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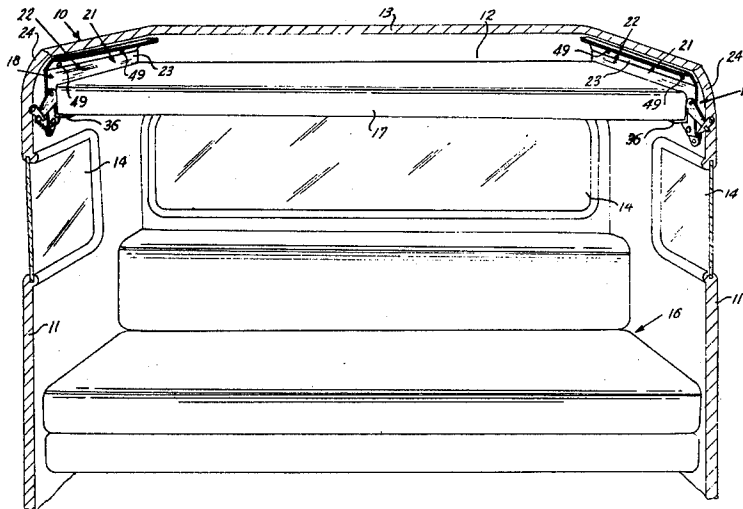
[54] **FOLDABLE SUPPORT APPARATUS FOR THE UPPER BED DECK OF A MOBILE HOME UNIT**
4 Claims, 7 Drawing Figs.

[52] U.S. Cl..... **296/23, 105/318**
 [51] Int. Cl..... **B60p 3/34**
 [50] Field of Search..... **296/23; 105/318**

[56] **References Cited**

UNITED STATES PATENTS
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ABSTRACT: A pair of foldable support structures carried on the ceiling wall of the body of a mobile home vehicle are arranged at opposite ends of the upper deck to support the upper deck for movement to an elevated horizontally disposed storage position adjacent the ceiling wall and to a lowered horizontal position suspended from the ceiling wall. Each support structure includes a mounting plate attachable to the ceiling wall and a pair of pivoted lever assemblies, interconnected for pivotal movement together, with one of their ends pivotally supported on the mounting plate and the other of their ends pivotally connected to an end of the upper deck. The lever assemblies are vertically extended to suspend the upper deck from the ceiling wall and are foldable inwardly toward each other to positions extended transversely of the upper deck to store the upper deck adjacent the ceiling wall.



