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C. F. KOLB

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FOLDING BED

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2 Sheets-Sheet 1

Inventor
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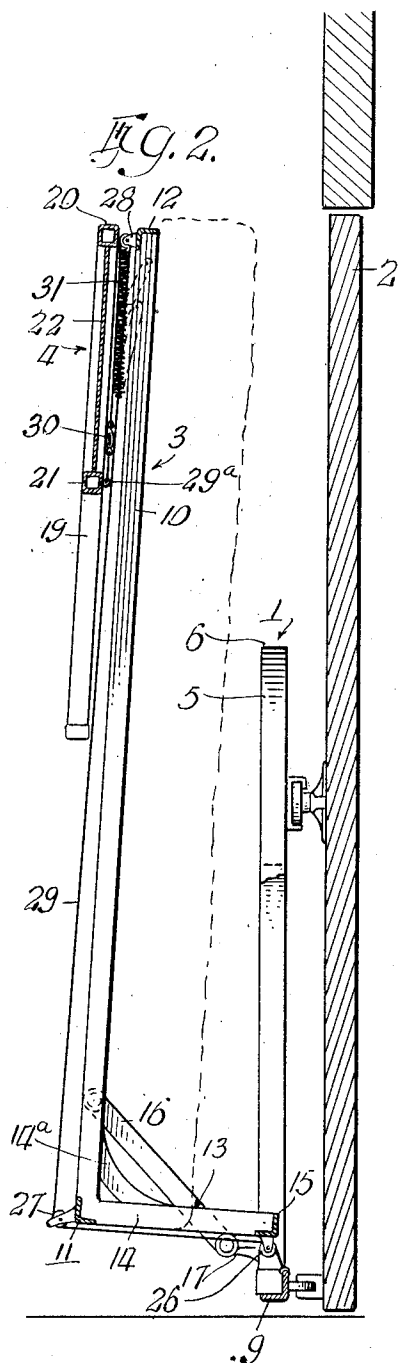
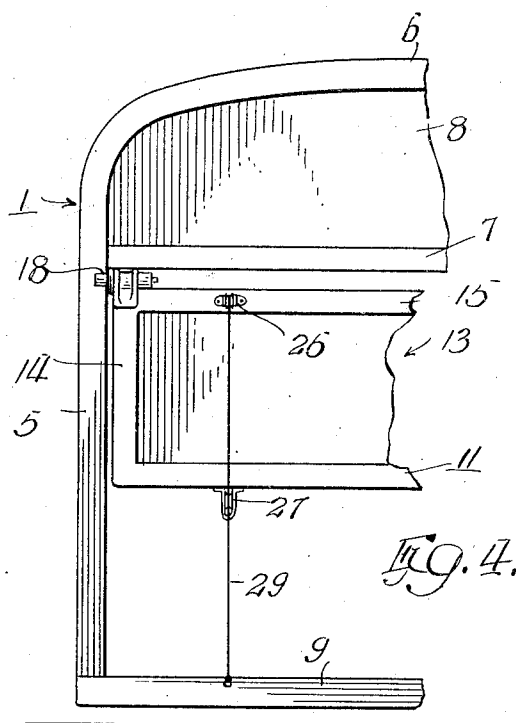
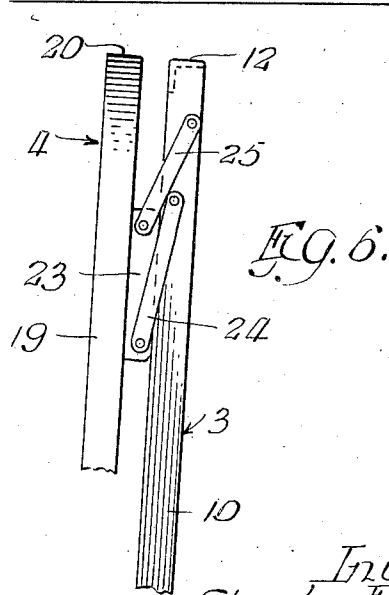
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FOLDING BED

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2 Sheets-Sheet 2



Inventor
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UNITED STATES PATENT OFFICE.

CHARLES F. KOLB, OF CHICAGO, ILLINOIS.

FOLDING BED.

Application filed August 17, 1925. Serial No. 50,578.

This invention relates to improvements in folding beds and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

5 Folding beds of both the door or recess type usually employ a foot end construction wherein either a whole or a part of the foot end is adapted in the folding or unfolding of the bed to swing from a position parallel with the bed
10 frame when folded into a perpendicular position when the bed is in a position for use.

