

BABY ROCKER

BACKGROUND OF THE INVENTION

Field of the Invention

5 The present invention relates to a baby rocker to be used as a chair or a bed for a baby or a child.

Background Art

10 There has been proposed a baby rocker including a pair of right and left front legs each having a wheel at a lower end thereof, a pair of right and left rear legs each having a wheel at a lower end thereof, a pair of right and left side plates connected to upper ends of the front legs and the rear legs, and a seat body disposed between the pair of side plates, the seat
15 body having a pair of armrests for covering the respective side plates (Japanese Patent Laid-Open Publication No. 2003-24189).

 In the baby rocker disclosed in Japanese Patent Laid-Open Publication No. 2003-24189, the front legs and the rear legs can swing relative to the side plates. By swinging the
20 front legs and the rear legs relative to the side plates, a height position of the seat body can be changed.

 In addition to the armrests, the seat body includes a seat portion, a leg portion connected to a lower part of the seat portion, a back portion connected to an upper part of the seat
25 portion, and a headrest connected to an upper part of the back portion. These members can swing relative to each other at their joints. Thus, the baby rocker functions not only as a chair on which a child can sit, but also as a bed on which a child can lie, by arranging the seat portion, the leg portion, and the back
30 portion in substantially parallel with each other.

 The seat body is supported from below, by a swing bar suspended from the respective side plates. The swing bar functions as a pendulum. The swing bar is formed into a flat rectangular shape with an upper part thereof being opened,
35 when viewed from the front of the baby rocker. Thus, the seat body reciprocates in a back and forth direction thereof, by

means of a swinging movement of the swing bar. When the baby rocker is used as a bed on which a child has a nap, the child can easily fall asleep by means of a swinging movement of the seat body in the back and forth direction.

5 The swing bar swings on the basis of the simple pendulum principle. Thus, a cycle (period) of the reciprocal movement of the seat body is mainly determined by a vertical length of the swing bar. The larger the vertical length of the swing bar is, the slower (longer) the cycle of the reciprocal
10 movement of the seat body becomes.

 However, the vertical length of the swing bar must be limited in order to obtain a compact baby rocker. Thus, in the baby rocker disclosed in Japanese Patent Laid-Open Publication No. 2003-24189, it is difficult to further slow down the cycle of
15 the reciprocal movement of the seat body.

SUMMARY OF THE INVENTION

 The present invention is made in view of the above difficulty. An object of the present invention is to provide a
20 compact baby rocker in which a slower cycle (a longer period) of a reciprocal movement of a seat body in a back and forth direction thereof can be achieved.

 The present invention is a baby rocker comprising: a seat body including at least a seat portion and a back portion; and a
25 rocking mechanism disposed below the seat body, for reciprocating the seat body in a back and forth direction thereof; wherein the rocking mechanism includes: a stationary part; a pendulum disposed on the stationary part, the pendulum being capable of swinging about a swing shaft inclined in a
30 width direction of the seat body, the width direction being perpendicular to the back and forth direction thereof; and a movable part slidably supported by the pendulum, for supporting the seat body from below; whereby the movable part reciprocates relative to the stationary part in the back and forth
35 direction of the seat body by means of a swinging movement of the pendulum.

In the baby rocker, a pair of pendulums may be arranged on the stationary part in the width direction of the seat body.

5 In the baby rocker, one of the stationary part and the movable part may be provided with a guiding plate extending in the back and forth direction of the seat body, while the other of the stationary part and the movable part may be provided with a restricting member, and the movable part may be prevented from being displaced relative to the stationary part in the width direction of the seat body because of an engagement of the
10 guiding plate and the restricting member.

In the baby rocker, a spherical body may be interposed between the movable part and the pendulum, and the movable part may slide relative to the pendulum by means of a rolling movement of the spherical body.

15 In the baby rocker, the movable part of the rocking mechanism and the seat portion of the seat body may be integrally formed with each other.

The present invention is a baby rocker comprising: a seat body including at least a seat portion and a back portion; and a
20 rocking mechanism disposed below the seat body, for reciprocating the seat body in a back and forth direction thereof; wherein the rocking mechanism includes: a stationary part; a fan-shaped roller disposed on the stationary part, formed of a substantially fan-shaped column having at least an
25 arcuate portion in cross-section, the arcuate portion contacting the stationary part; and a movable part for holding a spindle passing through the fan-shaped roller, and supporting the seat body from below; whereby the movable part reciprocates relative to the stationary part in the back and forth direction of
30 the seat body, by means of a rolling movement of the fan-shaped roller on the stationary part.

In the baby rocker, a pair of fan-shaped rollers may be spaced on the stationary part in the back and forth direction of the seat body.

35 In the baby rocker, a guiding plate extending in the back and forth direction of the seat body may be disposed on the

stationary portion, the guiding plate being provided with a guiding opening to be engaged with the spindle of the fan-shaped roller.

5 In the baby rocker, the movable part of the rocking mechanism and the seat portion of the seat body may be integrally formed with each other.

10 The present invention is a baby rocker comprising: a seat body including at least a seat portion and a back portion; and a rocking mechanism disposed below the seat body, for reciprocating the seat body in a back and forth direction thereof; wherein the rocking mechanism includes: a stationary part having sidewalls extending in the back and forth direction of the seat body; a first swinging member swingably suspended from the sidewalls of the stationary part; a swinging frame
15 supported by the first swinging member; a second swinging member swingably suspended from the swinging frame; and a movable part supported by the second swinging member, for supporting the seat body from below; the first swinging member and the second swinging member being at least partially
20 overlapped with each other in a height direction, whereby the movable part reciprocates relative to the stationary part in the back and forth direction of the seat body.

25 In the baby rocker, a pair of first swinging members may be disposed on the sidewalls of the stationary part with a space therebetween in the back and forth direction of the seat body, and a pair of second swinging members may be disposed on the swinging frame with a space therebetween in the back and forth direction of the seat body.

30 In the baby rocker, the movable part of the rocking mechanism and the seat portion of the seat body may be integrally formed with each other.

35 The present invention is a baby rocker comprising: a seat body including at least a seat portion and a back portion; and a rocking mechanism disposed below the seat body, for reciprocating the seat body in a back and forth direction thereof; wherein the rocking mechanism includes: a stationary

part provided with a concaved curved rail curved in the back and forth direction of the seat body; and a movable part having a wheel to rotate on the curved rail, for supporting the seat body from below; whereby the movable part reciprocates
5 relative to the stationary part in the back and forth direction of the seat body.

In the baby rocker, the movable part may be provided with the pair of wheels and a wheel shaft connecting the wheels to each other.

10 In the baby rocker, the stationary part may further include: a rotatable locking shaft extending in the back and forth direction of the seat body; and a locking member which is secured on the locking shaft and is disposed below the wheel shaft of the wheel, the locking member being provided with an
15 engagement groove to be engaged with the wheel shaft; so that the locking member restricts a displacement of the wheel shaft in the back and forth direction of the seat body, by rotating the locking shaft to engage the engagement groove with the wheel shaft.

20 In the baby rocker, the stationary part may further include a pair of sidewalls extending in the back and forth direction of the seat body, each sidewall being provided with a guiding opening to be engaged with the wheel shaft.

In the baby rocker, the movable part of the rocking
25 mechanism and the seat portion of the seat body may be integrally formed with each other.

In the baby rocker, the stationary part further may include: a locking shaft extending in a back and forth direction of the seat body and being capable of moving the back and forth direction of the seat body; a locking member which is
30 capable of vertically moving and is disposed below the wheel shaft of the wheel, the locking member being provided with an engagement groove to be engaged with the wheel shaft; and a connecting rod rotatably connected to the locking shaft and the
35 locking member; so that the locking member restricts a displacement of the wheel shaft in the back and forth direction

of the seat body, by moving the locking shaft in the back and forth direction to move the locking member upward so as to engage the engagement groove with the wheel shaft.

5 In a baby rocker according to the present invention, a seat body can reciprocate with a slower cycle (a longer period) in a back and forth direction thereof, by means of a rocking mechanism which can be arranged in a smaller space. Therefore, the seat body can reciprocate with an optimum cycle for a child, without enlarging the baby rocker.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a baby rocker in a first embodiment according to the present invention;

15 Fig. 2 is a perspective view of the baby rocker from which a storage box is detached;

Fig. 3 is a side view of the baby rocker from which a storage box is detached;

Fig. 4 is a side view of a rocking mechanism;

20 Fig. 5 is a cross-sectional view of the locking mechanism taken along the 5 - 5 line in Fig. 4;

Fig. 6 is a partial top view showing a swinging movement of a pendulum;

Fig. 7 is a front view of an alternative example of the rocking mechanism;

25 Fig. 8 is a side view of a rocking mechanism of the baby rocker in a second embodiment according to the present invention;

30 Fig. 9 is a front view of the rocking mechanism of the baby rocker in the second embodiment according to the present invention;

Fig. 10 is a top view of a rocking mechanism of the baby rocker in a third embodiment according to the present invention;

35 Fig. 11 is a front view of the rocking mechanism of the baby rocker in the third embodiment according to the present invention;

Fig. 12 is a cross-sectional view of the rocking mechanism taken along the 12 - 12 line in Fig. 10;

Fig. 13 is a side view of a rocking mechanism of the baby rocker in a fourth embodiment according to the present invention;

Fig. 14 is a front view of the rocking mechanism of the baby rocker in the fourth embodiment according to the present invention; and

Figs. 15A and 15B are partial side views of an alternative example of the rocking mechanism of the baby rocker in the fourth embodiment according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the present invention will be described below with reference to the accompanied drawings.

