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D E S C R I P T I O N

MATTRESS APPARATUS

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Technical Field

The present invention relates to a mattress apparatus for use in a bed or the like.

Background Art

10 A mattress apparatus for use in a bed or the like has a spring unit composed of spring bodies, such as coil springs, which are assembled to form a rectangular shape in a plan view. Resilient sheets made of urethane foam or the like are stacked on the upper and lower surfaces of the spring unit. The stacked body is
15 covered with an exterior cloth cover sewn into a bag shape.

A user, lying on his/her back on the mattress apparatus, may read a book or watch television. In this case, the user can read or watch in a more
20 comfortable position if the head is slightly raised from the horizontal.

The conventional mattress apparatus cannot keep the user's head in the raised state. Therefore, it is necessary for the user to insert a folded cushion or
25 the like under the pillow in order to keep the head in a higher position. However, if the head is kept in a higher position in this manner, the head may be

unstable or liable to be fatigued because the neck is forced to bend.

Jpn. Pat. Appln. KOKAI Publication No. 2004-261214 proposes a mattress apparatus, which solves the above
5 problem. The mattress apparatus disclosed in this publication comprises a fixed rod member and a movable rod member, which are provided integrally with a spring unit on both sides thereof along the width direction and connected by a hinge mechanism. The movable rod
10 member is raised relative to the fixed rod member at a specified angle, and kept at that angle by the hinge mechanism. With this structure, since one end portion of the spring unit is bent upward and kept at a specified angle, the user can stably rest the head on
15 the bent portion.

In the mattress apparatus disclosed in Jpn. Pat. Appln. KOKAI Publication No. 2004-261214, since the one end portion of the spring unit can be reliably
maintained in a bent state by the hinge mechanism, the
20 user can keep a comfortable posture with the head rested on the bent portion of the spring unit.

To easily bend the one end portion of the spring unit, according to the invention disclosed in Jpn. Pat. Appln. KOKAI Publication No. 2004-261214, frame wires
25 at the peripheral edge portions of the upper and lower surfaces of the spring unit are cut at the parts where the spring unit is bent. Thus, the frame wires are

prevented from causing bending resistance.

However, even if the frame wires are cut so as not to cause bending resistance, the spring unit itself will cause bending resistance. Therefore, the one end
5 portion of the spring unit cannot be easily bent by weak force.

Further, the user generally wants to bend the one end portion of the spring unit, while he or she is lying on his/her back on the mattress apparatus and
10 raising the head. In this case, however, since the user will bend the spring unit in the lying posture, it is difficult to apply strong force. Therefore, there is a strong demand for bending the spring unit with weak force.

15 Disclosure of Invention

The present invention provides a mattress apparatus having a spring unit, an end portion of which can easily be bent by weak force.

According to the present invention, there is
20 provided a mattress apparatus comprising: a spring unit having a first spring unit portion located in one end portion in a longitudinal direction and a second spring unit portion located in a portion except the one end portion in the longitudinal direction, the first spring
25 unit portion and the second spring unit portion being arranged with a predetermined gap therebetween; a movable rod member formed integrally with the first

spring unit portion at least on both sides in a width direction of the first spring unit portion; a fixed rod member formed integrally with the second spring unit portion at least on both sides in a width direction of the second spring unit portion; a hinge mechanism which
5 connects the movable rod member to the fixed rod member, and is configured to rotate the movable rod member relative to the fixed rod member and hold it at a specified rotation angle; a resilient sheet stacked
10 on at least an upper surface of upper and lower surfaces of the spring unit; and an exterior body covering a stacked body made of the resilient sheet and the spring unit.

