April 22, 1952 W. J. McNABB ET AL 2,593,590

CRIB ACTUATING MECHANISM

Filed May 21, 1949 2 SHEETS—SHEET 1

Fig. 1

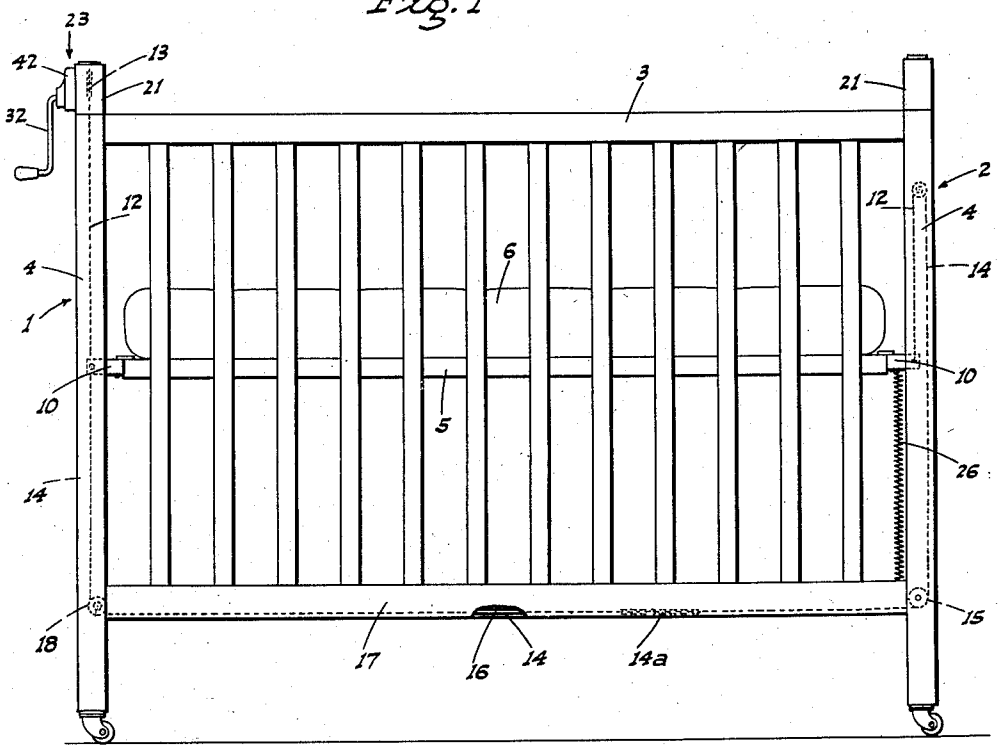


Fig. 4

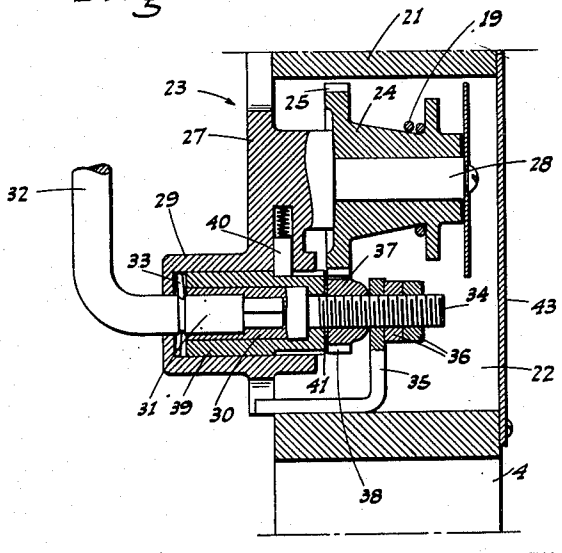
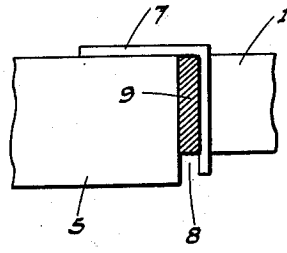


