

[54] **FOLDING HOSPITAL BED**

[76] Inventor: **Gilbert M. Garte**, 62 Curtis St.,
Situata, Mass. 02066

[22] Filed: **Jan. 11, 1972**

[21] Appl. No.: **216,955**

[52] U.S. Cl. **5/62, 5/114**

[51] Int. Cl. **A45f 1/00, A61g 7/10**

[58] Field of Search **5/62, 110, 112, 114; 128/33**

[56] **References Cited**

UNITED STATES PATENTS

948,120	2/1910	Wilson et al.	5/62
1,602,679	10/1926	Kibler	5/112
1,043,517	11/1912	Gavan	5/62
2,649,595	8/1953	Lewin	5/91

Primary Examiner—Casmir A. Nunberg
Attorney, Agent, or Firm—Donald D. Jeffery

[57] **ABSTRACT**

A folding bed including a main frame and an inner bed spring frame pivotally connected to the main frame at generally the longitudinal midpoint of said bed spring frame. The latter can be inclined relative to the main frame and locked in the desired position of adjustment. To store the bed, the inner bed spring frame can be disposed parallel to and within the main frame and the legs of the bed folded to provide a compact assembly. Inflatable pillows and mattress are stored in a deflated condition.

6 Claims, 7 Drawing Figures

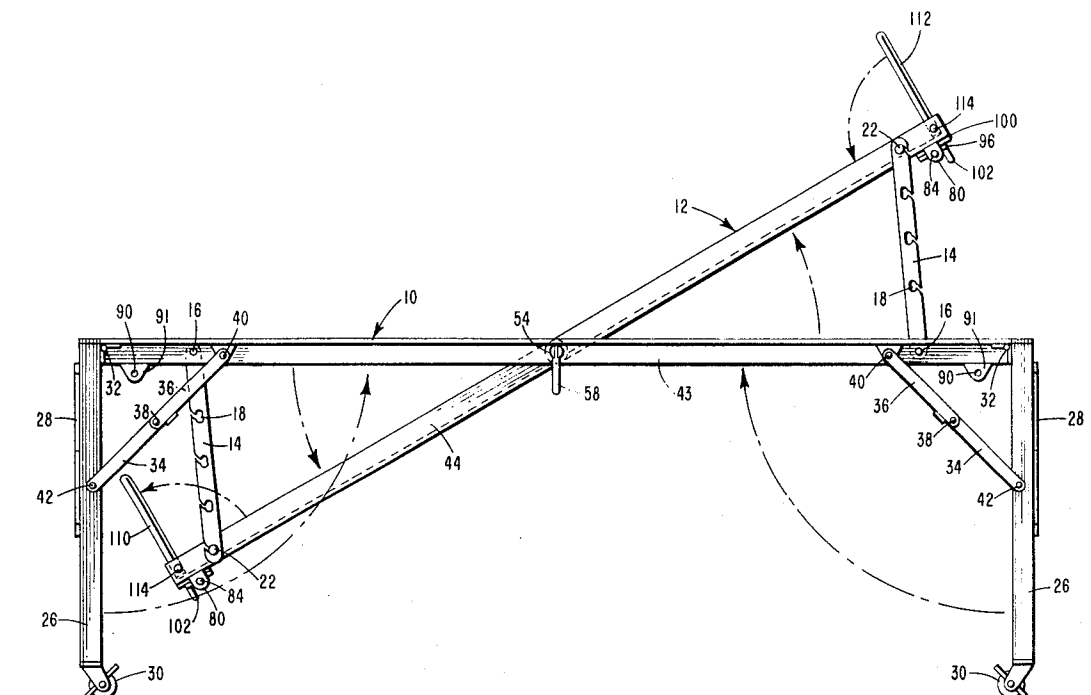
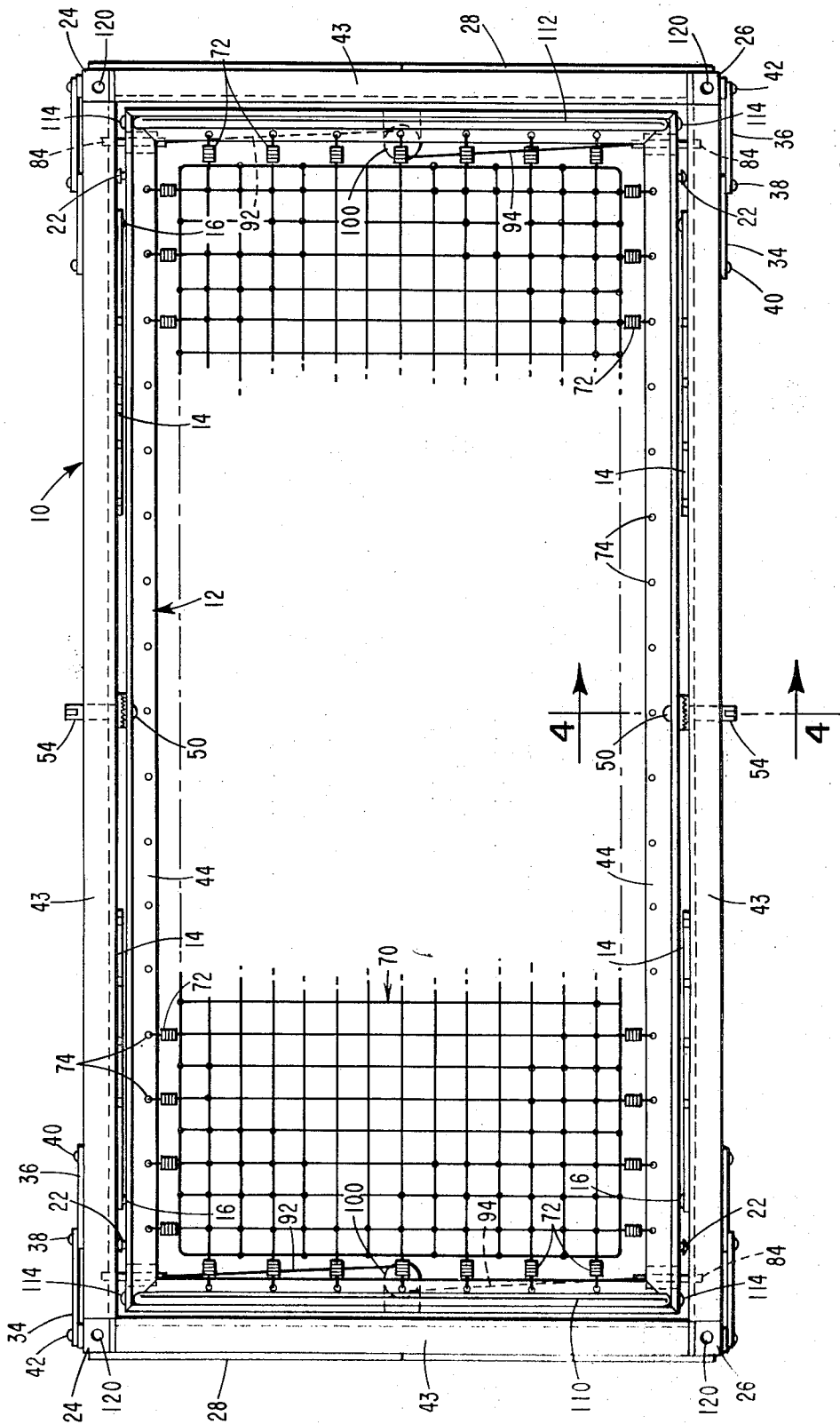
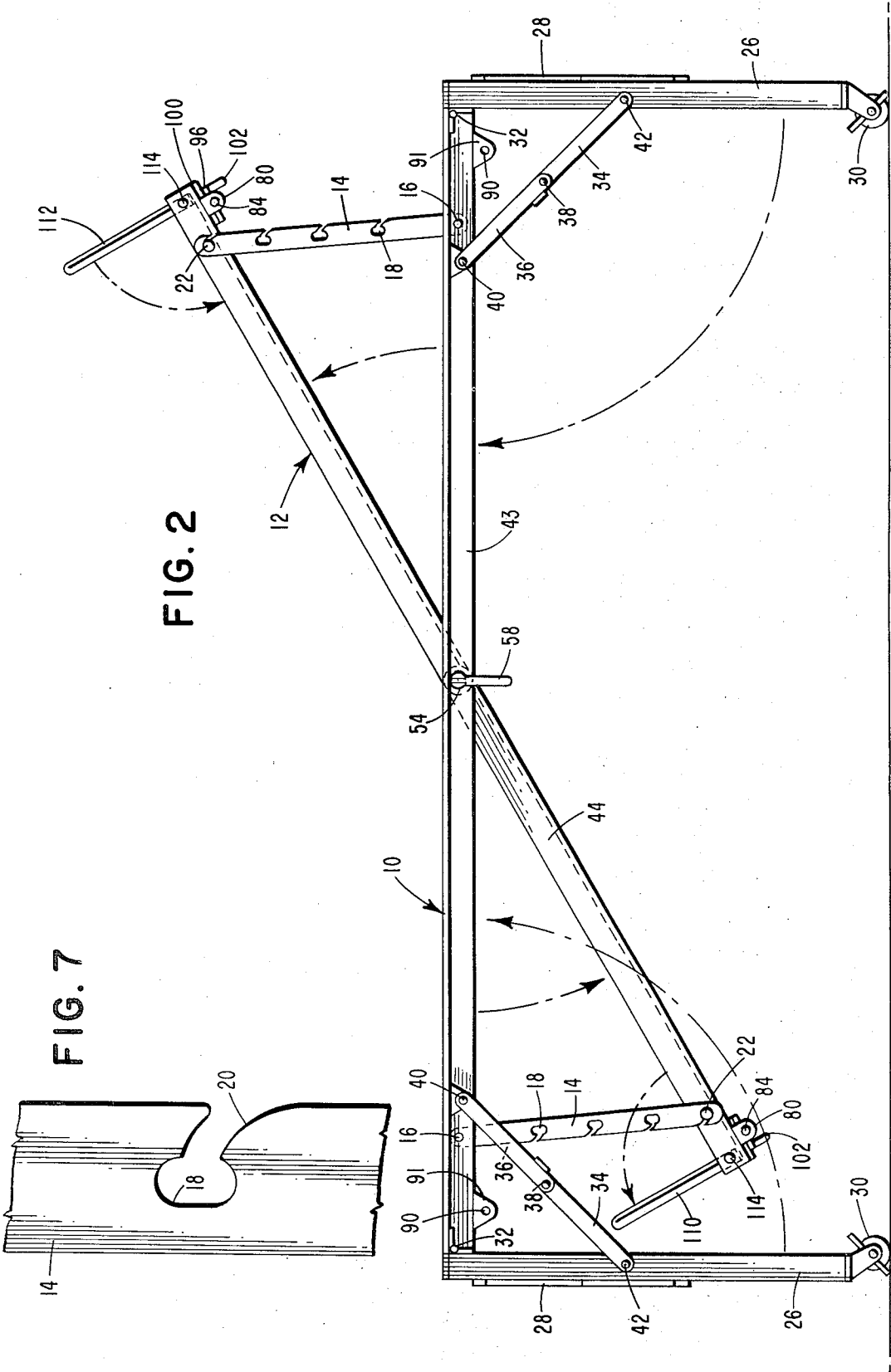


