July 19, 1927. 1,636,532

G. G. POWERS

FOLDING BED STRUCTURE

Filed July 9, 1924 2 Sheets-Sheet 1

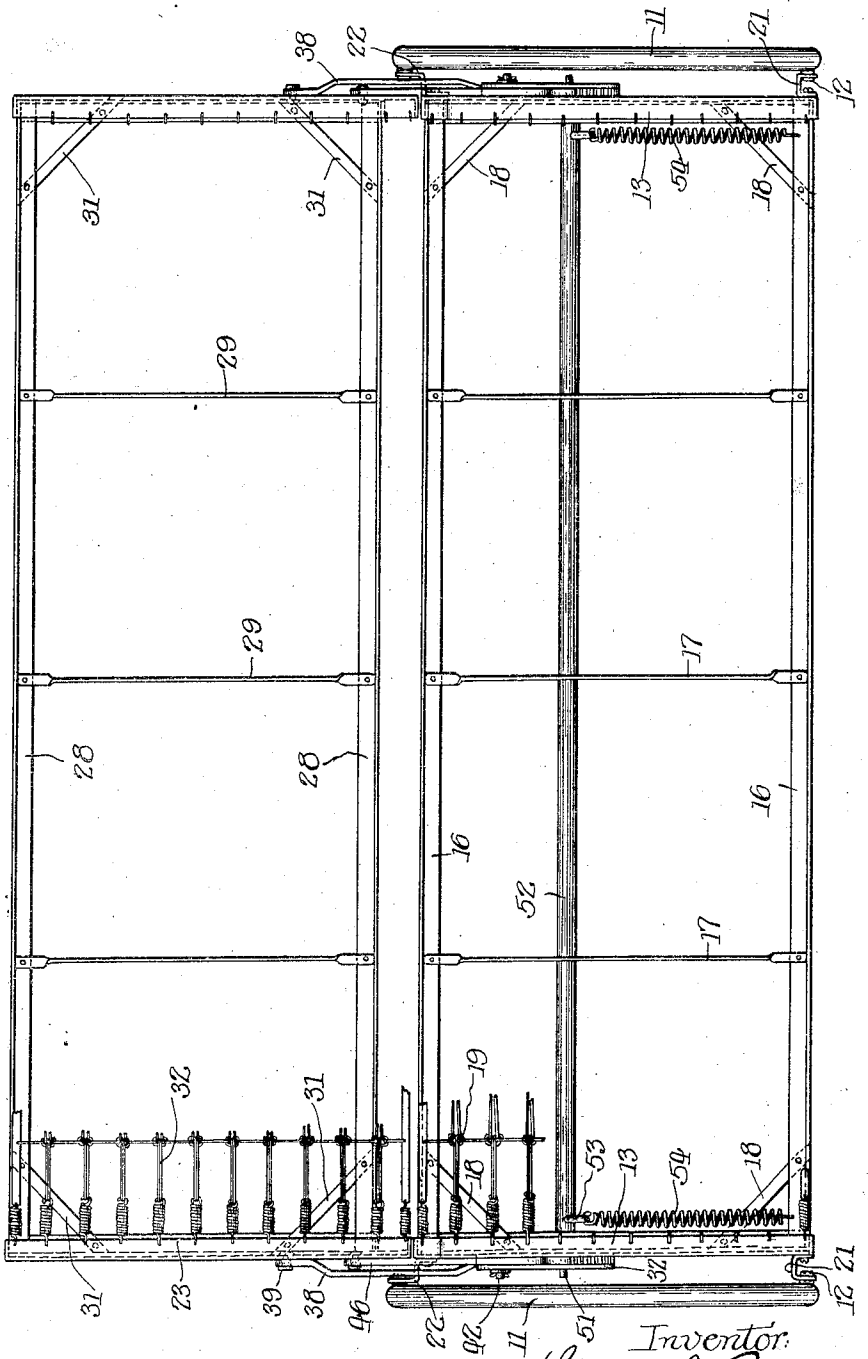


Fig. 1.

Inventor:
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Fig. 2.

