United States Patent [19]

Mann

[11] **3,709,467**

[45] **Jan. 9, 1973**

[54] **SELF CONTAINED ADJUSTABLE SUPPORT ASSEMBLIES TO SUPPORT, RAISE, AND LOWER A MOBILE LIVING FACILITY WITH RESPECT TO BOTH A VEHICLE AND THE GROUND**

[75] Inventor: **James F. Mann**, Tacoma, Wash.

[22] Filed: **Nov. 27, 1970**

[21] Appl. No.: **93,295**

[52] **U.S. Cl.** **254/45**, 214/515

[51] **Int. Cl.** **B66f 7/26**

[58] **Field of Search** ..... 254/45, 86 H; 214/515; 248/354 P

[56] **References Cited**

UNITED STATES PATENTS

3,275,298	9/1966	Hand	254/45
2,970,810	2/1961	Zich et al.	248/354 P
1,766,324	6/1930	Berner	248/354 P UX

Primary Examiner—Othell M. Simpson
Attorney—Roy E. Mattern, Jr.

[57] **ABSTRACT**

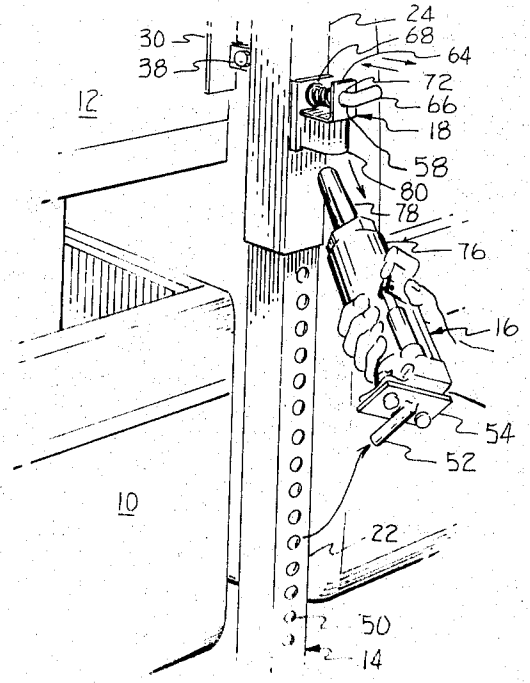
Mobile living facilities and other covered space structures are equipped with self contained adjustable support assemblies to support them above and lower them to ground, and to raise them above and lower them down on the receiving structure of a vehicle. Three self contained adjustable support assemblies are capable of supporting the mobile living facilities when secured to these facilities and resting on the ground.

Each support assembly has a supporting leg, an immediate leg surrounding guide sleeve secured to the mobile living facilities, and adjustable interlocks to secure supporting legs to the respective leg surrounding sleeves at selective variable effective leg lengths between the surrounding guide sleeve and the ground. Adjustments of the effective leg lengths are made by utilizing a self contained hydraulic jack that is removably positioned between each respective supporting leg and its corresponding surrounding guide sleeve. The jacking device is secured below to selective multiple receiving structures on the supporting leg and secured above to a receiving structure on the leg surrounding sleeve.

Before jacking, and with the jacking device in place, the respective adjustable interlock is withdrawn for the duration of the jacking movement. Subsequently, it is reset to thereafter transmit the lifting load independently of the jacking device. The travel of each raising or lowering motion corresponds to the travel of the removable jacking device.

One jacking device is moved about, during each overall height changing operation, to be used with the respective several support assemblies. Generally, four support assemblies are used and at least three are at all times secured by interlocks and are capable of fully supporting the mobile living facilities while the jacking unit is being used to adjust the height of the fourth support assembly.

