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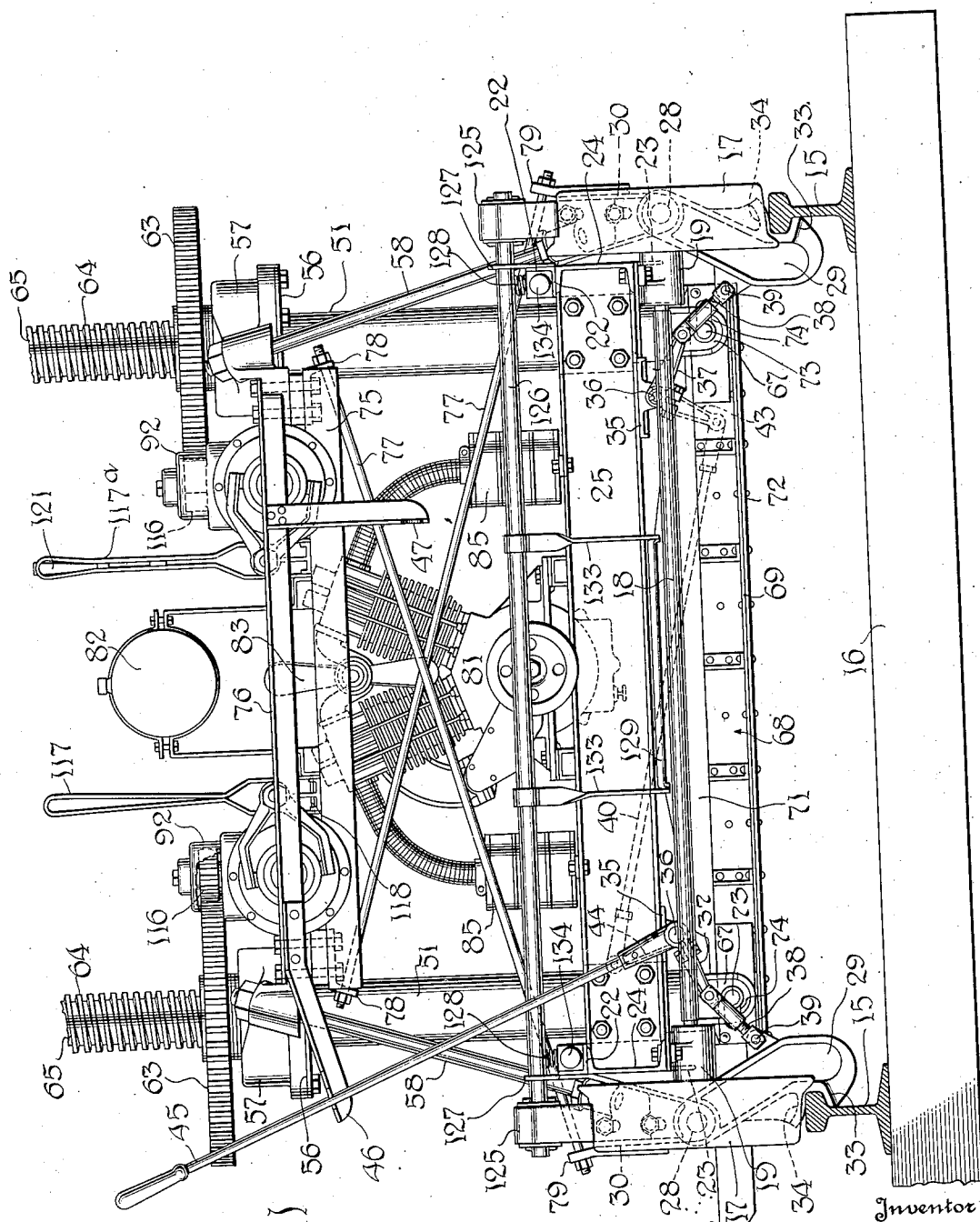
H. H. TALBOYS

