

[54] **RETRACTABLE BED**

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**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 349,933, April 11,  
1973, abandoned, which is a continuation-in-part of  
Ser. No. 243,311, April 12, 1972, abandoned.

[52] **U.S. Cl.**..... **5/10 R; 5/83**

[51] **Int. Cl.**..... **A47c 17/40**

[58] **Field of Search**..... **5/10, 63, 66, 83, 84**

[56] **References Cited**

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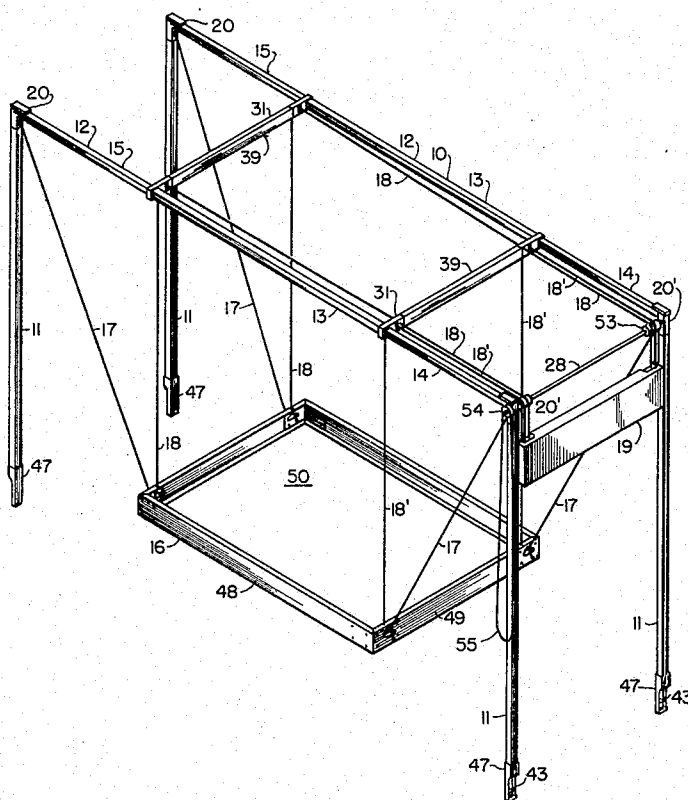
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[57]

**ABSTRACT**

A retractable bed has a frame with pairs of legs standing against opposite walls of a room and horizontal room spanning members extending between tops of the legs against the ceiling of the room, a bed platform, four retracting lines slidably extending from the corners of the bed platform vertically upward to the horizontal members, along the horizontal members, and downward at one pair of legs, a counterweight adjacent to a pair of legs attached to the retracting lines, four support lines extending from the corners of the bed platform over pulleys at the tops of the legs, and slack take-up weights at the ends of the support lines over the pulleys limiting the travel of the support lines over the pulleys and up slack in the support lines when the bed platform is retracted upward to the horizontal members balanced by the counterweight. The retracting lines pass over the pulleys mounted on a single shaft disposed over the counterweight so that a sheave and endless rope may rotate the shaft to raise and lower the bed platform between retracted and sleeping positions.