Brief Description of Drawings

15 FIG. 1 is a perspective view of a mattress apparatus placed on a bed according to a first embodiment of the present invention;

FIG. 2 is a plan view showing one end portion of a spring unit;

20 FIG. 3 is a cross-sectional view of an area including a gap between a first spring unit portion and a second spring unit portion of the spring unit of the mattress apparatus;

FIG. 4 is a cross-sectional view showing a
25 connecting portion connecting a spring unit with a movable rod member and a fixed rod member;

FIG. 5 is a side view showing an outline of the

configuration of the spring unit;

FIG. 6 is a cross-sectional view of a hinge mechanism;

FIG. 7 is a cross-sectional view of an area including a gap between a first spring unit portion and a second spring unit portion of a spring unit of a mattress apparatus according to a second embodiment of the present invention; and

FIG. 8 is a cross-sectional view of an area including a gap between a first spring unit portion and a second spring unit portion of a spring unit of a mattress apparatus according to a third embodiment of the present invention.

Best Mode for Carrying Out the Invention

FIGS. 1 to 6 show a first embodiment of the present invention. FIG. 1 is a perspective view showing a state in which a mattress apparatus 1 is placed on a bedplate 3 of a bed 2. The mattress apparatus 1 is configured such that one end portion 1a in the longitudinal direction of the bed 2, located on the side of a headboard 4, is raised and held at a specified angle.

As shown in FIGS. 2 and 3, the mattress apparatus 1 contains a spring unit 5. The spring unit 5 is divided into a first spring unit portion 7 provided in one end portion in the longitudinal direction of the mattress apparatus 1 and a second spring unit portion 8

provided in the other portion. The first and second spring unit portions 7 and 8 are disposed with a gap 9 of a predetermined distance therebetween.

5 In the first and second spring unit portions 7 and 8, a wire material constitutes a plurality of coil portions 11, whose axial lines are parallel with each other, thus forming a spring body 12. A plurality of spring bodies 12 are arranged along the width direction of the mattress apparatus 1. The upper and lower ends
10 of the adjacent spring bodies 12 are connected by helical wires 13. Further, frame wires 14 are connected by clips 15 over all peripheral edge portions of the upper and lower surfaces of each of the spring unit portions 7 and 8.

15 The frame wires 14 may be provided on the three edge portions of the first spring unit portion 7 and the three edge portions of the second spring unit portion 8 excluding the edge portions of the two unit portions facing each other.

20 On the three sides of the first spring unit 7 and the second spring unit 8, except for the sides facing each other, a U-shaped movable rod member 17 and a U-shaped fixed rod member 18, as shown in FIGS. 4 and 5, are provided integral with the spring units 7 and 8
25 by holding means to be described later.

The movable rod member 17 and the fixed rod member 18 are made of pipe members. The ends of the two

members at both sides along the longitudinal direction of the spring unit 5 are rotatably connected by the hinge mechanisms 21 so as to be held at a specified rotation angle.

5 The movable rod member 17 and the fixed rod member 18 connected by the hinge mechanisms 21 form a rectangle, which is slightly smaller than the plane figure of the spring unit 5. Therefore, the fixed rod member 18 and the movable rod member 17 arranged in the
10 peripheral portion of the spring unit 5 enters the gap between helical windings at the lower end in the axial direction of the coil portion 11 located in the peripheral portion of the spring unit 5, as shown in FIG. 4. Thus, the spring unit 5 integrally holds the
15 fixed rod member 18 and the movable rod member 17.

 As shown in FIG. 6, the hinge mechanism 21 has a first arm 27 and a second arm 28 as an attachment part. One end of the first arm 27 and one end of the second arm 28 are pivoted to a pivot shaft 26. One end of a
20 first connection rod 27a is inserted in and fixed to the other end of the first arm 27 by welding. The other end of the first connection rod 27a is inserted in and fixed to one end of the movable rod member 17 by welding.

25 One end of a second connection rod 28a is inserted in and fixed to the other end of the second arm 28 by welding. The other end of the second connection rod

28a is slidably inserted in one end of the fixed rod member 18. As a result, the movable rod member 17 is slidable relative to the hinge mechanism 21 and the fixed rod member 18 in the direction of an arrow A shown in FIG. 6.