1,780,989

TRACK JACK

Filed Feb. 16, 1929

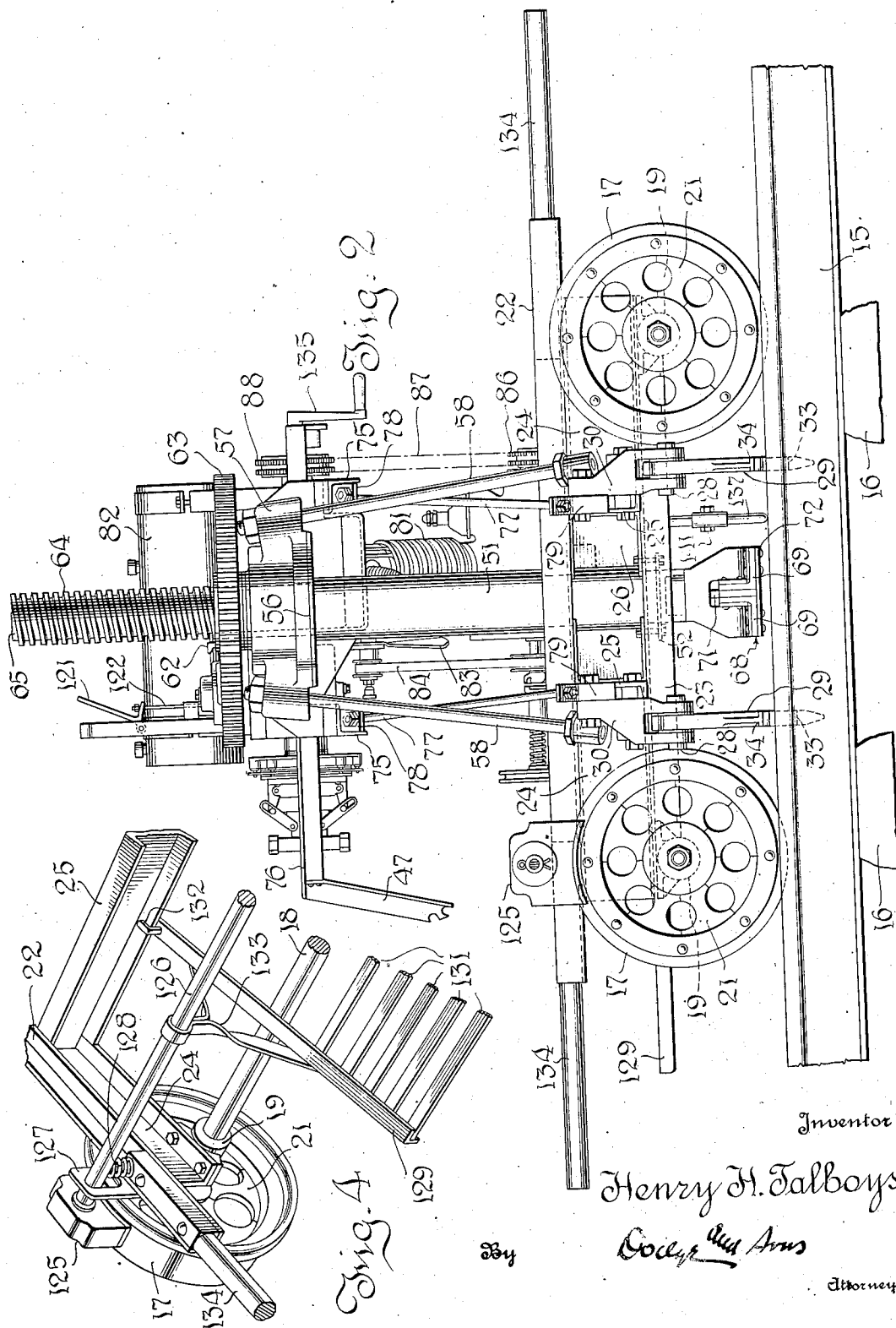
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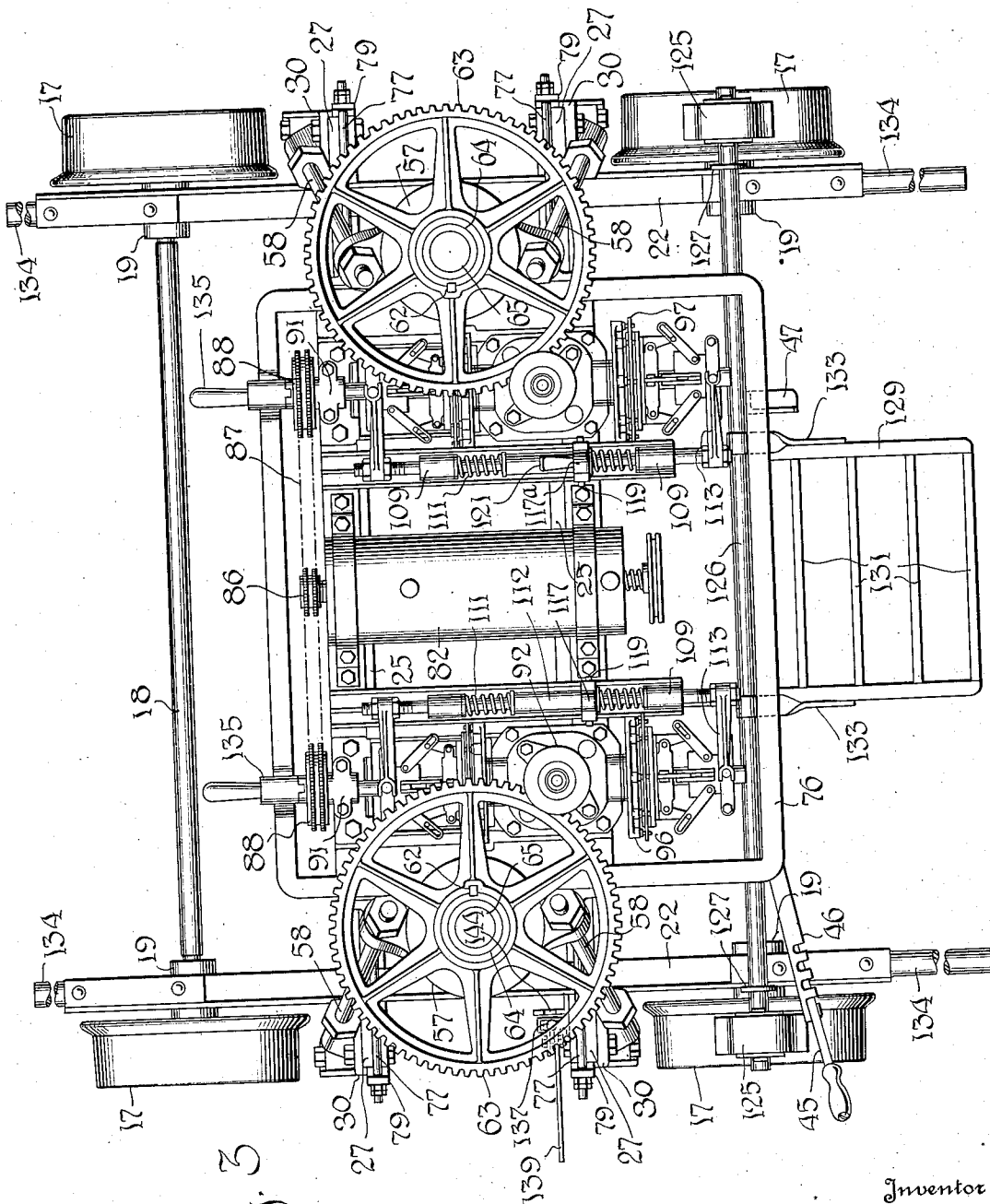


