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F. J. SULLIVAN

2,956,289

HOSPITAL BED

Filed Aug. 5, 1957

2 Sheets-Sheet 1

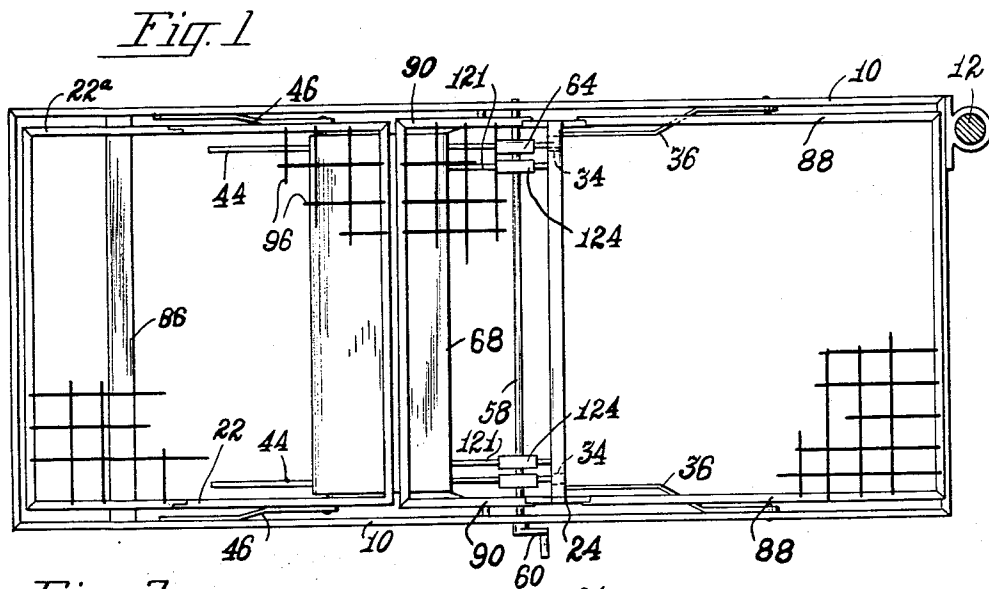
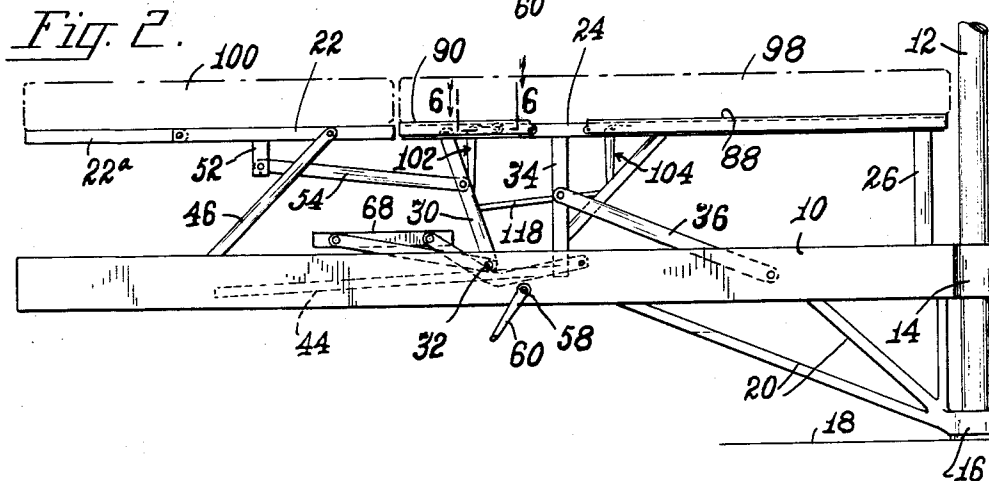
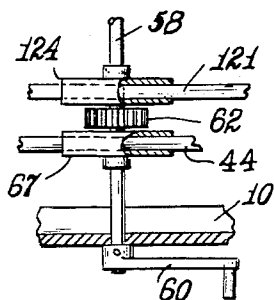


Fig. 5.



