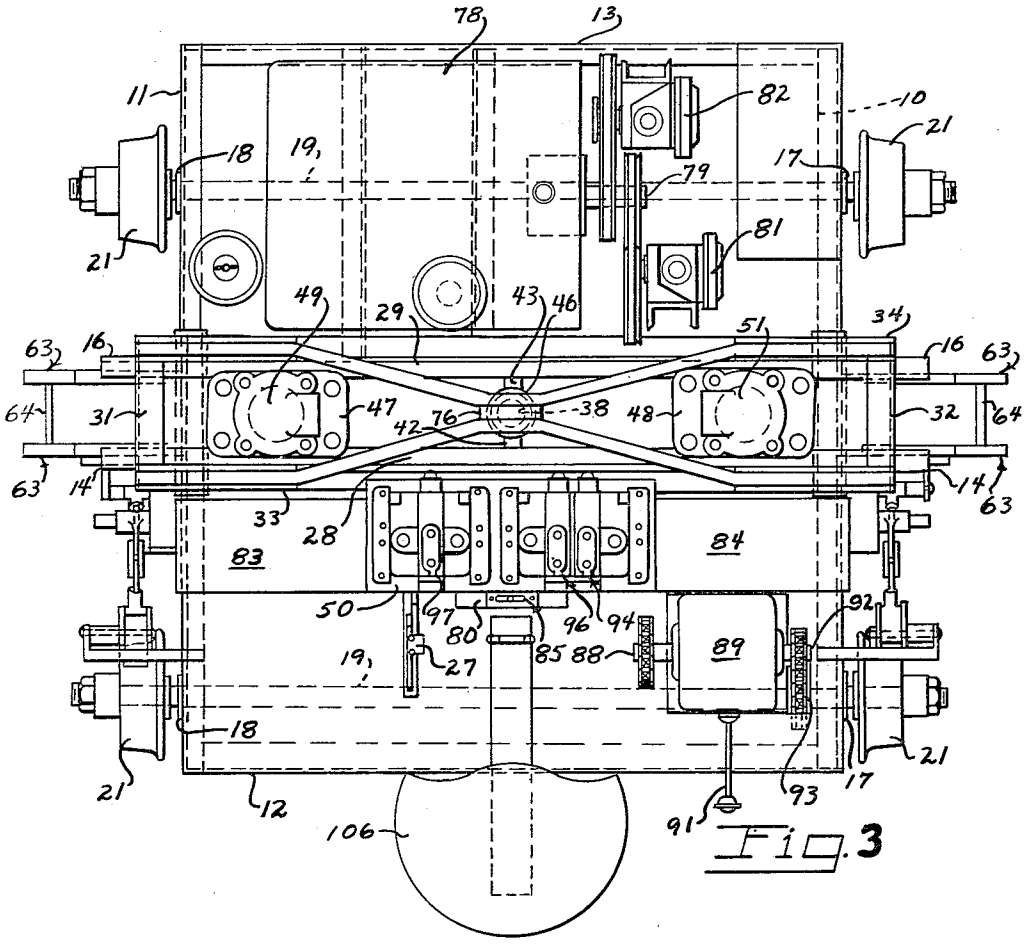


Fig. 3

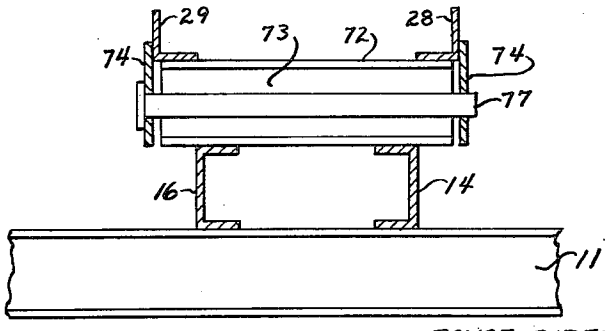


Fig. 5

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APPARATUS FOR RAISING RAILROAD TRACKS

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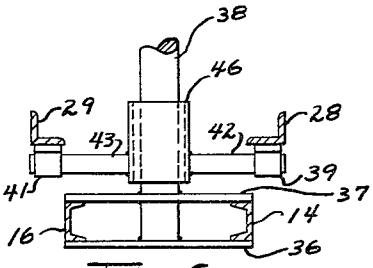


