Nov. 22, 1927. 1,650,217

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SPRING LIFTING MECHANISM FOR FOLDING COUCHES AND THE LIKE

Filed April 8, 1926 2 Sheets-Sheet 1

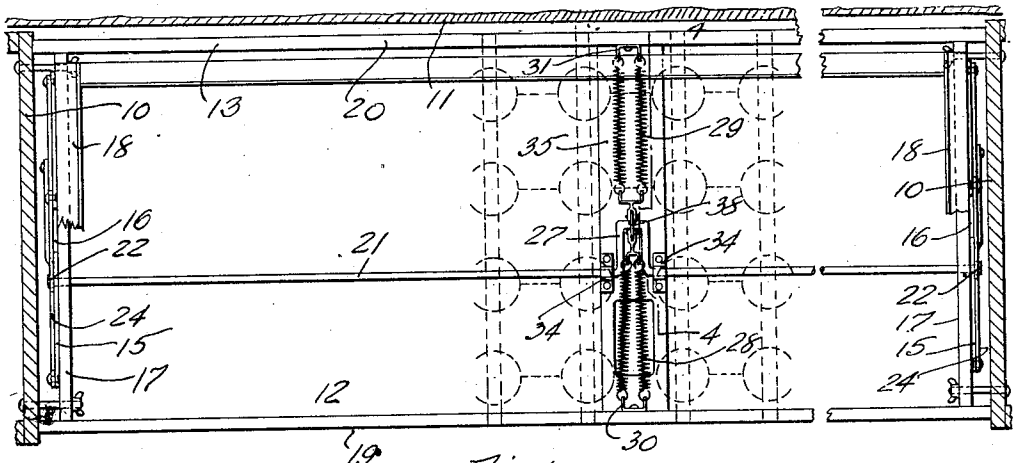


Fig. 1.

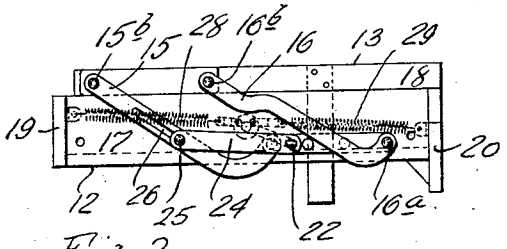


Fig. 2.

Fig. 3.

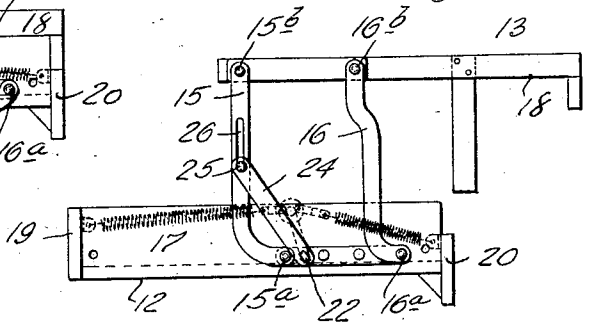
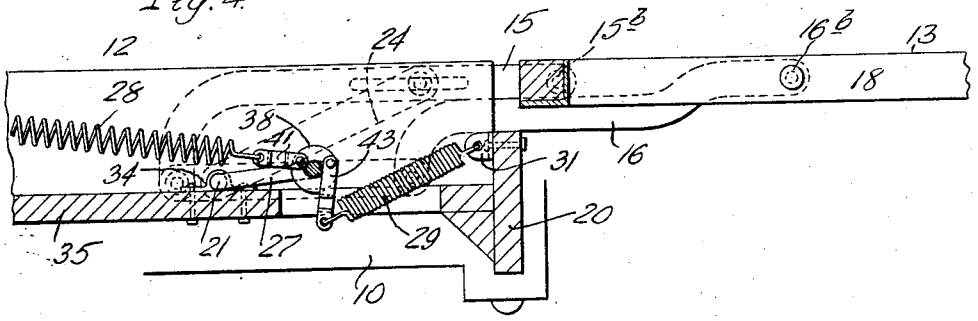


Fig. 4.



