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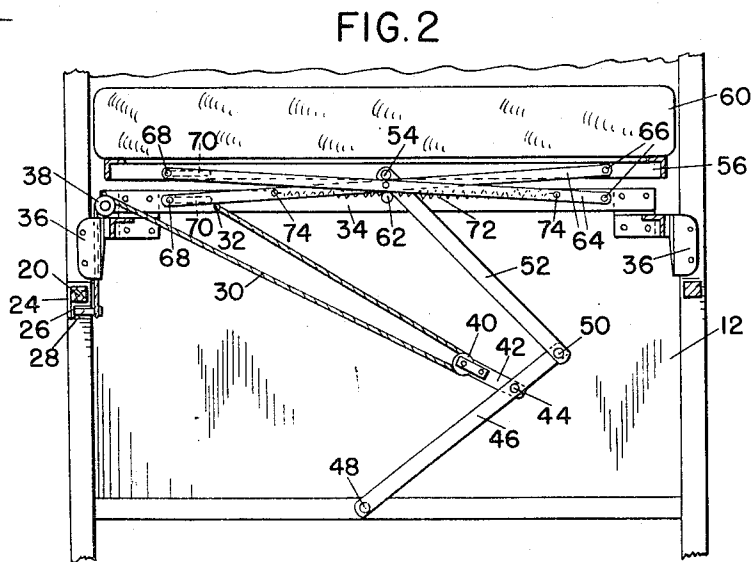
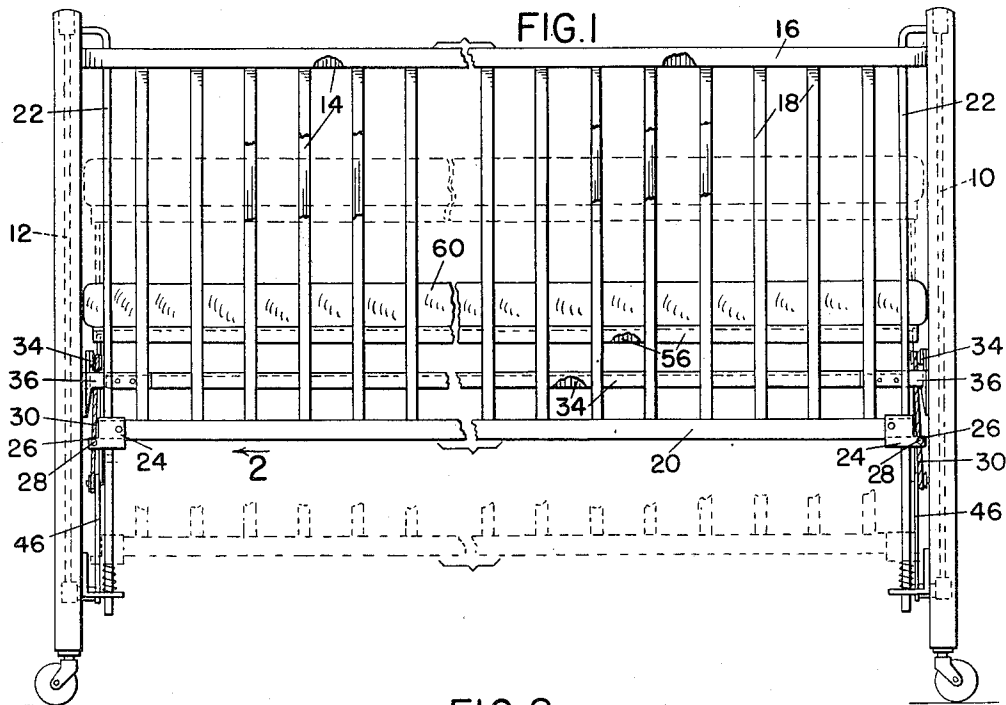
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AUTOMATIC MATTRESS SPRING ADJUSTMENT FOR DROP SIDE CRIB

