

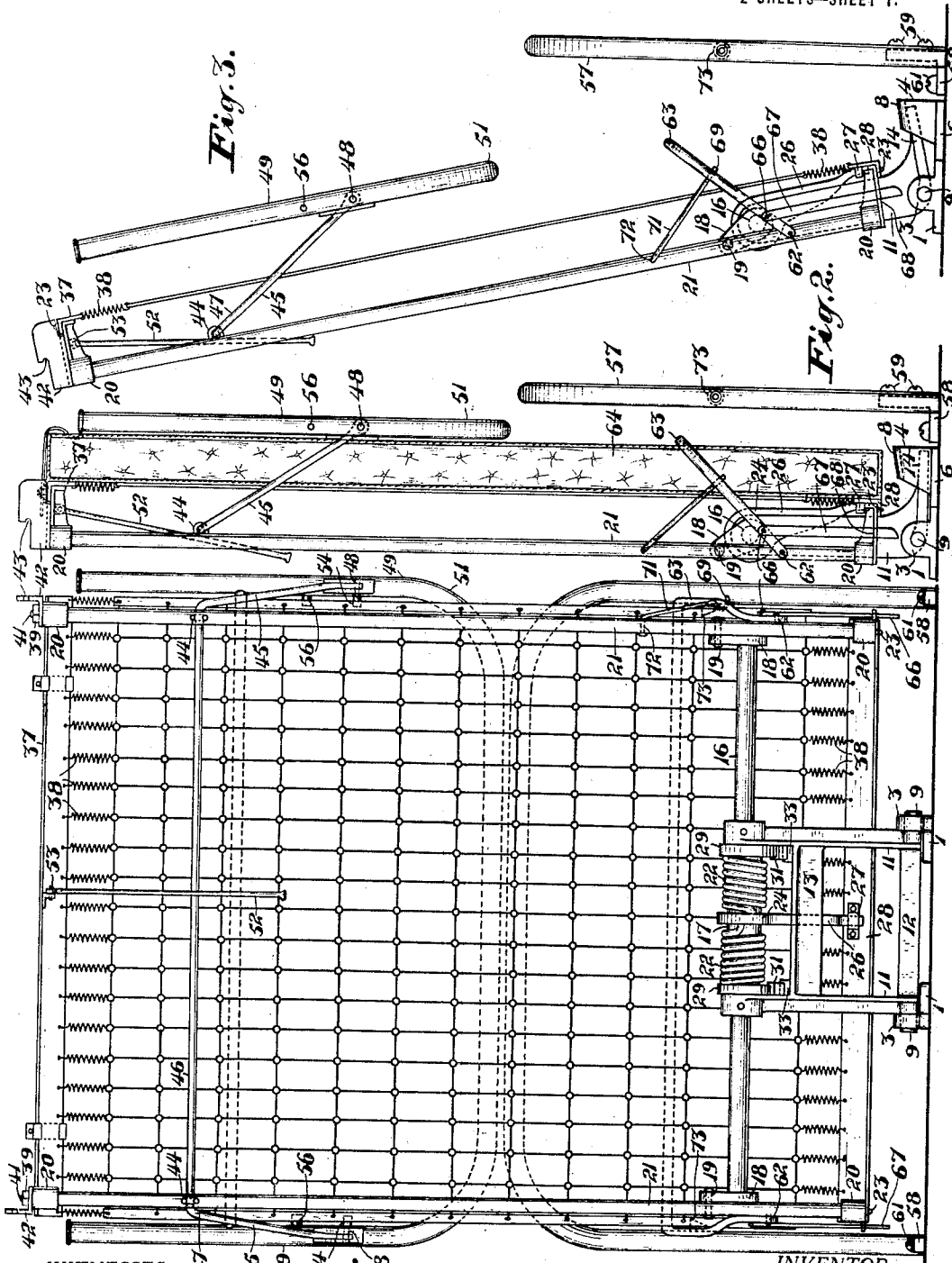
J. D. BELL.
TILTABLE BED.

