

Oct. 1, 1957

J. J. WETZLER

2,807,808

VERTICALLY ADJUSTABLE HOSPITAL BED

Filed May 21, 1954

4 Sheets-Sheet 1

Fig. 1

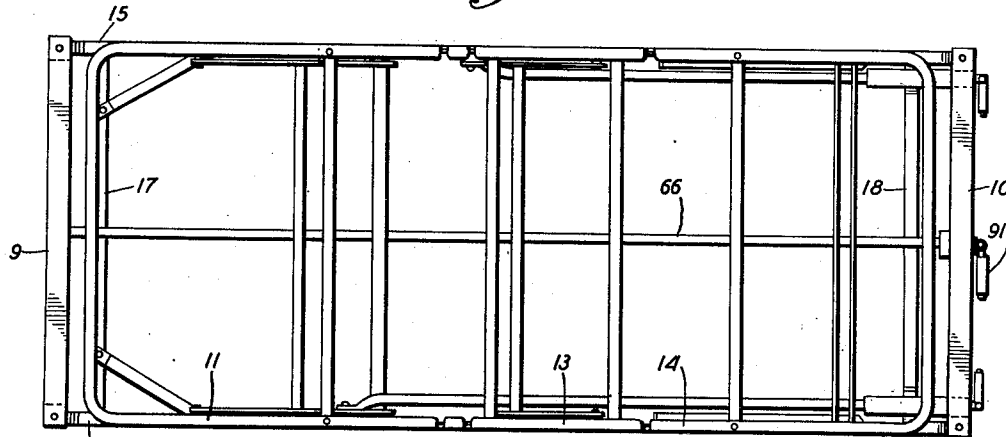


Fig. 2

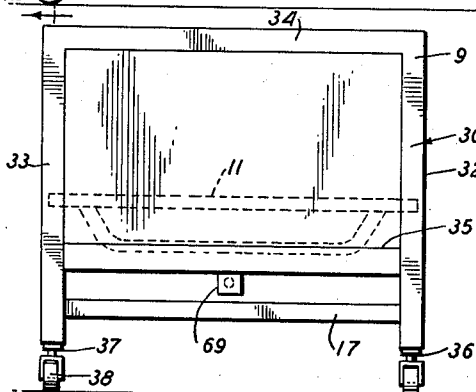
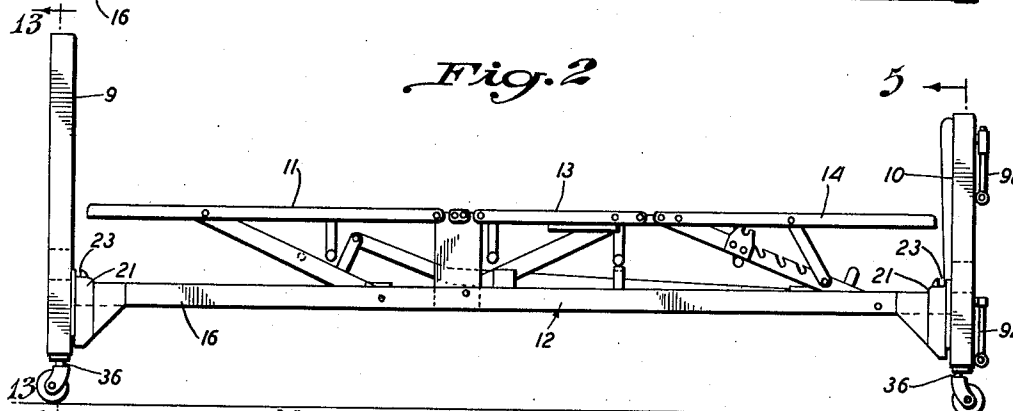