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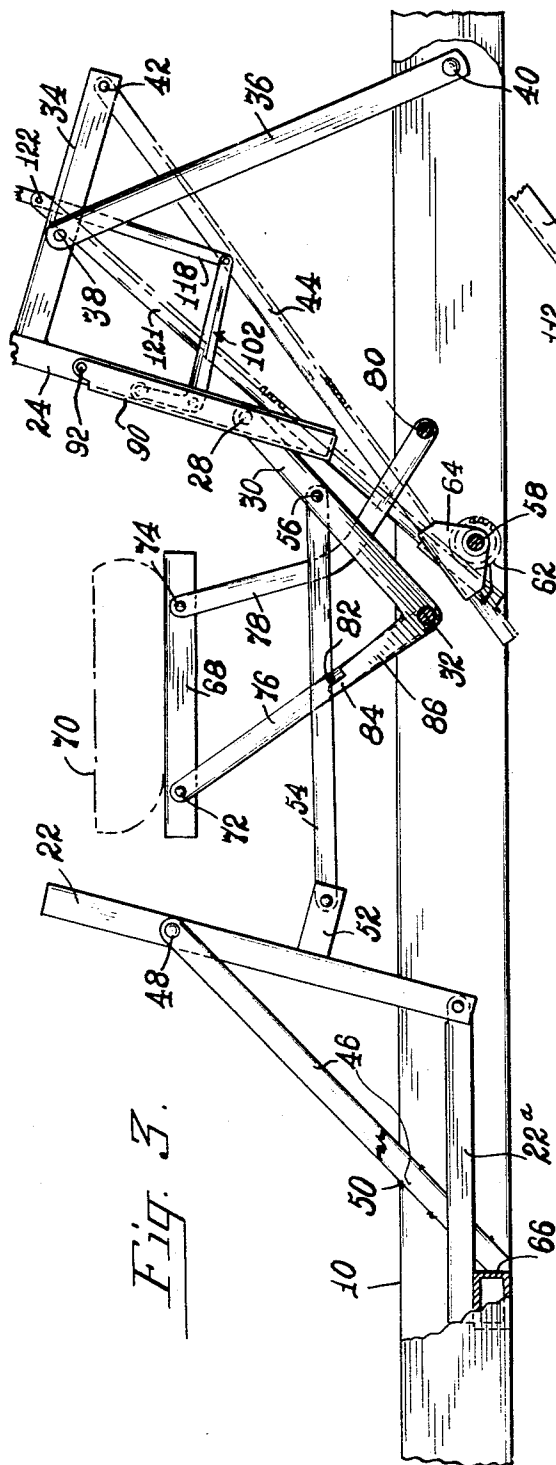
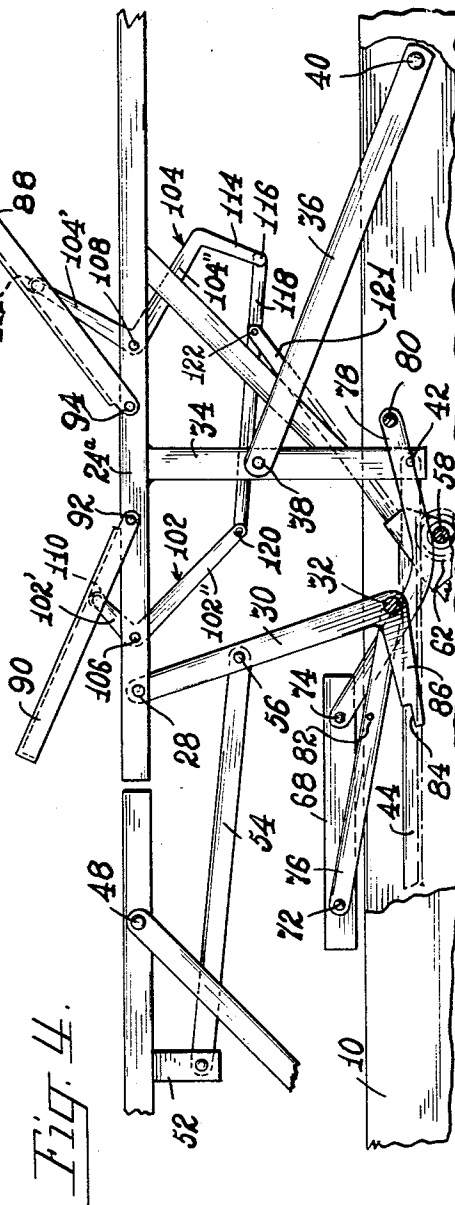
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2 Sheets-Sheet 2



