N. C. MERRILL.

UPTILTING BED.

APPLICATION FILED OCT. 28, 1909.

963,789.

Patented July 12, 1910.

2 SHEETS—SHEET 1.

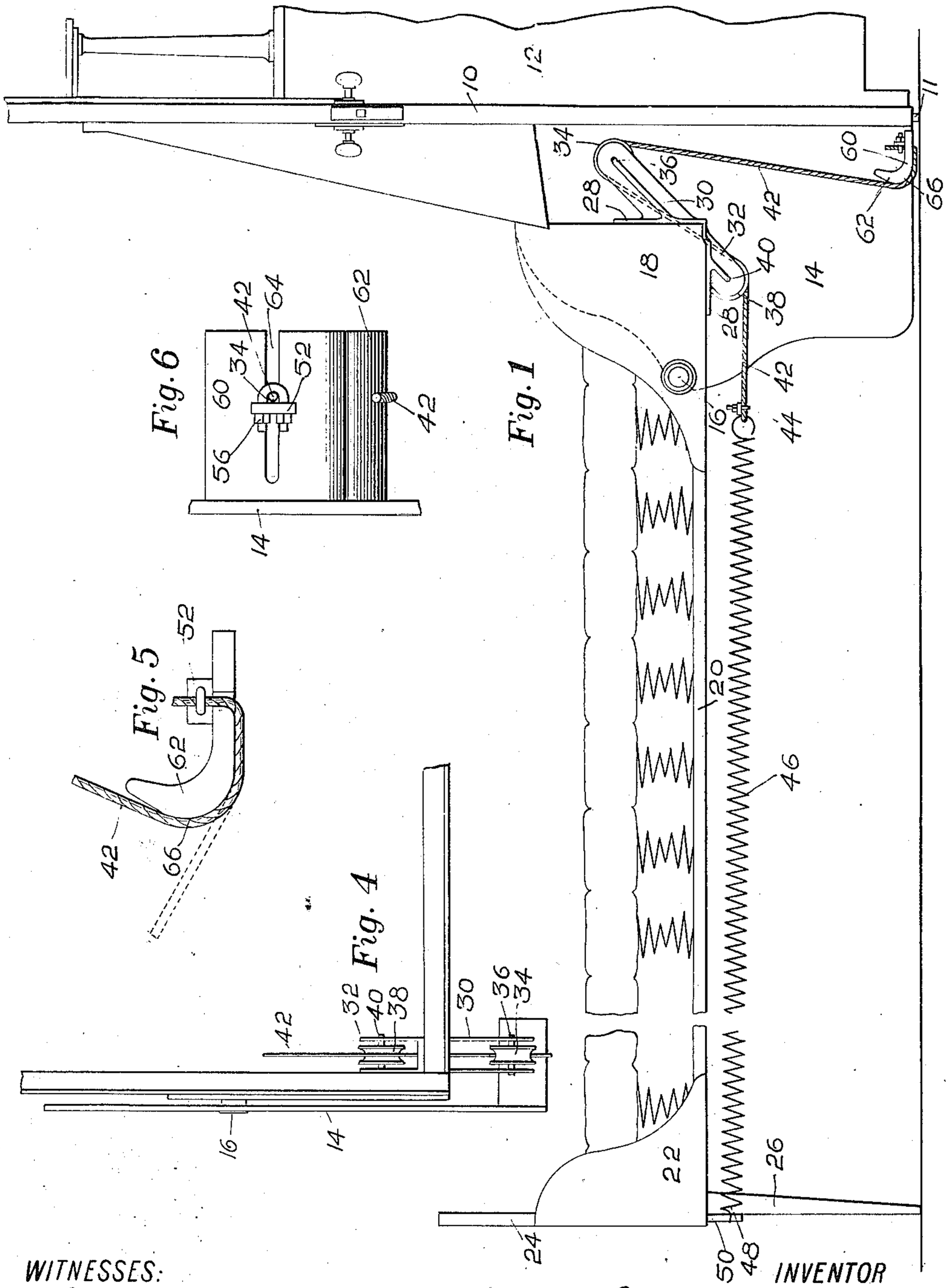

Fig. 1

Fig. 6

Fig. 5

Fig. 4

WITNESSES:

