

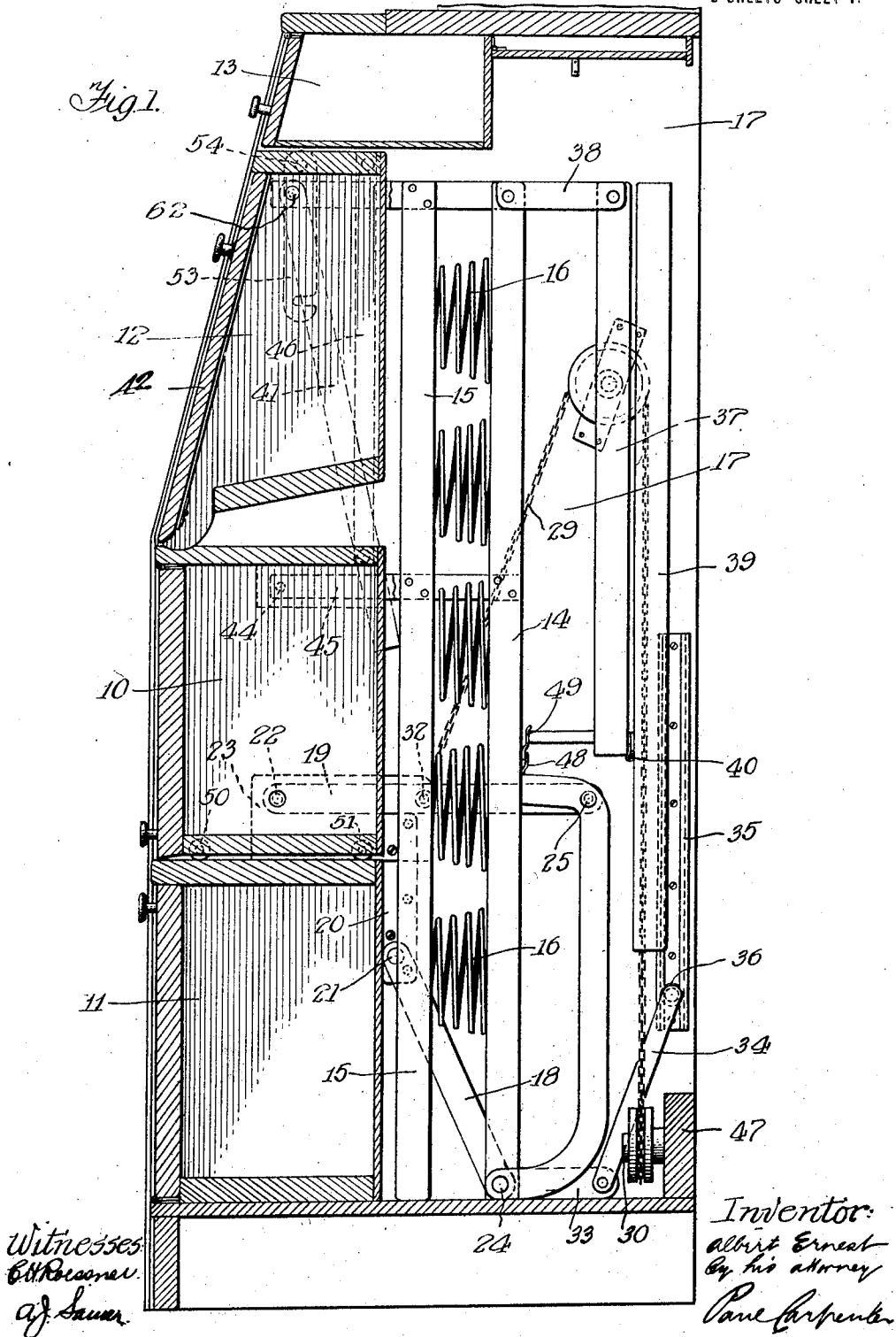
A. ERNEST.
FOLDING BED.