**10 Claims, 12 Drawing Figures**



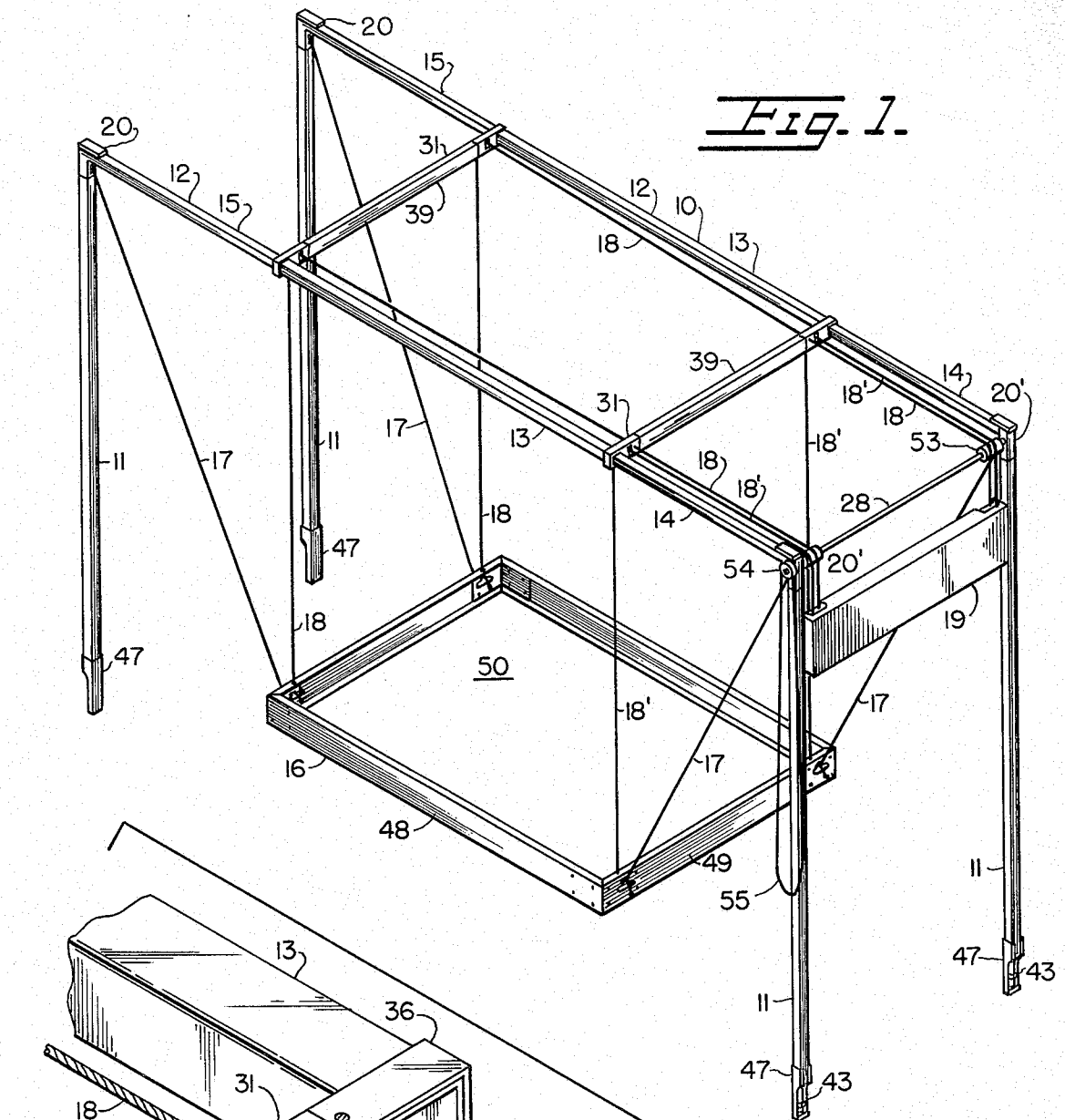


Fig. 1.

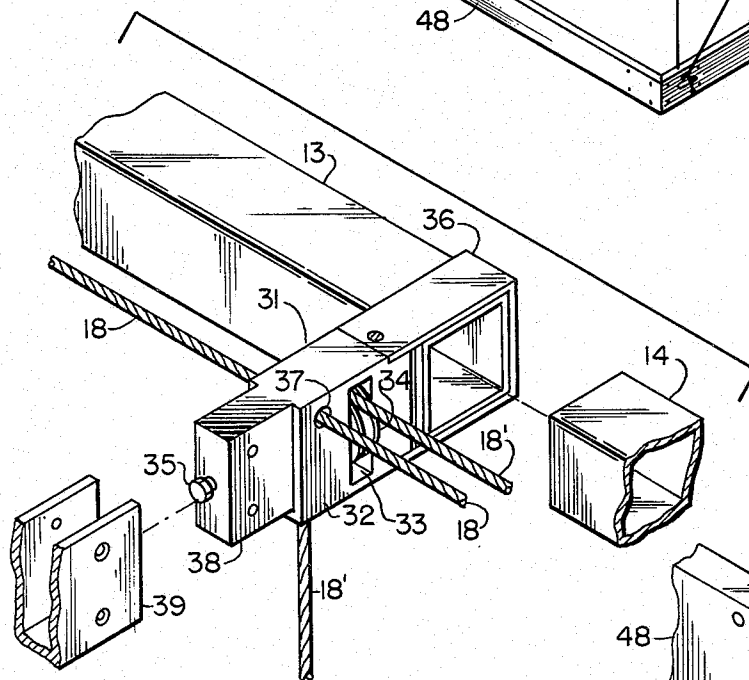


Fig. 3.

