

Oct. 21, 1958

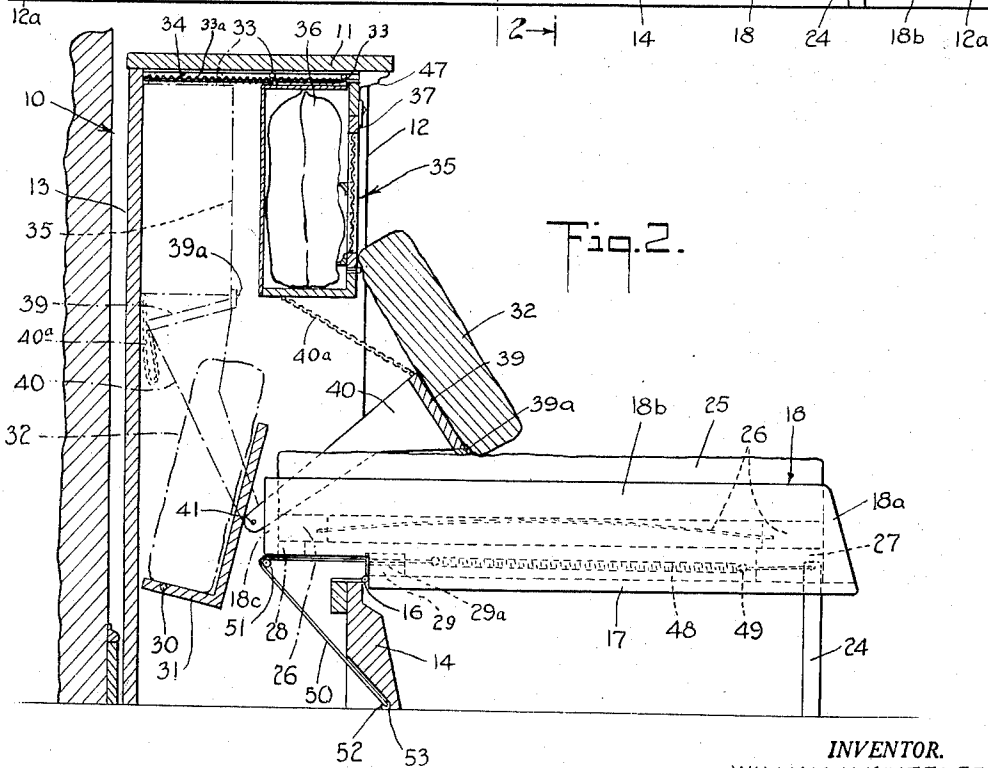
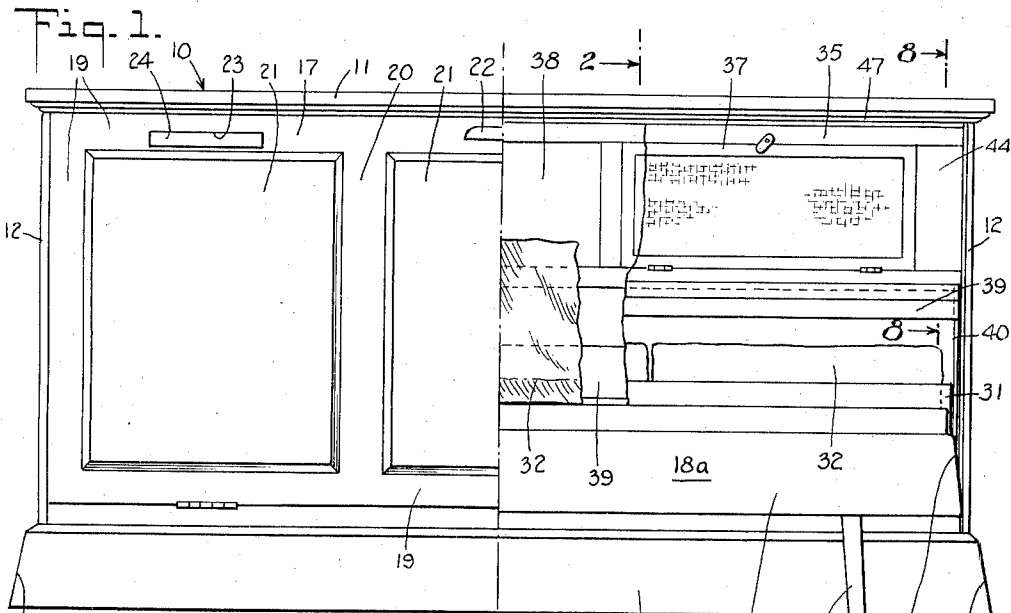
W. H. WHEELER