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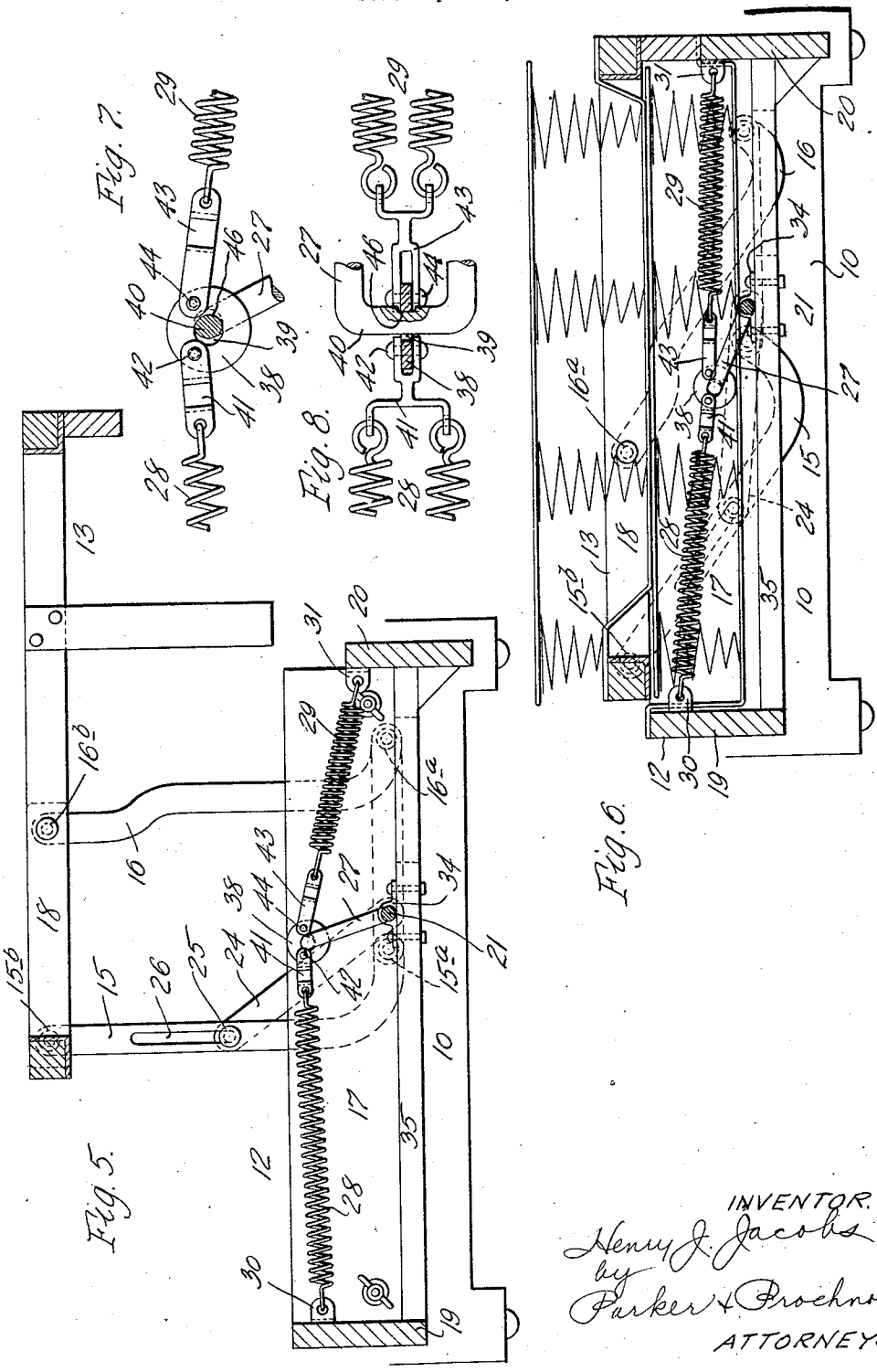


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE.

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SPRING-LIFTING MECHANISM FOR FOLDING COUCHES AND THE LIKE.

Application filed April 8, 1926. Serial No. 100,706.