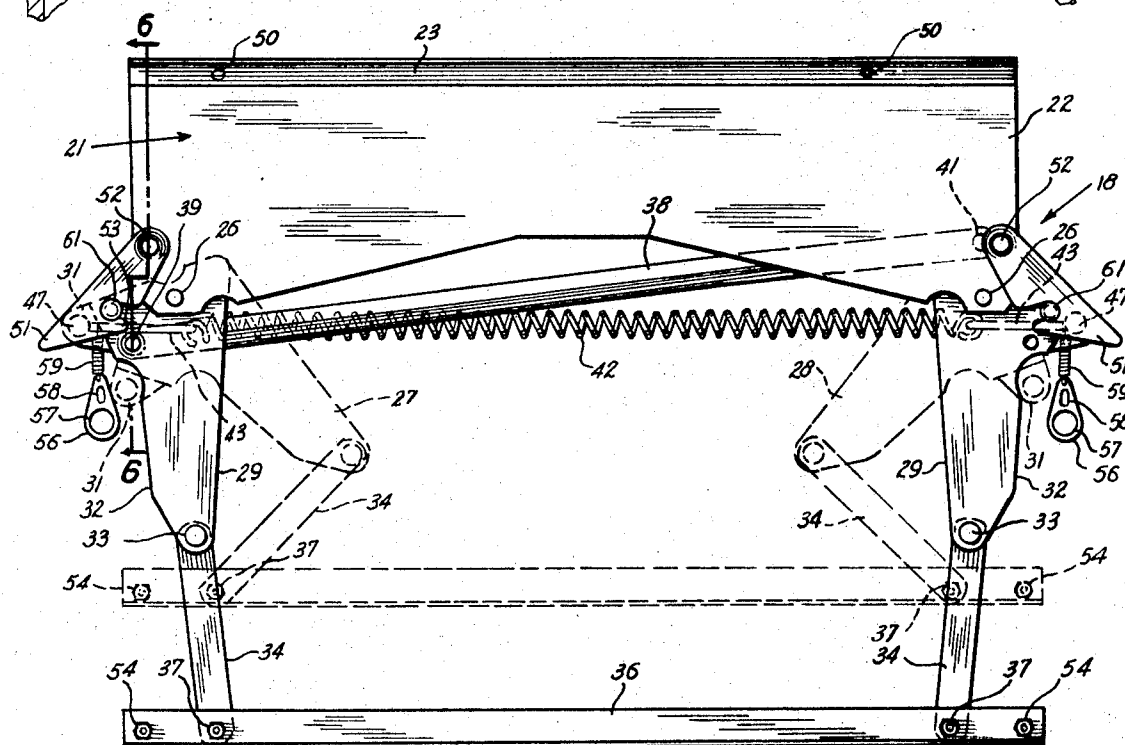
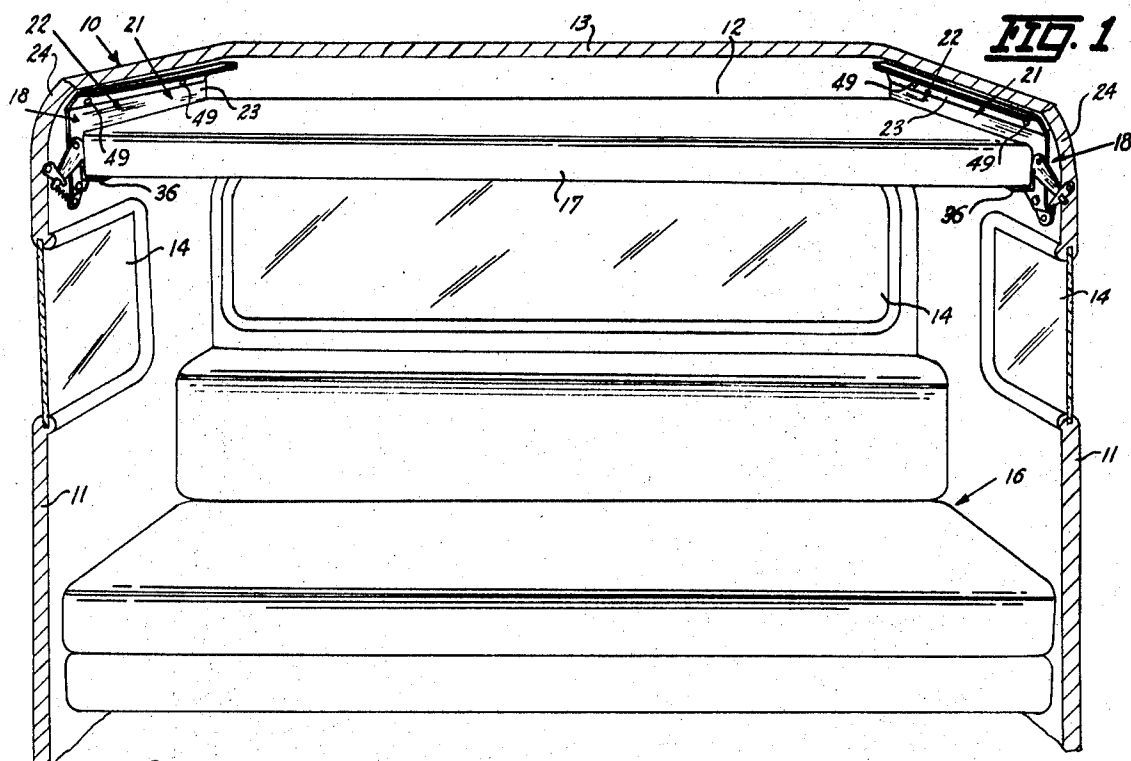
