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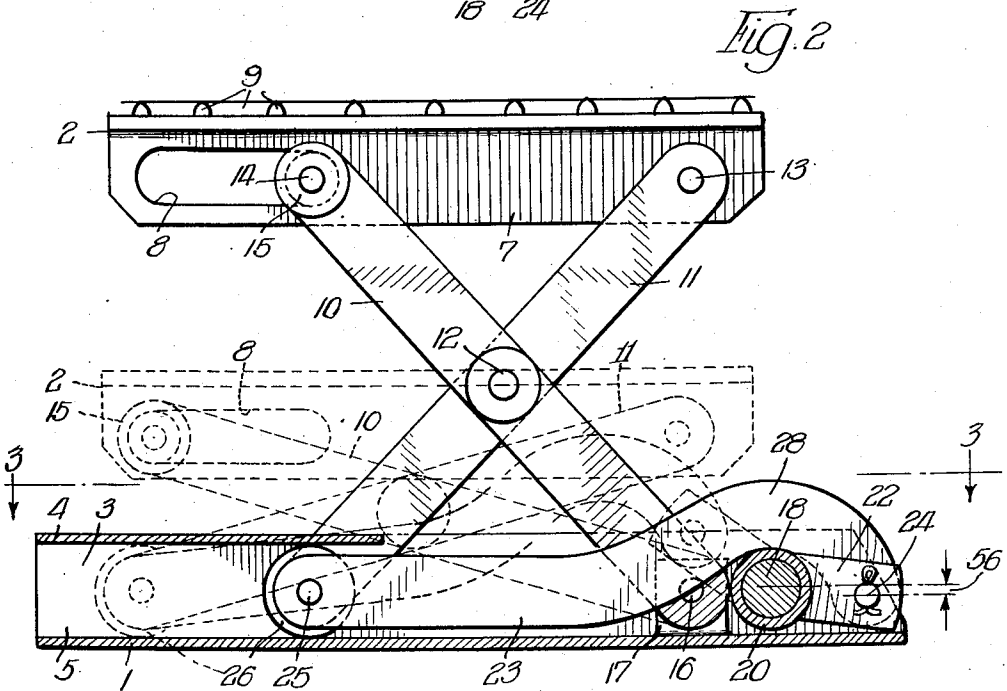
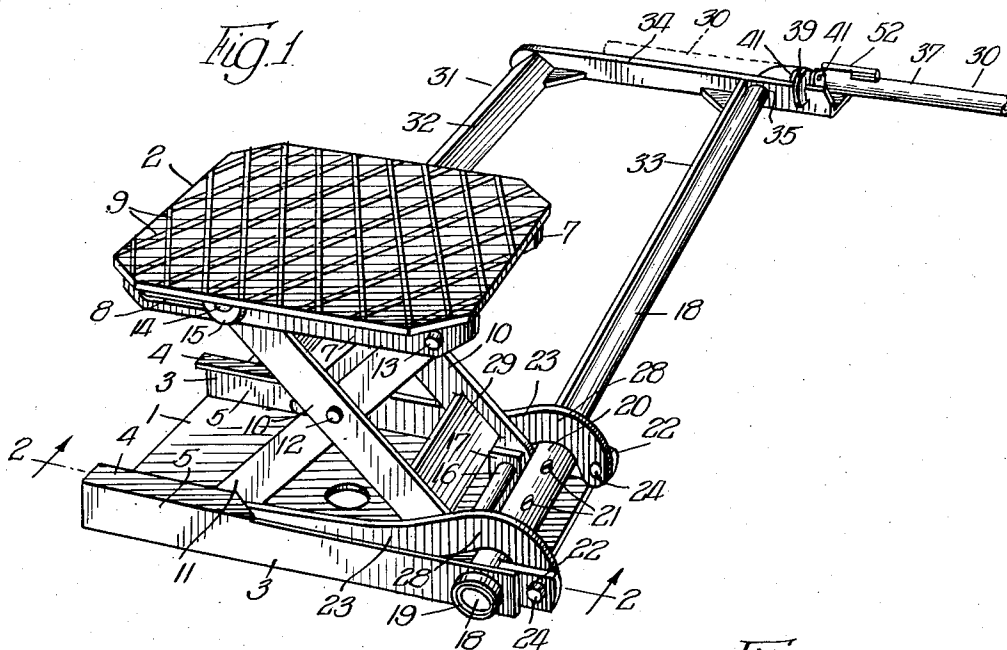
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2,911,191