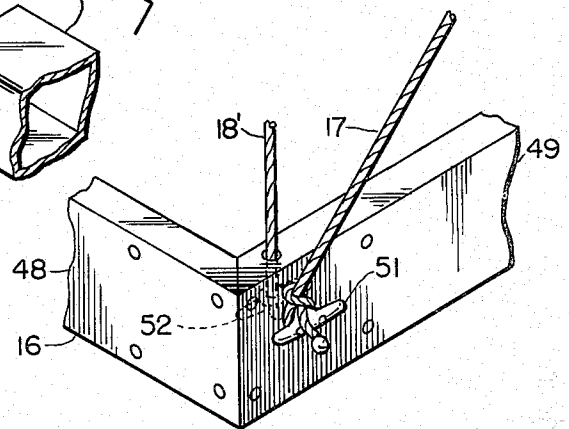
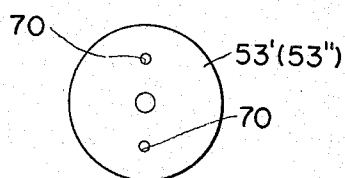
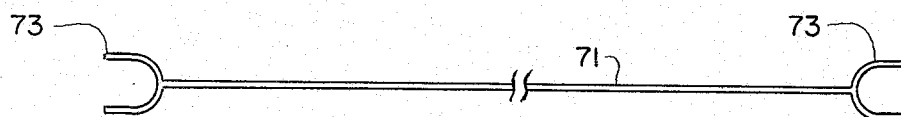
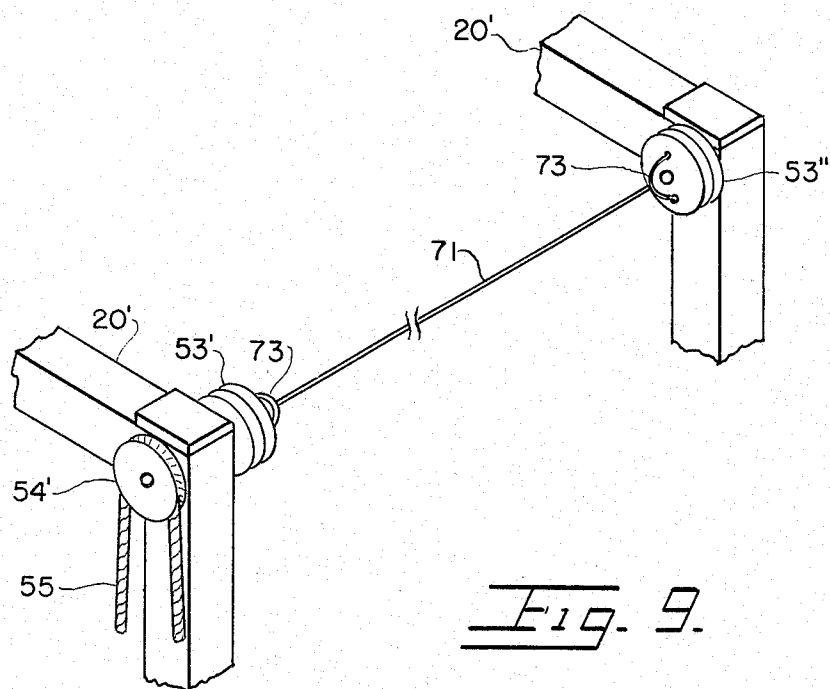
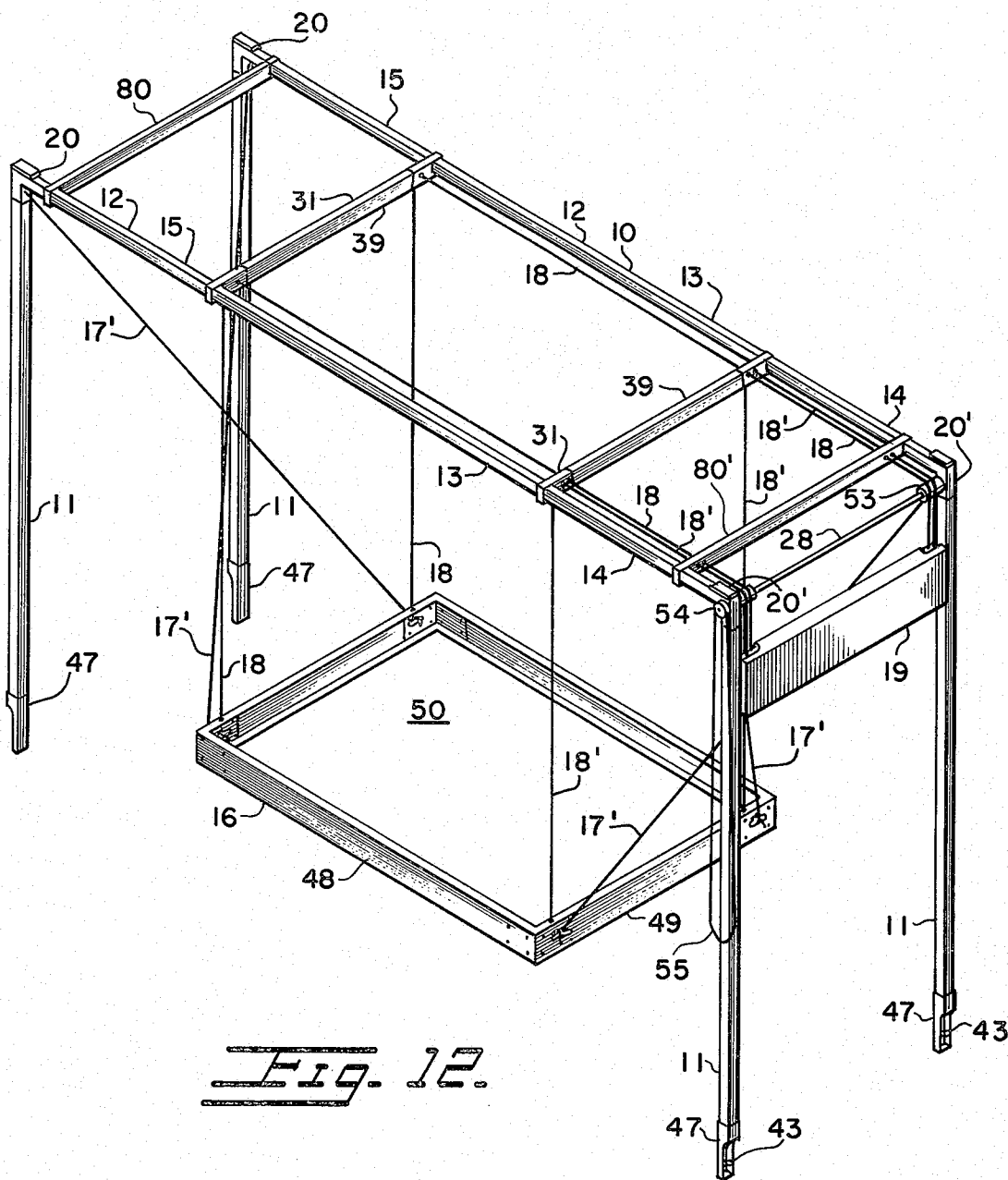


