Dec. 16, 1952 E. J. MARSH 2,621,891

WHEELED SCISSORS JACK

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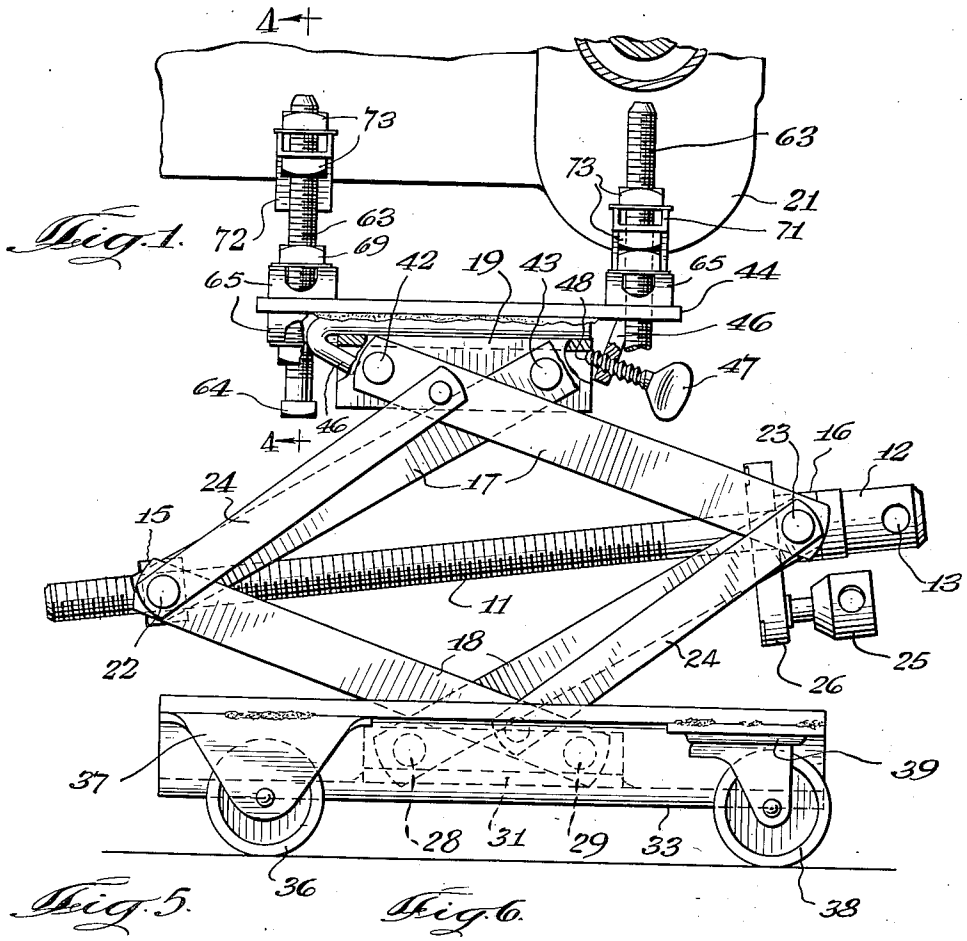


Fig. 1.

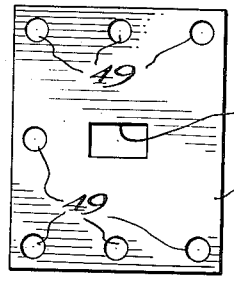


Fig. 5.

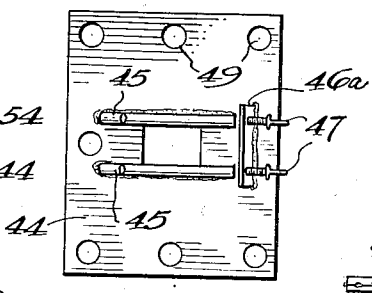


Fig. 6.

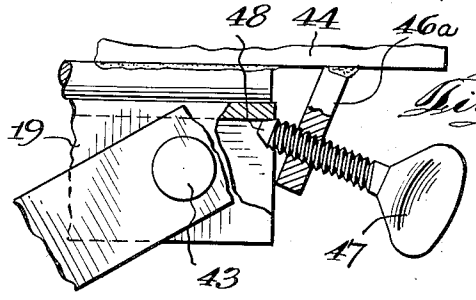


Fig. 7.