Fig. 4

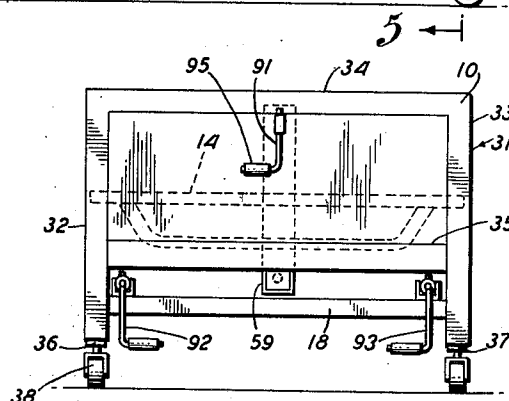


Fig. 3

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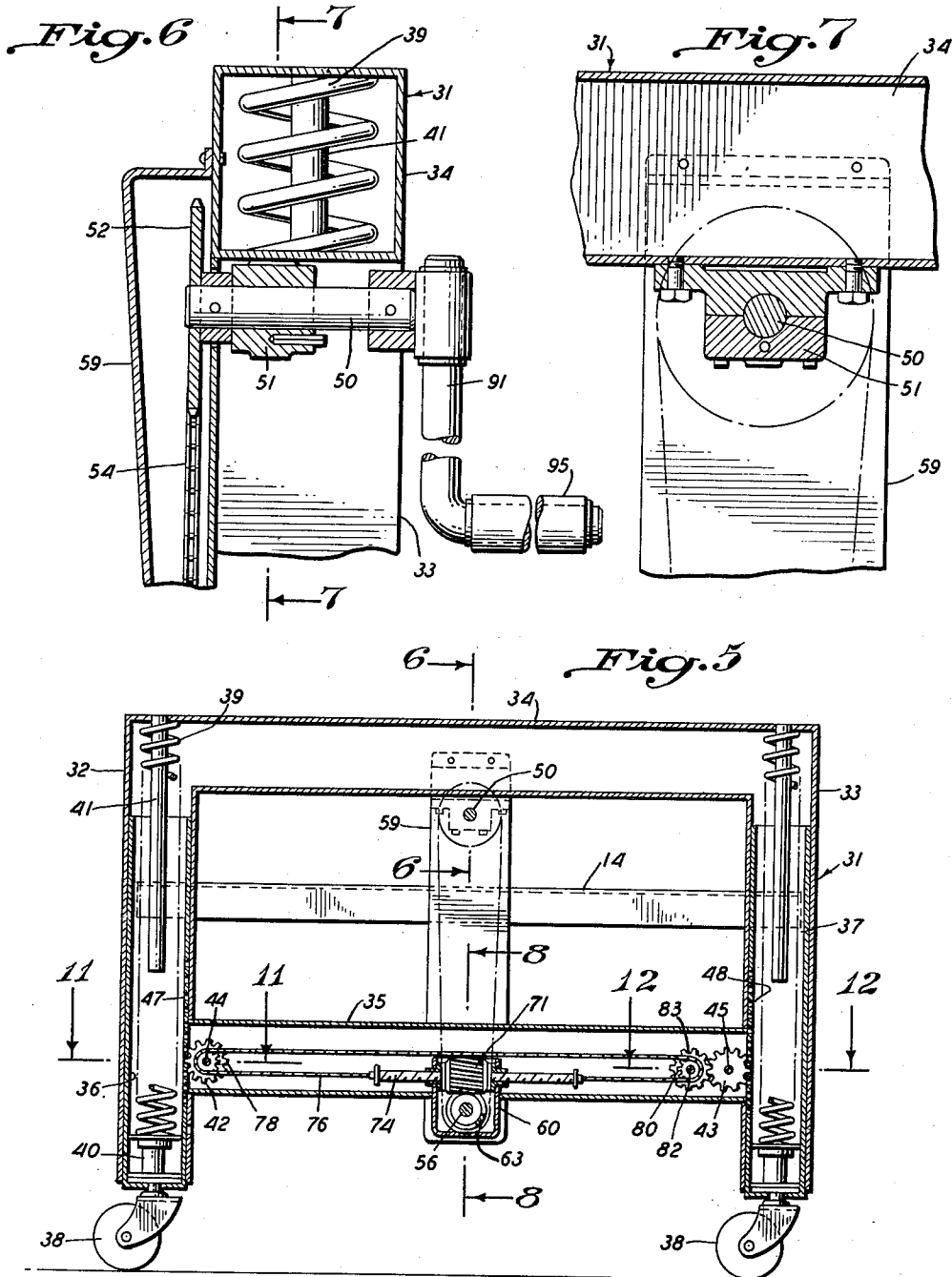
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Fig. 11