4 Claims, 7 Drawing Figures



PATENTED JAN 9 1973

3,709,467

SHEET 1 OF 2

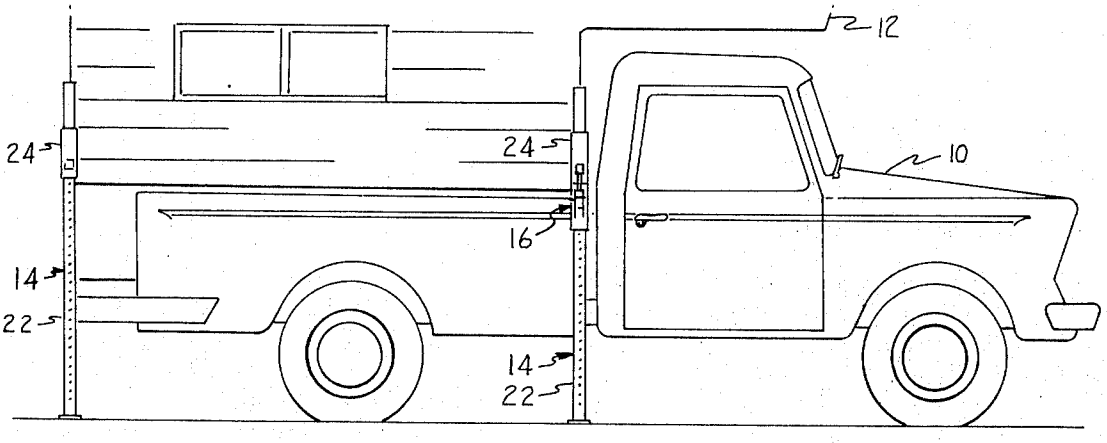


Fig. 1

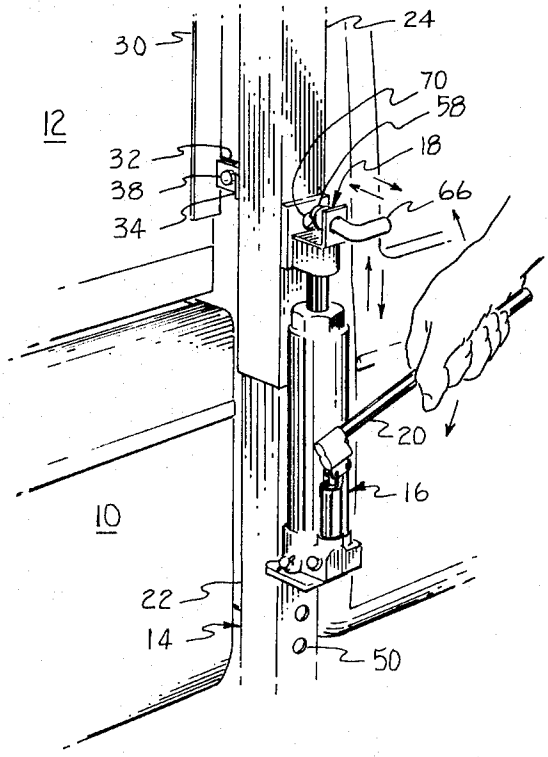


Fig. 2

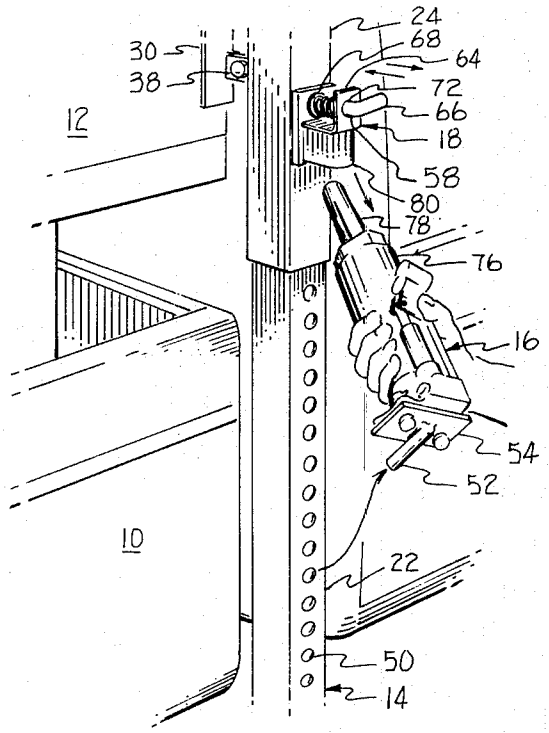


Fig. 3

INVENTOR
JAMES F. MANN

Roy Matterna
ATTORNEY

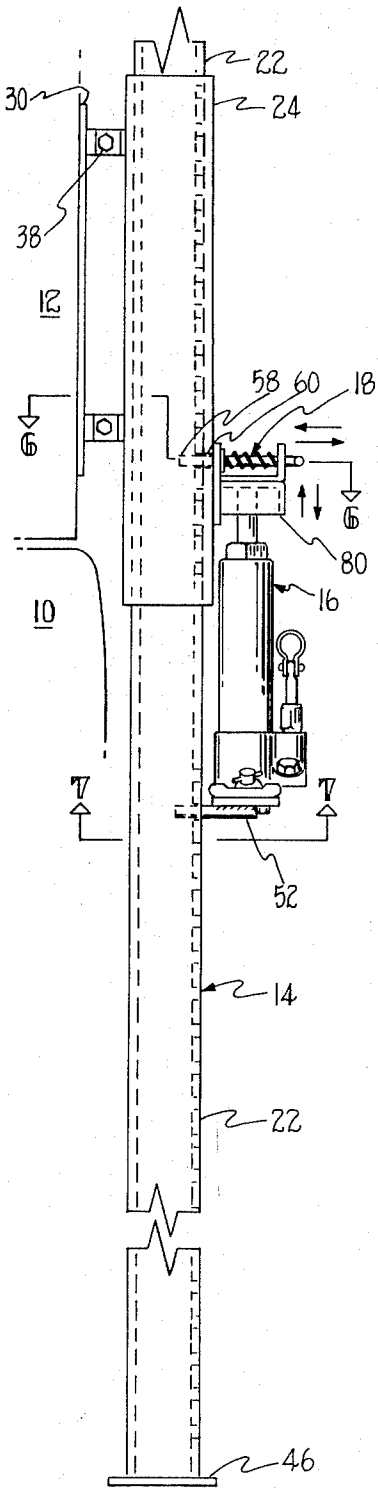


Fig. 4