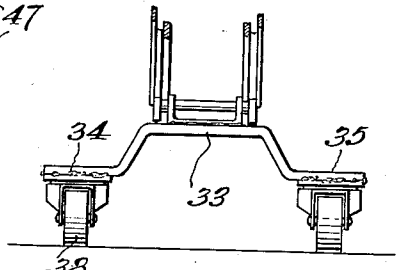


Fig. 11.

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Fig. 2.

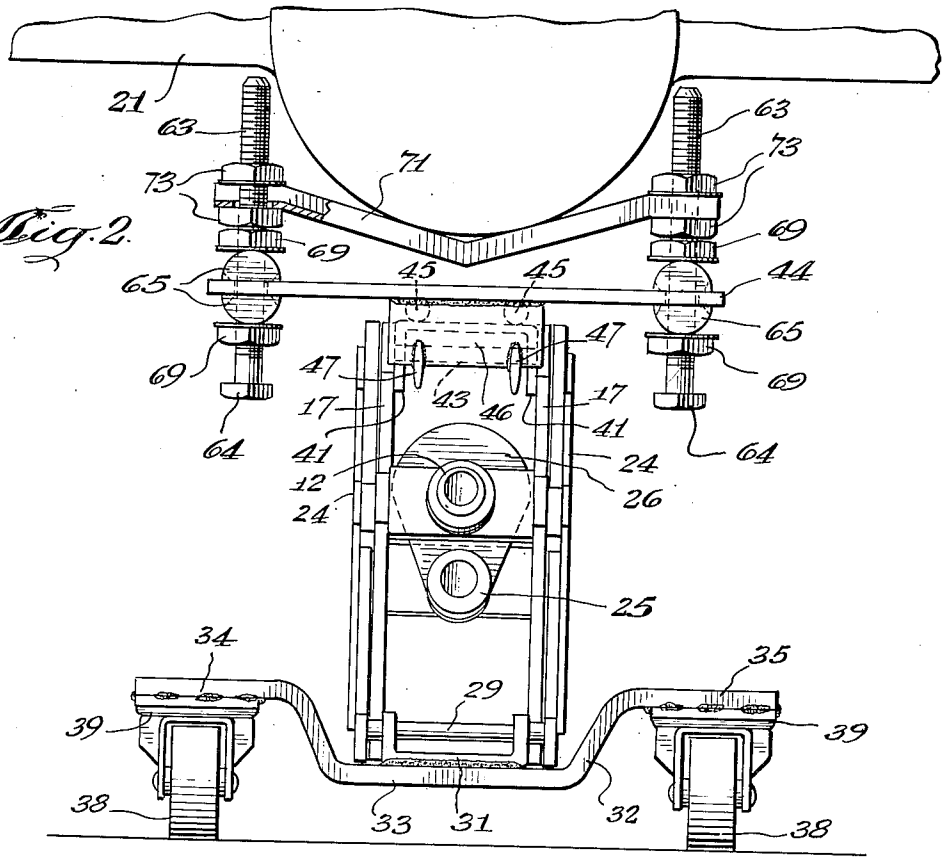


Fig. 9.

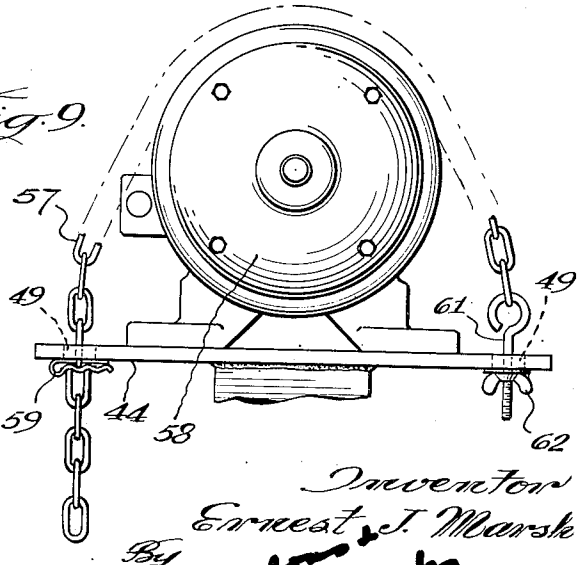
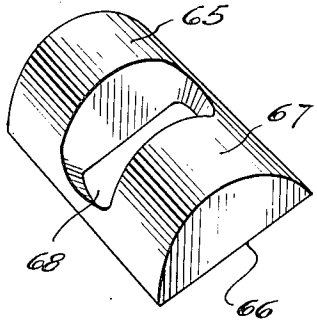


Fig. 8.



