

SPECIFICATION

TITLE OF THE INVENTION: BOTTOM FOR BED APPARATUS

5 Technical Field

[0001]

The present invention relates to a bottom for a bed apparatus on which a mattress will not slip when the bottom is positioned flat or aslant.

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Background Art

[0002]

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In a bed apparatus, the bottom on which a mattress is placed is formed of approximately rectangular, molded metallic plates being arrayed in the longitudinal direction of the bed apparatus. In order to support back-raising and foot-raising operations, the bottom is composed of the aforementioned rectangular plates with their short side arranged in the length direction of the bed apparatus (see Japanese Patent Application Laid-open 2006-198352 (Patent Document 1)).

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[0003]

25

In the bed apparatus of this kind, a plurality of plates are joined and placed on the bed frame. Because the joined plates flex in back-raising and/or leg-raising operations,

the plates need to be arranged with gaps therebetween.

[0004]

However, there is a fear that the gaps between plates causes the user to feel a jagged sensation. Though the user's
5 feel of a bed can be bettered by the mattress, there has been no proposal of the bottom that can prevent this jagged sensation.

[0005]

Further, as a structure for preventing the mattress from
10 slipping sideways over the bottom, in Patent Document 1, a pair of anti-sideslip members are arranged along both sides of the bottom. The anti-sideslip members engage the edges of the mattress to prevent slip.

15 Prior Art Documents

Patent Documents

[0006]

Patent Document 1:

Japanese Patent Application Laid-open 2006-198352

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Summary of the Invention

Problems to be Solved by the Invention

[0007]

In view of the above circumstances, it is an object of
25 the present invention to provide a bottom for a bed apparatus

that can make the user feel comfortable when lying on the bed apparatus.

Means for Solving the Problems

5 [0008]

According to the present invention, a bottom for a bed apparatus, which is height adjustable and is mounted on the top of a bed apparatus, comprising: a plurality of parts each formed of a resin plate having a thickness, including a back
10 bottom, a hip bottom, a knee bottom and a foot bottom, wherein

essential parts among the plurality of parts are joined by connecting parts, and the connecting parts are formed of the same material with, to be thinner than, and integrally with, the essential parts, and,

15 depressed portions are formed on the top surface of the bottom, the depressed portions are formed in the central part of the bottom with respect to the width direction, and a plurality of passage holes are formed from the top surface to the undersurface of the bottom in the depressed portions.

20 [0009]

In the present invention, it is preferable that, the depressed portions are formed in dimensions corresponding to the width of the user body, leaving surrounding areas in the head side, the foot side, and both sides in the width
25 direction, of the entire bottom.

[0010]

In the present invention, it is also preferable that, the depressed portions of the bottom are formed so that the depressed portions of the hip bottom is the deepest, and the
5 depressed portions of the knee bottom is the second deepest.

[0011]

In the present invention, it is preferable that, the essential parts of the bottom are the hip bottom, knee bottom and foot bottom, a flexing part is extended from the hip bottom,
10 overlapping the back bottom, and flexibly joined to the back bottom so as to slide along the back bottom when a back-raising operation is carried out.

Effect of the Invention

15 [0012]

According to the bottom of the bed apparatus of the present invention, the bottom includes the plurality of parts each formed of a resin plate having a thickness, including a back bottom, a hip bottom, a knee bottom and a foot bottom, and
20 the essential parts among the plurality of parts are joined by connecting parts, and the connecting parts are formed of the same material with, thinner than, and integrally with, the essential parts. Accordingly, the user who is lying in the bed will not sink in at each connecting part and will
25 not feel a bumpy sensation that would occur when part of the

mattress is closed in.

Further, since the depressed portions are formed in the central part of the bottom with respect to the width direction, the pressure against the body at points of contact when the user lies on the bed apparatus is alleviated compared to the case of a flat surface. In addition, it is possible to assure the breathability of the bottom by provision of passage holes.

As a result, it is possible to provide excellent effect of making the user feel a comfortable sensation in lying.

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Brief Description of Drawings

[0013]

[FIG. 1] (a) A schematic perspective view of a bed apparatus on which a bottom according to an embodiment of the present invention is mounted, and (b) a perspective view of the bottom.

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[FIG. 2] An overall plan view of a bottom.

[FIG. 3] A plan view of a back bottom of a bottom.

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[FIG. 4] (a) A plan view of essential parts of a bottom, or a hips bottom, a knee bottom and a leg bottom integrated, (b) a sectional view cut along a line B-B in (a).

[FIG. 5] (a) A sectional view cut along a line A-A in FIG. 3, and (b) a sectional view of foot-side parts, cut along a line C-C in FIG. 4(a).

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Mode for Carrying Out the Invention

[0014]

Now, an embodiment of the present invention will be described with reference to the accompanying drawings.

