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ELASTIC MODULE, ELASTIC MATTRESS, AND METHOD THEREOF

Abstract

An elastic module, the elastic module includes a plurality of pre-compressed springs and one or more lapping members, the plurality of pre-compressed springs contact or approach each other, middle parts of the plurality of pre-compressed springs are disposed with one or more connecting members, the plurality of pre-compressed springs are connected to the one or more lapping members through the one or more connecting members, and the one or more lapping members enable the plurality of pre-compressed springs to be connected in series to form rows and connect the plurality of pre-compressed springs in two adjacent ones of the rows together.

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Background/Summary

RELATED APPLICATIONS

[0001] This application claims priority to Chinese patent application number 202410191774.0, filed on Feb. 21, 2024. Chinese patent application number 202410191774.0 is incorporated herein by reference.

FIELD OF THE DISCLOSURE

[0002] The present disclosure relates to the field of elastic mattresses of furniture, and in particular relates to an elastic module, an elastic mattress, and a method thereof.

BACKGROUND OF THE DISCLOSURE

[0003] Bed mattresses are essential furniture in beddings for human use in modern life. Elastic bed mattresses with a middle part having elastic components are becoming increasingly popular for relaxation during sleep with increasing pressure in human lives. In order to withstand greater pressure, springs of the existing elastic mattresses, such as bed mattresses with elastic components, are often formed as whole structures and are not independent from each other. Even with respect to independent pocket springs, various spring ends of the pocket springs are often connected together through a connecting base, so that stress applied to a local portion will drive springs around the local portion to be subjected to the stress, thereby preventing the elastic mattresses comprising the pocket springs from changing a stress scope applied to the springs to conform to a curve of a human body by following a posture of the human body.

[0004] Therefore, the existing elastic mattresses cannot enable the elastic mattresses to conform to the curve of the human body to be more comfortable and softer by adjusting the stress according to a sleeping posture of a person.

BRIEF SUMMARY OF THE DISCLOSURE

[0005] The technical problem addressed by the present disclosure is to provide an elastic module to allow an elastic mattress to adjust a stress scope applied to springs according to a posture of human body on the elastic mattress to conform to a curve of the human body when being used in the elastic mattress, so that the elastic mattress can conform to ergonomic requirements to be softer and more comfortable while being subjected to greater stress.

[0006] In order to solve the aforementioned technical problems, the present disclosure provides an elastic module, the elastic module comprises a plurality of pre-compressed springs and one or more lapping members, the one or more lapping members comprise a plurality of lapping units, the plurality of pre-compressed springs contact or approach each other, middle parts of the plurality of pre-compressed springs are disposed with one or more connecting members, the plurality of pre-compressed springs are connected to the one or more lapping units through the one or more connecting members, and the one or more lapping members enable the plurality of pre-compressed springs to be connected in series to form rows and connect the plurality of pre-compressed springs in two adjacent ones of the rows together.

[0007] In some embodiments, a plurality of lapping units are integrally formed into the one or more lapping members, or the plurality of lapping units are spliced together to form the one or more lapping members.

[0008] In some embodiments, the one or more connecting members comprise first connecting structures, the plurality of lapping units comprise second connecting structures, and the first connecting structures are connected to the second connecting structures to achieve a connection between the plurality of lapping units and the one or more connecting members.

[0009] In some embodiments, one or more side surfaces of each of the one or more connecting members comprise one or more buckling pins acting as the first connecting structures, and one or more position-buckled members configured to limit a position of the one or more buckling pins are