Fig. 3

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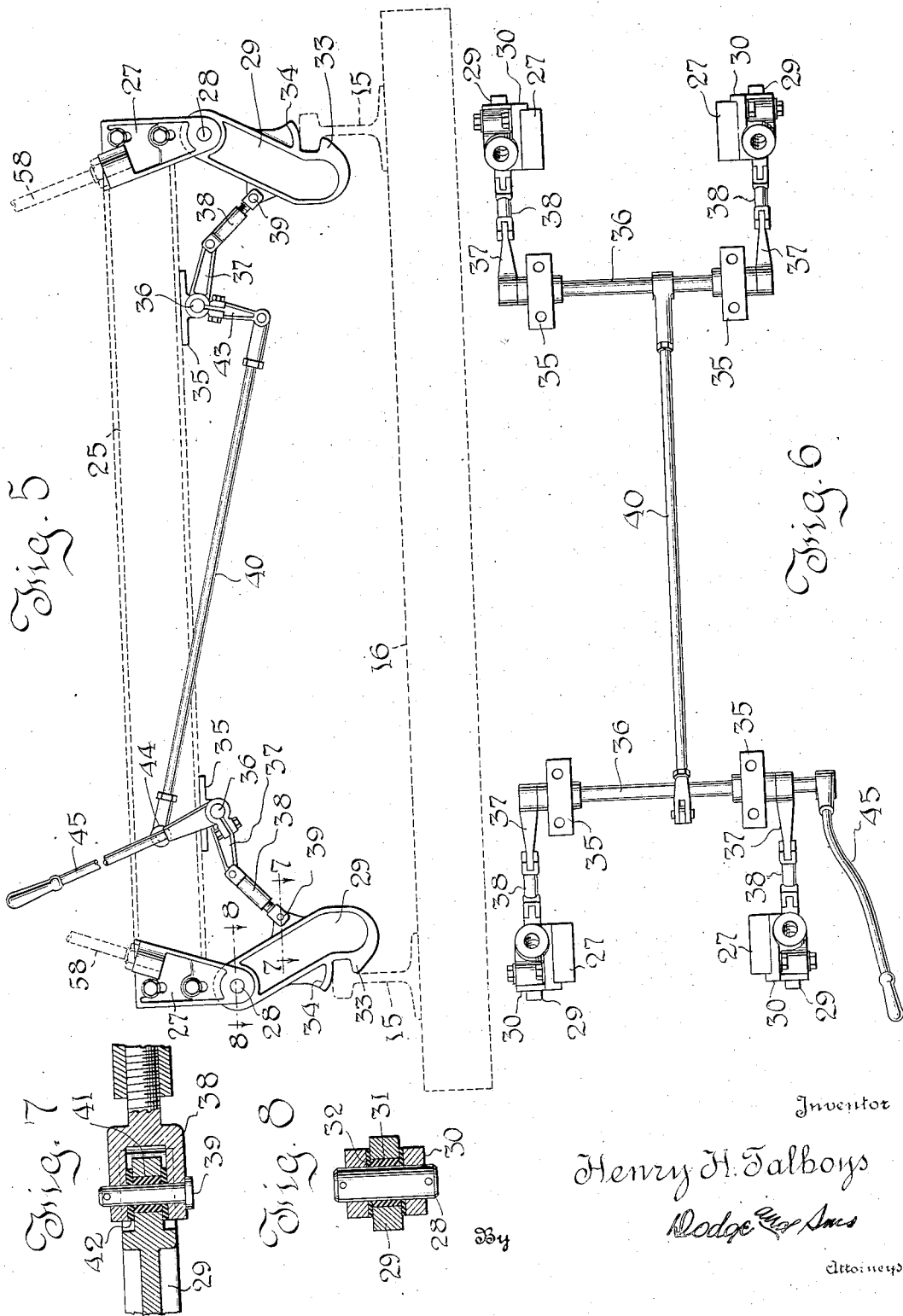
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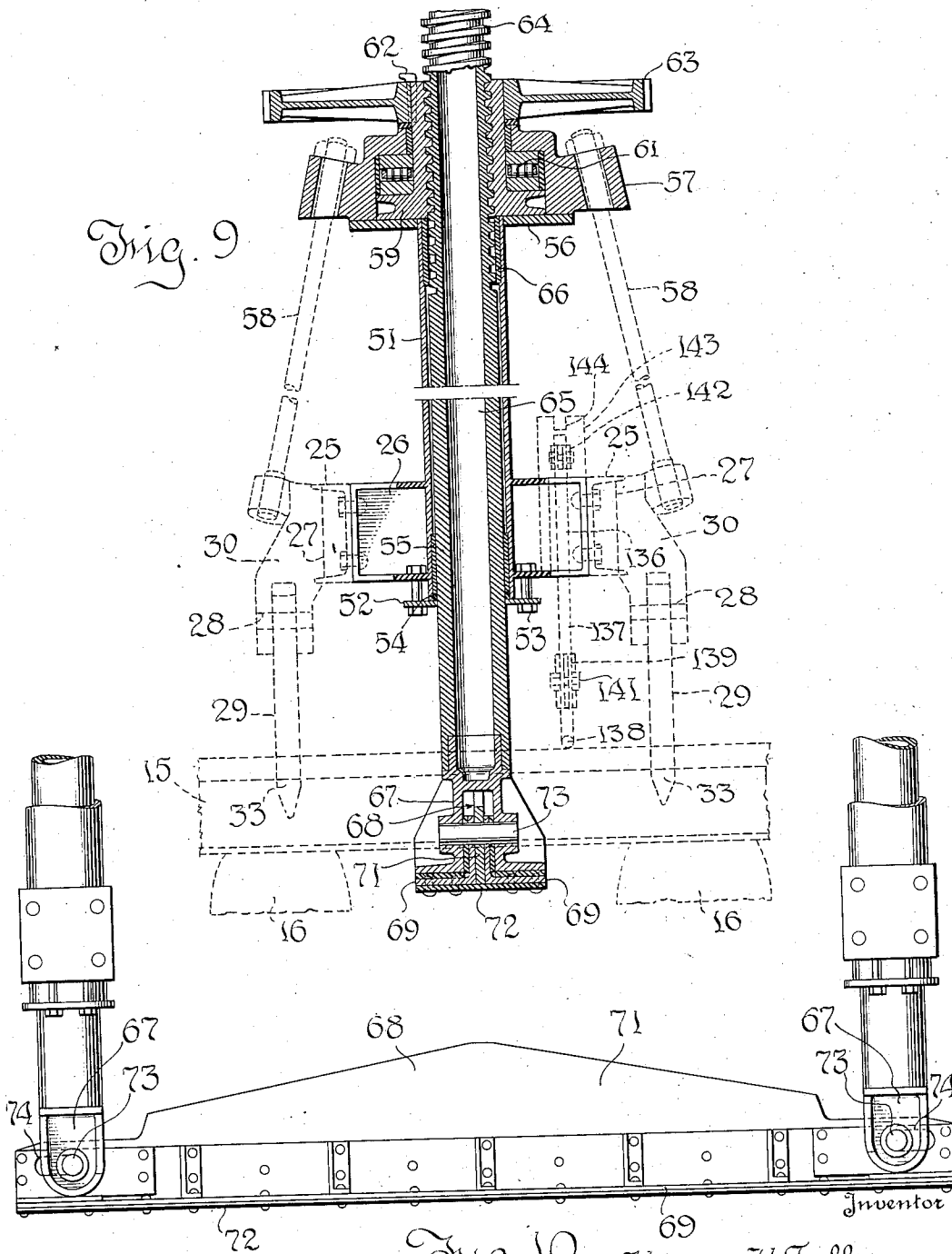