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INVENTOR

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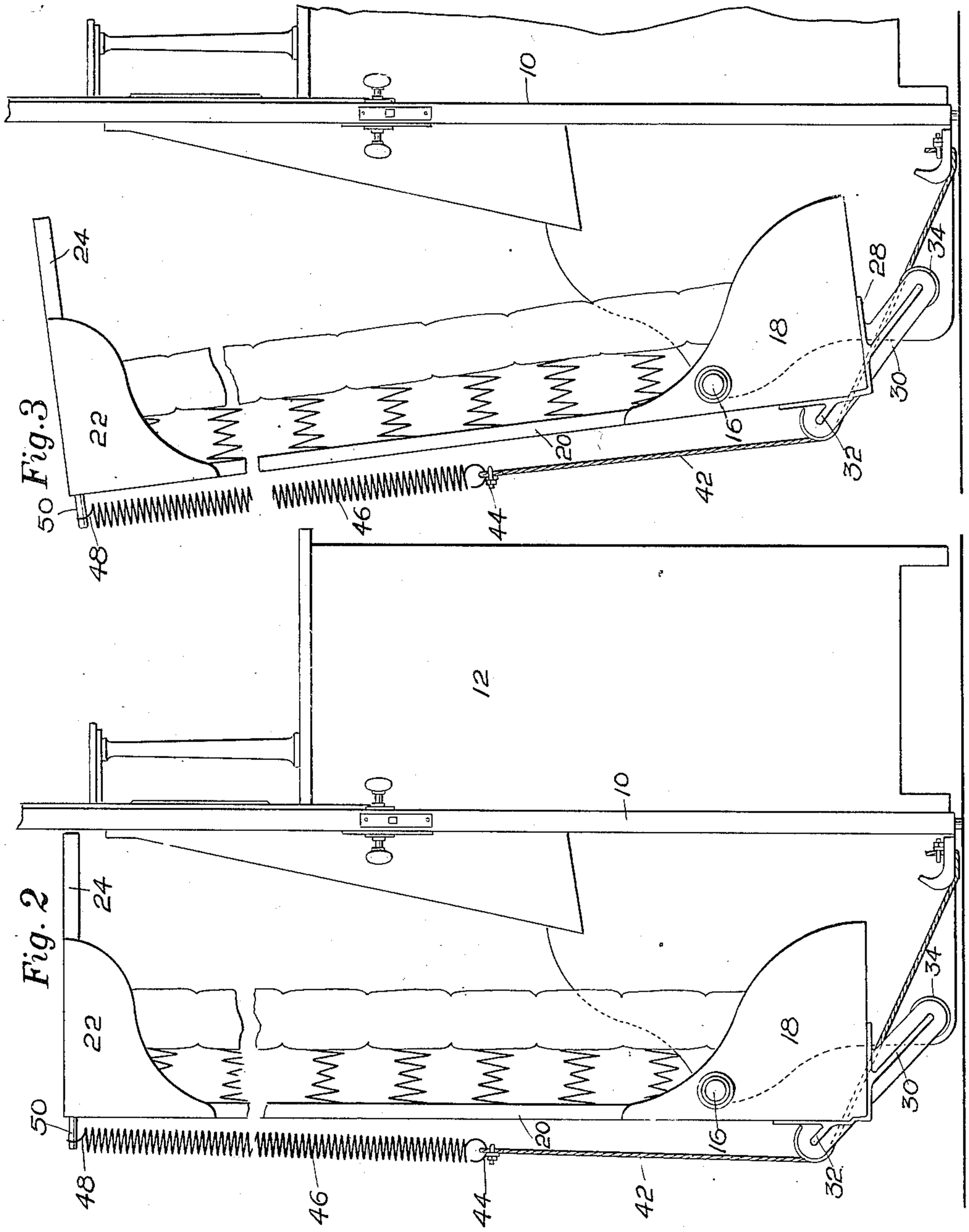

Fig. 3

Fig. 2

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UNITED STATES PATENT OFFICE.

NATHAN C. MERRILL, OF CHICAGO, ILLINOIS.

UPTILTING BED.

963,789. Specification of Letters Patent. Patented July 12, 1910.

Application filed October 28, 1909. Serial No. 525,183.

To all whom it may concern:

Be it known that I, NATHAN C. MERRILL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Uptilting Beds, of which the following is a specification.

This invention relates to folding beds and has for its object the providing of a novel mechanism which will assist in lifting the bed when it is in lowered or usable position and which will check the movement of the bed as it approaches closed position, thereby minimizing the tendency to slam against the upright door, frame or other support upon which the bed is mounted.

The invention consists in a spring rigidly attached at one end of the bed proper and at the other end by means of a cord, chain or the like to a fixed support, said cord or chain passing over two different pulleys or other pivotal supports so located that as the bed is moved from open to closed position this cord engages first one and then the other of these supports, whereby the tension upon the spring is varied for the purposes set forth.