Fig. 6

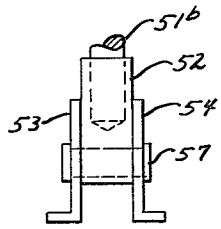


Fig. 7

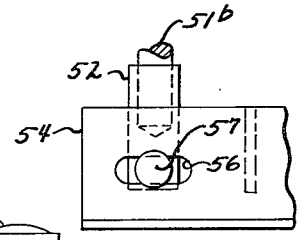


Fig. 8

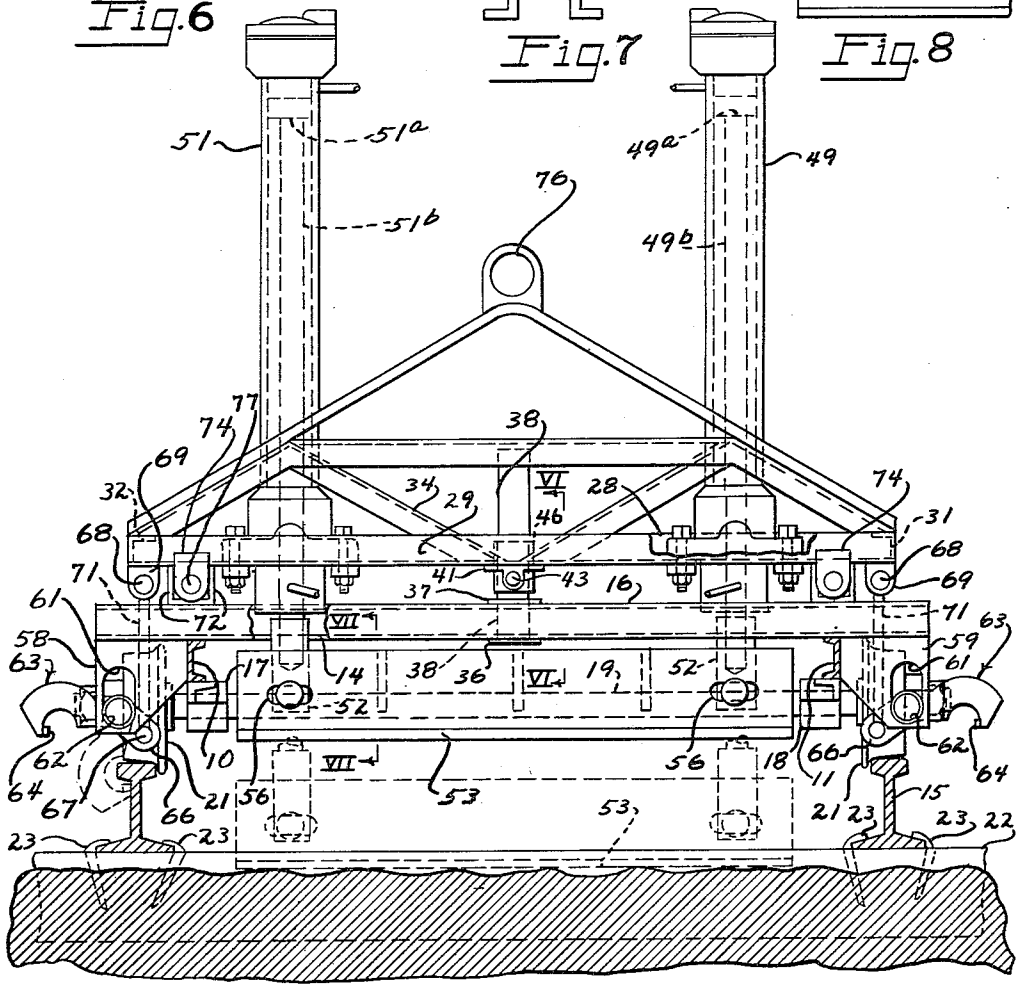


Fig. 4

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APPARATUS FOR RAISING RAILROAD TRACKS