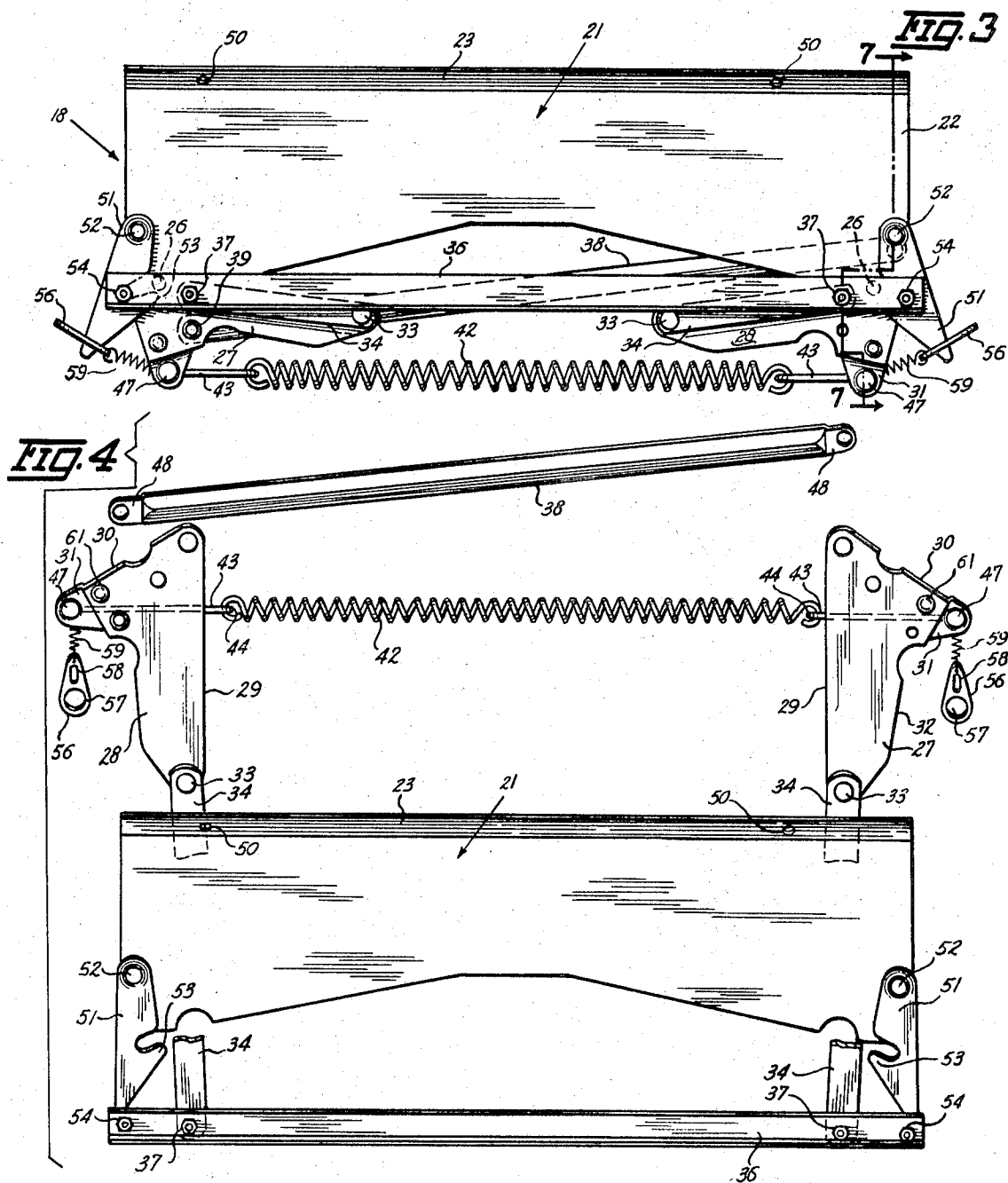


