

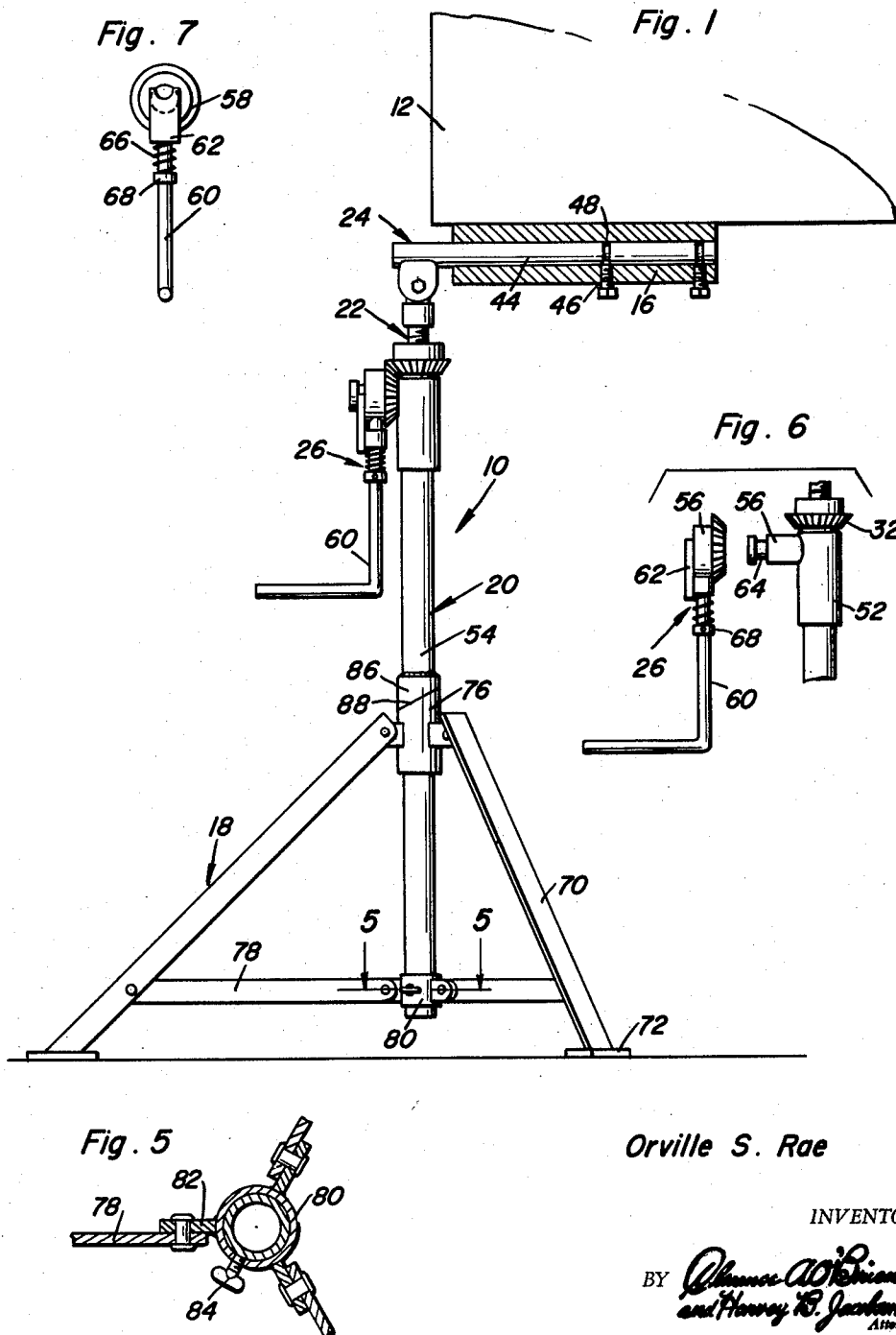
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O. S. RAE
TRUCK CAMPER BODY JACK