2,856,612

CONVERTIBLE CABINET, BED, AND SOFA

Filed Oct. 5, 1955

2 Sheets-Sheet 1



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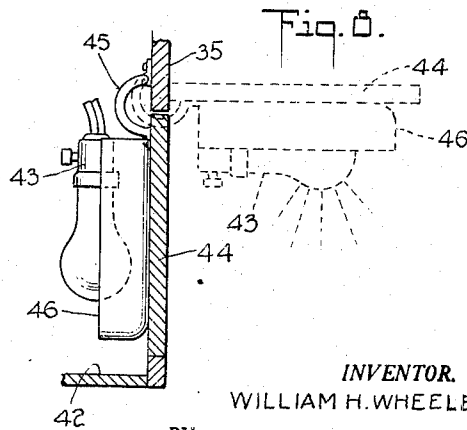
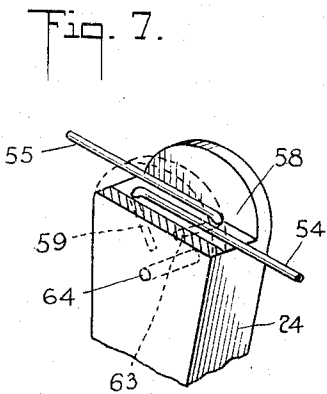
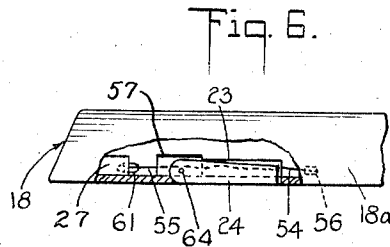
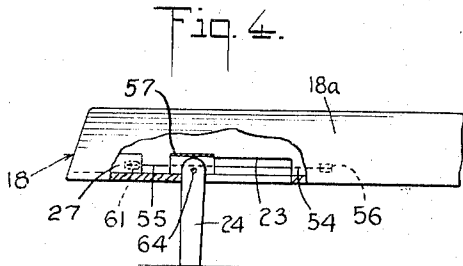
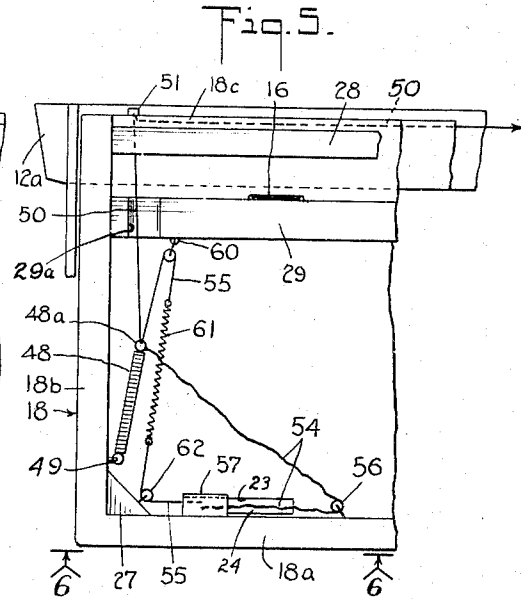
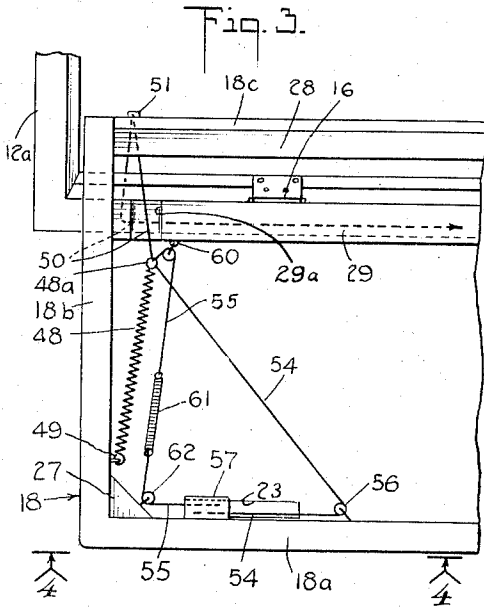
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CONVERTIBLE CABINET, BED, AND SOFA