LIFTING JACK FOR AUTOMOTIVE VEHICLES AND THE LIKE

Filed April 5, 1956

2 Sheets-Sheet 1



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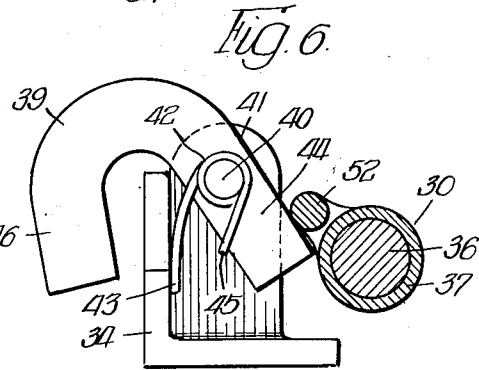
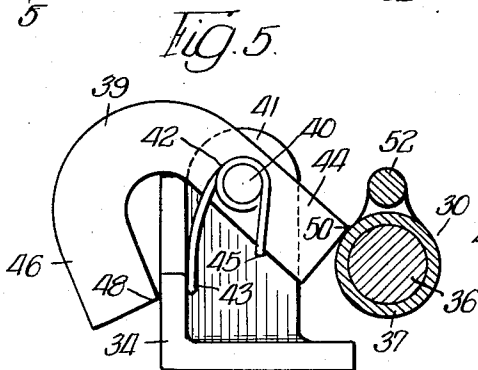
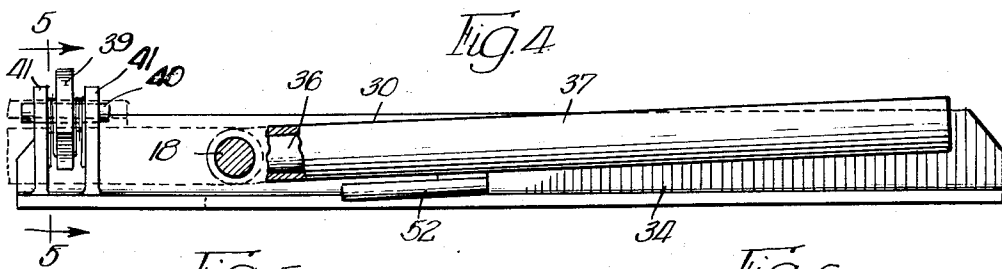
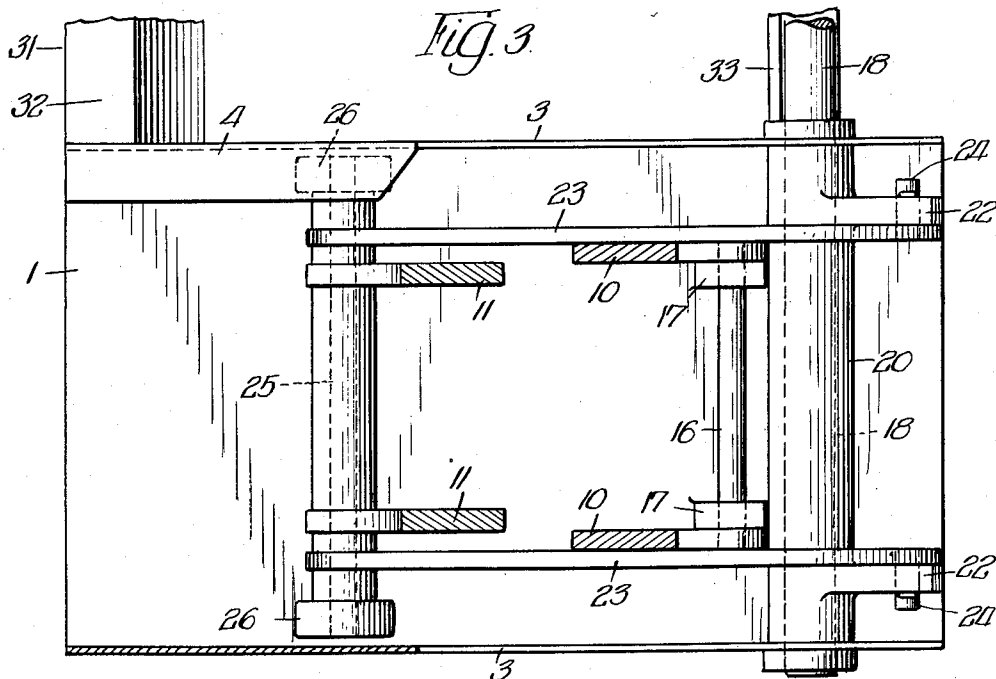
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LIFTING JACK FOR AUTOMOTIVE VEHICLES AND THE LIKE