[0015]

5 FIG. 1(a) is an overall perspective view of a bed apparatus on which a bottom according to the present invention is mounted, (b) is a perspective view of the bottom, and FIGS. 2 to 5 are illustrative views of the bottom.

[0016]

10 As shown in FIGS. 1 and 2, in the bed apparatus, the head side to which the head of the user is oriented when lying is indicated by "H" and the foot side to which the user's feet are oriented is indicated by "F".

[0017]

15 As shown in FIG. 1(a), the bed apparatus includes: a top frame 10 having an approximate ladder structure with its length oriented along the direction from the head side to the foot side; a bottom 12 placed on the top frame 10; and a head-side lift 14H and a foot-side lift 14F that are arranged
20 on the head and foot sides under the top frame 10, respectively, to support the top frame 10 so as to be raised and lowered relative to the floor.

[0018]

25 Approximately rectangular support frames 16, longer in the width direction of the bed apparatus, on which the top

frame 10 is set, are arranged on the head and foot sides under the top frame 10, and fixed to the top ends of the head-side lift 14H and foot-side lift 14F, respectively.

[0019]

5 Though not illustrated, the lifts 14H and 14F are detachably joined at their lower ends by means of a connecting frame. Each of the lifts 14H and 14F is provided with an actuator so that the drive force of each actuator can be controlled separately. The top frame 10 is hence possible
10 to perform a tilting operation for make level difference between the head side and the foot side by controlling drive of each actuator.

[0020]

 Further, in the top frame, a back-raising rod and a
15 knee-raising rod are provided on the head side and in the center area, respectively. Actuators for driving these are also provided.

[0021]

 As shown in FIGS. 1 and 2, the bottom 12 supports the
20 weight of the user with a mattress (schematically shown by a reference numeral '18' in FIG. 1) placed thereon. The bottom 12 is composed of multiple plates, specifically, a back bottom 12a for supporting the head and back of the user, a hip bottom 12b for supporting the hips, a knee bottom 12c for supporting
25 part from hips to knees and a foot bottom 12d for supporting

part from knees to toes.

[0022]

In the bed apparatus of the embodiment, the bottom 12 arranged on the top is height adjustable. That is, the back
5 bottom 12a of the bottom 12 is configured to enable back-raising operation by means of the back-raising rod, and the knee bottom 12c and foot bottom 12d are configured to enable knee-raising operation and foot-raising operation by means of the knee-raising rod.

10 [0023]

Herein, in the bottom 12, each of the back bottom 12a, hip bottom 12b, knee bottom 12c and foot bottom 12d, is formed of a resin plate having a thickness and formed with a depressed portion 20 on the top surface of each, as will be described
15 in detail.

[0024]

In the depressed portion 20, a plurality of passage holes 22 are perforated from the top surface to the undersurface of bottom 12. These multiple passage holes 22 are arrayed
20 in the width and length directions of the bottom 12. The passage holes 22 may be provided in any form and in any number as appropriate. In the embodiment the passage holes 22 are formed such that a plurality of circular and rectangular (the long side oriented in the width direction) holes are arrayed
25 in line and these lines are arranged in parallel in the

longitudinal direction of the bottom 12, as shown in FIG.
2.

[0025]

5 The depressed portions 20 are hollowed on the top surface
of the bottom 12. The depressed portions 20 are formed in
the central part of the bottom 12 with respect to the width
direction. Specifically, in the bottom 12, depressed
portions 20 are formed contiguously in the back bottom 12a,
hip bottom 12b, knee bottom 12c and foot bottom 12d. The
10 depressed portions 20 are formed on the top surface of bottom
12, leaving surrounding part of the bottom 12 as a whole.

[0026]

That is, the depressed portions 20 are formed leaving
flat surrounding areas 26 in the head side end of the back
15 bottom 12a, both sides of the back bottom 12a, hip bottom
12b, knee bottom 12c and foot bottom 12d and the foot side
end of the foot bottom 12d. In other words, the depressed
portions 20 are formed in the interior part surrounded by
the flat surrounding areas 26. The depressed portions 20 are
20 suitably formed with a width ranging from one half to four
fifths of the width of the bottom 12 though the bottom width
can be determined as appropriate.

[0027]

As sectionally shown in FIGS. 4(b) and 5, the depressed
25 portions 20 are formed with depths equal to or smaller than

half the thickness of the thick portions such as surrounding areas 26 of the back bottom 12a, hip bottom 12b, knee bottom 12c and foot bottom 12d of the bottom 12. The periphery of the depressed portion 20 contiguous from the surrounding area 26 is gently beveled with an angle of about 30 to 50 degrees with respect to the flat surface so that the user will not feel a bumpy sensation in lying in bed.

