ABSTRACT OF THE DISCLOSURE

A motor actuated baby crib rocking apparatus wherein the casted legs of the baby crib are optionally cooperate with either riding tracks permitting horizontal longitudinal crib movement or rocking tracks permitting transverse arcuate crib movement. The motor operates through a linkage assembly to transmit rotary motion into linear motion, the linkage assembly including connections permitting two-dimensional motion incurred during the rocking movement.

BACKGROUND OF THE INVENTION

It is well known that babies like to be rocked in a rhythmic pattern. Although the apparatus of this invention has been primarily designed to rock babies of human beings, it is to also be considered to be within the scope of this invention to employ this apparatus to rock other animal babies. It is most common for a parent to rock a child to sleep in a rocking chair. After the child is asleep, the parent normally places the child in a crib. Although such rocking movement is not necessary for a child to fall asleep, this rocking action functions as an anaesthetic for the child if the child is sick, teething, or any child who finds it difficult to sleep.

As a child frequently wakes up after having fallen asleep when being placed within the crib from the rocking chair, it has been common to rock the baby directly in the crib. As usually such a rocking procedure takes a period of time, there have been designed numerous devices to automatically rock cribs. Besides the numerous swinging pendulum-like rocking devices and the spring operated rocking devices, there have been many electric motor operated rocking devices used in the prior art.

The most common crib available for purchase at the present time provides for supporting the crib mattress upon a frame which is supported in a spaced relationship above the floor by a plurality of legs (usually four). Also, the crib legs have casters thereon or other low frictional type of devices to facilitate relocation of the crib within a room, a house, or from house to house. Many previous crib rocking devices are not designed to cooperate with this common type of crib. Also, of the rocking devices which are usable with this casted leg crib, all known rocking devices merely move the crib along the floor in a reciprocating manner. Although such a reciprocating movement is satisfactory to most children, in many instances a particular child desires an arcuate movement with the reciprocating movement being ineffectual. Also, to avoid the child becoming tiresome with a given movement, the inclusion of an additional movement for variety is desirable.

It would be most advantageous to design a crib rocking apparatus which would readily cooperate with the common type of casted crib structure, provide varied movements, and operate simply by a non-complex low cost mechanism.

SUMMARY OF THE INVENTION

The apparatus of this invention is designed primarily for employment with a common type of baby crib structure which is generally in the form of a rectangular shape having four legs located in the four corners of the rectangular crib structure. Each of these legs terminates in some form of low frictional device to facilitate moving of the crib structure, a common form of such a low frictional device being a caster. The apparatus of this invention provides for mounting of a rotary motor structure as an electric motor upon a motor housing. The motor housing is secured to an adjustable base with the base being adjustable in the longitudinal direction of the crib length. At each longitudinal end of the base is attached a crosspiece. Adjacent each end of each crosspiece is formed first and second track structure. The first track structure is transverse with respect to the base, that is substantially perpendicular thereto with the tracks on each crosspiece being inclined approximately 15 degrees with respect to the base. The first track structure on each crosspiece is inclined toward each other thereby comprising mirror images with respect to the central portion of the base. The second track structure attached to each crosspiece is horizontal and substantially parallel to the plane of the base. The casted legs of the crib are to be located in either the first track structure or the second track structure. With the legs so located within the first track structure, movement of the crib occurs in a transverse direction with respect to the base with one side of the crib descending the inclined track while the other side of the crib is ascending the inclined track. Therefore, with the first track structure, the crib is not only moved in a horizontal direction but also in a vertical direction thereby incurring two dimensional movement. This type of movement is similar to the rocking movement of a conventional crib rocker. The second track structure moves the crib longitudinally within a horizontal plane parallel to the base. This back and forth type of riding movement is milder than the foregoing two dimensional movement, and may be more desirable for younger children.

