Feb. 17, 1959 J. F. JOY 2,873,457

BED WITH ADJUSTABLE INVALID LIFT

Filed Feb. 25, 1955 4 Sheets-Sheet 1

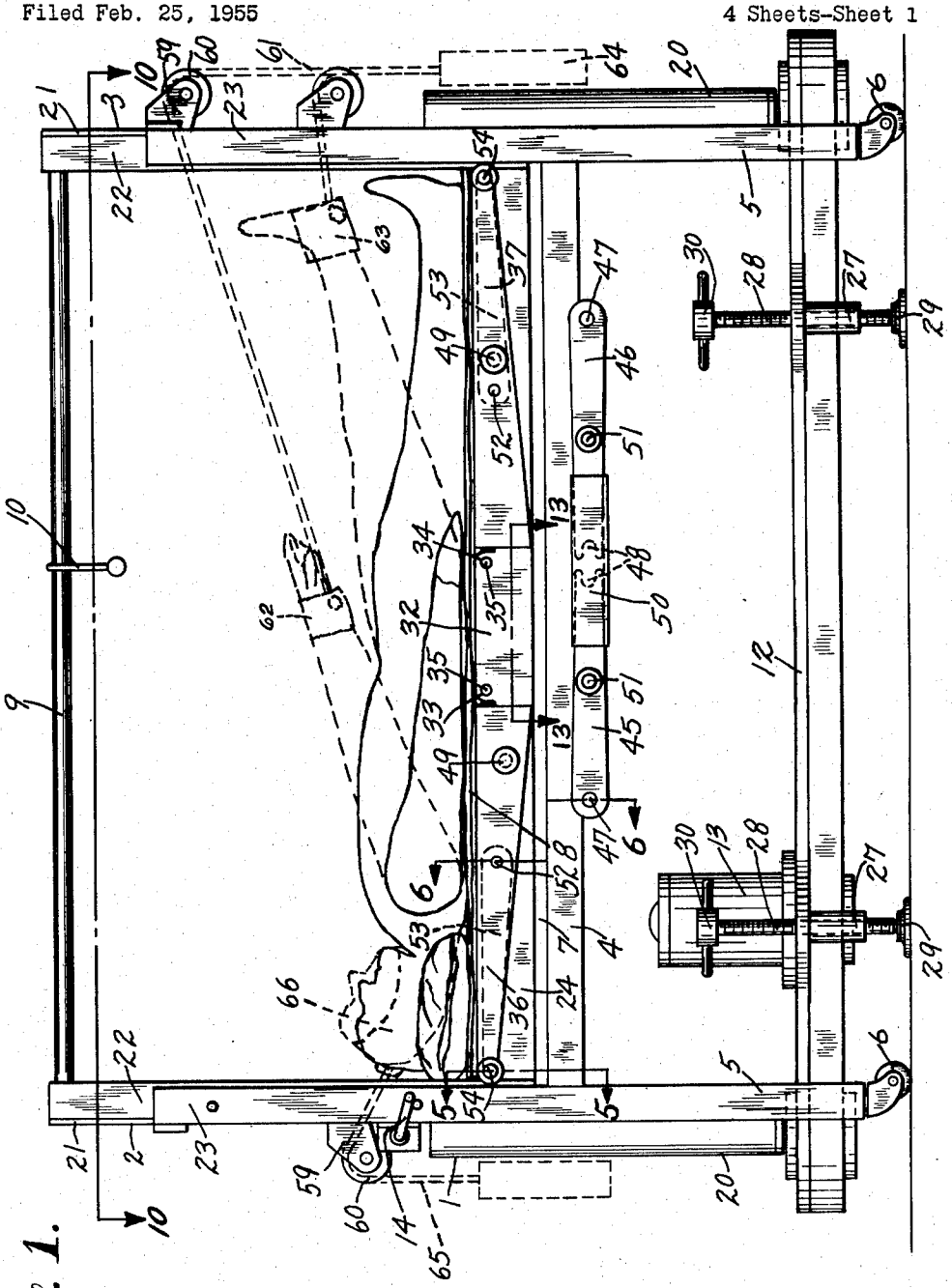


Fig. 1.