[0028]

According to the bottom 12 of the bed apparatus of the embodiment, the depressed portions 20 are formed around the center in the width direction of the bottom 12, so that the pressure against the body at points of contact when the user lies on the bed apparatus is alleviated compared to the case of a flat surface. In addition, the bottom can be made breathable thanks to the passage holes 22, the user feels comfortable when lying. Since the mattress 18 on the bottom 12 sinks into the depressed portions 20, the mattress is unlikely to slip relative to the bottom 12, hence can be prevented from slipping.

[0029]

Herein, among all the parts of the bottom 12, the back bottom 12a is formed as a single assembly as shown in FIG. 3. As shown in FIG. 4, among all the parts, the hip bottom 12b, knee bottom 12c and foot bottom 12d are essential parts, which are joined by connecting parts 24, forming a single

integrated assembly. The connecting parts 24 are formed of the same material with, thinner than, and integrally with, the essential parts.

[0030]

5 A flexing bottom 28 is extended on the head side from the hip bottom 12b forming the aforementioned essential part, and the flexing bottom 28 flexibly joined to the back bottom 12a so as to slide along the back bottom 12a.

[0031]

10 In this flexing bottom 28, a plurality of elongated bars each having a trapezoidal section and extended in the width direction of bottom 12, are arranged in the length direction of the bottom 12 and joined to each other by a thin part, forming an approximately slatted board-like or bellows-like
15 flexible structure. The flexing bottom 28 is accommodated in a coupling hollow 30 of the back bottom 12a so as to slide in the length direction of the bottom 12 and flexibly connect to the back bottom with an unillustrated pin fitted in a slot 30a of the back bottom 12a, in a slidable manner.

20 [0032]

 FIG. 5(a) shows an enlarged section of the back bottom 12a, FIG. 5(b) a sectional view of the hip bottom 12b, knee bottom 12c and foot bottom 12d. FIGS. 5(a) and 5(b) are depicted in different scales, but the depressed portions 20
25 are formed so that the depressed portion 20 of the hip bottom

12b is the deepest (with a depth d1) and the depressed portion of the knee bottom 12c is the second deepest (with a depth d2), as shown in FIG. 5(b). Here, the depressed portion 20 (with a depth d3) of the back bottom 12a and the depressed portion 20 (with a depth d4) of the foot bottom 12d are formed shallower than the depressed portion 20 of the knee bottom 12c. The depths of the depressed portions 20 are $d1 > d2 > d3$ (or $d4$).

[0033]

With the above configuration, when the entire bottom 12 is arranged horizontal, the hip bottom 12b is depressed to a certain extent so that the user's hips are held and the user's hips will not move in back-raising and feet-raising. As a result, it possible to positively prevent bending of the user's back.

Industrial Applicability

[0034]

The bottom of the bed apparatus of the present invention can be applied to the bottoms of various kinds of bed apparatus such as in-home care nursing bed apparatus, facility care nursing bed apparatus, hospital bed apparatus and the like.

Description of Reference Numerals

[0035]

	10	top frame
	12	bottom
	12a	back bottom
	12b	hip bottom
5	12c	knee bottom
	12d	foot bottom
	20	depressed portion
	22	passage hole
	24	connecting part
10	26	surrounding area
	28	flexing bottom

CLAIMS

1. A bed apparatus comprising,

a frame;

a first section disposed on the frame, the first section including a first depression which is disposed in a central portion of the first section with respect to a width direction of a top surface of the first section while leaving flat edge areas on left and right sides with respect to the width direction of the top surface of the first section and a second depression;

a second section disposed on the frame, the second section including a third depression which is disposed in a central portion of the second section with respect to a width direction of a top surface of the second section while leaving flat edge areas on left and right sides with respect to the width direction of the top surface of the second section, the third depression being formed so as to support user's hips in order not to move the user's hips when one side of the first section raises, a width of the third depression in a first direction being shorter than a width of the second depression in the first direction, the first direction being a direction from the left side towards the right side; and

a third section disposed between the first section and the second section.

2. The bed apparatus according to claim 1, wherein a depth of the third depression is larger than a depth of the first depression.

3. The bed apparatus according to claim 1 or 2, wherein the first to third sections being composed of same material.

4. The bed apparatus according to any one of the claims 1 to 3, wherein a plurality of holes are disposed in the first depression, the holes including a first hole and a second hole, a size of the first hole being different from a size of the second hole.

5. A bed apparatus comprising,
a frame;

a first section disposed on the frame, the first section including a first depression which is disposed in a central portion of the first section with respect to a width direction of a top surface of the first section while leaving flat edge areas on left and right sides with respect to the width direction of the top surface of the first section and a second depression;

a second section disposed on the frame, the second section including a third depression which is disposed in a central portion of the second section with respect to a width direction of a top surface of the second section while leaving flat edge areas on

left and right sides with respect to the width direction of the top surface of the second section, a depth of the third depression is larger than a depth of the first depression, a width of the third depression in a first direction being shorter than a width of the second depression in the first direction, the first direction being a direction from the left side towards the right side; and

a third section disposed between the first section and the second section, part of the third section being overlapped with and slidably contacted to the second depression of the first section, wherein

the third depression is formed so as to support user's hips in order not to move the user's hips when one side of the first section raises.