This invention relates to folding couches, beds or cots of that type having a movable section which is arranged to move laterally from a closed position on top of a stationary section to an open position at one side thereof. The invention relates particularly to improvements in the arrangement and connections for the lifting mechanism used in such structures for the purpose of assisting in the movements of the movable section during part of its travel and in retarding its movements during the remainder of its travel in either direction.

The objects of the invention are to provide an improved mounting and connection for the springs of lifting mechanisms for folding couches and the like structures, whereby said springs and the connections therefor are disposed in a more compact form and accessible position than heretofore; also to provide an improved connection between said springs and the operating means therefor which is so constructed as to prevent binding between said springs and said operating means and is adapted to reduce friction and wear between said parts to a minimum; also to construct said springs and said connecting means so that springs of full lifting capacity can be employed in a limited space, and also to improved lifting mechanism for structures of the kind described in the other respects hereinafter specified and claimed.

In the accompanying drawings:—

Fig. 1 is a fragmentary plan view, partly in section, of a folding couch provided with lifting mechanism having operating and connecting means for the springs, constructed and arranged as an embodiment of the invention.

Figs. 2 and 3 are end elevations of the movable and stationary sections of the couch, showing the movable section in closed and partly open position respectively.

Fig. 4 is a fragmentary, transverse section of the couch on an enlarged scale, on the line 4—4, Fig. 1, showing the movable section in open position.

Fig. 5 is a similar view, in a slightly different transverse plane, with the movable section in partly open position.

Fig. 6 is a transverse section of the couch closed.

Figs. 7 and 8 are respectively a fragmentary, sectional elevation and a fragmentary, sectional plan of the connections between the lifting springs and the operating shaft therefor.

For the purpose of disclosing the invention, a davenport bed or couch of well known form is shown in the drawings, comprising the usual upright end frames 10 and back 11, portions only of which are shown in Fig. 1, a stationary, horizontal spring section 12 extending between and secured to the end sections, and a movable section 13, which, in its closed position, rests on top of the section 12, Figs. 2 and 6, and forms the seat of the davenport, and which is movable upwardly, laterally and downwardly to a position alongside the section 12 to form a bed, Fig. 4. The section 13 is connected to the section 12 by pairs of links 15, 16 which are secured at their lower ends by pivots 15^a and 16^a to the end members 17 of the section 12 and at their upper ends by pivots 15^b and 16^b to the end members 18 of the section 13 so as to permit the section 13 to move in planes parallel with section 12 from and to its closed position. The sections are provided with the usual helical springs, Figs. 1 and 6, for supporting cushions or a mattress, and the end frames and back may be upholstered in the usual manner, as is well known.

The lifting mechanism for the movable section 13 includes a horizontal shaft or member 21, extending lengthwise of the section 12 and intermediate of its front and rear side members 19 and 20, each end of which extends through a hole in the adjacent end member 17 of said section and is rigidly secured at 22 to one end of a rocking lever 24. The other end of this lever has a pin 25 working in a slot 26 in the link 15, whereby swinging movements of the links 15 about their pivots 15^a through movement of the section 13, are imparted to the levers 24 for rocking the shaft 21. The shaft 21 is provided between its ends with an offset or U-shaped crank portion 27 to which the inner ends of pairs of lifting coil springs 28 and 29 respectively are coupled, by means to be described, while the outer ends of said springs are attached to fixed clips or brackets 30, 31 on the opposite side members 19 and 20 of the stationary section 12. In the construction shown, the crank shaft 21 is journalled adjacent the crank 27 in bearing brackets 34, secured on a transverse,

horizontal support 35, extending between the lower portions of the front and rear side members of the section 12.

In the closed position of the movable section 13 (Figs. 2 and 6), the springs 29 are extended and the springs 28 are in only a slightly stretched or extended condition, so that if the section 13 is moved to its open position (toward the right in the drawings), the lifting of the section during the first part of its movement will be assisted by the pull of the springs 29 upon the crank 27, the springs at this time being in their most extended condition. After the section passes beyond the intermediate position, Figs. 3 and 5, wherein the links 15 and 16 are substantially vertical, the weight of the section itself will be exerted to move the same to open position. This movement, however, will be resisted by the springs 28, the pulling effort of springs 29 being gradually lessened, so that the section will be prevented from dropping violently to its open position. This action occurs in reverse order when the section is returned to closed position, the springs 28 at first assisting in lifting the section, and the springs 29 then acting to retard the downward movement of the section 13 upon the section 12.