Fig. 10

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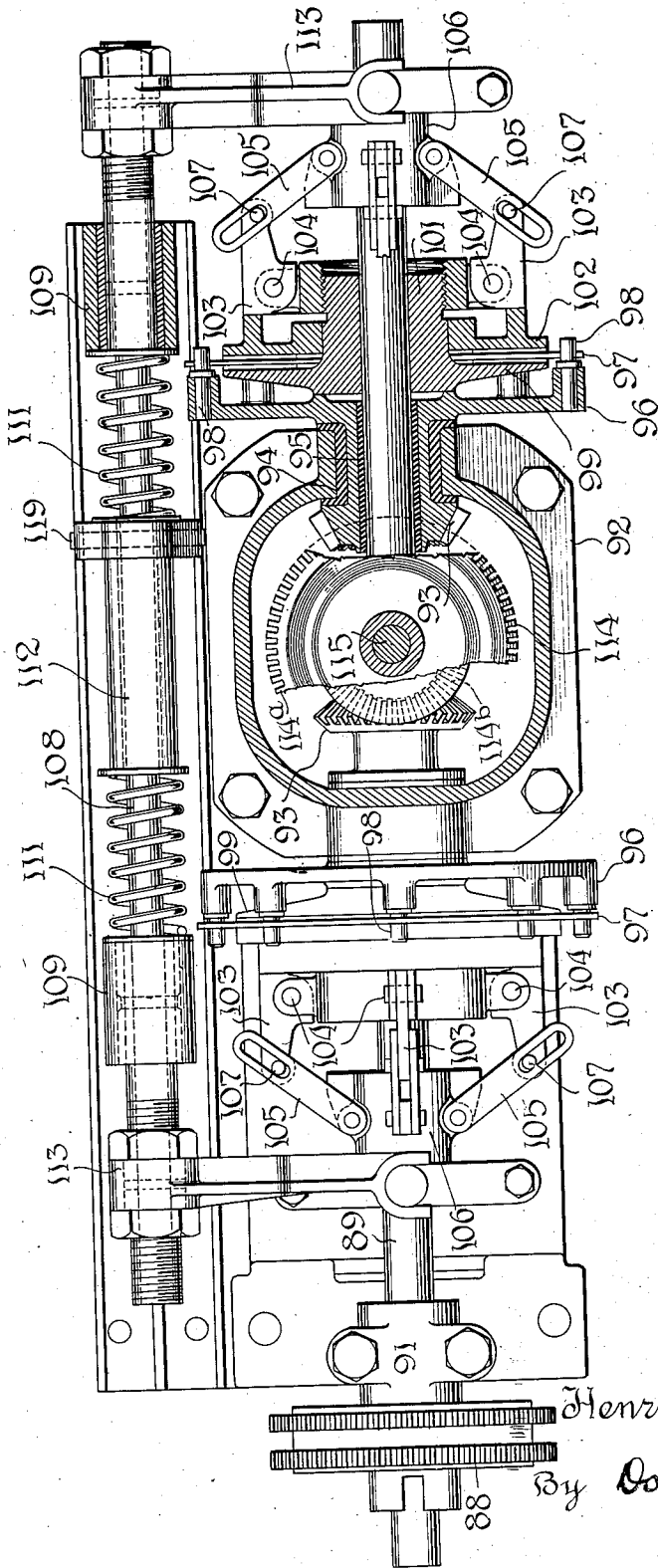
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Fig. 11



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UNITED STATES PATENT OFFICE

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TRACK JACK

Application filed February 16, 1929. Serial No. 340,622.

This invention relates to track jacks for the use of track crews in elevating, ballasting and maintaining railroad tracks.

The general purpose of the invention is to provide a jack, preferably power actuated, of ample capacity, which may be readily moved from place to place, and which will meet the peculiar requirements of this special service.

A track jack, for use on main line service, must not disturb the signal system, and, consequently, must not electrically connect the two rails of the track. It must be light enough to be lifted from the track and set aside by an ordinary track crew. It must be capable of being rapidly manipulated, and should be capable of raising either rail independently of the other, to assist in the work of raising and leveling.