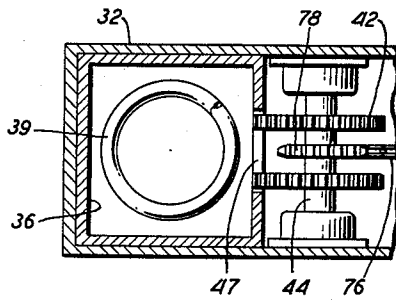


Fig. 12

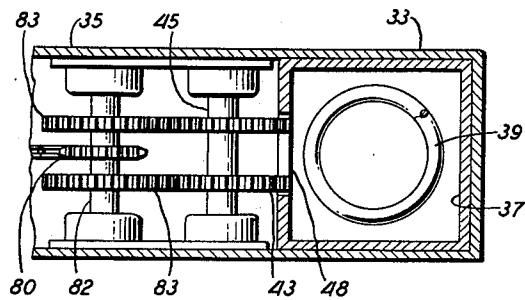


Fig. 9

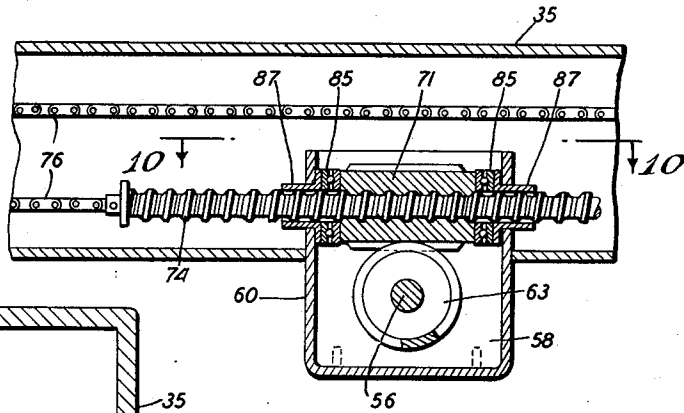


Fig. 8

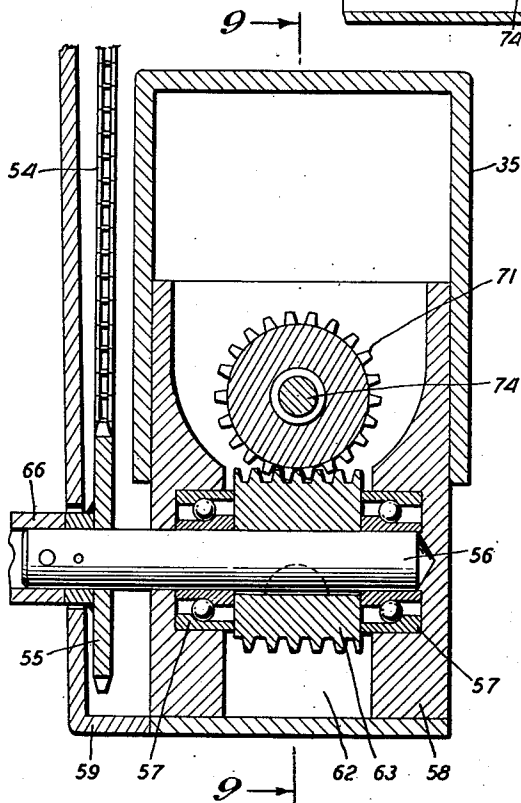
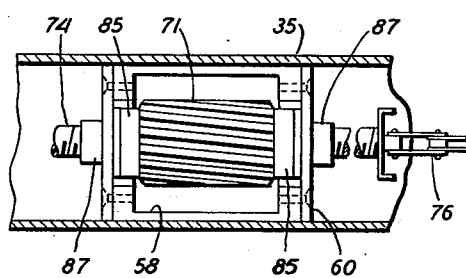