One of the objects of the present invention is to provide a simple and efficient means for permitting the free swinging movement of
15 the foot end into substantial parallel relation with the bed frame when the same is being folded upwardly and for automatically and positively swinging the foot end into a position at a right angle to the bed frame when
20 said bed frame is being unfolded or swung downwardly into its position for use.

A further object of the invention is to provide a simple counter balancing means for the bed frame which includes parts connected
25 to the foot end of the bed and so arranged that in the upward swinging movement of the bed frame the foot end swings in toward the same and in the downward swinging movement of the bed frame the foot end is positively brought into its perpendicular position or substantially so.

My invention consists generally in a folding bed of the form, arrangement and coaction of the parts whereby the above mentioned object, together with others that will hereinafter appear are attainable; and my invention will be more readily understood by reference to the accompanying drawings which illustrate what I consider at the present time to be the preferred embodiment thereof.

In the drawings:

Fig. 1 is a longitudinal vertical section through a folding bed embodying my invention and with the bed frame and foot end in the position they occupy when the bed is ready for use.

Fig. 2 is a similar view with the parts they assume after the bed frame has been folded up into its inoperative or substantially vertical position.

Fig. 3 is a top plan view of the foot end of the bed when in position ready for use.

Fig. 4 is a vertical section as taken on the line 4—4 of Fig. 1 and shows a part of the head end of the bed as viewed from the rear.

Fig. 5 is a detail view in side elevation on an enlarged scale showing the connection between the bed frame and foot end when the parts are in the position shown in Fig. 1.

Fig. 6 is a view similar to Fig. 5 but with the parts in the position they occupy as in Fig. 2.

The folding bed herein shown is of the door bed type as described in my copending application for patent Serial Number 50,577 filed August 17th, 1925, but as is apparent the invention is also applicable for use in connection with a folding bed of the recess type, so that the description of one type is only for the purpose of illustration and is not intended as by way of limitation.

Referring now in detail to that embodiment of the invention illustrated in the accompanying drawings, 1 indicates as a whole the head frame of the bed which is mounted for lateral movement on a door 2 as fully described in my application hereinbefore referred to. 3 indicates the bed frame and 4 indicates the foot end of the bed. The head frame comprises upright side members 5—5, a horizontal top member 6 and a horizontal intermediate member 7 and within said members is a suitable panel 8. The bottom ends of the side members of the head frame are connected together by an angle bar rail 9.

The bed frame 3 is rectangular in plan and comprises side rails 10—10, a head rail 11 and a foot rail 12 all made of angle bars with the vertical flanges thereof directed upwardly. Said bed frame includes a substantially short, secondary head frame 13 comprising upright side bars 14 and a horizontal top cross bar 15, said secondary head frame being located in the approximate plane of the head frame when the bed frame is in its horizontal position. The bed frame has a shifting fulcrum connection with the head frame provided by swinging links 16 pivoted at one end to forwardly extending brackets 17 secured to the bottom ends of the side members of the head frame a short distance above the angle bar 9. The top ends of said links are pivoted to the bed frame as shown. At the corners of the side and top rails 14 and 15 of the secondary head frame 13 are secured guide rollers 18 which have a rolling engagement with the side bars of the head frame and which are so constructed as to yield endwise to follow any unevenness in said side members. When an upward lift is imparted to the bed frame, it will fold into the position shown in Fig. 2

wherein it is inclined slightly rearwardly from the perpendicular and when a downward swing is imparted to the bed frame it will unfold into a horizontal position. The secondary head frame is braced from the bed frame by curved flat bars 14^a.

The foot end of the bed comprises upright side members 19, a top cross bar 20, a bottom cross bar 21 and a panel 22. On the inner surface of said foot end side members are secured forwardly extending brackets 23 and pivotally connecting said brackets and the foot ends of the side rails 10 are pairs of long and short links 24 and 25 respectively. Said links are of such proportion and are so arranged that when the foot end is in a perpendicular position and at a right angle to the bed frame as when the bed is ready for use, the longer links extend horizontally and parallel with the bed frame and the shorter links are inclined at an angle thereto as best shown in Figs. 1 and 5.