APPLICATION FILED JAN. 10, 1914. RENEWED FEB. 4, 1920.

1,368,205.

Patented Feb. 8, 1921.

2 SHEETS—SHEET 1.



WITNESSES:
S. C. Fleischer
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Fig. 1.

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2 SHEETS—SHEET 2.

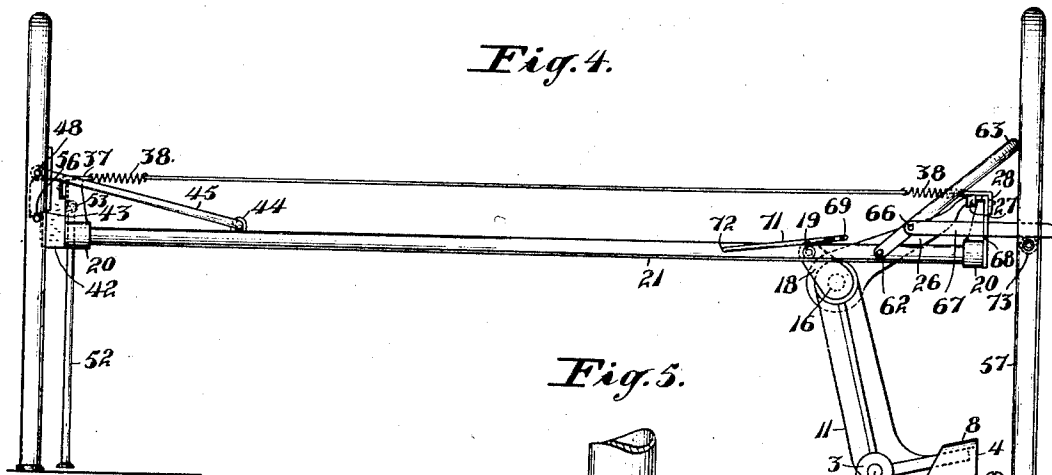


Fig. 5.

Fig. 7.

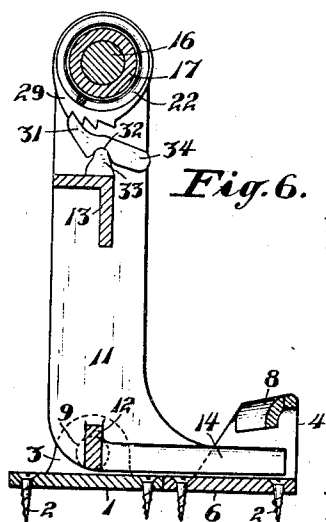


Fig. 6.

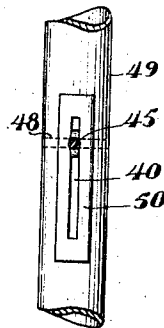
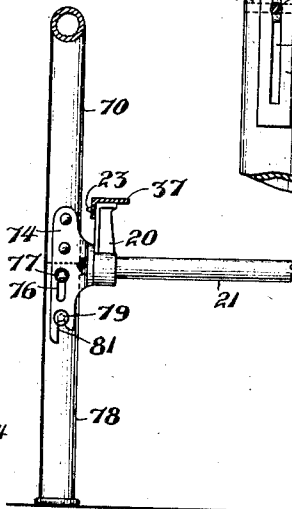


Fig. 8.

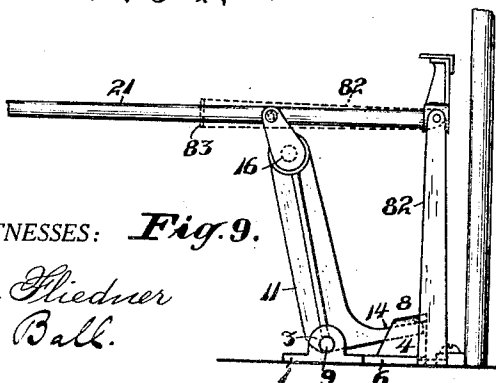
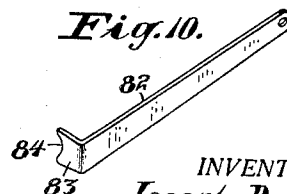


Fig. 9.