APPLICATION FILED FEB. 28, 1916.

1,400,534.

Patented Dec. 20, 1921.

2 SHEETS—SHEET 1.



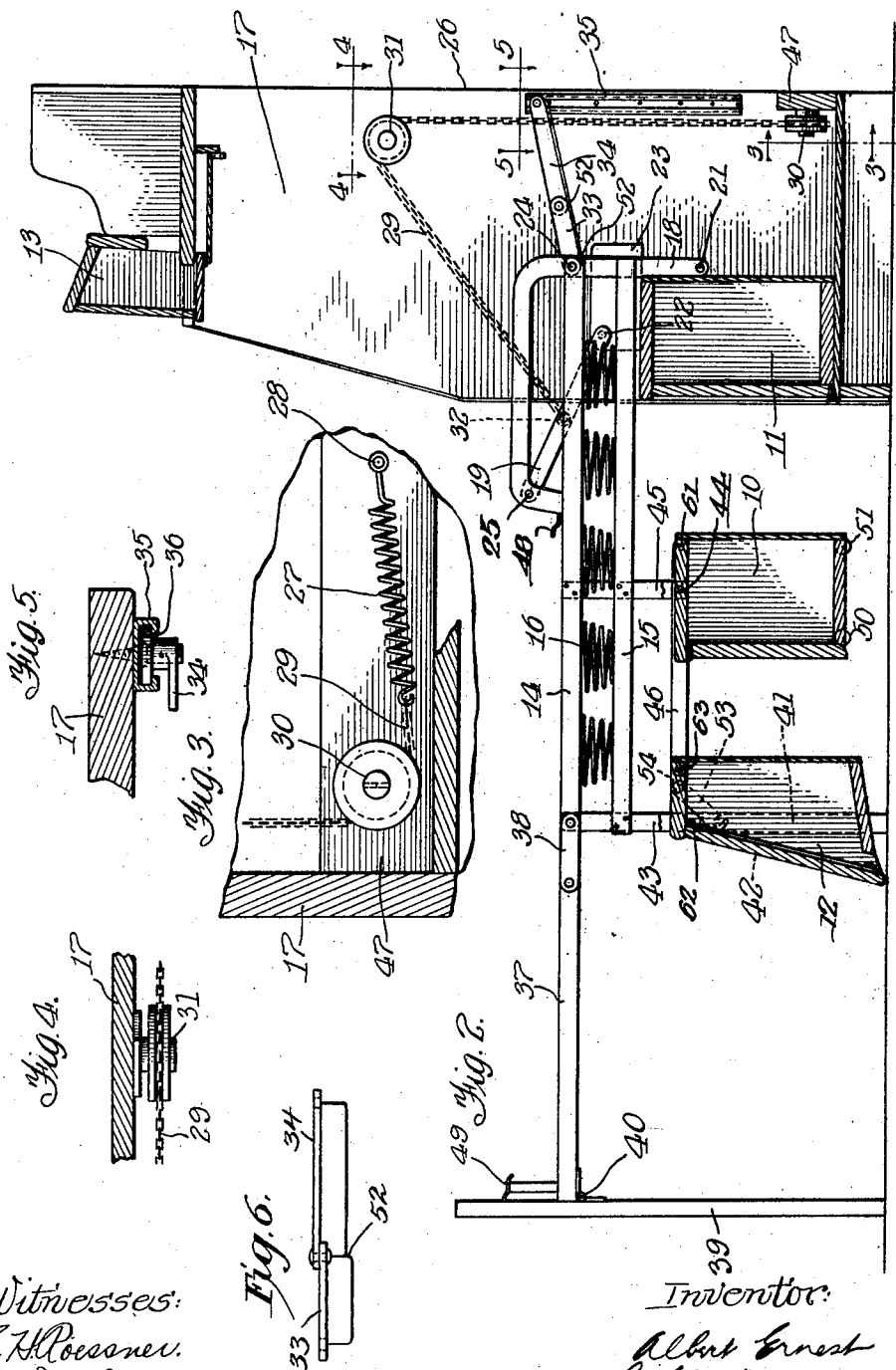
1,400,534.