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2 Sheets-Sheet 1



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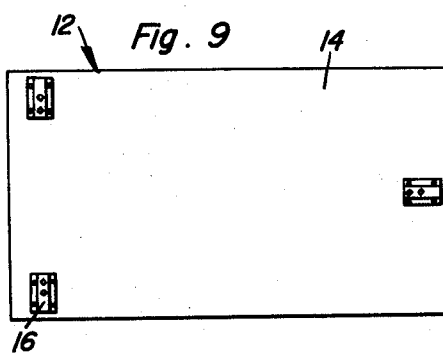
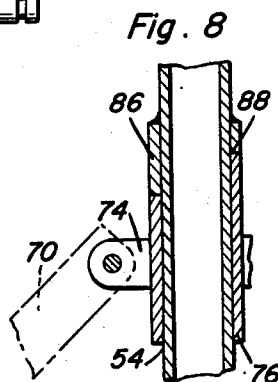
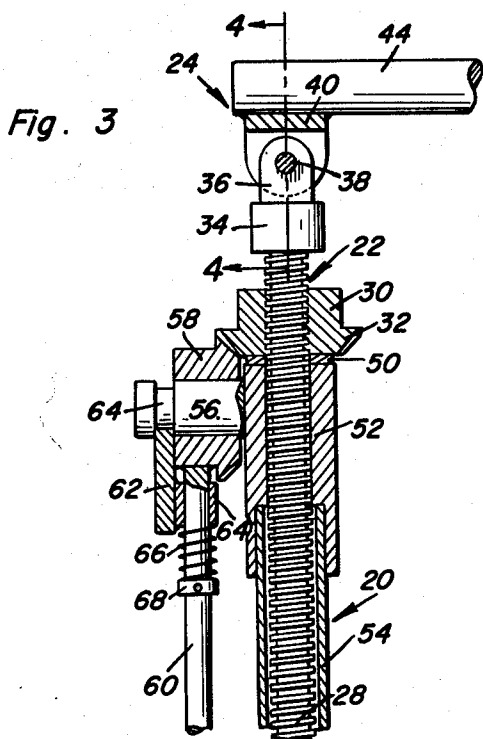
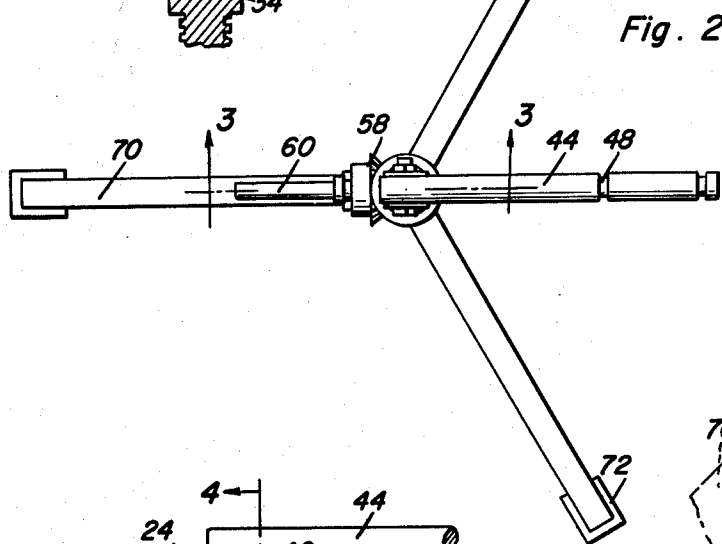
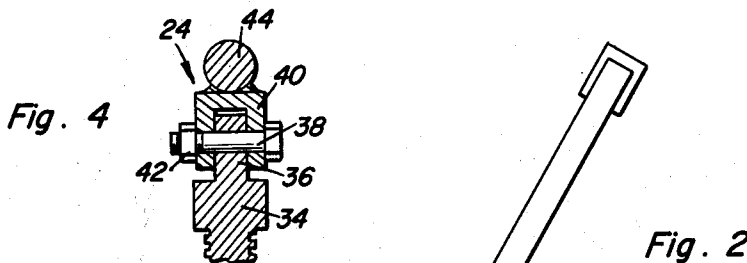
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TRUCK CAMPER BODY JACK

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14 Claims. (Cl. 254-45)

This invention relates to a load raising arrangement or system and more particularly to jack raising and stabilizing apparatus for elevating or lowering a camper body from a truck or pickup.

The apparatus of the present invention enables one individual to remove a camper body from a truck or pickup without additional equipment or aid and to level and stabilize such loaded body on any uneven or rough ground. It is therefore a primary object of the present invention, to provide a new and useful arrangement of load raising jack mechanisms capable of supporting a loaded device such as a camper body having an unknown center of mass location above a supporting plane defined by the load engaging portions of the jack mechanisms, which plane may necessarily be in an inclined or tilted position. Accordingly, the loaded body may be elevated or lowered by sequential actuation of each of the jack mechanisms on which it is supported which is a necessary procedure where a single individual is available and unable to simultaneously elevate or lower the loaded camper body at each of the jack mechanism locations.