respectively disposed on two side surfaces of each of the plurality of lapping units acting as the second connecting structures.
[0010] In some embodiments, the one or more buckling pins comprise one or more connecting arms and one or more position-buckled portions, the one or more connecting arms are fixedly connected to the one or more connecting members, and one or more widths of the one or more connecting arms are smaller than one or more widths of the one or more position-buckled portions to enable the one or more buckling pins to form one or more T-shaped buckling pins.
[0011] In some embodiments, the one or more position-buckled members comprise one or more position-buckled notches into which the one or more T-shaped buckling pins are inserted, position-limited portions configured to limit a position of the one or more position-buckled portions in a horizontal direction and formed by extending inward in opposite directions from two sides of the one or more position-buckled members in a direction facing away from the plurality of lapping units and one or more position-buckled structures configured to limit a position of the one or more T-shaped buckling pins in a vertical direction.
[0012] In some embodiments, the one or more position-buckled structures are disposed on at least one side of the position-limited portions and limit a position of the one or more connecting arms of the one or more T-shaped buckling pins.
[0013] In some embodiments, the one or more position-buckled structures are disposed in the one or more position-buckled notches and limit a position of the one or more position-buckled portions of the one or more T-shaped buckling pins.
[0014] In some embodiments, the one or more position-buckled members further comprise one or more releasing members for releasing from limiting a position of the one or more buckling pins.
[0015] In some embodiments, the one or more position-buckled structures have elasticity, the one or more releasing members are connected to the one or more position-buckled structures, and the one or more releasing members push and pull the one or more position-buckled structures to limit a position of the one or more buckling pins and release the one or more buckling pins.
[0016] In some embodiments, cantilevered arms are respectively disposed on two sides of the one or more buckling pins, the cantilevered arms are divided into first parts extending upward in a vertical direction and second parts extending outward in a horizontal direction, the first parts comprise second position-buckled structures extending outward in the horizontal direction, and the second position-buckled structures and the second parts form buckling grooves.
[0017] In some embodiments, the one or more position-buckled members are one or more insertion grooves into which the one or more buckling pins are inserted, two side surfaces of the one or more insertion grooves are inwardly hollowed out in the horizontal direction to form position-limited portions on two sides of upper portions of the one or more insertion grooves, and the buckling grooves and the position-limited portions achieve a position-limited cooperation in the vertical direction after the one or more buckling pins are inserted into the one or more insertion grooves.
[0018] In some embodiments, the one or more buckling pins further comprise a releasing member for releasing from limiting a position of the one or more buckling pins.
[0019] In some embodiments, the releasing member is connected to the cantilevered arms, and the releasing member pushes and pulls the cantilevered arms to drive the second position-buckled structures to be buckled to or be separated from the position-limited portions to limit a position of the one or more buckling pins and release the one or more buckling pins using the one or more position-buckled members.
[0020] In some embodiments, side surfaces of the one or more connecting members comprise one or more first connecting structures and one or more third connecting structures, the one or more first connecting structures are different from the one or more third connecting structures, the plurality of lapping units comprise one or more second connecting structures, the one or more first connecting structures are connected to the one or more second connecting structures to enable the plurality of pre-compressed springs connected in series to form in a front row, and the one or more

first connecting structures on the plurality of pre-compressed springs in a rear row and the one or more third connecting structures on the plurality of pre-compressed springs which have been connected in series to form the front row are connected together to achieve a connection of the plurality of pre-compressed springs in the front row and the rear row.

[0021] In some embodiments, two side surfaces of the one or more connecting members extend outward to form one or more first extended portions and one or more second extended portions, the one or more first extended portions on a first side surface of the two side surfaces comprise one or more rotatable protrusions configured to rotate about the one or more first extended portions as the one or more first connecting structures, and the one or more second extended portions on a second side surface of the two side surfaces comprise one or more recessed holes configured to enable the one or more rotatable protrusions to pass through as the one or more third connecting structures.

[0022] In some embodiments, the plurality of lapping units comprise one or more connecting holes acting as the one or more second connecting structures, the one or more rotatable protrusions extend into the one or more connecting holes and rotate to be misaligned with the one or more connecting holes to connect the plurality of pre-compressed springs connected in series to form the front row, and the one or more rotatable protrusions of the plurality of pre-compressed springs in the rear row extend into the one or more recessed holes of the plurality of pre-compressed springs connected in series to form the front row and rotate be misaligned with the one or more recessed holes to connect the plurality of pre-compressed springs in the front row and the rear row together.

[0023] In some embodiments, first ends of the plurality of lapping units comprise insertion members, second ends of the plurality of lapping units comprise insertion sockets, and one of the insertion members on one of the plurality of lapping units is inserted into one of the insertion sockets of another one of the plurality of lapping units to be spliced to form a corresponding one of the one or more lapping members.

[0024] In some embodiments, elastic position-limited members are disposed on surfaces of the insertion members, the elastic position-limited members comprise downwardly-inclined planes along an insertion direction of the insertion members, and a position-limited cooperation of the insertion sockets and the elastic position-limited members achieves a spliced connection of the plurality of lapping units.

[0025] In some embodiments, the insertion members rotate around the insertion sockets to enable the elastic module to be folded and raised.

