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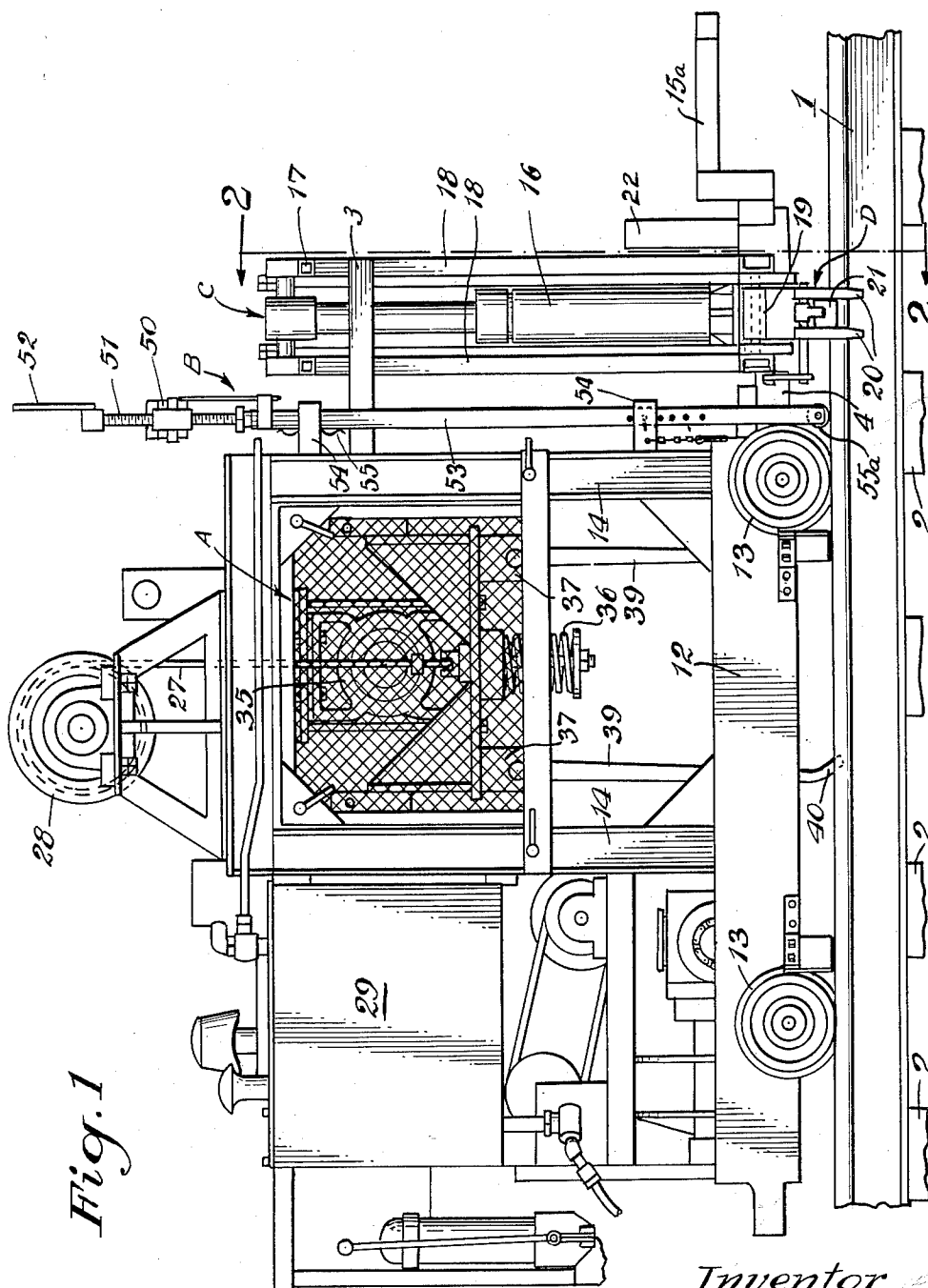
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3,071,082