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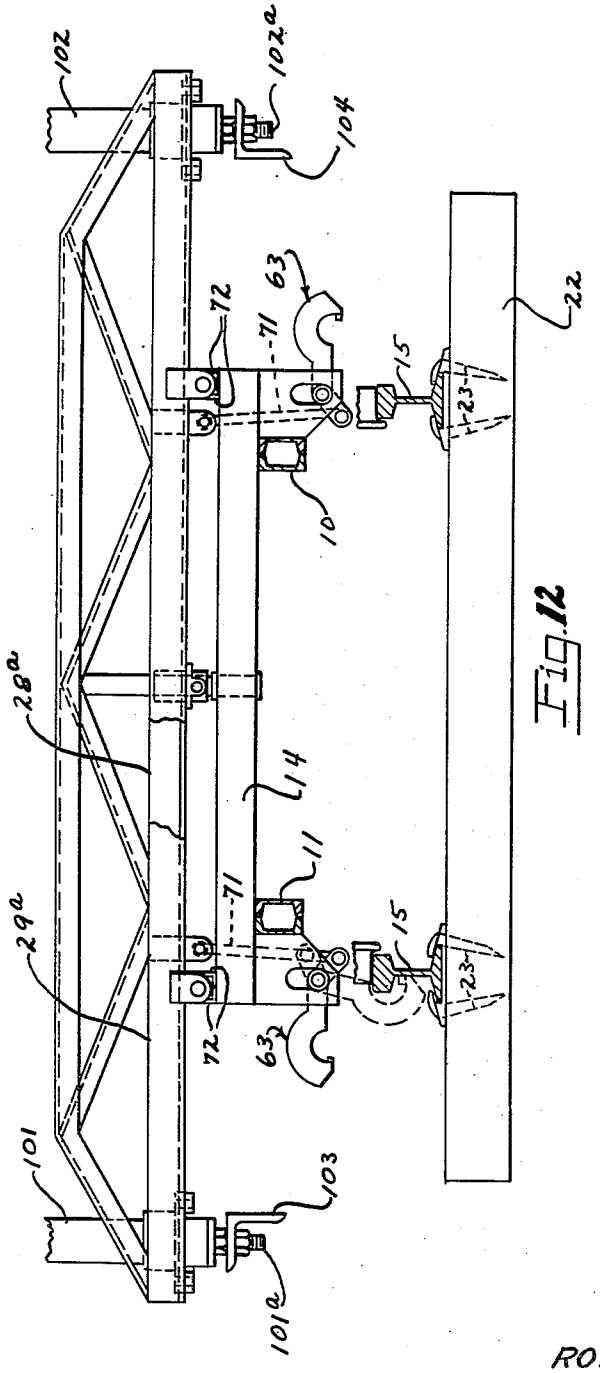


Fig. 12

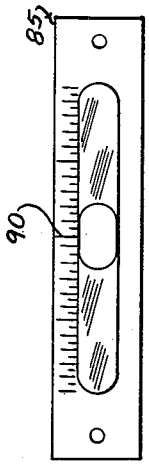


Fig. 13

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APPARATUS FOR RAISING RAILROAD TRACKS

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Application February 11, 1954, Serial No. 409,729

9 Claims. (Cl. 104—7)

This invention relates to apparatus for raising railroad tracks for the purpose of rehabilitating the track, that is, for such operations as surfacing, retimbering, reballasting or any other operation wherein the rails or rails and cross ties must be raised from the roadbed.

An object of my invention is to provide apparatus of the character designated by which a single operator may do the work of raising the track which at present and by manual means requires a gang of from about 4 to 8 men, and at the same time, to accomplish the track raising operation with more accuracy and efficiency than with hand methods.

My invention contemplates apparatus in which either rail and attached ties selectively may be raised, or, if desired, both rails may be raised simultaneously, either to the same height above the original tie bed or to different heights above the original bed, thus providing an all around, universal apparatus which may be used to position each rail at the desired elevation.