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2 Sheets-Sheet 2



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2,911,191

LIFTING JACK FOR AUTOMOTIVE VEHICLES AND THE LIKE

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Application April 5, 1956, Serial No. 576,449

10 Claims. (Cl. 254—122)

This invention relates, in general, to an improved lifting jack for automotive vehicles and the like, and has particular relation to a quick operating and inexpensive floor jack for raising the wheels of a vehicle a short distance above the floor for the purpose of removing the same or for turning the wheels so that they may be more readily washed; also for adjusting the brakes and for other purposes as suitable or desired.

It is old in the art to employ a linkage system for operating a jack. Prior jacks of this sort, however, have usually employed a screw or an hydraulic system for operating the linkage mechanism and thereby the jack. Screw and hydraulic operating mechanisms add to the cost and complexity of the jack, and are not quick operating. Difficulty has also frequently been encountered in placing and positioning such jacks beneath, for example, the differential or other part of the vehicle, for the purpose of raising the wheels, and in gaining access to and manipulating the means for operating the jack.

One of the main objects of the present invention is to provide an improved jack of the character described which will overcome the shortcomings and difficulties encountered with prior jacks of this sort.

Another object is to provide an inexpensive floor jack which is operable quickly and expeditiously.

Another object is to provide a jack which may be operated to fully raised and fully lowered positions by the simple expedient of swinging a single lever or handle through substantially 180°.

Another object is to provide a jack of the character described having a rock shaft which, when the lifting plate of the jack is in position beneath, for example, the differential, or other part, of the vehicle, extends laterally to position outwardly of one side of the vehicle where it carries a handle disposed generally normal to the rock shaft and operable from one horizontal position at which the lifting plate is in its fully lowered position through substantially 180° to an opposite horizontal position at which the lifting plate is in fully raised position.

Another object is to provide a jack of the character described in which the rock shaft carries crank means movable past center to lock the lifting plate against descent at the completion of the vertical movement of the lifting plate away from the base of the jack.

Another object is to provide spring-pressed latch means engageable with the operating lever or handle as it is depressed to position at which the lifting plate is in fully raised position, and a sleeve rotatable on the lever part of the handle and provided with a latch releasing member rotatable into coaction with the latch means to release the handle for movement to its other position.

Another object is to provide the jack according to the present invention with an improved wheel chuck structure for receiving a vehicle wheel and positioning, for example, the differential, or other part, of the vehicle over the lifting jack, and more particularly a wheel chuck

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structure which also serves to support the outer end of the rock shaft of the jack for turning movement.

Another object is to provide a jack in which the linkage system and other parts of the jack are interrelated to do the desired work and produce the new and advantageous results.

Further objects and advantages of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings, it being understood that the invention is limited only within the scope of the appended claims and not to the particular embodiment selected for illustration.

In the drawings:

Figure 1 is a perspective view of a jack embodying the present invention showing the lifting plate in raised position;

Figure 2 is a view taken substantially on the line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is a side view looking from the upper end of Figure 1 but with the operating lever or handle in the opposite horizontal position which it occupies when the lifting plate is in its lowered position;

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 4 and showing the operating lever or handle in the position it occupies when the lifting plate is in raised position and the latch means coacting with the handle; and

Figure 6 is a fragmentary sectional view similar to Figure 5 and showing the latch releasing member on the sleeve part of the operating lever or handle in latch releasing cooperation with the latch means.

Referring now to the drawings, the jack selected for illustration is of the type having a linkage system connected between the base 1 of the jack and the lifting plate or pad 2 and operable to move the plate 2 vertically toward and away from the base 1.

The base 1 has upstanding side flanges 3 inturned at their upper ends at 4 to form longitudinal guide channels 5 at opposite sides of the base 1.

The lifting plate 2 is disposed over the base 1 and has depending side flanges 7 provided with longitudinal guide slots 8. The upper surface of the lifting plate or pad 6 preferably has raised diagonal ribs 9 or is otherwise roughened to assure against slippage of the differential or other part of the vehicle from position thereon when the plate 2 is positioned beneath such part.