TAMPER JACK FOR RAILWAY TRACK MAINTENANCE

Original Filed Oct. 2, 1957

7 Sheets-Sheet 1



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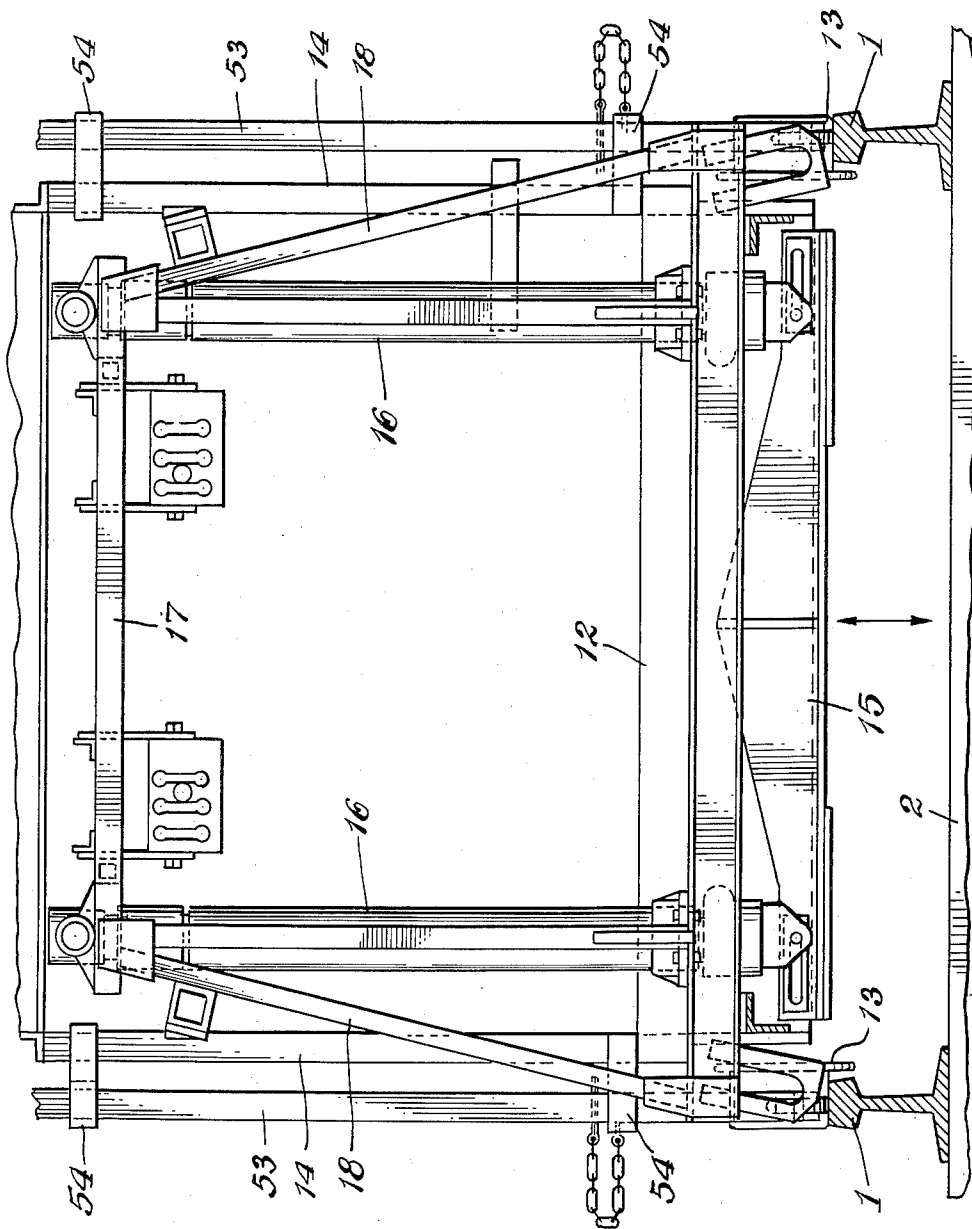


