

Nov. 29, 1927.

1,650,810

I. A. WEAVER

JACK

Filed July 20, 1922

4 Sheets-Sheet 1

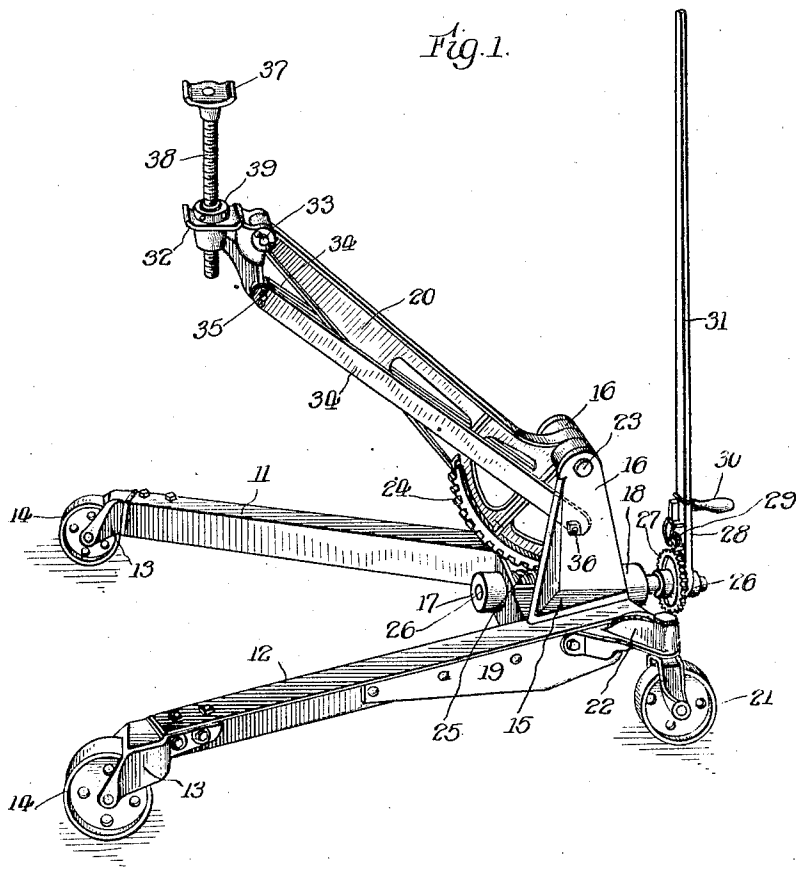
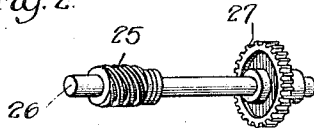


Fig. 2.



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Fig. 3.