Great difficulty is encountered in designing a jack structure of adequate capacity which shall yet be light enough to be lifted by the crew suggested, and for this reason the supporting truck or running gear is necessarily made as light as possible. As the shoe must be positively retracted, and as there is danger that the lifting element will become fouled on the ties and thus exert an undesired downward stress on the running gear, some means must be provided to protect the running gear from over stress. Some means should also be provided for lowering the jack by hand, in the event that the engine stalls.

These and various other useful features are adequately provided for by the present invention, a practical embodiment of which is illustrated in the accompanying drawings.

In the drawings,—

Fig. 1 is a front elevation of the structure, showing it clamped to the rail with the jacks retracted.

Fig. 2 is a side elevation with the parts in the same position.

Fig. 3 is a plan view.

Fig. 4 is a fragmentary perspective view showing how the wheel brakes are actuated by the operator's platform.

Fig. 5 is a fragmentary view showing the rail-engaging clamps and the actuating mechanism therefor.

Fig. 6 is a plan view of the mechanism shown in Fig. 5.

Fig. 7 is a section on the line 7—7 of Fig. 5, but drawn on a greatly enlarged scale.

Fig. 8 is a section on the line 8—8 of Fig. 5, also drawn on an enlarged scale.

Fig. 9 is a vertical sectional view through one of the jack screws and its guiding casing, together with the thrust bearing and jack nut. In this view the yokes for the rail clamps are shown, together with the tie rods which connect them with the thrust bearing.

Fig. 10 is a view of the ground-engaging shoe and connected portions of the jack.

Fig. 11 is a sectional plan view of one of the reversible transmissions, in neutral position, i. e., with both clutches disengaged.

Referring first to Figs. 1, 2 and 3, the track rails are shown at 15, and the ties at 16. It will be assumed, for purposes of explanation, that the rails 15 form parts of the signal circuit and are therefore insulated from each other.

The jack structure to be described is supported on the rails 15 by four flanged wheels 17 connected in pairs by axles 18 which turn in roller bearing boxes 19. In order to interrupt electrical circuits which would otherwise be established through the wheels and axles, the wheels are formed with an insulating web or spoke structure 21. In actual practice successful use has been made of a wooden spoked wheel with a pressed steel rim, as shown.

Supported on the bearing boxes 19 are side sills of light construction, made up of a top angle 22 and a bottom angle 23 tied together at their ends by relatively short pieces of channel iron 24. The channel irons 24 rest directly on the boxes 19 and at their inner ends they are joined to two cross members 25, most clearly shown in Fig. 9, but also visible in Figs. 1 and 2.

The cross members 25 are tied together by two specially formed flanged spacing members 26 (see Fig. 9) which also serve to position the lower ends of the jack members. The ends of the cross members 25 project beyond the side sills, that is, they extend through the space embraced by the top mem-

ber 22, the bottom member 23 and the two end members 25, and receive at each end a specially formed pad 27. These pads are shaped to fit between the flanges of the channel members 25 and are riveted to the webs thereof. Vertically adjustable in each pad is a forked yoke 30. At its lower forked end each yoke 30 is provided with a pivot pin 28, on which is mounted a track-engaging dog 29. Each dog 29 is insulated from the corresponding yoke 30 by the use of insulating bushings 31 and insulating washers 32 (see Fig. 8). Each dog 29 is provided with a nose 33 which engages under the head or bulb of the rail, and with a shoulder 34 which simultaneously engages the top of the head or bulb. The shoulder 34 is so designed with a cam-like or beveled nose that when the dog 29 is forced into engagement with the head of the rail it assumes the vertical load and protects the flanged wheel 17 against overload.

It is not strictly necessary that the shoulders 34 should be so positioned that when they engage the rails they lift the wheels 17 clear of the track, but they should at least engage with practically no clearance, to the end that the dogs 29 will transfer any downward thrust to the rail 15 substantially to the exclusion of the wheels 17. The vertical adjustment of yokes 30 will provide correction for wear.

Mounted on the two cross-members 25 are bearing brackets 35 for two parallel rock shafts 36. Each shaft carries two parallel arms 37 and each of these four arms is connected by a corresponding adjustable link 38 with a corresponding dog 29. The pivot pin 39 which connects each link 38 with its dog 29 is insulated, as shown in Fig. 7, by means of an insulating bushing 41 and insulating washers 42. The two shafts 36 are connected to turn simultaneously in reverse directions by means of an adjustable rod 40, which connects oppositely extending arms 43, 44, on respective shafts 36. One of the shafts 36 is provided with a hand lever 45, by means of which it may be rocked, and the motion of the hand lever thus serves to engage and disengage all four of the dogs 29 simultaneously.

In the engaged position the lever 45 is held by notches in a bracket 46 mounted on a part of the superstructure, later to be described, and in the disengaged position it is similarly held in notches in a bracket 47 also supported on the superstructure.

Extending through each member 26 and terminating slightly below the same, is a vertical guide tube 51. Each tube is supported by a member 26 to which it is welded or with which it may be formed integrally. The plate 52 is bolted in place and serves to retain a felt washer 54, to exclude sand. A bushing 55 is pressed into the lower end of the tube and offers a guiding surface for the

jack plunger hereinafter described. (See Figs. 9 and 10).

Mounted on the upper end of the tube 51 is a plate 56 which supports a thrust yoke and bearing housing indicated generally by the numeral 57 and of a form clearly shown in the drawings. This thrust yoke 57 is connected by tie-rods 58 with the two yokes 30 on the same side of the machine, it being understood that there are two jack structures, and accordingly that the parts 51 to 57 are duplicated.

Swiveled in the housing 57 is a nut 59 and its upward thrust is taken by a roller thrust bearing structure, indicated generally by the numeral 61. Keyed at 62 to the nut 59 is a spur gear 63 by means of which the nut is rotated. The nut 59 engages the threads 64 formed on the upper end of a tubular thrust member or jack plunger 65. The member 65 is guided by bushing 55 at the lower end of the tube 51, and also by a similar bushing 66 at the upper end thereof. At its lower end it is provided with a head 67 which straddles the web of a shoe, indicated generally at 68, and made up of angle sections 69 and plates 71 and 72. The head 67 receives a transverse pin 73 which extends through slots 74 adjacent a corresponding end of the ground-engaging shoe 68, and extending in the direction of the length of the shoe.