[0026] In order to solve the aforementioned technical problems, the present disclosure further provides an elastic mattress, the elastic mattress comprises the elastic module in the aforementioned embodiments.

[0027] In order to solve the aforementioned technical problems, the present disclosure further provides a method for applying the elastic mattress, the method comprises assembling the elastic mattress according to claim **21** in bed mattresses, sofas, or upholstered stools.

[0028] Compared with the existing techniques, the technical solution has the following advantages.

[0029] 1. In the elastic module provided by the present disclosure, the connecting members are disposed on in the middle parts of the plurality of pre-compressed springs, and adjacent ones of the plurality of pre-compressed springs are connected using a cooperation of the one or more lapping members and the connecting members. Upper ends of the plurality of pre-compressed springs are independently subjected to stress, and the elastic module can adjust a stress scope according to a posture of a human body while being dense and compact as a whole and resist to stress. The elastic module more conforms to ergonomics and is softer and more comfort when being used in the elastic mattress.

[0030] 2. In the elastic module provided by the present disclosure, the one or more releasing members are disposed on the connecting members or the one or more lapping members to release a connection of the connecting members and the one or more lapping members, so that the plurality

of pre-compressed springs after assembly can be disassembled to facilitate the user transporting and storing the elastic mattress or replacing worn ones of the plurality of pre-compressed springs.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] FIG. **1** illustrates a diagrammatic view of a pre-compressed spring in Embodiment 1;
[0032] FIG. **2** illustrates a side view of the pre-compressed spring in Embodiment 1;
[0033] FIG. **3** illustrates a diagrammatic view of a buckling pin in Embodiment 1;
[0034] FIG. **4** illustrates a diagrammatic view of a lapping member in Embodiment 1;
[0035] FIG. **5** illustrates a diagrammatic view of lapping units in Embodiment 1 in a disassembled state;
[0036] FIG. **6** illustrates a diagrammatic view of a lapping unit in Embodiment 1;
[0037] FIG. **7** illustrates a side view of the lapping unit in Embodiment 1;
[0038] FIG. **8** illustrates a diagrammatic view of a position-buckled member of the lapping unit in Embodiment 1;
[0039] FIG. **9** illustrates a sectional view of a connection of the lapping unit and a connecting member in Embodiment 1;
[0040] FIG. **10** illustrates a diagrammatic view of a connection of the pre-compressed spring and the lapping member in Embodiment 1;
[0041] FIG. **11** illustrates a diagrammatic view of pre-compressed springs that are connected in series to form a row in Embodiment 1;
[0042] FIG. **12** illustrates a diagrammatic view of a connection of the pre-compressed springs in two adjacent rows in Embodiment 1;
[0043] FIG. **13** illustrates a diagrammatic view of the connection using a second method in Embodiment 1;
[0044] FIG. **14** illustrates a diagrammatic view of an elastic module in Embodiment 1;
[0045] FIG. **15** illustrates a diagrammatic view of a pre-compressed spring in Embodiment 2;
[0046] FIG. **16** illustrates a diagrammatic view of a buckling pin in Embodiment 2;
[0047] FIG. **17** illustrates a diagrammatic view of a lapping member in Embodiment 2;
[0048] FIG. **18** illustrates a side view of the lapping member in Embodiment 2;
[0049] FIG. **19** illustrates a diagrammatic view of a lapping unit in Embodiment 2;
[0050] FIG. **20** illustrates a sectional view of a connection of the lapping unit and a connecting member in Embodiment 2;
[0051] FIG. **21** illustrates a diagrammatic view of an assembly of the pre-compressed spring in Embodiment 2;
[0052] FIG. **22** illustrates a diagrammatic view of a connection of the pre-compressed spring and the lapping member in Embodiment 2;
[0053] FIG. **23** illustrates a diagrammatic view of pre-compressed springs that are connected in series to form a row in Embodiment 2;
[0054] FIG. **24** illustrates a diagrammatic view of a connection of the pre-compressed springs in two adjacent rows in Embodiment 2;
[0055] FIG. **25** illustrates a diagrammatic view of an elastic module in Embodiment 2;
[0056] FIG. **26** illustrates a diagrammatic view of a pre-compressed spring in Embodiment 3;
[0057] FIG. **27** illustrates a diagrammatic view of a buckling pin in Embodiment 3;
[0058] FIG. **28** illustrates a diagrammatic view of a connection of the pre-compressed spring and a lapping member in Embodiment 3;
[0059] FIG. **29** illustrates a diagrammatic view of a lapping unit in Embodiment 3;
[0060] FIG. **30** illustrates a sectional view of a connection of the lapping unit and a connecting