Fig. 10



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Fig. 13

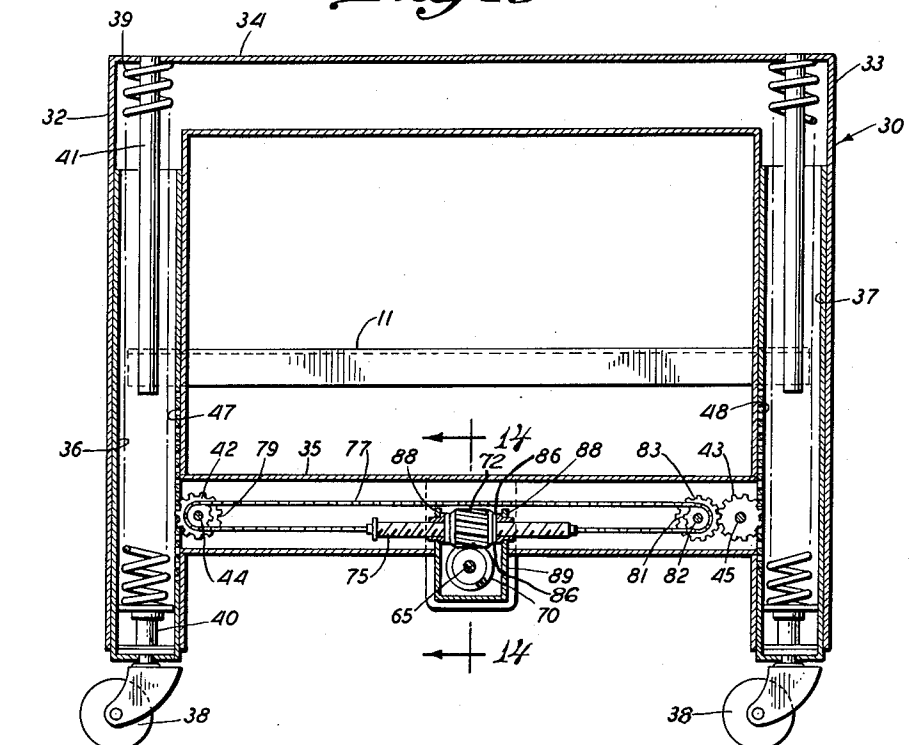
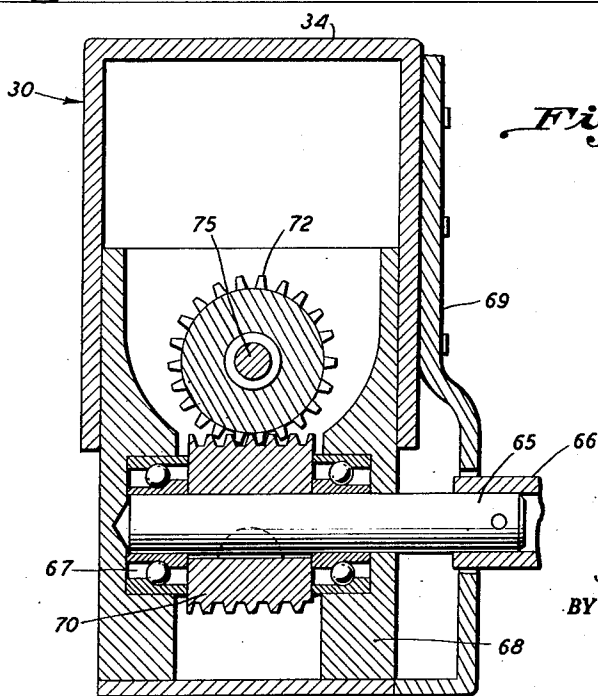


Fig. 14



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VERTICALLY ADJUSTABLE HOSPITAL BED

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Application May 21, 1954, Serial No. 431,464

3 Claims. (Cl. 5—63)

This invention relates to bed frames which are constructed to permit of the raising and lowering of the mattress carrying frame. While not limited thereto, such bed frames are particularly adapted for use in hospitals, convalescent homes and the like, whereby the mattress carrying frame may be disposed in the desired elevation to accommodate the particular requirement of any patient.

An object of the invention is to provide a bed frame in which the mattress carrying frame may be conveniently and quickly raised or lowered and which can be manipulated by a single individual without much effort to raise and lower the same.

Another object of the invention is to provide a bed frame of said character in which springs resiliently support the mattress carrying frame together with the mattress thereon and an occupant of the bed, whereby the springs function to relieve the means for raising and lowering the mattress supporting frame from the combined weight of the springs and the load imposed thereon.

A further object of the invention is to provide a raising and lowering mechanism carried by the head and foot ends of the bed frame and which is manipulated from one end thereof for raising and lowering the mattress carrying frame.

Still another object of the invention is to provide a bed frame of said character in which the opposite ends of the mattress carrying frame are raised or lowered simultaneously.

With the foregoing and other objects in view, reference is now made to the following specification and accompanying drawings in which the preferred embodiment of the invention is illustrated.

In the drawings:

Fig. 1 is a top plan view of a bed frame provided with means for raising and lowering the mattress carrying frame in accordance with the invention.

Fig. 2 is a view in side elevation thereof.

Fig. 3 is an end view of the foot of the bed frame.

Fig. 4 is an end view of the head of the bed frame.

Fig. 5 is an enlarged vertical sectional view taken approximately on line 5—5 of Fig. 2.

