

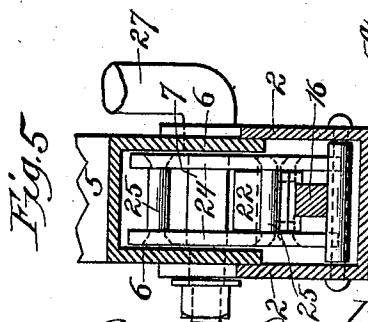
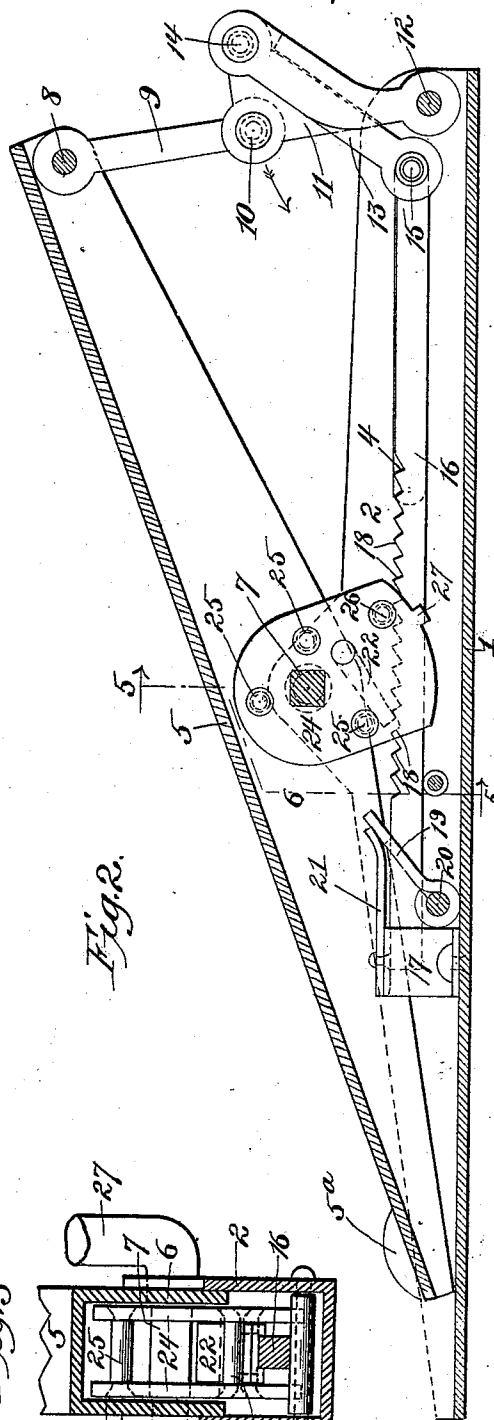
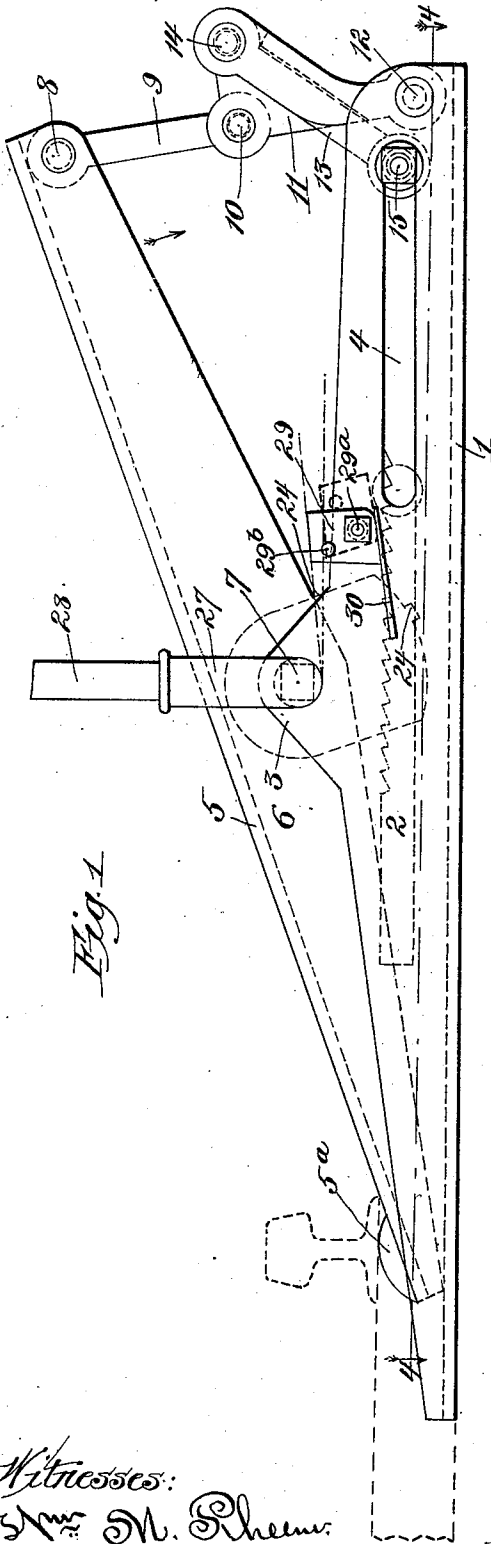
(No Model.)