member in Embodiment 3;
[0061] FIG. **31** illustrates a diagrammatic view of pre-compressed springs that are connected in series to form a row in Embodiment 3;
[0062] FIG. **32** illustrates a diagrammatic view of a connection of the pre-compressed springs in two adjacent rows in Embodiment 3;
[0063] FIG. **33** illustrates a diagrammatic view of an elastic module in Embodiment 3;
[0064] FIG. **34** illustrates a diagrammatic view of a pre-compressed spring in Embodiment 4;
[0065] FIG. **35** illustrates a diagrammatic view of a lapping member in Embodiment 4;
[0066] FIG. **36** illustrates a diagrammatic view of a rotatable protrusion extending into a connecting hole in Embodiment 4;
[0067] FIG. **37** illustrates a diagrammatic view of a connection of the pre-compressed spring and the lapping member in Embodiment 4;
[0068] FIG. **38** illustrates a diagrammatic view of a connection of the pre-compressed springs in two adjacent rows in Embodiment 4;
[0069] FIG. **39** illustrates a sectional view of a connection position of the pre-compressed springs in the two adjacent rows in Embodiment 4; and
[0070] FIG. **40** illustrates a diagrammatic view of an elastic module in Embodiment 4.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0071] The technical solutions in the embodiments of the present disclosure will be clearly and completely described below with reference to the accompanying drawings in the embodiments of the present disclosure. It is evident that the described embodiments are merely preferred embodiments of the present disclosure and should not be regarded as exclusive of other embodiments. All other embodiments fall within the protection scope of the present disclosure provided that they are obtained based on the embodiments of the present disclosure by those of ordinary skill in the art without creative efforts.
[0072] In the claims, the specification, and the drawings of the present disclosure, unless otherwise specified, it should be noted that the terms, such as “height”, “upper end”, “top”, “bottom”, “inner”, “outer”, “upper”, “lower”, “front”, and “rear”, indicate the orientation or the positional relationship based on the orientation or the positional relationship shown in the drawings and are only used to easily describe the present disclosure and simplify the description, rather than indicating or implying that the referenced device or element should have a specified orientation or be constructed and be operated in the specified orientation, so that it should not be understood as a limitation of the specific protection scope of the present disclosure.

Embodiment 1

[0073] Referring to FIGS. **1**-**14**, this embodiment provides an elastic module, and the elastic module comprises a plurality of pre-compressed springs **1**. The plurality of pre-compressed springs **1** are waist-shrinking springs with two ends larger than middle parts. Outer sides of springs are wrapped with fabric sleeves (i.e., the springs in the fabric sleeves are pre-compressed by the fabric sleeves to form the plurality of pre-compressed springs **1**). One of connecting members **2** is sleeved on an outer side of a corresponding one of the fabric sleeves wrapped on the middle parts of the plurality of pre-compressed springs **1**. The elastic module further comprises one or more lapping members **3**. The one or more lapping members **3** are formed by a front-and-rear spliced connection of a plurality of lapping units **31**. The plurality of pre-compressed springs **1** contact or approach. The connecting members **2** on the plurality of pre-compressed springs **1** and the plurality of lapping units **31** of the one or more lapping members **3** are connected each other. Each of the plurality of lapping units **31** on the one or more lapping members **3** is connected to a corresponding one of the plurality of pre-compressed springs **1**. The one or more lapping members **3** connect the plurality of pre-compressed springs **1** in series to form rows and are connected to two adjacent ones of the rows of the plurality of pre-compressed springs **1**.
[0074] Specifically, in this embodiment, two opposite side surfaces of each of the connecting

members **2** are respectively disposed with one of buckling pins **21** acting as a first connecting structure. The buckling pins **21** comprise connecting arms **211** and position-buckled portions **212**. The connecting arms **211** are fixedly connected to the two opposite side surfaces of a corresponding one of the connecting members **2** to enable the buckling pins **21** to be fixedly connected to the corresponding one of the connecting members **2**. Widths of the connecting arms **211** are smaller than widths of the position-buckled portions **212**, so that the buckling pins **21** define T-shaped buckling pins **21**.