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Fig. 3.

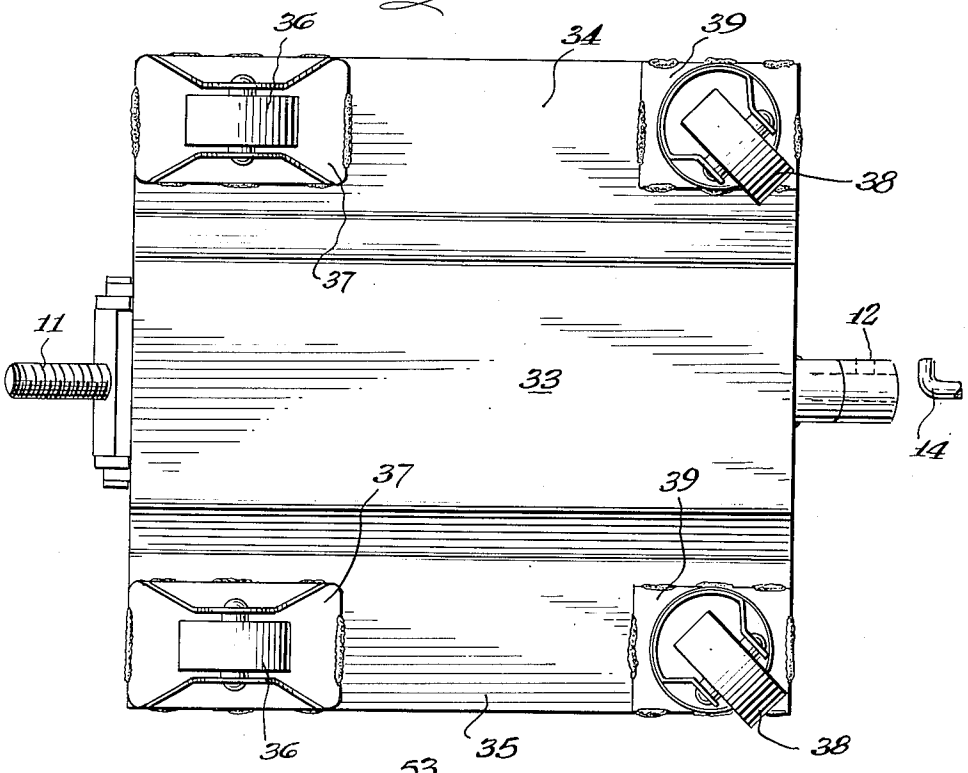


Fig. 4.

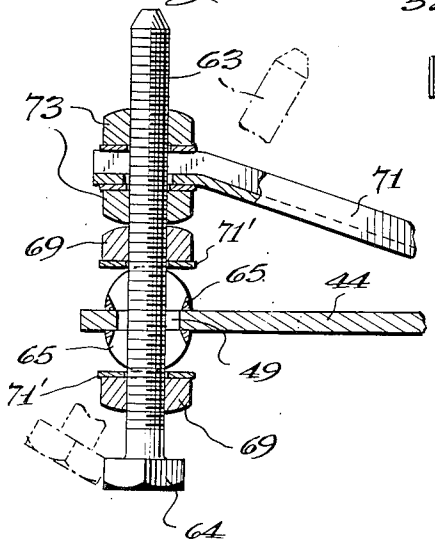
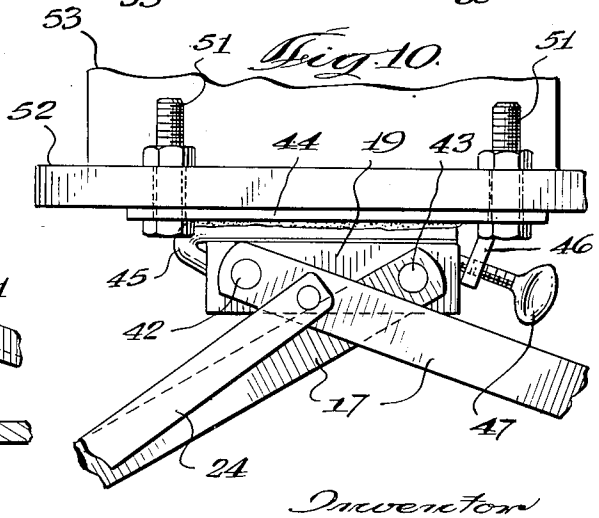


Fig. 10.