At each side of the lifting plate 2 is disposed lazy tongs comprising a pair of diagonal levers 10 and 11 pivoted together intermediate their ends at 12. The upper ends of the levers 11 have fixed pivotal connection at 13 with the side flanges 7 of the plate 6. A cross shaft 14 extends transversely through the guide slots 8 and the upper ends of the levers 10 and carries guide rollers 15 one having longitudinal guiding movement in each of the guide slots 8. The lower ends of the levers 10 have fixed pivotal connection at 16 with upstanding lugs 17 on the base 1.

For the purpose of operating the linkage system to raise and lower the plate 2 the jack is provided with a generally horizontally disposed rock shaft 18 mounted in bushings or bearing sleeves 19 carried by flanges 3 to turn about a generally transverse axis. A sleeve 20 surrounds the shaft 18 and is interposed endwise between the side flanges 3. This sleeve is fixed to turn with the shaft 18, for example, by set screws 21 (Figure 1) or otherwise as desired, and carries a pair of crank arms 22 for turning movement with the shaft 18.

For the purpose of actuating the linkage mechanism 10, 11 by rocking movement of the shaft 18 there are a pair of links 23. One link 23 is pivotally connected at

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one end at 24 to each crank arm 22. The opposite ends of the links 23 are pivoted at 25 to the lower ends of the levers 11 and guide rollers 26 are carried by the shaft 25 which pivotally connects the levers 11 and links 23. The guide rollers 26 move longitudinally in the guide channels 5 under the rocking action of the crank arms 22 as rocking movement is imparted to the shaft 18 as will presently appear. The links 23 are arched at 28 for positioning over the rock shaft 18 and the sleeve 20 thereon when the links 23 are positioned as shown in Figure 2 with the plate 2 in elevated position. The levers 10 may be rigidly connected by a cross piece 29 as shown in Figure 1.

When the lifting plate 2 of the jack is in position beneath, for example, the differential or other part of the vehicle, the rock shaft 18 extends laterally to position outwardly of one side of the vehicle where it carries a handle 30 which is disposed generally normal to the axis of the rock shaft 18 and outwardly of the side of the vehicle. The handle 30 is operable from one horizontal position shown fragmentarily in full lines in Figure 1 at which position the lifting plate 2 is in fully raised position through substantially 180° to an opposite horizontal position shown fragmentarily in dotted lines in Figure 1 at which position the lifting plate 2 is in fully lowered position. Thus the lifting plate 2 is operated to fully raised and fully lowered positions by the simple expedient of swinging the single lever or handle 30 through substantially 180°. This provides for quick and expeditious operation of the jack from position at one side of the vehicle.

The base 1 preferably includes a transversely extending frame 31 which constitutes a wheel chuck structure. This wheel chuck structure comprises an inverted angle iron 32 secured at its inner end to the base 1 and extending outwardly normal to the side of the base and an angle iron 33 also secured at its inner end to the base 1 and extending outwardly in parallel relation to the angle iron 32. The outer ends of the angle irons 32 and 33 are connected by an angle iron spacer bar 34 which serves also to form at 35 a bearing for the outer end of the rock shaft 18.

The handle 30 comprises an inner lever or bar 36 connected to the rock shaft 18 to rock the same about its axis by the aforesaid swinging movement of the handle. A sleeve 37 surrounds the lever or bar 36 (Figures 5 and 6) and has turning movement thereon.

A latch member in the form of an inverted generally U-shaped latch member 39 has one arm pivoted at 40 between a pair of lugs 41 rigidly connected to the base of the angle iron spacer bar 34 and upstanding therefrom. A spring 42 coiled about the pivot pin 40 has one end engaging the upstanding flange of the bar 34 at 43. The other end of the spring 42 is bent or looped into engagement with the lower edge of the adjacent arm 44 of the latch member 39 at 45. The latch member 39 is thus spring-pressed to the position shown in Figure 5, although the greater weight of the latch member 39 to the left of the pivot 40, as the device is shown in Figures 5 and 6, causes the latch member 39 to operate by gravity to the latching position shown in Figure 5. Thus, in case of spring breakage the latch will still function by gravity. Engagement of the arm 46 of the latch member with the upstanding flange of the bar 34 at 48 limits the counterclockwise movement of the member 39 about the pivot 40 under the action of the spring 42 as the latch is viewed in Figures 5 and 6.