2 Sheets—Sheet 1.

E. M. ROBINSON.
RAILWAY TRACK JACK.

No. 512,750.

Patented Jan. 16, 1894.



Witnesses:
 J^{ms} M. Rheem.
 Wm J. Hanning.

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 Inventor:
 Eugene M. Robinson
 By Raymond W. Quinhardt
 Attorneys

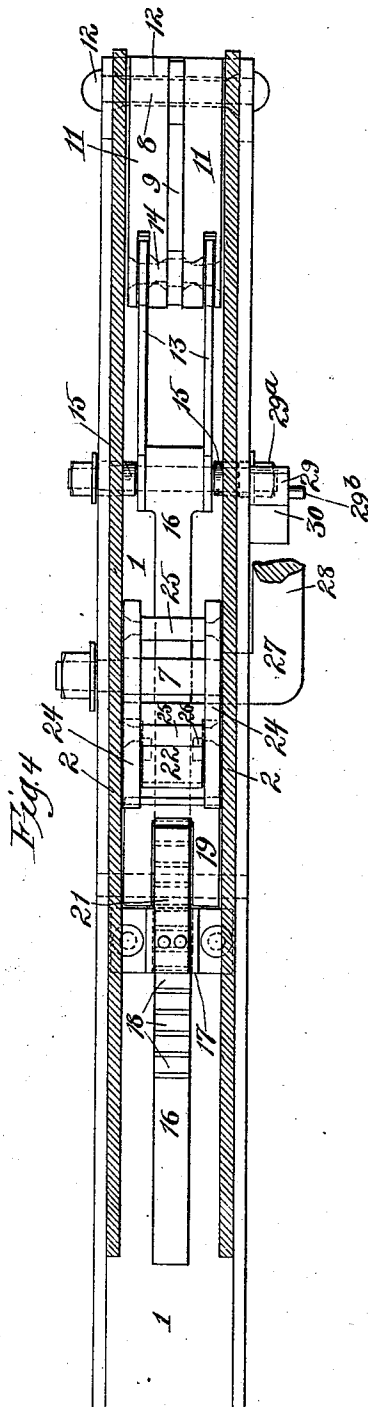
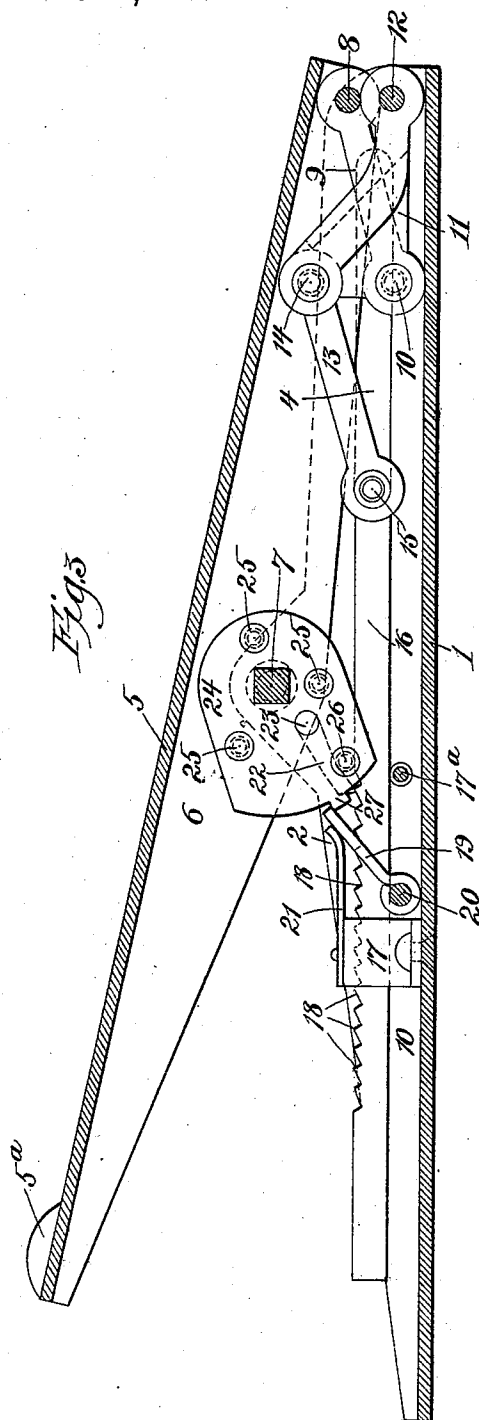
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2 Sheets—Sheet 2