FIG. 2

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FIG. 5

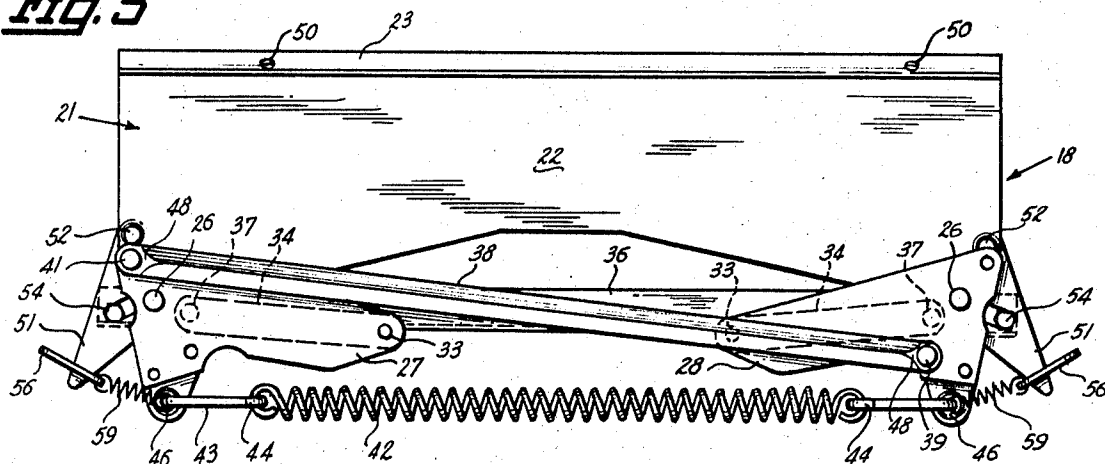


FIG. 7

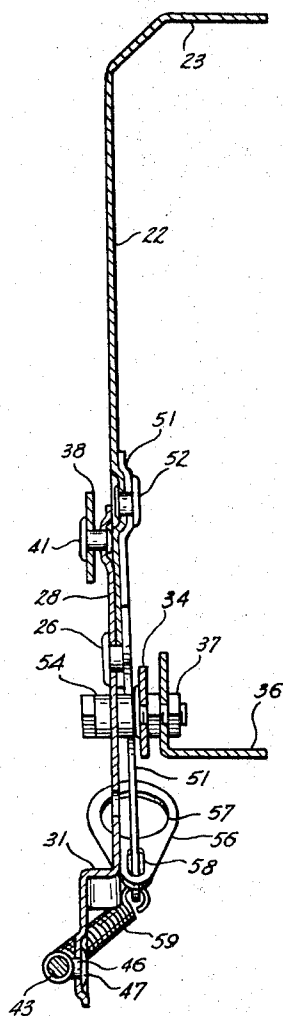
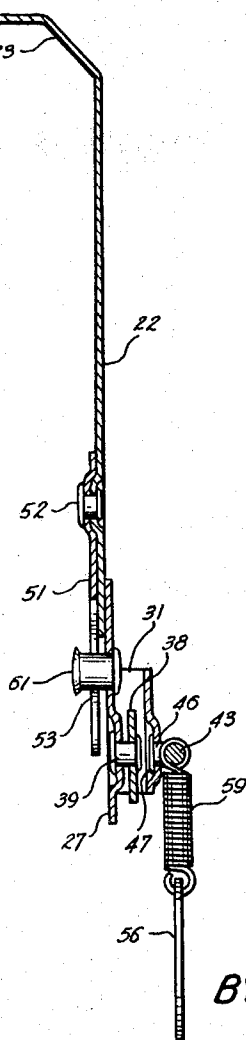