First Embodiment

Figs. 1 to 7 are views showing a baby rocker in a first embodiment of the present invention.

Fig. 1 is a perspective view of the baby rocker, Fig. 2 is a perspective view of the baby rocker from which a storage box is detached, and Fig. 3 is a side view of the baby rocker from which a storage box is detached.

As shown in Figs. 1 to 3, the baby rocker 1 includes: a pair of right and left front legs 10, 10 each having a wheel 14 at a lower end thereof; a pair of right and left rear legs 15, 15 each having the wheel 14 at a lower end thereof; a pair of right and left side plates 20, 20 connected to upper ends of the respective front legs 10, 10 and the respective rear legs 15, 15; a rocking mechanism 40 disposed between the side plates 20, 20; a seat body 30 disposed on the rocking mechanism 40; and a storage box 25 detachably attached to one of the side plates 20.

The baby rocker 1 can serve as a chair on which a child can sit, as shown in Fig. 2, and can also serve as a bed on which a child can lie, as shown in Fig. 1.

<General Structure and Operation of Baby Rocker>

Referring to Figs. 1 to 3, explanations are made about a general structure and an operation of the baby rocker 1 including the pair of front legs 10, the pair of rear legs 15, the pair of side plates 20, the rocking mechanism 40, the seat body 30, and the storage box 25. Note that only a rough description of the rocking mechanism 40 is made in this section, and a detailed description thereof will be made in the next section.

First, the pair of side plates 20, 20 of the baby rocker 1 are described in detail.

Each of the side plates 20 has a side plate base part 21 extending in a back and forth direction of the baby rocker 1, a rear leg holding part 23 secured on a front lower part of the side plate base part 21, and a front leg holding part 22 disposed on a rear lower part of the side plate base part 21. The front leg holding part 22 is attached to the side plate base part 21, such that the front leg holding part 22 can slide relative to the side plate base part 21 in the back and forth direction of the baby rocker 1 (Figs. 2 and 3).

One of the side plates 20, which is arranged on the right side in the front view of the baby rocker 1, further has a holding plate 24 fixed on an outer surface 21a of the side plate base part 21. The outer surface 21a faces outward in a width direction of the baby rocker 1. The holding plate 24 is disposed between the front leg holding part 22 and the rear leg holding part 23. The holding plate 24 has two projected parts downwardly projecting from a lower part of the side plate base part 21. Each of the projected part is provided with an opening 24a.

The rocking mechanism 40 is disposed between lower parts of the pair of side plates 20, 20. The rocking mechanism 40 has a stationary part 41 secured on the side plates 20, and the movable part 51 disposed above the stationary part 41. The movable part 51 can reciprocate relative to the stationary part 41 in the back and forth direction of the baby rocker 1 (back and forth direction of the seat body 30). As described above, a detailed description of the rocking mechanism 40 will

be made later.

The storage box 25 is described in detail. The storage box 25 has a box body 26, and a cover 27 attached to the box body 26 to open and close the same. The box body 26 is provided, on a side surface thereof, with two projections (not shown) to be engaged with the openings 24a of the holding plate 24 of the side plate 20. By engaging the projections with each of the openings 24a of the holding plate 24 and disengaging the projections therefrom, the storage box 25 can be detachably attached to the baby rocker 1 through the holding plate 24. A handle 27a is disposed on an upper surface of the cover 27. One can conveniently carry the storage box 25, which is detached from the baby rocker 1, by using the handle 27a.

The pair of front legs 10 and the pair of rear legs 15 are described below in detail.

As shown in Figs. 1 and 2, each of the pair of front legs 10, 10 is swingably connected, at an upper end thereof, to the front leg holding part 22 of the side plate 20. The front leg 10 extends downwardly forward from the front leg holding part 22. A connection rod 11 is disposed near a midpoint of each of the front legs 10 to thereby connect the pair of front legs 10, 10 to each other. Each of the pair of rear legs 15, 15 is swingably connected, at an upper end thereof, to the rear leg holding part 23 of the side plate 20. The rear leg 15 extends downwardly rearward from the rear leg holding part 23. A connection rod 16 is disposed near a midpoint of each of the rear legs 15 to thereby connect the pair of rear legs 15, 15 to each other. The front leg 10 and the rear leg 15 are rotatably connected to each other at an intermediate part of the respective front leg 10 and the rear leg 15. In the side view of the baby rocker 1, the front leg 10 and the rear leg 15 are positioned in a substantially X-shape arrangement.

As shown in Fig. 3, a position of the seat body 30 of the baby rocker 1 can be lowered, when the front leg 10 is swung clockwise in Fig. 2 about the front leg holding part 22 and the

rear leg 15 is swung counterclockwise in Fig. 2 about the rear leg holding part 23. At this time, the front leg 10 and the rear leg 15 are rotated to each other about a connection point thereof, with the front leg holding part 22 sliding rearward the baby rocker 1 relative to the side plate base part 21 whereby the upper end of the front leg 10 and the upper end of the rear leg 15 are spaced apart from each other, which is shown in Fig. 3.

The seat body 30 is described in detail.

As shown in Figs. 1 and 2, the seat body 30 has a seat portion 31, a leg portion 32 swingably connected to a front part of the seat portion 31, a back portion 33 swingably connected to a rear part of the seat portion 31, and a headrest 34 swingably connected to an upper part of the back portion 33. The seat body 30 is supported by the rocking mechanism 40 from below.

The seat body 30 is provided with a link (not shown) for connecting the back portion 33 to the leg portion 32, and the back portion 33 to the headrest 34. The link allows a swinging movement of the leg portion 32 relative to the seat portion 31 and a swinging movement of the headrest 34 relative to the back portion 33, in conjunction with a swinging movement of the back portion 33 relative to the seat portion 31.

Fig. 1 shows the baby rocker 1 in which the seat portion 31, the leg portion 32, the back portion 33, and the headrest 34 are arranged in substantially parallel with each other. From this state, when the back portion 33 is upwardly swung relative to the seat portion 31, the leg portion 32 and the headrest 34 are respectively swung in conjunction with the upward swinging movement of the back portion 33. Then, the seat body 30 adopts a posture shown in Fig. 2, so that the baby rocker 1 functions as a chair. From this state shown in Fig. 2, when the back portion 33 is downwardly swung relative to the seat portion 31 to be in parallel therewith, the leg portion 32 and the headrest 34 are swung in conjunction with the downward swinging movement of the back portion 33. Then, the seat body 30 adopts a posture shown Fig. 1, so that the baby rocker

1 functions as a bed.

As shown in Figs. 1 to 3, the seat body 30 is provided with a pair of armrests 36 disposed on both sides of the seat portion 31. Each of the armrests 36 has a hollow armrest body
 5 36a which is opened downward, and a swing plate 36b disposed on a front upper part of the armrest body 36a. The swing plate 36b can swing relative to the armrest body 36a.

In a practical use of a baby rocker 1, a cushion (not shown) is disposed on the seat body 30.

10 An operation of the baby rocker 1 as constituted above is described.

From the flat state of the baby rocker 1 shown in Fig. 1, the back portion 31 is upwardly swung relative to the seat portion 31 to be substantially perpendicular thereto. In
 15 conjunction with the upward swinging movement of the back portion 33 relative to the seat portion 31, the not shown link allows the leg portion 32 to swing relative to the seat portion 31 to be substantially perpendicular thereto, and the headrest 34 to swing relative to the back portion 33 into an inclined position.
 20 Then, the seat body 30 adopts the posture shown in Fig. 2, and the baby rocker 1 can be used as a chair on which a child can eat something or read a book.

From the state shown in Fig. 2, the back portion 33 is downwardly swung relative to the seat portion 31 to be in
 25 parallel therewith. In conjunction with the downward swinging movement of the back portion 33 relative to the seat portion 31, the not shown link allows the leg portion 32 to swing relative to the seat portion 31 to be in parallel therewith, and the headrest 34 to swing relative to the back portion 33 into an upright
 30 position. Then, the seat body adopts the posture shown in Fig. 1, and the baby rocker 1 can be used as a bed.