E. M. ROBINSON.
RAILWAY TRACK JACK.

No. 512,750.

Patented Jan. 16, 1894.



Witnesses:
Wm. N. Schem
Wm. J. Hanning

Inventor:
Eugene M. Robinson
By Raymond S. Quinby
Attorneys

UNITED STATES PATENT OFFICE.

EUGENE M. ROBINSON, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO
THE PAIGE IRON WORKS, OF SAME PLACE.

RAILWAY-TRACK JACK.

SPECIFICATION forming part of Letters Patent No. 512,750, dated January 16, 1894.

Application filed September 4, 1893. Serial No. 484,741. (No model.)

To all whom it may concern:

Be it known that I, EUGENE M. ROBINSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Railway-Track Jacks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this
10 specification.

My invention relates to that class of railway appliances, known as track-jacks, which are used in raising laid rails and their ties for the purpose of establishing or changing the grade
15 of the railway, for repairing depressions in the roadway, and for various other analogous purposes.

Among the primary objects of my invention is included that of producing a track-jack
20 which, if necessary, (by reason of the unexpected approach of a train or from other unavoidable causes,) may be left in position upon the track or railway without any liability of derailing, injuring or obstructing the train.
25 Secondly, to produce a track-jack which shall operate with a prying action and which shall exert its maximum lifting power at the commencement of its operation and gradually lessen its power while increasing its rapidity
30 of action so as to precisely accord with the requirements incident to operative efficiency; also, to produce a track-jack which shall be capable of being quickly and easily thrown out of operative position and which shall operate effectively without any previous preparation of the road-bed at or adjacent to its
35 place of operation.

To the above purposes, as also to such others as may appear from the ensuing description, my invention consists in certain peculiar and novel features of construction and arrangement as hereinafter described and
40 claimed.