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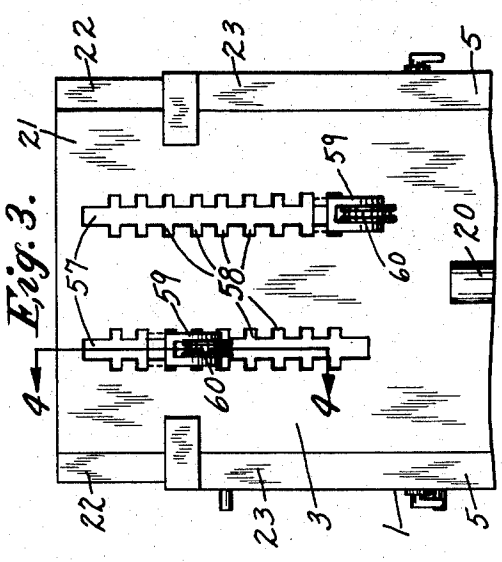


Fig. 3.

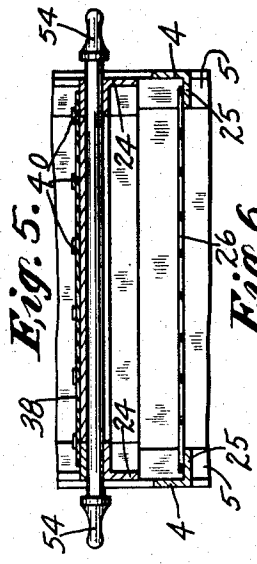


Fig. 5.

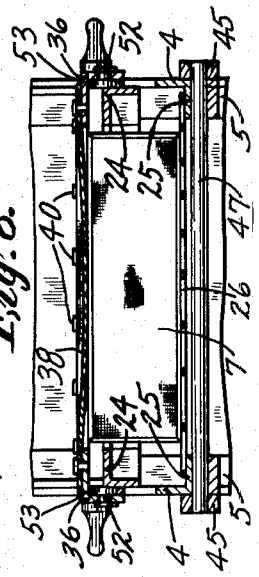


Fig. 6.

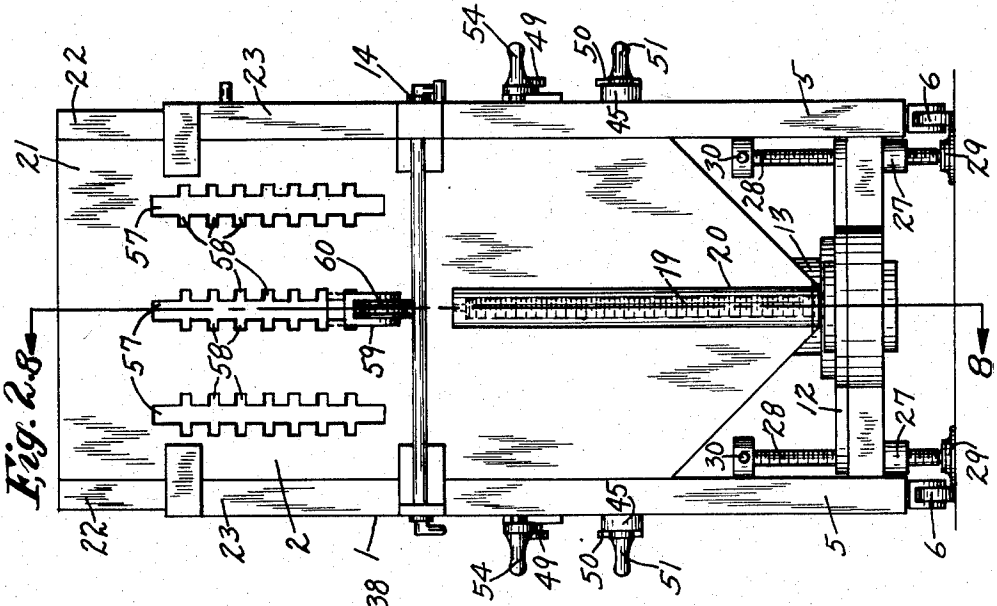


Fig. 2.

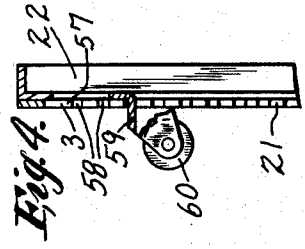


Fig. 4.