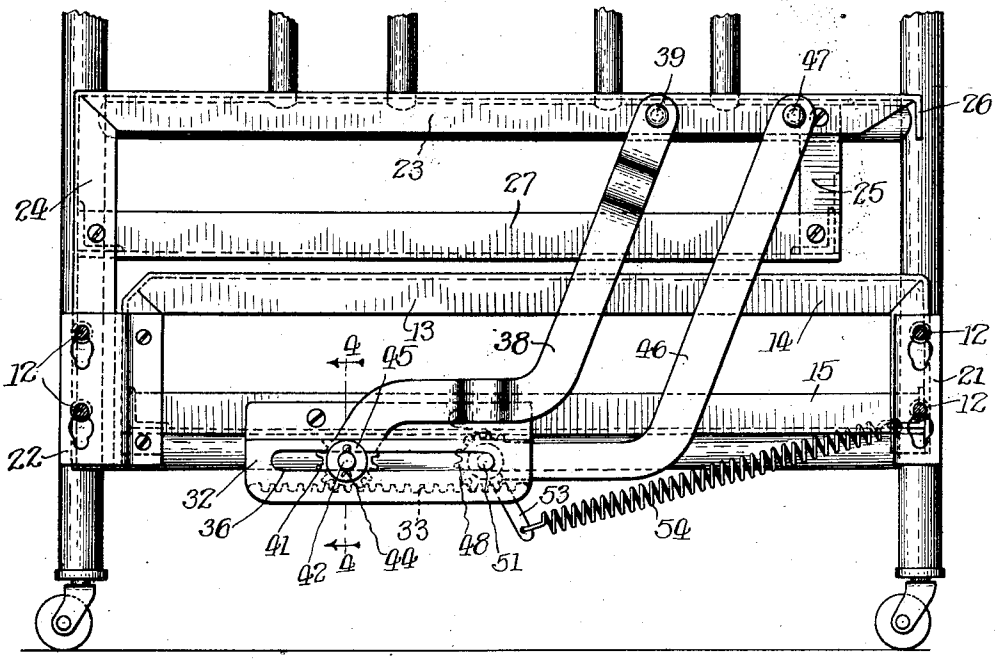


Fig. 4.

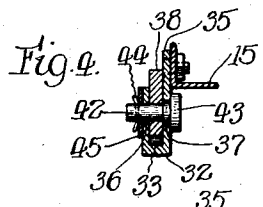


Fig. 5.

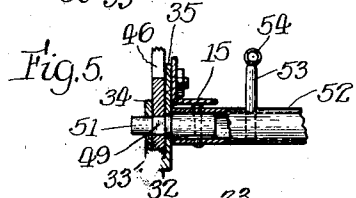


Fig. 3.

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Patented July 19, 1927. 1,636,532

UNITED STATES PATENT OFFICE.

GEORGE G. POWERS, OF CHICAGO, ILLINOIS, ASSIGNOR TO UNION BED & SPRING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

FOLDING BED STRUCTURE.

Application filed July 9, 1924. Serial No. 724,937.

My invention relates to folding or collapsible bed structures in general, but pertains more particularly or especially to what are known in the trade as day beds which, when folded or compacted, resemble couches or sofas, and when unfolded, form complete beds each with two mattress supporting sections in the same plane, which sections in the folded condition of the appliance are positioned one above the other.

One object of this invention is to provide a bed structure of this type which is simple in construction, which comprises but few parts, which may be manufactured at relatively small cost, which is easily operated, the parts of which are strongly and adequately supported, and which is unlikely to become damaged or injured in service.

To permit those skilled in this art to have a full and complete understanding of this invention and its various advantages both structural and functional, in the accompanying drawings forming a part of this specification and throughout the several views of which like reference characters refer to the same parts, I have illustrated one desirable and preferred embodiment of the invention but it is to be understood that many minor mechanical changes may be incorporated in the depicted structure without departure from the heart and essence of the invention as defined by the appended claims.

In these drawings:

Figure 1 is a fragmentary plan view of the bed structure in unfolded or open position;

Figure 2 is a partial elevation on an enlarged scale of the bed structure with one of the end pieces removed or the view may be considered as a vertical section just inside one of the end pieces of the structure;

Figure 3 is a similar view on a smaller scale illustrating the appliance in open position and may be considered as a vertical section adjacent to one of the end pieces as the structure is shown in Figure 1;

Figure 4 is a vertical section on line 4—4 of Figure 2; and

Figure 5 is a vertical section on line 5—5 of Figure 3.

The improved and novel folding bed structure comprises two ends 11, 11 of suitable pleasing shape or design and conveniently formed of associated or united tubular elements as is customary.

Each such end piece on its inner side has four, headed studs 12, 12 by means of which the remainder of the bed structure is detachably or demountably secured thereto.