The more precise nature of my invention will be better understood when described with reference to the accompanying drawings in which—

Figure 1 is a side elevation of a track-jack embodying my invention; the parts of the
50 jack being shown as in the position which they occupy at the commencement of opera-

tion. Fig. 2 is a central, longitudinal section of the same. Fig. 3 is a view similar to Fig. 2, but showing the parts of the jack in the position which they occupy at the completion
55 of operation. Fig. 4 is a horizontal section of the jack, taken on the line 4—4, of Fig. 1; the direction of view being downward as indicated by the arrows applied to the section line. Fig. 5 is a transverse vertical section of the jack,
60 taken on the line 5—5, of Fig. 2.

Previous to my present invention, track-jacks have been usually so constructed that when in operative position they stand vertically upward and thus form a serious obstruction
65 upon the roadway, and, moreover, they cannot be readily removed in unforeseen contingencies. Hence, in the event of the unexpected approach of a railway train the jack has to be abandoned where it is, and owing
70 to its heavy construction and the position which it occupies, it almost invariably derails the train.

It is well known that great loss both of life and property has resulted from railway trains
75 encountering railway track-jacks. Moreover, track-jacks as heretofore constructed, are slow in their operation, very wasteful in their expenditure of power, and having only a restricted base upon which to stand, require
80 a level place to be made in the roadbed, or a timber or block has to be provided upon which the jack can stand in order to operate effectively. As will be seen from the ensuing description, I have produced a track-jack
85 which is wholly free from all of the above mentioned objections; my track jack occupying practically a horizontal position while in operation and being wholly free from the path of movement of trains and also being rapid in
90 its action and capable of easy and quick removal when necessary.

Referring now to the drawings: 1 designates the base of the jack, said base being of considerably elongated form longitudinally,
95 and being transversely preferably of approximately U-form; there being two upwardly extending vertical and parallel flanges 2 shown as extending from one end of the base to the other and at the two opposite sides of said
100 base. The base 1 thus has the general form of a channel-iron excepting that each side

flange 2 tapers upwardly and rearwardly from its front end (which merges to the level of the base) to a point about midway of the length of the flange, at which point is located
 5 an integral upward enlargement 3. From the enlargement 3, each flange 2 preserves practically a uniform height to its rear end, and the rear portion of each flange is formed with a longitudinal slot 4, the purpose of
 10 which will be presently explained; the two slots 4 being located precisely opposite each other and extending each from near the rear end of its flange nearly to the middle thereof.

5 designates the lifting-arm or bar of the
 15 jack, this arm or bar being of about the same length as the base 1 and preferably (although not necessarily) having its front extremity formed with an enlargement 5^a for engaging the base of the rail and also for strengthening
 20 said end. The lifting-arm or bar 5 is also preferably of approximately inverted U-form in cross-section; there being two vertical parallel flanges 6 extending longitudinally of the bar at opposite sides thereof and from end to
 25 end thereof and pendent at right angles to the under surface of the bar. The bar 5 thus possesses approximately the form of a channel-iron excepting that each of its side flanges 6 tapers rearward and downwardly from its
 30 front end, (which merges to the level of the bar,) to a point about midway of the length of said bar; the remainder of each flange 6 being shown as tapering only slightly upward and rearward to the rear extremity of the flange.

35 I have thus minutely described the form of the base 1 and lifting-bar 5 in order that their most desirable form, practically, may be clearly understood; the form shown and described combining the advantages of the utmost
 40 strength together with lightness; but I desire it to be particularly understood that I do not propose to limit myself exclusively to this precise form; the base 1 and the lifting-bar 5 may be forged, rolled, or otherwise produced
 45 as desired, and either or both of said parts may be in the form of a straight bar, if so desired, without departing from the essential spirit of my invention. In any event, the lifting-arm 5 is pivoted, preferably at a point
 50 about midway of its length, to the base 1 in such manner as to permit the front end of the bar to be raised from and lowered toward the front end of the base, while the rear end of said bar is simultaneously being depressed
 55 toward, or raised from, the rear end of said base. I have shown a rock-shaft 7 as the means for so pivotally connecting the lifting-bar to the base; this shaft extending transversely of the base and bar, midway of the
 60 length of the same, and at its ends passing through the corresponding portions of the flanges 2 and 6. The lifting-bar may, however, be pivoted by any preferred means without departing from the essential spirit of my
 65 invention so long as the bar and base bear the positional relation to each other shown, since it is this relation of the parts which

adapts the jack to be placed horizontally so as to extend outward from the rail which is being operated upon, and thus to clear a passing train.

