Nov. 16, 1926.

1,607,420

E. H. WILLIAMS

INVALID BED

Filed Nov. 23, 1923

4 Sheets-Sheet 1

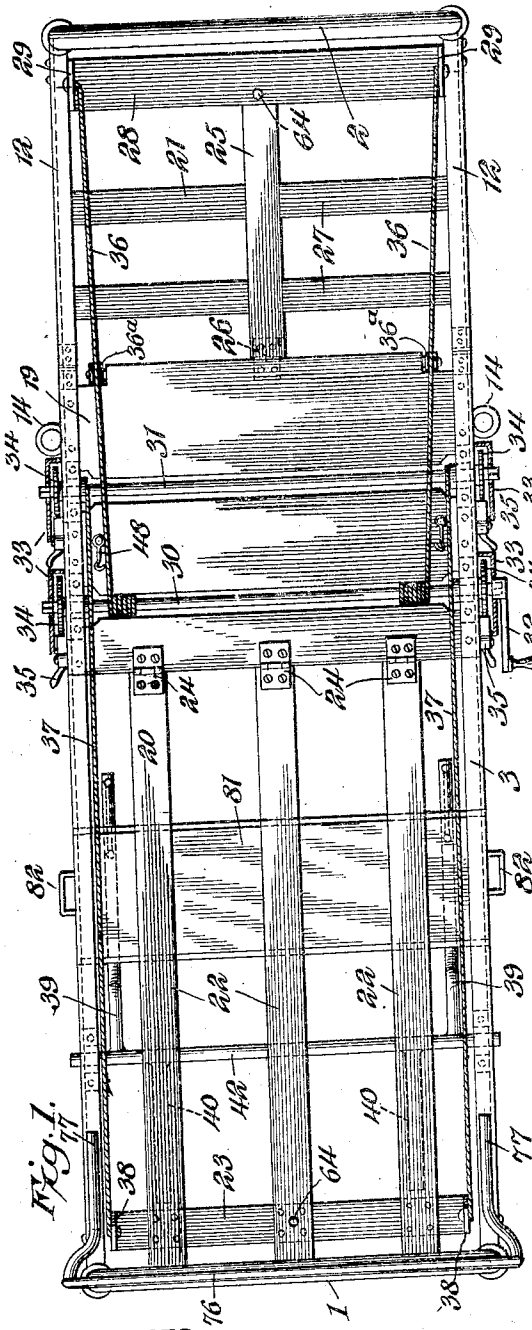


Fig. 1.

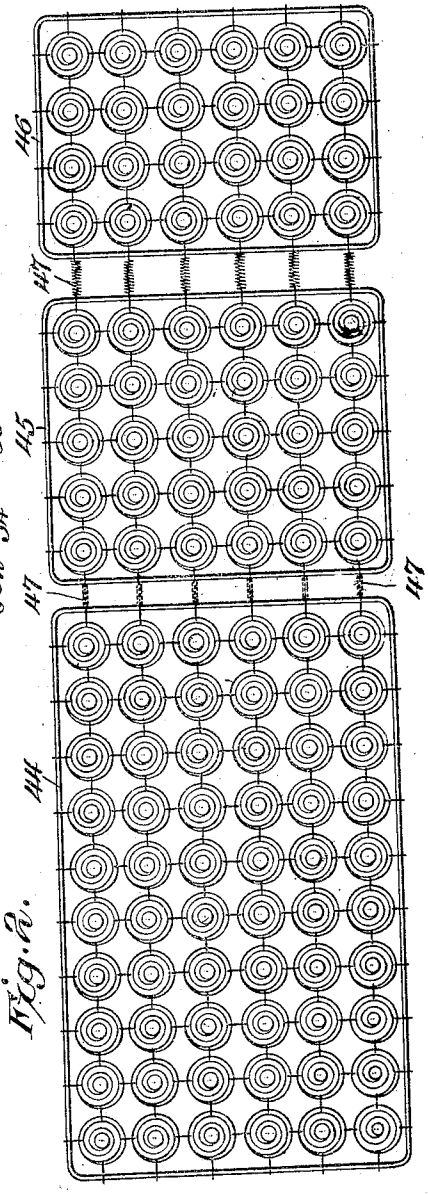


Fig. 2.

Eli H. Williams, INVENTOR,

BY E. G. Siggers.

ATTORNEY

WITNESSES

Howard D. Orr.

Harry E. Seidel

Nov. 16, 1926.