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2 Sheets-Sheet 1



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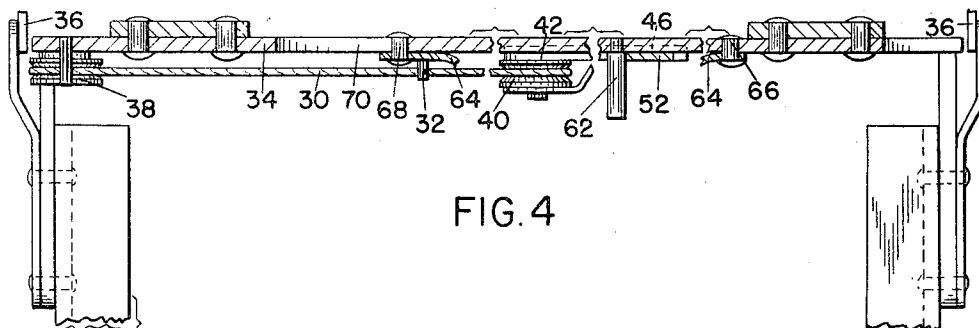
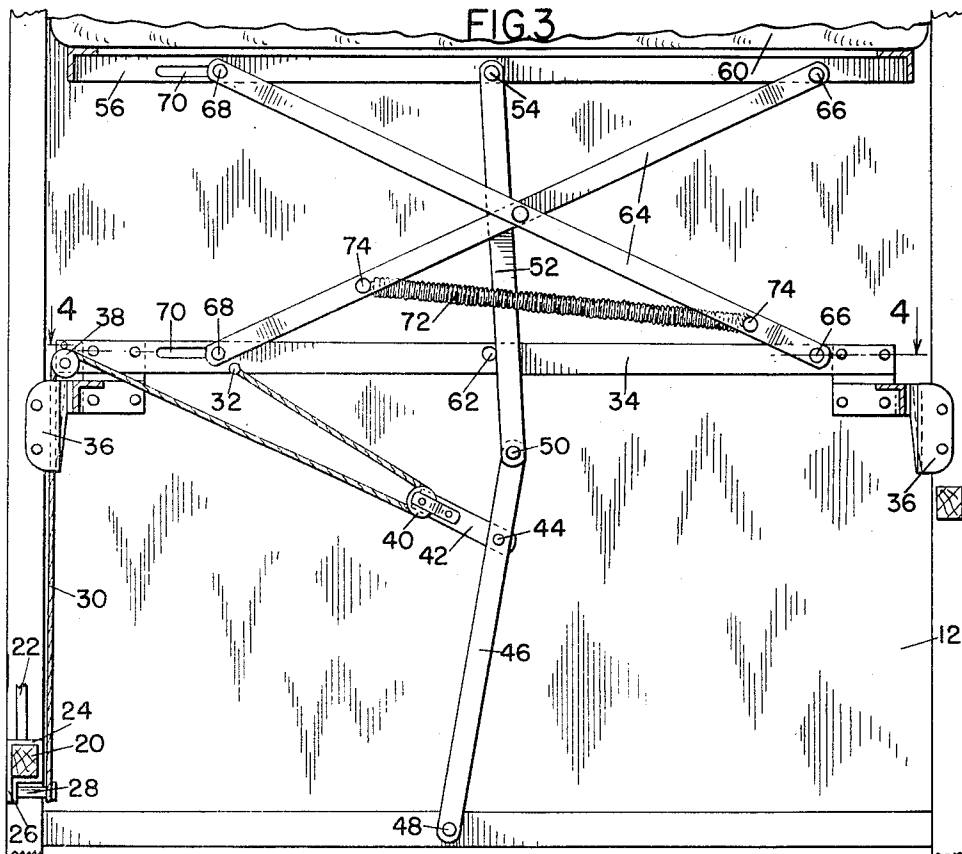
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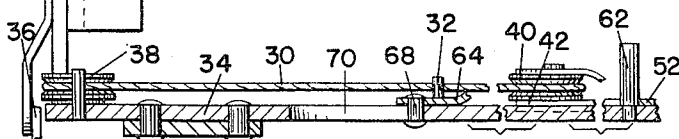


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AUTOMATIC MATTRESS SPRING ADJUSTMENT FOR DROP SIDE CRIB

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10 Claims. (Cl. 5—63)

This invention relates to an infant's crib or the like, and more particularly the invention is directed to an automatic adjustment for the crib mattress supporting spring which rises upon and due to the lowering of the drop side of the crib, the drop side being normally held in raised position with the mattress spring support in lowermost position for protection of the infant in the crib; but upon lowering the drop side, the crib mattress supporting spring is raised automatically by means of a special new and improved cable-operated linkage connected to the drop side and to the mattress supporting spring for actuation one by the other to raise the infant in the crib to utility height for convenience in infant care, etc.