Another object of the present invention is to provide jack elevating and lowering mechanisms for a camper body or the like operative to support such loaded body by a plurality of jack mechanisms each of which is actuated by a single removable actuating mechanism, each of said jack mechanisms also being foldable in a most convenient manner under the camper body when not in use.

An additional object of the present invention is to provide a jack supporting and elevating device which is connected to a loaded body for partial support thereof and having a foldable tripod base angularly positioned with respect to the supported body by a load responsive stop device providing optimum support for the loaded body.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of a jack mechanism installed below one portion of a loaded body.

FIGURE 2 is a top plan view of a single jack mechanism.

FIGURE 3 is an enlarged partial sectional view taken through a plane indicated by section line 3-3 in FIGURE 2.

FIGURE 4 is a partial sectional view taken substantially through a plane indicated by section line 4-4 in FIGURE 3.

FIGURE 5 is a partial sectional view taken substantially through a plane indicated by section line 5-5 in FIGURE 1.

FIGURE 6 is a partial side elevational view showing the jack actuating device disassembled from the jack mechanism.

FIGURE 7 is a front elevational view of the jack actuating device.

FIGURE 8 is a partial sectional view of the load responsive stop mechanism associated with the tripod base assembly of the jack mechanism.

FIGURE 9 is a bottom plan view of a typical loaded body on which the jack mechanisms are installed.

Referring now to the drawings in detail, it will be observed that a jack mechanism generally referred to by

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reference numeral 10 is installed below a loaded body member such as a camper body generally referred to by reference numeral 12. A plurality of novel jack mechanisms 10 are therefore provided for support of the body 12 by pivotal connection thereto about intersecting pivotal supporting axes which define a supporting plane. Referring therefore to FIGURE 9, it will be observed that the loaded body 12 has secured to the bottom 14 thereof a plurality of mounting members 16, three of which are illustrated with two members 16 mounted on one side spaced from each other and the third mounted on the other side of the body between the first two members so as to form a tripod support arrangement by three jack mechanisms 10. It will be appreciated, that the body 12 has a load distribution that is unknown so that the exact location of the center of mass is also unknown. Also, it will be apparent that the supporting plane 14 must necessarily be capable of support in a tilted position above the ground since elevation or lowering of the body 12 must be effected sequentially at each of the jack locations inasmuch as a single individual may be available and unable to simultaneously actuate all of the jack mechanisms. The novel jack mechanisms 10 are therefore arranged to accommodate tilting of the supporting plane 14 with various different load distributions of the load carried by the body 12.

Referring once again to FIGURE 1, it will be observed that the typical jack mechanism 10 illustrated at one location below the body 12, includes a foldable tripod base assembly generally referred to by reference numeral 18 which supports in its unfolded condition, a housing assembly 20 in spaced relation above the ground. Guidingly supported within the housing assembly 20 is a displaceable assembly generally referred to by reference numeral 22 pivotally connected to the loaded body 12 through the rotatable mount 16 and a joint assembly 24. A removable jack actuating device generally referred to by reference numeral 26 is therefore provided in operative engagement with the jack mechanism illustrated for elevating or lowering the loaded body 12 at the particular location associated with the jack mechanism. The same jack actuating mechanism may therefore be utilized for actuating each of the other jack mechanisms.

Referring now to FIGURE 3 in particular, it will be observed that the displaceable assembly 22 includes an elongated externally threaded screw member 28 which is rotatably mounted within the housing assembly 20 about a displacement axis. An internally threaded nut member 30 having a driven bevel gear portion 32, drivingly engages the screw member 28 so that upon rotation of the member 30, the screw member 28 will be axially displaced along the displacement axis. The elongated screw member 28 is therefore provided with an upper connecting portion 34 at its upper end for displacement of the loaded body 12 connected thereto by the joint 24.

Referring now to FIGURES 1, 3 and 4, it will be observed that the joint 24 includes a connecting ear projection 36 fixedly mounted at the upper end of the elongated screw member 28 through which a pivot bolt 38 extends. The connecting ear 36 is received between the sides of a channel member 40 through which the pivot bolt 38 also extends and maintained assembled by means of the locknut 42. The channel member 40 is therefore secured as by welding to the pivot shaft member 44. Accordingly, the displaceable screw member 28 will be pivotally displaceable about a folding axis extending through the pivot bolt 38 whereby the jack mechanism 10 may be folded up underneath the body 12 when not in use or may be pivotally displaced with respect to the folding axis in order to support the body with respect to uneven or irregular ground surface. The folding axis extending through the pivot bolt 38 is however disposed perpendicu-

lar to the pivotal supporting axis which extends through the pivot shaft 44 rotatably mounted in the mounting member 16 fixed to the bottom of the body 12. The pivot shaft is therefore held in axially fixed position within the rotatable mount 16 by a pair of axial lock elements 46 received within annular grooves 48 in the pivot shaft member 44. It will therefore be appreciated, that displacement of the screw member 28 connected to the body 12 through the joint 24, will be capable of accommodating any load distribution and any ground surface irregularity.

