Fig. 2

Fig. 3

Fig. 4

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EXTENSIBLE AND COLLAPSIBLE BED RETRACTABLE WITHIN A SOFA OR CHAIR, OTTOMAN-BED, CHEST OF DRAWERS

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Filed Nov. 12, 1958, Ser. No. 773,390
2 Claims. (Cl. 5—17)

This invention relates to an extensible and collapsible bed retractable within a sofa or chair, ottoman-bed, chest of drawers, which may be manually or electrically operated.

Thus an advantage of this invention is that the usual amount of springs, levers and cams are actually eliminated herein.

A further advantage is that no lifting or turning, commonly necessary with the kind of beds now used, is required with this invention, which may be operated with the strength of a child.

Further advantages will be obvious, as the description of this invention proceeds.

With the above and other objects in view, this invention consists of the novel features of construction, combination and arrangement of parts, hereinafter fully described, claimed and illustrated in the accompanying drawings, forming a part of this specification, and in which similar characters of reference indicate corresponding parts in all views, and in which:

FIGURE 1 is a perspective view of a sofa and extensible and collapsible bed.

FIGURE 2 is a side elevation of same, with parts broken off, and showing the linked sections constituting the sofa base.

FIGURE 3 is a top plan view of FIGURE 2.

FIGURE 4 is a top plan view of FIGURE 2.

FIGURE 5 is a side view, with parts broken off, and showing the linked sections with a collapsible leg and siège.

FIGURE 6 is another side view, with parts broken off, and showing a collapsible leg retracted into the frame of the bed.

FIGURE 7 is a side view of the bed contracted, with the mattress attached; while

FIGURE 8 is a sectional view taken on the line 8—8 of FIGURE 7.

Referring more particularly to the drawings, the numeral 10 indicates a sofa frame having side pieces 12 and a back rest 14; four beams 16, 17, 18 and 19 are permanently attached to the side pieces; U-shaped channels 20 and 21 are also permanently attached to each side of the latter; stabilizing bars 23 and 25 connect to the beams 16 and 17. Linked hinge sections 22 are provided with rollers 24 which travel in said U-shaped channels 20 and 21.

The linked hinge sections 22 are of a length coinciding with the radius of said U-shaped channels 20 and 21.

The corresponding linked sections are on each side of the sofa connected by U-shaped channels 28, and said linked sections are connected to each other by hinges 30, which comprise interchangeable knuckles 31, secured pivotally by means of pins 26 on which the rollers 24 are mounted.

Each linked hinge section 22 is provided with an upright plate 32 upon the upperside thereof, the plate being of a suitable height and are of the same length as the hinged sections 22. Respective end portions of the plates 32 are provided with right angularly directed extensions 33 (see FIGURES 2 and 4), the extensions 33 of the hinge sections 22 upon one side of the frame being in opposed relation to extensions 33 of each section at the opposite side of the frame and when the linked sections are in extended operative position, the upright extensions 33 will be in close abutting relation.

From the above construction, it will be seen that when the linked sections are moved to open or operative position, those sections which have been moved out of support engagement with the channel members 20 and 21, will be adequately supported against any possibility of sagging and thus provide a firm and smooth surface for support of a mattress presently to be described.

A frame 34 consists of the upper part sections two permanently attached legs 38 and two collapsible legs 42 and 44 pivoted on brackets 46 are also connected to the frame 34.

Links 45 pivoted to legs 42 and 44 and the frame 34 serve to provide stabilization when the collapsible legs are down.

A roller 48 and a pin 50 are arranged on the inside of each of the collapsible legs 42 and 44.

A rod 52 is fastened to beams 16 and 17 on each side of the frame 10, said bars are provided with a cam 54 each at their outer ends adapted to connect with rollers 48 in bringing the legs 42 and 44 into horizontal position under the frame 34, when said bed is retracted under the sofa or chair, as shown in FIGURE 6.

A rod 56, one within each side of the frame, is provided with a slot 58; said rod rides on a pin 60 and is formed with an upwardly extending bent 62 adapted to limit the withdrawal of the frame 34; the pin 50 secured to the leg 42 has for its purpose to push the rod inwardly, when the bed is to be collapsed.