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Patented Dec. 16, 1952

2,621,891

UNITED STATES PATENT OFFICE

2,621,891

WHEELED SCISSORS JACK

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Application September 26, 1950, Serial No. 186,829

7 Claims. (Cl. 254—10)

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The present invention relates to mobile lifting jacks and it concerns itself particularly with various accessory implementations which afford special utilities for making such jacks universally adaptable to a variety of uses.

Lift jack mechanisms to which the present invention is directed are sometimes known as hospital jacks and are characterized by the provision of a wheeled supporting base so that the jack, together with its load, can be moved from one station to another in a garage or workshop. The load engaging platform atop the elevating mechanism of the jack is equipped with various features of adjustable support for making it especially conforming to certain several varieties of shapes of loads. The provision of these features of close adaptability are particularly important to a mobile lifting unit where the load requires to be moved from one location to another and under conditions during which certain services and operations are performed upon the load.

It is recognized that heavily weighted and oddly shaped loads require to be made more secure against dislodgment than in the case of jacks utilized for lifting lighter loads. Also, as compared with stationary jacks mobile devices of this class require extraordinary safeguards in order to maintain stability and to prevent dislodgment such as might be provoked by vibration or sway resulting from floor surface irregularities.

Accordingly, a principal object of the present invention is to provide a hospital type or mobile lift jack having a vertical elevating lift platform that may be raised and lowered by a system of parallelogrammatic levers characterized by the provision of universally adjustable nesting appliances for achieving securement and safety so as to insure against dislodgement of a carried load even under conditions of extreme vibration and travel surface irregularities.

Another object of the present invention is to devise a jack mechanism for mobile service in which the lift platform is provided with interchangeable accessorial fixtures suitable to a variety of utilities inherent in automobile, truck and other types of load conditions.

A further object of the present invention is to devise a mobile jack unit in which the lift platform is appropriately equipped with both nesting and lashing fixtures that may be used interchangeably or conjointly for the purpose of diminishing dislodgment hazards to a minimum.

With the foregoing and other objects in view, the invention will now be described during the course of the following detailed specification by

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reference to the accompanying drawings in which like designating numerals denote corresponding parts throughout and in which:

Fig. 1 is a side elevational view of a hospital type lift jack having embodied therein various features of the present invention;

Fig. 2 is a front elevational view of the same apparatus illustrated in Fig. 1;

Fig. 3 is an inverted plan view of the base structure and roller wheels carried thereby which renders the unit mobile to accommodate movement or progression through various stations in a repair or assembly shop;

Fig. 4 is an enlarged detail sectional view taken approximately on line 4—4 of Fig. 1;

Fig. 5 is a plan view of an adaptor plate embodying certain features of the present invention illustrated on a slightly reduced scale;

Fig. 6 is an inverted plan view of the plate shown in Fig. 5;

Fig. 7 is an enlarged detail sectional view of a securing wing bolt and bracket structure for fastening the special purpose plate to a conventional jack elevating platform;

Fig. 8 is an enlarged detail perspective view of a semi-cylindrical cleat through which there is adapted to pass for swingable and universal adjustment one of a set of claw bolts;

Fig. 9 is a fragmentary side elevational view of an adaptor load plate utilizing a lashing chain for making fast an irregularly shaped load to the lift platform;

Fig. 10 is a fragmentary side elevational view showing the lift platform utilized as an anchoring floor but having the load bolted directly thereto through its specially provided apertures; and

Fig. 11 is a fragmentary sectional view through the jack lifting leverage system and base plate showing a modified adaptability of the base plate for obtaining an increased stature by the use of the same component piece parts.