A. ERNEST,
FOLDING BED.

APPLICATION FILED FEB. 28, 1916.

Patented Dec. 20, 1921.

2 SHEETS—SHEET 2.



Witnesses:
C. H. Rossoner.
A. J. Sauer.

Inventor:
Albert Ernest
by his attorney
Paul Carpenter

UNITED STATES PATENT OFFICE.

ALBERT ERNEST, OF PAXTON, ILLINOIS.

FOLDING BED.

1,400,534.

Specification of Letters Patent.

Patented Dec. 20, 1921.

Application filed February 28, 1916. Serial No. 80,819.

To all whom it may concern:

Be it known that I, ALBERT ERNEST, a subject of the Emperor of Germany, and a resident of Paxton, in the county of Ford and State of Illinois, have invented certain new and useful Improvements in Folding Beds, of which the following is a specification.

My invention relates to improvements in folding beds, more particularly folding beds of the type in which the bed is normally turned into a vertical position during the day-time, and then lowered into a horizontal position at night-time.

The principal objects of my present invention are to provide improved means for bringing the bed from a vertical position to a horizontal position; to provide means whereby in addition to turning the bed from a vertical position to a horizontal position, the bed is simultaneously given an additional forward movement; to provide means whereby receptacles may be arranged in front of the bed when in its vertical position; to provide means whereby these receptacles may be moved with the bed without interfering with the normal horizontal position of the receptacles; to provide improved means for increasing the effective length of the bed as compared with the length of the bed when in its vertical position; to provide means whereby a bed and a receptacle, such as a bookcase, may be conveniently combined in a single structure, and generally, to improve, simplify and cheapen the construction of folding beds and combined folding beds and receptacles.

In attaining these and other objects to be hereinafter described, I have provided a construction one embodiment of which is illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical section through the combined bed and bookcase with the bed folded away;

Fig. 2 is a view similar to Fig. 1 showing the bed in its horizontal extended position;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 2; and

Fig. 5 is a section on the line 5—5 of Fig. 2.

Fig. 6 is a detail view of a portion of the device.

The structure illustrated in the drawings

includes a pair of bookcases 10, 11, a disk 12 and a container 13 for papers or the like arranged one over the other when the bed is in its vertical position, as shown in Fig. 1. The bed includes an upper member 14 and a lower member 15 which supports the springs 16 on which the mattress rests. When this bed 14 is moved outwardly, the desk 12 and the upper bookcase 10 swing outwardly with the bed so that when the bed is in its extended position, as shown in Fig. 2, these parts are held suspended underneath the bed. The uppermost container 13 is moved outwardly and then turned upwardly out of the way of the end of the bed, as shown in Fig. 2. The bed is connected to the side walls 17 of the frame work of the structure by means of two pairs of links 18 and 19. The link 18 is pivotally connected at one end to a plate 20 attached to the wall 17 of the structure. Similarly the link 19 is pivotally connected at one end to a plate 23 attached to the side wall 17 of the structure. The link 18 is connected at its other end to the bed at the point 24, while the link 19 is connected to the bed at the point 25. These links are so arranged and proportioned that if the upper (Fig. 1) end of the bed is moved outwardly, the lower end of the bed moves not only upwardly, but outwardly as well into the position shown in Fig. 2. The object of this outward movement is to increase the effective length of the bed. This is accomplished by means of the links 33 and 34 which support the head of the sleeper when the bed is in its extended position, as shown in Fig. 2. The link 33 is pivotally connected to the bed at the point 24, and a shoulder 52 is provided to prevent the link 33 turning through a greater angle relatively to the bed than that shown in Fig. 2, which is the angle found to be most suitable in practice. These links 33 and 34 are preferably formed of angle iron so that the link 33 supports the link 34 as a whole when the bed is in its extended position. For guiding the end of the link 34 a slide 35 is provided in which runs a boss 36 (Fig. 5) connected to the link 34. To act to some extent as a counterweight for the weight of the bed, a spring 27 is provided connected at one end to the member 47 at the rear lower edge of the structure by the pin 28, and at the other end to a chain 29 passing around the pulleys 30 and 31. The other end of the chain is connected to the mid-point of the

link 19 at the point 32. It will be evident that when the bed is pulled downwardly the spring 27 is extended so that the latter will aid subsequently in the lifting of the bed structure.