Fig. 6 is an enlarged fragmentary vertical sectional view taken approximately on line 6—6 of Fig. 5.

Fig. 7 is a fragmentary sectional view taken approximately on line 7—7 of Fig. 6.

Fig. 8 is an enlarged fragmentary sectional view taken approximately on line 8—8 of Fig. 5.

Fig. 9 is a reduced fragmentary sectional view taken approximately on line 9—9 of Fig. 8.

Fig. 10 is a sectional view taken approximately on line 10—10 of Fig. 9.

Fig. 11 is an enlarged fragmentary sectional view taken approximately on line 11—11 of Fig. 5.

Fig. 12 is a similar view taken approximately on line 12—12 of Fig. 5.

Fig. 13 is an enlarged vertical sectional view taken approximately on line 13—13 of Fig. 2.

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Fig. 14 is an enlarged fragmentary sectional view taken approximately on line 14—14 of Fig. 13.

Referring to the drawings, the bed frame consists of head and foot ends 9 and 10 between which is supported a mattress carrying frame 12. The mattress carrying frame is provided with wire spring frames 11, 13 and 14 which are mounted thereon for adjustment of the frame 11 to dispose the same in inclined relation adjacent the head end and for adjustment of the frames 13 and 14 for elevating the confronting ends thereof to dispose the frame 13 in declining relation toward the head end and the frame 14 in declining relation toward the foot end. The mattress is supported on the said wire spring frames.

The mattress carrying frame 12 includes longitudinally extending side members 15 and 16 and transversely extending end members 17 and 18 which are secured to the side members at the ends thereof to provide a rigid frame structure. The said frame is provided with angulated end members 21 which slidably fit slotted brackets 23 affixed to the inner faces of the head and foot ends to permit of the convenient assembly and disassembly of the said parts of the bed frame.

The head and foot ends include tubular frame members 30 and 31 respectively which are of similar formation, each consisting of leg members 32 and 33, a transversely extending top rail 34 secured to the upper ends of the leg members, and a cross rail 35 secured to the leg members intermediate the ends thereof. The said leg members are of rectangular formation in cross-section and are slidably mounted on inner leg members 36 and 37 so as to form inner and outer leg members. The inner leg members 36 and 37 are likewise of rectangular formation in cross-section so as to snugly and slidably interfit within the outer leg members 32 and 33 with the lower ends of the inner leg members protruding through the lower ends of the outer leg members and having rollers 38 swivelly mounted in the protruding lower ends of the inner leg members for rollably supporting the head and foot ends of the bed frame. The said inner and outer leg members thus form inner and outer telescopically associated legs for the head and foot ends. Coil springs 39 are interposed between the top walls of the tubular frames 30 and 31 and the inner ends of shanks 40 supported on the lower ends of the inner leg members 36, 37 with the upper portions of the springs surrounding bars 41 which depend from the top wall of the tubular frames in concentric relation within the said inner and outer legs for retaining the springs in concentric relation therein. The coil springs resiliently support the tubular frames 30 and 31 together with the mattress carrying frame 12 which is removably mounted thereon by the slotted brackets 23 as hereinbefore described. The weight imposed upon the springs by the mattress carrying frame 12 and the load thereon is supported by the inner leg members 36 and 37 of the head and foot ends. Thus the coil springs 39 function to urge the tubular frames 30 and 31 upwardly and thereby relieve the means hereinafter described for raising and lowering the tubular frames 30 and 31 from the weight of said tubular frames and the weight of the mattress carrying frame and the load thereon whereby the physical effort to raise the tubular frames 30 and 31 is lessened.

In order to raise or lower the tubular frames 30 and 31, pairs of sprocket gears 42 and 43 are provided which are mounted on shafts 44 and 45 respectively journaled within the cross rails 35. The sprocket gears 42 and 43 project through the opposite ends of the cross rails 35 of the tubular frames and are in meshing engagement with rows of vertically spaced openings 47 and 48 in the inner side leg walls of the inner leg members 36 and 37 respectively. The openings 47 and 48 are spaced apart

corresponding to the pitch of the sprocket gears 42 and 43.