To the rear end of the lifting-bar 5 are pivotally connected, as at 8, the upper ends of a toggle-arm or link 9, the lower end of which is pivotally connected, as at 10, to the upper
 75 ends of a pair of companion toggle-arms or links 11; the lower ends of said links 11 being pivoted, as at 12, to the rear end of the base 1. It is to be observed that the lower arms of links 11 are of approximately inverted
 80 triangular form, and that the pivot 12 passes through the inverted apexes of the triangles. A pair of links 13, are pivoted at their rear ends, as at 14, to the upper part of the links 11 at points opposite from the pivot
 85 10, and the links 13 are pivoted at their opposite or front ends, as at 15, to the rear end of an actuating rack-slide 16, to be more fully described, which is movable backward and
 90 forward longitudinally in the base 1.

I have described the lower toggle-links 11 as of approximately inverted triangular form, and they may be either of such form, or of any preferred form which will permit the
 95 three pivots 10, 12 and 14 to occupy the required relation to each other. That is to say, these three pivots occupy the three angles of an imaginary inverted right angled triangle, the pivots 10 and 14 being at the angles of the inverted base and the pivot 12 being at
 100 the inverted apex of the triangle. The result of this arrangement is that when the front end of the lifting bar 5 has been fully raised, the pivot 14 shall be above the pivots 10, 12 and 16 and, consequently, there shall
 105 be no dead centering or straightening of the toggle and therefore the front end of the lifting-bar 5 can be quickly lowered when desired without danger of binding or centering
 110 the toggle, and a downward pull is always exerted upon the toggle even at its very last position.

The rack-slide 16, above referred to, is shown as a long, straight bar placed horizontally on edge within the base 1, so as to extend and move endwise longitudinally of said
 115 base, said bar resting upon a supporting and guide-roller 17^a, and the front end portion of the bar working through a guide 17 bolted, or otherwise, secured to the front
 120 part of the base, upon the upper side thereof. At its upper edge this rack-slide is formed or suitably provided with a series of rearwardly inclined rack-teeth 18 which extend from near the front end of the bar toward the rear end thereof. These rack-teeth
 125 18 are engaged at times by a detent-pawl 19 which is of approximately U-shape, so as to freely straddle the rack-bar 16 and the ends of which are pivoted, as at 20, to the inner
 130 surface of the flanges 2 of the base 1; the upper end or cross-piece of the detent engaging the rack-teeth 18. This detent is movably held in engagement with the rack-teeth by a

leaf-spring 21, the front end of which is suitably secured to the top of the guide 17, and the rear end of which presses downwardly upon the upper end of the detent as shown.

Obviously, any form of spring for holding the detent into engagement with the rack-teeth may be employed and also any form of detent, and, furthermore, the detent may operate simply by gravity if preferred.

22 designates the actuating-pawl of the jack, this pawl at its front end engaging the rack-teeth 18, and at its rear end being pivoted, as at 23, between two oppositely disposed pawl-carrier plates 24. These pawl-carrying plates are each similar in form to the other, each plate being of somewhat elongated shape and having its ends preferably somewhat rounded as shown. The rock-shaft 7, above referred to, passes through the two pawl-carriers 24 near their upper ends and said shaft is shown as polygonal at the points where it is surrounded by the carriers 24, but any arrangement is permissible which shall insure the movement of the carriers with the rock-shaft. The pivotal connection 23 of the actuating-pawl 22 with the pawl-carriers 24 is just below and in front of the rock-shaft 7, so as to insure the proper operative position of the pawl relative to the rack-teeth. The pawl-carrier plates 24 are also connected together by tie-bolts 25 which insure simultaneous movement of said carriers and on its inner surface each carrier is formed with an inwardly extending stud 26 located near the free end of the plate; said studs 26 occupying such position as to come at times into contact with the actuating-pawl 22 and lift it out of engagement with the rack-teeth 18 as hereinafter explained. The free end of each pawl-carrier 24 is, furthermore, provided with an outwardly extending stud 27, these two studs coming at times into engagement with the under side of the detent-pawl 19 so as to lift said pawl out of engagement with the rack-teeth 18 of the slide-bar 16, as also hereinafter explained.