Attention is now directed to the reference numeral 11 which designates a threaded draw screw, Figs. 1 and 3, having a shouldered head 12 apertured to a shallow depth and provided with a side opening 13. Into this head there is adapted to be fitted the L-shaped extension 14 of a detachable crank bar. By inserting this bar through the opening 13 and rotating the bolt 11 clockwise or counter-clockwise, there are drawn together or separated the trunnion nut 15 on the one hand and the trunnion collar 16 on the other, and as a consequence of which the scissors bars 17 and 18 which form the parallelogram system are ad-

justed. This mechanism is comprised of two sets of bars on each side of the platform yoke 19 which cause the latter to be raised or lowered with a corresponding raising or lowering of the object load 21 (in the case of Fig. 1, a rear axle differential housing). The nut 15 as well as the collar 16 are provided on each side with horizontally extending trunnion pivots 22 and 23 to which are articulated the ends of the link levers 17 and 18 as the stabilizing links 24.

Since the foregoing does not constitute the essential part of the present invention but is instead concerned only as the basic structure upon which the invention details are applied, it will suffice to understand the utility of these levers and links and their operation as it is accomplished in a general manner. By reason of the pitch of the threads of screw 11, a mechanical advantage is obtained in moving the parallelogram by the compressive motion induced between the threads and the nut 15 acting against the stationary collar 16. Where it is desired to gain further mechanical advantage, a secondary coupling head 25 is provided beneath the bolt head 12 disposed and performing in a generally similar manner but acting through a small diameter driving pinion to rotate a driven pinion of a gear system contained in the box 26 of which the driven gear is keyed to the screw 11.

The gear ratio in this way accomplishes the purpose of gaining further mechanical advantage in making it possible to rotate the screw 11 at a reduced speed and consequent increased power for the purpose of raising and lowering the jack platform 19 by the use of a lightweight remote control type of crank having a coupling extremity 14.

The lower ends of the levers 18 are pivoted as at 28 and 29 in a pair of pivot shafts which are supported in the side walls of a bracket 31, Fig. 2, welded to the inner surface of the bed plate channel 32 whose central rib 33 in the adaptation shown in Figs. 1 and 2 lies at a level below the flange ribs 34 and 35 giving to the over-all structure an advantage of maximum collapsibility for clearance, while yet affording the use of a set of stationary large caster wheels 36 journaled and supported in rigid bracket members 37 as well as the revoluble large caster wheels 38 pivotally supported in the pivot brackets 39. The magnitude of these wheels will be observed as ample and their consequent ruggedness correspondingly greater than would ordinarily be permitted in a device of shallow floor clearance.

It is to be observed that the crank rod 14 by reason of its L-shaped end portion which engages the bolt heads 12 and 25 also affords a means for pulling and pushing the jack assembly on its caster wheels 37 and 38. The size of the apertured openings in heads 12 and 25 as compared with those of the rod end 14 are such as to permit a limited free play but yet not to permit the rod 14 from being pulled out of the aperture 13 until it is swung acutely at an angle out of engagement.

In this way the jack unit may be rolled about on its swivel casters 38 to and fro as well as side to side for the purpose of accurately locating the jack beneath protuberant or otherwise suitable portions of an under-frame without having to expose the operator to close proximity with the under-frame or in hazard of his personal safety.

For some purposes lift jacks of this type are preferred to have a significantly greater stature or elevation under both conditions of extreme projection or full collapse.

The design of the base plate 32 with its mid-channel portion 33 affords accommodation whereby with the same elements jacks of two basic elevations can be constructed.

Attention is now directed to Fig. 11 wherein it will be observed that the central channel 33 is thereat exposed in a reverse manner to that shown in Fig. 2. The rest of the apparatus is applied in precisely the same way but on opposite surfaces and the starting elevation of the jack, thus modified, is increased to an extent which is twice the amplitude of the central depression 33. This versatility makes it possible to build two classes of hospital service jacks with the same basic components and even with utilizing substantially the same practices in welding assembly, tools, and other assembly line procedure and methods.

Attention is now again directed to the lift platform or yoke 19 which is best portrayed in Figs. 1 and 2 and which will be observed to be formed of heavy sheet metal stock and drilled through its side flanges 41 to receive the journal stub shafts 42 and 43. The top surface of the yoke platform 19 may be flat as indicated or it may be formed with a slight concavity to give to this member a quality of retentiveness and seat recess where its use is intended to be in direct application against the under-surfaces of objects to be lifted.