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7 Claims. (Cl. 5—2)

This invention relates to a combination article of furniture and particularly to a convertible cabinet, bed, and sofa. More particularly, the invention relates to a combination article of furniture of the class described having novel counter-balancing means facilitating the opening of a cabinet unit to provide a bed or sofa and further facilitating the return of the bed or sofa unit to said cabinet. In further particular the invention embodies automatically operated leg members on the bed and sofa unit having actuating means operatively coupled with said counter-balancing means.

The provision of extra seating and sleeping facilities, particularly in smaller houses and apartments, as well as in dens, recreation rooms, and other rooms doubling as guest rooms, presents a considerable problem. Collapsible cots and the like for extra sleeping facilities are awkward and seldom really comfortable. As for studio couches and chairs or sofas convertible to beds, it will be evident that the floor space occupied by such units when not converted to provide a bed is quite substantial. Frequently the need for periodic seating or sleeping facilities is not sufficient to warrant the full time presence of bulky articles of furniture of this type which prevent the more beneficial utilization of limited space.

An object of the present invention is to provide a combination article of furniture which in its normal or closed position is a neat and attractive wall cabinet of practical counter height to receive lamps, pictures, flower arrangements and the like while taking up a minimum of floor space adjacent the wall and which can be quickly and easily converted to a full size single bed extending along the wall to provide extra sleeping facilities or as readily converted to a sofa providing comfortable seating facilities for three or four persons. A further object being to provide a combination article of furniture of the class described having storage facilities for all materials required in utilizing the same either as a sofa or a bed. These and other objects of the invention will be readily apparent from a consideration of the following specification taken together with the accompanying drawing which gives a detail illustration of a preferred adaptation of my invention in which the various parts of the combination unit are identified by suitable reference characters in each of the views and in which:

Fig. 1 is a front elevation view of my combination article of furniture with the view divided to show at the left the closed position thereof and at the right the opened positions thereof;

Fig. 2 is a side elevation view of the combination unit shown in Fig. 1 with part of the structure indicating a section taken substantially on the line 2—2 of Fig. 1 and showing in full lines the relative position of parts when the unit is used as a sofa and in the dotted lines the relative position of parts when the unit is used as a bed;

Fig. 3 is a plan view of one front corner of the combination unit in the open position with mattress and spring removed to reveal the counterbalancing and leg actuating mechanism;

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Fig. 4 is a partial view substantially on the line 4—4 of Fig. 3 with part of the structure broken away to show the detail of the leg assembly in open position;

Fig. 5 is a view similar to Fig. 3 showing the relative position of the parts when the bed unit is in closed or inoperative position;

Fig. 6 is a view similar to Fig. 4 but taken substantially along the line 6—6 of Fig. 5 and showing the leg mechanism in closed position;

Fig. 7 is an enlarged perspective view of the upper end of a leg as seen in Figs. 4 and 6 with part of the structure broken away to indicate details of the control cable anchorage; and

Fig. 8 is a partial sectional view taken substantially on the line 8—8 of Fig. 1 showing details of a disappearing lamp unit, the same being shown in full lines in the retracted or inoperative position and in dotted lines in the extended or operative position.

As shown in Figs. 1 and 2 of the drawing, the combination article of furniture in accordance with my invention comprises an elongated cabinet 10 having a top wall or counter 11, end walls 12, a rear wall 13 and a low front wall part 14 which as shown in Fig. 2 of the drawing is a built-up construction protruding forwardly of the side walls 12. The forward protrusion of the front wall part 14 provides stability in the cabinet as will be more fully hereinafter described, as well as having an ornamental effect in the cabinet unit; and in keeping with the forward protrusion of the part 14, the base 12a of the side walls also protrudes slightly outwardly as seen in Fig. 1. Pivotaly coupled to the upper edge of the lower front wall part 14 by means of hinges 16 is a movable front wall part 17 providing a front closure for the cabinet as seen at the left-hand side of Fig. 1 and which carries the movable bed and sofa unit 18 as shown at the right-hand side of Fig. 1.