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Fig. 10.



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TILTABLE BED.

1,368,205.

Specification of Letters Patent.

Patented Feb. 8, 1921.

Application filed January 10, 1914, Serial No. 811,347. Renewed February 4, 1920. Serial No. 356,119.

To all whom it may concern:

Be it known that I, JOSEPH D. BELL, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Tilttable Beds, of which the following is a specification.

The present invention relates to improvements in that class of beds which swing from a horizontal to a vertical position. One object of the invention is to provide means whereby the bed can be so swung as to permit of its occupying the least possible space when in a vertical position, and also that the bed frame may be as far as possible below the spring mattress of the bed when in an extended position. A further object is to simplify the construction of the foot piece, and to render it easy to be moved from one position to the other. A further object is to provide simple mechanism for rendering the foot piece stable when extended.

My invention also resides in the novel construction, combination and arrangement of parts hereinafter specified and particularly pointed out in the claims.

In the accompanying drawing, Figure 1 is a front view of the bed in its closed or vertical position; Fig. 2 is a side view of the same; Fig. 3 is a side view of the bed partly lowered; Fig. 4 is a side view of the bed in its fully extended position; Fig. 5 is an enlarged vertical section through one side bar of the foot piece of the bed; Fig. 6 is an enlarged vertical section of the head support; Fig. 7 is a side view of a modified form of foot piece; Fig. 8 is a similar view, the parts being in different positions from those in Fig. 7; Fig. 9 is a side view of a locking means; Fig. 10 is a perspective view of the same, detached.

Referring to the drawing, 1 indicates two castings which are secured by screws 2 to the floor of a room and have raised apertured lugs 3. Also secured to said floor, in line with the respective castings 1, are the bases 6 of castings 4, having at their upper portions hook-shaped flanges 8 (see Fig. 6) extending toward each other. In said lugs 3 are pivoted trunnions 9 extending outwardly from upwardly extending side members 11 of a rocking support for the head of the bed having lower and upper hori-

zontal members 12, 13, connecting said side members, and having also rearward half-round extensions 14, adapted to engage the inwardly extending flanges 8. Through the upper ends of the upright side members 11 extends a fixed horizontal cross bar 16, on the ends of which are crank arms 18 pivoted at their other ends by bolts 19 to tubular side bars 21 of a bed frame.

The arrangement of the horizontal cross bar 16 at the ends of the crank arms, the other ends of which are pivotally secured to the side bars of the bed frame, is of value both when the bed is extended and when it is closed or collapsed. In the former position of the bed, as shown in Fig. 4, the side bars of the bed frame, and therefore the mattress springs, are at a considerable height above the cross bar 16 and the parts surrounding the same, so that there is no danger of said mattress springs coming in contact with said parts when a heavy person occupies the bed. In the closed position of the bed, as shown in Fig. 2, the arrangement causes said cross bar 16, and the parts immediately surrounding the same, to assume positions closer to the mattress springs than would otherwise be the case, so that said parts do not extend in front of the side bars of the bed, and therefore the bed can be closed or collapsed into a much narrower space.

For the purpose of balancing the weight of the bed there are provided balance-springs 22 coiled around a tube 17 around the cross-bar 16 and between the side members 11, the adjacent ends of the springs 22 being inserted in holes in a circular flange 24 formed integral with said tube 17 and located centrally between the side members 11 of the head support. From said flange 24 extends an arm 26, the outer end of which can slide through a hole formed by a guide 27 secured to an angle-iron 28 at the head of the bed. The other ends of the balance-springs are inserted in holes in ratchet segments 29 which loosely surround the cross-bar 16 between the inner surfaces of the upper ends of the side members 11 and the ends of the tube 17. Pawls 31 can engage the teeth of the ratchet segments and prevent rearward movement due to the tensions of the coiled springs. These pawls are loose pieces formed on their under sides with concavities 32 (Fig. 6) which can rock

on round bosses 33 formed integral with the upper cross member 13 of the support 11. Each pawl has a tail 34, which, by its greater weight than that of the nose of the pawl, forces said nose into engagement with a tooth of the corresponding ratchet segment. The tension of either spring can be varied as desired by turning it so as to cause the pawl to engage a different tooth.