As the handle 30 is depressed to the horizontal position shown in full lines in Figure 1 it moves into position beneath the arm 44 of the latch member which is spring-pressed into latching engagement with the handle 30 and particularly the sleeve 37 thereof at 50.

The sleeve 37 of the handle has a latch releasing member 52 rigidly joined thereto. When it is desired to swing the handle 30 to its opposite horizontal position as shown in dotted lines in Figure 1 the sleeve 37 is grasped

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in the hand and turned on the lever or handle bar 36. This rotates the latch releasing member 50 into coaction with the latch arm 44 and actuates this arm about the pivot 40 against the action of the spring 42 to released position as shown in Figure 6, whereupon the handle 30 may be swung through 180° to its opposite horizontal position to operate the lifting plate 2 to its fully lowered position.

In use of the jack of the present invention in raising the wheels of the vehicle a short distance above the floor, the jack is preferably located in a car washing stall or other permanent location so that it may be fastened to the floor with lag screws or similar means. The car is then driven into place and located over the saddle when the wheel rests in the wheel chuck. It is also contemplated placing the jack elsewhere in front of or behind the vehicle wheel with the lifting plate 2 longitudinally aligned, for example, with the differential housing or other part of the vehicle and with the handle 30 in the position shown in dotted lines in Figure 1 and the plate 2 thus in its lowermost position. The vehicle is then moved to roll the wheel tire over the angle iron 32 or the angle iron 33 depending upon whether the jack is in front or behind the vehicle wheel, and until the tire is positioned between the angle irons 32 and 33 with the axis of the wheel parallel with these angle irons. The wheel chuck thus receives the vehicle wheel and positions the differential housing or other part over the lifting plate 2.

The handle or lever 30 is then merely grasped and swung from its horizontal position as shown in dotted lines in Figure 1 through 180° to its opposite horizontal position as shown in full lines in the same figure. This swinging movement of the handle 30 rocks the shaft 18 in a clockwise direction (Figure 2) through 180° and the crank arms 22 act through the links 23 to draw the rollers 26 longitudinally through the guide channels 5 and the lower ends of the levers 11 toward the lower ends of the levers 10. This raises the lifting plate 2 and through it the vehicle wheels by the vertically expanding lazy tongs action of the levers 10 and 11.

At the completion of the vertical movement of the plate 2 away from the base 1 the pivotal connections 24 between the links 23 and the crank arms 22 move past center with respect to the pivotal connections 25 and 16 to lock the plate 2 and the vehicle wheels against descent until it is again desired to lower the plate 2. The amount of past center movement is indicated, for example, by the space 56 between the arrows shown in Figure 2.

Moreover as the handle 30 moves to its horizontal position as shown in full lines in Figure 1 it moves under the spring-pressed latch member 39 the arm 44 of which engages over the sleeve part of the handle 30 to latch the handle in this position.

When it is desired to lower the plate 2 in order to return the vehicle wheels into cooperation with the floor the sleeve 37 is grasped and rotated to release the latch arm 44 from the handle 30 whereupon the handle is swung to its opposite horizontal position as shown in dotted lines in Figure 1. This swinging movement of the handle 30 rocks the shaft 18 in a counterclockwise direction (Figure 2) through 180° and the crank arms 22 act through the links 23 to move the rollers 26 longitudinally through the guide channels 5 and the lower ends of the levers 11 away from the lower ends of the levers 10. This lowers the lifting plate 2 and thereby the vehicle wheels until they are again in cooperation with the floor. The vehicle may then be driven or moved from position over the jack which may be then stored, for example, in the garage, or elsewhere, until it is again brought into use.

The embodiment of the invention shown in the drawings is for illustrative purposes only and it is to be expressly understood that said drawings and the accompanying specification are not to be construed as a definition of the limits or scope of the invention, reference being had to the appended claims for that purpose.