The seat body 30 is connected, through the rocking mechanism 40, to the side plates 20, the front legs 10, and the rear legs 15. Therefore, when the baby rocker 1 is used as a
 35 bed, the seat body 30 on which a child lies can be moved in a reciprocal manner relative to the side plates 20, 20 in the back

and forth direction of the seat body 30, by means of the rocking mechanism 40. Since the baby rocker 1 reciprocates in the back and forth direction, the child lying thereon can easily fall asleep. By swinging the front legs 10 and the rear legs 15 relative to the side plates 20, a position of the seat body 30 can be lowered. Thus, the baby rocker 1 can be used safely even when the child is lying thereon.

The swing plate 36b of the armrest 36 of the seat body 30 is swingably attached to the armrest body 36a. As shown in Fig. 1, when one changes diapers or takes care of a child after bathing on the seat body 30 of the baby rocker 1 used as a bed, the swing plate 36b can be swung outside the armrest body 36a relative to the same in a width direction of the baby rocker 1 (width direction of the seat body 30). Thus, the armrest 36 does not interfere his/her action such as opening the legs of the child or caring the child. In addition, it is convenient to temporarily put some articles such as diapers on an inner surface of the swing plate 36b which is swung to face upward.

One of the side plates 20, which is arranged on the right side in the front view of the baby rocker 1, has the storage box 25 attached thereto. The storage box 25 can contain therein articles such as disposable diapers and baby wipes. Thus, one who is caring the child on the seat body 30 from the front side of the baby rocker 1 can take out such an article from the storage box 25 with his/her right hand, without moving from the front side of the baby rocker 1. Thus, he/she can take care of the child in a smooth and easy manner, with keeping an eye on the child.

Further, since the storage box 25 can be detached from the side plate 20, one can go out with the detached storage box 25.

<Rocking Mechanism>

Now, the rocking mechanism 40 is described in detail, with reference to Figs. 4 to 7. Fig. 4 is a side view of the rocking mechanism 40, Fig. 5 is a cross-sectional view of the rocking mechanism 40 taken along the 5 - 5 line in Fig. 4, Fig. 6

is a partial top view showing a swinging movement of a pendulum 62, and Fig. 7 is a front view of an alternative example of the rocking mechanism 40.

As shown in Figs. 4 to 6, the rocking mechanism 40 has:
5 a stationary part 41 formed of a flat plate; an elongated pendulum 62 disposed on the stationary part 41, the pendulum 62 being capable of swinging about a swing shaft 61 inclined in the width direction of the seat body 30; and a movable part 51
10 slidably supported by an end portion 63 of the pendulum 62, for supporting the seat body 30 from below.

In the rocking mechanism 40, the pendulum 62 on the stationary part 41 disposed between the side plates 20 swings, so that the movable part 51 reciprocates relative to the stationary part 41 in the back and forth direction of the seat
15 body 30. In accordance with the reciprocal movement of the movable part 51, the seat body 30 supported by the movable part 51 reciprocates relative to the side plates 20 in the back and forth direction of the baby rocker 1.

The back and forth direction of the seat body 30 means a
20 right and left direction in Fig. 4 which is a side view of the rocking mechanism 40. As clearly understood from Fig. 4, the back and forth direction of the seat body 30 corresponds to the back and forth direction of the baby rocker 1. The width direction of the seat body 30 means a direction perpendicular to
25 the back and forth direction of the seat body 30, i.e., a depth direction in Fig. 4. Thus, the width direction of the seat body 30 corresponds to the width direction of the baby rocker 1. In this specification, hereinafter, the term "back and forth direction" means the back and forth direction of the seat body
30 30 (back and forth direction of the baby rocker 1), and the term "width direction" means the width direction of the seat body 30 (width direction of the baby rocker 1).

First, the stationary part 41 is described. In this embodiment, the stationary part 41 is formed of a flat plate.
35 The stationary part 41 is fixed on the side plates 20 such that the stationary part 41 takes a horizontal orientation. The side

plates 20 are connected to each other by the stationary part 41. In this embodiment, the stationary part 41 is formed separately from the side plates 20. However, the stationary part 41 may be formed integrally with the side plates 20.

5 As shown in Fig. 5, a pair of pendulums 62 are disposed on the stationary part 41 in the width direction of the seat body 30. As shown in Fig. 4, another pair of pendulums 62 are disposed on the stationary part 41, which are spaced apart from the former pair of pendulums 62 in the back and forth direction
10 of the seat body 30. Namely, there are four pendulums 62 on the stationary part 41. A pendulum support table 42 corresponding to each of the pendulums 62 is disposed on an upper surface 41a of the stationary part 41. The pendulum support table 42 has the swing shaft 61. The pendulum 62,
15 which is supported by the swing shaft 61 through a bearing (not shown), is capable of swinging about the swing shaft 61. As shown in Fig. 5, the swing shaft 61 is inclined relative to a vertical direction in the width direction of the seat body 30, so that an upper end 61a of the swing shaft 61 is positioned
20 outside a lower end 61b of the swing shaft 61 in the width direction of the seat body 30. Thus, when no force is applied to the pendulum 62, the pendulum 62 extends in the width direction of the seat body 30 by gravitation.

 An upper surface of a distal end 62a of the pendulum 62
25 is provided with an elongated groove 62b extending in a longitudinal direction of the pendulum 62. A spherical body 63 is positioned in the elongated groove 62b. The spherical body 63 can move in the longitudinal direction of the pendulum 62 by rolling along the elongated groove 62b.

30 The above-described four pendulums 62, the pendulum support tables 42 corresponding to the respective pendulums 62, and the swing shaft 61 corresponding to the respective pendulums 62 have the same size and shape.

 The movable part 51 is described more in detail.

35 As shown in Fig. 5, the movable part 51 has a movable part base 51a formed of a flat plate. A downwardly projecting

receiving table 52 is disposed on a lower surface of the movable part base 51a, at a position corresponding to the elongated groove 62b of the distal end 62a of each of the pendulums 62. A hole 52a for receiving the spherical body 63 is formed in an end surface of the receiving table 52 facing the elongated groove 62b. Since the spherical body 63 is interposed between the hole 52a of the receiving table 52 and the elongated groove 62b of the pendulum 62, the movable part 51 is slidably supported by the distal end 62a of the pendulum 62. As shown in Fig. 5, the end surface of the receiving table 52 and an upper surface of a periphery of the elongated groove 62b are not in contact with each other. Thus, accompanied with a rolling movement of the spherical body 63 along the elongated groove 62b, the movable part 51 can smoothly slide relative to the distal end 62a of the pendulum 62. As shown in Figs. 5 and 6, when the pendulum 62 extends in the width direction of the seat body 30, the spherical body 63 is positioned on an innermost side (nearest the swing shaft 61) of the elongated groove 62b in the width direction.

As shown in Figs. 4 and 5, a guiding plate 53 extending in the back and forth direction of the seat body 30 is disposed on the lower surface of the movable part base 51a at a center part thereof in the width direction. Two restricting members 43 are disposed on the stationary part 41, which are spaced apart from each other in the back and forth direction of the seat body 30. Each of the restricting members 43 is formed into substantially a U-shape and extends upward to sandwich the guiding plate 53. An engagement of the restricting member 43 with the guiding plate prevents the movable part 51 from being displaced relative to the stationary part 41 in the width direction.

As shown in Fig. 4, the guiding plate 53 is provided with, near a lower end thereof, a guiding opening 53a extending in the back and forth direction. The restricting member 43 is provided with a restricting shaft 43a passing through the guiding opening 53a. The restricting shaft 43a has both ends

thereof connected to the restricting member 43 extending along both sides of the guiding opening 53a. Because of the guiding opening 53a and the restricting shaft 43a, the movable part 51 can be prevented from being detached from the stationary part
5 41.

A support part 54 is disposed on an upper surface of the movable part base 51a at a position substantially corresponding to each of the receiving tables 52. As shown in Fig. 4, the support part 54 is engaged with a receiving table 31a
10 downwardly projecting from a lower surface of the seat portion 31 of the seat body 30. By the engagement of the support part 54 and the receiving table 31a, the seat body 30 is supported by the movable part 51 from below.

In this embodiment, the movable part 51 is formed
15 separately from the seat body 30. However, the movable part 51 may be integrally formed with the seat portion 31 of the seat body 30. That is, the guiding plate 53 is disposed on the lower surface of the seat portion 31 of the seat body 30, and the receiving table 31a of the seat portion 31 of the seat body 30 is
20 formed to have the same structure as that of the receiving table 52, whereby the seat portion 31 of the seat body 30 is directly supported by the pendulum 62.