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4 Sheets-Sheet 2

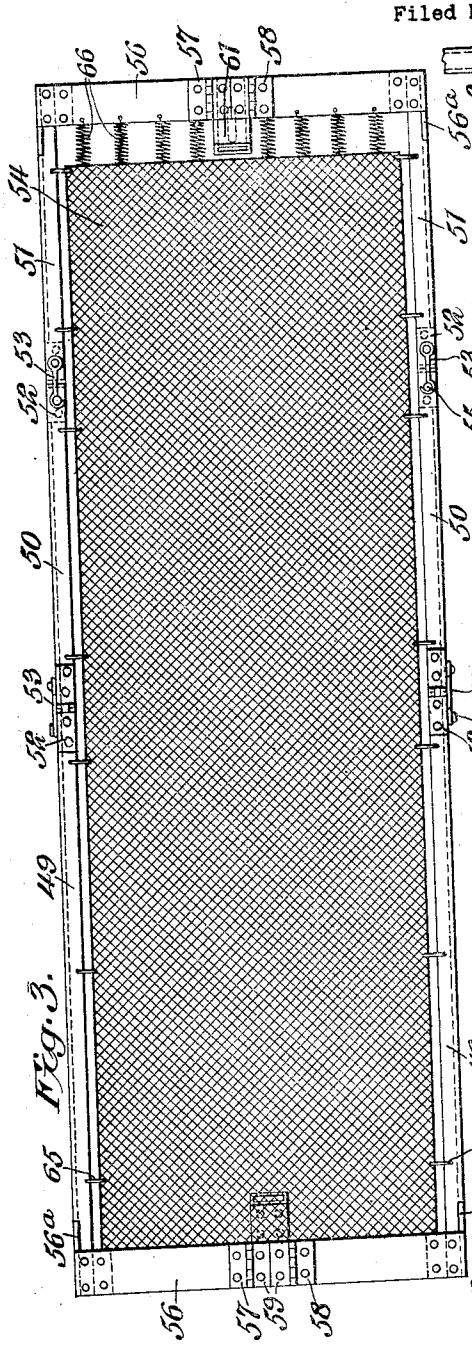


Fig. 3.

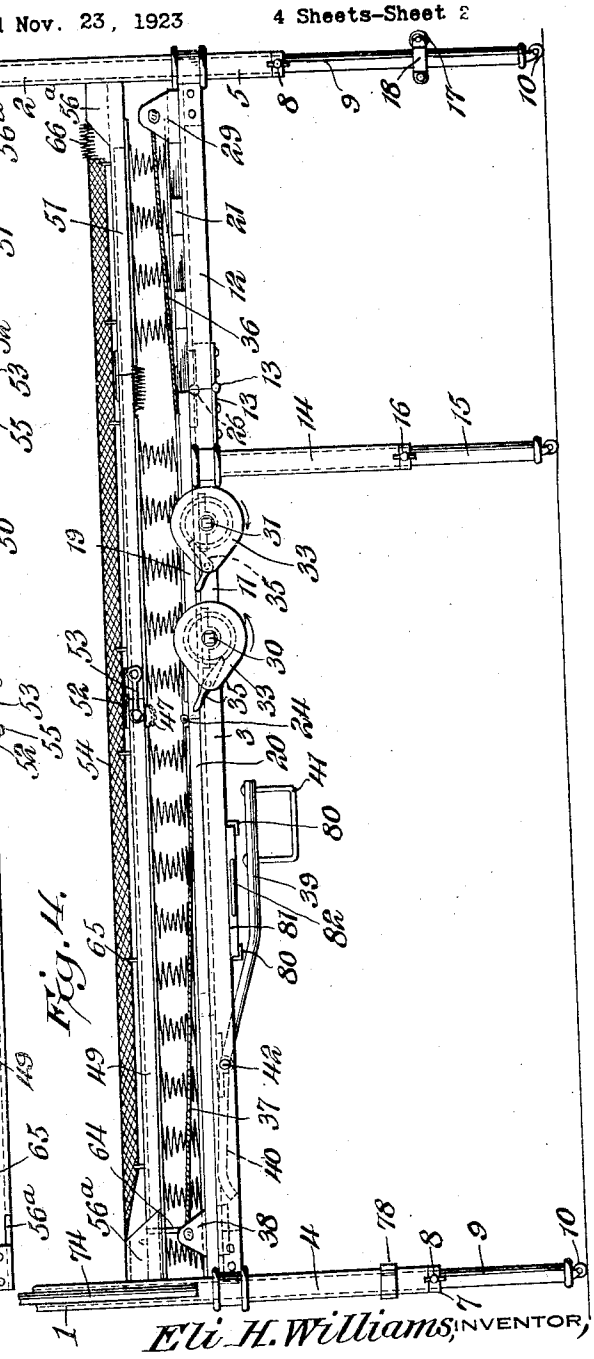


Fig. 4.