[0075] The plurality of lapping units **31** define elongated shapes, and position-buckled members **310** configured to limit positions of the T-shaped buckling pins **21** and acting as a second connecting structure are respectively disposed on two side surfaces a corresponding one of the plurality of lapping units **31** with the elongated shapes. The position-buckled members **310** are fixedly connected to the two side surfaces of the corresponding one of the plurality of lapping units **31**. Each of the position-buckled members **310** comprises a position-buckled notch **3101** into which a corresponding one of the T-shaped buckling pins **21** is inserted, position-limited portions **3102** configured to limit a position of a corresponding one of the position-buckled portions **212** in a horizontal direction and formed by extending inward in opposite directions from two sides of a side surface of each of the position-buckled members **310** in a direction facing away from the corresponding one of the plurality of lapping units **31**, and a position-buckled structure **3103** disposed on one of the position-limited portions **3102** on a right side. The position-buckled structure **3103** is configured to limit a position of a corresponding one of the T-shaped buckling pins **21** disposed in the position-buckled notch **3101** in a vertical direction. As a simple alternative to this embodiment, the position-buckled structure **3103** can also be disposed on one of the position-limited portions **3102** on a left side, or the position-buckled structure **3103** can be disposed on each of the position-limited portions **3102** on two sides.

[0076] The position-buckled structure **3103** has elasticity. Each of the position-buckled members **310** further comprises a releasing member **3104** configured to release from limiting a position of a corresponding one of the T-shaped buckling pins **21**. The releasing member **3104** is connected to the position-buckled structure **3103** through a cantilevered arm. The releasing member **3104** pushes and pulls the position-limited portions **3102** to drive the position-buckled structure **3103** to be buckled to or be separated from a corresponding one of the connecting arms **211** of the T-shaped buckling pins **21**, thus limiting the position of the corresponding one of the T-shaped buckling pins **21** and releasing the corresponding one of the T-shaped buckling pins **21**.

[0077] When the plurality of pre-compressed springs **1** are connected, the releasing member **3104** is pressed to pull the one of the position-limited portions **3102** on the right side to enable the position-limited portions **3102** on the two sides to form a space configured to receive the corresponding one of the connecting arms **211** of the T-shaped buckling pins **21**. At this time, each of the T-shaped buckling pins **21** on each of the connecting members **2** of the plurality of pre-compressed springs **1** and acting as the first connecting structure is inserted into the position-buckled notch **3101** on the corresponding one of the position-buckled members **310** of the plurality of lapping units **31** and acting as the second connecting structure from an upper side. After insertion, a position of each of the position-buckled portions **212** is limited by the position-limited portions **3102** in the horizontal direction, and each of the connecting arms **211** is disposed between the position-limited portions **3102** on the two sides. The releasing member **3104** is released to allow the position-buckled structure **3103** to limit a position of a corresponding one of the connecting arms **211** in the vertical direction, so that each of the T-shaped buckling pins **21** and a corresponding one of the position-buckled members **310** form a position-limited cooperation to achieve a connection between the corresponding one of the plurality of lapping units **31** and the corresponding one of the connecting members **2**.

[0078] Similarly, each of the T-shaped buckling pins **21** of each of the connecting members of the plurality of pre-compressed springs **1** is inserted into a corresponding one of the position-buckled

members **310** on the two sides of a corresponding one of the plurality of lapping units **31** of the one or more lapping members **3**. The one or more lapping members **3** comprise the plurality of lapping units **31**. The plurality of lapping units **31** enable the plurality of pre-compressed springs **1** to be connected to the one or more lapping members **3** synchronously to connect the plurality of pre-compressed springs **1** in series to form the rows. At the same time, as the position-buckled members **310** are disposed on the two sides of the corresponding one of the plurality of lapping units **31**, each of the position-buckled members **310** on the two sides of the corresponding one of the plurality of lapping units **31** is connected to a corresponding one of the T-shaped buckling pins **21** of a corresponding one of the connecting members of the plurality of pre-compressed springs **1** to connect the plurality of pre-compressed springs **1** in the two adjacent ones of the rows together.

[0079] In this embodiment, the one or more lapping members **3** are formed by the front-and-rear spliced connection of the plurality of lapping units **31**. A front end of each of the plurality of lapping units **31** comprises an insertion member **311**, and a rear end of each of the plurality of lapping units **31** comprises an insertion socket **312**. The insertion member **311** of the front end of a rear one of the plurality of lapping units **31** is inserted into the insertion socket **312** of the rear end of a front one of the plurality of lapping units **31** to realize a spliced connection of two adjacent lapping units **31** of the plurality of lapping units **31**.