Fig. 5



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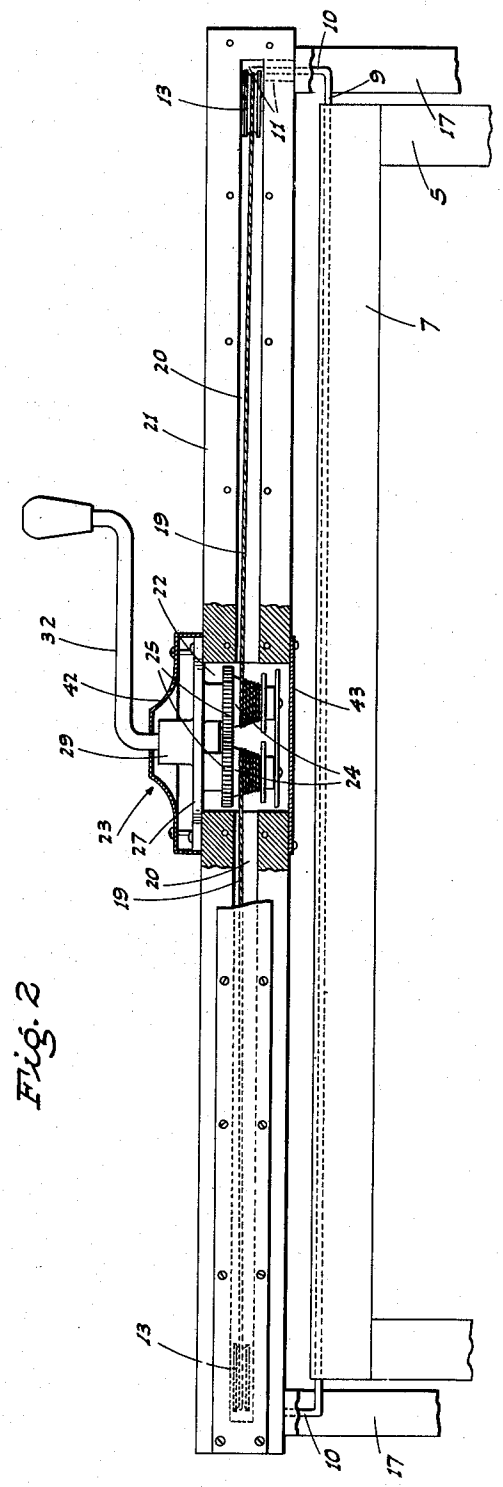

Fig. 2

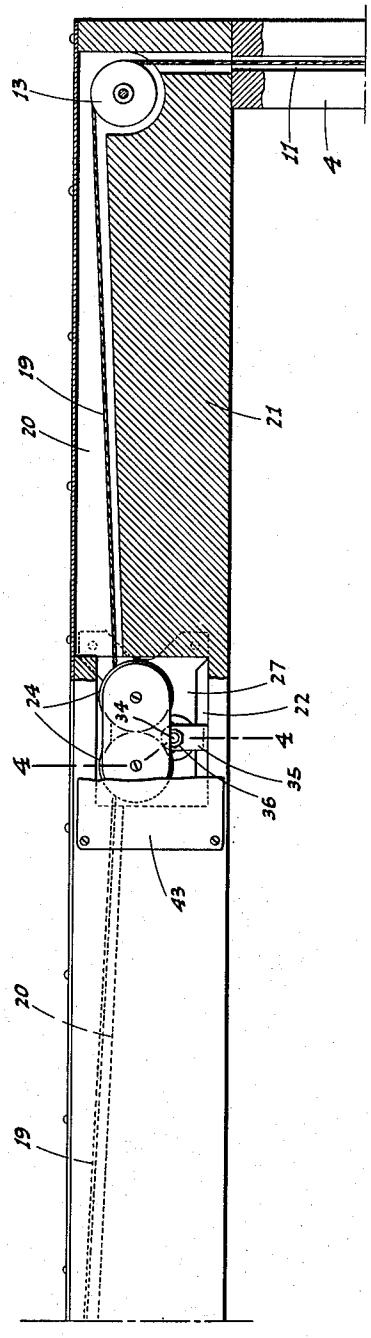

Fig. 3

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CRIB ACTUATING MECHANISM

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3 Claims. (Cl. 5—63)

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The present invention relates in general to baby cribs; and in particular is directed to improvements in a baby crib of a type which includes a vertically adjustable mattress frame.

