A driving mechanism of baby rocking chair includes a transmission system having a transmission motor, a monitoring device, and a control circuit. When the rocking chair oscillates upward and approaches a predetermined set-up high point position that is affected by the gravitational force causing the slowing down of rotating speed, the monitoring device transmits a signal and provides the control circuit with the signal. As the rocking chair reaches the predetermined set-up high point position, the control circuit is capable of switching the direction of the rotation of the transmission motor. It is by this way of controlling the rotating shaft of oscillation of the rocking chair that the control circuit is capable of driving the rocking chair steadily.
DRIVING MECHANISM OF BABY ROCKING CHAIR

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention relates to a driving mechanism of baby rocking chair, and more particularly, to a driving mechanism of baby rocking chair that is capable of making the transmission motor appear counter-rotation through an automatic monitoring circuit when the oscillation of the rocking chair reaches a predetermined set-up high point position.

[0003] 2. Description of the Prior Art

[0004] The baby rocking chair mainly provides regular oscillation to soothe the baby and make the baby fall asleep or provide the baby with recreation. Among the known products, currently, there is a baby rocking chair structure that changes the conventional manual rotation mode into the electrically-driven transmission of mechanism that is capable of relieving the burden of manual operation. Relevant documents such as the U.S. Pat. No. 6,319,138 and the Taiwan Patent No. 457907 etc. whose baby rocking chair mechanisms mainly include members such as a supporting framework, two oscillating arms, a chair, and a transmission mechanism etc. Among them, the oscillating arm being connected between the transmission mechanism and the chair makes use of a transmission mechanism to drive the oscillating arm to make the chair oscillate back and forth.

[0005] Conventional relevant transmission mechanism disclosed also by the U.S. Pat. No. 5,846,136 consists of a transmission motor, a worm, a rotating gear, and a driving block. Among them, the rotating gear connects a salient block that eccentrically rotates with the rotating gear. The driving block includes a extended sheet having a scoop channel for allowing the salient block to be contained and moved therein. By the use of the extended sheet, when the salient block appears eccentric rotation, the fact that the salient block performs a linear movement in the scoop channel is capable of transmitting the oscillating arm to perform back and forth oscillating motion. In the meantime, it is capable of storing the kinetic energy by the use of a torsion spring.

[0006] Since the above-mentioned conventional transmission mechanism employs crank mechanism in coordination with torsion spring to achieve oscillation action, the kinetic energy wastes for no reason at all during the oscillation. The demerit of this conventional transmission mechanism is that it wastes the power of storage battery, and its oscillation motion is unsteady.

SUMMARY OF THE INVENTION

[0007] In order to resolve the big amount of waste of kinetic energy of the driving mechanism of baby rocking chair, and to let the range of oscillation maintain more steady, the invention makes use of monitoring the oscillating state of the baby rocking chair to control the rotation and counter-rotation of the transmission motor so as to achieve the effect of steady oscillation of the rocking chair. The invention is capable of making the driving mechanism include a transmission system, a monitoring device, and a control circuit. Among them, the transmission system includes a transmission motor that can control the direction of rotation. When the rocking chair oscillates upward and approaches a predetermined set-up high point position that is affected by the gravitational force causing the slowing of rotating speed, the monitoring device is capable of monitoring and transmitting a signal and provides the control circuit with that signal. By the use of the control circuit to switch the direction of the transmission motor back and forth, the control circuit is capable of achieving the effect of providing the power for driving the rotating shaft of the rocking chair.

[0008] The accomplishment of this and other objectives and the range of suitability of the application of the invention will become apparent from the following description and its accompanying drawings of which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a schematic and isometric view of the mechanism of the invention;

[0010] FIG. 2 is a schematic and exploded view of the members of the invention;

[0011] FIG. 3 is a schematic and isometric view of the driving mechanism of the invention;

[0012] FIG. 4 is a schematic view of the motor's rotating speed of the invention;

[0013] FIG. 5 is a schematic view of the monitoring action control of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] As shown in FIG. 1, 2, and 3, the embodiment of the driving mechanism of baby rocking chair of the invention, basically, is a mechanism mounted on a rocking chair framework (10) and is driven to drive the rocking chair (20) by the use of electromagnetic control. The embodiment includes a rocking chair framework (10) and a pair of oscillating arms (11) that can connect to both sides thereof. By the use of the oscillating arm (11) connected to the rocking chair (20) and further by the use of a driving mechanism (3) to drive the rocking chair connected to the pair of oscillating arms (11), a certain range of oscillating motion is generated. The driving mechanism (3) includes a case (30) having a controlling push button (31), a rotating shaft (4), a transmission system (5), and a monitoring device (6), wherein the case (30) is mounted on a side of the rocking chair framework (10).