Teeth 29 are formed at the one end of the first arm 27. A stopper 31 to be engaged with the teeth 29 is pivoted to the one end of the second arm 28 by a pin 32. The stopper 31 is forced by a spring 33 in the direction in which it engages with the teeth 29.

A cam plate 34 is rotatably attached to the pivot shaft 26. A recessed portion 35 and a projected portion 36 are formed on the circumferential surface of the cam plate 34 at a predetermined distance therebetween along a circumferential direction. The distance from the pivot shaft 26 to the projected portion 36 in a radial direction is longer than the distance from the pivot shaft 26 to the teeth 29 in a radial direction. The one end of the first arm 27 is provided with an engagement body 37, which is located in the recessed portion 35 in the state where the stopper 31 engages with the teeth 29.

As a result, the first arm 27 can be maintained at a specified rotation angle relative to the second arm 28 by the engagement of the teeth 29 and the stopper 31. When the first arm 27 is rotated in a direction of an arrow B shown in FIG. 6, so that the cam plate 34 is

moved in association with this rotation by means of the engagement body 37 which is in contact with one end of the recessed portion 35, the stopper 31 runs on the projected portion 36 of the cam plate 34 and disengages from the teeth 39. Consequently, the first arm 27 can be free to rotate in a direction opposite to the arrow.

The first arm 27 can be rotated in the direction opposite to the arrow B until the engagement body 37 abuts on the other end of the recessed portion 35 to rotate the cam plate 34 and the stopper 31 is removed from the projected portion 36 of the cam plate 34 and engaged with the teeth 29, that is, until the first arm 27 is substantially horizontal to the second arm 28.

Thus, the hinge mechanisms 21 allow the movable rod member 17 to rise relative to the fixed rod member 18 at a specified angle relative to the fixed rod member 18 and also to turn flat from the raised position.

As shown in FIGS. 3 and 4, felt sheets 41 are laid on the upper and lower surfaces of the spring unit 5. The peripheral portions of each felt sheet 41 is folded to wrap around the frame wire 14, and retained to the frame wire 8 by a clip, which is not shown.

A holding cloth 43 is stacked on the felt sheet 41 laid on the lower surface of the spring unit 5. The holding cloth 43 has a rectangular shape, which is fully larger than the plane figure of the spring unit

5, and the peripheral portion thereof extends out from the peripheral portion of the spring unit 5.

As shown in FIG. 4, the peripheral portion of the holding cloth 43 extended from the peripheral portion of the spring unit 5 is wrapped around the movable rod member 17 and the fixed rod member 18 provided in the peripheral portion of the spring unit 5, from an inner part to an outer part, and returned to the peripheral portion of the lower surface of the spring unit 5.

The part of the holding cloth 43, which is bent toward the inner part of the movable rod member 17 and the fixed rod member 18, is fixed to the frame wire 14 on the lower side by a clip (not shown) together with the end portion of the felt sheet 41. The part of the holding cloth 43, which is bent from the inner part to the outer part, is fixed to the frame wire 14 on the upper side by the clip (not shown) together with the aforementioned part bent toward the inner part. As a result, the movable rod member 17 and the fixed rod member 18 are integrally held to the spring unit 5 by the peripheral portion of the holding cloth 43.

Since the movable rod member 17 and the fixed rod member 18 are integrally held to the spring unit 5, when the movable rod member 17 is rotated at a specified angle relative to the fixed rod member 18, the first spring unit portion 7 of the spring unit 5 follows the rotation. As a result, the first spring

unit portion 7 can be bent upward at the specified angle relative to the spring unit 8. Moreover, since the peripheral portion of the holding cloth 43 is wrapped around the rod members 17 and 18, the rod members 17 and 18 are prevented from directly hitting on the coil portions 11 of the spring units 7 and 8 and generating a metallic sound.