It will be observed that the slots 74 permit each jack thrust member 65 to be moved independently of the other notwithstanding the fact that the thrust members are positively guided in substantially vertical directions. It will also be observed that the length of the ground-engaging member 68 is such that it will ordinarily never contact either rail 15, and can never contact both rails at the same time.

As best shown in Figs. 1, 2 and 3, the thrust housings 57 are tied together by angle iron frame members 75 and also by relatively lighter angle iron guard frames 76. One of the guard frames 76 is the member which supports the notched brackets 46 and 47 for the lever 45. There are diagonal tie-rods 77 which connect brackets 78 on the housing 57 with brackets 79 on the pads 27. In this way the tubular members 51 become vertical thrust members which support the superstructure when the jacks are out of operation. When the jacks are in operation, the load is carried by the tie-rods 58 and steadied by the tie-rods 77, and the tension is transmitted directly from the housing 57 to the yoke members 30 and their connected dogs 29, without the transmission of stress to the side sills. Under such conditions members 25 are stressed in longitudinal compression.

Mounted on the cross members 25 is any suitable prime mover 81, here illustrated as a two-cylinder V-type air cooled motor, for example, a motorcycle motor. This has the

usual carbureter, not shown, and receives fuel from a tank 82 mounted above the engine. The engine is cooled by a fan 83, driven by a belt 84 from the engine itself, and exhausts through two mufflers 85. Any equivalent power plant might be substituted, or in some cases the jacks might be arranged for hand operation.

The crank shaft of the engine is provided with a sprocket 86 which drives, through a chain 87, two sprockets 88. The chain and sprocket mechanism just described is typical of any means for transmitting power from the engine to two reversible speed reducing trains. These trains are counterparts of each other, and the left hand one, as viewed in Fig. 3, is illustrated in greater detail in Fig. 11, to which reference will now be made.

The sprocket 88 is fast on a shaft 89. Adjacent the sprocket 88 is a bearing 91 provided to take the pull of the chain. The shaft is further supported by being swiveled in certain of the clutch-gear elements making up the transmission. The frame structure which supports the transmission need not be described in detail but bridges the cross members 75, as will be apparent from an inspection of the drawings.

Generally stated, the reversible transmission consists of two bevel pinions 93, of unequal pitch diameters, either of which may be selectively clutched to the shaft 89. Each of the pinions 93 is mounted in a bearing bushing, one of which appears at 94, and is itself bushed, as shown at 95, to support the shaft 89. The bushing 94 is supported in a housing 92. Each of the bevel pinions 93 is provided with a corresponding clutch, a portion of which is formed integral with the pinion. This portion is the spider 96. The two clutches are identical, and a description of one will suffice.

The spider 96 carries a floating clutch disk 97 by means of pins 98. This disk may be clamped between a flange 99 on a hub 101, fast on shaft 89, and a clamping ring 102, which is slidable on the hub 101. The actuating mechanism for the clutch includes a plurality of rocking cams 103 pivoted at 104 and arranged to act in unison on the ring 102 to force this in a direction to clamp the disk 97. The cams 103 are rocked in unison by a series of thrust links 105 connected to a sliding hub 106. There is a pin and slot connection at 107 designed to allow the two clutches to be actuated selectively by a single shifter. The shifter is made up of a longitudinal slide rod 108 guided in guides 109 and normally held in neutral position (in which both clutches are disengaged), by a pair of springs 111 which act between the guides 109 and the sleeve 112 fixed on the shaft 108.

The shaft 108 is provided at its ends with forked yokes 113 in swiveled engagement

with the hubs 106. Thus referring to Fig. 11, if the shaft 108 be moved to the left, the right hand clutch will be engaged, and the pin and slot connection at 107 will allow the necessary lost motion on the left hand clutch. Similarly, if the shaft 108 be then moved to the right, the right hand clutch will first be disengaged and after it has been disengaged the left hand clutch will be caused to engage. In this way the two bevel pinions 93 are clutched selectively to the shaft 89. These two pinions are constantly in mesh each with a different series of bevel teeth 114^a and 114^b formed on the element 114. This turns on a stub shaft 115 and is integral with spur pinion 116 which meshes with a corresponding one of the spur gears 63. Thus two different drive ratios are provided, one preferably about twice the other, so that in lowering the speed is about twice and the force about half the speed and force attained in raising the track.

As stated, there are two transmissions, such as illustrated in Fig. 11, and each is controlled by an upstanding lever. To distinguish these the two levers are indicated by the numerals 117 and 117^a. Each lever is fulcrumed on a corresponding pin 118, at its lower end, and is pinned at 119 to the corresponding collar 112. The levers are identical except that the lever 117^a is provided with a hand grip 121 which is connected by a reach rod 122 with the engine throttle, not shown. The purpose of this is to allow the operator to control the speed of the engine while manipulating the clutches. Some such provision is necessary, for the reason that the operator manipulates both clutches at once.

It is desirable that the jack be held against rolling along the track while the ground-engaging shoe is being forced downward to raise the track, and to accomplish this result the device is provided with a platform for the operator, which automatically applies a brake to one pair of wheels 17 when the operator mounts the platform.

The brake comprises shoes 125 mounted on the ends of a cross rod 126. The ends of this rod are guided in yokes 127 and are normally held up by coil springs 128.