Fig. 2

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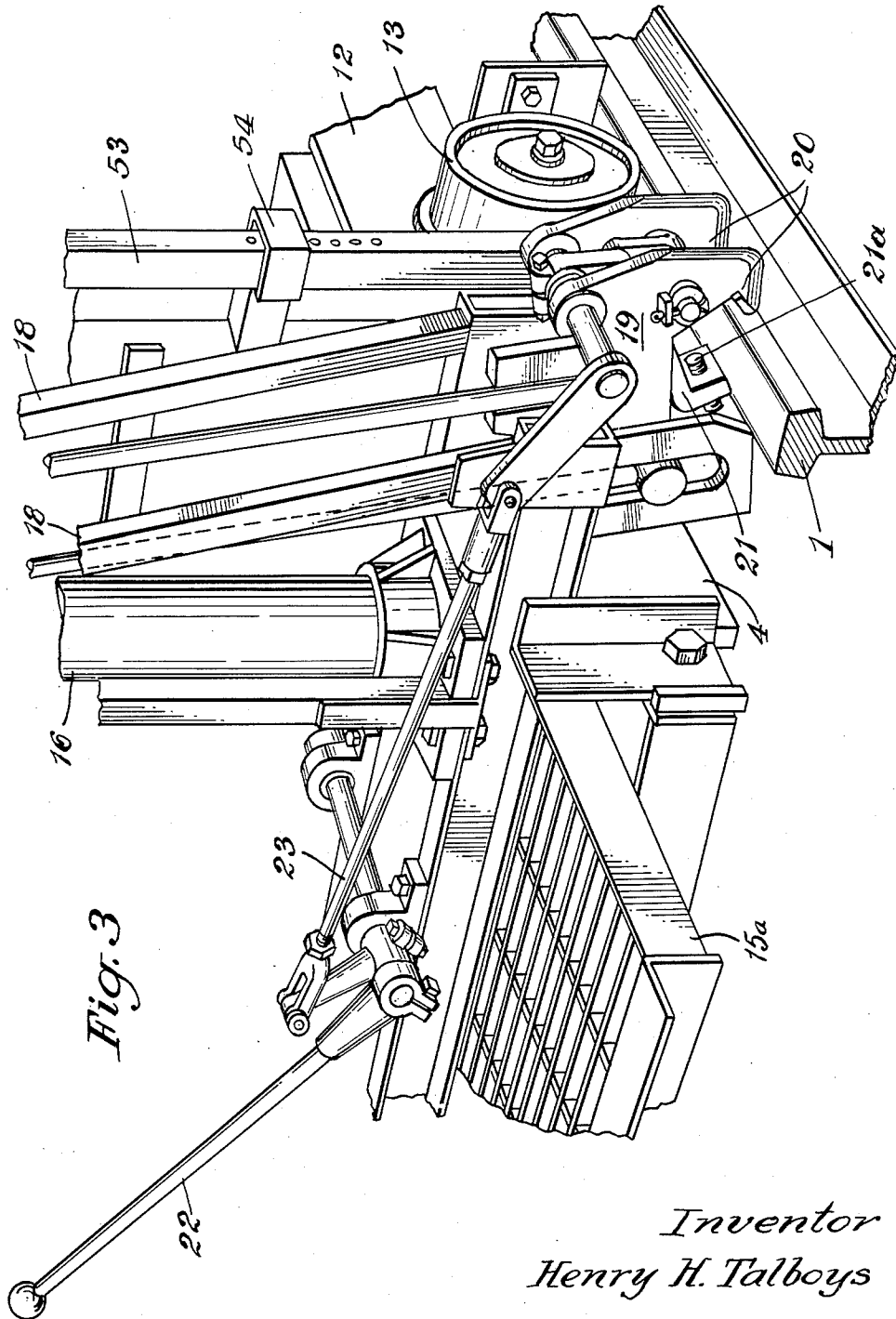
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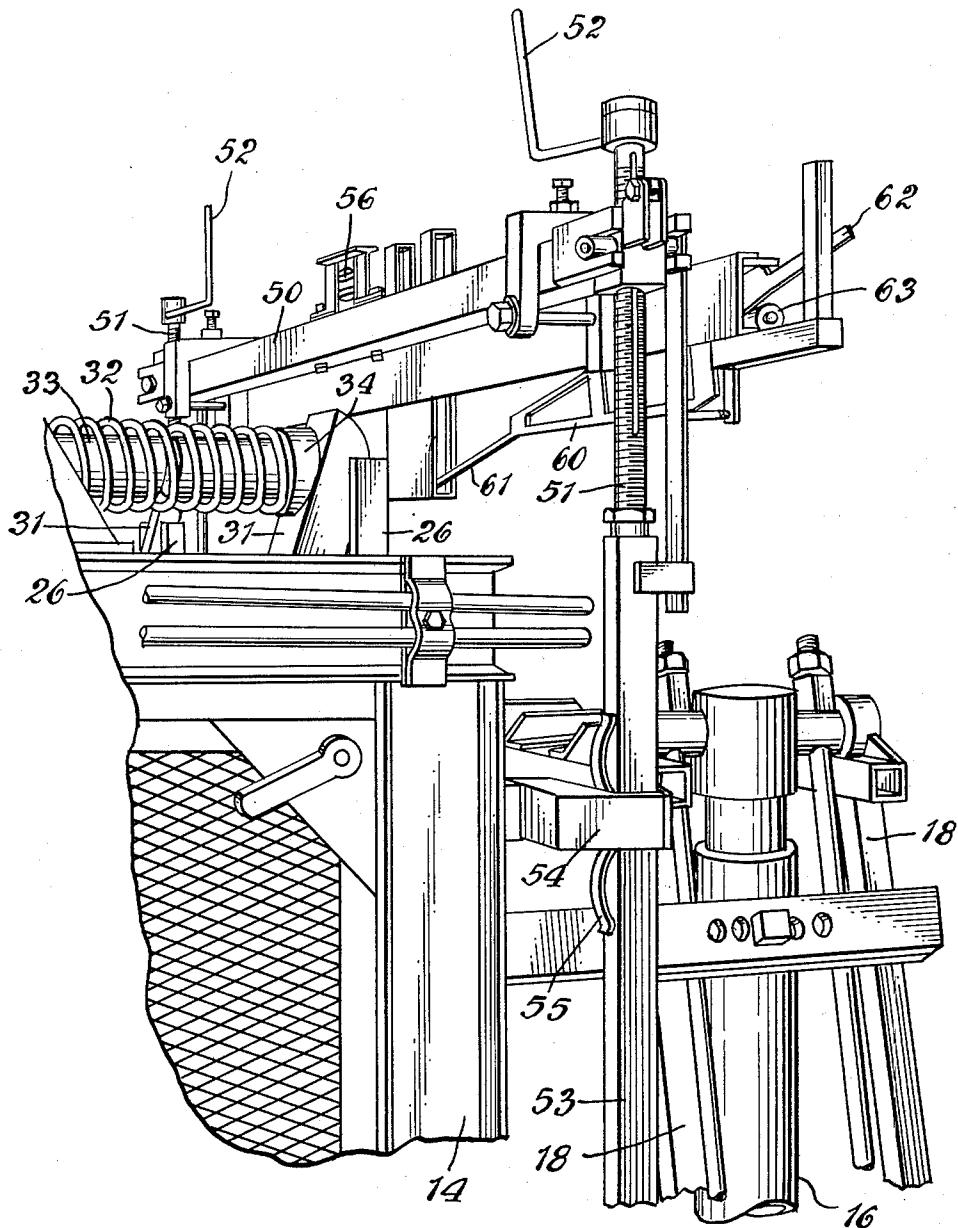