The bed proper includes a main-frame comprising a pair of rectangular end frame pieces, characterized as a whole 13, 13, each formed of a bent, inverted, U-shaped angle-bar 14, the vertical legs of which are connected together by a horizontal angle-bar 15.

The corresponding legs of such bent bars 14 of the two complementary end frames 13, 13 are fastened together by longitudinally-disposed angle-bars or rails 16, 16 cross-connected together at intervals by twisted straps 17, 17, and also joined to the corresponding end-frame bars 15 by diagonal or oblique braces 18, 18.

An appropriate or desirable metal bed-bottom fabric 19, shown very fragmentarily in Figure 1, is mounted on the horizontal parts of the angle-bars 14, 14 as is usual in constructions of this general character.

At its rear, this general frame at its opposite ends is equipped with slotted, channel-shaped brackets 21, 21 adapted to accommodate and be supported by the corresponding studs or pins 12, 12 of the two end pieces, and, also at the front portions of its two ends, it is supplied with slotted Z-shaped brackets or supporting plates 22, 22 similarly designed to receive and be supported by the complementary studs 12, 12.

The supplemental, bed-spring frame is of similar construction and includes two end frames, each comprising a top, horizontal angle-bar 23 bent down at its front end to provide a supporting leg 24, a short, upright angle-bar 25 connected at its upper end to the horizontal bar 23 at a point somewhat in advance of its rear end, the vertical flange of the latter being cut away and the other flange bent down at 26 to provide a suitable smooth finish, and a lower, horizontal angle-bar 27 fastened at its opposite ends to the leg and to the bar 25.

As in the other similar instance, lengthwise rails or bars 28, 28 connect together the two end frames and they are cross-united together by bar or strap members 29, 29 and are also equipped with oblique braces 31, 31 at the corners of the structure, a suitable bed bottom fabric 32 being secured at its ends to the top bars in the customary manner.

Each end bar 15 has a channel-shaped member 32 fastened against its outer face, such member having a horizontal rack 33 between its two parallel flanges 34 and 35 which are provided above the rack with registering horizontal slots 36 and 37.

As is clearly shown, the inner flange 35 of such rack supporting member is wider or deeper than its companion outer flange 34 thus affording appropriate means for securing such member in position on the frame.

The secondary or supplemental bedspring frame at each end is mounted on a parallel-motion mechanism whereby such frame may be easily shifted from inoperative to operative position and vice versa.

At each end of the structure, this mechanism includes a suitably-bent bar or link 38, of the shape and form depicted in Figure 2, which has its upper end pivoted or hinged to the auxiliary frame bar 23 at the point 39, whereas its lower end, which is formed as a partial or mutilated gear 41 whose teeth are in mesh with those of the corresponding stationary rack, is apertured to receive a short shaft 42 extended through the two slots 36 and 37 and adapted to move bodily therein lengthwise such slots.

To keep such shaft in proper position, one end of it has a head 43 and the other end is apertured to receive a retaining cotter-pin 44 between which and the outer flange 34 a collar or washer 45 is desirably interposed.

Each parallel-motion mechanism includes in addition a second, bent link 46 hinged to the bar 23 at the point 47 and provided at its lower end with a partial gear 48 also in mesh with the corresponding rack 33.

The gear end of such link is mounted on an angular part 49 of a stud shaft 51 accommodated in the aligned slots of the rack supporting member and pinned in the end of a long, tubular shaft 52 common to the pair of corresponding links.

Near each end-frame such hollow shaft has a radial arm 53 connected by a coil counterbalancing spring 54 to the rear rail or bar 16, the springs and arms being so arranged that they assist in lifting the supplemental bedframe and yieldingly oppose its descent into either operative or inoperative position.

In its folded condition, the parts of the bed occupy the positions indicated fully in Figure 2 with the auxiliary or movable bedspring section above the lower, main, bedspring part.

During the opening or unfolding movement of the bed parts into their operative positions as indicated in Figures 1 and 3, the lower pivots of the links automatically travel forwardly by reason of the coaction of their gears or pinions with the racks, whereby a desirable and improved movement of the parts occurs, the links at all times being in suitable and appropriate position for effectively supporting the forwardly and upwardly and downwardly moving bed section.

The two springs by their contraction assist in elevating the upper bed section and desirably oppose its subsequent descent into operative relation with the main bed section, the two unitedly or conjointly forming a full-size bed.