The operator's platform consists of U-shaped yoke 129 with cross slats 131. The ends of the yoke 129 are clipped at 132 to one of the members 25 in such a way that the yoke 129 may swing up and down through a small range of motion. It is suspended from the cross rod 126 by stirrup irons 133. Thus, when the operator stands on the platform the frame 129 swings downward drawing down the cross rod 126 and applying the brake blocks 125 to the tops of the wheels 17. For convenience in lifting the jack from the track, four hand grips 134 are bolted to the top member 22 of the side sills. Additional grips may be applied if necessary.

To allow the jack to be lowered by hand, in the event that the jack motor should stall while a train was approaching, hand cranks 135 are provided, to be applied to the ends of either or both shafts 89 which project beyond the sprockets 88 to receive the cranks.

At the end of one of the cross members 25 is a vertical guide 136 in which is vertically slidable a rod 137 having a foot 138 at its lower end, intended to rest on a rail head 15. The rod 137 carries a target or sighting blade 139 which, when the machine is in use, extends laterally (see Fig. 1). Being accurately positioned relatively to the rail head the target is especially accurate and convenient in leveling operations and is not affected by the clamping and unclamping of the jack to and from the rails. The target blade 139 may be adjusted in rod 137 by loosening bolt 141.

When in use the target 139 and rod 137 are held against rotation on a vertical axis by the head 142 which engages the face of plate 143. When not in use the rod 137 is lifted and turned on its axis so that blade 139 is under the truck. It is retained in this position by the engagement of a portion of head 142 in notch 144 formed in plate 143.

It will be observed that the track jack is not self-propelled, but is intended to be towed to the place of use behind a work car, such as the gasoline engine driven cars commonly in use. It is difficult to make the jack self-propelling without undue complication and weight, but the result is technically possible if desired.

When the jack is at the place of work, it is rolled into position. When the operator mounts the platform he automatically applies the brakes and retains it in position. He then moves the lever 45 to engage the dogs 29 with the heads of the rails. The operator has considerable leverage and the dogs 29 act to relieve the wheels 17 of load, preferably completely. Whether the dogs take the whole weight of the mechanism or not, they function to protect the wheels and axles from overload. This is an important feature, permitting lighter construction of the supporting truck than would otherwise be possible.

With the engine in operation, the operator can force the ground-engaging shoe 68 downward by manipulating the levers 117, 117^a and he can simultaneously control the speed of the engine by the hand grip 121. It will be understood that the shoe 68 passes between two ties and engages the roadbed and that continued operation of the jack will lift the rails and the ties from the roadbed. It will be observed that the operator can raise or lower either or both sides of the machine, or can lower one while raising the other, so that the utmost flexibility in operation is secured at all times.

The possibility of raising one side of the track doubles the capacity of the jack, as the entire power output of the engine may be applied to half the load. Thus the two sides of the track may be raised alternately step by step.

Whether the dogs 29 be engaged, or not, no electrical circuit is established from one rail 15 to the other, and consequently signal systems are not disturbed in their operation.

If it is necessary to remove the jack for the passing of a train, the shoe 68 is retracted upward, the dogs 29 are disengaged by manipulating the lever 45, and the entire jack structure may be lifted from the rails and set aside.

An examination of the drawings will indicate that the structure has been designed to exert a maximum lifting force through the ground-engaging shoe and to transmit the lifting force from the shoe to the track engaging dogs by direct connections, without imposing any load on the running gear or its frame. Moreover, if the shoe should foul the tie, while being retracted upward, the running gear and wheels can not be overloaded because the shoulder 34 on the dogs 29 will receive the thrust and protect the running gear from overload.

While I have shown and prefer screw jacks, other approximately equivalent types of jack are known, and can be substituted without departing from the broad spirit of the invention. Similarly, various modifications can be made in the frame structure, within the scope of the invention. It is also recognized that rail engaging means, other than the specific one illustrated, can be designed to accomplish the transmission of thrust in either of two directions, as herein described, and no necessary limitation to the specific structure here illustrated, is implied.

What is claimed is,—

1. A track jack for use on railway tracks whose rails serve as parts of signal circuits and the like, comprising in combination, a truck running on the rails of the track; means for insulating the treads of the wheels on one rail from the treads of the wheels on the other rail; rail-engaging means on the truck for each rail; means for insulating said rail-engaging means from each other; and hoisting means reacting between said rail-engaging means and the roadbed.

2. A track jack for use on railway tracks whose rails serve as parts of signal circuits and the like, comprising in combination, a truck running on the rails of the track; means for insulating the treads of the wheels on one rail from the treads of the wheels on the other rail; rail-engaging means on the truck for each rail; means for insulating said rail-engaging means from each other; hoisting means reacting between said rail-engaging means and the roadbed, said

hoisting means including two jacks; a shoe loosely connected with both said jacks, said shoe being shorter than the interval between said rails; and controllable means for actuating said jacks.

5 3. In a track jack; a frame; a motor thereon; a pair of screw jacks mounted on said frame to react in substantially vertical directions; independent reversible reduction trains between said motor and each screw
10 jack; a single ground-engaging member loosely connected with each jack; and rail-engaging clamps mounted on said frame.

15 4. In a track jack; a frame; a motor thereon; a pair of screw jacks mounted on said frame to react in substantially vertical directions; independent reversible reduction trains between said motor and each screw
20 jack; a single ground-engaging member loosely connected with each jack; rail-engaging clamps adapted to engage the top and lower side of the rail heads of a railway track; means for actuating said clamps; and a truck sustaining said frame and adapted to run on the railway track.

25 5. In a track jack; a frame; a power source mounted thereon; a pair of jacks mounted on said frame to react in substantially vertical directions; independent drive connections between said power source and said jacks; a
30 ground-engaging member loosely connected with each jack; rail-engaging clamps adapted to engage the top and lower side of the rail heads of a railway track; means for actuating said clamps to engage and disengage said
35 rail heads; and a truck for sustaining the weight of the frame and connected parts when said rail engaging clamps are disengaged.