Fig. 4

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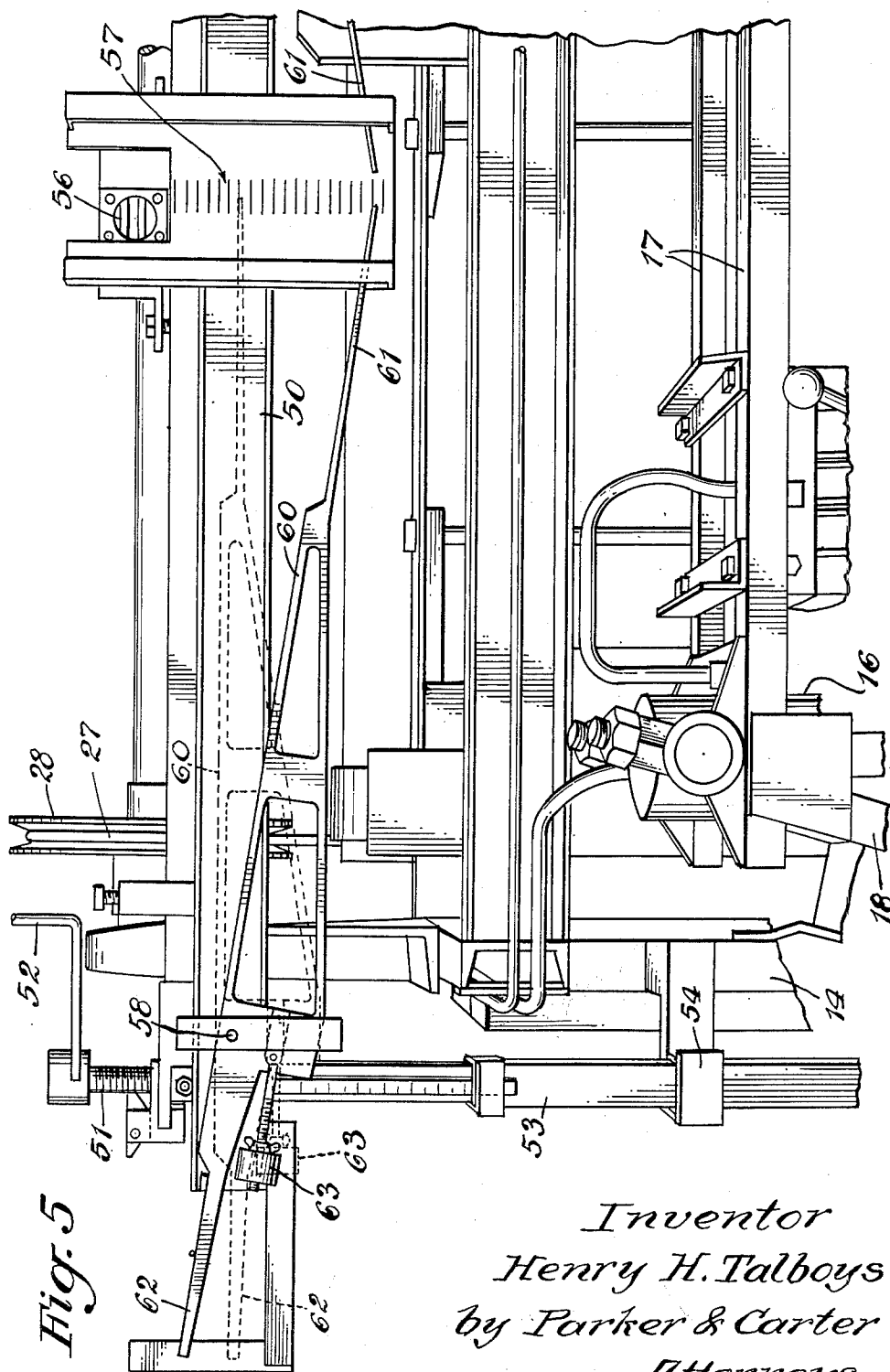
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TAMPER JACK FOR RAILWAY TRACK MAINTENANCE

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TAMPER JACK FOR RAILWAY TRACK MAINTENANCE

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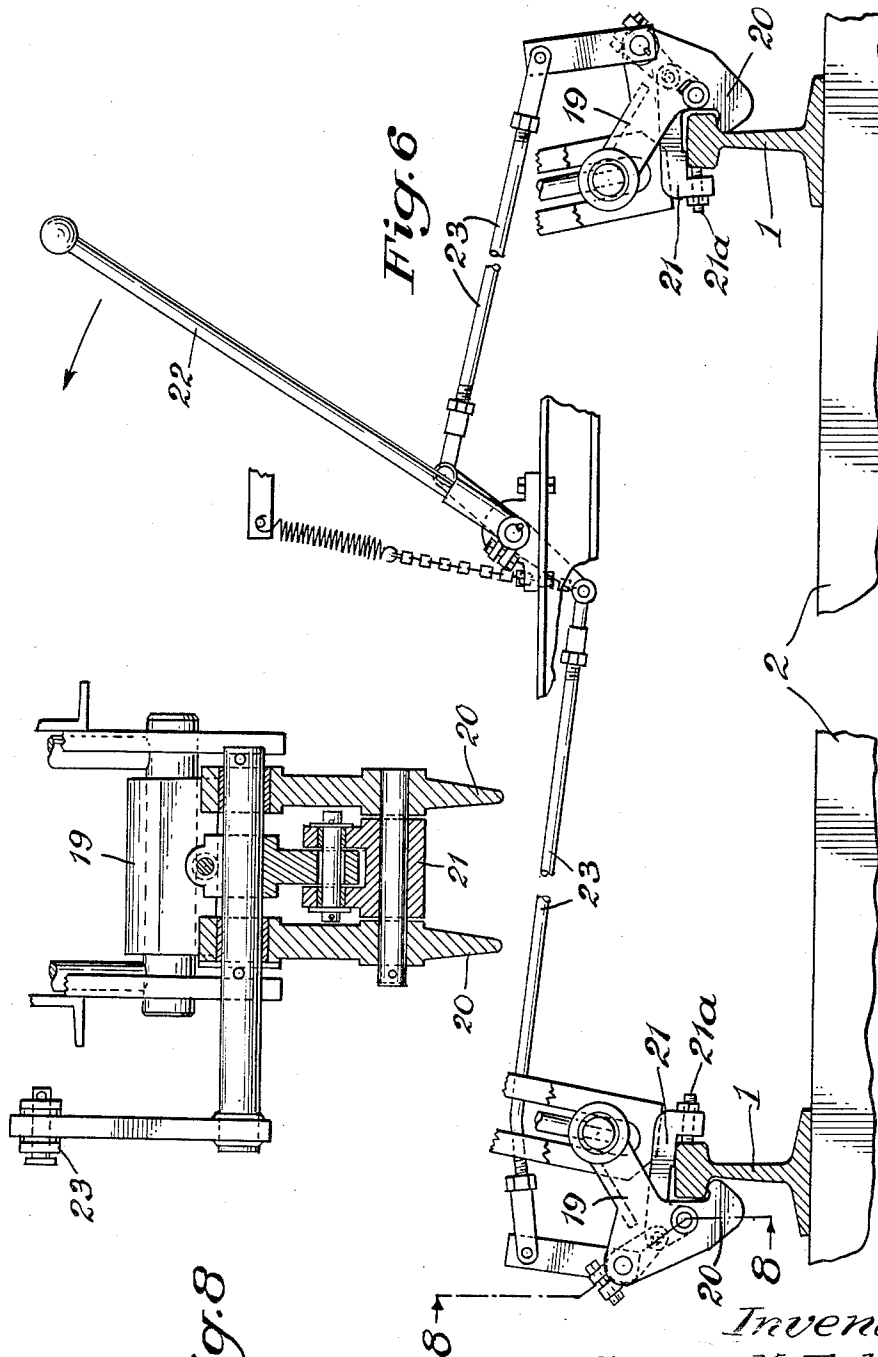