A motor (with a reduction gear not shown) drives a spur gear 66 which engages rack sections 68 fastened individually to the channels 28 of the link sections 22.

The purpose of the sectional links is to enable the latter to travel along the curves of the U-shaped channels 20 and 21.

A solid rack 70 is attached to a continuation of the rack sections 68 and to the frame 34.

A foot board 72 is hinged to the frame 34, as shown at 74 and 76. At the lower part of the board 72 is a lever 78 to which a spring 80 is permanently attached to keep said foot board extending downwardly, when the bed is in a collapsed position.

A cable 82 is attached to a pulley 84 on the shaft of the motor; the length of said cable is such that when the bed is pulled out, the lever 78 is pulled forwardly and thus brings the foot board into an upright position.

A mattress made of sponge rubber, or other suitable material, is fastened to the beams or cross bars 28, and is partly slotted at as 62, where the linked hinge sections join, in order to allow the said mattress to bend around the tracks 20 and 21 in opening and closing the bed. In order that the mattress be held in proper registry with the linked hinge sections, the side portions of the mattress snugly abut the upright extensions 32 (see FIGURE 8).

To open the sofa bed, a reversible motor with a gear reduction is activated by push button control so that by rotating the motor the gear 66 will engage the rack sections 68 and the solid rack 70; by this movement the cross bars 28 with the linked hinge sections attached to these will move in an outward direction, rolling the sections 22 over the tracks 20 and 21.

The solid frame 34 serving as a seat, when the bed is converted into a sofa or chair, will in moving forward release the legs from a horizontal position resting on a bar 52, into a vertical position for support of said frame.

The reverse action is accomplished by means of a cam 54 located on the outer end of the bar 52 and the rollers 48 on the legs 42 and 44.
By manual operation of the invention the bed is just pulled out.

It is obvious that changes may be made in the form, construction and arrangement of the several parts, as shown, within the scope of the appended claims, without departing from the spirit of the invention, and I do not, therefore, wish to limit myself to the exact construction shown and described herein.

The invention claimed is:

1. An extensible and retractable bed in combination with a sofa frame comprising a pair of U-shaped Channel members mounted upon the inner walls of the side pieces of the sofa frame, the bight portion of the U-shaped channel members being positioned inwardly of the rear wall of the sofa frame, and presenting respective vertically spaced forwardly extended trackways of a length terminating inwardly of the side frames of said sofa frame and being secured thereto; a mattress supporting frame consisting of a plurality of transverse channel shaped bars, each of said bars having a rack section secured to the underside thereof and of a length to extend from opposite sides thereof, the ends of adjacent rack sections being in close spaced relation, a transverse link member fixed to respective ends of said channel shaped bars, each link member having knuckles interengageable with knuckles of the next adjacent link member, a pin for interlocking said knuckles, each pin having a roller adapted to traverse said U-shaped channel members and gear means operatively connected to said rack sections for advancing and retracting said mattress supporting frame.

2. An extensible and retractable bed in combination with a sofa frame comprising a pair of U-shaped channel members mounted upon the inner walls of the side pieces of the sofa frame, the bight portion of the U-shaped channel members being positioned inwardly of the rear wall of the sofa frame, and presenting respective vertically spaced forwardly extended trackways of a length terminating inwardly of the side frames of said sofa frame and being secured thereto; a mattress supporting frame consisting of a plurality of transverse channel shaped bars, each of said bars having a rack section secured to the underside thereof and of a length to extend from opposite sides thereof, the ends of adjacent rack sections being in close spaced relation, a transverse link member fixed to respective ends of said channel shaped bars, each link member having knuckles interengageable with knuckles of the next adjacent link member, a pin for interlocking said knuckles, each pin having a roller adapted to traverse said U-shaped channel members, each of said link members having an upright plate upon the upper side thereof and of a length corresponding to the length of the link member, each link member further having right angular extensions, said extensions being in close abutting relation when the mattress frame is in extended position, and gear means operatively connected to said rack sections for advancing and retracting said mattress supporting frame.

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