FIG. 1





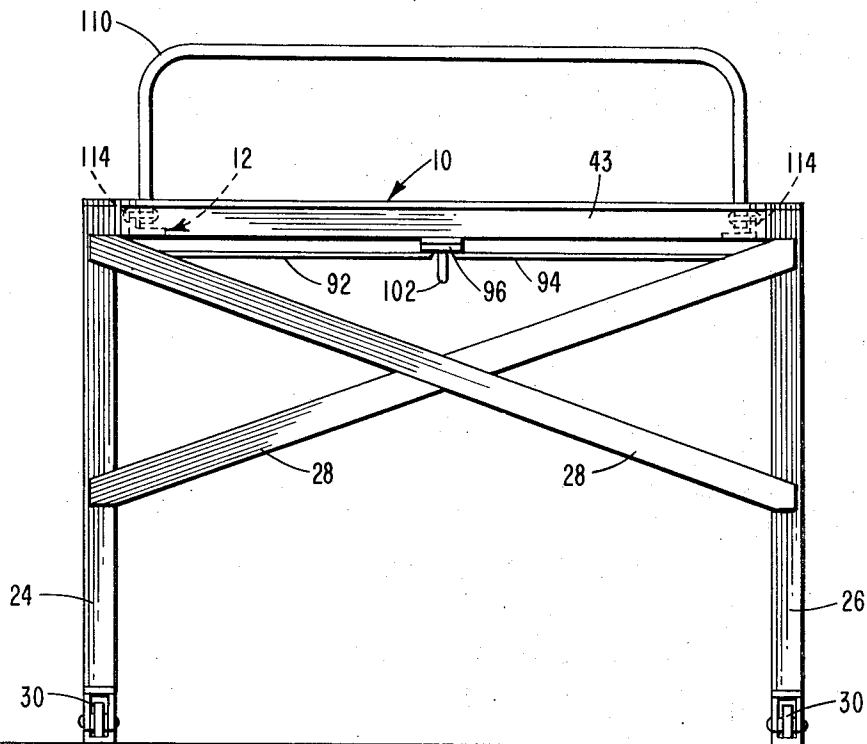


FIG. 3

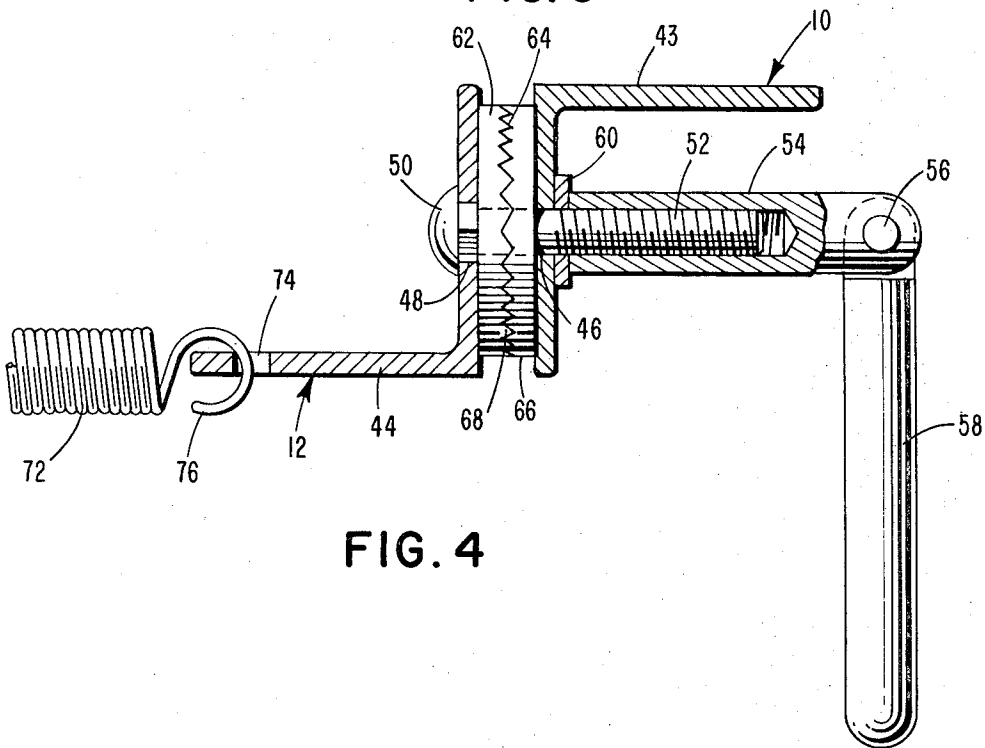


FIG. 4

FOLDING HOSPITAL BED

BACKGROUND OF THE INVENTION

The present invention relates to a folding bed assembly and more particularly to a folding bed assembly having particularly advantageous use in hospitals and the like.