Fig. 8

Fig. 6

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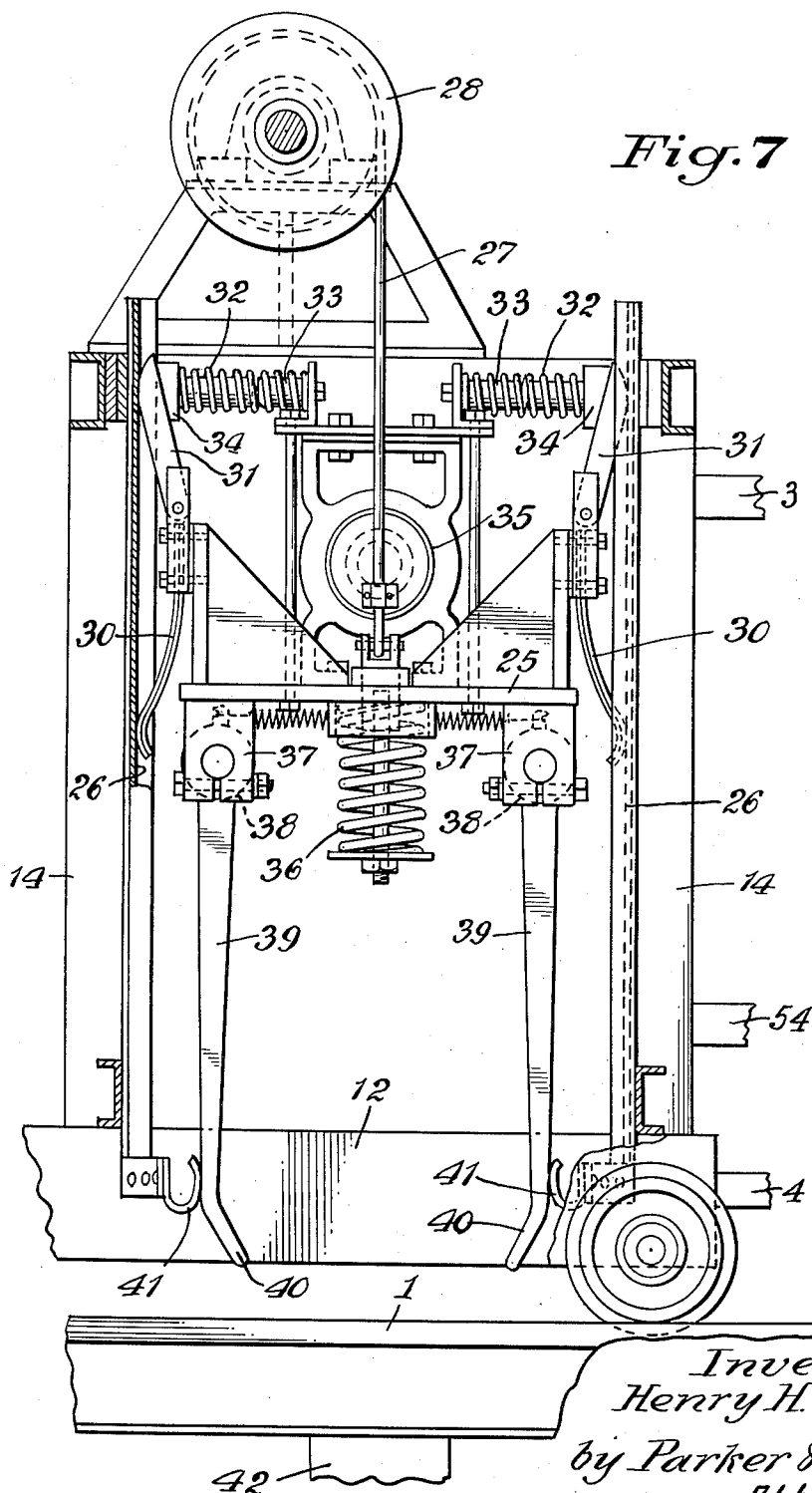
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TAMPER JACK FOR RAILWAY TRACK MAINTENANCE

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TAMPER JACK FOR RAILWAY TRACK MAINTENANCE

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Continuation of application Ser. No. 687,645, Oct. 2,
1957. This application Apr. 11, 1961, Ser. No. 103,681
7 Claims. (Cl. 104-12)

The present invention is in the field of trackworking methods and equipment. A primary purpose is to provide an improved tamping power jack. One use of such a jack is in connection with track surfacing or track adjusting, such a tamper jack being indicated in a previous application Serial No. 663,648, "Tamper Jack and Trackworking Assembly Therefor," filed in the United States Patent Office on June 5, 1957. This application is a continuation of Serial No. 687,645, filed October 2, 1957, now abandoned, which was a continuation in part of Serial No. 663,648, filed June 5, 1957, now abandoned.