My invention contemplates a vehicle adapted to run upon the rails and having essentially two frame components, namely, a lower frame to which are secured wheels and track engaging dogs, and an upper frame, movable vertically relative to the lower frame, together with means engaging the roadbed between the cross ties for raising the upper frame relative to the lower frame and also in which there are links connecting the rail gripping means to the upper frame, whereby, upon upward movement of the upper frame the entire vehicle, rails and attached ties are raised upwardly.

My invention contemplates lifting apparatus in which the lifting member or foot has fluid pressure cylinders, or the like, adjacent each end thereof, in combination with rail gripping members, the foot being disposed to rest on the roadbed between the cross ties, whereby upon energizing the cylinders the entire vehicle, rails and ties are raised upwardly.

My invention further contemplates a main frame carrying wheels that run on the rails and which also carries automatically actuated rail gripping dogs together with a lifting frame movable vertically relative to the main frame which carries the fluid pressure cylinders and the lifting foot, in combination with links directly connecting the upper frame to the gripping means.

A further object is to provide apparatus of the character designated which embodies a frame arrangement of the character indicated in which the dogs are directly connected to the upper frame through tension or pull members whereby the upward lift of the entire apparatus is directly transmitted to the rails without substantial loading of any of the portions of the device.

A still further object is to provide apparatus having the foregoing advantages in which the rail gripping members automatically adjust themselves to rails of different sizes within practical size ranges, permitting the vehicle to be used on a large number of different rail sizes without change in the structure thereof, or requiring any manual adjustments of the unit.

Apparatus illustrating features of my invention is shown in the accompanying drawings forming a part of this application in which:

Fig. 1 is a side elevational view of my improved apparatus with the rail gripping dogs in disengaged position;

Fig. 2 is an end elevational view, certain of the parts being broken away for the sake of clarity;

Fig. 3 is a plan view of my improved apparatus with certain of the parts broken away;

Fig. 4 is a detail sectional view taken generally along line IV—IV of Fig 1;

Fig. 5 is an enlarged detail sectional view taken generally along line V—V of Fig. 2;

Fig. 6 is a detail sectional view taken generally along line VI—VI of Fig. 4;

Fig. 7 is a detail sectional view taken generally along line VII—VII of Fig. 4;

Fig. 8 is a detail side elevational view of the mechanism shown in Fig. 7;

Fig. 9 is an isometric view of one of the rail gripping dogs removed from the remainder of the apparatus;

Fig. 10 is a schematic diagram illustrating the hydraulic system for one of the cylinders used for raising one rail of the track;

Fig. 11 is a schematic diagram illustrating the hydraulic system for the other cylinder used for raising the other rail of the track and which also includes a reversible fluid pressure motor for propelling the vehicle along the railroad track;

Fig. 12 is a fragmental cross sectional view showing a slightly modified form of lifting mechanism or upper frame assembly; and,

Fig. 13 is a plan view of a leveling device which may be employed to indicate the differences in elevation between the rails of the track.

Referring now to the drawings for a better understanding of my invention and more particularly to Figs. 1 to 11 inclusive, it will be seen that my improved apparatus embodies a main or lower frame having longitudinal side channels **10** and **11**. At the ends of the channels **10** and **11** are cross channels **12** and **13** which serve to make a rigid frame. Near the center of the frame, spanning the longitudinal channels **10** and **11**, are other parallel cross channels **14** and **16** which are secured in suitable manner as illustrated to the tops of the longitudinal channels.

Secured under the channels **10** and **11** are journal boxes **17** and **18** in which are journaled cross axles **19**. The axles carry flanged wheels **21** disposed to run upon the railroad rails **15** in the manner well understood. The rails are supported on cross ties **22** and are held to the cross ties by spikes **23**.

The lower frame of the vehicle may also carry brakes **24** which are actuated by a linkage mechanism indicated generally by the numeral **26** and which may be applied manually by means of a hand lever **27** as shown in Fig. 3.

The upper frame comprises a pair of transverse angles **28** and **29**, parallel to each other and having cross angles **31** and **32** at the ends thereof. The angles **28** and **29** are strengthened in vertical planes by means of V-shaped trusses **33** and **34** which may be formed of angles welded to the tops of the angles **28** and **29**.