A further object of the invention resides in the provision of a crib for infants as above described wherein the apparatus for raising and lowering the mattress supporting spring is located wholly below the latter and does not at any time extend above it, so that the mechanism is concealed even though not necessarily enclosed; and the provision of an apparatus as above described wherein the same is easier to operate, is fool-proof in operation, and is particularly easy to manufacture, assemble, adjust, and operate.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a view in front elevation of a crib embodying the present invention, parts being broken away, and illustrating the relative degree of motion of the mattress support between the extremes thereof;

Fig. 2 is a view in elevation illustrating the mechanism and showing the same in lowermost position and looking in the direction of arrow 2 in Fig. 1;

Fig. 3 is a similar but enlarged view showing the mattress support extended to uppermost position and the crib drop side in lowermost position; and

Fig. 4 is a section on line 4—4 of Fig. 2, parts being broken away.

Reference is made to Patent No. 2,448,317, August 31, 1948 illustrating an infant's crib, the present invention being an improvement thereover and providing a simpler construction which is easier to operate, less expensive to manufacture, and which provides for a minimum of malfunctions or disrupting of the elevating mechanism, so that the benefits of the invention are increased.

Referring now to Fig. 1, there is shown a conventional drop side crib, the same including a frame having an end panel 10, an opposite end panel 12, an inter-connecting rigid rear wall indicated at 14, there being a drop side at the front. As conventional, the rear wall could be a drop side also. The front drop side comprises a top rail 16, upright stiles or the like 18, and a bottom rail 20, the same being provided with conventional releasable lock means, not herein disclosed as being conventional in the art, to maintain the drop side in uppermost position and to lock the same in lowermost position.

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The top and bottom rails 16 and 20 of the drop side may be provided with vertical bores to be slidably guided in the vertical motion thereof by means of the usual drop slide rods 22 secured to the usual corner posts of the end panels as well known in the art. At the opposite ends of the lower rail 20, the same is provided with box-like rectangular shaped sleeves 24 which are similar but reversed to present projections 26 extending laterally thereof, these projections providing for fastening elements 28 to which are connected the ends of cables 30, see particularly Figs. 2 and 3, there being a cable 30 and elevating mechanism at each end of the crib, see Fig. 4.

The opposite end of each cable 30 is anchored at a fixed point indicated at 32 on a frame member 34, said frame member forming a part of a rectangular frame which is adapted to be secured by any well known means as indicated by brackets 36 to the end panels of the crib or to the corner posts therefor, or in any other manner found desirable or convenient.

Each cable 30 passes over a fixed idle roll 38 mounted on the frame-work 34 and is trained over a pulley, roller, or the like 40 mounted on a link 42 having an end thereof pivoted at 44 to a longer link 46 intermediate the ends of the latter.

Each link 46 is pivoted at its lower end at 48 to the respective end panel 10 or 12 or to some convenient fixed frame member, and the opposite end of each lever 46 is pivoted as at 50 to a second elongated link 52. The other end of each link 52 is pivoted as at 54 to a member 56 representing an end angle iron or other member of a mattress supporting spring frame. Mattress supports are ordinarily made in rectangular form of pieces of angle-iron or other convenient members and mount thereon a link fabric or other means to support the mattress, and only so much of the mattress supporting spring frame is shown as is necessary to illustrate the present invention.

It will be apparent from the above that when the drop side is in its solid line position in Fig. 1, i. e. in its uppermost position, the cables 30 appear as shown in Fig. 2. The drop side is in its uppermost position, and therefore the pulleys or rollers 40 will be in their lowermost position, as determined by the cables; links 46, 52 will be as shown with the vertically adjustable mattress support 56 substantially resting upon the horizontal fixed frame-work 34.