Fig. 2.







*Fig. 12*

## RETRACTABLE BED

## CROSS REFERENCES TO RELATED APPLICATIONS

This application is a continuation-in-part of my patent application Ser. No. 349,933 filed Apr. 11, 1973, which, in turn, is a continuation-in-part of my patent application Ser. No. 243,311 filed Apr. 12, 1972 both now abandoned.

## BACKGROUND OF THE INVENTION

Small modern apartments are difficult to furnish in a conventional manner. A bed is particularly cumbersome as it remains a large unfunctional unit when not in use. Conventional convertible sofa beds cannot be made in light aesthetic forms. Thus there is a need for the retractable bed of this invention which disappears against the ceiling when not in use freeing all the floor space under it.

## BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of the retractable bed of my invention;

FIG. 2 is a perspective view of a fragment of the bed platform with support and retracting lines attached thereto;

FIG. 3 is an exploded perspective view of a central pulley assembly fixed to the broken away end of a center member of a horizontal member with broken away ends of a transverse member and a telescoping member positioned for assembly;

FIG. 4 is a perspective view of a support pulley assembly with a support line passing therethrough having a take-up weight fixed to the end of the support line;

FIG. 5 is a perspective view of a broken away end of the frame of the retractable bed showing a counterweight suspended between a pair of legs;

FIG. 6 is a perspective view of a lower end of a leg having a screw adjuster fixed thereto and showing a cover removed therefrom;

FIG. 7 is a perspective view of a broken away end of a counterweight holder;

FIG. 8 is a perspective view of a broken away end of a cover for the holder of FIG. 7;

FIG. 9 is a perspective view of a broken away end of the frame of the retractable bed with support and retraction lines removed showing a modification thereof;

FIG. 10 is a side view of a flexible connecting rod;

FIG. 11 is a side view of a sheave modified to receive one end of the connecting rod of FIG. 10; and

FIG. 12 is a perspective view of a modification of my retractable bed.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. 1, the retractable bed of my invention has a frame 10 supported by its two pairs of legs 11. Extending between the tops of the pairs of legs 11 are transverse member 12 each having a central member 13 from which telescoping end members 14 and 15 extend. A bed platform 16 is supported in a lowered sleeping position by four support lines 17 and is raised into a retracted position by four vertical retracting lines 18 and 18' which are fixed to counterweight 19.