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1,607,420

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4 Sheets-Sheet 3

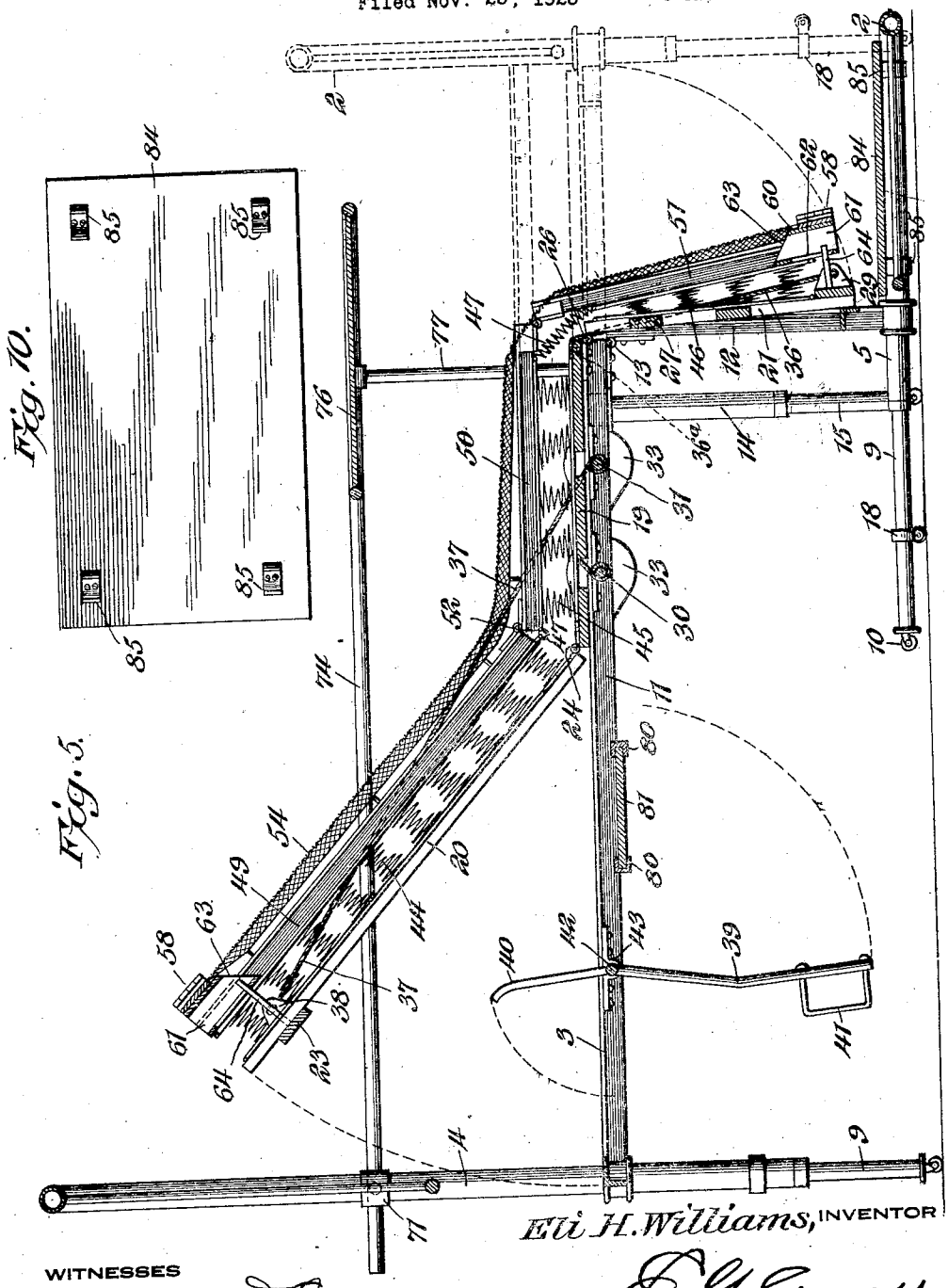


Fig. 10.