The lifting or upper frame is supported for vertical movement relative to the lower frame. This mounting comprises a pair of plates **36** and **37** which are welded on top of and below the channels **14** and **16**, adjacent the longitudinal mid-point thereof. Secured in the plates as by welding is a vertically upstanding pin **38**.

The upper frame angles **28** and **29** carry bearing blocks **39** and **41** respectively for receiving the outer ends of short shaft members **42** and **43**. The inner ends of the shaft members **42** and **43** are welded to a sleeve **46**

which slidably receives the pin 38. The upper frame is thus slidably mounted on the pin 38.

Spanning the angles 28 and 29 are plates 47 and 48. Mounted on the plates 47 and 48 are vertically disposed fluid pressure cylinders 49 and 51, respectively. The cylinders 49 and 51 have pistons 49*a* and 51*a* respectively, and piston rods 49*b* and 51*b*, respectively. The cylinders may be operated by fluid under pressure and preferably are double acting. The piston rods 49*b* and 51*b* project from the lower ends of their respective cylinders and are secured at their lower ends in sleeves 52, the details of which are shown more particularly in Figs. 7 and 8. Since both of the sleeves are identical a description of one will suffice for both. As shown in Figs. 7 and 8, the sleeves 52 are disposed between a pair of angles or plates 53 and 54. The angles or plates are provided with slots 56. Passing through the slots and through the sleeves 52 are pins 57 which are slidable in the slots 56 and which pivotally connect the sleeves to the angles or plates 53 and 54. The angles or plates 53 and 54 form in effect the lifting foot of the apparatus which is to be pressed downwardly between the cross ties. Due to the sliding connection 56 as will later appear, one of the rails may be raised to different elevation from the other.

Welded beneath the channels 14 and 16 at each end thereof are depending plates 58 and 59. The plates are provided with aligned vertically disposed slots 61. Passing through the slots 61 and movable vertically therein is a pin 62. Secured to the pin 62 are C-shaped rail clamping units or dogs 63. The lower ends of the jaws of the C-shaped units are cross connected by means of a plate 64. Each of the dogs has an inward extension or arm 66.

Pivotally connected to pins 67 passing through the extension 66 of the dogs and to pins 68 carried by depending lugs 69 on the connecting angles 31 and 32 are links or tension members 71. As illustrated in Figs. 2 and 4 the inner edges of the plates 58 and 59 may also be welded to the vertical sides of the channels 10 and 11.

Inwardly of the depending brackets 69, and welded across the tops of the channels 14 and 16 are short lengths of channels 72 with the flanges thereof abutting. This arrangement forms passages 73. Depending from the sides of the angles 28 and 29 are sets of lugs or ears 74 which, when the upper frame is in its lowermost position, lie at each end of the passages 73 between the channels 72. When it is desired to lock the upper frame against movement relative to the lower frame as when lifting the device from the track by the eye 76, pins 77 may be inserted through the brackets 74 and the channels 72. This prevents the dogs 63 from engaging the rails, permitting the entire apparatus to be lifted from the track as required.

The pairs of channels 72 serve also as means to limit the downward movement of the upper frame relative to the lower frame. As clearly shown in the drawings, when in the lowermost position the angles 28 and 29 rest on the short links of channels 72.

Mounted on the lower frame in suitable manner is an internal combustion engine indicated generally at 78. The shaft 79 of the engine drives a pair of hydraulic pumps 81 and 82. The pump 82 is supplied with fluid from a supply tank 83 and the pump 81 is supplied from a supply tank 84.

Also mounted on the lower frame is a reversible fluid motor 86 which drives the input shaft 88 of a two speed forward and reverse transmission such as the sliding gear type indicated generally by the numeral 89 and which has a gear shift lever 91 extending therefrom. The output shaft 92 of the transmission drives one of the axles 19 through a sprocket chain 93. Fluid for the motor 86 is taken from the pump 81 as indicated in Fig. 11. The hydraulic cylinder 51 is under control of a valve 94 whereas the motor 86 is under control of a hydraulic valve 96. In like manner, a valve 97 controls the flow of fluid to the cylinder 49. The several valves are of the

type to admit fluid under pressure from the pump to the respective fluid pressure device and simultaneously to return fluid to the tank 83 or 84.