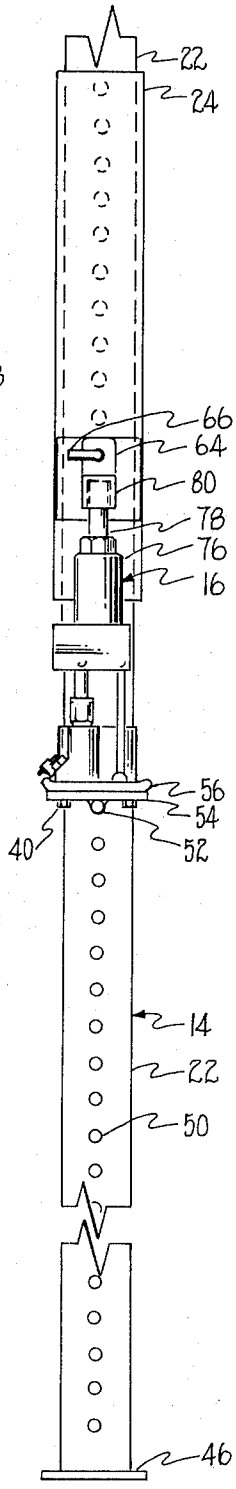


Fig. 5

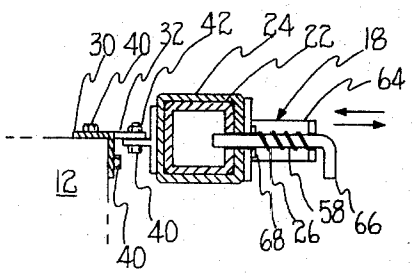


Fig. 6

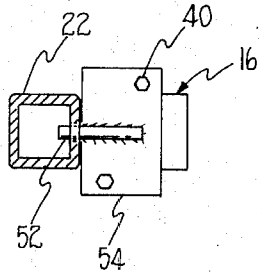


Fig. 7

INVENTOR
JAMES F. MANN

Roy Mattern Jr.
ATTORNEY

SELF CONTAINED ADJUSTABLE SUPPORT ASSEMBLIES TO SUPPORT, RAISE, AND LOWER A MOBILE LIVING FACILITY WITH RESPECT TO BOTH A VEHICLE AND THE GROUND