FIG. 6



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FOLDABLE SUPPORT APPARATUS FOR THE UPPER BED DECK OF A MOBILE HOME UNIT

SUMMARY OF THE INVENTION

The foldable support structures are of a compact construction for mounting from the ceiling wall in a substantially concealed location between a sidewall of the body of a mobile home vehicle and a corresponding end of an upper deck bed. When the upper deck is lowered from the ceiling in an occupant receiving position the pivoted lever assemblies from upright ceiling supported hangar members, one of which is located adjacent each corner of the upper deck. On raising the upper deck to its storage position adjacent the ceiling wall the lever assemblies are folded inwardly toward each other to substantially horizontal positions located between a sidewall of the body of the mobile home unit and an adjacent end of the upper deck. The foldable structures thus provide for a use of the full top area of the upper deck for occupant receiving purposes, and are substantially concealed when the upper deck is stored so as to give an unobstructed appearance and full use of the space below the upper deck. The support structures are releasably locked in the raised and lowered positions of the upper deck to eliminate any accidental or unintended movement of the upper deck from such positions. Spring means for biasing the foldable support structures to the folded positions therefor facilitates movement of the upper deck to its raised and lowered positions with a minimum of manual effort.

BRIEF DESCRIPTION OF THE DRAWING

Referring to the drawings:

FIG. 1 is a fragmentary perspective view of the interior rear portion of the body of a mobile home vehicle with portions broken away and other portions shown in section, illustrating the foldable support structures for the upper bed deck in the folded horizontal positions therefor providing for a storage position of the upper deck adjacent to the ceiling or roof of the vehicle body;

FIG. 2 is an enlarged side elevational view of one of the foldable structures, illustrated generally in FIG. 1, shown in an extended or unfolded position wherein the upper deck is horizontally disposed in a vertically spaced relation below the ceiling of the vehicle body;

FIG. 3 is a side elevational view illustrated similarly to FIG. 2 showing the support structure in a folded or retracted position;

FIG. 4 is a partially exploded perspective view of a foldable structure;

FIG. 5 is a side elevational view illustrated similarly to FIG. 3 looking at the side thereof opposite the side shown in FIG. 3;

FIG. 6 is an enlarged sectional detail view as seen on the line 6-6 in FIG. 2; and

FIG. 7 is an enlarged sectional detail view taken along the line 7-7 in FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. 1 of the drawings, there is illustrated the rear interior portion of the body 10 of a mobile home vehicle unit having sidewalls 11, a rear wall 12, and a ceiling wall or roof 13. The sidewalls 11 and rear wall 12 are provided in a usual manner with windows 14. Extended transversely between the sidewalls 11 and against the rear wall 12 is a rear seat assembly 16. As is well known the seat assembly is convertible to a bed unit or lower bunk. Mobile home vehicle units are also generally provided with an upper bunk or deck bed 17 that is movable to a storage position providing for a seating occupancy of the rear seat 16 and to an operating or sleeping position horizontally extended in a spaced relation from the ceiling wall 13.

The support apparatus of this invention for the upper deck 17 includes a pair of retractable and extendible support structures 18 that are similar in construction and operation and similarly installed relative to the ceiling wall 13 and upper deck 17. Only one such support structure, therefore, will be

described in detail with like parts being designated by like numbers.