I desire it to be distinctly understood that I do not propose to confine myself exclusively to the precise form and arrangement of pawls here shown and described since my invention contemplates any arrangement of devices for impelling the slide-bar forward and for preventing accidental retraction or retrograde movement of said slide-bar. Hence, I may substitute friction pawls, for ratchet-pawls, and may adopt various other expedients for accomplishing the required operative functions of the bar 16.

28 designates the actuating-lever or handle-bar of the jack this lever or bar being shown as inserted into a suitable socket 27 carried by one end of the rock-shaft 7.

29 designates a stop-block which is pivoted, as at 29^a upon that outer side of the side-flange 2 of the base 1 which is adjacent to the lever 28, and 30 designates a spring-arm which is secured at one end to the base 1, ad-

jacent to the stop 29, or to be still more precise, to the side-flange 2, and the opposite end of which presses upward against said stop 29. The stop 29 is of greater length than width and is adapted to be turned downward and rearward and upward and forward upon its pivot 29^a; a stub 29^b being shown as presenting a convenient means for thus manipulating the stop.

The operation of the jack is as follows: The front end of the lifting-bar 5 is brought downward into contact with the front end of the base 1 as shown in Fig. 1, and, assuming that the jack is to be used for raising a rail and its ties, the front end or toe of the lifting-bar is forced under the base or foot of the rail at a point between two of the ties; the base of the jack extending horizontally outward from the rail. An attendant or operator now grasps the actuating handle-bar 28 and moves it alternately backward and downward until it strikes the spring-stop 29 and then upward and forward; corresponding rocking movements being thus imparted to the rock-shaft 7. Each time that the handle-bar 28 moves rearward and downward, the pawl-carrying plates 24 swing forward and upward and the actuating-pawl 22 being in engagement with one of the rack-teeth 18, moves the slide-bar 16 forward; the detent-pawl 19 riding over the teeth 18 as they pass beneath it and finally engaging one of the teeth so as to prevent retrograde movement of the slide-bar as the actuating-pawl 22 is retracted. At each upward and forward movement of the actuating-lever 28, the actuating-pawl 22 is drawn backward (by the backward movement of the pawl-carriers 24) and rides over the teeth 18 until it secures a hold upon one of them and begins its forward movement as before. Thus, the slide-bar 16 is advanced forwardly during each rearward and downward movement of the actuating handle-bar 28, and these forward movements acting through the link-rod 13 serve to draw the upper ends of the lower toggle-arms 11 and the lower ends of the upper toggle-arms 9 forward; drawing the rear end of the lifting-bar 5 downward and raising the front end thereof, and correspondingly raising the rail and its ties as much as desired.

When it is desired to remove the jack, the stop 29 is turned rearward and downward upon its pivot 29^a until it assumes the position shown in dotted lines in Fig. 1; the upper end of the stop being then presented rearwardly and the front side of said stop being presented upwardly. The actuating-lever 28 is removed rearwardly and downwardly until it engages the upper side of the stop 29. Thus the pawl-carrier-plates 24 are swung upward and forward beyond the usual extent of such movement, the studs 26 strike beneath the actuating pawl 19, raising said pawls out of engagement with the rack-teeth 18, and permitting the front end of the lifting-bar 5 to descend, and, in thus doing to draw the slide-

bar 16 backward to its starting position; the toggles 9 and 11 straightening out vertically as the rear end of the lifting-bar 5 rises. It will be seen that the maximum power of the jack is exerted at the commencement of the upward movement of the front end of the lifting-bar 5, this being the period of greatest resistance to the action of the lifting-bar. It will also be seen that the jack may be tripped at any point in its operation simply by depressing the actuating handle-bar 28 after the stop 29 has been turned to permit the necessary additional movement or lengthened stroke of the said bar.