On the other hand, the spring tends to check the movement of the bed as it approaches the vertical position, and so prevents the bed slamming against the back wall of the structure. This double function of the spring is due to the fact that the point 32 to which the chain 29 is connected moves from one side across to the other side of the line adjoining the point 22 to the periphery of the pulley 31. As the spring tends to throw the bed forward when the latter is in its vertical position, a catch may be provided to hold the bed in its desired vertical position, particularly when the desk is being used.

In order to avoid constructing the structure as a whole of excessive height not only is the bed portion 14 arranged to move outwardly as well as downwardly when unfolding the bed, but also an extension 37 is provided which is connected to the outer end of the bed proper 14 by means of a link 38. This extension is supported at its outer end by legs 39 connected thereto by hinges 40. This extension 37 and its legs 39 are folded on top of the bed before the latter is moved into its vertical position, as shown in Fig. 1. Spring catches 48 and 49 are attached to the parts 14 and 37, respectively, for detachably folding the parts 14 and 37 in their folded position relatively to each other.

The bed 14 is supported at its inner end by means of the link 18, and the extension 37 is supported at its outer end by the leg 39. The links 37 and 38 are of angle iron so that the latter cannot fall below the horizontal position shown in Fig. 2. In order, however, to support the outer end of the bed 14 a leg 41 is provided pivotally attached at 42 to the arm 43. The leg 41 is connected by a link 53 to the projecting end 54 of the link 46 so that the leg is automatically moved rearwardly as the bed is moved from its horizontal to its vertical position, so that the end of the leg will not strike against the bookcase 10.

The desk 12 is pivotally connected at the point 62 to an arm 43 arranged to project downwardly from the underside of the bed, as shown most clearly in Fig. 2, while the bookcase 10 is similarly pivotally connected at 44 to an arm 45 which also projects downwardly from the underside of the bed. The pivot points 42 and 44 are arranged substantially vertically above the centers of gravity of the desk and bookcase, respectively, so that these parts retain their normal horizontal position as a whole during the movement of the bed from its vertical

to its horizontal position, so that the contents of these receptacles are not spilled on the floor. A link 46 connecting the desk and bookcase tends to prevent swinging of one or other, or both, of these receptacles above the points of suspension 42 and 44 respectively. This link 46 prevents the receptacle 42 swinging for the reason that when the bed is extended the pivots 44 and 61 are in a straight line with the link 46 so that movement of the link 46 to the left (Fig. 2) which must occur if the receptacle 12 is to swing is almost impossible as the turning movement on the receptacle 10 produced by pulling the link 46 is zero. This link also prevents in very large measure the swinging of the receptacle 10 as the pivots 62 and 63 are nearly in line so that the turning moment on the receptacle 12 produced by pulling the link 46 to the right (Fig. 2) is very slight.

The book case 10 is preferably provided with rollers 50 and 51 on its underside to facilitate movement forward or backward along the top of the book case 11.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is:—

1. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame, and a receptacle and a pivotal connection between parts rigidly connected with said receptacle and said bed respectively, and a second pivotal connection between said receptacle and said bed whereby said receptacle is maintained in substantially horizontal position.

2. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame, and a receptacle pivotally attached to said bed, the point of attachment being substantially vertically over the center of gravity of the receptacle in its normal position, and a second pivotal connection between said receptacle and said bed whereby said receptacle is maintained in substantially horizontal position.