Fig. 5.

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Nov. 16, 1926.

1,607,420

E. H. WILLIAMS

INVALID BED

Filed Nov. 23, 1923

4 Sheets-Sheet 4

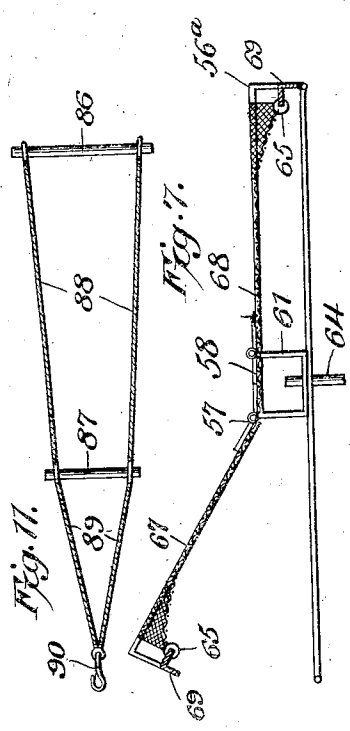


Fig. 7.

Fig. 11.

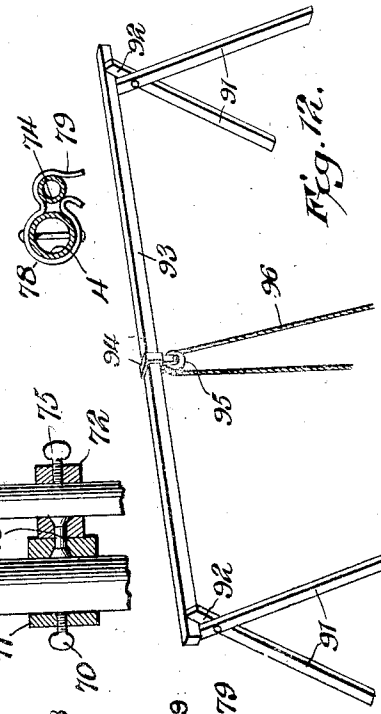


Fig. 12.

Fig. 9.

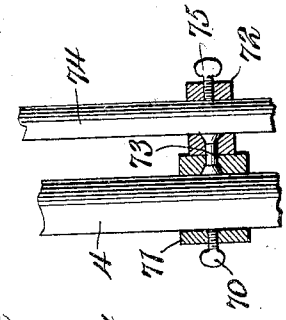


Fig. 8.

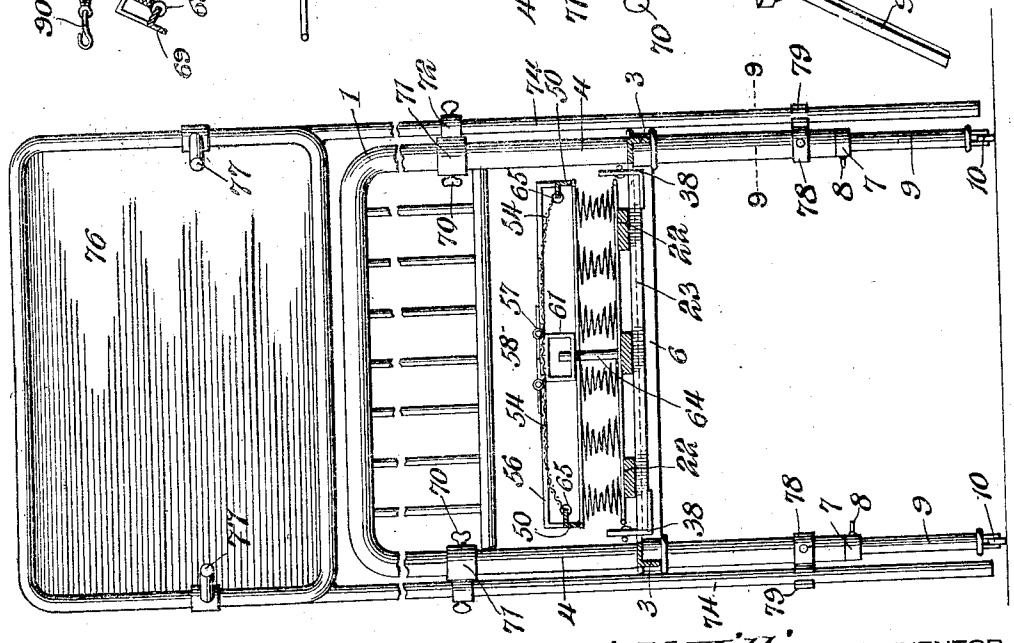


Fig. 6.