A support structure 18 includes an elongated flat mounting plate or bracket 21 having a main body member 22 of a generally rectangular shape (FIGS. 1 and 2) formed with an upwardly and inwardly inclined top section 23. The inclination of the top section 23 corresponds generally to the curvature of the junction 24 of the ceiling wall 13 with a sidewall 11. Pendently carried adjacent opposite ends of the body member 22 for pivotal movement about pivots 26 extended transversely thereof are operating levers 27 and 28. Each operating lever 27 and 28 is of a generally elongated triangular shape (FIGS. 2 and 4) having a base side 29, a short side 30 and an apex portion 31 formed between the short side 30 and the hypotenuse side 32. The pivots 26 are located at the lower corner portions of the body member 22 of the mounting plate 21 and the operating levers 27 and 28 are supported thereon with their base sides 29 facing each other. Each pivot support 26 is extended through a corresponding operating lever 27 and 28 in a position adjacent to the top side 30 and closer to the base side 29 than to the apex portion 31.

The end of the base side 29 (FIG. 2) of an operating lever 27 remote from the pivotal support 26 is pivotally connected at 33 to one end of a suspension lever 34. The opposite end of a suspension lever is pivotally connected to an end frame member 36 of the upper deck 17 by a pivot pin 37 projected laterally from the frame member 36 at a position adjacent one end thereof. The pivot pins 37 are spaced longitudinally of the end member 36 a distance apart which is less than the spacing of the pivotal supports 26 longitudinally of the mounting plate 21. As a result when a lever assembly, comprised of an operating lever 27 and a suspension lever 34, is pendently supported from the mounting plate 21, as shown in FIG. 2, the axis of the pivot connection 33 is in a vertical plane located between vertical planes extended through the axes of the pivotal support 26 and pivot connection 37.

The pair of lever assemblies for each supporting structure 18 are interconnected for concurrent relative pivotal movement by a tie rod 38 (FIGS. 2 and 5) that has one end pivotally connected at 39 adjacent to the apex portion 31 of the operating lever 27 and its opposite end pivotally connected at 41 to the operating lever 28 at the junction of the base side 29 and short side 30 thereof. As shown in FIGS. 2 and 6 the tie rod 38 is located adjacent the sides of the operating levers 27 and 28 remote from the mounting plate 21.

The operating levers 27 and 28 are continuously biased for pivotal movement inwardly toward each other by a coil spring 42 that is connected at each end to a connector member 43 (FIGS. 4 and 5). Each connector member 43 is made of a rod material having a hooked end 44 connectable with a corresponding end of the coil spring 42. The other end of a connector member 43 is formed with a laterally extended pivot or bearing 46 (FIG. 6) which terminates in a head portion 47. Each of the pivots 46 is extended transversely of a corresponding operating lever 27 and 28 at the apex portion 31 thereof.

As shown in FIGS. 6 and 7, the laterally offset apex portions 31 of the levers 27 and 28 locates the connector members 43 and in turn the spring 42 in a clearance relation with outer side of the tie rod 38. Likewise, it will be noted that each operating lever 27 and 28 at its pivoted connection 29 and 41, respectively, with the tie rod 38 is formed with a laterally extended bearing portion 48 so as to be in a pivotal clearance relation with the tie rod 38 and the mounting plate 21. The spring 42, operating levers 27 and 28, suspension levers 34 and tie rod 38 are thus interconnected for pivotal movement relative to each other in parallel planes extended longitudinally of the mounting plate 21.

The mounting plate 21 (FIG. 1) extends fore and aft of the vehicle body 10 with its inclined top section 23 extended inwardly of the vehicle body 10 and secured to the ceiling wall 13 by screws 49 inserted through holes 50 in the top section 23. The body section 22 of the mounting plate thus projects downwardly adjacent to and in a parallel spaced relation with

a sidewall 11 at a position above the rear seat assembly 16. When a support structure 18 is in a retracted position therefor, as shown in FIGS. 1, 3 and 5 the frame member 36 of the upper deck 17 is horizontally disposed above the rear seat assembly 16 in a position adjacent to the ceiling wall 13 and within the lateral confines or vertical height of the mounting plate 21. In this retracted position (FIGS. 3 and 5) the operating levers 27 and 28 are projected inwardly toward each other in a back-to-back relation with corresponding suspension levers 34 which from the pivot connections 33 are projected away from each other.