As shown in FIGS. 4 and 5, support pulley assemblies 20 and 20' have lower shanks 21 which fit into the tops of the tubular legs 11. The bodies 25 of assemblies 20

and 20' each contain a recess 22 within which a pulley 23 is journaled on an axle 24. A vertical bore 26 extends upward from the bottom of each shank 21 to communicate with a recess 22 so that each support line 17 can be threaded up through bore 26 and recess 22 over a pulley 23. A slack take-up weight 27 is fixed to the end of each support line 17 to hang within a tubular leg 11. Thus weights 27 take up slack in the support lines 17 as bed platform 16 is raised and the weights 27 are larger than the bores 26 so that they are stopped by shanks 21 to hold bed platform 16 at a desired sleeping level.

Horizontal shanks 29 projecting from the bodies 25 extend into the ends of the tubular members 14 and 15. Resilient pads 30 are fixed on top of the bodies 25 to bear against the ceiling of a room when the bed of my invention is installed. Assemblies 20 and 20' are identical except that assemblies 20' are journaled to receive a shaft 28.

As shown in FIG. 3, central assemblies 31 are clamped on both ends of each center member 13. The telescoping members 14 and 15 slide within the members 13. The body 32 of each central assembly 31 contains a recess 33 within which a pulley 34 is journaled on a bolt 35 which is turned axially into body 32. Further screwing of bolt 35 into assembly 31 causes it to engage and deform the end of a central member 13 to fix it within clamping frame 36 and lock a member 14 or 15 from sliding within member 13. A passage aperture 37 is provided next to the top of pulley 34. This aperture 37 is only used in one pair of assemblies 31 to accommodate a retracting line 18'. A shank 38 receives the end of transverse channel 39 about it so that the channels 39 secure the transverse members 12 a spaced distance apart.

As shown in FIG. 6, each leg 11 has a bottom plug 40 having a lower flange 41 inserted upward within it. Plug 40 contains a threaded aperture 42 to receive a screw jack 43 therein. Jack 43 has a foot 45 on which it is rotated by turning a nut 44 welded to it. Foot 45 has a resilient floor pad 46 fixed under it. A cover 47 slips about the bottom of each leg 11 and is slid downward to hide screw 43. The rear edges of cover 47 are cut away to accommodate a standard baseboard of a room.

As may be seen in FIGS. 1 and 2, bed platform 16 is a frame having sides 48 and ends 49 disposed about a mattress support board 50. Cleats 51 and 52 or the like are used to adjustably secure lines 17, 18 and 18' to the corners of platform 16.

Referring again to FIG. 5, the support pulley assemblies 20' have the shaft 28 journaled to extend through them. Two sheaves 53 are fixed to shaft 28. Each sheave 53 contains two grooves to receive the lines 18 and 18'. A single sheave 54 on one end of shaft 28 has an endless loop of rope 55 pass over it so that pulling a run of loop 55 will retract or lower bed platform 16.

As may be seen in FIGS. 7 and 8, counterweight holder 60 has upper and lower flanges 61 and 62 between which weights 63 are slipped to balance the weight of platform 16 and any bedding thereon. Lines 18 and 18' are fixed to upper flange 61. Cover 64 has a top 65 and ends 66 to completely conceal weights 63. Counterweight 19 remains between a pair of legs 11 to take little space.

The retractable bed of my invention enjoys a number of advantages. Since the bed platform 16 is supported in the lowered sleeping position by lines 17, the only

load these lines 17 impose on member 12 is in compression. The much lighter retraction load which only includes the weight of platform 16 and bedding is taken by lines 18 and 18'. Only this lighter retraction load imposes a bending load on member 12. Thus both members 12 and the entire frame 10 may be fabricated from relatively light materials at a practical cost. Further, the frame 10 can be elongated or shortened to span any room as the members 14 and 15 telescope into the central member 13. Elaborate cross bracing for rendering the frame 10 rigid is not required as the screw jacks 43 jam and lock each leg in a fixed position between the floor and ceiling. The pads 30 and 46 prevent damage to an apartment and prevent the legs 11 from slipping. Since the retractable bed is completely selfsupporting and does not need to be bolted or otherwise fixed permanently in place, it may be easily moved and it meets with the approval of landlords.