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WITNESSES

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Patented Nov. 16, 1926. 1,607,420

UNITED STATES PATENT OFFICE.

ELI H. WILLIAMS, OF WATERTOWN, TENNESSEE, ASSIGNOR OF ONE-THIRD TO S. VINSON WILLIAMS AND ONE-THIRD TO ALVIE C. PHILLIPS, BOTH OF WATERTOWN, TENNESSEE.

INVALID BED.

Application filed November 23, 1923. Serial No. 676,576.

This invention relates to bedsteads, and is more particularly directed to an invalid bed which is capable of various adjustments.

The object of the invention is to provide a bed having a plurality of yieldable bed springs which may be readily adjusted to various positions for supporting patients in the most comfortable manner, the various positions being effected and the changes being made in a manner which is very favorable and desirable for the patient.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing in the drawing, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Fig. 1 is a plan view of the bedstead disclosing the mechanism connected with the bed for making various adjustments of the springs.

Fig. 2 is a plan view of a plurality of springs which are placed upon the platform shown in plan view in Fig. 1.

Fig. 3 is a plan view of a horizontal spring frame.

Fig. 4 is a side view of my improved bedstead.

Fig. 5 is a longitudinal section of the invalid bed in position for placing an invalid in reclined sitting position.

Fig. 6 is a transverse section of the bedstead.

Fig. 7 is an end view of a horizontal spring, one section of which is tilted at an angle.

Fig. 8 is a fragmentary view in section of a swiveled connection for the supporting rods of the table.

Fig. 9 is a cross section taken along the line 9—9 of Fig. 6.

Fig. 10 is a plan view of a foot rest which is detachably secured to the foot frame.

Fig. 11 is a view in detail of an obstetrical instrument adapted to be secured to the bed.

Fig. 12 is a view in perspective of a device by which the patient may assist in raising himself.

Referring to the drawing, 1 designates the head frame, 2 the foot frame, and 3 the side rails of the bed. The head frame and foot frame are each provided with the hollow posts 4 and 5, respectively, the posts of each frame being connected by the usual decorative framework and the angle irons 6.

The posts 4 of the head frame and posts 5 of the foot frame are provided at their ends with collars 7, each collar having a screw-threaded perforation in which is adapted to be inserted a set screw 8. Legs 9 are telescopically mounted in the posts 4 and 5, and positioned in place by means of the set screws 8 being forced up tight against said legs. The usual casters 10 are mounted at the lower ends of the legs 9. The side rails 3 are formed of a plurality of sections 11 and 12, the respective sections of each rail being pivotally connected by means of the hinge 13 secured to the under sides of the abutting ends of the sections 11 and 12.

Near the pivoted ends of the sections 11 of the side rails are secured hollow posts 14 telescopically receiving legs 15, which are slidably mounted in the posts 14 and held in adjusted position by means of set screws 16. The posts 14 and the legs 15 support the hinged end portions 11 of the side rails when the sections 12 and the foot frame 5 are lowered angularly with respect to the side rails 3, and the foot frame 2 is positioned horizontally and supported upon the floor by casters 17 mounted in a collar 18 on the legs 9 of the foot frame.

It will be observed that by reason of the difference between the radius extending horizontally from the hinge 13 to the back of the foot frame and the radius extending diagonally from the hinge 13 to the caster at the end of the leg 9 of the foot frame, that the operator would experience difficulty in positioning the foot frame horizontally because the legs 9 would interfere with the movement by reason of their length, but since the legs are adjustable

vertically within the posts 5 of the foot frame, the set screws 8 may be loosened and the legs 9 shoved into the hollow posts 5 sufficiently to permit the legs to clear the floor and position the foot frame horizontally. The casters 17, in this position of the foot frame, serve the same purpose as the casters 10 when the foot frame was in a vertical position.

Firmly mounted upon the ends of the sections 11 of the side rails 3 are a plurality of spaced bars forming an intermediate platform 19 upon the opposite sides of which are pivotally mounted a head platform 20 and a foot platform 21. The head platform is formed of a plurality of equally spaced parallel bars 22 secured near their outer ends to a cross bar 23, the outer ends of the bars 22 resting upon the angle iron 6 of the head frame, while the inner ends of these bars are hingedly mounted at 24 to the intermediate platform 19.