In lowering the bed from the upright or closed position the tension of the springs 22 is not increased until the extensions 14 impinge against the flanges 8. Until that occurs the tension of the springs 22 causes the head support to swing outward with the bed about the trunnions 9 as an axis. But when the head support can no longer swing outward, by reason of the abutment of the extensions 14 against the flanges 8, as shown in Fig. 3, the bed is then swung outward on the pivot bolts 19. In so doing the outer end of the arm 26 is moved upward, increasing the tension of the springs 22.

The ends of the side bars 21 are received in the socketed ends of castings 20 which have thereon studs 23, by which are attached head and foot angle-irons 28, 37, extending transversely of the bed, to which angle-irons are connected at suitable intervals the springs 38 of a wire mattress. Secured to said socketed ends by nuts 39 and bolts 41, of which the heads are contained within the tubular side bars, and which pass through apertures in said ends, are angle plates 42, each having a recessed shoulder 43 directed downwardly when the bed is extended. Secured to and extending upwardly from said side bars are bearings 44 for the middle member 46 of a yoke 47, the outer ends of the side members 45 of which extend within, and are pivoted by pivot pins 48 to, the tubular side members 49 of a foot piece 51 of the bed. When the bed is extended, a support 52 pivoted at its upper end, as shown at 53, to the frame of the bed, and maintaining by gravity its vertical position, first comes in contact with the floor, and forms a temporary support for the bed. The upper portion of the foot piece is then pulled upward and forward, the side members of the yoke 47 swinging about their inner ends until extensions 54 of the pivot pins 48, extending toward each other through the tubular side members of the foot piece, contact with the upper edges of the rearwardly extending members of the angle plates 42. The yoke 47 can then swing no farther, but the foot piece swings by gravity to a position in which its ends are in contact with the floor. A slight outward pull upon the top of the foot piece moves the bottom of the foot piece inwardly. At the same time lower stop pins 56, extending toward each other from the sides of the foot piece, move

underneath the shoulders 43, and since they rise as the foot piece is moved inward, they raise the shoulders, thereby raising the bed, and also the support 52 pivotally connected to the bed, so that the foot of said support is no longer in contact with the floor. The pins 56 then move into the recessed portions of the shoulders 43, and the lower end of the bed drops slightly, the support 52, however, still not being in contact with the floor.

Secured to the side members 49 adjacent to the slots 40 through which the outer ends of the side members or arms 45 of the yoke 47 extend into said members 49 are slotted plates 50, the upper ends of the slots of which form stops for said arms 45, as shown in Fig. 5, limiting the outward movement of the lower portions of the side members 49 of the foot piece below the pins 56, so that said pins are properly guided into the recesses beyond the shoulders 43. Hence to raise the foot piece, in the extended position of the bed, all that is necessary is to pull the foot piece toward the head piece, and, in doing so, the foot piece can never impinge upon the mattress before it reaches its final position, this being prevented by the upper end of the slot in the plate 50, which acts as a stop preventing the angle between the plane of the foot piece and the foot of the yoke being reduced below a certain minimum, which is approximately a right angle. At the same time that the foot piece is so raised by the pull thereon in a direction toward the head of the bed, the force imparted to the foot piece is transmitted to the bearings 44 and therefore to the side bars of the bed, holding the foot of the bed down while the foot piece is being raised. Since the foot piece is nearer to the pivotal axis of the bed when it has been placed in its inoperative position upon the mattress, shown in Fig. 2, the strength of a spring which then counterbalances the weight of the bed is less than it would have to be if said foot piece were not raised, and therefore the spring may be made correspondingly lighter.