It will be observed that the axially displaceable screw member 28 is rotatably mounted within the housing assembly 20 for guided movement along the displacement axis so as to displace the pivot shaft member 44 and its pivotal supporting axis which is disposed perpendicular to the folding axis through the bolt 38 by means of which the displaceable screw member 28 is connected to the pivot shaft 44. Accordingly, the housing assembly 20 is provided for the purpose of enclosing the screw member 28 to protect it from foreign matter and to maintain lubricant on the threads of the screw member as well as to rotatably support thereabove the nut member 30 which threadedly engages the screw member 28 for axial displacement thereof. A thrust washer 50 is therefore disposed above a supporting housing portion 52 of the housing assembly 20 for anti-friction rotatable support of the bevel gear 32 thereabove. Received within and fixed to the housing portion 52, is an elongated tubular housing portion 54 to which the tripod base assembly 18 is connected for support of the housing assembly. Also rigidly connected to the housing portion 52 and extending therefrom perpendicular to the displacement axis, is a gear supporting projection 56 by means of which the jack actuating device 26 may be positioned for driving engagement with the bevel gear 32 in order to actuate the displaceable screw member 28.

Referring now to FIGURES 3, 6 and 7 in particular, it will be observed that the jack actuating device 26 includes a drive bevel gear member 58 which is adapted to mesh with the driven bevel gear 32 when it is positioned on the gear supporting projection 56. A handle member 60 is therefore rigidly connected as by welding to the hub portion of the drive bevel gear 58 for rotation thereof about the gear supporting stub shaft projection 56. In order to hold or lock the jack actuating device 26 on the gear supporting projection 56, a spring biased lock mechanism is provided which includes a lock element 62 engageable within an annular groove 64 on the projection 56. Fixed to the lock element 62, is a collar 64 for slidably mounting the lock element 62 on the handle 60. A spring element 66 is therefore provided on the handle member 60 reacting between the slidable collar 64 and a collar 68 fixed to the handle member 60. It will therefore be appreciated, that the lock element 62 is displaceable against the bias of the spring 66 for release of the jack actuating device 26. A single jack actuating device 26 may therefore be utilized for actuation of each of the jack mechanisms.

Referring now to FIGURES 1, 2, 5 and 8 in particular, it will be observed that the tripod base assembly 18 includes three equally spaced leg members 70 the lower ends of which mount traction feet elements 72 for engagement with the ground. The upper ends of the leg members 70 are pivotally connected to pivot ear members 74 which are fixed in equally spaced relation to an upper swivel tube section 76. The swivel tube section 76 is both slidably and rotatably mounted on the elongated tubular housing portion 54 so that the tripod base assembly may be both foldable and angularly displaceable with respect to the housing assembly 20. Each of the tripod leg members 70 therefore has pivotally connected adjacent the lower ends thereof, brace members 78 which are all pivotally interconnected at equally spaced positions to a lower swivel member 80 by means of pro-

jecting ear elements 82. The swivel member 80 is therefore also slidable and angularly displaceable about the tubular housing portion 54 so as to accommodate folding of the tripod base assembly and angular displacement thereof relative to the housing assembly. The lower swivel member 80 may optionally be locked in supporting position by means of a setscrew element 84 in order to prevent axial shifting only. The tripod base assembly 18 is angularly set in a predetermined position relative to the housing assembly when loaded by means of a torsional overload stop member 86 that is firmly secured as by welding to the tubular housing portion 54. When the operator actuates the device 26, the bevel gear 58 transmits torque to bevel gear 32, so that a reaction thrust is applied to the projection 56 mounting gear 58 to impose a torsional stress at the upper end of the jack housing tending to produce twisting thereof. Accordingly, the stop member 86 may form with the upper swivel tube section 76, a continuous tubular section which is cut at a 45° angle so as to form confronting cam edges 88. It will therefore be apparent, that the angular position of the leg members 70 of the tripod base assemblies 18 on each of the jack mechanisms, may be supported in the ground at a predetermined angular position relative to the loaded body 12 for optimum level or stabilized support thereof and yet accommodate angular displacement or twist of the jack mechanisms relative to the base assemblies and the loaded body 12 varied in accordance with irregularities of the ground and changes in load distribution and tilted positions of the body 12. The cam edges 88 will therefore resist this twist or relative angular displacement between the housing assembly 20 and the tube section 76 that occurs during the load elevation procedure yet relieve any torsional strain that would be imposed on the legs of the base assembly by the jack mechanism in view of the relative camming movement between the cam edges. As the loaded body 12 is restored to its level position when elevated, the cam edges will angularly realign the jack mechanisms with the base assemblies to the predetermined angular position preceding the elevation procedure. It will also be apparent, that when not in use, the tripod base assembly may be folded up against the housing assembly with the entire jack mechanism then folded underneath the bottom of the body 12.