The movable front wall portion 17 presents at the outer surface thereof peripheral frame parts 19 and intermediate cross-frame parts 20 forming a plurality of panels 21 which can be suitably ornamented and if desired, can be made removable and interchangeable to provide different decorative effects. Centrally of the upper frame part 19 is a handle 22 to facilitate grasping the front wall part 17 in lowering and raising the bed unit 18. Also in the upper frame part 19 are cutouts 23 receiving, flush with the surface of the frame part 19, legs 24 which are automatically extended in the manner hereinafter described to the position shown in Fig. 2 and at the right of Fig. 1 for supporting and aligning the bed unit 18 in its lower or open position.

The bed unit 18 receives a mattress 25 recessed between the front wall 18a, end walls 18b, and rear wall 18c of the bed unit. The mattress 25 is supported on a spring unit 26 which rests on front corner braces 27 and a longitudinal rear brace 28. It will be noted that the side walls 18b protrude inwardly of the cabinet beyond the pivoted edge of the front panel 17 and a longitudinal stiffening member 29 is provided along the hinged or mounting edge of the front panel 17 as will be noted in Fig. 2 of the drawing.

Arranged within the cabinet 10 and pivoted to the side walls 12 at a point 30 slightly below the hinge 16 is a bin 31 which extends substantially the length of the mattress 25 and is adapted to receive sofa cushions 32. Above the bin 31 and secured to the top wall 11 of the cabinet by rollers 33 moving in tracks 34 is a multiple cabinet unit 35 which can be moved from a rear position shown in dotted lines in Fig. 2 and at the extreme right in Fig. 1 to a forward position as shown in full lines in Fig. 2 and centrally in Fig. 1 of the drawing. The multiple cabinet unit 35 provides compartments 36 controlled by doors 37 to receive pillows and bedding or the like

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and a central compartment 38 as seen in Fig. 1 which may be an open shelf to receive radio, clock and other items of the kind. The inner cabinet unit 35 is in the inner position shown in dotted lines in Fig. 2 of the drawing when the cabinet is closed and when the bed unit 18 is extended for sleeping purposes, and is moved to the forward position shown in full lines in Fig. 2 when the bed unit is converted to a sofa for seating purposes.

In making the latter conversion a back-rest 39 carried by end members 40 arranged outwardly of the bin 31 and pivoted to the side walls 12 at a point 41 forwardly of the inner cabinet unit 35, is swung from its rear position shown in dotted lines in Fig. 2 to its forward or operative position as shown in full lines in Fig. 2. An offset portion 39a on the back-rest serves the dual purpose of providing support for the inner cabinet unit 35 holding the same in its rear position and providing a bearing surface against the mattress 25 when the back-rest 39 is extended to its operative position. The end members 40 are of a length to carry the back-rest 39 forwardly on the mattress 25, and the back-rest 39 is so inclined that the cushions 32 and the exposed portion of the mattress 25 provide the dimensions and contour desired in a normal sofa. Thus when the combination unit is set up as a sofa, it provides comfortable seating for three or even four people.

The inner cabinet unit 35 is normally held inwardly by light springs 33a extending from the forward rollers 33 to a rear wall 13, and is rolled forwardly and supported in its forward position by means of chains 40a joining ends of the back-rest 39 with inner lower edges of the cabinet unit 35. Thus when in use as a sofa the compartments 36 and 38 are disposed directly behind the upper edge of the cushions 32 and readily accessible for use.

The movable cabinet unit 35 is also provided at the ends thereof with small separate compartments 42 (note Fig. 8 of the drawing) which house disappearing lamps 43 mounted on panel members 44 which are pivoted at the upper edges thereof preferably by means of concealed throw-hinges 45. The mountings for the lamps 43 suitably include shade elements 46 serving to prevent objectionable upward rays from the lamps. It will be evident that when swung upwardly to the position shown in dotted lines in Fig. 8 of the drawing, the lamps 43 will provide effective light for either reading or general illumination when the combination unit is used either as a sofa or as a bed. In other words, the lamps 43 can be extended and operated when the movable cabinet unit 35 is in the forward position or in the rear position. In either instance, the lamps are so positioned that they can be effectively used and easily operated when the unit is set up either in the form of a bed for sleeping facilities, or as a sofa.