The rotary motion of the motor is transformed into linear movement by means of a linkage assembly. The free end of the linkage assembly is attached to a portion of the crib structure as the base for the motor. The linkage assembly includes two loose connections which permit a small amount of angular movement of the linkage elements with respect to each other. This angular movement is necessary with the crib structure being moved in the two dimensions when located in the first track structure. It is to be understood that to rock the crib when in the first track position, the linkage is attached to the crib structure on one of the sides thereof so as to cause movement of the crib structure in a transverse direction. If the crib is located in the second track structure the linkage will be attached to either the fore or aft end of the crib structure, resulting in longitudinal movement of the crib.

Because there are a few size variations of crib structures, it is desirable to form the apparatus so as to be adjustable to fit these various crib sizes. As a result, the base upon which the motor is supported and to which is attached the crosspieces supporting the track structures is adjustable with respect to the motor housing. This adjustment in longitudinal length will permit the apparatus to be adaptable to fit the various crib lengths. It is to be known that variation in crib size relates only to longitudinal length with the thickness or width of the crib being a standard dimension. Therefore, no adjustment of width is necessary. To also compensate for the various crib sizes and also to facilitate attachment of the linkage assembly to the side portion of the crib structure and the longitudinal portion of the crib structure, the linkage assembly is also adjustable to facilitate such attachment.
3 BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view of the apparatus of this invention as attached to crib structure to effect movement of the crib in the longitudinal, horizontal direction;

FIG. 2 is a partly-in-section view of the apparatus of FIG. 1 taken along line 2—2 of FIG. 1;

FIG. 3 is a bottom view of the apparatus of FIG. 1 taken along line 3—3 of FIG. 1;

FIG. 4 is a partly-in-section side view of the apparatus of FIG. 1 taken along line 4—4 of FIG. 1;

FIG. 5 is a sectional side view similar to FIG. 4 but showing the crib rocking structure in the two dimensional rocking position;

FIG. 6 is a cutaway, partly-in-section view of the link- age assembly employed in this invention showing in more detail the adjustment feature thereof; and

FIG. 7 is an enlarged cutaway view of the motor shaft and associated linkage structure attached thereto.

DETAILED DESCRIPTION OF THE SHOWN EMBODIMENT

Referring particularly to the drawings, there is shown in FIG. 1 a baby crib 10 having four legs 12, a mattress base 14 and a mattress 16. Each of the four legs 12 terminate in a low frictional device as a caster 18. It is to be understood that other types of low frictional moving devices such as ball bearings could be readily substituted for the casters 18. The mattress base 14 is fixed by appropriate structure (not shown) to the crib structure 10.

The baby crib rocking structure 20 of this invention provides for the use of an actuation means such as a motor 22 which is electrically powered to effect rotation of a shaft 24. A cooling fan 25 is rotated by shaft 24 to prevent motor 22 from overheating. It is to be understood that although an electric motor is shown, other types of actuation means could be employed, it being understood that electric power is readily available in most environments were the crib rocking structure 20 of this invention would be employed. Shaft 24 is fixed as by bolt 26 to an angle plate 28. Bolt 26 is freely retained in cooperation with the shaft 24 and plate 28 by means of a nut 34. Rotational movement of plate 28 with respect to shaft 24 is permitted about bolt 26. Within one leg of the plate 28 is formed a slot 30 which is to cooperate with cotter pin assembly 32. Cotter pin assembly 32 functions to effect attachment of first linkage arm 36 to plate 28. Located between first linkage arm 36 and plate 28 is structure 38 which is to permit a small amount of angular movement of first linkage arm 36 with respect to plate 28. Structure 38 may take various forms as rubber washers or the like, or a plurality of metallic washers wherein one or more of the washers are bellwye shaped. The position of slot 30 is to permit a small amount of adjustable movement of first linkage arm 36 with respect to plate 28. Adjacent the free end of first linkage arm 36 are located first and second spaced apart bolt fasteners 40 and 42. Each of the fasteners 40 and 42 are to cooperate with a longitudinal slot 44 located within a second linkage arm 46. It is to be readily apparent that because of slot 44 and the bolt type of fasteners 40 and 42 cooperating therewith, adjustment is permitted of the first linkage arm 36 with respect to the second linkage arm 46.