The means for pivotally attaching the foot piece forms an important improvement of the bed. Heretofore, so far as I am aware, no one has secured a foot piece to the side bars of a bed frame by swinging arms pivoted to said side bars and also to said foot piece, which allow the foot piece to swing as a whole from a position in which it rests on the top of the mattress to a position in which it extends vertically at the end of the bed. The reason why this has not been done appears to be on account of the great strain which is put upon an arm swinging at one side of the bed if the foot piece is swung by force applied to an arm on the other side. Unless said force is applied at a central point of the foot piece (which in practice is very inconvenient to do) the twisting effect

of the force is insufficiently resisted by the joints which hold the arms to the foot piece and to the side bars. I overcome this difficulty, by pivotally and bodily movably attaching a foot piece to the side bars of a bed frame by means of two swinging arms formed in a single piece with a cross bar which extends between the side bars, that is, by using for the swinging arms the side members of a yoke. In consequence, when the foot piece is raised by force applied at one side thereof, the force for raising the other side of the foot piece is transmitted to said other side, not through the pivotal joint between the foot piece and the swinging arm, but by means of the bar which integrally connects the two side arms of the yoke. The swinging arms and the middle member of the yoke, being integrally connected together, move as a single piece, and consequently there is no strain on any joint, and the foot piece can readily be swung into either position by force applied at one side only.

It is obvious that while I have herein shown the yoke 47 as applied to a foot piece of a bed it may equally well be applied to the head piece.

The head piece 57 of the bed is secured to the floor by brackets 58 of which the upright members are received within the tubular lower portions of the head piece and secured by screws 59 to the head piece, while the horizontal members extend through recesses in said tubular members at their lower ends and are secured to the floor by screws 61. The means for fastening the head piece to the floor are thus rendered very inconspicuous. The advantage of making the head piece 57 of the bed in a separate piece from the bed and fixedly located, by being secured either to the floor, as here shown, or to the wall or a door of a room, is that thereby the moving parts, as joints and the like, which are required when the head piece frame is made a part of the bed, are materially reduced in number.

To the side members of the bed are pivoted, as shown at 62, the outer ends of the side members of a head yoke 63, which rests, in the closed position of the bed, upon the mattress 64, there being pivoted thereto, as shown at 66, ends of guard rods 67 which slide through guide holes 68 in the head angle plates 42. In the position in which it rests on the mattress, said head yoke 63 is retained by a hook 69, upon the end of an arm 71 pivoted at 72 in one of the side rails. When said hook has been disengaged from the corresponding side member of the head yoke said head yoke can be swung rearwardly, from off the upper surface of the mattress. The guard rods then move through the holes 68 and extend over studs 73 in the stationary head piece, and thereby

form locking devices for preventing the bed being raised when extended.

In the modification of the invention shown in Figs. 7 and 8, there is provided a foot piece 70 secured to angle plates 74, which angle plates are secured in like manner as the angle plates 42 to the socketed ends of the castings 20, and said angle plates have therein vertical slots 76, in which can slide bolts 77 secured to legs 78, which have extending therefrom lower bolts 79, which are adapted to enter recesses 81 in the lower ends of said angle plates, the foot piece then resting upon the upper ends of said legs, the bolts 77 assuming positions in the upper ends of said slots 76, and the bolts 79 assuming positions in the upper ends of said recesses 81.

In Figs. 9 and 10 I show means for locking the bed securely against moving into its closed position. Said means comprises a hanger 82 pivotally secured upon the head of the bed, and of a length to extend to the floor when the bed is in its extended position. Said hanger has a foot 83 extending at right angles from the main portion of the hanger, and formed with a recess 84 in its end adapted to engage a side rail of the bed. When it is desired to close the bed this hanger is raised from its vertical to a horizontal position, in which the recess engages said side rail. The bed is then free to be collapsed. Such a hanger may be used on each side of the bed. It serves as an additional security against preventing the bed collapsing, and may therefore be used by timid or nervous persons, although it will not generally be used by persons who fully understand the construction of the bed.