As shown in Figs. 4 to 6, the rocking mechanism 40 has a vertically reduced size. Accordingly, the rocking mechanism 40
25 can be disposed below the seat body 30, while maintaining a compact size of the baby rocker 1 as a whole.

An operation of the rocking mechanism 40 as constituted above is described.

As described above, the swing shaft 61 is inclined such
30 that the upper end 61a is positioned outside the lower end 61b in the width direction of the seat body 30. When the pendulum 62 extends in the width direction of the seat body 30, the pendulum 62 takes a lowermost position which is shown by a solid line in Fig. 6. In accordance with a swinging movement of
35 the pendulum 62 from such a position about the swing shaft 61, the pendulum 62 is gradually raised. Thus, once the baby

rocker 1 is made to swing, the pendulum 62 symmetrically swings in a cyclic manner by gravitation about a width direction of the seat body 30 shown in Figs. 4 and 5.

As shown in Fig. 6, accompanied with the swinging
5 movement of the pendulum 62, the distal end 62a of the pendulum 62 moves inward in the width direction of the seat body 30. At this time, the receiving table 52 of the movable part 51 can slide relative to the distal end 62a of the pendulum 62 in the longitudinal direction thereof. Further, the restricting
10 member 43 restricts a displacement of the movable part 51 in the width direction of the seat body 30. Therefore, although the distal end 62a of the pendulum 62 moves inward in the width direction of the seat body 30, which is shown by a broken line in Fig. 6, the receiving table 52 is prevented from being
15 displaced in the width direction of the seat body 30. As a result, the movable part 51 can reciprocate only in the back and forth direction of the seat body 30 in a smooth and cyclic manner, without being displaced in the width direction of the seat body 30.

20 The pendulum 62 swings in a cyclic manner on the basis of a so-called horizontal pendulum principle. Thus, it is possible to make the swinging cycle (period) slower (longer), not only by increasing a longitudinal length of the pendulum 62, but also by reducing an angle θ formed between the vertical
25 direction and the swing shaft 61 which is inclined in the width direction of the seat body 30. The reduced inclination angle θ of the swing shaft 61 results in a reduced thickness of the rocking mechanism 40. Thus, a swinging cycle of the baby rocker 1 can be adjusted to be an optimum one for a child,
30 without enlarging the baby rocker 1 as a whole.

The restricting member 43 is provided with the restricting shaft 43a passing through the guiding opening 53a of the guiding plate 53. Thus, during a reciprocal movement of the movable part 51 relative to the stationary part 41, the movable
35 part 51 can be prevented from being detached from the stationary part 41.

As described above, according to this embodiment, the baby rocker 1 can be used both as a chair and a bed. When the baby rocker 1 is used as a chair, a child can sit thereon and eat something or read a book. When the baby rocker 1 is used
5 as a bed, one can change diapers of the child lying thereon or take care of the child after bathing. The child can sleep on the baby rocker 1 as a bed.

The pendulum 62 supported by the stationary part 41 of the rocking mechanism 40 swings in a cyclic manner on the
10 basis of the horizontal pendulum principle. The receiving table 52 of the movable part 51 is slidably supported by the distal end 62a of the pendulum 62. The restricting member 43 of the stationary part 41 restricts a displacement of the movable part 51 in the width direction of the seat body 30. Accordingly, by
15 means of a swinging movement of the pendulum 62, the movable part 51 can reciprocate by gravitation relative to the stationary part 41 in a smooth and cyclic manner in the back and forth direction of the seat body 30.

The rocking mechanism 40 has a vertically reduced size.
20 Thus, the rocking mechanism 40 can be disposed below the seat body 30, while maintaining a compact size of the baby rocker 1 as a whole.

It is possible to make the swinging cycle (period) slower (longer), not only by increasing a longitudinal length of the
25 pendulum 62, but also by reducing an angle θ formed between the vertical direction and the swing shaft 61 which is inclined in the width direction of the seat body 30. The reduced inclination angle θ of the swing shaft 61 results in a reduced thickness of the rocking mechanism 40. Thus, a swinging cycle
30 of the seat body 30 can be adjusted to be an optimum one, without enlarging a size of the baby rocker 1 as a whole.

In this embodiment, the restricting member 43 extending upward to sandwich the guiding plate 53 from both side thereof prevents the movable part 51 from being displaced relative to
35 the stationary part 41 in the width direction of the seat body 30. However, the present invention is not limited thereto, and a pair

of rollers (not shown) may be disposed on the stationary part 41 to sandwich therebetween the guiding plate 53. Since the rollers sandwich therebetween the guiding plate 53 from both sides thereof, the movable part 51 is prevented from being
5 displaced relative to the stationary part 41 in the width direction of the seat body 30.

Alternatively, as shown in Fig. 7, a guiding groove 64, in place of the guiding plate 53, may be formed in the movable part 51, and a restricting roller 65 to be positioned in the
10 guiding groove 64 may be disposed above the pendulum support table 42. By the engagement of the guiding groove 64 and the restricting roller 65, the movable part 51 can be prevented from being displaced relative to the stationary part 41 in the width direction of the seat body 30.

15 In the alternative example shown in Fig. 7, a guiding opening 62c is formed in the distal end 62a of the pendulum 62, and the receiving table 52 is provided with a pair of downwardly extended parts 52b, 52b for sandwiching therebetween the distal end 62a of the pendulum 62 in the back and forth
20 direction of the seat body 30. A restricting shaft 52c passing through the guiding opening 62c is disposed between the extended parts 52b, 52b. Accordingly, the movable part 51 can be prevented from being detached from the stationary part 41, by means of the guiding opening 62c and the restricting shaft
25 52c.

Second Embodiment

A second embodiment of the present invention will be described below with reference to Figs. 8 and 9.

Excluding a rocking mechanism, the second embodiment shown in Figs. 8 and 9 has substantially the same constitution as that of the first embodiment shown in Figs. 1 to 7. Thus, a detailed description of members other than the rocking mechanism is omitted. In addition, in the rocking mechanism shown in Figs. 8 and 9, members having the same structure and
30 function as those of the first embodiment shown in Figs. 1 to 7 have the same reference numbers, and their detailed
35

description is omitted.

Fig. 8 is a side view of a rocking mechanism 70, and Fig. 9 is a front view of the rocking mechanism 70.

As shown in Figs. 8 and 9, the rocking mechanism 70 includes: a stationary part 41; a fan-shaped roller 71 disposed on the stationary part 41, formed of a substantially fan-shaped column having at least an arcuate portion 71a in cross-section, the arcuate portion 71a contacting the stationary part 41; and a movable part 51 for holding a spindle 73 rotatably passing through the fan-shaped roller 71, and supporting a seat body 30 from below.

In the rocking mechanism 70, the movable part 51 reciprocates relative to the stationary part 41 in a back and forth direction of the seat body 30, by means of a rolling movement of the fan-shaped roller 71 on the stationary part 41. In accordance with the reciprocal movement of the movable part 51, the seat body 30 supported by the movable part 51 reciprocates relative to side plates 20 in a back and forth direction of a baby rocker 1.

The back and forth direction of the seat body 30 means a right and left direction in Fig. 8 which is a side view of the rocking mechanism 70. A width direction of the seat body 30 means a direction perpendicular to the back and forth direction of the seat body 30, i.e., a depth direction in Fig. 8.

In the second embodiment, the fan-shaped roller 71 is formed of a fan-shaped column having a fan-shaped end surface 71b. The stationary part 41 is formed of a flat plate. On an upper surface 41a of the stationary part 41, there is disposed a pair of fan-shaped rollers 71, 71 which are spaced apart from each other in the width direction. Another pair of fan-shaped rollers 71, 71 are disposed on the upper surface 41a, which are spaced from the former pair of fan-shaped rollers 71, 71 in the back and forth direction. That is, the rocking mechanism 70 has four fan-shaped rollers 71. As shown in Fig. 8, when the fan-shaped rollers 71 are viewed from the lateral side thereof, the fan-shaped rollers 71 which are spaced from each other in

the width direction are overlapped with each other. As shown in Fig. 9, when the fan-shaped rollers 71 are viewed from the front thereof, the fan-shaped rollers 71 which are spaced from each other in the back and forth direction are overlapped with each other.

As described above, each of the fan-shaped rollers 70 are positioned such that the arcuate portion 71a contacts the upper surface 41a of the stationary part 41. That is, as shown in Figs. 8 and 9, each of the fan-shaped rollers 71 and the stationary part 41 are in line contact with each other along a contact line L2.

Next, the spindle 73 is described in detail. As shown in Figs. 8 and 9, two spindles 73, 73 extend in the width direction of the seat body 30. Each of the spindles 73 passes through the pair of fan-shaped rollers 71, 71 which are spaced apart from each other in the width direction, at a point near a peak 71c of the fan-shaped end surface 71b of the fan-shaped roller 71, the point being positioned on a symmetrical line L1 of the fan-shaped end surface 71b. A bearing (not shown) is disposed between the spindle 73 and each of the fan-shaped rollers 71, whereby the fan-shaped roller 71 can smoothly rotate about the spindle 73.