The hospital beds typically found in hospitals and like environments have several features in common. They are relatively large in size and ruggedly built to withstand long periods of use, thereby constituting a relatively high initial cost item. They are also customarily provided with means for adjusting the bed frame which supports the occupant to various levels and inclinations to facilitate patient treatment. In addition, they are normally provided with means for receiving supplemental patient care accessories such as traction equipment, oxygen equipment or similar apparatus to provide the necessary environment in order to obtain optimum patient care and treatment.

The typical hospital bed is essentially of like construction whether the bed is located in a private, semi-private, or ward type environment. In periods of peak patient occupancy or in conditions of emergency or disaster, the provision of necessary hospital space to receive additional beds has long been a persistent problem, not to mention the initial cost of purchasing such beds for the indicated emergency conditions. To applicant's best knowledge, there is not presently available a bed which can be conveniently folded and stored when not in use and which at the same time can provide the features normally found on typical bed constructions for providing optimum patient care. Applicant is aware of the use of folding cots and the like for emergency conditions in hospitals, but these cots are considered to be of a totally different order than the type of bed discussed above and provided in accordance with the present invention.

SUMMARY OF THE INVENTION

With the above in mind, a principal object of the present invention is to provide a hospital bed generally similar to those beds typically found in hospitals, but distinguished therefrom by being foldable when not required to be placed in use thereby to permit convenient and space-saving storage.

A further object of the present invention is to provide such a folding bed the construction of which includes means to adjust the bed spring on which the patient rests to the desired angle, and to lock such bed spring in such adjusted angle. In accordance with the invention, the bed spring is pivoted to the outer bed frame adjacent the mid-point of the bed spring, with means being provided to lock the bed spring to the frame when the spring is disposed horizontally in the normal manner of use. When it is desired to elevate either the upper or lower portion of the patient's body, the bed spring can be quickly and simply released from such locked, horizontal position, moved to the desired inclined position, and locked in such position.

A further object of the present invention is to provide a foldable bed of the type described wherein the mattress and pillows or air bags can be supplied in a deflated condition for storage with the bed. When conditions require use of the bed, the mattress can be quickly

inflated, and a bag or bags inflated to support the patient in the desired position on the bed spring.

These and other objects will become apparent as the following description proceeds, in particular reference to the application drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings, FIG. 1 comprises a top plan view of the folding bed in accordance with the present invention;

FIG. 2 comprises a side elevational view of the bed, with the inner frame being shown in an inclined position;

FIG. 3 comprises an end elevational view of the bed;

FIG. 4 comprises a sectional view taken on line 4—4 of FIG. 1;

FIG. 5 is a side elevational view of the folding bed, with the mattress and air bags being shown inflated and arranged in a particular patient position;

FIG. 6 is a fragmentary, bottom plan view of one end of the bed, showing the preferred locking arrangement for maintaining the bed spring in a horizontal position, and

FIG. 7 is an enlarged, fragmentary view of the supporting brace for supporting the inner bed frame in an inclined position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in more detail to the application drawings, wherein like parts are indicated by like reference numerals, and initially to FIGS. 1-3, the folding bed constructed in accordance with the present invention comprises a main frame generally indicated at 10 and a bed spring frame generally indicated at 12 which is dimensioned to fit within the main frame 10, as can be seen in FIG. 1. The inner frame 12 is pivoted at both sides thereof to the main frame 10 at generally the longitudinal mid-point of the frame 12, as shown in FIGS. 1 and 2. The specific pivoting arrangement will be described below when particular reference is made to FIG. 4 of the application drawings, although it will be noted here that the bed spring can be maintained in a generally horizontal position within the plane of the main frame 10, or inclined with the respect to such plane, as shown in FIG. 2.