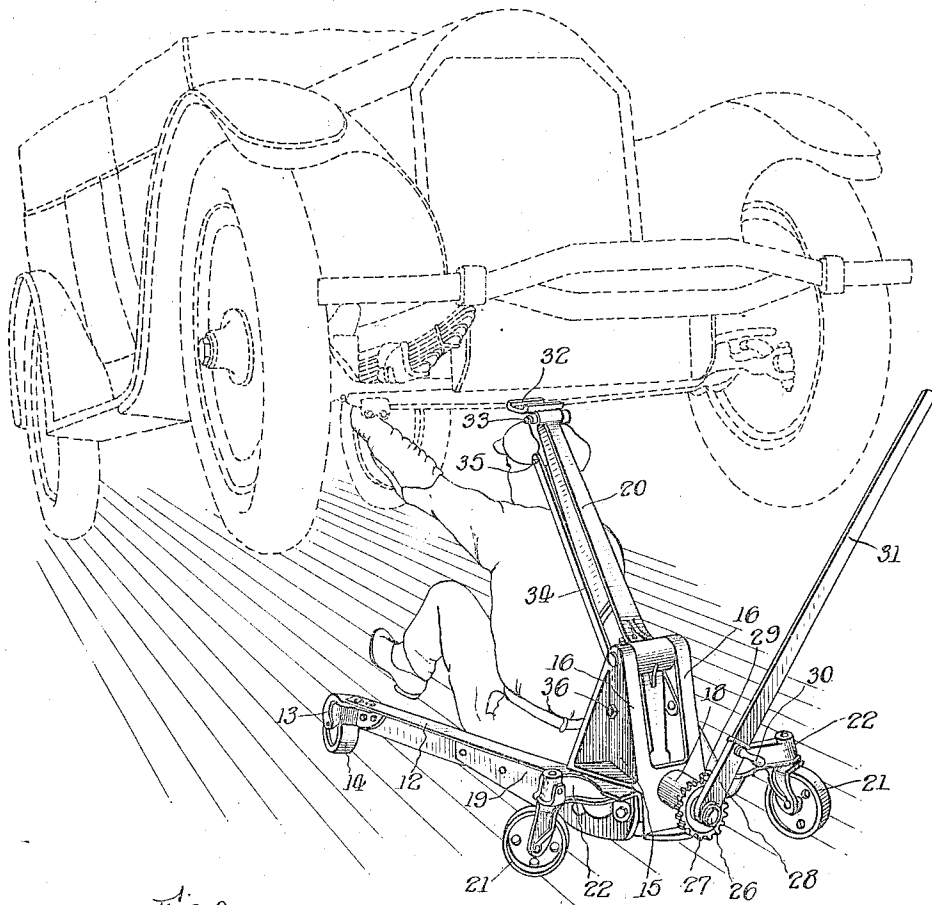
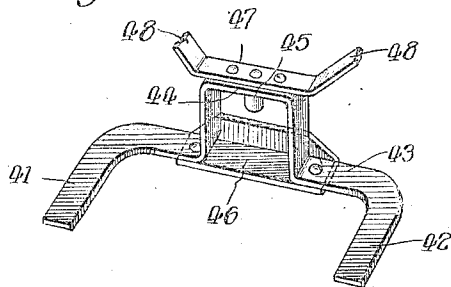


Fig. 4.



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Fig. 5.

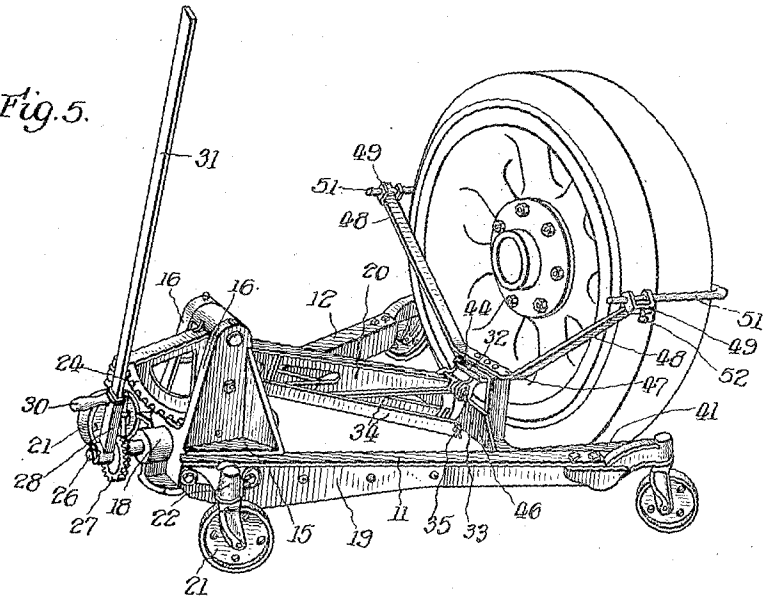
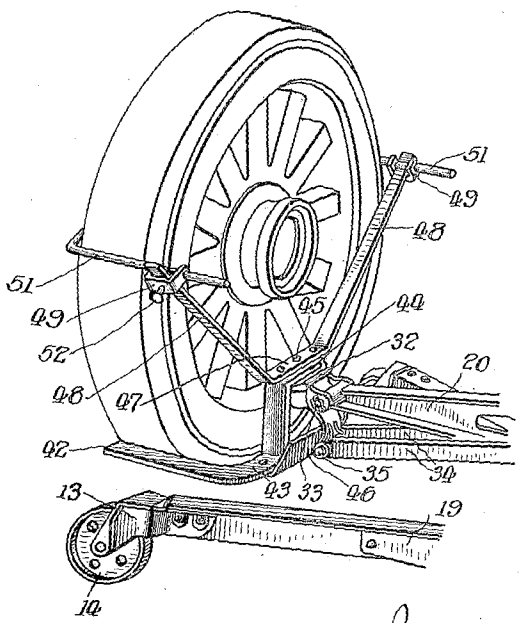


Fig. 6.