Additionally, it will be seen that the pivot connections 37 of the suspension levers 34 with the upper deck frame member 36 are located inwardly of the pivot supports 26 for the operating levers 27 and 28 in a common horizontal plane which is located between the horizontal planes that are common to the pivot supports 26 and pivot connections 33, respectively. This retracted position of a supporting structure 18 is defined by the stop action of the suspension levers 34 and upper deck member 36 to limit upward pivotal movement of the operating levers 27 and 28 toward each other. In other words any upward pivotal movement of the operating levers 27 and 28 from their positions shown in FIGS. 3 and 5 tends to move the pivot connections 37 of the suspension levers 34 with the frame member 36 toward each other. However, this inward movement of the pivot connections 37 is prevented by the frame member 36 which maintains fixed the spacing between the pivot connections 37.

The operating levers 27 and 28 are continuously urged to their retracted stop positions by the spring 42. The short side 30 of each operating lever 27 and 28 functions as a moment arm for the spring 42 relative to a pivot support 26 so that the tension force of the spring is constantly applied to move the operating levers upwardly against the stop action of the suspension members 34 and the upper deck frame member 36.

A supporting structure 18 is locked in its retracted position in FIGS. 3 and 5 by a flat latch member 51 pendently supported at 52 at each end of the body section 23 of the mounting plate 21 at a position adjacent a pivot support 26. The latch member 51 (FIGS. 3 and 7) is formed with a hook 53 which on pivotal movement of the latch member is engageable with or released from a corresponding catch member 54 that projects laterally from the upper deck frame member 36 at a position spaced outwardly from an adjacent pivot connection 37.

The latch member 51 is releasably maintained in locked engagement with the catch member 54 by a finger actuated holding member 56 (FIGS. 3 and 4) of a flat generally triangular shape having a finger hole 57 and a latch receiving slot 58. The holding member 56 is interconnected with an adjacent connector member 43 by a coil spring 59 which is placed under tension when the free end of a latch member 51, as shown in FIG. 3, is inserted within the slot 58.

To lower the upper deck 17 the holding members 56 are disengaged from the latch members 51 which are then swung outwardly out of engagement with the catch members 54. On manual downward movement of the upper deck the decrease against the biasing action of the spring 42, a supporting structure 18 is moved from its retracted position of FIG. 3 to its extended or unfolded position shown in FIG. 2. During this downward movement of the upper deck 17 the tension force of the spring 42 functions to counterbalance the weight of the upper deck so as to prevent any sudden falling movement of the upper deck. However, and as clearly shown in FIG. 2, the effective counterbalancing action of the spring 42 is progressively diminished as the upper deck 17 approaches the lowered position therefor by virtue of the decrease in the effective length of the spring moment arm on the operating levers 28 and 29 relative to the pivotal supports 26. As a result the weight of the upper deck 17 in its lowered position substantially overcomes the biasing action of the spring 42 to elevate the upper deck.

The lowered position of the upper deck 17 and in turn the unfolded position of the support structures 18 is reached when the operating levers 28 and 29 and corresponding suspension levers 34 are pendently supported in an end-to-end relation from the pivot supports 26. The upper deck is locked in its lowered position by the latch members 51, the hooks 53 of which are pivotally movable into locking engagement with corresponding catch members 61 (FIGS. 2 and 6) projected laterally inwardly from an operating member 28 and 29 at a position adjacent the apex portion 31 thereof.

To return the upper deck 17 to its elevated position the latch members 51 are disengaged from the catch members 61 and the upper deck is then moved upwardly with a minimum of manual effort due to the assistance action of the spring 42. In both the raising and lowering of the upper deck 17, it will be apparent from FIG. 2 that the pivot connections 37 of the suspension levers 34 with upper deck frame member 36 are movable together in parallel vertical planes so as to maintain the upper deck horizontally disposed at all times. This concurrent movement is accomplished by virtue of the interconnection of the operating levers 27 and 28 with the tie rod 38 and the fixed spacing of the pivot connections 37 on the frame member 36.