A pair of supporting braces commonly designated at 14 are provided at each end of the main frame 10, with the braces being pivotally connected to the main frame through pivot pins 16. Each brace 14 includes a series of spaced, oblong shaped openings commonly designated at 18, the entrance to which is through a curved opening or slot 20, shown enlarged in FIG. 7. Pins commonly designated at 22 are formed on and laterally extend from the sides of the bed spring frame 12 relatively adjacent the ends thereof for selective engagement in the slots 18. The curved lead-in openings 20 facilitate movement of the pins 22, which have reduced neck portions (FIG. 1), into the openings 18, with the oblong shape of the openings 18 preventing inadvertent withdrawal of the pins 22 from the openings.

The bed spring frame 12 is shown in its most inclined position in FIG. 2, although it will be understood that the inclination of the bed spring frame 12 will be adjusted to fit the particular patient's needs. To return the bed spring frame 12 to a horizontal position, the pins 22 are withdrawn from the openings 18 and the sup-

porting braces 14 allowed to drop about their pivotal and the to the main frame 10. When the bed is folded and stored, as will be hereinafter described, the supporting braces 14 lie generally in the plane of the main frame 10.

The main frame 10 is supported at each end by legs 24 and 26, FIG. 3, with diagonal braces commonly designated at 28 being shown in the preferred form of the invention to rigidify the leg assembly. To facilitate rolling movement of the bed, the legs 24 and 26 are preferably supported on casters commonly designated at 30, which can be of conventional form and function.

Referring to FIG. 2, the legs 24 and 26 at each end of the main frame are pivotally connected thereto through a hinge 32 to permit folding of the legs to a position generally parallel to the plane of the main frame 10. The legs 24 and 26 are further interconnected to the main frame 10 through braces 34 and 36, which are pivoted at 38 at their adjacent ends and pinned as shown at 40 and 42 to the main frame and adjacent leg, respectively. The braces 34 and 36 when extended as shown in FIG. 2 maintain the legs 24 and 26 in a vertical position, and permit folding of the legs to a position adjacent the main frame, when the bed is desired to be stored.

Referring to FIGS. 1 and 4, the main frame 10 is formed of angle members 43 which are rigidly interconnected at their adjoining corners to provide a rectangular bed frame, in conventional manner. The bed spring frame 12 is likewise constructed of angle members 44 joined to form a frame of slightly smaller dimension so as to fit within the frame 10. The angles 43 and 44 as shown in FIG. 4 are provided with aligned openings 46 and 48, respectively, for receiving there-through a mounting bolt 50. The threaded shank 52 of the bolt 50 is received in a threaded sleeve 54 the end of which is apertured to receive a pin 56 for mounting a handle 58. A washer 60 is interposed between the inner end of the sleeve 54 and the adjacent leg of the angle member 43.

Affixed to the vertical leg of the angle member 44 is a truncated cylindrical element 62 having teeth 64 disposed around its front, exposed surface. A similar such cylindrical element 66 having complementary teeth 68 is rigidly mounted on the vertical leg of the angle member 42 which comprises the main frame 10. The teeth 64 and 68 are shown in FIG. 4 in locked position thereby preventing the bed spring frame 12 from pivoting relative to the main frame 10. The locking is effected through tightening of the sleeve 54 on the shank 52 of the bolt 50, by means of the handle 58. The FIG. 4 positioning of the bed spring frame 12 relative to the main frame 10 is the normal positioning of the bed when the patient is horizontal.

When it is desired to incline the bed spring frame 12 relative to the main frame 10, the sleeve 54 is loosened or withdrawn by means of the handle 58, from the bolt shank 52 thereby permitting the angle member 42 to be withdrawn from the angle member 44, thereby disengaging the teeth 64 and 68. The bed spring frame 12 can then be inclined to the desired position relative to the main frame 10, and supported in such position by the braces 14 previously described. When so supported, the sleeve 54 can again be tightened on the bolt shank 52 to advance the angle member 43 for meshing engagement with the teeth 64 and 68 to lock the bed in such inclined position. The locking arrangement

shown in FIG. 4 could be used as the sole means of maintaining the bed either in a horizontal or an inclined position.