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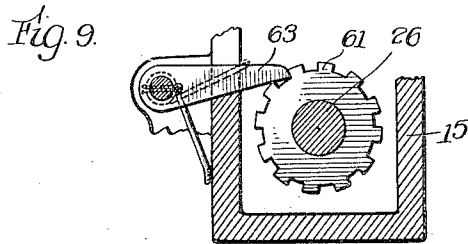
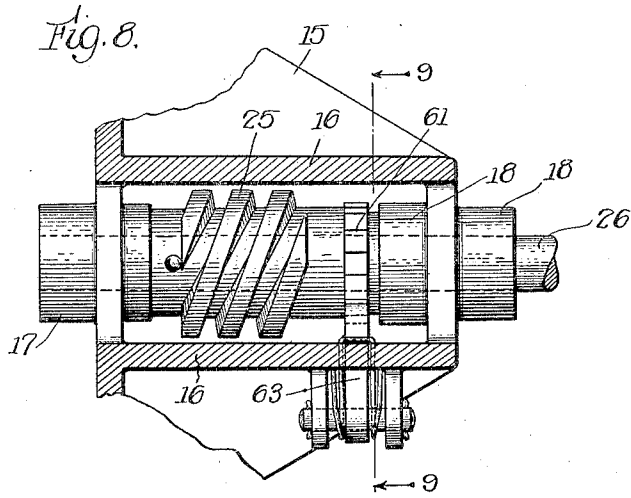
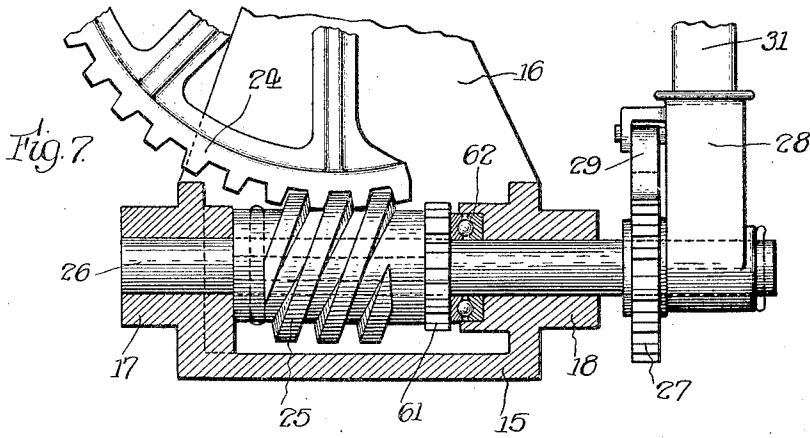
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4 Sheets-Sheet 4



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# UNITED STATES PATENT OFFICE.

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## JACK.

Application filed July 20, 1922. Serial No. 576,219.

The main object or leading purpose of the present invention is the provision of a jack or lifting appliance of comparatively heavy, substantial construction especially adapted for use with automobiles, etc., although, of course, it is not restricted to any particular use, its structural and functional characteristics rendering it useful in several other relations.

When used with automobiles, it is capable of lifting the load from a comparatively low position to an extremely high elevation, thus enabling a mechanic to work beneath the body thus raised.

It is, therefore, useful in supporting the body of the vehicle while its springs are being repaired or oiled when the weight of the body is thus removed from them.

It is also designed to be of substantial service when shock absorbers are being applied to or removed from the vehicle.

With suitable attachments applied, the device is of material advantage in handling truck wheels while they are being removed from or applied to the vehicle and during their transportation to and from hydraulic or other presses to the tables of which they must be raised or lifted for removing the old tires and replacing them with new ones.

To enable those skilled in this art to fully understand this invention I have illustrated in the accompanying drawings forming a part of this specification a desirable and preferred embodiment of the invention and for simplicity the same parts or elements throughout the several views have been supplied with like reference characters.