Further, the movable rod member and the fixed rod member 18 are arranged substantially like U shapes surrounding the spring unit portions 7 and 8 on the three sides. Therefore, the movable rod member 17 and the fixed rod member 18 prevent the spring unit portions 7 and 8 from twisting in the width direction. Particularly when the movable rod member 17 is raised along with the first spring unit portion 7, the raised first spring unit 7 is liable to twist in the width direction. However, the movable rod member 17 prevents the twisting.

As shown in FIG. 3, silencers 44 made of cloth or resin sheets are attached by means of clips 45 to upper sides of the first spring unit portion 7 and the second spring unit portion 8, which face each other with the gap 9 therebetween. Therefore, when the first spring unit portion 7 is raised, the side of the first spring unit portion 7 and the side of the second spring unit portion 8 are prevented from directly hitting on each other and generating a metallic sound.

Two resilient sheets 46 are stacked on the felt sheet 41 on the upper side of the spring unit 5, whereas one resilient sheet 46 is stacked on the holding cloth 43 on the lower side thereof. Thus, the resilient sheets 46 on the upper side of the spring unit 5 is thicker than that on the lower side.

The stacked body made of the spring unit 5 and the resilient sheets 46 is covered with an exterior body 47. As shown in FIGS. 3 and 4, the exterior body 47 has an upper end portion 48 covering the upper surface of the spring unit 5, a lower end portion 49 covering the lower surface thereof, and a side portion 50 covering the peripheral surface thereof. Each of the end portions 48 and 49 and the side portion 50 has a three-layered structure, which is made of a front sheet, a back sheet and a resilient sheet sandwiched therebetween. The peripheral portions of the end portions 48 and 49 are integrally sewn on the upper and lower ends of the side portion 50 with a tape edge 51.

As shown in FIG. 1, an operating member 58, formed of a tape member shaped like the letter U, is attached to an end of the exterior body 47 corresponding to the first spring unit 7. One end of the operating member 58 is sewn onto the lower surface of the exterior member 47, a middle portion is sewn onto the side surface thereof, and the other end is extended on the upper surface thereof. With this structure, when the

operating member 58 is pulled up, the hinge mechanism 21 is operated to raise a part of the first spring unit portion 7, that is, the one end portion 1a of the mattress apparatus 1.

5 In the mattress apparatus 1 as described above, the movable rod member 17 and the fixed rod member 18 are respectively formed integral with the first spring unit 7 and the second spring unit 8 in the peripheral portion of the spring unit 5. The movable rod member
10 17 and the fixed rod member 18 are rotatable and can be held at a specified rotation angle by means of the hinge mechanism 21.

 Therefore, when the one end portion 1a in the longitudinal direction of the mattress apparatus 1 is
15 raised, the hinge mechanism 21 operates to rise the one end portion 1a, that is, the first spring unit portion 7, along with the movable rod member 17, and held at a specified angle as shown in FIG. 1. Thus, the one end portion 1a of the mattress apparatus 1 can be bent
20 upward.

 As a result, since the user lying on his/her back on the mattress apparatus can keep a comfortable posture with the head raised owing to the one end portion 1a, he or she can read or watch television in
25 the lying posture.

 Since the one end portion 1a has the operating member 58, the user can easily pull up the one end

portion 1a by means of the operating member 58, when
the one end portion 1a is to be raised. In other
words, the operating member 58 makes it easy to perform
the operation of raising the one end portion 1a of the
5 mattress apparatus 1.

The first spring unit portion 7 provided at the
one end portion 1a of the mattress apparatus 1 is
separated from the other portion, i.e., the second
spring unit portion 8 of the mattress apparatus 1.
10 Therefore, high resistance is not substantially applied
when the one end portion 1a of the mattress apparatus 1
is raised.

More specifically, since the spring unit 5 is
divided into the two spring unit portions 7 and 8, the
15 first spring unit portion 7 is raised without bending
the spring unit 5. Therefore, the operation of raising
the first spring unit portion 7 can be easily performed
with weak force.