Attached to the free end of the second linkage arm 46 by means of a nut and bolt assembly 48 is a first mounting bracket 50. A structure 52 is located between the first mounting bracket 50 and the second linkage arm 46 in a manner similar to and of the type of structure previously described in structure 38. Structure 52 permits a small amount of angular movement of the first mounting bracket 50 with respect to the second linkage arm 46. A second mounting bracket 54 is to be located in an adjacent spaced parallel relationship to the first mounting bracket 50 by means of first and second wing nut fastening assemblies 56 and 58. The first and second wing nut fastening assemblies 56 and 58 are to function to bind together the first mounting bracket 50 and the second mounting bracket 54 with a portion of the crib structure located therebetween, as the lower flanged portion of the mattress base 14.

Motor 22 is fixedly secured to first and second attaching plates 60 and 62. The attaching plates 60 and 62 are connected to first and second housing elements 64 and 66. The housing elements 64 and 66 are located in parallel relation to each other and spaced apart with the motor 22 located therebetween. The fore and aft portion of each of the housing elements 64 and 66 are connected to the first and second base elements 68 and 70. The first and second housing elements 64 and 66 are connected to the base elements 68 and 70 by means of bolts 72, each of the bolts 72 cooperating with a slot 74 located within its respective base element 68 or 70. Each of the bolts 72 are secured to a wing nut 76. Prior to the tightening of the wing nuts 76, each of the base elements 68 and 70 are adjustably movable the distance of the slot 74 with respect to the first and second housing elements 64 and 66.

The free end of the base elements 68 is secured to a first crosspiece 78. In a similar manner, the free end of base element 70 is secured to a second crosspiece 80. Located within the first crosspiece 78 in longitudinal alignment therewith are channel shaped tracks 82. Tracks 82 and 84 are inclined with respect to first base element 68 with the outer-most edges of the tracks 82 and 84 being the lowest point of the incline. Second crosspiece 80 has similar channel shaped tracks 86 and 88 inclined in a similar manner with respect to second base element 70. Adjacent each end of crosspiece 78 and located at right angles with respect thereto are tracks 90 and 92. Tracks 90 and 92 are also formed in the shape of a channel and are located in a parallel relation to one another with the track surface being substantially parallel to the surface of first base element 68. In a similar manner, tracks 94 and 96 are attached to crosspiece 80 with the tracks 94 and 96 being substantially parallel to the surface of second base element 70. The width of each of the channel shaped tracks is chosen so as to cooperate with a caster 18 which is attached to each of the legs 12 of the crib 10.

The operation of the crib rocking structure of this invention is as follows: If a person desires to effect longitudinal back and forth riding movement of a crib, each of the casters 18 of the crib legs 12 are located within tracks 90, 92, 94 and 96. The position of each of the casters 18 within its respective track is chosen approximately midway of the length of the track element, as shown in FIG. 1 of the drawings. This particular location of each of the casters 18 is accomplished by means of adjusting the first and second base elements 68 and 70 with respect to the first and second housing elements 64 and 66. Upon achieving the desired adjustment, wing nuts 76 are tightened thereby maintaining the desired position.

A portion of the crib 10, as the flange upon the mattress base 14, is then located in between first mounting bracket 50 and second mounting bracket 54. To effect longitudinal movement of the crib structure, the mounting brackets are secured to either the fore or aft portion of the crib as shown in FIG. 1 of the drawings. If it is necessary to extend brackets 50 and 54 to cooperate with the mattress base 14, bolts 40 and 42 are loosened, permitting longitudinal movement of second linkage arm 46 with respect to first linkage arm 36. Upon the desired adjustment being achieved, bolts 40 and 42 are retightened. With the brackets 50 and 54 located with the flange of the mattress base 14 therebetween, wing nuts 56 and 58 are tightened thereby securing in a fixed manner brackets 50 and 54 to the mattress base 14. Upon the applying of electric power to motor 22, rotation of shaft 24 occurs which results in longitudinal movement of the crib 10 within the
tracks 90, 92, 94 and 96. A selection of motor 22 is to be such as to effect a low velocity, rhythmic type of movement.