It will be noted that the front wall 18a and side walls 18b of the bed unit are tapered inwardly to provide a relatively narrow peripheral edge adjacent the mattress 25. The forward inner edges of the side wall 12 as well as the moulding strip 47 along the forward edge of the top wall are similarly tapered to provide a close peripheral engagement when the bed unit 18 is raised to the vertical or inoperative position. When thus raised, the mattress 25 is supported against sagging by engagement with the inner cabinet unit 35 and with the bin 31 which has been pivoted to a position of alignment with the dotted line position of the cabinet 35.

While there is substantial weight to the bed unit 18 and the spring and mattress which move therewith, I am able by counter-balancing means to offset this weight to such extent that even a small child can raise and lower the bed unit. This counter-balancing means arranged at both ends of the bed unit 18, together with the leg actuating means associated therewith is clearly illustrated in Figs. 3 to 6 of the drawing as embodying a heavy coil-spring 48 secured by a bracket 49 to the inner surface

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of the end wall 18b in alignment with the corner bracket 27 (note Fig. 1 of the drawing) and secured at its other end 48a to a cable 50 which extends through cut-out recess 29a in the stiffening member 29, around a pulley bracket 51 at the lower edge of rear wall 18c and then downwardly and forwardly to a point 52 adjacent the forward edge of front wall part 14. The cable 50 may be anchored by means of a suitable bracket at the point 52, but is preferably continued through a groove or recess 53 transversely of the unit to be coupled with the spring 48 at the opposite end of the bed unit 18. In this way the tension in the springs 48 at opposite ends of the bed unit is automatically equalized.

The end 48a of the spring 48 which carries the cable 50 is also secured to leg operating cables 54 and 55. Cable 54 passes around a pulley bracket 56 secured to the front wall 18a of the bed unit and then to the upper end of leg 24 which is pivotally mounted between front wall 18a and an angle-iron bracket 57 secured thereto. As shown in Fig. 7 of the drawing, the cable 54 is disposed in a groove 58 in the upper end of the leg 24 and has its end anchored in a recess 59 extending into the leg 24 at an acute angle with respect to the cable 54. The cable 55 extends around pulley bracket 60 secured to the longitudinal brace 29 and then with intermediate small coil-spring 61 passes around pulley bracket 62 on the corner brace 27 and has its end anchored in recess 63 extending into the leg 24 at an acute angle opposed to that of the recess 59. It will be noted that the recesses 59 and 63 in each instance carry the respective cables 54 and 55 beyond the pivotal axis 64 of the leg, thereby providing leverage for the controlled movement of the leg as hereinafter described.

The operation of the counter-balancing means and leg actuating means is readily apparent from a comparison of Figs. 3 and 4 of the drawing with Figs. 5 and 6. When the bed unit 18 is lowered, its weight is largely offset by extension of the spring 48 and as the end 48a moves, it causes a simultaneous shortening of the cable 55 and tensioning of the cable 54, the latter pulling the leg 24 to the extended position. When the bed unit 18 is elevated to the closed or inoperative position as shown in Figs. 5 and 6, the spring 48 contracts and as the end 48a thereof moves, it releases the tension in cable 54 and increases the tension in cable 55 substantially extending spring 61. This increased tension in cable 55 and the action of spring 61 pulls the leg 24 into the retracted or inoperative position as shown in Fig. 6 of the drawing. It will thus be apparent that the leg operation is fully automatic and coincidental to the opening and closing movements of the bed unit and further, that both in the open and closed positions the leg 24 is firmly supported against inadvertent displacement.

While the particular size and strength of springs 48 and 61 are dependent upon the particular construction materials employed and the resulting weight of the complete bed unit 18, I have employed as the spring 48 a $\frac{3}{8}$ " spring having approximately 80 pound tension when stretched from 10 inches to 17 inches in length and as the spring 61 a $\frac{1}{2}$ " spring having approximately 10 pounds tension when stretched from 6 to 10 inches.