The said sprocket gears are rotated for raising or lowering the tubular frames together with the mattress supporting frame 12 by means of the rotation of a crank shaft 50 which is journaled in a bearing 51 secured to the under side of the top rail 34 of the tubular frame 31. The crank shaft 50 has a sprocket wheel 52 affixed to the inner end thereof and about which is trained an endless sprocket chain 54. The sprocket chain 54 engages about a sprocket wheel 55 affixed to a short shaft 56 which is journaled in spaced ball bearings 57 mounted in recesses in a rectangular block 58. The block 58 is located in the lower end of a housing 59 secured to the top rail 34 so as to enclose the sprocket wheels 52 and 55 together with the chain 54 and with the side walls 60 of the lower end of the housing projecting upwardly through a bottom opening in the cross rail 35. The block 58 also projects into the said cross rail and is formed with a cavity 62 in which a worm 63 is splined on the shaft 56. A short shaft 65 similar to the short shaft 56 is also provided for the tubular frame 30 and the said shafts are connected by a shaft 66 which extends beneath the mattress carrying frame 12. The short shaft 65 is journaled in spaced ball bearings 67 mounted in a rectangular block 68 similar to the block 58. The block 68 is located in a housing 69 affixed to the cross rail 35 of the tubular frame 30. A worm 70 similar to the worm 63 is affixed to the short shaft 65 between the ball bearings 67 whereby the worms 63 and 70 carried by the tubular frames 31 and 30 turn in unison with the turning of the crank shaft 50.

The worms 63 and 70 are in meshing engagement respectively with worm wheels 71 and 72 mounted for rotation within the blocks 58 and 68 respectively. The worm wheels 71 and 72 are internally threaded and are mounted on threaded pull rods 74 and 75 which extend longitudinally within the cross rails 35 of the tubular frames 31 and 30 respectively. The pull rods are connected at their ends with endless chains 76 and 77 respectively which engage about sprocket gears 78 and 79 respectively affixed to the shafts 44 on which the pairs of sprocket gears 42 of the tubular frames are mounted. The sprocket chains also engage about sprocket wheels 80 and 81 respectively which are affixed to shafts 82 journaled within the cross rails 35 in parallel relation with the cross shafts 45 of the tubular frames. A pair of sprocket gears 83 is mounted on each of said shafts 82 so as to dispose the same in meshing engagement with the pairs of gears 43 in each of the tubular frames.

The worm wheels 71 and 72 are arranged respectively between ball bearings 85 and 86 mounted in the blocks 58 and 68 which bearings are in axial alignment with the worms and through which the pull rods 74 and 75 slidably extend. The pull rods are slidable also in tubular bushings 87 and 88 respectively. The bushings 87 protrude through openings in the side walls 60 of the housing, while the bushings 88 protrude through the side walls 89 of the housing 69 with the flanged inner ends of said bushings located between the ball bearings 85 and 86 and the said side walls to retain the bushings in position.

The crank shaft 50 may be turned in any desired manner such as manually or by electric motor, and as illustrated, the outer end of the crank shaft 50 is formed with a rectangular shaped end for removably receiving the crank 91 for manually turning the crank shaft. Constructed in this manner, the crank shaft 50, is operatively connected with the pairs of sprocket gears 42 and 43 which are in meshing engagement with the inner legs 36 and 37 of each of the tubular frames 30 and 31 of the head and foot ends. Turning of the crank shaft 50 in a clockwise direction as viewed from the foot of the bed frame or as shown in Fig. 5 of the drawings, will effect rotation of the short shafts 56 and 65 and a clock-

wise rotation of the worms 63 and 70. Clockwise rotation of the worm gears will effect rotation of the worm wheels 71 and 72 respectively so as to move the pull rods 74 and 75 from right to left as viewed in Fig. 5. This will effect clockwise rotation of the pairs of sprockets 42 and counterclockwise rotation of the pairs of sprockets 43 with a consequent simultaneous downward movement of the tubular frames 30 and 31 so as to lower the mattress carrying frame 12. Rotation of the crank shaft 50 in a counterclockwise direction will accordingly effect counterclockwise rotation of the pairs of sprocket gears 42 and a clockwise rotation of the pairs of gears 43 with a consequent upward movement of the tubular frames 30 and 31 and a raising of the mattress carrying frame 12.

The wire spring frames 11, 13 and 14 are of standard construction, the frame 11 being raised and lowered by means of a crank 92, while the frames 13 and 14 are raised and lowered by means of a crank 93. The said cranks may be turned with the handles thereof disposed parallel with the foot end 10 and when the said springs are to be elevated the cranks may be turned to dispose the handles thereof outwardly. The crank 91 may also be turned so as to dispose the handle 95 thereof parallel with the foot end 10 as shown in Figs. 1 and 2 of the drawings or the same may be turned to dispose the handle member outermost as shown in Fig. 6.