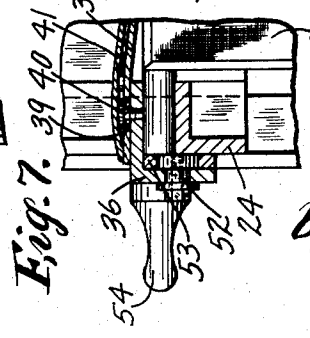


Fig. 7.

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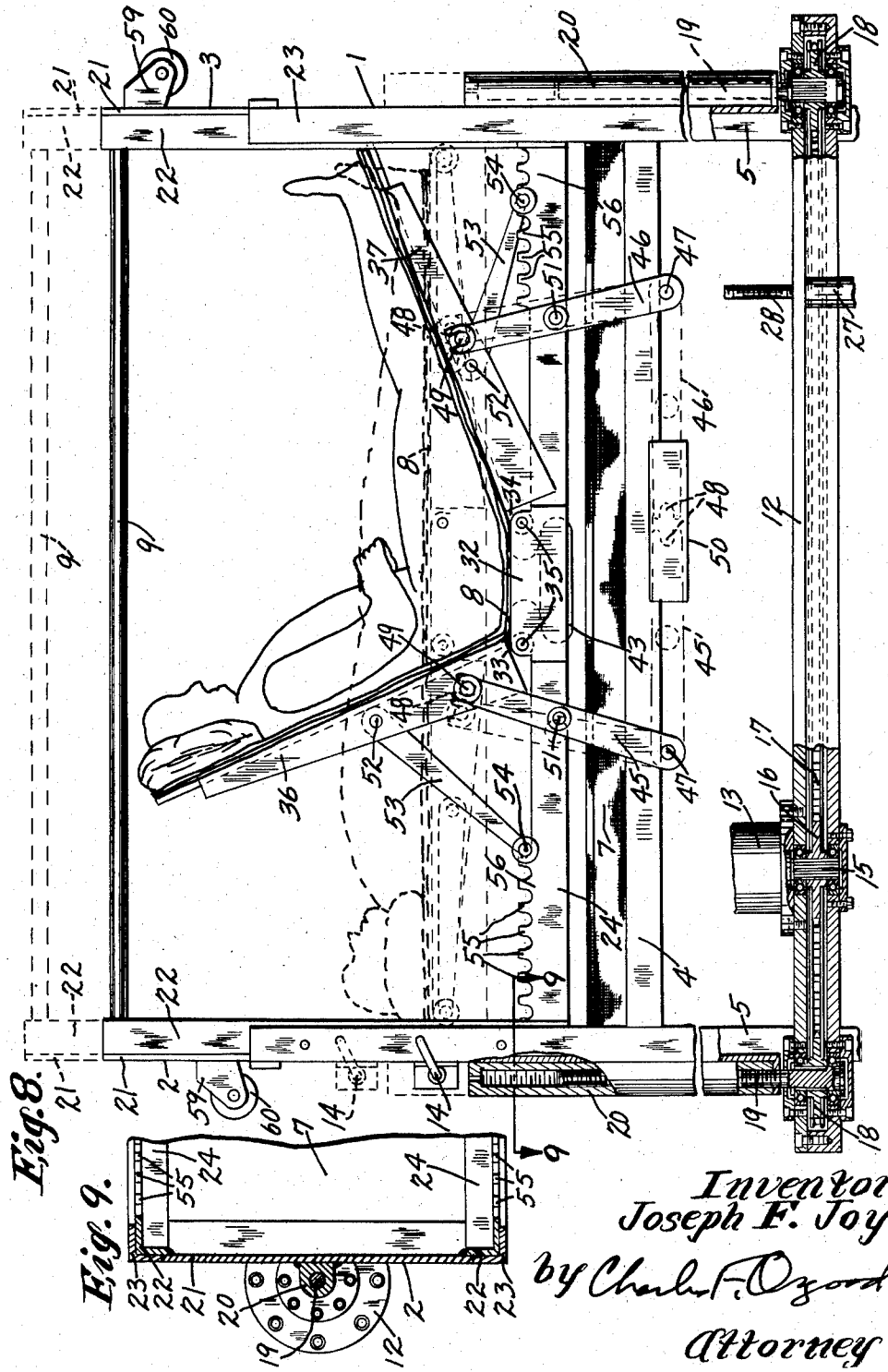


Fig. 8.