However, when the drop side is released and lowered to the dotted line position as shown in Fig. 1, the cables will be extended downwardly (see Fig. 3), and the ends at 32 being fixed, the rollers 40 will be pulled forwardly of the crib which is to the left in Figs. 2 and 3; and linkage 46 and 52 will be moved so as to tend to straighten out as shown in Fig. 3. Under these conditions, obviously the spring frame or support 56 must be moved vertically upwardly and in this condition the top edge of the mattress indicated at 60 may be positioned adjacent the top edge of the drop side, depending upon the relative proportions of the parts utilized. In any event, the crib spring or support rises as the drop side descends and vice-versa, to carry out the purposes of the invention.

A stop 62 is provided on frame-work 34 in position to intercept linkage 52 in the Fig. 3 position to prevent the same going past a dead center, thus preventing locking of the mattress spring frame in its uppermost position. In other words, when the drop side is released from its lowermost position and moved upwardly, the action of the linkage is smooth and positive and need not be unlocked as it remains unlocked at all times due to stop 62. The drop side itself latches the parts in the upper and lower positions due to the usual latches as well known in the art.

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A cross linkage generally indicated at 64 is provided, the respective members thereof being pivoted at points 66 to the respective frames 34 and 56 and the opposite ends thereof as at 68 being slidable and guided by slots 70 to accomplish the change in the cross linkage 64 from the Fig. 2 folded position to the Fig. 3 extended position thereof. The linkage 64 balances the spring frame or support 56, maintaining the same always in a horizontal position, and provides for smoother operation.

Tension springs 72 are connected between the parts of the linkage 64 as at 74, and these springs extend and are tensioned in the lowermost position of the spring frame 56 (see Fig. 2). Springs 72 assist in raising the mattress spring frame, the mattress and the infant which occupies the crib, whereby the balance desired between the drop side and the spring frame and mattress is achieved, it being understood that an ideal condition is one in which the infant, mattress and spring frame are in balanced relationship, so that the least effort is required to both lower and raise the drop side.

By reason of the above-described construction, the same is very easily operated, even with the occupant of the crib supported on the mattress, in spite of the weight of the mattress, the linkage, the spring frame and the child, and by the relatively simple linkage disclosed, the objects of the invention are carried out in a simplified and more easily operated form, which provides a positive-acting mechanism not liable to malfunction or to stick in any way. All the mechanism is concealed and located below the mattress and therefore cannot be interfered with by the crib occupant, and the crib itself resembles a conventional crib in appearance without bulky or double end panels.

The new mechanism operates more smoothly in part due to the pulley arrangement which doubles the mechanical advantage in the operation of the device and thus results in easier cooperation with less work.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in claims, but what I claim is:

1. A crib construction comprising a crib frame, a drop side thereon, a vertically movable mattress supporting spring frame in the crib frame, an extensible linkage on the crib frame connected to the frame thereof and to the spring frame, means causing said linkage to extend and contract, said means being secured to the crib drop side and operated thereby to raise the spring frame upon lowering the drop side and vice-versa, said means including an elongated flexible actuator having an end secured to the drop side and the other end secured to a fixed crib member, the actuator having an intermediate portion movably associated with the linkage.

2. A crib construction comprising a crib frame, a drop side thereon, a vertically movable mattress supporting spring frame in the crib frame, an extensible linkage on the crib frame connected to the frame thereof and to the spring frame, means causing the linkage to extend and contract, said means being secured to the crib drop side and operated thereby to raise the spring frame upon lowering the drop side and vice-versa, said means including an elongated flexible actuator having an end secured to the drop side and the other end secured to a fixed crib member, the actuator having an intermediate portion movably associated with the linkage, a fixed idle roller on the crib frame adjacent the drop side, said flexible actuator being trained over the roller.

3. A crib construction comprising a crib frame, a drop side thereon, a vertically movable mattress supporting spring frame in the crib frame, an extensible linkage on the crib frame connected to the frame thereof and to the spring frame, said linkage including a pair of articulated elongated members, means causing the linkage to extend and contract, said means being secured to the crib drop side and operated thereby to raise the spring frame

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upon lowering the drop side and vice-versa, said means including an elongated flexible actuator having an end secured to the drop side and the other end secured to a fixed crib member, the actuator having an intermediate portion movably associated with the linkage, a fixed idle roller on the crib frame adjacent the drop side, said flexible actuator being trained over the roller, and means on one of the elongated members of the extensible linkage to slidably receive the flexible actuator in looped form between the idle roller and the fixed end of the flexible actuator.