The invention also consists in a novel mounting for the fixed end of the flexible end of the cord or connector whereby the cord may be adjusted in two directions, thereby assuring its always being in alinement with the pulleys upon the bed.

The invention also consists in details which will be described as the specification proceeds.

Figure 1 of the drawings illustrates a folding bed equipped with the preferred form of this invention, the bed being in lowered or usable position. Fig. 2 illustrates the same parts as in Fig. 1 in the position which they assume when the bed is in closed position. Fig. 3 illustrates the position of the parts of Figs. 1 and 2 when the bed is in an intermediate position between that of those figures, where the cord shifts from tending to pull the bed up from the floor to the position where it tends to hold the bed away from the wall, door or panel. Fig. 4 is a detail view of the pulleys, the cord over them and the attaching block for the stationary end of the cord. Fig. 5 is a side and Fig. 6 a plan view of the attaching block.

A device of this invention is attached to any suitable vertical wall or support, but for convenience is here illustrated as attached to a swinging door 10 pivoted at the bottom 11 and at the top to a corresponding pivot, not shown, so that the bed may be rotated with the door into and out of a room in whose wall the door is mounted. This door in ordinary practice carries upon one side a bookcase, china closet or wardrobe 12, as desired, and upon the opposite side the device of this invention attached thereto through a pair of parallel brackets 14, only one appearing in the drawing. These brackets which carry a pivot 16 on which is journaled the head bracket 18 of a bed side rail 20 on the opposite end of which is a foot bracket 22 of the folding bed. The two foot brackets 22 are connected together by the foot board 24 and carry the other leg supports 26 adapted to sustain the foot end of the bed when it is in use, as shown in Fig. 1. Rigidly connected to the head end of the bed by means of the angular clip 28 or any other suitable means are two levers 30 and 32 extending diagonally of and across the plane of the side rails 20 of the bed. Upon the longer of these levers 30 is a pulley 34 journaled at 36 and upon the shorter of these levers 32 is a pulley 38 journaled at 40. These two pulleys lie in the same vertical plane, perpendicular to the axes of the pivots 16. Passing over these two pulleys 34 and 38 is a flexible member 42, in the particular case herewith illustrated, a rope having one end attached at 44 to a retractile spring 46 whose opposite end is connected at 48 to a suitable bracket 50 projecting from the under side of the bed and located near the foot thereof. This bracket 50 is, as shown, made so that it extends substantially across the spring and if the cord 42 breaks the entire blow of the contracting spring 46 is taken by this member 50 instead of by other parts of the bed with consequent damage thereto. The opposite end of this flexible member 42 is detachably connected by means of a block 52, a U shaped loop 54 and nuts 56, to the plate 60 which is attached by any suitable means to the bracket 14 adjacent to the front of the door 10. On the front of this plate 60 is an upwardly turned curved member 62 over which the rope 42 is adapted to pass. In this plate 60 is an elongated slot 64 parallel to the axis of the pivot 16 and running across the plane of pulleys 34 and 38, through which slot 64 the rope 42 passes and in which it may be ad-

justed longitudinally. This structure is important in that it always keeps the rope in line with the pulleys so that there is no tendency to fray or cut the edges of the rope. In order to prevent cutting of the rope it also is very important that the face 66 of member 62 be rounded as shown.

The result of the construction last described is that by loosening the nuts 56 and consequently the loop 54 said loop may be adjusted lengthwise of the rope thus tightening or loosening the tension on the spring.

Assuming that the parts are in the position of Fig. 1 it will be seen that the flexible member 42 passes over the pulley 34 then under the pulley 38 to the spring 46, with the result that in accordance with the well known principle of leverage of ropes over pulleys, the pull upon the rope 42 between pulley 34 and the block 60 is just double the actual tension or pulley force acting upon a lever whose effective length is the distance between the pivots, and the pivot 36 tends very forcibly to assist in the elevation of the bed from the lowered position of Fig. 1 toward that of Fig. 3. As the bed swings up the angularity of the rope on opposite sides of the pulley 34 becomes greater and consequently this multiplication of pull on the pulley becomes less. When the position of Fig. 3 is reached the uptilting pull over the fulcrum on lever 30 disappears and we have simply the pull of the rope over the pulley 38 which reverses the pull on fulcrum 16 with a less length of fulcrum to prevent the bed from slamming. As the bed swings from the position of Fig. 3 to that of Fig. 2 the angular relationship of the portions of the rope on each side of the pulley 38 becomes less with the result that as the bed approaches the position of Fig. 2 the tension of the spring is considerably greater than at Fig. 3 thereby checking the bed as it reaches the position of Fig. 2 and tending to minimize, if not entirely remove the slamming effect which is, in the absence of this device, produced either by excessive strength exerted by the operator or by the fact that pivot 16 is not in the center of gravity of the bed with the result that in the position of Fig. 2 the greater portion of the weight of the bed is between pivot 16 and door 10. Actual experiments have demonstrated that the particular positions of the levers 30 and 32 and of the block 60 in reference to the bed and wall 10 are important in determining the effectiveness and satisfactory working of the device.