In these drawings:—

Figure 1 is a perspective view of the complete jack;

Figure 2 is a similar view of the worm shaft forming a part of the jack;

Figure 3 illustrates in perspective one way in which the jack may be employed for elevating an automobile permitting the workman to occupy the position shown;

Figure 4 is a fragmentary perspective view of the attachment or accessory used in connection with the handling of truck wheels;

Figure 5 is a perspective view indicating the employment of the jack and attachment in association with a truck wheel;

Figure 6 is a fragmentary view of a portion of the parts illustrated in Figure 5;

Figure 7 is a partial vertical section through the lower portion of an appliance incorporating a somewhat modified embodiment of the invention;

Figure 8 is a horizontal section through the same part of the mechanism; and

Figure 9 is a vertical cross-section on line 9—9 of Figure 8.

Referring to the drawings, it will be perceived that the frame of the jack or elevating appliance comprises two, horizontal, diverging legs or angle-bars 11 and 12 on the outer ends of which, by means of suitable castings 13, 13 bolted, riveted, or otherwise fixedly fastened thereto, appropriate carrying wheels 14, 14 are mounted in parallelism.

At their other or nearer ends, these two arms or legs are bolted or securely and rigidly fastened in any approved manner to the opposite faces of a main housing or casting 15 of peculiar and especial shape clearly shown including a pair of upstanding, spaced, parallel, upwardly-converging, braced walls 16, 16 and aligned bearings 17 and 18 in its lower skeleton portion.

Each side angle-bar or leg, 11 or 12, has a top, outwardly-extended, horizontal flange and a vertically-disposed depending flange along its inner margin, and in order to strengthen the latter flange near such connecting or central casting, each such flange has riveted against its outer face a plate 19 of varying width or depth corresponding in a general way to the strains placed upon it.

The construction also includes a pair of castor-wheels 21, 21 and their supporting brackets 22, 22 secured to the frame against the outer faces of the two plates 19, 19 opposite the main-casting as is most clearly shown perhaps in Figure 3.

A tapered canti-lever lifting or jack arm 20 is fulcrumed between the walls 16, 16 on a short cross shaft 23 supported in the upper parts of the latter, and such arm at one end

is equipped on its under portion with a segment worm-wheel 24 concentric with the axis of shaft 23.

The lifting and lowering movements of such arm or cantilever are brought about by a worm 25 on a shaft 26 rotatable in bearings 17 and 18 and in mesh with the worm-wheel 24, whereby turning of the shaft and worm acts to rock the lift or jack arm up or down.

Shaft 26 is provided with a square-tooth ratchet-wheel 27 fixed thereto and rotatable therewith, the shaft having a lever-head or socket-member 28 loosely mounted thereon at one side of the ratchet-wheel, such element 28 having a ratchet-pawl 29 of ordinary construction with teeth at its opposite ends so that the ratchet-wheel may be operated in either direction. If desired this pawl may be equipped with spring means of any appropriate style to maintain either of its end teeth in cooperative engagement with the ratchet-wheel.

Member 28 has an operating handle 30 for adjustments of the arm 20, but when a substantial load is to be lifted, a comparatively long bar handle 31 is inserted in the socket of element 28 to secure adequate leverage on the shaft.

A vertically-apertured saddle 32 is hinged on the free end of arm 20 at 33, and, in order to maintain such member in horizontal relation for all angular positions of the rock or lift arm, a parallel-motion mechanism is provided consisting of two links, 34, 34, one on each side, each pivotally connected to the member at 35 and to the main casting or housing, inside of the corresponding wall 16, at 36.

With some kinds of work, the saddle 32 alone is used to directly engage the load, but in other cases, it is desirable to equip such element with an extension, for example to increase the height of the lift, or the use of such an extension above the cantilever arm in its lowered position enables the jack to be placed under the running-board of the vehicle and still have the extension engage the frame thereof for lifting or elevating purposes, whereby one side of the car chassis may be raised to enable either the front or rear spring to be replaced or lubricated while the weight is removed therefrom, and without having any obstruction in the way of the mechanic while he is working on either end of the spring at either the front or rear portion of the car.

Such extension conveniently takes the form of a seat-member 37 swivelled on the upper end of an upright, screw-threaded rod 38 occupying the vertical hole through the saddle 32, the adjustment being secured and the weight being borne by a nut 39 on the screw-rod and resting on the top face of the saddle.

Obviously, adjustment of the nut governs the height of the seat member above the saddle.

It will be understood from the above description that, through a powerful leverage, the arm 20 may be rocked up or down to raise or lower the load, and, that, by reason of the diverging relation of the supporting legs 11 and 12, the workman, as shown in Figure 3, may occupy the space directly below the lifting element 32 or 37 as the case may be which engages the body undergoing elevation or maintained in raised position.