Fig. 9.

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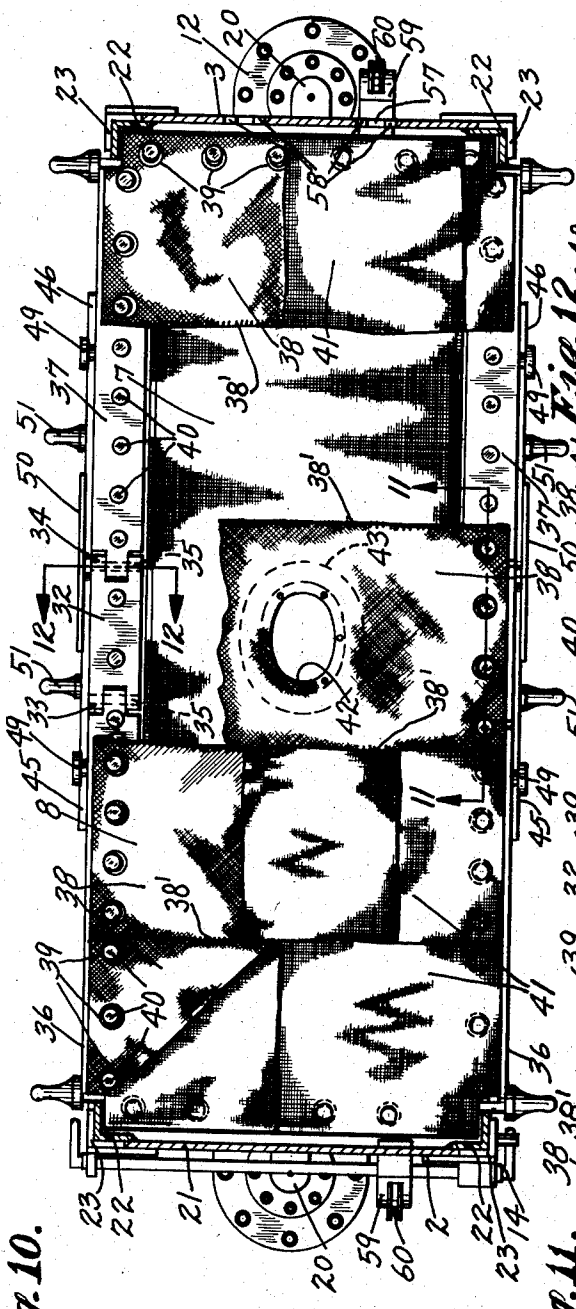


Fig. 10.

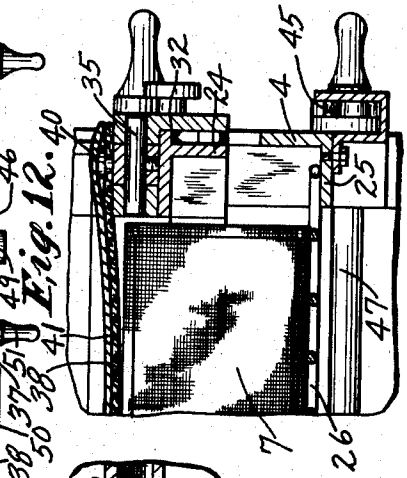


Fig. 12.

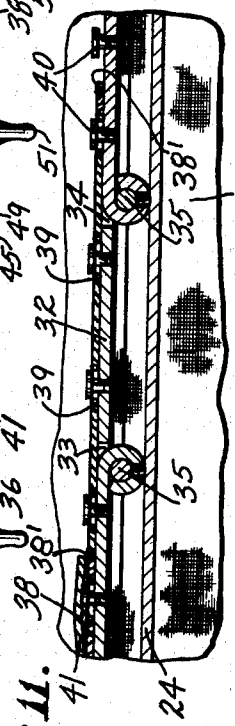


Fig. 11.