In general, the described construction and arrangement of the couch and the lifting mechanism is well known in the art, and except in combination with the elements hereinafter noted, forms no part of the invention. In order, however, to permit the necessary movements of the section 13 relative to the section 12, and to enable the correct proportions to be maintained between these sections and the supporting links 15 and 16, lever 24 and crank shaft 21, said shaft is positioned nearer to the side member 20 than to the side member 19 of the stationary section 12. The space available for the springs 29 is therefore less than for the springs 28, and in order to compensate for this and provide the necessary extension of the springs 29 without injury thereto, and also to provide a novel anti-friction and non-binding connection for both pairs of springs, the following construction is employed:—

A disk or washer 38 having a hole 39 is loosely arranged on the bowed end 40 of the crank 27, and a shackle or link 41 loosely connected to the inner ends of the springs 28, extends toward and is pivotally secured at 42 to said disk 38. A similar shackle or link 43 is secured at one end by a pivot 44 to the disk 38 and at its other end is loosely connected to the inner ends of the springs 29, see Figs. 7 and 8.

This arrangement is of particular advantage in connection with the short springs 29, as in the position of the parts shown in Fig. 6, the link 43 forms a continuation of said spring, and provides the necessary length to extend between the crank and the side member 20, without unduly stretching said spring, which would not be the case if the relatively short springs 29 were connected directly to the disk 38. Also in the other position, shown in Fig. 4, the springs 29 can collapse to occupy the minimum space, while the link 43 hangs downward, with the connected ends of said springs, below the end of the crank, thus taking up the combined length of the springs 29 and links 43 by an angular disposition of these parts. The cross member 35 is preferably apertured to provide space for the springs 29 and link 43 in their collapsed position. The pivotal connections between the links and the disk 38 and between the disk and the crank, enables the springs and links to adjust themselves freely to the different movements of the crank without binding and with the minimum of friction.

Preferably the bowed end 40 of the crank is notched, as at 46 to form a seat for the disk 38 which always bears against said seat, due to the constant pull of the springs 28, thereby preventing the displacement of said disk.

The described construction of the lifting mechanism is efficient and practical, is inexpensive to produce and comprises few additional parts, which, however, add greatly to the life of the lifting springs and reduce the effort necessary in lifting the movable section.

I claim as my invention:—

1. In a folding couch, a stationary section, a section movable relatively thereto from a position above said section to a position at one side thereof, and mechanism for assisting the movements of said movable section comprising a shaft journalled in said stationary section and which is arranged to rock when said movable section is shifted, a U-shaped crank on said shaft having an outer end of round cross section, tension springs at opposite sides of said crank and having their outer ends secured to said stationary section, means for operatively securing the inner ends of said springs to said crank including an apertured disk rotatably mounted on said outer end of the latter, a connecting member pivoted to said inner ends of each of said springs and to said disk, said round outer end of said crank having a groove formed in one side thereof and forming a seat for said disk, and one of said springs being always under tension to hold said disk in said seat to prevent displacement of said disk.

2. In a folding couch, a stationary section, a section movable relatively thereto from a position above said section to a position at one side thereof, and mechanism for assisting the movements of said movable section comprising a shaft journalled in said sta-

tionary section and which is arranged to rock when said movable section is shifted, a U-shaped crank on said shaft having an outer end of round cross section, pairs of tension springs arranged at opposite sides of said crank and having their outer ends secured to said stationary section, means for operatively connecting the inner ends of said pairs of springs to said crank, said means comprising an apertured disk rotatably mounted on said outer end of said crank, a shackle having arms at one end pivoted to the inner ends of one pair of said springs and having its other end pivoted to said disk, a similar shackle pivoted to said disk and connecting the inner ends of the other pair of said springs, a seat formed at one side of said crank end in which said disk engages, and one of said pairs of springs being always under tension to hold said disk in said seat.

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