Not only do I propose to vary the construction and arrangement of the pawl-mechanism as above mentioned, but I also contemplate within the spirit of my invention any form of stop attachment which will usually arrest the forward movement of the pawl-carriers before their studs can strike the actuating and detent-pawls, but which will yield when necessary, and permit a continued forward movement of said pawl-carriers sufficient to trip the pawls.

I also desire it to be understood that I may employ a single block or piece, for carrying the pawl 22, in lieu of the two connected plates above described.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. A railway-track jack, comprising a horizontal base, a lifting-bar pivotally connected to said base, and a toggle-mechanism connected to the base and to the lifting-bar and serving to move one end of said bar vertically away from the adjacent end of the base, substantially as set forth.

2. A railway-track jack, comprising a horizontal base, a lifting-bar pivotally connected intermediately of its ends to said base, and a toggle-mechanism connected to one end of the base and to the corresponding end of the lifting-bar and serving to move the opposite end of said bar vertically away from the adjacent end of the base, substantially as set forth.

3. A railway track-jack, comprising a horizontal base, a lifting-bar pivotally connected to said base, a toggle-mechanism connecting the bar to the base and operating to raise one end of the bar away from said base, and a sliding bar movable upon the base and connected to the toggle-mechanism so as to actuate the latter, substantially as set forth.

4. A railway-track jack, comprising a horizontal base, a lifting-bar pivotally connected to said base, a toggle-mechanism connecting the lifting-bar to the base and operating to raise one end of the bar away from said base,

a sliding-bar movable upon the base and connected to the toggle-mechanism so as to actuate the latter, and an actuating-pawl operating by contact with the sliding-bar, to actuate the latter, substantially as set forth.

5. A railway-track jack, comprising a horizontal base, a lifting-bar pivotally connected to said base, a sliding-actuating-bar mounted upon the base and operatively connected to the lifting-bar so as to raise the end of the bar from the base, and an actuating-pawl operating by contact with the sliding-bar to produce the effective movement thereof, substantially as set forth.

6. A railway-track jack, comprising a horizontal base, a lifting-bar pivotally connected to said base, a sliding-actuating-bar mounted upon the base and operatively connected to the lifting-bar so as to raise the end of the latter from the base, and an actuating and detent pawl-mechanism operating by contact with the sliding-bar to produce the effective movement thereof and to prevent retrograde movement thereof, substantially as set forth.

7. A railway-track jack, comprising a horizontal base, a lifting-bar pivotally connected to said base, a sliding-actuating-bar movable upon the base and operatively connected to said bar so as to raise the end of the bar from the base, a swinging pawl-carrier mounted upon the base and carrying an actuating pawl operating by engagement with the sliding-bar to produce effective movement of the latter, and a detent-pawl mounted also upon the base and operating by contact with the sliding-bar to prevent retrogression of the latter; the pawl-carrier being arranged to engage and lift the actuating and detent pawls from the sliding-bar, substantially as set forth.

8. A railway-track jack, comprising a horizontal base, a lifting-bar pivotally connected to said base, a sliding actuating-bar movable upon the base and operatively connected to said lifting-bar, a swinging pawl-carrier mounted upon the base and carrying an actuating-pawl operating by contact with the bar, a detent-pawl mounted also upon the base and operating by contact with the bar, an actuating-arm connected to the pawl-carrier, and a movable stop carried by the frame and serving to arrest the usual movement of the actuating-arm and also to be turned to permit continued movement of said arm so as to enable the pawl carrier to trip the pawls, substantially as set forth.

EUGENE M. ROBINSON.

Witnesses:

JNO. L. CONDRON,
TODD MASON.