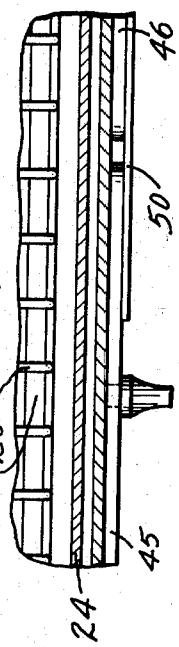


Fig. 13.

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United States Patent Office 2,873,457 Patented Feb. 17, 1959

2,873,457

BED WITH ADJUSTABLE INVALID LIFT

Joseph F. Joy, Pittsburgh, Pa.

Application February 25, 1955, Serial No. 490,450

2 Claims. (Cl. 5—83)

This invention relates to beds for invalids and more particularly to a hospital bed having an adjustable invalid lift.

In my copending application Serial No. 467,083, filed November 5, 1954, which is a continuation of my copending application Serial No. 137,103, filed January 6, 1950, now abandoned, there is shown a hospital bed with invalid lift and the present invention contemplates improvements over such a bed, and similar known types of beds, in that the structure is simplified and made more readily adjustable. The bed of the present invention embodies a single vertically adjustable stretcher arranged above the conventional mattress and this stretcher has relatively tiltable parts operated by the elevating mechanism for the stretcher whereby the patient may at times assume a relatively comfortable position.

An object of the present invention is therefore to provide an improved hospital bed having an improved adjustable invalid lift. Another object is to provide an improved adjustable bed having a vertically adjustable stretcher superimposed with respect to the mattress whereby the patient lying on the mattress may be elevated above the mattress. Yet another object is to provide an improved bed having an improved superimposed stretcher above the mattress provided with relatively tiltable portions which may be tilted by movement of the stretcher during lowering thereof by its adjusting mechanism. A further object is to provide an improved stretcher having detachable fabric strips and sheet sections whereby while the patient on the stretcher is adequately supported access to and handling of the patient on the stretcher may be facilitated. These and other objects and advantages of the invention will however more fully appear in the course of the ensuing description.

In the accompanying drawings there is shown for purposes of illustration one form which the invention may assume in practice.

In these drawings:

Fig. 1 is a side elevational view of a hospital bed constructed in accordance with a preferred illustrative embodiment of the invention.

Fig. 2 is an end elevational view of the head end of the bed shown in Fig. 1.

Fig. 3 is a fragmentary elevational view of the foot end of the bed, showing the adjustable traction sheaves.

Fig. 4 is a detail vertical section taken on line 4—4 of Fig. 3.

Fig. 5 is a fragmentary cross section taken on line 5—5 of Fig. 1.

Fig. 6 is a fragmentary cross section taken on the planes of line 6—6 of Fig. 1.

Fig. 7 is an enlarged fragmentary view of the left-hand portion of the structure shown in Fig. 6.

Fig. 8 is a central longitudinal vertical section, with parts shown in full, taken on line 8—8 of Fig. 2, and showing the pivoted stretcher parts in tilted positions.

Fig. 9 is a detail horizontal section taken on line 9—9 of Fig. 8.

Fig. 10 is a horizontal section taken on line 10—10 of Fig. 1 showing details of the adjustable stretcher.

Fig. 11 is an enlarged detail vertical section taken on line 11—11 of Fig. 10, showing the pivots for the tiltable stretcher parts.

Fig. 12 is an enlarged fragmentary cross section taken on line 12—12 of Fig. 10.

Fig. 13 is an enlarged detail horizontal section taken on line 13—13 of Fig. 1.

The improved bed with adjustable invalid lift, as shown in the drawings, generally comprises a frame 1 having a vertical head section or head board 2, a vertical foot section or foot board 3 and side sections or side bars 4 attached to the head and foot boards, and the latter have legs 5 supported by swivelled caster wheels 6. The frame of the bed supports a conventional mattress 7 and superimposed with respect to the mattress is an adjustable invalid lift or stretcher 8. A horizontal rod 9 extends at the longitudinal center of the bed longitudinally between the upper portions of the head and foot boards and adjustable longitudinally along this rod is a suitable support 10 for a mirror or other accessory equipment.