One important object of the present invention is to provide the crib with a novel elevating mechanism for the vertically adjustable mattress frame of the crib; such mechanism being hand actuated, and including a crank-operated unit disposed on one end board of the crib centrally of its sides and adjacent the top for convenience of access and so that the operator has a view lengthwise into the crib during the adjusting operation.

Another object of the invention is to provide an elevating mechanism, as in the preceding paragraph, wherein the mattress frame is suspended on and adjusted by a cable system which includes a plurality of runs extending within the structure of the crib between attachment members on the mattress frame and the crank operated unit on one end board of the crib; such unit including a drum assembly to which the cable runs connect.

An additional object of the invention is to provide an elevating mechanism, as described, which embodies—as a safety feature—an automatic brake arranged in the crank operated drum unit to prevent accidental unwinding of the cables from the drum assembly under the influence of the weight of the mattress frame, mattress, and baby thereon.

A further object of this invention is to provide an elevating mechanism, as above, wherein the aforesaid crank-operated drum unit is designed so that the crank is removable, thus assuring against unauthorized manipulation of said mechanism, or accidental release of the brake which results from back-turning of the handle.

A further object of the invention is to provide a crib wherein the mattress frame is detachably fitted at each end, in self-locating relation, with a novel supporting cross bar formed at the ends with integral, longitudinal, outwardly projecting attachment fingers for connection with corresponding suspension runs of the cables; such cross bars thus presenting the attachment fingers with correct transverse spacing, and in proper relative position on the mattress frame, for cable connection.

A further object of the invention is to provide a practical, safe, and convenient elevating mechanism for a vertically adjustable mattress frame of a crib, and yet a mechanism which is exceedingly effective for the purpose for which it is designed.

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These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of a baby crib embodying the present invention.

Fig. 2 is an enlarged, fragmentary plan view, partly in section, of the end portion of the crib on which the crank-operated drum unit is mounted; the latter being shown in the view.

Fig. 3 is an enlarged fragmentary elevation, partly in section, of the structure shown in Fig. 2.

Fig. 4 is an enlarged cross section on line 4—4 of Fig. 3.

Fig. 5 is an enlarged fragmentary elevation showing the manner of securing each end of the mattress frame to the corresponding cross bar between the attachment fingers.

Referring now more particularly to the characters of reference on the drawings, the invention is embodied in a baby crib which includes upstanding end boards 1 and 2 connected together by spaced crib sides 3; the end boards each including corner posts 4.

A vertically adjustable mattress frame 5 is disposed in the crib and supports the mattress 6.

At each end thereof the mattress frame 5 has a transverse, inverted angle iron 7 fixed thereto in a manner to form a transverse, downwardly opening groove 8.

A cross bar 9 removably but snugly engages in the groove 8, from below, at each end of the mattress frame 5; each cross bar 9 having attachment fingers 10 integral with the ends thereof. The attachment fingers 10 project horizontally, in a longitudinally outward direction, into vertical grooves 11 in the corresponding corner posts 4.

Within the vertical grooves 11, the fingers 10 attach to suspension runs 12 of a simultaneously adjustable cable system which suspends the mattress frame in the crib for selective raising or lowering adjustment.

Said cable system is disposed wholly within the confines of structural members of the crib; the suspension runs 12 turning about direction-changing pulleys 13 at the upper ends of said grooves 11. The cables corresponding to the suspension runs 12 in the corner posts 4 of the end board 2 include transfer runs 14 which extend downwardly through the grooves 11 of said corner posts, about direction-changing pulleys 15, thence lengthwise in grooves 16 in the lower rail 17 of the corresponding crib side 3. From the grooves 16 the transfer runs 14 turn about corresponding

direction-changing pulleys 18 and pass upwardly in the corner posts 4 of the end board 1 to connection with the adjacent fingers 10.

With this arrangement a pair of cables turn over the pulleys 13 in the corner posts of the end board 1, and thence said cables extend laterally inwardly as control leads 19; the latter being disposed in horizontal grooves 20 in the top rail 21 of said end board 1, and such grooves are capped as shown.