40 6. In a track jack; a frame; a motor thereon; a pair of jacks mounted on said frame to react in substantially vertical directions; independent drive trains between said motor and each of said jacks, each train including
45 reversing clutch means and an actuating handle therefor; a speed controller for the motor, associated with one of said actuating handles; a truck for supporting the weight of the frame and its supported parts on a
50 track; and positive rail-engaging clamps supported on said frame and adapted to transmit stresses between the frame and track without the imposition of load on said truck.

55 7. In a track jack; a frame; a motor thereon; a pair of jacks mounted on said frame to react in substantially vertical directions; independent drive trains between said motor and each of said jacks, each train including
60 reversing clutch means and an actuating handle therefor; a speed controller for the motor, associated with one of said actuating handles; a truck for supporting the weight of the frame and its supported parts on a track; positive rail-engaging clamps supported on
65 said frame and adapted to transmit stresses

between the frame and track without the imposition of load on said truck; a movable platform for the operator; a brake for said truck; resilient means normally holding said brake released; and operative connections between the brake and platform arranged to cause the brake to be applied by the weight of the operator. 70

8. A track jack, comprising in combination, a power driven jack mechanism adapted to exert force in both vertical directions, said
75 mechanism including a shoe to react against the roadbed, and rail-engaging clamps capable of being locked to the rails of a track and when locked to transmit to the jack mechanism vertical stresses in either up or down
80 directions; and a wheeled truck adapted to run on the track and serving to support said track jack only when said rail-engaging clamps are disengaged.

85 9. A track jack, comprising in combination two power driven jack mechanisms, each adapted to exert force in both vertical directions and both loosely connected to a shoe arranged to react against the roadbed between the rails of the track; rail-engaging
90 clamps capable of being locked to the rails and when locked serving to transmit to the jack mechanism vertical stresses in either up or down directions; and a wheeled truck adapted to run on rails of the track and serving to support said track jack only when
95 said rail-engaging clamps are disengaged.

100 10. A track jack, comprising in combination, a frame; a pair of power driven independently operable reversible jacks mounted in said frame to react in substantially vertical directions against the roadbed; rail-engaging clamps supported by said frame and capable of engaging and disengaging the
105 rails of a track and when engaged serving to transmit stresses between the frame and track in both up and down directions; and a wheeled truck adapted to run on said track and serving to support said frame and the parts mounted thereon only when said clamps
110 are disengaged.

115 11. In a track jack, a main frame; a wheeled running gear distinct from said main frame adapted to run on the rails of a track and to support said main frame; track clamps mounted on said main frame, movable into and out of engagement with both track rails and adapted when in engagement therewith to transmit directly to the main frame
120 vertical stresses in either direction; and hoisting means reacting between said main frame and the roadbed.

125 12. In a track jack, a main frame; a wheeled running gear distinct from said main frame adapted to run on the rails of a track and to support said main frame; track clamps mounted on said main frame, movable into and out of engagement with both track rails and adapted when in engagement therewith
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- to transmit directly to the main frame vertical stresses in either direction; two hoisting jacks supported in said main frame and each acting in a fixed substantially vertical direction; means for actuating said jacks, each independently of the other; and a roadbed engaging shoe loosely connected with both said jacks.
13. In a track jack, a main frame; a wheeled running gear distinct from the main frame adapted to run on the rails of a track and to support said main frame; track clamps mounted on said main frame, movable into and out of engagement with both track rails and adapted when in engagement therewith to transmit directly to the main frame vertical stresses in either direction; hoisting means reacting between said main frame and the roadbed; and insulating means serving to preclude the establishment of electric circuits between the two rails of the track through the wheels of the truck and said clamps.
14. In a track jack; a main frame; a wheeled running gear adapted to run on the rails of a track and to support said main frame; track clamps mounted on said main frame, movable into and out of engagement with both track rails and adapted when in engagement therewith to transmit directly to the main frame vertical stresses in either direction; two hoisting jacks supported in said main frame and each acting in a fixed substantially vertical direction; means for actuating said jacks, each independently of the other; a roadbed engaging shoe loosely connected with both said jacks; and insulating means serving to preclude the establishment of electric circuits between the two rails of the track through the wheels of the truck and said clamps.
15. In a track jack, a frame; a pair of jack mechanisms mounted on said frame to react in substantially vertical directions against the roadbed; means for actuating said jack mechanisms independently of each other; rail engaging clamps mounted on said frame; means for adjusting said clamps vertically relatively to said frame; means for actuating said clamps in unison; and a wheeled truck for sustaining said frame on said track when said clamps are disengaged.
16. In a track jack; a frame; a jack mechanism mounted on said frame to react in a substantially vertical direction against the roadbed; rail engaging clamps mounted on said frame and adapted to react both upward and downward against the rails; means for adjusting said clamps vertically relatively to said frame; and a wheeled truck for sustaining said frame on said track when said clamps are disengaged.
17. In a track jack; a frame; a motor thereon; a jack mounted on said frame to react in a substantially vertical direction; a reversible drive train between said motor and jack including a low speed lifting train, a higher speed lowering train and selective clutching means for said trains; a wheeled truck for supporting the frame on the track; and rail engaging clamps adapted to transmit stresses between the frame and track without the imposition of load on the truck.
18. In a track jack; a frame; a motor thereon; a pair of jacks mounted in said frame to react in substantially vertical directions; independent reversible drive trains between said motor and each of said jacks, each train including a low speed lifting train, a higher speed lowering train and selective clutching means; a wheeled truck for supporting the frame on the track; and rail engaging clamps adapted to transmit stresses between the frame and track without the imposition of load on the truck.
19. The combination with a jack structure adapted to be clamped to track rails and having means to react against the roadbed to lift the track, of a sighting target carried by said jack structure.
20. The combination with a jack structure adapted to be clamped to track rails and having means to react against the roadbed to lift the track, of a sighting target guided on said jack structure and adapted to be positioned by engagement with a rail of the track.
- In testimony whereof I have signed my name to this specification.
- HENRY H. TALBOYS.

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