Another purpose is to provide an improved combined tamper and jack in which a body or frame is locked to the rails of a track.

Another purpose is to provide such a tamper jack in which a jack is employable to direct a downward pressure against the road bed at a point between the rails and between adjacent pairs of ties, whereby the jack and the rail secured thereto and the ties secured to the rail, may be lifted in relation to the ballast.

Another purpose is to provide such a tamper jack in which, in association with the jack, tamping means are provided for tamping the ballast, preferably adjacent each rail of the track.

Other purposes will appear from time to time in the course of the specification and claims.

This invention is illustrated more or less diagrammatically in the accompanying drawings wherein:

FIGURE 1 is a side elevation of a tamper jack made in accordance with the present invention;

FIGURE 2 is a partial vertical section on the line 2-2 of FIGURE 1, with parts broken away and parts omitted;

FIGURE 3 is a perspective view of a part of the jack and track clamping component, with the rail clamp in unlocked position;

FIGURE 4 is a partial perspective view illustrating the rail-height-controlling component of the system;

FIGURE 5 is a partial view, from a different direction, of the structure shown in FIGURE 4;

FIGURE 6 is a schematic view, in transverse section, illustrating the rail gripping component of the mechanism in operative positions;

FIGURE 7 is a side elevation of the tamping component of the mechanism; and

FIGURE 8 is a section of the clamping mechanism, taken on line 8-8 of FIGURE 6.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, in FIGURE 1, 1 indicates the rails of a track, the rails being connected by ties 2. Considering the tamper power jack as such, as shown in the present drawings, it combines a jack component and a tie tamping component, with the further inclusion of means for locking the tamper jack to the rails. The tie tamping component and the jack component may operate at the same time, or in succession. As will later appear, the rails may be somewhat lifted and with them the ties secured thereto, and during such lifting operation, or in some predetermined time relation thereto, the tie tamping component operates to tamp the ballast under the ties and, preferably, in the neighborhood of the rails

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and the zones of connection between the rails and the ties.

Considering the tamping power jack in detail, it combines a jack component and a tie tamping component, with the further inclusion of means for locking the tamper jack to the rails.

Considering, for example, FIGURES 1 and 2, any suitable bottom frame 12 is supported upon the rails of the track by suitable flanged wheels 13. Any suitable frame 14 is mounted on or forms part of and extends upwardly from the base 12. The frame and base support a tamping unit, indicated generally at A, a sensing and control unit at B, a jacking unit at C, and a track gripping component at D. The jacking unit C and the track gripping unit D are supported on suitable braces or extensions 3 and 4 extending rearwardly from the frame. In considering, for example, FIGURE 1, at the right end of the figure, there is illustrated the jack assembly or component C and the track gripping component. The track gripping component D also is shown in some detail in FIGURE 3, which shows it in inoperative position, and in FIGURE 6, which shows it in rail engaging position.

FIGURE 2 illustrates the relationship of the locking arrangement to the jack. The jack may include an abutment or shoe 15 formed and adapted to engage the surface of the roadbed between adjacent ties. It may be raised and lowered by any suitable hydraulic rams or the like, generally indicated at 16, 16. An upper frame or cross-portion 17 may be secured to the rails by downwardly and outwardly extending tension members or links 18. At the lower ends of these links are positioned the locking assemblies illustrated, in some detail, in FIGURES 3 and 6. Each such assembly includes a dog or latch lever 19 carrying at its lower, outer end a hook 20 positioned to extend inwardly beneath the upper flange or head of one of the rails. 21 is a cross-piece pivoted in relation to 20, provided with a rail engaging adjustment 21a and formed and adapted to overlie the rail flange and to engage its inner face. Any suitable operating leverage, including the handle lever 22 and the operating rods 23, may be employed, as shown in FIGURES 3 and 6, to move the locking elements 20 into and out of locking relation with the rail flanges. Assuming that the parts are in the position in which they are shown in FIGURE 6, then the jack structure of FIGURE 2 may be employed. By any suitable controls the hydraulic thrust elements 16 are expanded and force the shoe 16 downwardly against the ballast surface. However, the upper frame or cross-portion 17 is locked to the rails, as above described, and the result of a downward thrust of the abutment 15 is to tend to lift the rails and the ties upwardly in relation to the ballast, at the point or zone of application of force of the jack. An operator's platform extending longitudinally from the extensions 4, as at 15a, may be beyond the jack, as shown in FIGURE 1.

Considering, again, FIGURE 1, let us assume that the locking and jack assemblies are operating to hold the frame 12 locked in relation to the rails, with the rails being subjected to an upward pull. The tamper component A of the tamper jack then may come into play. This component is shown, in some detail, in FIGURE 7, and includes a transverse platform or element 25 which may be raised and lowered between any suitable vertical guides 26 by a hoisting cable 27 passing over any suitable drum 28 and extending to a suitable power source, such as the engine diagrammatically indicated at 29. It will be understood that the operator may raise and drop the platform 25, it being more or less flexibly guided within the guides 26 by suitable guides. There is illustrated, for example, leaf spring elements 30 and pivoted engaging arms 31. It will be understood, however, that the

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guiding mechanism may be widely varied, as long as it is adapted to permit the platform 25 and its associated parts to be raised and dropped. In the present instance, however, the upper levers 31 are illustrated as spring-thrust outwardly, for example, by coil springs 32, guided on suitable abutments 33, which direct a thrust outwardly against the upper end of the levers 31, for example, by suitable blocks 34. The platform 25 and the parts mounted thereon are subjected to vibration, for example, by an unbalanced rotor assembly, not shown in detail but indicated more or less diagrammatically at 35. The unbalanced rotor and the means for rotating it do not of themselves form part of the present invention and will not be described in detail. It will be understood, however, that during the raising and dropping of the platform 25 and while it is in dropped position, a suitable unbalanced rotor is rotated at adequate speed to impart a high frequency vibration to the platform 25 and to the below-described tamping bars mounted on the platform. It will also be understood that to permit the platform to be raised and dropped, there is provided suitable spring cushion means for the cable 27, including, for example, the spring 36.