[0015] The above-mentioned rotating shaft (4) is either connected to an end of the oscillating arm (11) or directly connected to the rocking chair (20) in order to rotate the oscillating arm (11) to oscillate or directly rotate the rocking chair (20) (or rocking bed) to appear reciprocating oscillation.

[0016] The transmission system (5) includes a direct-current power supply (51), a transmission motor (52), and a speed-reducing gear train (53). In the present embodiment, the direct-current power supply (51) can make use of storage battery to provide the power supply required by the transmission motor (52). The speed-reducing gear train (53) being equipped between an end of the transmission motor (52) of a transmission shaft (521) and rotating shaft (4) has
the main purpose of reducing the rotating speed of the transmission motor (52) to adapt to the oscillating rocking chair (20). In the present embodiment, one end of the transmission shaft (521) of the transmission motor (52) is connected to a rotating disk (54) that rotates at the same speed following the transmission shaft (521) of the transmission motor (52). In accordance with the invention, the transmission motor (52) can employ the direct-current power supply (51) to perform driving action. Affected by the gravitational force, the speed of the transmission shaft (521) of the transmission motor (52) gradually slows down when the oscillating arm (11) is oscillating upward. As shown in FIG. 4, the rotating speed is the lowest (almost approaches zero) when the rocking chair (20) is oscillated up to the highest position (i.e. when the oscillating range is at the highest point). In addition, the rotating disk (54) provides embossed facets at equal space or blades (541).

The monitoring device (6) for monitoring or calculating the location or speed of the rotation of the rotating disk (54) is mounted at a side of the rotating disk (54). In the present embodiment, the monitoring device (6) is a light interrupter that mainly provides the following two monitoring signals. 1. When the light interruptor has monitored that the oscillating arm (11) has reached the highest point, that is, when the rotating speed of the rotating disk (54) (transmission motor) is the slowest, the light interruptor provides a control circuit (7) with a first signal; 2. The light interruptor is capable of monitoring and calculating the number of the embossed facets or the blades (541) to provide the control circuit (7) with a second signal.

As shown in FIG. 5, the control circuit (7) includes a signal-receiving interface (71), a memory unit (IC) (72), a motor's steering control circuit (73), and a motor's rotating speed control circuit (74). Among them, the memory unit (72) mainly sets up the rotating speed and rotating time of the transmission motor (52) beforehand to make the oscillating arm (11) or rocking chair (20) oscillate within a definite extent of range. The signal-receiving interface (71) mainly receives the first and the second signals provided by the monitoring device (6). Besides, the motor's steering control circuit (73) mainly controls the rotation and counter-rotation of the transmission motor (52) while the motor's rotating speed control circuit (74) controls the raising or lowering of the current in order to control steadily the rotating speed of the transmission motor (52).

By the use of the above-mentioned structural members, the memory unit (72) of the control circuit (7) sets up beforehand the rotating time of the transmission motor (52) and the rotating range of the rotating disk (54). This is to make the oscillating arm (11) or the rocking chair (20) oscillates within the predetermined range through the speed-reducing gear train (53) and the rotating shaft (4). Affected by the gravitational force, as the transmission motor (52) rotates and drives the transmission motor (52) or oscillating arm (11) up to the highest point, the rotating speed of the transmission motor (52) is the lowest. At this moment, the control circuit (7) transmits the first signal to the signal-receiving interface (71) of the control circuit (7). Then, the signal-receiving interface (71) provides the signal and switches the rotation direction of the transmission motor (52) into counter-rotation through the motor's steering control circuit (73). As the transmission motor (52) counter rotates to the opposite oscillating highest point, the monitoring device (6) makes the transmission motor (52) generate rotation again following the above-mentioned sequence. Following this kind of cycle, the monitoring device (6) is capable of making the rocking chair (20) or oscillating arm (11) oscillates back and forth within a predetermined range.