The foot platform 21 comprises a longitudinally disposed bar 25 hingedly mounted at 26 upon the platform 19, spaced parallel cross bars 27 secured to the longitudinal bar 25, and an end cross bar 28 secured at right angles to the end of the longitudinal bar 25 and provided with perforated flanges 29 projecting upwardly from said cross bar. The cross bar 28 is secured in any approved manner to the sections 12 of the side rails 3.

Mounted in bearings depending from the section 11 of the side rails 3, running transversely of the bed and located in the spaces between the bars forming the platform 19, are shafts 30 and 31. These shafts are operated by cranks 32 secured upon the outer ends of the shafts which project beyond casings 33 that house ratchets 34. These ratchets are rigidly mounted on and near the ends of the shafts 30 and 31. Pawls 35 are pivotally mounted upon the section 11 of the side frame and are adapted to engage the teeth of the ratchets 34 to lock the shafts 30 and 31 from unauthorized rotation. It will be noted from Fig. 1 of the drawing that the casings 33, ratchets 34, and pawls 35 are duplicated upon the opposite side of the bed.

As the shaft 30 is rotated in the direction indicated by the arrow in Fig. 4, cables 36 which are secured at one end to said shaft and at their other ends to the flanges 29 located on the platform 21, are wound upon the shaft and the foot of the bed is drawn upwardly from the horizontal position shown in Fig. 5 in full lines, to the vertical position shown in dotted lines.

When the shaft 31 is rotated in the direction indicated by the arrow in Fig. 4, the cables 37, which are secured at one of their ends to the shaft 31 and at their outer ends to the outer free end of the head platform 20, are wound upon the shaft 31 and the head platform is elevated at an angle to the horizontal plane passing through the middle platform 19. The foot lever 39 is depressed, forcing the arms 40 upwardly which engage bars 22 of the head platform and slightly tilting the platform 20 from its horizontal position of rest; otherwise a great strain will be thrust upon the cables 37 since said cables are substantially in a horizontal position. The foot levers 39 are positioned inwardly and beneath the side rail 3 having the stirrup 41 adapted to receive the foot of the operator, and like the elevating arm 40 are integrally mounted at one end on a rock shaft 42 mounted in bearings 43 which are secured at opposite points upon the side rails 3.

If it be desired at any time to lower the head platform 20 or the foot platform 21, it will only be necessary to release the pawls 35 from engagement with the teeth of the ratchets 34 when the weight of the head and foot platforms will be sufficient to cause them to descend. It will be necessary to withdraw the legs 9 of the foot frame from the hollow posts 5 sufficiently to permit the casters 10 to rest on the floor. The set screws are again manipulated to secure the legs 9 in supporting position for the foot frame.

Upon the three platforms described above are placed three springs 44, 45 and 46, which are hinged together by coil springs 47 and which may be considered collectively as a single bed spring. These springs are of the type commonly known as the vertical coil spring. The intermediate spring 45 is fastened to the intermediate platform 19 by means of hooks 48 which are secured to the middle platform 19. The head spring 47 and the foot spring 46 are elevated simultaneously with the head platform 20 and the foot platform 21 respectively, while the intermediate spring 45 must remain in stationary position on the platform 19.

Mounted upon these three sets of springs is another spring having a pair of parallel jointed side bars comprising sections 49, 50 and 51, hingedly connected together by means of the hinges 52, the said hinges being located above and in line with the hinged portion of the platforms, 20 and 21. Latches 53, pivotally mounted near the ends of the different sections of the side bars of the spring 54, engage pins 55 located on the abutting ends of the adjacent sections of the side bars of the spring and maintain the pivoted sections in rigid alinement. The transverse bars 56 are broken centrally and connected together by the hinges 57, 58, the outer ends of the hinges being secured to the adjacent ends of the end frames 56 and the inner portions 59 of the hinges abutting and being secured upon the top plates 60 of boxes 61. The transverse bars are rigidly connected at their ends to the ends of

the side bars by means of plates 56a, whereby the bars 56 are offset at a higher level from the plane of the side bars.