BACKGROUND OF INVENTION

Dual purpose vehicles such as pickup trucks are being used not only as trucks, but, alternately, also as recreational vehicles when covered space structures, often fully equipped with living accommodations, are secured to them for weekend and vacation trips. There are now many loading and unloading tools, supports, and facilities being used to unload and load these living accommodations, generally called campers, on trucks, generally called pickups. There are mechanical jacking facilities, cable and winch adjusting facilities, and overall hydraulic lift systems. However, none of these are arranged to combine mechanical adjustable height supports with removable self contained hydraulic height adjusting units to completely raise and lower the camper with respect to both the pickup and ground.

SUMMARY OF INVENTION

Several self contained adjustable support assemblies, support covered space structures, often having living facilities called campers, when they are not in use and while they are raised and lowered on to a vehicle, which is generally a pickup truck. At least three adjustable support assemblies mechanically and structurally support the camper at any one time while a fourth adjustable support assembly is being changed in its overall effective height.

The height change is made by employing a self contained hydraulic jacking device. It is removably positioned between respective receiving structures located on both a supporting leg and a leg surrounding sleeve of a respective adjustable support assembly. During each height adjustment of a respective support assembly, a mechanical interlock between the supporting leg and its surrounding sleeve is kept in a released positon until the new adjustable height is reached.

The surrounding sleeves are positoned about the campers, generally one at each corner, by using load distributing brackets, secured between them and the campers by employing various fasteners. Using these adjustable support assemblies, hydraulically moved in sequency by operation of a removable hydraulic jacking unit, a camper is always safely handled and supported in a most convenient way.

DRAWINGS OF THE PREFERRED EMBODIMENT

FIG. 1 is a partial side elevation showing a camper living facility in position on a pickup truck, and also indicating how adjustable support assemblies are postioned at the time of transfer of the weight of the camper to or from the pickup truck, one hydraulic jacking unit being shown in place;

FIG. 2 is a partial perspective view showing how the hydraulic jacking unit is positioned and operated to relatively move the components of the adjustable support assemblies and consequently cause movement of the camper relative to the pickup truck, the mechanical interlock being shown in its retracted position;

FIG. 3 is a partial perspective view showing how the hydraulic jacking unit is conveniently removed and installed to be effectively used with all the adjustable support assemblies during loading or unloading of the camper;

FIG. 4 is a partial elevational view alongside the pickup truck and camper showing the right front adjustable support assembly with the hydraulic jack in place;

FIG. 5 is a partial elevational view of the adjustable support assembly, with the hydraulic jack in place, as viewed from the side of a pickup truck and camper;

FIG. 6 is a partial sectional view taken along broken section line 6—6 of FIG. 4, showing the interlock in its locking position to prevent relative movement between the supporting leg and the surrounding sleeve; and

FIG. 7 is a partial sectional view taken along section line 7—7 of FIG. 4, illustrating how the base of the hydraulic jack is held in the supporting leg.

DESCRIPTION OF THE PREFERRED EMBODIMENT

General Arrangement and Operation

In FIG. 1, a pickup truck **10** is shown equipped with a camper **12**. At each corner of the camper **12**, self contained adjustable support assemblies **14** are illustrated in their neutral position, either having just been used to lower camper **12** in place on pickup **10**, or having just been located to raise camper **12** above pickup **10**. On the right forward adjustable support assembly **14**, a removable hydraulic jack **16** is illustrated in its operating position.

If camper **12** is ready to be raised above pickup **10**, then hydraulic jack **16**, after withdrawing an interlock **18**, is actuated by hand movements applying force through the lever handle **20**, as illustrated in FIG. **2**. If, however, camper **12** is completely loaded on pickup **10** and ready for a trip, then, as illustrated in FIG. **3**, hydraulic jack **16** is removed. Thereafter the supporting leg **22** is raised up passing in part through the surrounding guide sleeve **24** to a position well clear of the roadway. Interlock **18**, biased by coil spring **26**, keeps the supporting leg **22** and the guide sleeve **24** in the raised over the roadway position.