It will be understood that the locking arrangement shown in FIG. 4 is duplicated at the other pivotal connection of the bed spring frame to the main frame. It will also be understood that although such locking arrangement could provide the sole means to maintain the bed either in a horizontal or inclined position relative to the main frame, supplemental supporting means are preferably employed, with the supporting braces 14 supplementing the support for the bed spring frame when inclined, and the means to be presently described when reference is made to FIG. 6 supplementing the support for the bed spring frame when the same is disposed in a horizontal position.

Referring to the construction of the bed spring frame 12, the same comprises in the form shown an inner wire frame generally indicated at 70 of conventional construction and formed of interconnected wire members, as shown in FIG. 1. A series of coil springs commonly designated at 72 resiliently connect the inner spring frame 70 to the angle members 44, with the latter being provided with openings 74 to receive the outer, free ends 76 of the springs 72, most clearly seen in FIG. 4. The springs 72 extend around the entire periphery of the inner spring frame 70, thereby to provide a resilient supporting surface for the patient.

Referring now to FIG. 6, which comprises a bottom plan, fragmentary view of the bed, there is illustrated therein supplemental means for maintaining the bed spring frame 12 in a horizontal position relative to the main frame 10. Rigidly secured to the bottom of the angle member 43 are cylinders 80 and 82 at both sides of the bed spring frame. Extending through each cylinder is a pin 84 having an enlarged, piston-like portion 86 disposed within the cylinder 80 and biased by coil spring 88 in a direction laterally outwardly of the bed spring frame, or to the left as shown in the exposed cylinder in FIG. 6. The outer, free end of the pin 84 extends through an opening 90 formed in a dependent flange member 91 welded to the bottom of frame member 43, in alignment with the pin 84, so as to maintain the bed spring frame as nearly horizontal as possible.

A pair of actuating rods 92 and 94 interconnect the pins 84 with a rotating disc 96 which is pivotally connected by means of a pin 98 to a plate 100 secured to the adjacent leg of the angle member 44. A handle 102 extends downwardly from the disc 96 for rotating the same about the axis through the pin 98.

In the position shown, the springs 88 resiliently bias the pins 84 outwardly of the cylinders 80 and 82 for engagement in holes 90 by the outer ends of the pins 84, thereby maintaining the bed in its horizontal position. When it is desired to incline the bed, the toothed cylinders 62 and 66 are unlocked as above described in reference to FIG. 4, and the disc 96 thereafter rotated by means of the handle 102 in a counterclockwise direction, as indicated at FIG. 6. Such rotation serves to withdraw the pins 84, through the interconnecting rods 92 and 94, thereby permitting pivotal movement of the bed spring frame 12 relative to the main frame 10. After the frame 12 has cleared the frame 10, the disc 96 can be released whereby the pins 84 will be biased outwardly. When the bed spring frame 12 is subsequently returned to its horizontal position, the pins 84

can be retracted and released when aligned with the openings 90.

As above indicated, the mattress and pillows supplied with the bed are preferably inflatable so as to permit flat storage of the same. Referring to FIG. 5, there is illustrated therein the mattress 101 and pillows 103, 104 and 106 resting on the bed spring frame 12 and supporting the mattress 100 and thus the patient in a "gatch" position for optimum patient treatment. The pillows or bags can be deflated and stored flat when not in use, and with the mattress 100 can be placed flat on the bed spring frame.

In the form shown, generally U-shaped end members 110 and 112 are mounted at both ends of the bed on the bed spring frame 12. Referring to FIG. 3, the members 110 and 112 are preferably pivotally connected to the bed spring frame 12 at 114 for pivotal movement between their upright position as shown in FIGS. 2 and 5 and a downwardly folded position in which they are normally positioned within the confines of the frame 12. If desired, the members 110 and 112 may be resiliently mounted so as to bias the same to a folded position to more effectively retain the mattress, air bags, and the like on the bed spring frame when the bed is folded.