4. A crib construction comprising a pair of end members for the crib, a drop side extending between the end members, a fixed frame secured to the end members and a vertically movable mattress support located above the fixed frame, an extensible linkage for each end member, each linkage including a link pivotably associated with an end member and another link pivotally associated with a corresponding end of the mattress support, said linkages being extended to raise the latter and folded to lower the same, an elongated flexible actuator for each linkage, means on one of the links of each linkage to slidably receive the corresponding flexible actuator intermediate the ends thereof, means anchoring each flexible actuator at one end to the frame and at the other end to the drop side, and means guiding the flexible actuators to cause a pull on each actuator to extend the linkages as the crib drop side descends to raise the mattress support.

5. The crib construction of claim 4 wherein the guiding means for the flexible actuators comprises idle pulleys on the end members adjacent the drop side, the flexible actuators extending thereover, downwardly to the points of connection thereof to the drop side.

6. The crib construction of claim 4 including a stop on an end member to limit the motion of the linkage in the extension movement thereof to prevent the linkage from assuming an aligned relationship of the various links of each linkage.

7. For use with an infant's crib including a frame having a drop side, a unitary assembly for cooperation with said drop side and including apparatus for raising and lowering a mattress-supporting spring frame as the drop side is lowered and raised respectively, said apparatus comprising a frame adapted for securement to a crib frame in fixed relation thereto, a mattress-supporting spring frame movably mounted on the fixed frame for vertical motion to adjust the height thereof, a linkage including a link secured to the mattress-supporting spring frame and adapted to be fixed to a portion of the crib frame for extension to raise the mattress-supporting spring frame and for contraction to lower the same, and flexible means connectible to said drop side and to said linkage, including means for effectively shortening the flexible connection to extend the linkage as the drop side is lowered, and selectively providing for folding of the linkage under the action of gravity upon raising the drop side.

8. The apparatus of claim 7 including a cross linkage of scissor type connected between the fixed frame and the mattress-supporting spring frame at corresponding ends of the same, and spring means tending to extend said scissors to aid in raising the mattress-supporting spring frame and to yieldingly resist lowering thereof.

9. An infant's crib having a drop side and an adjustable mattress-supporting spring frame, comprising a frame adapted to be fixed to the crib, means adjustably supporting the spring frame on the fixed frame, an extensible linkage having one link connected to the spring frame and another link connected to the crib frame at a fixed point below the fixed frame, an elongated flexible member, means on one of said links for slidably receiving the flexible member, said last-named means maintaining the flexible member in the form of an open loop, means connecting the flexible member to the drop side, whereby the drop side will extend the linkage upon down-

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ward motion and allow the linkage gravitationally to fold upon upward motion, said flexible member being engaged at one end at a fixed position and engaging an idler on the crib frame over which it is trained, said idler being located adjacent the drop side, and the flexible member including a portion located substantially vertically between the idler and the point of connection of the flexible member to the drop side.

10. In an infant's crib having a crib frame, a drop side connected thereto, a vertically adjustable mattress supporting spring frame mechanism, said mechanism comprising a frame secured in fixed position to said crib, a linkage at each end of the crib having a link pivoted at a fixed point on the crib frame below the fixed frame and having another link pivoted to a spring frame above the fixed frame for extension of the linkage to raise the spring frame relative to the fixed frame and for relative folding motion to lower the spring frame relative to the fixed frame, a roller on one of the links of the linkage, a flexible cable, said cable having one end fixed to the

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fixed frame and being trained over the roller, an idler roller on the crib frame adjacent the drop side, said flexible cable being trained over said idler roller and descending therefrom, said flexible cable terminating below the idler roller in fixed relationship to said drop side, said flexible cable forming an open loop between the first-named fixed end thereof and the idler roller, said loop being effectively shortened upon lowering of the drop side to extend the linkage to raise the mattress-supporting spring frame, and said loop being effectively lengthened under the influence of gravity as the spring frame descends upon raising the drop side.

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