Self Contained Adjustable Support Assemblies

As illustrated throughout FIGS. **1** through **6**, at each corner of camper **12**, a self contained adjustable support assembly **14** is secured to camper **12**. Preferably, a corner bracket **30** is well fastened to the camper **12** to distribute the supporting loads into the camper framing, not shown. At two or more locations spacing and mounting tabs **32** are formed along corner bracket **30**. Overlapping tabs **34** are formed on guide sleeve **22**. When the holes **36** of these tabs **32**, **34** are aligned, fastening assemblies **38**, each having a bolt **40** and nut **42**, are used to firmly position guide sleeve **24** with respect to camper **12**.

Each supporting leg **22** is sized to pass through guide sleeve **24** with limited clearance. Whenever interlock **18** is removed relative movement occurs until the base plate **46** on leg **22** contacts the ground. If hydraulic jack **16** is still installed, it will lower away also and therefore it should be held.

The Adjustable Interlock of the Support Assemblies

The interlocking of supporting leg **22** and guide sleeve **22** is undertaken at several selected locations by providing many pin receiving holes **50** throughout supporting leg **22**. Also during the jacking operations these same holes are utilized to receive a bottom load transfer pin **52**. It is secured to a bottom plate **54** that inturn is fitted to the base **56** of hydraulic jack **16**, as shown in FIGS. **4**, **5**, and **7**.

Once a selected location is determined by jacking or by hand positioning of supporting leg **22** with respect guide sleeve **24**, the pin **58** of interlock assembly **18** is inserted through hole **60** in sleeve **24** and beyond through the respective aligned hole **50** in supporting leg **22**. Pin **58** is supported and guided by bracket **64** that is secured to sleeve **24**. Pin **58** has a turned end **66** serving as a handle. It also has a circular flange to contact the end of coiled spring **26** which keeps pin **58** in its interlock position until intentionally withdrawn.

During intended relative movements between supporting leg **22** and guide sleeve **24**, by applying a retracting force at handle **66**, pin **58** is withdrawn against the force of spring **26** until it is cleared from hole **50** of leg **22**, hole **60** of sleeve **24** and hole **70** in bracket **64**. Thereafter, pin **58** is angled to one side while still kept in hole **72** in bracket **64** and biased by spring **26** into contact with bracket structure adjacent to hole **70**. Once an interim or final relative position is reached between supporting leg **22** and guide sleeve **24**, then pin **58** of interlock **18** is realigned and spring biased back through holes **70**, **60** and a selected hole **50**, to thereby lock them together once again as a supporting assembly.

Self Contained Hydraulic Jacking Assembly

As a manner of economy and practicality, and quick overall operations, the self contained hydraulic jacking assembly **16** is equipped with accessories to be removably fitted to each support assembly. At the base **56** of hydraulic cylinder **76**, a base plate **54** is secured and to it inturn is secured a load transfer pin **52** capable of closely fitting the holes **50** along leg **22**.

No special fitting is secured directly to the piston **78** of hydraulic jack **16**. However, bracket **64** is preferably enlarged below to form a receiver **80** into which piston **78** may be inserted, as illustrated in FIGS. **1** through **5**.

Therefore, at anytime hydraulic jack **18** is readily placed into a jacking position or readily withdrawn when interlock **18** is actively transferring part of the camper load between guide sleeve **24** and supporting leg **22**.

Operation of hydraulic jack **16** during height changes in undertaken by using removable handle **20**, as shown in FIG. **2**. When not is use, handle **20** and hydraulic jack **16** are carried inside the camper or pickup.