Each of the spindles 73 are supported, near end portions thereof, by the movable part 51 through four receiving tables 72 disposed below a lower surface of a movable part base 51a formed of a flat plate. Thus, the movable part 51 can move relative to the stationary part 41 in the back and forth direction, by means of a rolling movement of the fan-shaped rollers 71 on the stationary part 41.

As shown in Fig 9, the upper surface 41a of the stationary part 41 is provided with guiding plates 53, 53 which are disposed adjacent to, and inside the fan-shaped rollers 71 in the width direction. As shown in Figs. 8 and 9, each of the guiding plates 53 extends in the back and forth direction of the seat body 30, and is perpendicular to the stationary part 41. The guiding plate 53 has a guiding opening 53a to be engaged

with each of the spindles 73. As shown in Fig. 8, the guiding opening 53a receives therein the spindle 73, and is formed into a shape along a trajectory of movement of the spindle 73 when the fan-shaped roller 71 rolls on the stationary part 41.

5 As shown in Figs. 8 and 9, the rocking mechanism 70 has a vertically reduced size. Accordingly, the rocking mechanism 70 can be disposed below the seat body 30, while maintaining a compact size of the baby rocker 1 as a whole.

10 An operation of the rocking mechanism 70 as constituted above is described.

As described above, the fan-shaped roller 71 is formed of a fan-shaped column having the fan-shaped end surface 71b. A center of gravity of the fan-shaped roller 71 is on the symmetrical line L1. The spindle 73, to which loads of the seat
15 body 30 and the movable part 51 are applied, passes through a point on the symmetrical line L1. A reference state of the fan-shaped roller 71 is shown by a solid line in Fig. 8, in which the symmetrical line L1 of the fan-shaped roller 71 is perpendicular to the contact line L2 between the fan-shaped
20 roller 71 and the stationary part 41. When the fan-shaped roller 71 rotates in one direction from this reference state into the state shown by two-dot chain lines in Fig. 8, the center of gravity of the fan-shaped roller 71 on the symmetrical line L1 and the spindle 73 gradually move in an opposite direction
25 relative to the contact line L2 between the fan-shaped roller 71 and the stationary part 41, in accordance with the rotating movement of the fan-shaped roller 71. Thus, once the baby rocker 1 is made to swing to rotate the fan-shaped roller 71 on the stationary part 41, the fan-shaped roller 71 symmetrically
30 rotates in a cyclic manner by gravitation in the right and left direction in Fig. 8, about the reference state shown by the solid line in Fig. 8 in which the symmetrical line L1 is perpendicular to the stationary part 41. In accordance with the cyclic rolling movement of the fan-shaped roller 71, the movable part 51 can
35 reciprocate relative to the stationary part 41.

The fan-shaped roller 71 rotates in a cyclic manner on

the basis of a so-called rolling (rolling movement) pendulum principle. Thus, it is possible to change a cycle (period) of the reciprocal movement of the movable part 51, by modifying a shape of the fan-shaped roller 71, in particular, the arcuate portion 71a, or shifting along the symmetric line L1 a position where the spindle 73 passes through the opening 53a. Thus, a cycle of the reciprocal movement of the seat body 30 can be adjusted to be an optimum cycle for a child.

The guiding plates 53 are disposed on the stationary part 41 inside the fan-shaped rollers 71 in the width direction of the seat body 30. The spindles 73 respectively pass through the guide openings 53a of the guiding plates 53. Thus, the fan-shaped roller 71 can be prevented from being displaced in the width direction of the seat body. At the same time, the movable part 51 can be prevented from separating away from the stationary part 41. In addition, an excessive rolling movement of the fan-shaped roller 71 can be prevented. Accordingly, the movable part 51 can smoothly reciprocate only in the back and forth direction of the seat body 30, without being displaced in the width direction thereof.

As described above, in the second embodiment, the fan-shaped roller 71 disposed on the stationary part 41 can rotate thereon in a cyclic manner on the basis of the rolling pendulum principle. The guiding plate 53 restricts a displacement of the fan-shaped roller 71 in the width direction of the seat body 30. The spindle 73 held by the movable part 51 passes through the fan-shaped roller 71 and the guiding opening 53a of the guiding plate 53. Thus, the movable part 51 can smoothly reciprocate relative to the stationary part 41 in the back and forth direction of the seat body 30 by gravitation in a cyclic manner, by means of the rolling movement of the fan-shaped roller 71 on the stationary part 41.

It is possible to change a cycle (period) of the reciprocal movement of the movable part 51, by modifying a shape of the fan-shaped roller 71, in particular, the arcuate portion 71a, or shifting along the symmetric line L1 a position where the spindle

73 passes through the opening 53a. Thus, a cycle of the reciprocal movement of the seat body 30 can be adjusted to be an optimum cycle for a child, without enlarging the rocking mechanism 70.

5 In addition, the rocking mechanism 70 has a vertically reduced size. Accordingly, the rocking mechanism 70 can be disposed below the seat body 30, while maintaining a compact size of the baby rocker 1 as a whole.

10 The second embodiment shows the pair of fan-shaped rollers 71 disposed on the stationary part 41 which are spaced apart from each other in the width direction of the seat body 30. However, the present invention is not limited thereto. A single fan-shaped roller 71 elongated in the width direction of the seat body 30 may be disposed on the stationary part 41.

15 In the second embodiment, a cross-section of the arcuate portion 71a of the fan-shaped roller 71 is a sector, that is, the fan-shaped roller 71 has a constant curvature at each point of the arcuate portion 71a. However, the fan-shaped roller 71 may have an ununiform curvature at each point from a center
20 portion to an end portion of the arcuate portion 71a.

Third Embodiment

A third embodiment of the present invention will be described below with reference to Figs. 10 to 12.

25 Excluding a rocking mechanism, the third embodiment shown in Figs. 10 to 12 has substantially the same constitution as those of the first embodiment shown in Figs. 1 to 7 and the second embodiment shown in Figs. 8 and 9. Thus, a detailed description of members other than the rocking mechanism is omitted. In addition, in the rocking mechanism shown in Figs.
30 10 to 12, members having the same structure and function as those of the first embodiment shown in Figs. 1 to 7 and the second embodiment shown in Figs. 8 and 9 have the same reference numbers, and their detailed description is omitted.

35 Fig. 10 is a top view of a rocking mechanism 76, Fig. 11 is a front view of the rocking mechanism 76, and Fig. 12 is a cross-sectional view of the rocking mechanism 76 taken along

the 12 - 12 line in Fig. 10.

As shown in Figs. 10 to 12, the rocking mechanism 76 includes: a stationary part 41 having sidewalls 41b extending in a back and forth direction of a seat body 30; a first swinging member 77 swingably suspended from the sidewalls 41b of the stationary part 41; a swinging frame 79 supported by the first swinging member 77; a second swinging member 81 swingably suspended from the swinging frame 79; and a movable part 51 supported by the second swinging member 81, for supporting the seat body 30 from below.

In the rocking mechanism 76, the movable part 51 reciprocates relative to the stationary part 41 in the back and forth direction of the seat body 30, by means of a swinging movement of the first swinging member 77 relative to the stationary part 41 and a swinging movement of the second swinging member 81 relative to the swinging frame 79. In accordance with the reciprocal movement of the movable part 51, the seat body 30 supported by the movable part 51 reciprocates relative to side plates 20 in a back and forth direction of a baby rocker 1.

The back and forth direction of the seat body 30 means a depth direction of Fig. 11 which is a front view of the rocking mechanism 76. The width direction of the seat body 30 means a right and left direction in Fig. 11 which is a front view of the rocking mechanism 76.

In the third embodiment, the stationary part 41 has a pair of sidewalls 41b, 41b, and a stationary part base 41c formed of a flat plate for connecting lower ends of the pair of sidewalls 41b, 41b to each other. As shown in Fig. 11, the stationary part 41 is of a flat rectangular shape with its upper part being opened, when the stationary part 41 is viewed from the front thereof.

As shown in Fig. 11, the first swinging member 77 has: a pair of first swinging member suspended parts 77a, 77a suspended from the sidewalls 41b, each of the suspended parts 77a being swingably supported by the sidewall 41b through a

bearing (not shown) disposed near an upper periphery of the sidewall 41b; and a first swinging member connecting part 77b extending in the width direction of the seat body 30, for connecting the pair of suspended parts 77a, 77a to each other.

5 As shown in Fig. 11, the first swinging member 77 extending inside a contour of the stationary part 41 is of a flat rectangular shape with its upper part being opened, when the first swinging member 77 is viewed from the front thereof. As shown in Figs. 10 and 12, two first swinging members 77, which are spaced
10 apart from each other in the back and forth direction of the seat body 30, are disposed between the sidewalls 41b, 41b of the stationary part 41.