Accordingly, even when the user is in a position
20 of lying on the mattress apparatus 1, he or she can
pull the operation member 58 with one hand while
raising the head, or by directly raising the one end
portion 1a of the mattress apparatus 1 with one hand.
Thus, the mattress apparatus 1 is easy and convenient
25 to use. The user can rotate the one end portion 1a
without getting down from the mattress apparatus 1.

As described above, since the spring unit 5 is

divided into the first spring unit 7 and the second spring unit 8, the one end portion 1a of the mattress apparatus can be raised with substantially no resistance.

5 Moreover, the two resilient sheets 46 are stacked on a portion above the divided portion between the first spring unit portion 7 and the second spring unit portion 8 for reinforcement. Therefore, a part of the user's body, for example, may not easily fall in the
10 gap 9 between the first spring unit portion 7 and the second spring unit portion 8. Consequently, although the spring unit is divided into the first spring unit portion 7 and the second spring unit portion 8, the performance of the mattress apparatus 1 is kept high.

15 When the one end portion 1a of the mattress apparatus 1 is raised, the two resilient sheets 46 on the portion above the divided portion between the first spring unit portion 7 and the second spring unit portion 8 are bent. Therefore, the one end portion 1a
20 of the mattress apparatus 1 may not be easily bent because of the resistance generated by the bending of the resilient sheets 46.

 However, when the one end portion 1a of the mattress apparatus 1 is raised, if resistance is
25 generated by counterforce due to the bending of the resilient sheets 46, the hinge mechanism 21 slides relative to the fixed rod member 18 because of the

resistance in the direction indicated with the arrow A in FIG. 6. In other words, the first spring unit portion 7 slides relative to the second spring unit portion 8.

5 Accordingly, the resistance generated by the bending of the resilient sheets 46 is reduced. The first spring unit portion 7 can be bent upward with relatively weak force also for this reason.

FIG. 7 shows a second embodiment of the present invention. In this embodiment, two resilient sheets 46 are stacked on each of the upper and lower surfaces of the spring unit 5. In addition, a belt-shaped reinforcement resilient member 53 is inserted in the gap 9 between the first spring unit portion 7 and the second spring unit portion 8 along the entire length of the width direction of the spring unit 5.

15 The upper and lower ends of the reinforcement resilient member 53 are fixed by an adhesive to the felt sheets 41 on the upper and lower surfaces of the spring unit 5. Therefore, the reinforcement resilient member 53 is prevented from slipping or falling out of the gap 9.

20 With the above structure, the regions of the mattress apparatus 1 above and below the gap 9 are reinforced not only by the two resilient sheets provided on the upper and lower surfaces of the spring unit 5 but also by the reinforcement resilient member

53 disposed in the gap 9 between the upper and lower resilient sheets 46.

Therefore, it is ensured that a part of the user's body may not deform the resilient sheets 46 and be prevented from falling in the gap 9.

FIG. 8 is a third embodiment of the present invention. In this embodiment, the felt sheets 41 laid on the upper and lower surfaces of the spring unit 5 are cut at the portion of the gap 9 between the first spring unit portion 7 and the second spring unit portion 8. The cut parts of the felt sheets 41 are respectively wrapped around the upper and lower side portions of the first spring unit portion 7 and the second spring unit portion 8, and held thereto by clips 42. Thus, the felt sheets 41 produce a silencing effect for preventing the sides of the first spring unit portion 7 and the second spring unit portion 8 from directly hitting on each other and generating a metallic sound.

Further, the two resilient sheets 46 laid on the upper surface of the spring unit 5 is connected to the resilient sheet 46 laid on the lower surface of the spring unit 5 by a cord-like connecting member 55 in the gap between the first and second spring unit portions 7 and 8. An indication member 56, such as a button, is connected to the end of the connecting member 55 projected from the upper surface of the

mattress apparatus 1.