The foregoing type of movement is located within a single horizontal plane. If it is desired to have instead a two-dimensional rocking type of movement, the casters 18 are then located within tracks 82, 84, 86 and 88. Such location is permitted by means of releasing wing nuts 70 and moving base elements 68 and 70 toward each other the desired amount. Upon achieving such location, wing nuts 76 are again retightened, fixing the position of base elements 68 and 70 with respect to the housing element 64 and 66. The mounting brackets 50 and 54 are relocated in cooperation with the mattress base 14 upon the side of the base 14 as shown in FIG. 5 of the drawing. To permit the attachment of the brackets 50 and 54 to a side element of the base 14, bolts 40 and 42 are released and the second linkage arm 46 is moved toward the first linkage arm 36. With the mounting brackets 50 and 54 secured in a similar manner to a side portion of the base 14, the bolts 40 and 42 are tightened, securing together linkage arms 36 and 46. The electric motor 22 is then activated thereby imparting a transverse movement to the crib 10. In one direction of transverse movement of the crib 10, one side of the crib moves not only transversely but down the inclined tracks 86 and 82, with the opposite side of the crib moving up the inclined tracks 88 and 84. Movement of the crib in the opposite transverse direction results in the crib being moved down the inclined tracks 88 and 84 and with the other side of the crib moving up the inclined tracks 86 and 82. In this manner not only is a back and forth movement achieved, but also a slight up and down movement, thereby creating a movement similar to a rocking type of movement. Because this latter movement is two-dimensional, slight angular movement of the brackets 50 and 54 is required with respect to the shaft 24 of the motor 22. Therefore, structures 52 and 38 are provided in the connections of the linkage arms to permit such angular movement.

What is claimed is:

1. Apparatus for effecting rhythmic motion of a structure comprising:
an actuation means, said actuation means being capable of imparting motion to said structure in a substantially single direction; and
a first track and a second track, said first track and said second track each being capable of confining movement of said structure in a particular direction, said first track being disposed substantially at a right angle to said second track.

2. An apparatus as defined in claim 1 wherein:
said first track also being inclined with respect to said second track.

3. An apparatus as defined in claim 2 wherein:
said first track including at least spaced apart fore and aft track elements, said fore track element confining motion of said structure in a direction generally toward said aft track element; and
said second track including at least spaced apart right and left track elements, said right and left track elements being located parallel to each other.

4. An apparatus as defined in claim 3 wherein:
the inclination of said fore element being substantially the mirror image of said aft element.

5. An apparatus as defined in claim 1 wherein:
said actuation means including a motor effecting rotary motion of an output shaft:
a linkage assembly connecting said output shaft to said structure, said linkage assembly permitting at least two-dimensional movement of said structure with respect to said motor.

6. In combination baby crib having a plurality of legs, each of said legs terminating in a low frictional device to facilitate moving of said crib, and a baby crib rocking apparatus including:
an actuation means being capable of imparting linear motion to said crib in a substantially single direction;

a first track and a second track, said first track and said second track each being capable of cooperating with said low frictional devices and confining movement of said crib in a particular direction, said first track structure being disposed substantially at a right angle to said track.

7. An apparatus as defined in claim 6 wherein:
said first track structure also being inclined with respect to said second track structure.

8. An apparatus as defined in claim 7 wherein:
said first track structure including a pair of spaced apart fore track elements and a pair of spaced apart aft track elements, each fore element is substantially the mirror image of its respective aft track element; and
said second track structure including at least spaced apart right and left track elements, said right and left track elements being located parallel to each other.

9. An apparatus as defined in claim 6 wherein:
said actuation means including a motor effecting rotary motion of an output shaft;
a linkage assembly connecting said output shaft to said crib, said linkage assembly permitting at least two-dimensional movement of said crib with respect to said motor.

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