As shown in Fig. 11, the swinging frame 79 has a pair of frame side parts 79a, 79a extending in the back and forth
15 direction of the seat body 30, and a frame connecting part 79b connecting the pair of side frame parts 79a, 79a to each other. As shown in Fig. 12, each of the frame side parts 79a has a contour of an isosceles trapezoid shape. As shown in Fig. 11, the pair of frame side parts 79a, 79a are spaced apart from
20 each other in the width direction of the seat body 30, and are respectively disposed near both ends of the first swinging member connecting part 77b of the first swinging member 77. Each of the frame side parts 79a has an upper part 79c and a lower part 79d. As shown in Fig. 12, each of the frame side
25 part 79a is rotatably supported by the first swinging member 77 passing through both ends of the lower part 79d through bearings (not shown). In the third embodiment, the frame connecting part 79b connects the pair of frame side parts 79a, 79a to each other at a center portion of the upper part 79c.

30 As shown in Fig. 11, the second swinging member 81 has: a pair of second swinging member suspended parts 81a, 81a suspended from the upper parts 79c of the frame side parts 79a, each of the suspended parts 81a being swingably supported by the upper part 79c through a bearing (not shown);
35 and a second swinging member connecting part 81b extending in the width direction of the seat body 30, for connecting the

pair of second swinging member suspended parts 81a, 81a to each other. The second swinging member 81 is of a flat rectangular shape with its upper part being opened, when the second swinging member 81 is viewed from the front thereof.

5 As shown in Figs. 10 and 11, the second swinging member 81 is positioned inside the first swinging member 77 in the width direction. The second swinging member 81 and the first swinging member 77 is partially overlapped with each other in a height direction (up and down direction in Figs. 11 and 12).

10 As shown in Figs. 10 and 12, four receiving tables 82 are suspended from a lower surface of a movable part base 51a of the movable part 51. The second swinging member connecting parts 81b of the two second swinging members 81 pass rotatably through the respective receiving tables 82 through
15 bearings (not shown). Thus, the movable part 51 is supported by the second swinging members 81 through the receiving tables 82.

Similar to the first embodiment, a support part 54 (not shown in Fig. 10) is disposed on an upper surface of the
20 movable part base 51a at a position substantially corresponding to each of the receiving tables 82. Each of the support part 54 is engaged with a receiving table 31a disposed on a lower surface of a seat portion 31 of the seat body 30. By the engagement of the support part 54 and the receiving table 31a,
25 the seat body 30 is supported by the movable part 51 from below.

As shown in Figs. 10 to 12, the rocking mechanism 76 has a vertically reduced size. Accordingly, the rocking mechanism 76 can be disposed below the seat body 30, while
30 maintaining a compact size of the baby rocker 1 as a whole.

An operation of the rocking mechanism 40 as constituted above is described.

The first swinging member 77 is swingably suspended from the sidewalls 41b of the stationary part 41. Thus, once
35 the first swinging member 77 is made to swing, it swings in a cyclic manner by gravitation about a vertical direction. In

accordance with the swinging movement of the first swinging member 77, the swinging frame 79 supported by the first swinging member connecting part 77b of the first swinging member 77 can reciprocate relative to the stationary part 41 in the back and forth direction.

The second swinging member 81 is swingably suspended from the upper part 79c of the swinging frame 79. Thus, once the second swinging member 81 is made to swing, it swings in a cyclic manner by gravitation about a vertical direction. In accordance with the swinging movement of the second swinging member 81, the movable part 51 supported by the second swinging member connecting part 81b of the second swinging member 81 can reciprocate relative to the swinging frame 79 in the back and forth direction.

Since the first swinging member 77 swings relative to the stationary part 41, and the second swinging member 81 swing relative to the swinging frame 79, the movable part 51 can reciprocate by gravitation relative to the stationary part 41 in the back and forth direction of the seat body 30. Therefore, the seat body 30 can reciprocate in a cyclic manner relative to the side plate 20 in the back and forth direction of the baby rocker 1.

The cyclic reciprocal movement of the movable part 51 relative to the stationary part 41 is on the basis of a so-called double pendulum (dual pendulum) principle. As compared with the movable part 51 which is directly supported by the first swinging member 77, the movable part 51 which is supported by the first swinging member 77 through the second swinging member 81, as in the third embodiment, can reciprocate with a slower (longer) cycle. As shown in Fig. 11, the second swinging member 81 is positioned inside the first swinging member 77 in the width direction of the seat body 30. In addition, as shown in Figs. 11 and 12, the first swinging member 77 and the second swinging member 81 are overlapped with each other in the height direction. Thus, although the rocking mechanism 76 is provided with the second swinging

member 81, an enlargement of the rocking mechanism 76 can be avoided.

It is possible to obtain an optimum cycle (period) of the reciprocal movement of the seat body 30 for a child, by
5 adjusting a length of the first swinging member suspended part 77a of the first swinging member 77 and a length of the second swinging member suspended part 81a of the second swinging member 81.

As described above, the second swinging member 81 is
10 positioned inside the first swinging member 77 in the width direction. In addition, the first swinging member 77 and the second swinging member 81 are overlapped with each other in the height direction. Thus, the movable part 51 can reciprocate relative to the stationary part 41 with a slower cycle, without
15 enlarging the rocking mechanism 76.

It is possible to change the cycle (period) of the reciprocal movement of the movable part 51, by changing a length of the first swinging member suspended part 77a of the first swinging member 77 and/or a length of the second
20 swinging member suspended part 81a of the second swinging member 81. Thus, a cycle of the reciprocal movement of the seat body 30 can be adjusted to be an optimum cycle for a child.

The rocking mechanism 76 has a vertically reduced size.
25 Accordingly, the rocking mechanism 76 can be disposed below the seat body 30, while maintaining a compact size of the baby rocker 1 as a whole.

In the third embodiment, the stationary part 41 is formed separately from the side plates 20, and the movable part 51 is
30 formed separately from the seat body 30. However, not limited thereto, the stationary part 41 may be formed integrally with the side plates 20, and the movable part 51 may be formed integrally with the seat body 30, as described in the first embodiment.

35 In this constitution, the first swinging member 77 is swingably connected to an upper part of the side plates 20,

while the receiving table 31a of the seat body 30 is directly supported by the second swinging member suspended connecting part 81b of the second swinging member 81. In this case, the stationary part base 41c may be omitted. Such a rocking mechanism 76 is partially overlapped with the seat body 30, whereby the baby rocker 1 can have a more reduced size.

Fourth Embodiment

A fourth embodiment of the present invention will be described below with reference to Figs. 13 to 15B.

10 Excluding a rocking mechanism, the forth embodiment shown in Figs. 13 to 15B has substantially the same constitution as those of the first embodiment shown in Figs. 1 to 7, the second embodiment shown in Figs. 8 and 9, and the third embodiment shown in Figs. 10 to 12. Thus, a detailed description of members other than the rocking mechanism is omitted. In addition, in the rocking mechanism shown in Figs. 13 to 15B, members having the same structure and function as those of the first embodiment shown in Figs. 1 to 7, the second embodiment shown in Figs. 8 and 9, and the third embodiment shown in Figs. 10 to 12 have the same reference numbers, and their detailed description is omitted.

Fig. 13 is a side view of a rocking mechanism 90, Fig. 14 is a front view of the rocking mechanism 90, and Figs. 15A and 15B are partial side views of an alternative example of the rocking mechanism 90.

As shown in Figs. 13 and 14, the rocking mechanism 90 includes a stationary part 41 which is provided with a concaved curved rail 93 curved in the back and forth direction of a seat body 30, and a movable part 51 having a wheel 96 to rotate on the curved rail 93, for supporting a seat body 30 from below.

In the rocking mechanism 90, the movable part 51 reciprocates relative to the stationary part 41 in the back and forth direction of the seat body 30. In accordance with the reciprocal movement of the movable part 51, the seat body 30 supported by the movable part 51 reciprocates relative to side plates 20 in the back and forth direction of a baby rocker 1.

The back and forth direction of the seat body 30 means a right and left direction in Fig. 13 which is a side view of the rocking mechanism 90. The width direction of the seat body 30 means a depth direction in Fig. 13 which is a side view of the
5 rocking mechanism 90.

First, the stationary part 41 is described. In the fourth embodiment, as shown in Fig. 14, the stationary part 41 is provided with a pair of sidewalls 91, 91, and a stationary part base 92 for connecting lower ends of the pair of sidewalls 91, 91
10 to each other.