Mounted on the apparatus in view of the operator, such as on the base 50 for the valve assembly, is a bracket 30 for supporting a spirit type level 35. The level is provided with suitable graduations 90 whereby the operator can readily see if the track is level or which side thereof needs to be raised or lowered in order to level the same.

In Fig. 12 I show a slightly modified form of my invention in which the angles 28*a* and 29*a* are elongated to provide overhanging ends which project beyond the ends of the cross ties 22 of the railroad track. In this instance the hydraulic cylinders 101 and 102 are mounted on the outer projecting ends of the angles. Piston rods 101*a* and 102*a* are provided with lengths of angles 103 and 104 which serve to engage the roadbed outwardly of the cross ties in order to lift the track and cross ties. The dogs 63, the relative vertical sliding arrangement between the frames and the remaining mechanism other than that specifically mentioned are substantially identical to that already described. The modified form of my invention is used in those cases wherein it is desirable to keep the center of the track between the rails clear for operations while the track is raised.

From the foregoing the method of constructing and using my improved track raising mechanism will be readily understood. It will be seen that with my improved apparatus the entire track including the rails and ties may be raised to permit the packing of ballast under the ties during rehabilitation of the track or for any other operation where the raising of the track is necessary. When the lifting foot comprising the angles or plates 53 and 54 or the individual angles 103 and 104 are lowered to the ground, continued downward movement of the piston rods of the fluid pressure cylinders first pivots the track engaging dogs 63 about the pins 62, causing them to engage the vertical webs of the rails. Continued upward movement of the upper frame draws the plate 64 snugly up under the balls of the rails. The entire lifting force is transmitted directly from the upper frame through the links 71 to the extensions 66 of the gripping members 63, thus affording a substantially straight upward lift with a minimum of strain on the parts. In the event it is desired to raise one rail higher than the other the individual hydraulic systems and control valves permit the operator to raise or lower one end of the foot, or one foot, more or less than the other. By providing an operator's seat 106 adjacent the valves, the operator is positioned directly above the work and has an excellent view, thus facilitating placing of the foot between the ties. Due to the slotted arrangement for mounting the pins 62 it will be apparent that my improved apparatus is capable of gripping rails of considerable variance in height.

In actual practice I have found that my improved apparatus is fully effective for its intended purposes and that it enables one operator to replace a large number of men when raising tracks for ballasting or otherwise.

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

What I claim is:

1. In apparatus for raising a railroad track from its roadbed, a vehicle comprising a frame having wheels adapted to run upon the rails of the track, a lifting frame, means mounting the lifting frame for movement in a vertical plane relative to the vehicle frame, means on the lifting frame engageable with and operable to exert a downward force on the roadbed and thereby effective to move the lifting frame relative to the vehicle frame, rail gripping units pivotally connected to said vehicle frame,

pivoted linkage connections between the lifting frame and the rail gripping units operable in response to upward movement of the lifting frame to move the said gripping units into gripping engagement with the rails, said pivoted linkage connections transmitting the lifting forces substantially directly from the lifting frame through the rail gripping units to the rails.

2. In apparatus for raising a railroad track from its roadbed, a vehicle comprising a frame having wheels adapted to run upon the rails of the track, a lifting frame, means mounting the lifting frame for movement in a vertival plane relative to the vehicle frame, downwardly movable means on the lifting frame engageable with and operable to exert a downward force on the roadbed and thereby effective to move the lifting frame vertically relative to the vehicle frame, rail gripping dogs pivoted to the vehicle frame and engageable with the outer sides of the rails beneath the balls thereof, extensions on the dogs projecting inwardly of the pivot points of the dogs, and links pivotally connected to the lifting frame and to the extensions on the dogs and movable in response to upward movement of the lifting frame to move said gripping dogs into gripping engagement with the rails.