Any suitable motor operated mechanism may be provided for raising and lowering the stretcher 8 and herein, for illustrative purposes, comprises a horizontal frame 12 secured to the legs 5 of the head and foot boards beneath the mattress. Supported by the lower frame is a motor 13, herein desirably an electric motor, controlled by switch levers 14 conveniently located at the sides of the head board. This motor has a vertical shaft 15 (Fig. 8) secured to a drive sprocket 16. This sprocket engages and drives an endless chain 17 housed within the lower frame 12 as shown, and this chain passes around and drives end sprockets 18 secured to the lower ends of vertical adjusting devices herein vertical screws 19 supported by and suitably journaled within the lower frame 12. These screws are threadedly engaged in elongated upright nut members 20 secured to vertical end plates 21 connected to vertical side angle members 22 guided within outer vertical angle members 23 of the head and foot boards. The side supports or side bars 24 for the stretcher may have end cross members and are secured to the vertical plates 21 so that when the motor 13 is operated the stretcher 8 may be raised or lowered relative to the mattress as desired. The threads of the screws and nuts are self locking and serve to hold the stretcher in adjusted position.

As shown in Figs. 5 and 6, the side bars 4 of the bed-frame provide inner ledges 25 by which a conventional bedspring 26 may be supported and the mattress supported by the spring may, as shown in Fig. 6, be of the usual inner-spring type. The stretcher side bars 24, when the stretcher is lowered, extend longitudinally along the outer sides of the mattress as shown.

Secured to the sides of the lower frame 12 at inner sides of the legs 5 are upright nut members 27 in which are threadedly engaged vertical screws 28 having bottom floor engaging feet 29. Secured to the upper ends of these screws are handles 30 so that the screws may be manually rotated to raise or lower the feet with respect to the floor surface. Thus, the bed may be raised from its caster wheels 6 onto the feet 29 to afford greater steadiness of the bed.

The invalid lift or stretcher 8 comprises centrally located or middle side plates 32 on which are pivotally supported at 33 and 34, on transverse pivot pins 35 (Fig. 11), stretcher frame sections 36 and 37, and these pivoted sections may be tilted into different angular positions so that the patient on the stretcher may recline in a relatively comfortable position. Extending across the side portions of the stretcher frame are cross strips

38 of fabric or webbing disposed closely side by side with their adjacent edges connected together as by conventional slide fasteners 38' (Fig. 10), and these strips cooperate to form a continuous flexible support for the patient on the stretcher. Desirably these cross strips are provided with eyelets or grommets 39 attachable to headed pins 40 secured along the tops of the sides and ends of the stretcher frame. Extending above and lying upon these cross strips are strips 41 of sheeting similarly attachable to the stretcher frame. These cross strips may be separately detached to facilitate bathing of the patient on the stretcher or otherwise to obtain access to portions of the patient's body. Also the cross sheeting sections may be readily replaced as desired without removing the patient from the stretcher.

The central or intermediate cross strip and overlying strip of sheeting are formed with suitable registering openings, as indicated at 42 (Fig. 10), and a usual receptacle such as a bed pan 43 may be placed on the mattress beneath these openings, in the manner shown in Fig. 8.

The tilting mechanism for the pivoted frame sections of the stretcher comprises pairs of pivoted side arms or armlike struts 45 and 46 secured to transverse pivot shafts or rods 47 (Fig. 6) carried by and journaled on the side bars 4 of the mattress supporting frame. These side arms have slotted outer ends 48 and abutments such as pins 49 secured to the sides of the pivoted sections of the stretcher frame are engaged by the slotted ends of the arms with the pins seated in the slots. When the arms are lowered into their inoperative positions as shown in full lines in Fig. 1 they may rest on suitable brackets 50 attached to the side bars 4. The arms have conveniently located handles 51 whereby they may be raised and lowered. When the slotted ends of the strut-like arms are engaged with the pins 49, with the stretcher frame in its elevated position, as shown in dotted lines in Fig. 8, the motor operated mechanism 19, 20 may be operated to lower the stretcher frame and as the stretcher frame is lowered the strut-like arms cause the tiltable frame sections 36 and 37 of the stretcher frame to swing into the angular positions indicated in full lines in Fig. 8, thereby to enable the patient on the stretcher to assume a relatively comfortable position. Evidently a series of pins may be located at different positions along the sides of the tiltable frame sections for selective engagement with the strut-like arms so that the angles of tilt thereof may be varied as desired.