When the handle 31 is rocked alternately up and down on one side of the axis of the shaft 26, the load will be raised, moving upwardly step by step during the successive downward movements of the handle, and when the same handle is rocked up and down on the other side of such axis, the load will be lowered step by step, each partial descent occurring during each downward movement of the handle.

For the removal and replacing of vehicle-wheels, such as the heavy truck wheels equipped with solid or pneumatic tires, and the raising and lowering of such wheels to and from the table of the press on which the tire replacement operations are performed, a materially different attachment or accessory is employed.

This part is shown in Figures 4, 5 and 6 and comprises a flat bar bent to provide parallel, spaced arms 41 and 42, the connection portion 43 of the bar being looped upwardly supplying a middle elevated section 44 equipped on its under face with a downwardly-extended lug or pin 45 adapted to fit in the hole of the saddle 32.

The two parts of the bar on opposite sides of the loop are tied together by a connecting angle-bar 46 riveted thereto.

To the top face of the middle section 44 there is riveted the center part or section 47 of a bar or yoke, the end portions 48, 48 of which flare or diverge upwardly as indicated in Figures 5 and 6, and each of these is fitted with an adjustable, U-shaped, apertured clamp 49 straddling the bar, the legs of the clamp having aligned holes adjustably receiving the shank of a hook 51 formed of a bent cylindrical rod.

A set or clamping screw 52 extends through a threaded hole in the web of the clamp, its inner end bearing against the adjacent face of the part 47.

By turning this screw, the shank of the hook may be drawn against the bar and securely but adjustably maintained in position.

Truck-wheels are very heavy, and, inasmuch as the brake-drum is attached to one side, it is difficult to roll the demounted wheel over the floor by hand, and it is dangerous for one person to handle.

This improved appliance with the attach-

ment or accessory specified handles such wheels with comparative ease.

Assuming that the auxiliary attachment described is in place on the lifting or jack-arm and that its angle-bar 46 is bearing against the lower part of the saddle-element 32, and assuming, furthermore, that it is desired to remove a truck-wheel from its vehicle and that the latter has been jacked up sufficiently so that the wheel is off of the floor or ground, the jack is rolled along until the arms 41 and 42 are beneath the wheel tire on opposite sides of its center, whereupon the jack-arm by manipulation of handle 31 is rocked upwardly until the weight of the wheel is just borne by such supporting yoke 41, 42.

Then the two hooks 51 are adjusted or positioned to extend around to the rear of the tire and clamped in this position, and bodily movement or rolling of the jack away from the vehicle carries the wheel with it, such wheel resting on the parts 41 and 42 and being prevented from falling over by the arms 48 and hooks 51.

The jack may be used also to raise the wheel up to the press table on which it is deposited during the tire removal operation.

The wheel when ready for replacement on the vehicle is held on the jack in the position it occupied when it was removed, and the jack carrying the wheel is rolled into position to apply the wheel to the end of its axle or center support, whereupon the hooks are released and turned out of position and the supporting arms 41 and 42 lowered sufficiently to permit the jack to be rolled out of the way.

It should be noted that in performing these operations, the jack or lifting and transporting device may be quickly and accurately placed and that the wheel lifting member extends clear to the floor on either side of the wheel.

If preferred, the jack alone may be used for elevating the wheel from the floor while it is still on its axle, but before removing the wheel from the axle the latter or some corresponding part of the vehicle must be supported by other means to temporarily take the place of the wheel to be removed.

It may be observed also that the shape and construction of the jack and its attachment are such that the center of the wheel is not interfered with whereby it may be readily sighted while placing it in position on its axle, and there is no obstruction to interfere with the proper use of tools such as wrenches or puller clamps in removing or replacing the truck wheels.

It will be seen additionally that the jack has an extremely long and wide wheel base which gives assurance of security while loads are elevated to a considerable height.

In some cases in a construction of this

type the end thrust of the worm on the frame may be somewhat excessive for the ready and efficient performance of the functions specified, unless suitable anti-friction means are provided between these parts, and accordingly such a construction has been shown in detail in Figures 7, 8 and 9.