Referring to FIG. 1, there is provided at each corner of the main frame 10 an opening 120 for the purpose of receiving traction sockets, or like accessory equipment for patient treatment. It will be understood that the main frame can be additionally modified to receive equipment or accessories in much the same manner as the usual hospital bed.

The normal use of the bed constructed in accordance with the invention should be apparent from the above description. The bed spring frame 12 can be positioned relative to the main frame 10 in the manner described to permit horizontal or inclined patient positioning. The bed spring frame 12 can be locked at any adjusted position by means of the supplemental locking arrangements described, in combination with the central locking means illustrated in FIG. 4. The mattress and air bags or pillows can be inflated for use when the bed has been set up.

When the bed is no longer required to be used, the same can be quickly folded and stored in a minimum of space. To fold the bed, the bed spring frame 12 is first moved or maintained in its horizontal position, and locked. The end members 110 and 112 are then folded downwardly to overlie the bed spring frame, and the legs 24 and 26 at each end of the bed are thereafter folded upwardly beneath the top horizontal flange of the main frame. The supporting braces 14 and the actuating handle 58 are then positioned generally in the plane of the main frame 10 so as to form a very compact folded assembly.

Although it will be understood that the folding bed in accordance with the present invention has general utility, it can be used to particularly good advantage in the usual hospital room environment, since the bed can be quickly removed or installed when the need arises. The unique construction of the bed enables the same when set up to perform essentially the same functions as the normal hospital beds, thereby providing critically needed bed capacity in times of emergencies, without

significantly detracting from patient care or comfort.

I claim:

1. A folding bed comprising

- a. a main bed frame,
- b. a pair of legs at each end of said main frame and hinged thereto, said legs folding from a supporting position to a folded position generally within the plane of said main bed frame,
- c. a bed spring frame disposed within said main bed frame, said bed spring frame and said main frame being of generally the same depth whereby when said legs are folded within the plane of said main frame, a compact, relatively flat bed assembly is provided,
- d. pivot means for pivotally mounting said bed spring frame on a single axis generally intermediate the length of said bed spring frame thereby to permit said bed spring frame to be inclined relative to said main frame to the desired patient position, and
- e. locking means associated with said pivot means to maintain said bed frame either in a position generally parallel to said main bed frame or at an angle inclined thereto.

2. The folding bed of claim 1 further including supplemental means to maintain said bed frame in a position generally parallel to said main bed frame, comprising a pair of locking pins carried by said bed spring frame, means for biasing said pins into slots provided therefor in said main frame, and means for retracting said pins from said slots to permit movement of said bed spring frame relative to said main frame.

3. The folding bed of claim 1 wherein said pivot means for pivotally mounting said bed spring frame on said main bed frame comprises a mounting bolt extending through aligned openings provided therefor in the adjacently disposed portions of said main frame and said bed spring frame, said locking means to maintain said bed frame either parallel or inclined to said main frame comprising locking members carried by the respective frames in the area of their pivotal connection, and means to move said locking members toward each other in locking arrangement or away from each other to permit movement of said bed spring frame relative to said main frame.

4. The folding bed of claim 3 further including a threaded sleeve carried by said mounting bolt, and handle means exposed at the exterior of said bed for rotating said sleeve for positioning said locking members in locked and unlocked positions.

5. The folding bed of claim 1 further including supporting brace members pivotally carried by said main frame and provided with generally oblong shaped openings with entrance slots to receive pins disposed at either side of said bed spring frame, with engagement of said pins in selected openings in said braces serving to maintain said bed spring frame in the desired angle of inclination.

6. The folding bed of claim 1 further including an inflatable mattress and inflatable bags or pillows for supporting said mattress when inflated in the desired patient position, the inflation of said mattress and pillows permitting storage of the same on said bed spring frame for convenient storage.

* * * * *