With the above structure, when the one end portion 1a of the mattress apparatus 1 is bent upward, the connecting member 55 prevents the resilient sheets 46 stacked on the upper surface of the spring unit 5 from rising up.

Moreover, since the indication member 56 connected to the connecting member 55 is provided on the surface above the gap 9, the portion to be bent in the one end portion 1a of the mattress apparatus 1 can be discriminated at first sight because of the indication member 56.

In the third embodiment, the holding cloth 43 to hold the movable rod member 17 and the fixed rod member 18 is not provided on the lower surface of the spring unit 5. Instead, the movable rod member 17 and the fixed rod member 18 are connected by the hinge mechanism 21 so as to form a rectangular shape, which is slightly smaller than the plane figure of the spring unit 5. As a result, the movable rod member 17 and the fixed rod member 18 are integrally connected to the spring unit 5.

In the embodiments described above, only one end portion of the spring unit can be raised. However, the spring unit may be configured such that the other end portion thereof can also be raised in the same manner as the one end portion. With this structure, the user

lying on the mattress apparatus can raise not only the head but also the foot portion and keep the raised posture. This structure is effective in recovering from fatigue of the foot portion or the like.

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Industrial Applicability

According to the present invention, the spring unit is divided into the first spring unit portion and the second spring unit portion, which are connected by the hinge mechanism with a predetermined gap
10 therebetween. Therefore, when the one end portion of the spring unit is bent upward, the spring unit does not cause bending resistance. Accordingly, the bending operation can be performed easily with weak force.

C L A I M S

1. A mattress apparatus characterized by comprising:

5 a spring unit having a first spring unit portion located in one end portion in a longitudinal direction and a second spring unit portion located in a portion except the one end portion in the longitudinal direction, the first spring unit portion and the second spring unit portion being arranged with a predetermined gap therebetween;

10 a movable rod member formed integrally with the first spring unit portion at least on both sides in a width direction of the first spring unit portion;

15 a fixed rod member formed integrally with the second spring unit portion at least on both sides in a width direction of the second spring unit portion;

20 a hinge mechanism which connects the movable rod member to the fixed rod member, and is configured to rotate the movable rod member relative to the fixed rod member and hold it at a specified rotation angle;

a resilient sheet stacked on at least an upper surface of upper and lower surfaces of the spring unit; and

25 an exterior body covering a stacked body made of the resilient sheet and the spring unit.

2. The mattress apparatus according to claim 1, characterized in that a side of the first spring unit

portion and a side of the second spring unit portion, which face each other with the gap therebetween, are covered with silencer members that prevent the sides from hitting on each other and generating a sound.

5 3. The mattress apparatus according to claim 1, characterized in that resilient sheets are provided on both the upper and lower surfaces of the spring unit, and the resilient sheet on the upper surface is thicker than the resilient sheet on the lower surface.

10 4. The mattress apparatus according to claim 1, characterized in that resilient sheets are provided on both the upper and lower surfaces of the spring unit, and a reinforcement resilient member which prevents the resilient sheets from deforming into the gap is
15 provided in the gap between the first spring unit portion and the second spring unit portion.

 5. The mattress apparatus according to claim 1, characterized in that resilient sheets are provided on both the upper and lower surfaces of the spring unit, a
20 part of the resilient sheets that cover the gap between the first spring unit portion and the second spring unit portion are connected to each other by a connecting member, which prevents the resilient sheet covering the upper surface of the spring unit from
25 rising up when the first spring unit portion is rotated upward relative to the second spring unit portion.

 6. The mattress apparatus according to claim 1,

characterized in that the hinge mechanism has a first arm and a second arm, which are connected such that they are rotatable relative to and held to each other at a specified rotation angle, the first arm being
5 connected and fixed to the movable rod member, while the second arm being slidably connected to the fixed rod member.

7. The mattress apparatus according to claim 1, characterized in that a part of the exterior body which
10 corresponds to the first spring unit portion has an operating member to raise the first spring unit portion by operating the hinge mechanism.