3. In apparatus for raising railroad tracks, a vehicle having a frame carrying wheels adapted to support the vehicle on the rails, an upper lifting frame mounted on the vehicle frame for movement vertically thereof, rail gripping dogs, means mounting the dogs on the vehicle frame for pivotal movement toward the rails and for upward movement relative to the vehicle frame, fluid pressure jack means embodying a pair of relatively movable parts, means securing one of said parts to the lifting frame with the other thereof disposed to contact the roadbed of the track, means to supply fluid under pressure to the jack means whereby a downward force is exerted on the road bed and the lifting frame is raised and lowered, and tension members connecting the lifting frame to the dogs operable upon initial upward movement of the lifting frame to pivot the dogs into contact with the rails and then move them upwardly to engage under the balls of the rails.

4. In apparatus for raising the railroad track from its roadbed, a vehicle having a frame and wheels supporting the same from the rails, a lifting frame on top of the vehicle frame mounted for vertical movement relative to the vehicle frame, a pair of fluid pressure cylinders having piston rods mounted substantially vertically on the lifting frame with the piston rods thereof extending downwardly to exert thrust against the roadbed whereby said lifting frame is raised and lowered, pivotally mounted dogs on the vehicle frame disposed to contact the outer sides of the rails beneath the balls of the rails, said dogs being mounted for upward sliding movement relative to the vehicle frame, extensions on the dogs extending inwardly of the pivot points thereof, rigid links pivotally connecting the extensions of the dogs to the lifting frame, and means to admit fluid under pressure to the upper ends of the cylinders.

5. In railroad track raising apparatus, a vehicle having a frame supported by wheels upon the rails, an upper frame mounted above the vehicle frame for movement vertically of the vehicle frame, means carried by the upper frame having roadbed engaging elements effective when so engaged to exert a downward force on the roadbed and raise the upper frame relative to the vehicle frame, rail gripping members pivotally and vertically slidably carried by the vehicle frame, and pivoted linkage connections between the upper frame and the said rail gripping members operable to hold the rail gripping members out of rail engaging position when the upper frame is lowered and to move the same to rail gripping position when the said upper frame moves a distance upwardly of the vehicle frame.

6. In apparatus for raising railroad tracks, a vehicle having a frame and wheels supporting the vehicle for movement on the rails of the track, an upper frame mounted for vertical movement relative to the vehicle frame, a pair of vertically disposed hydraulic cylinders having piston rods projecting from the lower ends thereof mounted in substantial transverse alignment on the upper frame between the rails of the railroad track, a roadbed engaging member pivotally connected adjacent each end to the lower ends of the piston rods and disposed to contact the roadbed between the cross ties of the track, pivotally and vertically slidably connected rail gripping dogs on the vehicle frame which overhang the outer sides of the rails when disengaged, extensions on the dogs extending inwardly of the pivot points thereof, rigid links pivotally connected to the upper frame and to the extensions of the rail gripping dogs, and means to admit fluid under pressure selectively to the upper ends of said cylinders whereby the piston rods move downwardly pressing the lifting member against the roadbed thereby raising the upper frame and pivoting the dogs against the sides of the rails.

7. Apparatus as defined in claim 6 in which the upper frame is mounted on the vehicle frame by means of a vertically disposed pin secured to the vehicle frame, together with a slidable connection between the upper frame and said pin.

8. In track lifting apparatus, a vehicle having a frame and wheels for supporting the frame upon the rails, an upper frame having means thereon engageable with the roadbed for raising the upper frame relative to the vehicle frame, rail engaging dogs pivotally mounted on said vehicle frame and overhanging the outer side of the rails, links connecting the dogs and the upper frame and operable upon upward movement of the upper frame to pivot the dogs into engagement with said outer sides of the rails, and manually removable means for locking the frames in lowered position relative to each other when raising the apparatus from the track.

9. In track raising apparatus, a vehicle having a frame and wheels supporting the frame upon the rails, an upper frame mounted for vertical movement relative to the vehicle frame, said upper frame having sidewise extensions projecting outwardly past the rails, fluid pressure cylinders mounted vertically on the upper frame adjacent the outer ends of the extensions and having piston rods disposed to move downwardly into contact with the roadbed outside of the rails, rail gripping dogs pivotally and vertically slidably mounted on the vehicle frame, pull links connecting the dogs to the upper frame operable upon upward movement of the upper frame to pivot the dogs into rail gripping engagement with the rails, and means to admit fluid under pressure to the upper ends of the cylinders.

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