From the foregoing description, the operation and utility of the jack elevating and supporting arrangement of the present invention will be apparent as well as the novel jack mechanism structure involved. It will therefore be appreciated, that support of a loaded body is accomplished by a tripod support arrangement of separate jacks each of which in turn is stabilized by a folding tripod of its own. The angular position of the base assemblies may be preserved during elevation because of the pivotal displacement between the jack mechanisms and the supported body by virtue of the universal joint connections thereto, cooperating to provide a stabilized support at all times despite irregularities of the ground and different load distributions because of the load responsive cam feature.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination with a loaded device having an unknown load distribution above a tiltable supporting plane defined by intersecting supporting axes, pivotal supporting means connected to said loaded device through which said supporting axes extend, displaceable means, pivotal connecting means pivotally connected to said displaceable

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means about folding axes in spaced perpendicular relation to said supporting axes for pivotal connection thereof under load to the pivotal supporting means about said supporting axes, housing means guidingly supporting said displaceable means for movement along displacement axes intersecting said folding axes, base means including means for mounting said housing means in predetermined angular positions about said displacement axes for support of the loaded device above the ground with the supporting plane in a stabilized position and actuating means operatively positionable on the housing means in driving relation to said displaceable means for sequential displacement of the loaded device at each of the supporting axes to tiltable positions of said supporting plane with respect to the base means.

2. The combination of claim 1, wherein said housing means comprises elongated tubular means mounting said displaceable means for movement along said displacement axis and having one end, driven gear means rotatably supported on said one end, and gear supporting means fixedly mounted on said tubular means for receiving said actuating means thereon in driving engagement with said driven gear means, said driven gear means being drivingly connected to said displaceable means for axial displacement thereof along said displacement axis.

3. The combination of claim 2, wherein said actuating means comprises removable gear means, handle means connected to said removable gear means and spring biased lock means slidably mounted on said handle means for holding said removable gear means positioned on said housing means in driving engagement with said driven gear means.

4. The combination of claim 3, wherein said displaceable means includes elongated drive means mounted by said housing means for movement along said displacement axis, connecting means fixedly mounted at one end of said elongated drive means, pivot means axially secured to said loaded device for pivotal displacement relative thereto, about a pivotal supporting axis, and joint means fixedly secured to said pivot means and pivotally connected to said connecting means about said folding axis to prevent angular displacement of said elongated drive means about said displacement axis relative to said loaded device.

5. The combination of claim 1, wherein said displaceable means includes elongated drive means mounted by said housing means for movement along said displacement axis, connecting means fixedly mounted at one end of said elongated drive means, pivot means axially secured to said loaded device for pivotal displacement relative thereto about each of said pivotal supporting axes, and joint means fixedly secured to said pivot means and pivotally connected to said connecting means about said folding axis to prevent angular displacement of said elongated drive means about said displacement axis relative to said loaded device.

6. The combination of claim 1, wherein said actuating means comprises removable gear means, handle means connected to said removable gear means, and spring biased lock means slidably mounted on said handle means for holding said removable gear means positioned on said housing means.

7. The combination of claim 1, wherein said mounting means includes, load responsive means operatively connected to the housing means and the base means for accommodating angular displacement of the housing means from said predetermined angular position during said sequential displacement of the supporting plane in response to torsional stress applied to the housing means, whereby strain imposed on the base means is relieved and the housing means is realigned in said predetermined angular position when the supporting plane is restored to a level position.