A full scale model of my convertible cabinet, bed, and sofa has fully demonstrated its practicability in the various intended uses thereof. The closed cabinet provides a well proportioned piece of furniture that can readily be made to blend with various types of furniture, including the most modern types. The opening of the cabinet to provide a bed can be effected easily in the matter of seconds. If seating facilities are desired rather than sleeping facilities, the cushions 32 are removed from bin 31, the back-rest 39 is pulled forward carrying with it the movable inner cabinet 35 and the cushions 32 are placed against the back-rest 39. These operations can be performed in less time than it takes to read these sentences describing the steps. When thus set up as a

sofa, the unit has a neat appearance which can blend well with many types of furnishings, and is properly proportioned for comfortable seating, i. e. the depth from the front edge of mattress 25 to the front of cushions 32 is approximately 21 inches. It is important also to note that the conversion of the unit to either bed or sofa can be effected without disturbing in any way articles which may be arranged on the upper surface of the top wall or counter 11, or in the open inner compartment 38.

When using the unit essentially as a convertible bed it is to be noted that the construction is such that the bed can be stored away without particular concern for the arrangement of bedding thereon. The taper or bevel in the wall 18a and 18b provide ample clearance between the mattress 25 and the periphery of the front opening in cabinet 11 so that blankets and the like protruding beyond the mattress will not interfere with raising or closing of the bed unit. Furthermore the bevel in walls 18a and 18b and corresponding bevel at the outer edges of side walls 12 and in top strip 47 prevent the possibility of jamming if a blanket or the like should become caught therebetween.

The unit is exceedingly sturdy and stable in the pivotal movement of the bed unit. A contributory factor in this stability is the forward protrusion of the lower front wall part 14. Not only does the front wall or base part 14 engage the floor substantially forwardly of the hinges 16, but it will be noted that the cable anchorage point 52 (or cable groove 53) is also forwardly of said hinges. The lower front wall part 14 through hinges 16 acts as a rear leg for the bed unit. The relative position of the hinges rearwardly of the floor engaging front portion of the wall or base 14 provides that the added load of persons sitting or reclining on the bed unit is carried internally of the cabinet periphery as it engages the floor, thus making the cabinet more resistant to possible tipping as greater load is applied to the bed or sofa.

Various changes and modifications in the combination article of furniture herein disclosed may occur to those skilled in the art and to the extent that such changes and modifications are embraced by the appended claims, it is to be understood that they constitute part of my invention.

I claim:

1. A combination wall cabinet, bed and sofa device comprising an elongated and relatively low wall cabinet having end and top walls extending the full depth of said cabinet and having a pivotally mounted front wall part carrying a mattress unit telescopically interfitting within said end and top walls, said mattress unit when in the vertical position occupying approximately the forward half of said cabinet as viewed in vertical cross section and when in horizontal position disposing the mattress thereof at a sofa seating level and protruding substantially in front of and partially within said cabinet, the rear half of said cabinet having upper and lower storage compartments bearing against said mattress and supporting the same when in vertical position, said lower compartment comprising an elongated tiltable bin receiving sofa cushions, said upper compartment providing concealed storage for pillow and bedding, and being movable from its normal rearward position to a position in substantial alignment with the forward edges of said end walls, an elongated sofa cushion aligning member pivotally secured to said end walls and extending transversely of said cabinet to be movable from a stored position between said upper and lower compartments to a cushion supporting position intermediate the inner and outer edges of the mattress when extended, means coupling said member with said upper compartment to move the same into and support the same in the forward position in the forward movement of said cushion aligning member, and said cushion aligning member and upper compartment when in the forward position engaging

lower and upper portions respectively of said sofa cushions to support the same at a distance from the forward edge of said mattress and at an inclination with respect thereto to provide seating comfort comparable to that of a sofa per se.

2. A combination wall cabinet, bed and sofa device as defined in claim 1, wherein the front wall of said cabinet has in upper forward portions thereof extending along and closely spaced from the upper edge thereof, pivoted members disposed in substantial alignment with said front wall when the same is in vertical position and protruding substantially perpendicularly therefrom to provide supporting legs for said bed unit when in the extended position.