Two curved rails 93 are integrally formed with each of the sidewalls 91 at lower parts thereof, the curved rails 93 being spaced apart from each other in the back and forth direction of the seat body 30. In the fourth embodiment, as shown in Fig.
15 13, when each of the curved rails 93 are viewed from the lateral side thereof, the curved rail 93 has an arcuate upper surface 93a, and is symmetrically formed about a center part 93b which is a lowest part in the upper surface 93a in a height direction. The four curved rails 93 have the same size and shape.

As shown in Fig. 13, a guiding opening 94 is formed in the respective sidewalls 91 at a position corresponding to the curved rail 93. As shown in Fig. 14, each of the sidewalls 91 is provided with a ceiling part 91a for covering the curved rail 93 from above.

The pair of sidewalls 91, 91 have a symmetrical shape to each other. That is, as shown in Fig. 13, when the sidewalls are viewed from the lateral side thereof, the pair of sidewalls 91, 91 are positioned such that the curved rails 93 and the guiding openings 94 of one sidewall 91 are overlapped with the curved
30 rails 93 and the guiding openings 94 of the other sidewall 91.

Next, the movable part 51 is described. The movable part 51 has four wheels 96 respectively disposed on the curved rails 93, two wheel shafts 97 each connecting the pair of wheels 96, 96 which are spaced apart from each other in the width
35 direction, and a movable part base 51a formed of a flat plate for supporting the wheel shafts 97.

As shown in Figs. 13 and 14, the two wheel shafts 97 extending in the width direction are spaced apart from each other in the back and forth direction, and are secured on the movable part base 51a through receiving tables 95. Each of the wheel shafts 97 supports, near both end portions 97a thereof, the pair of wheels 96, 96.

As shown in Fig. 13, each of the end portions 97a of the wheel shaft 97 passes through the wheel 96 to project outward in the width direction. An upper periphery 94a of the guiding opening 94 is formed into a shape along a trajectory of movement of the wheel shaft 97 when the wheel 96 rolls on the curved rail 93. As shown in Fig. 14, the end portion 97a of the wheel shaft 97 is disposed adjacent to the upper periphery 94a of the guiding opening 94. Thus, when the wheel 96 is likely to move upward to be separated from the curved rail 93, the end portion 97a comes into contact with the upper periphery 94a of the guiding opening 94. Thus, the upward movement of the wheel 96 from the curved rail 93 is limited.

Each of the wheels 96 can rotate about the wheel shaft 97, but cannot move relative to the wheel shaft 97 in a longitudinal direction thereof. The wheel 96 is provided with a flange portion 96a inside the same in the width direction. The flange portion 96a is engaged with an inside surface 93c of the curved rail 93. Thus, the movable part 51 can smoothly move on the curved rail 93 in the back and forth direction, while a displacement of the movable part 51 is prevented in the width direction.

As shown in Fig. 13, the wheel shafts 97 are attached to the movable part base 51a such that, when one of the wheels 96 is located on the center part 93b of the corresponding curved rail 93, the rest three wheels 96 are also located on the center parts 93b of the corresponding curved rails 93, respectively.

As shown in Figs. 13 and 14, two locking shafts 98 extending in the back and fourth direction of the seat body 30 are disposed on the stationary part base 92 of the stationary part 41. Each of the locking shaft 98 is rotatably attached to

the stationary part base 92 through a holder 92a. A rear end of the locking shaft 98 projects rearward from the stationary part base 92. A lever 98a is attached to the projected rear end of the locking shaft 98.

5 Each of the locking shaft 98 is provided with two locking members 99 secured thereto. Each of the locking members 99 has a locking engagement groove 99a to be engaged with the wheel shaft 97. The locking member 99 is of an elongated shape, and is positioned below the wheel shaft 97 when the
10 wheel 96 is located on the center part 93b of the curved rail 93. Thus, in a state where the wheel 96 is located on the center part 93b of the curved rail 93, when the locking shaft 98 is rotated, the locking member 99 takes an upright posture as shown in Fig. 14, so that the locking engagement groove 99a is
15 engaged with the wheel shaft 97 as shown in Fig. 13.

As shown in Figs. 13 and 14, the rocking mechanism 90 has a vertically reduced size. Accordingly, the rocking mechanism 90 can be disposed below the seat body 30, while maintaining a compact size of the baby rocker 1 as a whole.

20 An operation of the rocking mechanism 90 as constituted above is described.

The curved rail 93 is curved in the back and forth direction of the seat body 30. As shown in Fig. 13, when the curved rail 93 is viewed from the lateral side thereof, the upper
25 surface 93a of the curved rail 93 has an arcuate shape which is symmetrical about the center part 93b. Thus, once the movable part 51 is made to swing relative to the stationary part 41 in the back and forth direction from a state where each of the wheels 96 is located on the center part 93b of the
30 corresponding curved rail 93, the movable part 51 reciprocates relative to the stationary part 41 in a cyclic manner by gravitation in the back and forth direction of the seat body 30.

The cyclic reciprocal movement of the movable part 51 is on the basis of a rolling pendulum (roller pendulum) principle.
35 Thus, it is possible to change a cycle (period) of the reciprocal movement of the movable part 51, by modifying a shape of the

curved rail 93. When the curved rail 93 has a smaller curvature, a cycle of the reciprocal movement of the movable part 51 can be slowed down (elongated). Therefore, it is unnecessary to enlarge the rocking mechanism 90.

5 As shown in Fig. 14, each of the wheels 96 is provided with the flange 96a inside the same in the width direction. Each of the flange portions 96a is engaged with the inside surface 93c of the curved rail 93. The wheel 96 cannot move relative to the wheel shaft 97 in the width direction. Each of
10 the sidewalls 91 is provided with the ceiling part 91a for covering the curved rail 93 from above, whereby a deposition of dust on the curved rail 93 can be prevented. Accordingly, the movable part 51 can smoothly reciprocate in the back and forth direction of the seat body 30, with a displacement of the
15 movable part 51 being restricted in the width direction of the seat body 30.

Each of the end portions 97a of the wheel shaft 97 is disposed adjacent to the upper periphery 94a of the guiding opening 94 formed in the sidewall 91. Thus, when the wheel
20 96 is likely to move upward to be separated from the curved rail 93, the end portion 97a comes into contact with the upper periphery 94a of the guiding opening 94. Therefore, the upward movement of the wheel 96 from the curved rail 93 is limited, whereby a detachment of the movable part 51 from the
25 stationary part 41 is prevented. Since the end portion 97a of the wheel shaft 97 comes into contact with a side edge 94b of the guiding opening 94, an excessive movement of the movable part 51 can be prevented in the back and forth direction.

In order to lock the reciprocal movement of the seat body
30 30, the lever 98a projecting rearward in the back and forth direction from the locking mechanism 90 is rotated at an angle of 90°, so as to swing the locking member 99 upward through the locking shaft 98, as shown in Fig. 14. Then, the wheel shaft 97 is engaged with the locking engagement groove 99a of
35 the locking member 99, so that a movement of the wheel shaft 97 is restricted in the back and forth direction of the seat body

30. Thus, a position of the seat body 30 can be locked relative to the side plates 20.

As described above, according to the fourth embodiment, the wheel 96 of the movable part 51 is positioned on the curved rail 93 of the stationary part 41. Thus, the movable part 51
5 can reciprocate relative to the stationary part 41 by gravitation.

The rocking mechanism 90 has a vertically reduced size. Accordingly, the rocking mechanism 90 can be disposed below the seat body 30, while maintaining a compact size of the baby
10 rocker 1 as a whole.

Further, it is possible to make a cycle of the reciprocal movement of the movable part 51 slower (longer), by modifying a shape of the curved rail 93, without enlarging the rocking mechanism 90. Thus, the cycle of the reciprocal movement of
15 the seat body 30 can be adjusted to be an optimum cycle for a child.

Furthermore, the end portion 97a of the wheel shaft 97 is engaged with the guiding opening 94 of the sidewall 91. Thus, a detachment of the movable part 51 from the stationary part
20 41, and an excessive movement of the movable part 51 relative to the stationary part 41 can be prevented.

Each of the wheels 96 is provided with the flange 96a inside the same in the width direction. Each of the flange portions 96a is engaged with the inside surface 93c of the curved rail 93. The wheel 96 cannot move relative to the wheel
25 shaft 97 in the width direction. The sidewall 91 is provided with the ceiling part 91a for covering the curved rail 93 from above. Accordingly, the movable part 51 can smoothly reciprocate in the back and forth direction of the seat body 30, with a displacement of the movable part 51 being restricted in
30 the width direction of the seat body 30.

When the locking shaft 98 is rotated, the locking engagement groove 99a of the locking member 99 is engaged with the wheel shaft 97, so that a displacement of the movable
35 part 51 is restricted in the back and forth direction. As a result, a position of the seat body 30 can be locked relative to the side

plates. 20.