FIGS. 9-11 show a modification of this invention. Sheaves 53' and 53'' are mounted to rotate independently on assemblies 20'. Sheave 53' has sheave 54' mounted to rotate with it, sheave 54' having an endless loop of rope 55, as shown in FIG. 5, pass about it.

Sheaves 53' and 53'' contain pairs of apertures 70. A connecting rod 71 has U-shaped forked ends 73 which enter the pairs of apertures 70. Rod 71 should be of three-sixteenth inch to one-fourth inch steel to allow it to twist.

This modification functions as follows. If users sit on a side of bed platform 16 as shown in FIG. 1, the support lines 17 on that side may stretch to lower the loaded side so that the retracting lines 18 and 18' on the low side slip over the sheave 20' on the low side. This misaligns the retracting lines 17 so one side of the platform 16 retracts higher than the other. With the above modification, connecting rod 71 twists to accommodate any unequal stretching of support lines 17 and then springs to realign the sheaves 53' and 53'' and evenly retract platform 16.

FIG. 12 shows a modification of my retractable bed in which the support lines 17' are crossed at each end of the bed platform 16. This modification prevents even gentle sideways swinging of the bed platform 16 and thus stabilizes it against any substantial motion in normal use. The crossed lines 17' tend to pull the assemblies 20 and 20' inwardly so that light compression members 80 and 81 should be inserted between the pairs of assemblies 20 and 20'.

While my invention has been shown and described in the best forms known, it will nevertheless be understood that this is purely exemplary and that modifications may be made without departing from the spirit of the invention.

I claim:

1. A retractable bed comprising, in combination, a frame having transverse members and two pairs of legs supporting the ends of said transverse members to span a room adjacent to the ceiling, a bed platform smaller than the span of said room, support lines fixed to the corners of said bed platform, pulley means at the ends of said transverse members over which said support lines run, slack take-up weights on said support lines beyond said pulley means limiting travel of said support lines over said pulley means securing said bed platform in a low sleeping position with said support lines extending

tending upward and outward from the corners of said bed platform to said pulley means at the ends of said transverse members, four retracting lines extending vertically upward to said transverse members from the corners of said bed platform and extending slidably along said transverse members to extend downward adjacent to one pair of said legs, and a counterweight fixed to said retracting lines substantially balancing the weight of said bed platform as said platform is retracted upward against the ceiling, said slack takeup weights taking up slack in said support lines as said bed platform is retracted.

2. The combination according to claim 1 wherein said transverse members each have a central member and two end members telescoping into the ends of said central member to fixed therein to span a room.

3. The combination according to claim 2 wherein said central member are the length of one dimension of said bed platform, and with the addition of central assemblies containing pulleys over which said retracting lines run, said central assemblies being fixed at the ends of said central members and wherein said legs have screw jacks at their lower ends jamming said frame between floor and ceiling.

4. The combination according to claim 1 with the addition of a shaft journaled at one end of said transverse members, said shaft having sheaves mounted thereon over which said retracting lines run and from which said counterweight hangs.

5. The combination according to claim 4 with the addition of a single sheave mounted on said shaft, and an endless loop disposed over said single sheave, pulling said loop rotating said shaft retracting and lowering said bed platform.

6. The combination according to claim 1 wherein said legs are tubular and said pulley means are at the tops of said legs, said slack take-up weights hanging from said support lines within said tubular legs.

7. The combination according to claim 1 wherein said counterweight is an elongated flat weight hanging between a pair of said legs.

8. The combination according to claim 1 with the addition of first and second sheaves independently journaled at the ends of said transverse members over which said retracting lines run and from which said counterweight hangs, and an elastically twistable shaft connecting said first and second sheaves.

9. The combination according to claim 8 wherein said first and second sheaves are between said transverse members and contain pairs of aperture, and wherein said shaft has forked ends engaging said pairs of apertures connecting said sheaves, and with the addition of a single sheave mounted to rotate with said first sheave, and an endless loop disposed over said single sheave so that pulling said loop rotates said first and second sheaves retracting and lowering said bed platform.

10. The combination according to claim 1 wherein said support lines extend from the ends of said bed platform to said pulley means; wherein said support lines cross at the ends of said bed platform; and with the addition of compression members extending between the ends of said transverse members of said frame.

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