What is claimed is:

1. In a bed frame, head and foot ends each including inner and outer hollow upright members, said outer upright members slidably interfitted with the inner upright members protruding through the lower ends of the outer upright members for engagement with a supporting surface for supporting the bed frame, a mattress supporting frame located between said head and foot ends and secured to said outer upright members for movement therewith, coil springs arranged within said inner and outer upright members resiliently urging said outer upright members upwardly, a hollow cross member connecting the outer upright members of each of the head and foot ends, gears rotatably mounted within said cross members at each end thereof arranged in meshing engagement with said inner upright members for raising and lowering the outer upright members in unison with the rotation of said gears, interengaging worm wheel and worm rotatably carried by each of said cross members with the worm wheels located within said cross members respectively, threaded rods threadedly engaged by said worm wheels for movement in either direction longitudinally of said cross members, means operatively connected between said rods and said first mentioned gears for turning said gears with the rotation of said worm wheels respectively, a shaft connecting the worms of said head and foot ends for movement of said worms in unison, crank means carried by one of said head and foot ends, means operatively connecting said crank means with one of said worms for rotation of said worms in either direction for elevating and lowering said outer upright members in unison together with said mattress supporting frame by turning said crank means, and said coil springs functioning to render said crank means easier to turn for elevating said outer upright members.

2. In a bed frame, head and foot ends each including inner and outer hollow upright members of generally rectangular shape in cross-section, said outer upright members slidably interfitted with the inner upright members protruding through the lower ends of the outer upright members for engagement with a supporting surface for supporting the bed frame, a mattress supporting frame located between said head and foot ends and secured to said outer upright members for movement therewith, coil springs arranged within said inner and outer upright members resiliently urging said outer upright members upwardly, a hollow cross member connecting the outer upright members of each of the head and foot ends, a pair

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of gears rotatably mounted on a common shaft within said cross members at each end thereof arranged in meshing engagement with a row of vertically spaced openings in said inner upright members for raising and lowering the outer upright members in unison with the rotation of said pairs of gears, interengaging worm wheel and worm rotatably carried by each of said cross members with the worm wheels located within said cross members respectively, threaded rods threadedly engaged by said worm wheels respectively for movement in either direction longitudinally of said cross members, means operatively connected between said rods and said first named pairs of gears for turning the said pairs of gears with the rotation of said worm wheels respectively, a shaft connecting the worms of said head and foot ends for movement of said worms in unison, crank means carried by one of said head and foot ends, means operatively connecting said crank means with one of said worms for rotation of said worms in either direction for elevating and lowering said outer upright members in unison together with said mattress supporting frame by turning said crank means, and said coil springs functioning to render said crank means easier to turn for elevating said outer upright members.

3. In a bed frame, head and foot ends each including inner and outer hollow upright members of generally rectangular shape in cross-section, said outer upright members slidably interfitted with the inner upright members protruding through the lower ends of the outer upright members for engagement with a supporting surface for supporting the bed frame, a mattress supporting frame located between said head and foot ends and secured to said outer upright members for movement therewith, coil springs arranged within said inner and outer upright members resiliently urging said outer upright members upwardly, a hollow cross member connecting the outer upright members of each of the head and foot ends, a pair of gears rotatably mounted on a common shaft within said cross members at each end thereof arranged in mesh-

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ing engagement with a row of vertically spaced openings in said inner upright members for raising and lowering the outer upright members in unison with the rotation of said pairs of gears, interengaging worm wheel and worm rotatably carried by each of said cross members with the worm wheels located within said cross members respectively, said worm wheels each having a longitudinally extending threaded bore, threaded rods threadedly engaged in the threaded bores of said worm wheels respectively for movement in either direction longitudinally of said cross members, sprocket chains secured to said rods respectively and engaging about means carried by said common shafts for turning the said pairs of gears with the rotation of said worm wheels, a shaft connecting the worms of said head and foot ends for movement of said worms in unison, crank means carried by one of said head and foot ends, means operatively connecting said crank means with one of said worms for rotation of said worms in either direction for elevating and lowering said outer upright members in unison together with said mattress supporting frame by turning said crank means, and said coil springs functioning to render said crank means easier to turn for elevating said outer upright members.

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