In the claims the spring 46 and the member 42 will together be referred to as a "spring device."

The claims are:—

1. In a device of the class described the combination of a suitable support, a bed pivotally mounted thereon to swing between closed and usable position, a pair of pulleys located on the bed in different directions from the pivot of the bed, a spring device attached to the bed, and to a fixed point, passing over said pulleys which are so located that as the bed swings between said open and closed positions the spring device acts successively over them to distribute the tension of the spring to counteract the weight of the bed in its different positions as described.

2. In a device of the class described the combination of a suitable support, a bed pivotally mounted thereon so as to swing between closed position, parallel thereto and open position perpendicular thereto, a pair of pulleys located on the bed in different directions and at different distances from the pivot of the bed but in a plane perpendicular to said pivot of the bed, a spring device attached to the foot of the bed and to a fixed point near the base of the support, said spring device passing over said pulleys which are so located that as the bed swings between said positions the spring device acts successively over them to distribute the tension of the spring to counteract the weight of the bed in its different positions, as described.

3. In a device of the class described, the combination of a suitable support, a bed pivotally mounted thereon so as to swing between closed position, parallel thereto and open position perpendicular thereto, a pair of pulleys located on the bed on different sides of the pivotal axis of the bed, said pulleys lying in the same plane, perpendicular to the axis of the bed, a bracket at the foot of the bed, a spring attached to the bracket which extends from the bed a distance about equal to the diameter of the spring, a flexible member connected to the opposite end of the spring passing over the pulleys and having its other end attached near the base of the support, the location of attaching points of the spring and flexible member and the pulleys being such that as the bed swings between said positions the flexible member acts successively over the different pulleys to distribute the tension of the springs to counteract the weight of the bed in its different positions, as described for the purposes set forth.

4. In a device of the class described the combination of a suitable support, a bed pivotally mounted thereon so as to swing between closed position, parallel thereto and open position perpendicular thereto, a pair of pulleys located on the bed on different sides of the pivotal axis of the bed and at unequal distances therefrom, said pulleys lying in the same plane perpendicular to the axis of the bed, a spring having one end attached to the foot of the bed and a flexible member attached to the spring passing over

the pulleys and having its other end attached near the base of the support, the location of the attaching points of the spring and flexible member and the pulleys being such that the flexible member acts successively over the different pulleys to distribute the tension of the spring to counteract the weight of the bed in its different positions, as described for the purposes set forth.

5. In a device of the class described the combination of a suitable support, a bed pivotally mounted thereon so as to swing between closed and open position, a pair of pulleys on the bed in the same plane perpendicular to the axis of the bed, and in different directions from the pivotal axis of the bed, a spring device having one end attached to the bed and the other end attached to a fixed stationary member near the base of the support and means for adjusting the point of attachment of said spring device across said stationary member for the purposes described.

6. In a device of the class described the combination of a suitable support, a bed pivotally mounted thereon so as to swing between closed and open position, in combination with a pair of pulleys lying in the same plane, a spring device passing over the pulleys, a plate mounted in fixed position transversely of the plane of the pulleys there being an elongated slot in said plate also extending across the plane of the pulleys and means attached to the end of the flexible member adapted to be detachably attached through said slot to said plate member whereby the flexible member may be detachably adjusted transversely of the pulleys to insure proper traveling of the flexible member over the pulleys, as described.

7. In a device of the class described provided with pulleys and a flexible member over them; a plate attached to a fixed support, said plate having a slot therein within which the end of the flexible member may slide.

8. In a device of the class described provided with pulleys and a flexible member over them; a plate attached to a fixed support, said plate having a slot therein within which the end of the flexible member may slide transversely of the plane of the pulleys.

9. In a device of the class described, a bracket and a plate 60 attached thereto said plate being provided with the slot 64, the upturned end 62 and the curved surface 66 as shown and described.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

NATHAN C. MERRILL.

Witnesses:

DWIGHT B. CHEEVER,

MARGARET D. ROBB.