I claim:—

1. In combination with a bed frame having side bars, a support for the head portion of the bed frame, pivoted to rock about a transverse horizontal axis, and a U-shaped member, of which the middle portion is pivotally supported by said support about a transverse horizontal axis, and the outer ends of the terminal portions pivotally support the side bars about a transverse horizontal axis.

2. In combination with a bed frame having side bars, a support for the head portion of the bed frame, pivoted to rock about a transverse horizontal axis, and a U-shaped member pivotally connected to one of the aforesaid elements to rock about a transverse horizontal axis, and of which the middle portion is supported by said support, and the terminal portions pivotally support at their outer ends the side bars about a transverse horizontal axis.

3. In combination with a bed frame having side bars, crank arms each supporting at one end a corresponding side bar to swing thereon about a transverse horizontal

axis, a cross bar connecting the other ends of said crank arms, and a support pivoted to swing about a transverse horizontal axis and supporting the middle of said cross bar so that the latter can swing about a transverse horizontal axis thereof.

4. In combination with a bed frame having side bars, crank arms each pivoted at one end to a corresponding side bar, a cross-bar connecting the other ends of said crank arms, and a support pivoted to rock about its lower portion as an axis and supporting the middle of said cross-bar.

5. In combination with a bed frame having side bars, crank arms each pivoted at one end to a corresponding side bar, a cross-bar connecting the other ends of said crank arms, pivot bearings adapted to be secured to a support, a head support having at its lower portion trunnions in said bearings, the middle portion of said cross-bar being supported on the upper portion of said head support.

6. In combination with a bed frame, a yoke, a middle member of which extends across the bed frame, pivotal bearings for said yoke at the sides of the bed frame, and an end piece pivotally connected to the free ends of the yoke and supported wholly thereby.

7. In combination with a bed frame and a movable end piece, a swinging connection to which both the bed frame and the end piece are pivoted, an extension from the bed frame, means carried by the end piece and impinging upon said extension to arrest the swinging movement of said swinging connection, and means on said end piece and engaging said extension to support the same.

8. In combination with a bed frame and a movable end piece, a swinging connection to which both the bed frame and the end piece are pivoted, an extension from the bed frame, means carried by the end piece and impinging upon said extension to arrest the swinging movement of said swinging connection, means for limiting the swinging of said end piece upon said swinging connection,

and means on said end piece engaging said extension to support the same.

9. In combination with a bed frame and an end piece, a swinging connection to which both said bed frame and end piece are pivotally connected, and a temporary support pivotally connected to the bed frame adjacent to the end piece, said bed frame and end piece having parts arranged to engage each other in the movement of the end piece to raise said bed frame and render said support inoperative.

10. In combination with a support, means for securing it to a floor, a bed arranged to swing on said support from a horizontal to a vertical position, and an end piece for the bed secured to the floor independently of the bed.

11. In combination with a support, means for securing it to a floor, a bed arranged to swing on said support from a horizontal to a vertical position, an end piece for the bed secured to the floor independently of the bed, a head yoke arranged to be swung on to the upper surface of the mattress of the bed when extended, and guide rods moved by the movement of the yoke from the mattress and which engage said stationary head piece to form locking devices.

12. In combination with a bed frame, an end piece movably connected with an end of the bed frame, means whereby said end piece when in a vertical position supports an end of the bed frame, and a leg, pivoted to the same end of the bed frame, arranged to support the same end of the bed frame when the end piece is moved from said vertical position, and adapted to be raised from off the floor when said end frame is moved into its supporting position.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH D. BELL.

Witnesses:

FRANCIS M. WRIGHT,
D. B. RICHARDS.