[0080] More specifically, a thickness of the insertion member **311** of the front end of each of the plurality of lapping units **31** is slightly thinner than a thickness of each of the plurality of lapping units **31**. An elastic position-limited member **3111** is disposed on a side surface of the insertion member **311**, and the elastic position-limited member **3111** has elasticity and can be pressed from a first position protruding from the side surface of the insertion member **311** to a second position aligned with the side surface of the insertion member **311**. A front half of the elastic position-limited member **3111** defines a downwardly-inclined plane along a direction in which the insertion member **311** is inserted into the insertion socket **312**. A thickness of the insertion socket **312** of the rear end of each of the plurality of lapping units **31** is slightly thicker than the thickness of each of the plurality of lapping units **31**. A middle of the insertion socket **312** in a thickness direction comprises an insertion groove **3121** into which the insertion member **311** is inserted. A thickness of the insertion groove **3121** is greater than the thickness of the insertion member **311** and smaller than a total thickness of the insertion member **311** and the elastic position-limited member **3111**. An inner side of the insertion groove **3121** comprises a position-limited structure configured to limit a position of the elastic position-limited member **3111**, and the position-limited structure can be a space on an inner wall of the insertion groove **3121** configured for popping out the elastic position-limited member **3111**.

[0081] When the one or more lapping members **3** are formed by the front-and-rear spliced connection of the plurality of lapping units **31**, the insertion member **311** of the front end of the rear one of the plurality of lapping units **31** is inserted into the insertion groove **3121** of the insertion socket **312** of the rear end of the front one of the plurality of lapping units **31**. During an inserting process, the elastic position-limited member **3111** is pressed by the inner wall of the insertion groove **3121** to be gradually aligned with the side surface of the insertion member **311** so as to be inserted into the insertion groove **3121**. When the insertion member **311** is inserted into the insertion groove **3121** until the elastic position-limited member **3111** pops out and is limited by the inner wall of the insertion groove **3121**, a connection between the front one and the rear one of the plurality of lapping units **31** is achieved. In order to adapt to various application scenarios, such as hospital beds, where a bed head needs to be raised, as a simple alternative to this embodiment, the insertion member **311** can rotate around the insertion socket **312**, so that the elastic module can be folded and raised.

[0082] A number of the plurality of lapping units **31** of the one or more lapping members **3** can be adjusted according to a size of the elastic module. In this embodiment, the plurality of lapping units **31** comprise twenty lapping units **31** having the front-and-rear spliced connection according to the

aforementioned method. The plurality of pre-compressed springs **1** are then respectively connected to two side surfaces of the twenty lapping units **31** to connect twenty pre-compressed springs **1** of the plurality of pre-compressed springs **1** together in series to form a row and connected to the plurality of pre-compressed springs **1** in two adjacent rows synchronously. Similarly, ten rows of the twenty of the plurality of pre-compressed springs **1** are connected together to form the elastic module. The plurality of pre-compressed springs **1** are connected to the plurality of lapping units **31**, and the plurality of lapping units **31** are then spliced together to form the elastic module using the second method (shown in FIG. **13**). A spliced sequence of the plurality of pre-compressed springs **1** and the plurality of lapping units **31** to form the elastic module is not limited to what is described herein, as long as a purpose of the present disclosure can be achieved.

[0083] The formed elastic module is dense, compact, and resistant to stress, and at the same time, a stress scope applied to the plurality of pre-compressed springs **1** can be adjusted according to a posture of a human body. The elastic module of this embodiment is softer and more comfortable when being used for bed mattresses, sofas, upholstered stools, or other furniture.

Embodiment 2

[0084] Referring to FIGS. **15-25**, the plurality of pre-compressed springs **1** of this embodiment are the same as that of Embodiment 1. This embodiment mainly differs from Embodiment 1 in that two opposite sides of each of the connecting members **2** comprise T-shaped buckling pins **22** (i.e., buckling pins **22**). Position-buckled portions **222** of the T-shaped buckling pins **22** are slightly lower than connecting arms **221** in the vertical direction.