When the movable bed section is in lowered operative position as shown in Figure 3, its legs 24, 24 rest on the floor and support its front part, whereas the two bent links 38, 38 bear on the tops of the brackets 22, 22 which assist in sustaining them, the rear portion of the movable bed section being supported at all times by the pairs of links 38, 46.

When it is desired to fold the bed, its front section is raised and moved rearwardly as occasioned by its peculiar mounting and such folding of the bed structure is aided and assisted first by the contraction of the springs and then by their subsequent expansion, so that they help the lifting of the parts and counterbalance or oppose their lowering.

During the unfolding or opening of the bed the pivot shafts 42 and 51 move forwardly on their racks and during the folding or closing of the bed they move rearwardly on such racks, which actions are positive by reason of the intermeshing of the teeth of the gears and racks.

This assures a desirable and correct positioning of the bed-section supporting links under all conditions and gives the front bed section advantageous forward and rearward movements which it would not otherwise possess.

The invention is not limited and restricted to the precise and exact details of construction illustrated and described and these may be modified within comparatively wide limits and still incorporate the fundamental principles of the invention.

I claim:

1. In a folding-bed construction of the character described, the combination of a stationary bed-section, a movable bed-section in its inoperative position above and in its operative position in front of and in the plane of said stationary bed-section, legs at the front of the movable bed-section adapted to rest on the floor in the open condition of the bed, a supporting link at each end of the structure each pivoted at its upper end to the movable bed-section, a pivotal mounting for the lower end of each such link, and rack and gear means to effect forward and rearward travel of said lower pivotal mountings during the opening and closing movements of the movable bed-section.

2. In a folding-bed construction of the character described, the combination of a

stationary bed-section, a movable bed-section in its inoperative position above and in its operative position in front of and in the plane of said stationary bed-section, legs at the front of the movable bed-section adapted to rest on the floor in the open condition of the bed, a pair of supporting links at each end of the structure each pivoted at its upper end to the movable bed-section, a pivotal mounting for the lower end of each such link, and rack and gear means to effect forward and rearward travel of said lower pivotal mountings during the opening and closing movements of the movable bed-section.

3. In a folding-bed construction of the character described, the combination of a stationary bed-section, a movable bed-section in its inoperative position above and in its operative position in front of and in the plane of said stationary bed-section, supporting legs at the front of the movable bed-section adapted to rest on the floor in the open condition of the bed, a supporting link at each end of the structure each pivoted at its upper end to the movable bed-section, a gear rigid with the lower end of each of said links, and a stationary rack at each end of the structure in cooperative relation with the corresponding gears, whereby the lower ends of said links travel forwardly and rearwardly during the opening and closing movements of the movable bed-section.

4. In a folding-bed construction of the character described, the combination of a stationary bed-section, a movable bed-section in its inoperative position above and in its operative position in front of and in the plane of said stationary bed-section, legs at the front of the movable bed-section adapted to rest on the floor in the open condition of the bed, a pair of supporting links at each end of the structure each pivoted at its upper end to the movable bed-section, a gear rigid with the lower end of each of said links, and a stationary rack at each end of the structure in cooperative relation with the two corresponding gears, whereby the lower ends of said links travel forwardly and rearwardly during the opening and closing movements of the movable bed-section.

5. In a folding-bed construction of the character described, the combination of a stationary bed-section, a movable bed-section in its inoperative position above and in its operative position in front of and in the plane of said stationary bed-section, legs at the front of the movable bed-section adapted to rest on the floor in the open condition of the bed, a pair of supporting-links at each end of the structure each pivoted at its upper end to the movable bed-section, a pivotal mounting for the lower end of each such link, rack and gear means to effect forward and rearward travel of said lower pivotal mountings during the opening and closing movements of the movable bed-section, an arm at each end of the structure movable angularly and bodily with the lower end of one of said links, and a spring connected to each of said arms to assist in elevating the movable bed-section and to resist its descent.

6. In a folding-bed construction of the character described, the combination of a stationary bed-section, a movable bed-section in its inoperative position above and in its operative position in front of and in the plane of said stationary bed-section, legs at the front of the movable bed-section adapted to rest on the floor in the open condition of the bed, a pair of bent supporting links at each end of the structure each pivoted at its upper end to the movable bed section, a pivotal mounting for the lower end of each such link causing its travel forwardly and rearwardly during the opening and closing movements of the movable bed-section, and an abutment at each end of the construction on which the pair of links at the respective ends of the structure bear in the open condition of the folding-bed construction.

In witness whereof I have hereunto set my hand.

GEORGE G. POWERS.