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HOSPITAL BED

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2 Claims. (Cl. 5—67)

The invention relates to improvements in beds for use by invalids or in hospitals and more particularly to a bed structure having a main spring frame formed in two portions and having an auxiliary spring frame structure formed in two sections and carried on one of the main frame portions. The frame portions and the frame sections are movable relative to each other so as to facilitate selective adjustment thereof easily and without discomfort to the patient.

Specifically, the bed structure includes a pair of main frame portions which normally lie in a common horizontal plane and are pivotally and slidably associated with each other and with the bed side rails to permit their being moved toward and away from each other and tilted so as to permit a substantially vertically movable platform or commode to be moved from a position of concealment when the portions are horizontal, into a position of use when said portions are tilted. The structure includes common means for automatically positioning the platform or commode when the said frame portions are moved. Furthermore, one of the frame portions carries a back support spring frame section and a seat spring frame section each of which normally lies substantially in the plane of the frame portion carrying the same and which are pivotally mounted thereon and are movable into tilted positions relative thereto so as to permit a patient to assume a sitting position when the commode is in its concealed position. Common operating means is provided to selectively move the frame portions and commode platform as a unit or to move the back and seat frame sections.

An object of the invention is to provide a rugged novelly constructed bed and novel means for adjusting the positions of selected portions thereof selectively.

Another object is to provide a bed of the character described, with novel operating linkage for operatively connecting two frame portions of the bed and a commode platform for operation in unison.

Another object is to provide a movable frame portion on a bed structure with novelly constructed and operated back support and seat spring frame sections movable relative to said frame portion.

Another object is to provide a bed structure having a plurality of adjustable frame portions and spring frame sections with novel means common to said portions and sections for selective adjustment thereof and of a commode platform associated therewith.

Another object is to provide a bed structure of the character described which is not expensive to manufacture, is simple to operate, efficient in use and very practical.

These and other objects of the invention will become apparent as the description proceeds and upon reference to the accompanying drawings, in which:

Fig. 1 is a plane view of a bed embodying the features of the present invention.

Fig. 2 is a side elevational view thereof, showing the parts in the position illustrated in Fig. 1.

Fig. 3 is an enlarged fragmentary side elevational view, partly broken away, showing the parts in one position of adjustment.

Fig. 4 is a view similar to Fig. 3, showing the parts in another position of adjustment.

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Fig. 5 is a fragmentary horizontal sectional view showing the common control means.

Fig. 6 is a detail sectional view, on an enlarged scale, taken substantially on line 6—6 of Fig. 2.

Referring to the accompanying drawings, the bed structure includes the usual frame having side rails 10. The frame, including the side rails 10, may be supported by means of conventional legs or, as shown in Fig. 2, it may be suspended for swinging in a horizontal plane about a post 12 located preferably at the head or rear end thereof. A bearing 14 mounts the frame on the post and a thrust bearing 16, located on the post closely adjacent to the floor 18, is joined to the frame by a plurality of rigid braces 20.

As indicated hereinabove, the present invention is concerned with the provision of novel means to facilitate the positioning of a patient occupying the bed from the usual flat position into a sitting position, in which position a platform carrying a commode may or may not be carried from a normally concealed position into a position for use. This is accomplished in the present instance by providing the bed with a plurality of selectively movable frame portions and spring frame sections which are selectively moved into various positions of adjustment.