[0085] Two sides of each of a plurality of lapping units **32** each comprises a position-buckled member **320**. A position-buckled structure **3203** of the position-buckled member **320** is independently disposed in a part of a position-buckled notch **3201** into which a corresponding one of the position-buckled portions **222** is inserted. That is, the position-buckled structure **3203** is disposed on an inner side of a right one of position-limited portions **3202**. When each of the T-shaped buckling pins **22** is inserted into the position-buckled notch **3201** of the position-buckled member **320**, the position-buckled structure **3203** limits a position of the corresponding one of the position-buckled portions **222** of the T-shaped buckling pins **22** in the vertical direction to limit positions of the T-shaped buckling pins **22**.

[0086] The position-buckled member **320** further comprise a releasing member **3204** configured to release from limiting a position a corresponding one of the T-shaped buckling pins **22**. The releasing member **3204** is connected to the position-buckled structure **3203** through a cantilevered arm. The releasing member **3204** pushes the position-buckled structure **3203** to be buckled to or be separated from the corresponding one of the position-buckled portions **222** of the T-shaped buckling pins **22** to limit the position of the T-shaped buckling pins **22** and release the T-shaped buckling pins **22**.

[0087] When the plurality of pre-compressed springs **1** are connected, the releasing member **3204** is pressed to pull the position-buckled structure **3203** apart to enable the position-buckled notch **3201** on the inner sides of the position-limited portions **3202** to form a space into which the corresponding one of the position-buckled portions **222** of the T-shaped buckling pins **22** is inserted. At this time, each of the T-shaped buckling pins **22** on a corresponding one of the connecting members **2** of a corresponding one of the plurality of pre-compressed springs **1** acting as a first connecting structure is inserted into the position-buckled notch **3201** on the position-buckled member **320** of the plurality of lapping units **32** acting as a second connecting structure from an upper side. After insertion, a position of the corresponding one of the position-buckled portions **222** is limited by the position-limited portions **3202** in a horizontal direction, and each of the connecting arms **221** is disposed between the position-limited portions **3202** on the two sides. The releasing member **3204** is released to enable the position-buckled structure **3203** to limit a position of the corresponding one of the position-buckled portions **222** disposed in the position-buckled notch **3201** in the vertical direction, so that each of the T-shaped buckling pins **22** and the

position-buckled member **320** form a position-limited cooperation to achieve a connection of the corresponding one of the plurality of lapping units **32** and the corresponding one of the connecting members **2**.

[0088] In this embodiment, each of the lapping members **3** is integrally formed by four lapping units **32** of the plurality of lapping units **32**. A frontmost end of each of the lapping members **3** formed by the four lapping units **32** comprises an insertion member **321**, and a rearmost end of each of the lapping members **3** comprises an insertion socket **322**. The insertion member **321** of one of the lapping member **3** is inserted into the insertion socket **322** of another one of the lapping members **3** to form a lengthened lapping member so as to adjust a length of the lengthened lapping member **3**. The lapping members **3** can be connected to form the lengthened lapping member by splicing according to a size of the elastic module.

[0089] More specifically, a thickness of the insertion member **321** is slightly thinner than a thickness of each of the lapping members **3**. An elastic position-limited member **3211** is disposed on a side surface of the insertion member **321**, and the elastic position-limited member **3211** has elasticity and can be pressed from a first position protruding from the side surface of the insertion member **321** to a second position aligned with the side surface of the insertion member **321**. A front half of the elastic position-limited member **3211** defines a downwardly-inclined plane along a direction in which the insertion member **321** is inserted into the insertion socket **322**. A thickness of the insertion socket **322** is slightly thicker than the thickness of each of the lapping members **3**. A middle of the insertion socket **322** in a thickness direction comprises an insertion groove **3221** into which the insertion member **321** is inserted. A thickness of the insertion groove **3221** is greater than the thickness of the insertion member **321** and smaller than a total thickness of the insertion member **321** and the elastic position-limited member **3211**. An inner side of the insertion groove **3221** comprises a position-limited structure configured to limit a position of the elastic position-limited member **3211**, and the third position-limited structure can be a space on an inner wall of the insertion groove **3221** configured for popping out the elastic position-limited member **3211**.