For the purpose of adapting this device to conditions of special surface irregularities, it is intended that an adaptor plate 44 be provided, see Figs. 5, 6 and 10, to the under-surface of which there are welded a pair of parallelly disposed hook bars 45 whose hook projections 46, Fig. 1, are adapted to straddle the one edge of the platform 19 and in cooperation with these bars 45 there is also provided a threaded bracket 46a preferably welded at an angle as indicated in Fig. 7 to the under-surface of plate 44 through which there is adjustably disposed in threaded cooperation with these threads a wing nut 47 having a tapered or frusto-conical end portion 48 designed to press against and clamp the floor of bracket 19 imparting a horizontal as well as an upwardly and leftwardly directed force which serves the purpose of effectively integrating plate 44 with platform 19 whereby the two of them will respond as a single element.

The removable adaptor plate 44 is provided with several apertures that may be appropriately tailored to special conditions as for example it may have bolt holes 49 through which to pass anchor bolts 51 for securing the plate 44 to a flange 52 of an object 53 characterized in this manner. Alternatively, the platform 44 may have a special shaped aperture such as the one indicated of rectangular outline 54 for receiving a protuberant portion which characterizes certain types of under-frame structures as where a drain cock is disposed at the lower level of a crank case housing or as where an oil drain cap screw is thereat located.

Under other conditions of use the apertures 49 may be made to serve the purpose of passing a lashing chain or rope 57 therethrough whereby short or squatty loads 58 may be made stable and secure to the platform 44. When utilized in this regard a length of lash chain 57 is inserted through two of the openings 49 to form a loop sufficient to embrace the load 58. A cotter pin 59 may be placed in the last chain link aperture below the surface of plate 44 after the manner of a toggle link barrier and an eye bolt 61 is provided which may be disposed near one of the em-

ployed openings 49. Thereafter by drawing up on the wing nut 62 the effective loop of lash chain 57 may be drawn taut as the load 58 is made fast to the platform or plate 44 in a facile and easy to regulate manner.

The apertures 49 in plate 44 lend themselves to still further adaptations or uses in connection with the claw bolts 63, see particularly Fig. 4, in which there is illustrated a practice utilizing four of the bolts passed through the cornerwise extreme apertures 49 of plate 44. Claw bolts 63 are preferably square headed as at 64 so as to lend themselves to manipulation and adjustment by means of a conventional mechanic's wrench. On the sides of the plate 44 there is threaded over each bolt 63 a semi-cylindrical spacer cleat 65, the contour and characteristics of which are best illustrated in Fig. 8.

Each cleat 65 has a flat surface 66 for placement against the plate 44 and a semi-cylindrical surface 67 in opposition thereto as indicated in Fig. 4. Through its central opening 68 the bolt 63 is adapted to pass with a significant margin of clearance both transversely of the cleat, as will be manifest from the elongated opening 68, as well as in a sense perpendicular thereto as afforded by the width of these openings.

Threaded onto the bolt 63 on top and bottom with respect to cleats 65 are a pair of nuts 69 preceded by pressure discs or washers 71. In practice the lowermost nut 69 is first placed, thereby determining the extent at which the bolt 63 ranges upwardly of the surface of plate 44. Thus, where these bolts are required to contact recesses or depressions in the under surface of a load that may be irregularly protuberant, there is afforded through the use of the herein disclosed apparatus, a device which is quickly and easily made adjustable to suit an infinite variety of conditions.

When the upper nut 69 is thereafter screwed down firmly embracing between them the semi-cylindrical cleats 65 and the plate 44, the claw bolts 63 are made rigid in their positions of adjustment not only as regards longitudinal range but also by angularly shifting of the bolt 63 as indicated in dotted outline in Fig. 4 or in an opposite direction thereto this adjustment may be made to conform closely to all manners of irregular or uneven conditions of surface in the load.

Under a further practice, the claw bolts 63 may be made to receive transversely extending straps or channels 71 and 72, Fig. 1, anchored between the lock nuts 73, affording thereby a practice for supporting certain classes of loads with the advantages of full cradle nesting. When the yokes or straps 71 and 72 are made of channel stock with the channel ribs disposed upwardly, this nesting affords not only a contour conformity but also it gives multiple edge biting characteristics which prevent the load from shifting longitudinally of itself. Under certain conditions of automotive equipment handling, particularly as concerns differential and transmission drive casings, the security of this form of load support contributes a major degree and quality of safety superior to any previously known methods attended at the same time with universal adaptability.