It will also be noted that the supporting structures 18 at no time detract from a neat appearance of the interior of the body 10 of the mobile home vehicle. Thus, as shown in FIG. 1, when the supporting structures are in their retracted positions they are substantially concealed by the upper deck 17 and located within a storage space between a sidewall 11 and corresponding end of the upper deck 17. When the upper deck is in its lowered position of FIG. 2 only the operating levers 28 and 29 and suspension levers 34 are clearly exposed.

I claim:

1. In a vehicle body having a pair of opposite sidewalls and a ceiling wall, a support apparatus for supporting an upper deck bed between said sidewalls for vertical movement to an elevated position adjacent said ceiling wall and to a lowered position suspended from said ceiling wall, said support apparatus comprising:

- a pair of foldable support structures corresponding to the ends of the upper deck, each support structure including a pair of lever assemblies each of which comprises an operating lever and a suspension lever pivoted together at one of the ends thereof,
- pivot means for supporting the other ends of the operating levers from the ceiling wall,
- second pivot means for connecting the other ends of the suspension levers to corresponding ends of the upper deck,
- with the operating lever and suspension lever member in each lever assembly being extended in an end-to-end relation and said pair of lever assemblies inclined inwardly toward each other when the upper deck is in the lowered position therefor, and the operating levers in each of said support structures being extended toward each other transversely of the upper deck when the upper deck is in the elevated position therefor,
- means for releasably locking one of the operating levers against pivotal movement in the lowered and elevated positions of said upper deck bed, and
- means interconnecting the operating levers in each support structure for concurrent pivotal movement.

2. In a vehicle body having a pair of opposite sidewalls and a ceiling wall, a support apparatus for supporting an upper deck bed between said sidewalls for vertical movement to an elevated position adjacent said ceiling wall and to a lowered position suspended from said ceiling wall, said support apparatus comprising: a. a pair of foldable structures corresponding to opposite ends of said upper deck bed, each of which includes an elongated flat mounting member extended transversely of the upper deck bed and secured to the ceiling wall at a position between a sidewall and an adjacent end of the upper deck bed,

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- b. a pair of pivoted lever assemblies corresponding to each mounting member, each lever assembly including an operating lever and a suspension lever pivotally connected to together at one of the ends thereof, each operating lever having the other end thereof pivotally supported adjacent an end of a corresponding mounting member. 5
- c. pivot means connecting the other end of a suspension lever with a corresponding end of said upper deck bed to provide for said two lever members in a lever assembly being in an end-to-end relation and said pair of lever assemblies inclined inwardly toward each other when the upper deck bed is in the lowered position therefor, 10
- d. a tie rod pivotally interconnected to the pair of operating levers corresponding to each mounting bracket to provide for a concurrent pivotal movement of said pair of operating levers from said upright positions therefor to positions projected inwardly toward each other wherein the upper deck bed is in the elevated position therefor, and 15 20

- e. means for releasably locking said lever assemblies against relative pivotal movement when said upper deck bed is in the elevated and lowered positions therefor.
- 3. The invention according to claim 2 including:
 - a. means interconnected between the pairs of operating levers on each mounting member for yieldably urging said operating levers for pivotal movement inwardly toward each other.
 - 4. The invention according to claim 2 wherein:
 - a. said locking means includes a pivoted latch member on each mounting member,
 - b. a first catch member on an operating lever corresponding to said mounting member, and
 - c. a second catch member on said upper deck bed,
 - d. said latch member being pivotally movable into locking engagement with said first catch member when the upper deck is in the lowered position therefor, and into locking engagement with the second catch member when the upper deck is in the elevated position therefor.

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