In addition, in the present embodiment, the memory unit (72) sets up the range of the rotating disk (54) beforehand, and the monitoring device (6) (i.e. the light interrupter) calculates the rotation range of the rotating disk (54) through the number of the embossed facets or the blades (541) on the rotating disk (54). As the rotation range of the rotating disk (54) is either insufficient or exceeded the predetermined set-up value, i.e. the predetermined oscillating position of the rocking chair (20) or oscillating arm (11), the monitoring device (6) transmits the second signal to the signal-receiving interface (71) of the control circuit (7). By the use of the motor’s rotating speed control circuit (7) to output a relatively higher current or to lower the current, the rotating disk (54) of the transmission motor (52) can restore back to the original predetermined rotational position. It is by this way that the rocking chair (20) or oscillating arm (11) can achieve the effect of steady oscillation.

In the present embodiment, the memory unit (72) of the control circuit (7) is capable of setting a multiple sets of set-up value to make the rocking chair (20) of the invention possess a multi-stage oscillation for the users to select their options.

It will become apparent to those people skilled in the art that various modifications and variations can be made to the mechanism of the invention without departing from the scope or spirit of the invention. In view of the foregoing description, it is intended that all the modifications and variation fall within the scope of the following appended claims and their equivalents.

What is claimed is:

1. A driving mechanism of a baby rocking chair mounted at a rocking chair frame work for driving a rotating shaft of the rocking chair and generating rotation and counter-rotation with a predetermined angle; the driving mechanism comprises:

   a transmission system, further comprises a DC (direct current) power supply, a transmission motor, and a speed-reducing gear train; by making use of the DC power supply to provide the transmission motor with electric energy, the transmission motor is capable of generating oscillation through the speed-reducing gear train to transmit to the rotating shaft of the rocking chair;

   a monitoring device, for monitoring the rotating speed of the motor and outputting a signal representing the rotating speed of the motor; and

   a control circuit, further comprises a signal-receiving interface, a memory unit, a motor's steering control circuit; by making use of the signal-receiving interface to receive the signal and make the memory unit store a set-up value beforehand, when the rotating speed representing by the signal attains the predetermined set-up value, the motor's steering control circuit can make the motor perform counter-rotation.
2. The driving mechanism of baby rocking chair as claimed in claim 1, wherein the rotating shaft is the one that directly drives the rocking chair to perform oscillation.

3. The driving mechanism of baby rocking chair as claimed in claim 1, wherein an oscillating arm connected between the rotating shaft and the rocking chair is the one that oscillates the rocking chair.

4. The driving mechanism of baby rocking chair as claimed in claim 1, wherein the DC power supply is a storage battery.

5. The driving mechanism of baby rocking chair as claimed in claim 1, wherein the rotating speed is reduced to the lowest when the rocking chair oscillates to the set-up highest position.

6. The driving mechanism of baby rocking chair as claimed in claim 5, wherein the monitoring device is capable of monitoring the lowest rotating speed and providing the control circuit with signal for switching the rotational direction of the transmission motor.

7. The driving mechanism of baby rocking chair as claimed in claim 1, wherein the monitoring device is a light interruptor.

8. A driving mechanism of baby rocking chair mounted at a rocking chair framework for driving a rotating shaft of the rocking chair and generating rotation and counter-rotation with a predetermined angle; the driving mechanism comprises:

   a transmission system, further comprises a power supply, a transmission motor, and a speed-reducing gear train; by making use of the power supply to provide the transmission motor with rotation output, the transmission motor is capable of generating oscillation through the speed-reducing gear train to transmit to the rotating shaft of the rocking chair; and the other end of the transmission shaft of the transmission motor connects a rotating disk having embossed facets at equal space or blades;

   a monitoring device, for monitoring and calculating the rotation range of the rotating disk and outputting a signal representing the rotation range of the rotating disk; and

   a control circuit, further comprises a signal-receiving interface, a memory unit, a motor’s rotating speed control circuit; by making use of the signal-receiving interface to receive the signal and make the memory unit store a set-up value beforehand, when the rotation range representing by the signal attains the predetermined set-up value, the motor’s rotating speed control circuit is capable of increasing or decreasing the current to increase or decrease the rotating speed of the transmission motor.

9. The driving mechanism of baby rocking chair as claimed in claim 8, wherein the rotating speed of the rotating disk is the same as that of the transmission motor.

10. The driving mechanism of baby rocking chair as claimed in claim 8, wherein the monitoring device is the one that is capable of monitoring the number of embossed facets or blades that have passed to generate a signal representing the rotation range of the motor.

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