Fixed to the top member 15 of the secondary head frame near each side thereof is a sheave 26 and mounted on the head bar 14 of the bed frame in line with the sheaves 26 are sheaves 27. The foot end bar of the bed frame is also provided with sheaves 28 as shown. Flexible members or cables 29 are attached to the cross or angle bar 9 of the head frame 1 and each is passed upwardly to be trained over an associated sheave 26 and then downwardly to be trained under an associated sheave 27. From each sheave 27 said cables are passed rearwardly to be trained over an associated pulley 28 and then pass downwardly therefrom to be attached to a rearwardly extending eye 29^a on the bottom cross member 21 of the foot end 4. When the bed is in a position ready for use, said cables are preferably substantially taut and to maintain the same in this condition I provide a turn buckle 30 therein for the purpose of adjustment and to take up the stretch which may develop in said cables. I find it convenient to place a turn buckle in that portion of the end of each cable attached to the eye 29.

31—31 indicate contractile helical springs, one associated with each cable. Each spring is attached at one end to its associated cable as indicated at 32 and is attached at its other end to the foot end rail 12 of the bed frame. It is desirable to attach said last mentioned end of the spring in a plane closely adjacent to that of the associated cable and to that end I may attach it to the block in which the sheave 28 is journaled as shown in Fig. 3.

Assume that the bed is in its position for use as shown in Fig. 1 wherein the bed frame is in its horizontal position and the foot end is in its perpendicular position. When it is desired to fold up the bed into its inoperative position, an upward lift is imparted to the foot end to swing the bed frame about its shifting fulcrum with the head frame. This movement is assisted by the contractile action

of the springs 31 which exert a pull on the head ends of the cables and which at the same time take up the slack developed in the cables due to the decrease in the distance between the sheaves 26 and angle bar 9 as said sheaves approach the same in the movement of the bed frame. At the same time this slack permits the foot end to swing about the links 24 and 25 into a position adjacent to and substantially parallel with the bed frame as shown in Fig. 6, which bed frame occupies a position tilted slightly rearwardly from the perpendicular as shown in Fig. 2.

When it is desired to again bring the bed frame in the position for use, a downward pull is exerted on the foot end and associated end of the bed frame. This swings the sheaves 26 away from the angle bar 9 and of course acts to "take up" the cable, pulling against the action of the springs 31 which resist the downward swing of the bed an amount substantially counter balancing the weight thereof so that the bed frame cannot fall but comes down nice and easy. At the same time the slack is taken out of the foot ends of the cables and as the cables become taut they will act to swing the foot end about the links 24—25 and into a position substantially perpendicular when the bed frame reaches its horizontal position. Thus in the downward movement of the bed frame the foot end is swung into a perpendicular position by an active force and in the upward movement of the bed frame the foot end swings into a position substantially parallel therewith under the action of gravity, the top end of the foot end being then positioned in the plane of the foot end rail of the bed frame.

The sheaves and cables, being located "under" the bed are concealed from view when the bed is in its position for use and in no manner can become engaged with the bedding used upon the bed. The parts are few in number and cannot readily get out of order.

While in describing my invention I have referred to certain details of construction as well as form and arrangement of parts, I do not wish to be limited thereto except as may be pointed out in the appended claims.

I claim as my invention:

1. A folding bed embodying therein, a main head frame, a bed frame having means by which it is swingably connected at one end to said main head frame for movement from a horizontal position to substantially a vertical position and vice versa and including a fixed supplemental head frame, a foot end pivotally connected to the other end of the bed frame, sheaves on said bed frame and said supplemental head frame, a cable trained over said sheaves and fixed at its ends to said main head frame and foot end respectively, and spring means associated with said cable and bed frame and acting in the swinging movement of the bed frame to counter balance

the same, said cable acting in one movement of the bed frame to swing the foot end into substantially a perpendicular position.

2. A folding bed embodying therein, a head
5 frame, a bed frame including a fixed supplemental head frame, means providing a shifting fulcrum folding connection between said head frame and bed frame, a foot end operatively connected to the foot end of the bed
10 frame, sheaves on the foot and head ends of the bed frame and also on the fixed supplemental head frame, a flexible member fixed at one end to the head frame and passing over said sheaves and a spring fixed at one end to
15 the foot end of the bed frame and at its other end to said flexible member.

3. A folding bed embodying therein, a head

frame, a bed frame including a fixed supplemental head frame, means providing a shifting fulcrum folding connection between said
20 head frame and bed frame, a foot end operatively connected to the foot end of the bed frame, sheaves on the foot and head ends of the bed frame and also on the fixed supplemental head frame, a flexible member fixed at
25 one end to the head frame and passing over said sheaves and a spring also located under the bed frame and attached to the foot end thereof adjacent the sheave thereon and fixed
30 at its other end to said flexible member.

In testimony whereof, I have hereunto set my hand, this 11th day of August, 1925.

CHARLES F. KOLB.