6. The bed apparatus according to claim 5, wherein the first to third sections being composed of same material.

7. The bed apparatus according to claim 5 or 6, wherein a plurality of holes are disposed in the first depression, the holes including a first hole and a second hole, a size of the first hole being different from a size of the second hole.

8. A bottom for a bed apparatus, in which a depressed portion

is formed on the bottom by hollowing out a central part of the bottom with respect to a width direction of a top surface of the bottom while leaving flat edge areas on left and right sides with respect to the width direction of the top surface, and a plurality of passage holes are formed from the top surface to an undersurface of the bottom,

wherein

the bottom has parts corresponding to a hip bottom, the hip bottom being formed with the depressed portion,

the bed apparatus has a top frame configured by arranging a pair of frame members at left and right sides with respect to the bed apparatus,

the bottom has parts corresponding to a back bottom, the back bottom being formed with the depressed portion, a width of the depressed portion of the hip bottom in a first direction being shorter than a width of the depressed portion of the back bottom in the first direction, the first direction being a direction from the left side towards the right side,

the hip bottom is mounted on the top frame, wherein the hip bottom having flat edge areas on left and right sides with respect to a width direction of the hip bottom is arranged so as to be positioned on the left and right sides frame members, and

the depressed portion of the hip bottom is formed so as to

hold user's hips in order not to move the user's hips when a back-raising is carried out.

9. A bottom for a bed apparatus, in which a depressed portion is formed on the bottom by hollowing out a central part of the bottom with respect to a width direction of a top surface of the bottom while leaving flat edge areas on left and right sides with respect to the width direction of the top surface, and a plurality of passage holes are formed from the top surface to an undersurface of the bottom, wherein

the depressed portion is formed in a dimension corresponding to a width of a user body, leaving flat edge areas in a head side, a foot side, and both of the left and right sides in the width direction, of the entire bottom,

the bottom has a part corresponding to a hip bottom, the hip bottom being formed with the depressed portion,

the bottom has parts corresponding to a back bottom, the back bottom being formed with the depressed portion, a width of the depressed portion of the hip bottom in a first direction being shorter than a width of the depressed portion of the back bottom in the first direction, the first direction being a direction from the left side towards the right side, and

the depressed portion of the hip bottom in the bottom is formed so as to hold user's hips in order not to move the user's hips when a back-raising is carried out.

10. A bottom for a bed apparatus, in which a depressed portion is formed on the bottom by hollowing out a central part of the bottom with respect to a width direction of a top surface of the bottom while leaving flat edge areas on left and right sides with respect to the width direction of the top surface, and a plurality of passage holes are formed from the top surface to an undersurface of the bottom,
wherein

the bottom has parts corresponding to a hip bottom, a knee bottom and a foot bottom, each bottom of the parts being formed with the depressed portion,

the depressed portion of the hip bottom is the deepest, and the depressed portion of the knee bottom is the second deepest, and

the depressed portion of the hip bottom is formed so as to hold user's hips in order not to move the user's hips when a back-raising is carried out.

11. A bottom for a bed apparatus, which is height adjustable and

is mounted on the top of a bed apparatus, comprising:

a plurality of parts each formed of a resin plate having a thickness,

wherein

essential parts among the plurality of parts are joined by connecting parts, and the connecting parts are formed to be thinner than the essential parts,

a depressed portion is formed on the bottom by hollowing out a central part of the bottom with respect to a width direction of a top surface of the bottom while leaving flat edge areas on left and right sides with respect to the width direction of the top surface, and a plurality of passage holes are formed from the top surface to an undersurface of the bottom,

the essential parts of the bottom are a hip bottom, a knee bottom, a foot bottom and a back bottom, each essential part being formed with the depressed portion,

a flexing part as the connecting part is extended from the hip bottom, overlapping the back bottom, and flexibly joined to the back bottom so as to slide along the back bottom when a back-raising operation is carried out,

a width of the depressed portion of the hip bottom in a first direction being shorter than a width of the depressed portion of the back bottom in the first direction, the first direction being

a direction from the left side towards the right side, and

the depressed portion of the hip bottom is formed so as to hold user's hips in order not to move the user's hips when the back-raising is carried out.

12. The bottom for a bed apparatus according to any one of Claims 8 to 11, wherein the sum of widths of the flat edge areas on the left and right sides with respect to the width direction of the top surface is within a width ranging from one half to one fifths of the width of the bottom.

13. A bed apparatus comprising the bottom according to any one of Claims 8 to 12.