Pivoted at 52 on the tiltable frame sections 36 and 37 are struts or armlike supports 53 provided with handles 54 and these supports 53 may engage the teeth 55 of rack-like members 56 integral with the side bars 24 of the adjustable stretcher frame, thus to hold the tilted frame sections in position. The frame sections 36 and 37 may be tilted at different angles and at times may be manually supported to permit release of the arms 45 and 46 and then held in position by the members 53, and by properly operating the power elevating mechanism the tiltable frame sections may be separately tilted. The tilted sections of the stretcher frame may be lowered in a similar manner by the elevating mechanism simply by raising the stretcher frame to permit the frame sections 36 and 37 to swing back down into their lowered positions. The pivoted supports 53 may be folded against the pivoted frame sections of the stretcher frame as shown in Fig. 1.

The vertical end plates 21 of the vertically adjustable stretcher frame are provided with parallel vertical slots 57 (Figs. 2 and 3) having side notches 58 and brackets 59 for traction sheaves or pulleys 60 (Fig. 4) are attachable at different elevations in the slots in engagement with the proper notches. Cables 61 extend from suitable arm and leg casts 62 and 63, shown in dotted lines in Fig. 1, around these sheaves and are attached to suitable weights 64. A weighted cable 65 may be attached to a head cast 66 to provide traction for the neck of the patient in a well-known manner.

The general mode of use of the improved hospital bed is as follows: Normally the invalid lift or stretcher 8 is lowered down onto the mattress 7 so that the weight of the patient is received by the mattress. When it is desired to change the bedding on the mattress this may be facilitated by elevating the stretcher to lift the patient above the mattress to the position indicated in dotted lines in Fig. 8. Also at this time certain ones of the cross strips of fabric and sheeting may be detached from the stretcher frame to permit access to portions of the patient's body or to facilitate replacement of the strips while the patient remains supported by the stretcher. The slide fasteners connecting the adjacent edges of the fabric strips 38 enable the latter to provide in cooperation a continuous flexible support for the patient on the stretcher. By properly engaging the strut-like arms 45 and 46 with the pins 49 on the pivoted frame sections 36 and 37 of the stretcher frame and by lowering the stretcher by means of the power mechanism, the pivoted frame sections of the stretcher frame may be tilted, as indicated in full lines in Fig. 8, thereby to enable the patient to assume a relatively comfortable position. The pivoted supports 53 engaging the rack teeth 55 provide rigid holding means for the tilted frame sections and by the use of these supports 53 the stretcher frames may be independently tilted as desired. To enable the bed to be easily rolled over the floor and steered, the feet 29 may be raised from the floor so that the bed is at that time supported entirely by the swivelled caster wheels 6.

As a result of this invention an improved hospital bed is provided having an improved adjustable invalid lift or stretcher. By the provision of the power operated elevating mechanism for the stretcher and the associated strut-like arms, the pivoted parts of the stretcher frame may be relatively tilted as desired simply by lowering the stretcher frame eliminating the need for relatively complicated tilting devices. The series of detachable cross strips of fabric and sheeting enable ready access to portions of the body of the patient lying on the stretcher and also serve to facilitate replacement of the strips while the patient remains in supported position on the stretcher. These and other advantages of the invention will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A bed of the character disclosed comprising a bed-frame having a horizontal portion supporting a mattress, a stretcher overlying said mattress and having a frame supported on said bed-frame, said stretcher frame including a tiltable portion, power operated mechanism mounted on said bed-frame for elevating and lowering said stretcher with respect to said mattress, a releasable adjustable element on said bed-frame and when in operative position engaging said tiltable frame portion for causing tilting of said tiltable frame portion as the result of lowering of said stretcher by said power operated mechanism and while said horizontal portion of said bed-frame remains horizontal, and additional adjustable means for locking said tiltable frame portion in tilted position independently of said adjustable element whereby said tiltable frame portion may be held in any of its tilted positions when said adjustable element is released.

2. A bed of the character set forth in claim 1 wherein said additional locking means comprises a pivoted strut mounted on said tiltable frame portion, and abutment

teeth are provided on said stretcher frame with which said strut is engageable.

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