3. A folding bed comprising, in combination, a frame, a receptacle rigidly connected to said frame, a bed movable relatively to said frame, and means comprising a link for moving the end of said bed around said receptacle and upwardly and outwardly relatively to said frame, the point of connection of said link to said frame being higher than the point of connection of the link to said bed when the latter is folded within said frame.

4. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame, means for positively turning said bed from a substantially vertical position to a substantially horizontal position, and simultaneously giving said bed an additional upward and forward movement

relatively to said frame, and pairs of links adapted to bridge the space between the end of the bed and the frame when said bed is in its horizontal position.

5 5. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame, and a receptacle and a pivotal connection between parts rigidly connected with said receptacle and the under side of
10 said bed respectively, and a second pivotal connection between said receptacle and said bed whereby said receptacle is maintained in substantially horizontal position.

6. A folding bed structure comprising, in
15 combination, a frame, a bed movable relatively to said frame, a plurality of receptacles pivotally attached to said bed and adapted to swing relatively to the bed as the latter is caused to descend from vertical to
20 horizontal position and to project from the under side of said bed when the bed approaches the horizontal and a link connection, independent of the frame, for connecting said receptacles and thus tending to
25 maintain their parallelism to the horizontal at all times.

7. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame, a plurality of receptacles pivotally
30 tally mounted on the bed so that each has its point of pivot always above the center of gravity of the receptacle, and a link connecting the receptacles so that the inertia of each tends to dampen the vibration of the
35 other.

8. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame, and a link pivotally connected at one end to said bed and at the other
40 end to said frame the point of connection of said link to said frame being nearer the front of the frame than the point of connection with said bed when the latter is folded within said frame and substantially vertically
45 cally beneath the point of connection with said bed when the latter is extended.

9. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame, and means for positively moving the bed forwardly and upwardly comprising a link pivotally connected at one end to said bed and at the other end to said
50 frame, the point of connection of said link to said frame being nearer the front of the frame than the point of connection with said bed when the latter is folded within said frame and substantially vertically beneath the point of connection with said
55 bed when the latter is extended.

60 10. A folding bed comprising in combination a frame, a bed movable relatively to

said frame, and a link pivotally connected at one end to said bed and at the other end to said frame, the point of connection of said link to said frame being in front of, 65 but at substantially the same level as the point of connection of said link to said bed when the bed is folded within said frame, whereby the bed is given a maximum forward movement when the bed is lowered. 70

11. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame and means for positively moving the bed forwardly and upwardly comprising a link pivotally connected at one end to said bed and at the other end to said
75 frame, the point of connection of said link to said frame being in front of, but at substantially the same level as the point of connection of said link to said bed when the bed is folded within said frame, whereby the bed is given a maximum forward movement when the bed is lowered. 80

12. A folding bed comprising, in combination, a frame, a bed movable relatively to said frame and means for positively moving the bed forwardly and upwardly comprising a link pivotally connected at one end to said bed and at the other end to said frame, the point of connection of said link to said
85 frame being in front of, but at substantially the same level as the point of connection of said link to said bed when the bed is folded within said frame, and being in back of the said point of connection of the link to the bed when the bed is in open or unfolded position whereby the bed is given a maximum forward movement when the bed is lowered. 90

13. A folding bed structure comprising in
100 combination, a fixed frame, a bed pivotally supported intermediate its ends relatively to said frame, a pair of separate links on either side of said bed, each pivotally connected at one end to said frame, and at the
105 other end to said bed, adapted to give each point of pivoted connection to said bed an upward movement in addition to that incident to the pivotal support thereof as said bed is turned from a substantially vertical
110 position to a substantially horizontal position, said points of pivotal connection to the frame being forwardly of the points of pivotal connection to the bed when the bed is in folded position. 115

In testimony whereof I have hereunto signed my name in the presence of the two subscribing witnesses.

ALBERT ERNEST.

Witnesses:

RUDOLPH JOHNSON,
CHARLES R. SULLIVAN.