Summary of Advantages

One person may safely and conveniently lower or raise a camper **12** with respect to a pickup **10** and to the ground, by operating a hydraulic jack **16** throughout its major stroke, alternately, at the respective corner located adjustable support assemblies **14**, keeping at least three support assemblies always mechanically locked by interlock **18** to support the camper **12**. Between trips of alternate uses of a pickup **10** as a truck and as a recreational vehicle, the camper **12** is conveniently raised and lowered, preferably, only a limited distance in a very short time using the hydraulic jack **16** alternately at the respective corners of the camper **12**. At all transfer times, the camper **12** remains under control as at least three interlocks **18** are always engaged. During the removed storage times, camper **12** is firmly supported by all four adjustable support assemblies **14**.

After loading of camper **12** on pickup **10** and removal of hydraulic jack **16**, each adjustable support assembly **14**, is very quickly well cleared of the roadway by hand raising the supporting legs **22** up through the guide sleeves and thereafter locking them again in these retracted positions by using interlock **18**. After the return from a trip and conversion back to a pickup truck is wanted, interlocks **18** are cleared and supporting legs are quickly dropped to the ground, again saving much time in making the conversion from recreational vehicle to a work vehicle and vice versa. Therefore, the hydraulic jack **16** is only needed to clear camper **12** just above pickup **10** during unloading, and to lower it just this short distance during loading of camper **12** on pickup **10**.

I claim:

1. Adjustable support assemblies to support, raise and lower a covered space facility with respect to both a vehicle and the ground, each assembly comprising:

a. a supporting leg;

b. a guide in which the supporting leg moves;

c. means to interlock the supporting leg to the guide at selective effective heights of the supporting leg; and

d. means, to receive a self contained hydraulic jacking unit positioned between the guide and the supporting leg, whereby, upon release of the interlock means, a hydraulic jacking unit is moved through it operating stroke to change the effective height of the supporting leg, comprising a pin securable to a base of the hydraulic jacking unit, several spaced pin receivers in the supporting leg to receive the pin when it is secured to the hydraulic jacking unit, a receiver secured to the guide into which top portions of the hydraulic jacking unit may be inserted.

2. Adjustable support assemblies, as claimed in claim **1**, wherein each assembly also comprises an attachment structure to be secured to a covered space facility to distribute loads transmitted from the guide.

3. Adjustable support assemblies, as claimed in claim **2**, wherein multiple connection means are used between the attachment structure and the guide, each comprising, overlapping horizontally extending tabs with central openings, arranged in pairs and joined respectively to the attachment structure and guide, and removable fastener assemblies insertable through the central openings of the tab and then secured to hold the extending tabs together and to transmit the supporting loads between the covered space facility and the guide.

4. An adjustable support assembly to be secured to the corner structure of a camper dwelling, and operated in sequence with other like adjustable support assemblies so secured to raise and to lower a camper dwelling with respect to a pickup truck and then to maintain the relative position selected, comprising:

a. a supporting leg having a foot for load distributing ground contact and a body for relative movement with respect to a guiding member, the body having

spaced receiving structures to receive a locking member and to receive a hydraulic jacking member;

b. a guiding member to receive the supporting leg for relative movement and having a receiving structure to receive a locking member and a receiving structure to receive a hydraulic jacking member, and having fastener connection structures utilized when the adjustable support assembly is secured to corner structure of a camper dwelling;

c. a removable locking member for interlocking the body of the supporting leg to the guiding member at selective effective load carrying heights as the removable locking member is inserted through receiving structure on the guiding member and through a selected spaced receiving structure of the body of the supporting leg while a hydraulic jacking member is supporting the load, and thereafter upon complete insertion of the removable locking member, the hydraulic jacking member is removed and prepared for making another elevational change; and

d. a removable self contained hydraulic jacking unit having a projecting means secured to its base to be selectively and removably located in one of the several receiving structures of the body of the supporting leg depending on the height adjustment to be made, and also the top of the hydraulic jacking unit to be located in a receiving structure of the guiding member, and thereafter, the hydraulic jacking unit is effectively operated to raise and to lower the camper dwelling with respect to a pick up truck, and, when no longer needed, to be removed during rapid adjustments of the body of the supporting leg relative to the guiding member when no camper dwelling load is being supported such as when the camper dwelling is securely in place on a pick up truck.

* * * * *