3. In a convertible article of furniture of the class described embodying a relatively low cabinet part having a front wall closure carrying a bed unit pivotally mounted in said cabinet part for movement between a vertical stored position and a horizontal sleeping and sitting position, said bed unit supporting a mattress spaced from the inner surface of said front wall closure, the improvements that comprise counter-balancing means for said bed unit substantially disposed between the mattress and said front wall closure, said counterbalancing means embodying resilient means secured at the forward swinging portion of said bed unit and having free ends providing at opposed ends of said bed unit yieldable displacement toward the rear edge of said bed unit, cables secured to the free ends of said resilient means and passing around pulley brackets at the rear edge of said bed unit and to anchorage points at the bottom forward portion of said cabinet.

4. In a convertible article of furniture of the class described embodying a relatively low cabinet part having a front wall closure carrying a bed unit pivotally mounted in said cabinet part for movement between a vertical stored position and a horizontal sleeping and sitting position, said bed unit supporting a mattress spaced from the inner surface of said front wall closure, the improvements that comprise counter-balancing means for said bed unit substantially disposed between the mattress and said front wall closure, said counterbalancing means embodying resilient means secured at the forward swinging portion of said bed unit and having free ends providing at opposed ends of said bed unit yieldable displacement toward the rear edge of said bed unit, cables secured to the free ends of said resilient means and passing around pulley brackets at the rear edge of said bed unit and to anchorage points at the bottom forward portion of said cabinet, and said cables being joined transversely of the cabinet part between said last named points to thereby equalize tensions in said resilient means at opposed ends of said bed unit.

5. In a convertible article of furniture of the class described embodying a relatively low cabinet part a front wall closure carrying a bed unit pivotally mounted in said cabinet part for movement between a vertical stored position and a horizontal sleeping and sitting position, said bed unit supporting a mattress spaced from the inner surface of said front wall closure, the improvements that comprise counter-balancing means for said bed unit substantially disposed between the mattress and said front wall closure, said counterbalancing means embodying resilient means secured at the forward swinging portion of said bed unit and having free ends providing at opposed ends of said bed unit yieldable displacement toward the rear edge of said bed unit, cables secured to the free ends of said resilient means and passing around pulley brackets at the rear edge of said bed unit and to anchorage points at the bottom forward portion of said cabinet, said resilient means being extended when the bed unit is in horizontal position and contracted when the bed unit is in vertical position, and cables secured to the free ends of said resilient means and passing around spaced pulleys within said bed unit for automatically controlling the extending and retracting movements of pivoted leg

members as the bed unit is respectively lowered and raised, the cables providing for retracting movement of said legs including yieldable means providing substantial elongation thereof.

6. In a convertible article of furniture of the class described embodying a relatively low cabinet part having a front wall closure carrying a bed unit pivotally mounted in said cabinet part for movement between a vertical stored position and a horizontal sleeping and sitting position, said bed unit supporting a mattress spaced from the inner surface of said front wall closure, the improvements that comprise counter-balancing means for said bed unit substantially disposed between the mattress and said front wall closure, said counterbalancing means embodying resilient means secured at the forward swinging portion of said bed unit and having free ends providing at opposed ends of said bed unit yieldable displacement toward the rear edge of said bed unit, cables secured to the free ends of said resilient means and passing around pulley brackets at the rear edge of said bed unit and to anchorage points at the bottom forward portion of said cabinet, said resilient means being extended when the bed unit is in horizontal position and contracted when the bed unit is in vertical position, cables secured to the free ends of said resilient means and passing around spaced pulleys within said bed unit for substantially controlling the extending and retracting movements of pivoted leg members as the bed unit is respectively lowered and raised, the cables providing for retracting movement of

said legs including yieldable means providing substantial elongation thereof, and said leg actuating cables being secured to said legs at points substantially spaced from the pivoted mounting thereof providing substantial leverage in the extending and retracting movements of said legs.

7. In a convertible cabinet, bed, and sofa device wherein the cabinet part has an upper storage compartment movable from a rearward position in the bed orientation of said device to a forward, sofa-cushion engaging position in the sofa orientation of said device, the improvement that comprises concealed lamp units at end portions of said movable compartment providing an effective source of light for reading in the bed orientation of said device, and said lamps providing an equally effective source of light for reading in the sofa orientation of said device by reason of the forward movement of said upper storage compartment.

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