Extending downwardly from the lower surface of the platform 25, is illustrated any suitable abutments or flanges generally indicated at 37, to which are pivoted tamping bars. Each such tamping bar includes an upper hub 38, a body portion 39, and a lower offset or bent end portion 40. As will be seen from FIGURE 7, the tamping bars are pivoted for limited rotation about horizontal axes generally perpendicular to the extension of the rails. The lower ends of the bars are engaged by any suitable yielding guides shown, for example, at 41 in FIGURE 7. As shown in FIGURE 7, the tamper jack is positioned with a pair of tamper bars being located one at each side of a tie indicated at 42. Assume that the platform 25 is dropped, it will be understood that the weight of the platform 25 and its associated vibrating mechanism and tamping bars is substantial. The ends of the tamper bars penetrate the surface of the ballast at each side of the particular tie 42. While there is no intention to be limited to any particular number of tamper bars, it is practical to have a single pair of tamper bars at each end of the platform 25, one such bar being adjacent each of the rails of the track. An efficient arrangement is to have such bar located immediately within each rail. As the platform 25 is dropped, and as the tamper bars penetrate the ballast at each side of the tie 42, the rather violent vibration of the eccentric assembly 35 is imparted to the platform 25 and to the tamper bars, and they loosen the ballast at each side of the tie 42 and, to a substantial degree, beneath the tie. The opposing curvature or bending of the lower ends 40 of the tamper bars tends to cause them to travel toward each other and toward and beneath the tie 42. The bend or curvature of the lower ends of the tamper bars is sufficient to impart a loosening vibration to the ballast not only along but even, to some degree, beneath the tie. With a succession of such drops of the head and of the accompanying vibration, and with the operation of the jack, at the same time, continuing, it will be seen that the rails can readily be slightly lifted, and, with them, the ties to which they are secured, in connection with adjustments of level of the track.

It will not be necessary to go, in detail, into the power plant and its controls. It is sufficient to observe that a single power plant 29 may be employed, suitably connected to power the hoist for raising and dropping the platform 25 of the tamping component. At the same time, it may provide power for the hydraulically operated jack. It may also be employed to convey the tamper jack unit along the rail, either to move the entire assembly or team from place to place along the rails or to change the alignment of the tamping component from tie to tie during the progressive movement of the tamper jack along the track.

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Whereas the present tamper jack assembly may be used for various purposes in connection with trackworking equipment and operations, one practical use is in surfacing track, with the tamper jack forming part of a team in which a wire or wires may be aligned along or near the opposite rails of the track. Under some circumstances, a single wire may be employed. One example of a practical use is in connection with a situation where wires are aligned at a level substantially above the rail level, but outwardly somewhat beyond each rail. In employing a tamper jack in connection with adjusting or varying the height of the rails it is important that the operator of the tamper jack know precisely "where he is." A close control is provided for by which the operation of the tamper jack may be kept under constant observation. This structure of control and observation is illustrated, in some detail, in FIGURES 4 and 5. This control structure may be dispensed with if a tamper jack is to be employed by itself and not as part of the above-described team. However, assuming that the tamper jack is to be used with the team of wire aligning and supporting carriages, the structure of FIGURES 4 and 5 may advantageously be employed.

Referring to FIGURE 5, the control unit B may include a cross-piece or cross-structure, generally indicated as 50, which may be adjusted vertically at one or both ends, as by the adjusting screw 51 and the operating handle 52. This adjustment controls the relation of the cross-structure to the vertical bars 53 movable in guides 54 so as to float relative to the frame and held against undesired rapid movement, for example, by cramping springs 55. It will be understood that at the lower end of each vertical bar 53 a rail engaging roller 55a may be positioned. The cross-piece 50 may carry a spirit level 56 and, as shown, carries also a suitable graduation 57, the purpose of which will later appear. Pivoted at each end of the cross-piece 50 as at 58 is a pointer lever, generally indicated as 60, having an inner pointer 61 opposed to the graduate 57 and an outer lever 62 engaging one of the wires. The balance of the pointer lever 60 is preferably delicate, and may be adjusted, for example, by the adjustable counterweight 63, so that although the outer arm 62 bears against one of the wires, it does not exert sufficient upward thrust against the wire perceptibly to change the position of the wire. Thus the inner pointer 61 indicates the relation of the level of the wire to the level of the rail or track. As the tamper jack operates, and as one or another of the rails is raised, the position of the lever 60 varies, and the pointer 61, as it travels across the graduate 57, indicates the change of rail position or plane. It will be understood that one of the pointer levers 60 may be positioned at each end of the cross-bar or cross-assembly 50. It will thus be clear that the operator of the tamper jack, by observing the spirit level or the pointers, or both, will always know the progress made in changing the surface of the rail or rails.