I claim:

1. In a lifting jack of the character described, a base, a lifting plate disposed over said base, linkage means connected between said base and said plate and operable to move said plate vertically toward and away from said base, said base including a transversely extending wheel chuck structure for receiving a vehicle wheel and positioning the differential of the vehicle over said lifting plate, a generally horizontally disposed and transversely extending rock shaft mounted on said base and the wheel chuck structure thereof for turning movement about a generally transverse axis, crank means carried by said rock shaft for turning movement therewith, link means, said linkage means having first pivotal connections with said link means and said base, a second pivotal connection between said link means and said crank means and movable past center with respect to said first pivotal connections to lock said lifting plate against descent at the completion of the vertical movement of the lifting plate away from said base, and a handle carried by said rock shaft and disposed generally normal to said rock shaft and outwardly of one side of the vehicle when the differential of the vehicle is positioned over said lifting plate, said handle being operable from one horizontal position at which said lifting plate is in its fully lowered position through substantially 180° to an opposite horizontal position at which said lifting plate is in fully raised position.

2. In a lifting jack of the character described, a base, a lifting plate disposed over said base, said base including a transversely extending wheel chuck structure for receiving a vehicle wheel and positioning the differential of the vehicle over said lifting plate, a generally horizontally disposed rock shaft mounted on said base to turn about a generally transverse axis, a handle carried by said rock shaft and disposed generally normal to said rock shaft and outwardly of one side of the vehicle when the differential of the vehicle is positioned over said lifting plate, said handle being operable from one horizontal position at which said lifting plate is in its fully lowered position through substantially 180° to an opposite horizontal position at which said lifting plate is in fully raised position, crank means carried by said rock shaft for turning movement therewith, a link pivotally connected at one end to said crank means and having its other end extending beneath the plane of said lifting plate, and lazy tong comprising crossed levers acting between said base and said lifting plate for moving said plate away from and toward said base by turning movement of said generally horizontally disposed rock shaft, the lower end of one of said levers being pivoted to the extending end of said link and movable longitudinally with respect to said base and the lower end of the other lever being pivoted to said base.

3. In a lifting jack of the character described, a base, a lifting plate disposed over said base, said base including a transversely extending wheel chuck structure for receiving a vehicle wheel and positioning the differential of the vehicle over said lifting plate, a generally horizontally disposed rock shaft mounted on said base to turn about a generally transverse axis, a handle carried by said rock shaft and disposed generally normal to said rock shaft and outwardly of one side of the vehicle when the differential of the vehicle is positioned over said lifting plate, said handle being operable from one horizontal position at which said lifting plate is in its fully lowered position through substantially 180° to an opposite horizontal position at which said lifting plate is in fully raised position, crank means carried by said rock shaft for turning movement therewith, a link pivotally connected at one end to said crank means and having its other end extending beneath the plane of said lifting plate, and lazy tong comprising crossed levers acting between said base and said lifting plate for moving said plate away from and toward said base by turn-

ing movement of said generally horizontally disposed rock shaft, the lower end of one of said levers being pivoted to the extending end of said link and movable longitudinally with respect to said base and the lower end of the other lever being pivoted to said base, the pivotal connection between the link and the crank means being movable past center with respect to the pivotal connections between one lever and the link and between the other lever and the base to lock the lifting plate against descent at the completion of the vertical movement of the lifting plate away from the base.

4. In a lifting jack of the character described, a base, a lifting plate disposed over said base, said base including a transversely extending wheel chuck structure for receiving a vehicle wheel and positioning the differential of the vehicle over said lifting plate, a generally horizontally disposed rock shaft mounted on said base to turn about a generally transverse axis, a handle carried by said rock shaft and disposed generally normal to said rock shaft and outwardly of one side of the vehicle when the differential of the vehicle is positioned over said lifting plate, said handle being operable from one horizontal position at which said lifting plate is in its fully lowered position through substantially 180° to an opposite horizontal position at which said lifting plate is in fully raised position, crank means carried by said rock shaft for turning movement therewith, a link pivotally connected at one end to said crank means and having its other end extending beneath the plane of said lifting plate, lazy tong comprising crossed levers acting between said base and said lifting plate for moving said plate away from and toward said base by turning movement of said rock shaft, the lower end of one of said levers being pivoted to the extending end of said link and the lower end of the other lever being pivoted to said base, and latch means coacting with said handle for latching said handle in its horizontal position at which said lifting plate is in fully raised position.