The grooves 20 communicate, at adjacent ends, with a central recess 22 formed in the top rail 21, and a crank-operated drum unit, indicated generally at 23, is mounted in connection with said top rail 21 from the outside and projects into said recess. Within the recess 22 the crank-operated drum unit 23 includes a pair of side by side drums 24, and said drums are on horizontal axes which extend transversely of the top rail.

The control leads 19 connect to the corresponding drums 24 in such relation that when the drums are rotated in opposite directions, the control leads 19 simultaneously wind on or off said drums.

The drums 24 are connected together for simultaneous rotation by meshing gears 25 formed integral with said drums, and the latter are crank actuated, in the manner hereinafter described, to cause the control leads 19 to wind on and off said drums so as to simultaneously raise or lower the mattress frame, respectively.

To assure of the stability of the mattress frame 5 adjacent the end board 2, and to prevent any slack in the transfer runs 14, relatively light-duty tension springs 26 connect between the mattress frame and points on the crib therebelow.

In order to assure proper tensioning and even pull on both cables, a short adjustable chain and hook unit 14a is interposed in each transfer run 14 along its bottom stretch as indicated.

The crank operated drum unit 23 comprises, in addition to the drums 24 with matching gears 25, the following structural arrangement:

An upstanding mounting plate 27 is secured on the top rail 21 over the outer end of the recess 22, and spindles 28 project inwardly from such mounting plate in supporting relation to the drums 24; the latter being tapered, as shown, to the end that the control leads 19 wind closely thereon.

In a plane below the drums 24, the mounting plate 27 is formed with an outwardly projecting boss 29 in which a rotary socket 30 is turnable; such rotary socket being adapted to have the non-circular shaft 31 of a hand crank 32 engaged therein in removable relation. A snap ring 33 frictionally but releasably holds the crank shaft 31 in the rotary socket 30.

At its inner end the rotary socket 30 is formed with an integral, inwardly extending spindle 34 which extends in turnable and non-threaded relation through a fixed, upstanding bracket 35, and a pair of lock nuts 36 are secured on the spindle 34, to the rear of said bracket.

Ahead of the bracket 35 the spindle 34 has a nut 37 threaded thereon, the threads being right-hand, and the nut being also a pinion 38 meshing with one of the gears 25.

A rotary sleeve 39 surrounds the rotary socket 30 between the latter and the boss 29; the inner end of the rotary sleeve 39 being closely adjacent the nut 37, and in such relation to the bracket 35 that nut 37 may have a slight amount of axial movement along spindle 34. A ratchet device 40 cooperates with the rotary sleeve to permit it to

rotate in the direction in which the nut 37 rotates (clockwise) to raise the mattress frame, but prevents rotation of said sleeve in the direction in which the nut 37 rotates to lower the mattress frame.

In the operation of this unit, and assuming that it is desired to raise the mattress from a lowered position, the initial clockwise turning movement of crank 32 turns spindle 34 in the same direction. The natural resistance or drag of the pinion-nut 37 to rotation causes the same to be advanced without rotation along the spindle until it jams against sleeve 39 at point 41, and thus in effect locking said sleeve, nut and spindle together so that they will all turn as a unit in a clockwise direction as long as a clockwise turning moment is imparted to crank 32. Such rotation of the pinion-nut is obviously transmitted to the cable drums 24 to wind the cables thereon and raise the mattress frame.

The instant the clockwise rotation of the crank 32 is halted, the tendency of the cable drums to turn in the opposite direction due to the weight of the mattress frame suspended from said drums, causes a rotative moment to be imparted to pinion-nut 37 in a direction to cause the same to advance (in an anti-clockwise direction) on spindle 34 and again jam—or remain jammed—against sleeve 39, and tending to rotate the same. Since said sleeve cannot rotate in such direction, however, because of the ratchet device 40, an effective and automatic brake against undesired lowering of the mattress frame is thus provided.

When it is desired to lower the mattress frame, crank 32 is turned in an anti-clockwise direction imparting rotation in the same direction to spindle 34. This causes the pinion-nut 37 to back away—without rotation—from sleeve 39. As soon as the nut 37 is free of brake sleeve 39, the rotative movement of the drums in a mattress frame lowering direction (due to the weight of the mattress frame thereon) will act to rotate the nut and as long as the crank handle is rotated in said anti-clockwise direction at the same speed as that of the nut, the latter will remain centered between bracket 35 and sleeve 39 and the mattress frame will be lowered. As soon as such rotation is halted, however, the tendency of the drums and gearing to rotate in the opposite direction—if the mattress frame is not fully lowered and is still exerting a drag thereon—at once cause nut 37 to jam against sleeve 39 and lock the nut and associated parts against further rotation in a mattress lowering direction.