Referring now particularly to Figs. 1, 2 and 3, the bed includes a pair of substantially rectangular shaped frame portions 22—24, preferably fabricated from square tubular stock, arranged end to end and having combined overall dimensions corresponding substantially to the dimensions of the usual bed frame including the side rails 10. The frame portion 22 is designated herein as a foot portion, whereas the frame portion 24 is designated as a head portion. As illustrated, the head portion 24 has a pair of rigid depending legs 26 at the end adjacent to the supporting post 12 which are adapted to seat on, but are disconnected from, the side rails 10 so as to support said rear frame end at a desired elevation above the side rails when the head portion 24 is substantially horizontal. The other, or front, end of the head portion 24 is pivotally supported, as at 28, on the upper free end of a pair of like bell-crank links 30 which are pivotally secured, as at 32, one to each side rail 10. The head portion 24 also has a pair of laterally spaced bars 34 rigid therewith and extending downwardly perpendicularly thereto. Each of these bars mounts one end of a link 36, as at 38, the other end of which is pivotally secured to the respective side rail 10, as at 40. The lower end of each bar 34 carries a pivot 42 to which one end of an actuating rack 44 is secured.

The foot frame portion 22 is pivotally mounted in the plane of the head frame portion 24 by means of straps 46, one of which is secured pivotally, as at 48, to each side of said frame and which extends downwardly diagonally and is secured, as at 50, to the respective side rail 10. A pair of depending brackets 52, on said foot portion, each pivotally mounts one end of one of a pair of links 54 that are pivotally connected, as at 56, one to each of the bell-crank links 30. This link connection provides mechanical means to insure that when the head frame portion 24 is tilted upwardly in a manner to be described presently, the foot frame portion 22 is tilted in unison therewith. The relative positions of the head and foot portions 24 and 22, when tilted, are shown in Fig. 3.

Tilting of the head and foot frame portions is effected by manual or power operation of a pinion shaft 58 which extends transversely of the bed frame and is journaled in the side rails 10. The shaft may carry an operating crank 60 on one of its ends and it is adapted to have limited longitudinal movement for a purpose to be described presently. A pinion 62 is carried firmly on the shaft 58 and a bracket 64 maintains the rack 44 in posi-

tion to be meshed with the pinion when the latter is moved axially into registering alignment therewith. Rotation of the shaft 58 in a clockwise direction will move the rack 44 from the retracted position shown in Fig. 2, into a projected position illustrated in Fig. 3. When this occurs, the head frame portion 24 is tilted about the pivot 38, while the connecting link 36 swings upwardly rearwardly about its pivot 40 so as to carry the front end of the head frame portion 24 downwardly rearwardly away from the foot portion 22 and elevate the rear end of said frame portion. Movement of the head frame portion into such a tilted position causes the bell-crank links 30 to rock about their pivots 32 and pull the links 54 rearwardly to tilt the foot portion 22 about its pivots 48 substantially into the position illustrated in Fig. 3. When in this position, an articulated end portion 22a of said foot portion 22 is carried downwardly into contact with a transverse brace 66 extending between the side rails 10, and rests substantially in the horizontal position shown.

The bed structure also includes a platform 68 adapted to support a commode 70, which platform extends transversely between the side rails and normally is concealed beneath the frame portions 22—24. Referring to Figs. 1, 2 and 3, the platform 68 is pivotally mounted at its ends, as at 72—74 to the respective ends of pairs of links 76—78, the other ends of which are pivoted respectively at 32 and 80 to said side rails 10. The pair of links 76 each have a laterally projecting pin 82 between their ends arranged for engagement by the offset ends 84 of the arms 86 of bell-crank levers 30. As is best shown in Figs. 2 and 4, the platform 68 normally rests substantially in the plane of the top edges of the side rails. However, when the bell-crank levers 30 are moved from their Fig. 2 position into the position shown in Fig. 3, the pins 82 on the platform links 76 are engaged by the offset ends 84 and said links are swung upwardly so as to elevate the platform substantially into the position shown in Fig. 3. This locates the platform 68 and the commode 70 thereon in a position for convenient use by a patient supported in a substantially sitting position by the tilted head frame portion 24 and the articulated foot frame portion 22.