5. In a lifting jack of the character described, a base having upstanding flanges forming guide channels at opposite sides thereof, a lifting plate disposed over said base and having depending flanges with guide slots therein, a generally horizontally disposed rock shaft mounted on said base to turn about a generally transverse axis, crank arms carried by said rock shaft for turning movement therewith, links pivoted to said crank arms and actuated longitudinally by turning movement of said rock shaft, a pair of diagonal levers at each of the opposite sides of said base and pivoted together intermediate their ends, one lever of each of said pair of levers having fixed pivotal connection with said base at one end and having at its opposite end a roller having sliding movement in one of said slots, the other lever of each pair of levers having fixed pivotal connection with said lifting plate at one end and having pivotal connection with said links at their opposite ends with rollers on said latter pivotal connections operating longitudinally in said guide channels, said base including a transversely extending wheel chuck structure for receiving a vehicle wheel and positioning the differential of the vehicle over said lifting plate, and a handle carried by said rock shaft and disposed generally normal to said rock shaft and outwardly of one side of the vehicle when the differential of the vehicle is positioned over said lifting plate, said handle being operable from one horizontal position at which said lifting plate is in its fully lowered position through substantially 180° to an opposite horizontal position at which said lifting plate is in fully raised position, the pivotal connections between said links and said crank arms being disposed past center with respect to the pivotal connections between said levers and said base and the axis of the rollers operable in the guide channels on said base when the operating handle is in its latter horizontal position to lock the same in said position.

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6. A lifting jack according to claim 5 wherein the wheel chuck structure comprises an open frame formed by a pair of parallel bars extending transversely from said base and connected at their outer ends by a spacer bar.

7. In a lifting jack of the character described, in combination, a base, a lifting plate disposed over said base, a generally horizontally disposed operating member mounted on said base to turn about a generally transverse axis, crank means carried by said operating member for turning movement therewith, a link pivotally connected at one end to said crank means and having its other end extending beneath the plane of said lifting plate, lazy tong comprising crossed levers acting between said base and said lifting plate for moving said plate away from and toward said base by turning movement of said generally horizontally disposed operating member, the lower end of one of said levers being pivoted to the extending end of said link and movable longitudinally with respect to said base and the lower end of the other lever being pivoted to said base, the crank means being disposed on one side of said generally horizontally disposed operating member with the pivotal connection between one lever and the link and the pivotal connection between the other lever and the base both disposed on the other side of said operating member, a handle carried by said horizontally disposed operating member and operable from one horizontal position at which the lifting plate is in fully lowered position through substantially 180° to an opposite horizontal position at which the lifting plate is in fully raised position, latch means coacting with said handle for latching the handle in its latter horizontal position, said latch means comprising a spring-pressed latch arm pivotally carried by said base and movable into latching engagement with said handle as the handle is depressed to said latter horizontal position, said handle including a lever having a sleeve rotatable thereon, and a latch releasing member carried by said sleeve and rotatable into coaction with said latch arm to release said handle for movement to its other position.

8. In a lifting jack of the character described, a base, a lifting plate disposed over said base, linkage means connected between said base and said plate and operable to move said plate vertically toward and away from said base, said base including a transversely extending wheel chuck structure for receiving a vehicle wheel and positioning a portion of the vehicle over said lifting plate, said wheel chuck structure extending outwardly from said base and having an outer side spaced transversely from

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said base, a generally horizontally disposed and transversely extending rock shaft mounted at its inner end on said base and at its outer end on the wheel chuck structure thereof for turning movement about a generally transverse axis, crank means carried by said rock shaft for turning movement therewith, link means, said linkage means having first pivotal connections with said link means and said base, a second pivotal connection between said link means and said crank means and movable past center with respect to said first pivotal connections to lock said lifting plate against descent at the completion of the vertical movement of the lifting plate away from said base, and an operator at the outer side of said wheel chuck structure and operatively connected with the outer end of said rock shaft for rocking said shaft from position at which said lifting plate is in fully lowered position through substantially 180° to raise said lifting plate to raised position.

9. In a lifting jack of the character described, a base, a lifting plate disposed over said base, said base including a transversely extending wheel chuck structure for receiving a vehicle wheel and positioning a portion of the vehicle over said lifting plate, said wheel chuck structure extending outwardly from said base and having an outer side spaced transversely from said base, a generally horizontally disposed rock shaft mounted at its inner end on said base and at its outer end on the wheel chuck structure thereof to turn about a generally transverse axis, linkage means connected between said base and said plate and to said rock shaft, and an operator at the outer side of said wheel chuck structure and operatively connected with the outer end of said rock shaft for rocking said shaft to raise said lifting plate to raised position through said linkage means.

10. A lifting jack according to claim 9 wherein there is means for locking said lifting plate against descent at the completion of its movement to raised position.

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