When the crank operated drum unit 23 is not in use the crank 32 is removed so that a person without authority, or the infant in the crib, cannot cause accidental release of said unit.

The mounting plate 27 is enclosed within a protective hood 42, while the opposite or inner end of the recess 22 is closed by a cover plate 43.

The above described actuating mechanism for the vertically adjustable mattress frame of an infant's crib provides a very practical, reliable, and convenient means of raising, and controlling the lowering of, said mattress frame.

Additionally, as the crank-operated drum unit 23 is disposed centrally on one end board at the top thereof, with the crank projecting outwardly, the operator can manipulate said crank while in a position to view into the crib lengthwise thereof.

A further advantage of the above positioning of the crank operated drum unit 23 is that there is no obstruction of the crib at either side thereof,

which lends to the convenience of use of the crib.

Also, by mounting the crank operated drum unit **23** in a central position the corresponding cables in the cable systems are relatively balanced or equalized.

The actuating mechanism, in its structure and use, is quite safe; there being no exposed working mechanisms to injure the infant or operator, and the automatic brake assures against any possible accidental lowering of the mattress frame.

The crib frame is extra deep compared to the conventional crib so that an active baby may be lowered in the frame sufficient to assure safety against possibly falling out.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. In a baby crib which includes a vertically adjustable mattress frame, and a simultaneously adjustable cable system suspending the mattress frame in the crib; said cable system including a plurality of cables disposed mainly within the confines of structural members of the crib, the latter including an end board, control leads of the cables extending to a substantially common point on the end board for simultaneous adjustment, and a hand crank actuated drum unit mounted on the end board at said point in connection with all of said control leads of the cables; the end board including a top rail, there being a recess in the top rail intermediate its ends and grooves in communication with the recess from opposite sides, the drum unit including a drum assembly in said recess, and said control leads of the cables extending through said grooves to connection with the drum assembly; the recess and grooves being enclosed and the shaft of the crank extending horizontally outward from the recess lengthwise of the crib whereby said crank is disposed exteriorly of the end board adjacent the top thereof and intermediate its sides.

2. In a baby crib which includes a vertically adjustable mattress frame, and a simultaneously adjustable cable system suspending the mattress frame in the crib; said cable system including a plurality of cables disposed mainly within the confines of structural members of the crib, the latter including corner posts having vertical grooves therein opening toward the mattress

frame, the cable system having a suspension run in each groove, a cross bar secured to each end of the mattress frame, and rigid attachment fingers projecting longitudinally outward from the ends of each cross bar into corresponding grooves wherein said fingers attach to the corresponding suspension runs, the mattress being formed with a transverse, downwardly opening groove at each end thereof; the corresponding cross bar removably but snugly engaging in each transverse groove from below; the cross bar being of a length to dispose the attachment fingers in proper position for engagement in the vertical grooves in the corner posts.

3. In a baby crib which includes a vertically adjustable mattress frame and cables suspending said frame; means to control the frame raising and lowering movement of the cables comprising a pair of connected drums on which the cables are wound, one drum having a gear thereon, a pinion meshing with the gear, the weight of the mattress frame exerted on the drums through the cables tending to rotate the drums in a frame lowering direction, a rotary member having a threaded spindle projecting from one end and on the threads of which the pinion is mounted, a hand crank engageable with the other end of the member to rotate the same in one direction or the other, a rotary sleeve about and turnable relative to said member, a support for the sleeve mounted on the crib, the spindle threads being cut in a direction to cause the pinion to advance along the spindle and bind against the adjacent end of the sleeve upon rotation of said pinion in the direction imparted thereto by rotative movement of the drums in a frame lowering direction, or by corresponding relative rotation of the spindle in the other direction; and to cause the pinion to retract along the spindle and away from the sleeve upon rotation of the spindle in the other direction, and a ratchet holding device acting on the sleeve to prevent rotation of the same in said one direction.

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