These boxes are open at their ends, and since the base of the bottom 62 is longer than the top, the sides of the boxes are cut away as shown at 63 in Figs. 4 and 5. The bottom of each box is provided with a longitudinal slot in which is adapted to project a pin 64, one pin being secured centrally upon the cross bar 23 of the head platform 21 and another upon the cross bar 28 of the foot platform 21. This construction of the boxes 61, and the pins 64 working in the longitudinal slots formed in the bases 62 of the boxes 61, provides a separable and loose connection between the frame of the spring 54 and the head and foot platforms, so that when the head and foot platforms are tilted there will be had a certain amount of play between the ends of the spring 54, and the head and foot platforms.

The sections 49, 50 and 51 of the side rail of the spring 54 are provided with spaced perforations through which are inserted rings 65 which engage the outer edge portion of the spring 54, and secure these portions of the spring to the side bars, so that as the catches 53 are released from the pins 55, the spring 54 will be properly supported by the sections 49, 50 and 51 when the head platform is tilted upwardly and the foot platform is tilted downwardly.

The end of the spring 54 near the head of the bed is rigidly secured to the transverse frame 56, while the end of the spring near the foot frame, which is spaced from the transverse bar 56 is connected to the said bar by means of springs 66.

As shown in Fig. 7, the spring 54 may not only be broken transversely so that when the head platform is raised the head portion of the spring 54 may also be raised, and when the foot platform is lowered that the foot portion of the spring 54 may also be lowered, but it may be likewise broken longitudinally, either portion 67 or 68 of the spring being adapted to be tilted. The object of hinging the portions 67 and 68 of the spring 54 is to provide a means whereby the patient may be readily and comfortably tilted or rolled in the bed by tilting either one of the portions 67 or 68, as the case may be.

Upon the posts 4 of the head frames are adjustably secured, by means of set screws 70, sleeves 71. Collars 72 are swiveled upon the sleeve 70 by means of a pin 73, and are transversely perforated, through which perforations are inserted rods 74. A set screw 75 mounted in each collar 72 engages a rod 74 to lock said rod in position in the collars 72. Upon the upper ends of the rod 74 are secured a table 76 and downwardly and inwardly projecting legs 77, the feet of which being adapted to rest upon the side frames 11 when the table is lowered in a horizontal position before the patient. Before the table 76 may be lowered in horizontal position, it will be necessary to remove the lower ends of the rods 74 from engagement with the clips 78 which are secured on the posts 4 of the head frame and have outwardly-extending jaws 79 adapted to engage the rods and hold them in vertical position.

Secured to the underneath portion of the side rails 2 of the bed are spaced angle irons 80 extending transversely of the bed and adapted to support a slidable tray 81 which is provided upon its outer ends with handles 82. The tray 81 is designed for the purpose of supporting articles ordinarily used in a sick room and being slidable in the angle irons 80 may be pulled out from either side of the bed.

The operation of my device is as follows:—

The bed shown in Fig. 4 is in normal horizontal position. If it be desired to turn the patient upon his side, it will not be necessary to lift him since the spring 54 may be tilted longitudinally from either side of the bed by raising either one of the portions 67 and 68 of the spring 54.

If it be desired to place the patient in a reclining sitting position for the purpose of feeding him, as shown in Fig. 5, the crank 32 may be rotated in the direction indicated by the arrow to revolve the shaft 31 and thereby wind the cable 37 upon said shaft to raise the head portion of the bed in an inclined position; but before the head platform 20 may be inclined in the position shown in Fig. 5, it will be necessary for the nurse to release the catches 53 from the pins 55 of the side bars of the spring 54, so that the frame of the spring may be broken at the hinged connections of the platforms 20 and 21. The pawls 35 will engage the ratchets 34, as the crank is rotated, so that the shaft 31 will be automatically locked in in position when the crank is turned and therefore the head platform will be automatically supported at any angle in which it may be placed.

The foot platform 21 may now be lowered with the foot frame, since the foot platform is secured to the foot frame of the bed. The set screws 8 are loosened when the legs 9 may be telescopically moved into the posts 5 of the foot frame sufficiently for the casters 10 to clear the floor. The crank 32 which is secured upon the end of the shaft 30 is rotated in a direction which is opposite to the direction indicated by the arrow in Fig. 4, when the shaft 30 will unwind the cable 36 and permit the foot frame to be lowered in a horizontal position, the casters 17 engaging the floor of the room.

If it be desired to elevate the foot frame to a vertical position, the crank attached to the shaft 30 will be rotated in the direction indicated by the arrow in Fig. 4, when the cable 36 will be wound upon the shaft 30 and exert a pull upon the foot frame, raising the same to a vertical position. The set screws 8 are released and the legs 9 allowed to fall or be lowered from their telescopic engagement with the posts 5 until the casters 10 rest upon the floor of the room. The set screws 8 are then screwed tight to hold the legs in their adjusted positions for supporting the bottom of the bed.