8. A jack structure for attachment to a loaded body

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adapted to be removed from a supporting vehicle comprising, a pivot bracket through which a supporting axis extends, means for securing the pivot bracket to the loaded body, a shaft positioned in said bracket for angular displacement about said supporting axis, a supporting post positioned in spaced relation to said bracket, base means operatively connected to said post for support thereof in an angularly fixed position, movable means in said post for projection and retraction therefrom and having a load engaging end pivotally connected to the shaft about a folding axis perpendicular to the supporting axis, and means for releasably holding the post in said angularly fixed position relative to the base means under load to relieve strain imposed on the base by torsional stress applied to the post during movement of the load by the movable means.

9. In combination, a vehicle, a body adapted to be supported by the vehicle in a substantially stabilized position and detachable therefrom, means for removing the body from and supporting the body independently of the vehicle comprising, a plurality of supporting posts, said body having means pivotally connecting said supporting posts thereto for support of the body in tilted positions, base means adapted to be supported on the ground and engageable with the supporting posts in predetermined angular positions for support of the body in the stabilized position, each of said posts having force producing means for elevating said body, and overload means responsive to angular displacement of the supporting posts from said predetermined angular positions during elevation of the body to said tilted positions for realigning the posts to the predetermined positions when the stabilized position of the body is restored.

10. In combination with a body adapted to be supported on a vehicle, base means engageable with the ground on at least three spaced locations, adjustable support means operatively engageable with said base means in a predetermined orientation relative thereto for optimum support of the body in a stabilized position relative to the base means, means pivotally connecting the support means to the body for support thereof in both said stabilized position and in tilted positions relative to the base means, means operatively connectable to the adjustable support means for displacing said body to said tilted positions urging displacement of the support means from said predetermined orientation relative to the base means, and overload means operatively connected to the base means and the support means for accommodating displacement from said predetermined orientation in response to said urge and restoring said predetermined orientation when the stabilized position is reestablished.

11. In combination with a camper body removably mounted on a vehicle frame, means for elevating said body off the vehicle frame comprising, two bracket members mounted in spaced relation adjacent one side of the body, a third bracket member mounted adjacent a side of the body opposite said one side between the two bracket members, and three jack devices pivotally connected under load to the body by the three bracket members about intersecting supporting axes extending through said bracket members, each jack device comprising, a tubular housing, a displaceable member movably mounted by the tubular housing for linear movement along and angular displacement about a displacement axis extending through the housing, a pivot shaft rotatably mounted in one of said bracket members about one of said supporting axes, means pivotally connecting said pivot shaft to the displaceable member about a folding axis disposed in perpendicular spaced relation to the supporting axis and perpendicular intersecting relation to the displacement axis, supporting leg means operatively connected to the housing for support thereof by the ground in a predetermined angular position, actuatable means mounted in said housing and engageable with said displaceable

member for imparting said linear movement thereto; and removable actuating means selectively engageable with each of the actuatable means associated with the respective jack devices for sequentially imparting linear movement to the displaceable members to displace the body at each of the bracket members.

12. In combination with a loaded body adapted to be removably mounted on a vehicle, means for elevating said body off the vehicle and supporting the body in a level position comprising, three jack devices, each jack device including a tubular housing, base means for supporting the housing on the ground in a fixed angular position about a displacement axis extending vertically through the housing, a displaceable member extended from the housing for displacement along said displacement axis, and force transmitting means mounted in said housing for imparting movement to said displaceable member; removable actuating means for operating the force transmitting means of the respective jack devices to sequentially displace the displaceable members of the respective jack devices, load engaging means pivotally connected to each of said displaceable members about a folding axis disposed in perpendicular intersecting relation to said displacement axes respectively and bracket means secured to said body for pivotally connecting said load engaging means thereto under load about intersecting supporting axes, whereby said loaded body may be supported in tilted positions during sequential displacement of the displaceable members without angular displacement of the tubular housings from said fixed angular positions.

13. The combination of claim 12 including overload means mounted by the housing of each of the jack devices for accommodating angular displacement thereof relative to the base means by the actuating means and restor-

ing the housing to the fixed angular position upon re-establishment of a level position for the loaded body.

14. In combination with a loaded body, a plurality of jack devices, each of said jack devices having an elongated housing through which a longitudinal displacement axis extends, an elevating member mounted by said housing for movement along said displacement axis, force producing means operatively connected to said elevating member for displacement thereof along said displacement axis and load engaging means pivotally connected to said elevating member about a folding axis intersecting the displacement axis, and bracket means fixedly secured to said loaded body and pivotally connected to the load engaging means of the respective jack devices about intersecting supporting axes closely spaced in perpendicular relation to the folding axes of the respective jack devices.

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