In this embodiment of the invention, the parts of the mechanism are much the same as those already described, but a ratchet or toothed lock wheel or collar 61 is loose on shaft 26 at the end of the hub of the worm 25, and between the part 61 and the adjacent face of the shaft bearing 18 a ball-bearing 62 is interposed, whereby to ease and facilitate the turning of the worm and the associated worm-wheel sector 24 during the load-lifting action.

Owing to the quick pitch of the thread of the worm, it is desirable to render such anti-friction elements inoperative while the arm 20 is supporting the load and while the latter is being lowered.

Accordingly a spring-pressed dog or pawl 63 is mounted on the frame which permits the member 61 to turn in that direction corresponding to the elevating movement of the load-lifting arm 20 of the jack, under which circumstances the teeth of the part 61 travel idly under the dog, the latter, however, by coercion with such teeth preventing retrograde rotation of the element 61.

The obvious result is that the worm and worm-wheel may be turned to raise the load without undue effort because the ball-bearing is operative under such circumstances, but since the toothed member cannot turn and is held stationary during the reverse rotation of the worm, thus rendering the ball-bearing inoperative, the end thrust of the worm is employed to assist in maintaining the load raised and to assist in restraining or retarding its descent when it is being lowered.

Those trained in this art will readily understand that the invention is not limited and restricted to the precise and exact details of structure shown and described because these may be changed within comparatively wide limits without departure from the heart and essence of the invention and without the sacrifice of any of its substantial benefits and advantages.

I claim:

1. In a jack of the character described, the combination of a support having a pair of substantially-horizontal diverging legs extended outwardly therefrom and connected together only near their adjacent ends, and affording ample space between them for the workman, carrying-wheels for said support and legs, a load-lifting arm rockingly mounted on said support for movement in a vertical plane between said spaced legs, means to rock said arm, a load-engaging

member rockingly mounted on said arm, and means to maintain said member positively in substantially horizontal relation for all positions of said arm.

5 2. In a jack of the character described, the combination of a support comprising a main body and a pair of substantially-horiz-  
10 zontal legs diverging therefrom and connected together only near their adjacent ends and affording ample space between them for the workman, carrying-wheels therefor, a load-lifting arm rockingly mounted near one  
15 end thereof on said support to operate in a vertical plane between said legs, means to rock said arm, a load-engaging member hinged to said arm, and a link pivotally connected to said arm and support to maintain  
20 said member in substantially-horizontal relation for all positions of said arm.

20 3. In a jack of the character described, the combination of a main support having a pair of outstanding substantially-horiz-  
25 ontal diverging legs connected together only near their adjacent ends and affording ample space between them for the workman, a load-lifting arm fulcrumed on said support for vertical movement in a plane between said legs, and a worm and worm-wheel to rock  
30 said arm.

30 4. In a jack of the character described, the combination of a main support having a pair of substantially-horizontal diverging  
35 legs connected together only near their adjacent ends and affording ample space between them for the workman, a load-lifting arm fulcrumed on said support for movement in a vertical plane between said legs, a worm and worm-wheel to rock said arm, and  
40 a pawl and ratchet mechanism to operate said worm.

40 5. In a jack of the character described, the combination of a support comprising a main body and a pair of substantially-horiz-  
45 ontal legs diverging therefrom and connected together only near their adjacent ends and affording ample space between them for the workman, carrying-wheels revoivable about axes fixed with relation to and near the  
50 free ends of said legs, castor-wheel means for said support near said main body, a load-lifting arm fulcrumed on said support for movement in a vertical plane between said legs, a worm and worm-wheel to operate said arm, ratchet and pawl mechanism to operate said  
55 worm, a load-engaging member mounted on said arm, and a link pivotally connected to said member and support to maintain said member in substantially-horizontal relation for all positions of said arm.

60 6. In a jack of the character described, the combination of a support, carrying-wheels therefor, a load-lifting member movably mounted on said support, means to operate said member, and spaced means on  
65 said member adapted to support a vehicle-

wheel by engaging the lower portion of its periphery on opposite sides of its center.

7. In a jack of the character described, the combination of a support, carrying wheels therefor, a load lifting member movably  
70 mounted on said support, means to operate said member, spaced means on said member adapted to support a vehicle-wheel by engaging the lower portion of its periphery on opposite sides of its center, and means on  
75 said member to engage the opposite faces of the wheel to prevent it from toppling over.