In the fourth embodiment, the stationary part 41 includes the rotatable locking shaft 98 extending in the back and forth direction of the seat body 30, and the locking member 99 which
 5 is secured on the locking shaft 98 and is disposed below the wheel shaft 97 of the wheel 96, the locking member 99 being provided with the engagement groove 99a to be engaged with the wheel shaft 97, so that the locking member 99 restricts a
 10 displacement of the wheel shaft 97 in the back and forth direction of the seat body 30 by rotating the locking shaft 98. However, the present invention is not limited thereto. Alternatively, as shown in Figs. 15A and 15B, the stationary part
 41 may include: a locking shaft 102 extending in the back and forth direction of the seat body 30 and being capable of moving
 15 the back and forth direction of the seat body 30; a locking member 99 which is capable of vertically moving and is disposed below the wheel shaft 97 of the wheel 96, the locking member 99 being provided with the engagement groove 99a to be engaged with the wheel shaft 97; a connecting rod 103
 20 rotatably connected to the locking shaft 102 and the locking member 99; and a restriction member 101 disposed on the stationary part base 92 of the stationary part 41, for restricting a displacement of the locking member 99 in the back and forth direction.

25 In this alternative example, as the locking shaft 102 is moved so that a distance between a connecting point 104 connecting the locking shaft 102 to the connecting rod 103, and connecting point 105 connecting the locking member 99 to the
 connecting rod 103 widens in the back and forth direction, the
 30 locking member 99 moves downward. On the other hand, as the locking shaft 102 is moved so that a distance between the connecting point 104 connecting the locking shaft 102 to the connecting rod 103, and the connecting point 105 connecting the locking member 99 to the connecting rod 103 narrows in the
 35 back and forth direction, the locking member 99 moves upward. When the locking member 99 moves upward, the wheel shaft 97

is engaged with the engagement groove 99a of the locking member 99, whereby a displacement of the wheel shaft 97 is restricted in the back and forth direction.

5 In the alternative example, as shown in Fig. 15A, when the locking shaft 102 is moved rearward, the locking member 99 moves downward. On the other hand, as shown in Fig. 15B, when the locking shaft 102 is moved forward, the locking member 99 moves upward.

10 As shown in Fig. 15B, it is preferable that the locking member 99 raises the wheel shaft 97 so that the wheel 96 moves away from the curved rail 93, when the locking member 99 moves upward. When the locking member 99 holds the wheel shaft 97 such that the wheel 96 is away from the curved rail 93, a displacement of the movable part 51 can be securely
15 restricted in the back and forth direction.

In this constitution, as shown in Fig. 15B, the stationary part 41 preferably has a movement restriction member 106 for restricting a movement of the locking shaft 102. The movement restriction member 106 is positioned to restrict a
20 movement of the locking shaft 102 toward one side (forward in this example) in the back and forth direction from a condition that the connecting point 104 connecting the locking shaft 102 to the connecting rod 103 is slightly shifted to the one side from the connecting point 105 connecting the locking member 99 to
25 the connecting rod 103. Thus, the locking member 99 can stably hold the wheel shaft 97, with the wheel 96 being away from the curved rail 93. Since the wheel 96 is away from the curved rail 93, if a load is applied to the seat body 30, the curved rail 93 can be prevented from being deformed by the
30 load through the wheel 96.

What is claimed is:

1. A baby rocker comprising:
 - a seat body including at least a seat portion and a back portion; and
 - a rocking mechanism disposed below the seat body, for reciprocating the seat body in a back and forth direction thereof; wherein
 - the rocking mechanism includes:
 - a stationary part;
 - a pendulum disposed on the stationary part, the pendulum being capable of swinging about a swing shaft inclined in a width direction of the seat body, the width direction being perpendicular to the back and forth direction thereof; and
 - a movable part slidably supported by the pendulum, for supporting the seat body from below;
 - whereby the movable part reciprocates relative to the stationary part in the back and forth direction of the seat body by means of a swinging movement of the pendulum.
2. The baby rocker according to claim 1, wherein
 - a pair of pendulums are arranged on the stationary part in the width direction of the seat body.
3. The baby rocker according to claim 1, wherein
 - one of the stationary part and the movable part is provided with a guiding plate extending in the back and forth direction of the seat body, while the other of the stationary part and the movable part is provided with a restricting member, and
 - the movable part is prevented from being displaced relative to the stationary part in the width direction of the seat body because of an engagement of the guiding plate and the restricting member.
4. The baby rocker according to claim 1, wherein
 - a spherical body is interposed between the movable part

and the pendulum, and

the movable part slides relative to the pendulum by means of a rolling movement of the spherical body.

5. The baby rocker according to claim 1, wherein the movable part of the rocking mechanism and the seat portion of the seat body are integrally formed with each other.

6. A baby rocker comprising:

a seat body including at least a seat portion and a back portion; and

a rocking mechanism disposed below the seat body, for reciprocating the seat body in a back and forth direction thereof; wherein

the rocking mechanism includes:

a stationary part;

a fan-shaped roller disposed on the stationary part, formed of a substantially fan-shaped column having at least an arcuate portion in cross-section, the arcuate portion contacting the stationary part; and

a movable part for holding a spindle passing through the fan-shaped roller, and supporting the seat body from below;

whereby the movable part reciprocates relative to the stationary part in the back and forth direction of the seat body, by means of a rolling movement of the fan-shaped roller on the stationary part.

7. The baby rocker according to claim 6, wherein

a pair of fan-shaped rollers are spaced on the stationary part in the back and forth direction of the seat body.

8. The baby rocker according to claim 6, wherein

a guiding plate extending in the back and forth direction of the seat body is disposed on the stationary portion, the guiding plate being provided with a guiding opening to be engaged with the spindle of the fan-shaped roller.

9. The baby rocker according to claim 6, wherein the movable part of the rocking mechanism and the seat portion of the seat body are integrally formed with each other.

10. A baby rocker comprising:

a seat body including at least a seat portion and a back portion; and

a rocking mechanism disposed below the seat body, for reciprocating the seat body in a back and forth direction thereof; wherein

the rocking mechanism includes:

a stationary part having sidewalls extending in the back and forth direction of the seat body;

a first swinging member swingably suspended from the sidewalls of the stationary part;

a swinging frame supported by the first swinging member;

a second swinging member swingably suspended from the swinging frame; and

a movable part supported by the second swinging member, for supporting the seat body from below;

the first swinging member and the second swinging member being at least partially overlapped with each other in a height direction,

whereby the movable part reciprocates relative to the stationary part in the back and forth direction of the seat body.

11. The baby rocker according to claim 10, wherein

a pair of first swinging members are disposed on the sidewalls of the stationary part with a space therebetween in the back and forth direction of the seat body, and a pair of second swinging members are disposed on the swinging frame with a space therebetween in the back and forth direction of the seat body.

12. The baby rocker according to claim 10, wherein
the movable part of the rocking mechanism and the seat portion of the seat body are integrally formed with each other.
13. A baby rocker comprising:
a seat body including at least a seat portion and a back portion; and
a rocking mechanism disposed below the seat body, for reciprocating the seat body in a back and forth direction thereof; wherein
the rocking mechanism includes:
a stationary part provided with a concaved curved rail curved in the back and forth direction of the seat body; and
a movable part having a wheel to rotate on the curved rail, for supporting the seat body from below;
whereby the movable part reciprocates relative to the stationary part in the back and forth direction of the seat body.
14. The baby rocker according to claim 13, wherein
the movable part is provided with the pair of wheels and a wheel shaft connecting the wheels to each other.
15. The baby rocker according to claim 14, wherein
the stationary part further includes a rotatable locking shaft extending in the back and forth direction of the seat body, and a locking member which is secured on the locking shaft and is disposed below the wheel shaft of the wheel, the locking member being provided with an engagement groove to be engaged with the wheel shaft, so that the locking member restricts a displacement of the wheel shaft in the back and forth direction of the seat body, by rotating the locking shaft to engage the engagement groove with the wheel shaft.
16. The baby rocker according to claim 13, wherein
the stationary part further includes a pair of sidewalls extending in the back and forth direction of the seat body, each

sidewall being provided with a guiding opening to be engaged with the wheel shaft.

17. The baby rocker according to claim 13, wherein the movable part of the rocking mechanism and the seat portion of the seat body are integrally formed with each other.

18. The baby rocker according to claim 14, wherein the stationary part further includes: a locking shaft extending in a back and forth direction of the seat body and being capable of moving the back and forth direction of the seat body; a locking member which is capable of vertically moving and is disposed below the wheel shaft of the wheel, the locking member being provided with an engagement groove to be engaged with the wheel shaft; and a connecting rod rotatably connected to the locking shaft and the locking member; so that the locking member restricts a displacement of the wheel shaft in the back and forth direction of the seat body, by moving the locking shaft in the back and forth direction to move the locking member upward so as to engage the engagement groove with the wheel shaft.