The construction disclosed includes also novel means associated with and carried by the head frame portion 24 to permit a patient to assume a sitting position at such times as when use of the commode is not required. To accomplish this, the head frame has mounted thereon a back supporting section 88 and a seat section 90. As is best shown in Figs. 1 and 2, these sections normally lie flat against the top of the head portion 24 and are movable therewith as a unit when said portion is tilted into the Fig. 3 position. They are movably mounted on the head portion for independent tilting movement only when the head portion is substantially horizontal. As illustrated, the seat section 90 comprises a rectangular U-shaped frame having the free ends of its side portions pivotally secured, as at 92, to the sides of the head portion forwardly of the depending bars 34. The back section 88 is constructed and shaped like the seat section but is of sufficient size as to overlie substantially the remaining rear area of the head portion and it is pivotally secured thereto rearwardly of the depending bars 34, as at 94. The seat and back sections 90—88 and the intermediate section 24a of the head portion 24 have therein the usual webbing or spring structure 96 for supporting a mattress unit 98. A second mattress unit 100 is similarly supported on the foot frame portion 22.

In order to move the seat section 90 and the back section 88 into tilted positions, such as is shown in Fig. 4, there is provided a novel linkage structure operably associated with the pinion 62 so as to be selectively engaged and operated thereby. The linkage structure (best shown in Fig. 4) includes two pairs of bell-crank levers 102—104, one of each pair being pivotally mounted as at 106—108 respectively, in each side of the head por-

tion 24. The levers 102 each have one of their arms 102' underlying a side portion of the seat section adjacent to the pivot 92, as best shown in Fig. 6, and it carries a roller 110 on its free end. The other arm 102'', of each lever 102 extends below the head portion 24. The other levers 104 are similarly mounted and each has an arm 104' underlying a side portion of the back supporting section 88 adjacent its pivot 94, which arm carries a roller 112 on its free end. The arm 104'' of said lever 104 also depends from the head portion 24 and terminates in a perpendicular extension 114 which is pivotally connected, at 116, to a link 118 that is also connected pivotally, as at 120, to the free end of the lever arm 102''.

A rack 121 is connected, as at 122, to the link 118 and it extends through a guide bracket 124 on the pinion shaft 58 for operative engagement by the pinion 62. It should be quite apparent at this time that when the pinion 58 is shifted laterally into mesh with the rack 121 and then rotated, the seat and back support sections 90—88 can be moved from the horizontal position shown in Fig. 2, into the tilted position shown in Fig. 4, and vice versa.

Although an exemplary embodiment of the invention is illustrated in the accompanying drawings, in detail, and fully described in the foregoing description, it should be understood that the invention may embody other features of construction than those specifically illustrated and is not to be limited or restricted except as may be required by the scope of the appended claims.

I claim:

1. In a bed structure including a base frame comprising foot and head frame portions, a spring frame assembly comprising two sections spaced apart end to end and pivotally mounted at opposed ends to said head frame portion so as to be movable into and out of an inclined position relative to the plane of said head frame portion, two sets of bell-crank levers pivotally connected to said head frame portion, one set underlying one of said sections and the other set underlying the other of said sections, anti-friction means on one end of each lever arranged to bear against the underside of the related section at all times, a link connecting the other end of each lever of a set to the other end of each lever of the other set, a rack connected to said link, and manually operable pinion means engageable with the rack and actuable to rock the levers in unison for moving the sections into and out of inclined positions relative to the head frame portion.

2. In a bed structure including a base frame comprising foot and head frame portions, a spring frame assembly comprising two sections spaced apart end to end and pivotally mounted at opposed ends to said head frame portion so as to be movable relative to the plane of said head frame portion, levers pivotally connected to said head frame portion, certain of said levers underlying one of said sections and other of said levers underlying the other of said sections, a roller carried by each lever and bearing against the underside of the related section, a link connecting said levers, a rack connected to said link, and manually operable pinion means engageable with the rack and actuable to rock the levers in unison for moving the sections into and out of inclined positions relative to the head frame and to each other.

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