While the present invention has been explained and described in reference to certain expressly disclosed embodiments it will be understood nevertheless that it is susceptible to changes and variations without departing from its essential

spirit or scope. Accordingly it is not intended to be limited in an understanding of this invention to the particular description set forth in the foregoing specification nor to the illustrations in the accompanying drawings except as indicated in the hereunto appended claims.

The invention claimed is:

1. In combination with a mobile jack unit which comprises a wheeled base structure, a system of leverage scissors and a yoke lift platform, a detachable plate secured to said platform, screw camming means for integrating said plate to said platform, and upstanding claw fingers having screw threaded shank portions passing through apertures in said plate, lock nut means for intercepting said plate at predetermined ranges in said claw fingers, and semi-cylindrical cleats placed on opposing surfaces of said plate between said lock nuts having radially angling apertures therein through which said claw fingers pass whereby said claw fingers may be adjusted throughout predetermined angular positions, universally as afforded by rotatable placement and longitudinally as afforded by said lock nut placement.

2. The combination set forth in claim 1 including saddle strap support means carried by opposed ones of said claw fingers and formed of channel stock with its channel edges directed uppermost to afford a nesting saddle contour and multiple edge engagement with supported loads.

3. In combination with a mobile type of auto and truck jack which comprises a wheeled base structure, a system of leverage scissors having lowermost pivotal articulation with said base structure, a yoke platform having articulation with the uppermost extremities of said system, a detachable wide area plate secured to said platform, screw camming means for integrating said plate to said platform, and upstanding fingers having screw threaded shank portions passing through apertures in said plate, lock nut means for binding said plate at predetermined ranges in said fingers and cleats placed on opposing surfaces of said plates between said lock nuts having radially angling apertures therein through which said fingers pass whereby said fingers may be made secure throughout predetermined angular positions universally as afforded by rotatable placement and longitudinally as afforded by said lock nut securement.

4. The combination set forth in claim 3 in which said base structure is a channelled plate having a central elevated portion, and a bracket having side walls apertured to receive pivotal studs which constitute the articulation with said system of leverage scissors.

5. In combination with a jack unit which comprises a base structure, a system of leverage scissors, and a yoke lift platform, a plate secured to said platform and upstanding claw fingers having screw threaded shank portions passing through apertures in said plate, lock nut means for intercepting said plate at predetermined ranges in said claw fingers and semi-cylindrical cleats placed on opposing surfaces of said plate between said lock nuts, having radially angling apertures therein through which said claw fingers pass whereby said claw fingers may be adjusted throughout predetermined angular positions, as afforded by rotatable placement or lock nut placement.

6. In combination with a mobile jack unit which comprises a wheeled base structure, a system of leverage scissors and a yoke lift platform,

a plate secured to said platform, and claw fingers having screw threaded shank portions passing through apertures in said plate, nut means for intercepting said plate at predetermined ranges in said claw fingers, and semi-cylindrical cleats placed on opposite surfaces of said plate, said cleats having apertures therein through which said claw fingers pass, said apertures being sufficiently larger than said claw fingers that said claw fingers may be adjusted throughout predetermined angular positions, universally as afforded by rotatable placement, and longitudinally as afforded by nut placement.

7. A hospital type lift jack comprising a formed base plate having longitudinal channel deflections to afford side ridge portions in planar alignment and a central portion in a plane offset thereto, a scissors type parallelogrammatic leverage system pivotally carried by said center ridge portion, a formed saddle platform having side walls and pivotal articulations to said parallelogrammatic leverage system, said platform being carried at the upper extremity of said system for engaging the underside of load surfaces, and a detachable plate adapted to be secured to said saddle platform having hook portions at one end

for overhanging an edged extremity of said platform and having an engaging screw disposed at upwardly angling position, for engaging the opposite edged extremity of said platform, a chain for passing through apertures in said plate to form a loop, a cotter pin for intercepting a variable length of said chain in its loop, and an eye bolt threaded to receive a nut for gradiently adjusting and tightening the intercepted loop of said chain.

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