To replace the head sections of the springs and platform in a horizontal position, the pawls 35 are released from engagement with the ratchets while the crank 32 is held firmly and allowed to rotate in a direction opposite to the direction indicated by the arrow in Fig. 4. The shaft 31 will slowly permit the cables 37 to unwind as the head section of the bed is lowered by its own weight.

Rollers 36[a] are rotatably mounted on the bar 19 of the intermediate platform for engaging the cables 36 and are adapted to support the tables at those points in order to permit the foot frame to more freely be placed in position.

The platform 84, shown in Figs. 5 and 10, is adapted to be detachably secured to the foot frame by means of spring clips 85 which are adapted to embrace the post of said frame, and when in lowered position, support the feet of the patient.

In Fig. 11 is shown an obstetrical device for the purpose of assisting the patient in childbirth, and it is provided with a foot rest 86 and hand-grip 87 spaced from each other by a flexible means 88, such as a cord, rope or strap. The outer free ends 89 which extend beyond the hand-grip 87 are fastened to a hook 90 which is adapted to be secured to some portion of the bed.

In Fig. 12, is shown a lifting device by which the patient may be elevated, or by which the patient may, by pulling upon certain elements of the device, raise himself or assist in the operation when he is being elevated, and comprises pairs of spaced pivoted legs 91 having their smaller portions 92 engaging and supporting a bar 93. The feet or lower ends of the pivoted bars 91 are adapted to be supported upon the side frames of the bed. The bar 93 provides a cross beam upon which the hanger 94 is slidably mounted and which is provided with a rotatably mounted pulley 95 over which the rope 96 rides. The patient may be supported in any manner by one end of the rope 96, while the other portion may be drawn downwardly by the attendant and thus elevate the patient, or when the patient has recovered sufficient strength, he may grasp both ends of the rope 96 and by pulling upon the same, sufficiently elevate himself for whatever purposes that may be desired.

What is claimed is:—

1. A bedstead having a head frame and a foot frame connected by side rails, each side rail being formed of a plurality of sections hingedly mounted upon each other, whereby the foot frame may be swung into a horizontal position, the posts of said foot frame adapted to be foreshortened to permit the foot frame to move through an arc of a circle and be placed in a horizontal position, a plurality of casters secured to each of the foot posts between their ends and projecting laterally therefrom to support it on the floor when it is swung down, and a platform providing a foot rest detachably secured to the upper side of the foot frame when it is so swung down, said platform substantially covering the foot frame from the side rails to the top portion thereof.

2. A bedstead having a head frame and a foot frame connected by rails, each side rail being formed of a plurality of sections hingedly mounted upon each other, whereby the foot frame may be swung into a horizontal position, a plurality of springs including a coil spring and a woven wire spring supported on the bed and transversely divided into sections, the adjacent sections of each spring being pivotally mounted upon each other, said woven wire spring having longitudinal sections hingedly mounted on each other, the transverse hinge lines of the woven wire spring being located substantially above the corresponding hinge lines of the coil spring, and means for lowering the foot frame.

3. A bedstead having a head frame and a foot frame connected by side rails, each side rail being formed of a plurality of sections hingedly mounted upon each other, whereby the foot frame may be swung into a horizontal position, a plurality of platforms supported between the side rails, the outer end platforms being hingedly connected to the central platform, a pair of bed springs supported on the platforms and each formed of a plurality of sections hingedly mounted upon each other, the outer ends of the end sections of one of the springs and platforms being loosely and detachably connected with each other and the corresponding hinge lines of the two springs being located one substantially above the other.

4. A bedstead having a head frame and a foot frame connected by side rails, an intermediate platform secured to the side rails, a foot platform hingedly connected to one end of the intermediate platform, a head platform hingedly connected to the other end of the intermediate platform and supported at its outer end upon a portion of the head frame, a spring secured to the in-

termediate platform formed of a plurality of hingedly mounted sections, a second bed spring supported upon the first-mentioned bed spring and formed of a plurality of sections hingedly mounted upon each other, means projecting from the outer ends of the head platform and the foot platform and loosely engaging the ends of the second mentioned springs to prevent displacement of said springs, means for tilting the head platform, and means for lowering the foot platform.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

ELI H. WILLIAMS.