8. In a jack of the character described, the combination of a support, carrying-  
80 wheels therefor, a load-lifting arm rockingly mounted on said support, means carried by said arm to support a vehicle-wheel and to prevent the wheel while thus supported from falling over, and  
85 means to maintain said wheel-supporting means in substantially horizontal relation for all positions of said arm.

9. In a jack of the character described, the combination of a main support having  
90 diverging legs, carrying-wheels for said support, a load-lifting member operable in a vertical plane between said legs, means to operate said member, and means carried by said member to support a vehicle-wheel  
95 while engaging the under portion of its periphery.

10. In a jack of the character described, the combination of a main support having  
100 diverging legs, carrying-wheels for said support, a load-lifting arm rockingly mounted on said support to rock in a vertical plane between said legs, means to rock said arm, and means carried by said arm to support the vehicle-wheel while engaging the under  
105 portion of its periphery.

11. In a jack of the character described, the combination of a main support having  
diverging legs, carrying-wheels for said support, a load-lifting arm rockingly mounted  
110 on said support to rock in a vertical plane between said legs, means to rock said arm, and spaced means carried by said arm to support a vehicle-wheel while engaging the under portion of its periphery on opposite  
115 sides of its center.

12. In a jack of the character described, the combination of a main support having  
diverging legs, carrying-wheels for said support, a load-lifting arm rockingly mounted  
120 on said support to rock in a vertical plane between said legs, means to rock said arm, spaced elements carried by said arm to support a vehicle-wheel while engaging the under portion of its periphery on opposite  
125 sides of its center, and means to maintain said wheel-supporting elements substantially horizontal for practically all positions of said arm.

13. In a jack of the character described, 130



the combination of a main-support having a pair of substantially-horizontal diverging legs, carrying-wheels for said support, a load-lifting arm rockingly mounted on said support to rock in a vertical plane between said legs, means to rock said arm, means carried by said arm to support a vehicle-wheel while engaging the under portion of its periphery, and means to maintain said wheel-supporting means substantially-horizontal for practically all positions of said arm.

14. In a jack of the character described, the combination of a main support having a pair of substantially-horizontal diverging legs, carrying-wheels for said support, a load-lifting arm rockingly mounted on said support to rock in a vertical plane between said legs, means to rock said arm, spaced elements carried by said arm to support a vehicle-wheel while engaging the under portion of its periphery on opposite sides of its center, means to maintain said wheel-supporting element substantially-horizontal for practically all positions of said arm, and means to prevent the wheel supported by such element from toppling over.

15. A lifting jack, comprising a supporting frame, a bell-crank lever having a forwardly-extending load arm and a downwardly-extending power arm pivoted on a horizontal axis thereon, a sleeve pivoted to the load end of said lever, a shoe mounted in said sleeve, a rod connecting said pivoted sleeve with the frame, and actuating means connected with said power arm.

16. A lifting jack comprising a supporting frame, a bell-crank lever having a forwardly-extending load arm and a down-

wardly-extending power arm pivoted to swing in a vertical plane on said frame, a sleeve, a pivotal connection between said sleeve and said power arm, including a bifurcation on one of said elements in which the other element is pivotally mounted, a shoe mounted for vertical adjustment in said sleeve, a reach rod substantially parallel with said load arm pivotally connected to said sleeve and to the frame whereby said sleeve is maintained in vertical position, and actuating means connected with said power arm.

17. A lifting-jack comprising in combination, a supporting-frame, a bell-crank lever having a forwardly-extending load-arm and a downwardly-extending power-arm pivoted on a horizontal axis thereon, a load-support hinged to said load-arm, means to maintain said load-support in substantially-horizontal relation for all positions of said load-arm, and a seat-member adapted to engage the load and mounted on said load-support with capability of turning about a vertical axis.

18. A lifting-jack comprising in combination, a supporting-frame, a bell-crank lever having a forwardly-extending load-arm and a downwardly-extending power-arm pivoted on a horizontal axis thereon, a load-support hinged to said load-arm, a rod connecting said load-support to said frame to maintain the load-support in substantially horizontal relation for all positions of said load-arm, and a seat-member adapted to engage the load and mounted on said load-support with capability of turning about a vertical axis.

In witness whereof I have hereunto set my hand.

IRA A. WEAVER.