The use and operation of this invention are as follows:

While there is no wish to be limited to any particular use of my tamper jack, one practical use is in connection with surfacing track or rails to conform to a predetermined line or plane of reference. Assuming that suitable means are employed for maintaining such a line or plane of reference, for example, the wire or wires earlier mentioned, the tamper jack may be employed for surfacing or adjusting or leveling the rail or rails. Where a two-wire system is used, the cross-bar of the tamper jack carries two pointers, each pointer being pivoted intermediate its ends, for rotation about a horizontal, longitudinal axis. These axes are substantially nearer the outer ends of the pointer than the inner end. The operator may select, for example, a 3/1 ratio, whereby movement of the outer arm of the lever, in engagement with one of the wires, causes a 3/1 multiplication of the movement of the inner end of the lever, aligned across any suitable calibrated signaling means 57. By pivoting both

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pointers on a cross-bar structure, and by providing a uniform central scale, the operator can employ one or both of the pointers to obtain the desired adjustment of rail level. Assume that one rail, the grade rail, is at a proper elevation, and that its pointer, the pointer which engages the wire nearest that rail, is set at zero on the scale; then the other rail may be brought to proper elevation by doing work on the track or rail until the second pointer is also at zero. The cross-bar on which both pointers are mounted is initially adjusted to obtain the desired result, or give the desired indication. Where the rails are to be at the same level, the cross-bar is horizontal; and the desired level is reached, with the horizontal cross-bar, when both pointers are at zero. But assume that one of the rails is to be elevated in relation to the other. In that case, the cross-bar is adjusted to reduce the distance between it and the rail which is to be elevated. As the rail is elevated the cross-bar end above the rail is elevated; but when the second rail pointer is at zero, and the cross-bar is horizontal, the rails lie at a different level. The distance between the top surface of the grade rail and the cross-bar is greater than the distance between the other rail and the cross-bar. But the cross-bar is leveled, and both pointers are at zero, when the desired elevation has been given to the rail opposite to the grade rail.

While the operator may employ the pointers, as above described, in some uses of the tamper jack, the operator may employ the spirit level 56, either by itself, or in combination with the use of one or both of the pointers.

It will be realized that whereas this invention has been described and illustrated as a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. Therefore, the description and drawings are to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting it to a precise showing.

It is claimed:

1. For use with a tamper jack for elevating and tamping the rails of a railroad track, a control structure constructed to be mounted on the tamper jack and having lower portions adapted to engage both rails, a connection between the tamper jack and the control structure so that the control structure will float on the tamper jack and will be moved therewith but will be physically supported primarily by the rails, and sensing means on the control structure constructed to coordinate the rails with a plane of reference established along the track above the rails including a pair of pointer levers pivotally mounted on each side of the control structure, one on each side, generally above each rail, and pointing laterally inwardly toward each other, and a scale structure mounted generally in the center of the control structure opposite the inner ends of the pointer levers, the outer ends of the pointer levers being constructed to sense the plane of reference.

2. The structure of claim 1 further characterized in that the control structure includes vertically movable, vertically disposed bars constructed to be disposed on each side of the tamper jack above and aligned with the rails, rollers on the lower ends of the bars adapted to engage and roll on the rails, a cross-bar laterally disposed between the upper ends of the vertical bars, the pointer levers being mounted on the cross-bar, and adjusting means between the cross-bar and each of the vertical bars

for independently varying the height of either end of the cross-bar from the rails.

3. In combination, a tamper jack for elevating and tamping the rails of a railroad track, a control structure mounted on the tamper jack and having lower portions adapted to engage both rails, a connection between the tamper jack and the control structure so that the control structure floats on the tamper jack and will be moved therewith but will be physically supported primarily by the rails, and sensing means on the control structure constructed to coordinate the rails with a plane of reference established along the track above the rails including a pair of pointer levers pivotally mounted on each side of the control structure, one on each side, generally above each rail, and pointing laterally inwardly toward each other, and a scale structure mounted generally in the center of the control structure opposite the inner ends of the pointer levers, the outer ends of the pointer levers being constructed to sense the plane of reference.

4. The structure of claim 3 further characterized in that the control structure includes vertically movable, vertically disposed bars constructed to be disposed on each side of the tamper jack above and aligned with the rails, rollers on the lower ends of the bars adapted to engage and roll on the rails, a cross-bar laterally disposed between the upper ends of the vertical bars, the pointer levers being mounted on the cross-bar, and adjusting means between the cross-bar and each of the vertical bars for independently varying the height of either end of the cross-bar from the rails.

5. The structure of claim 3 further characterized by and including locking means for locking the control structure in an elevated position on the tamper jack so that the lower portions will not be in engagement with the rails and will be supported by the tamper jack, the control structure resting on the rails and floating, relative to the tamper jack, when the locking structure is unlocked.

6. In combination, a tamper jack for elevating and tamping the rails of a railroad track, a control structure mounted on the tamper jack and having lower portions adapted to engage both rails, a connection between the tamper jack and the control structure so that the control structure floats on the tamper jack and will be moved therewith but will be physically supported primarily by the rails, and sensing means on the control structure constructed to coordinate the rails with a plane of reference established along the track above the rails, including a sensing device mounted on each side of the control structure to sense the reference plane, one on each side, generally located above each rail, and an indicator structure located so as to be viewed by the operator of the tamper jack, the indicator structure cooperating with both sensing devices so that the indicator structure will reflect when the tamper jack has raised either rail to a certain position, relative to the plane of reference.

7. The structure of claim 6 further characterized in that each sensing device includes a pointer lever pivotally mounted on one side of the control structure, one such pointer lever on each side, mounted generally above each rail, and pointing laterally inwardly toward each other, and a scale structure mounted generally in the center of the control structure opposite the inner ends of the pointer levers, the outer ends of the pointer levers being constructed to sense the plane of reference.

No references cited.