[0090] In this embodiment, when the lapping members **3** are lengthened, the insertion member **321** of a front end of one of the lapping members **3** is inserted into the insertion groove **3221** of the insertion socket **322** of a rear end of another one of the lapping members **3**. During an inserting process, the elastic position-limited member **3211** is pressed by the inner wall of the insertion groove **3221** to be gradually aligned with the side surface of the insertion member **321** so as to be inserted into the insertion groove **3221**. When the insertion member **321** is inserted into the insertion groove **3221** until the elastic position-limited member **3211** pops out and is limited by the inner wall of the insertion groove **3221**, a connection between two of the lapping members **3** is achieved. Thereby, the lapping members **3** can be connected to form the lengthened lapping member having the eight lapping units **32** of the plurality of lapping units **32**.

[0091] The plurality of pre-compressed springs **1** are respectively connected to two sides of the eight lapping units **32** to connect eight of the plurality of pre-compressed springs **1** together in series to form a row and connected to the plurality of pre-compressed springs **1** in two adjacent rows synchronously. Similarly, twenty rows of the eight of plurality of pre-compressed springs **1** are connected together to form the elastic module. The rest of Embodiment **2** is the same as Embodiment **1** and will not be described herein.

Embodiment 3

[0092] Referring to FIGS. **26-33**, the plurality of pre-compressed springs **1** of this embodiment are the same as that of Embodiment 1. This embodiment mainly differs from Embodiment 1 in that two opposite sides of each of the connecting members **2** each comprises a buckling pin **23**. Two cantilevered arms **230** are respectively disposed on two sides of the buckling pin **23**. Each of the two cantilevered arms **230** is divided into a first part **2301** extending upward in a vertical direction and a second part **2302** extending outward in a horizontal direction. The first part **2301** comprise a second position-buckled structure **2303** extending outward in the horizontal direction, and the

second position-buckled structure **2303** and the second part **2302** form a buckling groove **2304**.
[0093] Two side surfaces of each of a plurality of lapping units **33** each comprises an insertion groove **330** acting as a position-buckled member. Two sides of the insertion groove **330** are inwardly hollowed out in the horizontal direction to enable two sides of an upper portion of the insertion groove **330** to form a position-limited portion **3301**. After the buckling pin **23** is inserted into the insertion groove **330**, the buckling groove **2304** and the position-limited portion **3301** form a position-limited cooperation in the vertical direction to limit positions of the buckling pin **23** and the insertion groove **330**.
[0094] In this embodiment, the buckling pin **23** further comprises releasing members **231** configured to release from limiting the positions of the buckling pin **23** and the insertion groove **330**. The two cantilevered arms **230** are respectively connected to two of the releasing members **231**. The releasing members **231** push and pull the two cantilevered arms **230** to drive the second position-buckled structure **2303** to be buckled to or to be separated from the position-limited portion **3301** to limit a position of the buckling pin **23** using the insertion groove **330** as the position-buckled member and release the buckling pin **23**.
[0095] When the plurality of pre-compressed springs **1** are connected, the releasing members **231** on two sides of the buckling pin **23** are pressed inward. The buckling pin **23** is then inserted into the insertion groove **330** from an upper side, and the releasing members **231** are released. At this time, the position-limited portion **3301** is buckled to the buckling groove **2304**. A position of the buckling pin **23** is limited by the insertion groove **330** in the horizontal direction after being inserted into the insertion groove **330**. At the same time, the second position-buckled structure **2303** is buckled to a lower end of the position-limited portion **3301**, and the second part **2302** is buckled to an upper end of the position-limited portion **3301** to limit a position of the buckling pin **23** in the vertical direction, thereby achieving the connection of the connecting members **2** and the one or more lapping members **3**.
[0096] When the plurality of pre-compressed springs **1** are disassembled, the releasing members **231** on the two sides of the buckling pin **23** are pressed inward to drive the second position-buckled structure **2303** to be separated from the position-limited portion **3301**, and the buckling pin **23** is then pulled upward from the insertion groove **330** to release the connection of the connecting members **2** and the one or more lapping members **3**.
[0097] In this embodiment, five of the plurality of lapping units **33** are integrally formed into a corresponding one of the one or more lapping members **3**. The plurality of pre-compressed springs **1** are respectively connected to two sides of the five of the plurality of lapping units **33**. The five of the plurality of pre-compressed springs **1** are connected in series to form a row and are connected to the plurality of pre-compressed springs **1** in two adjacent rows. Similarly, ten rows of the five of the plurality of pre-compressed springs **1** are connected each other through the one or more lapping members **3** to form the elastic module. The rest of Embodiment 3 is the same as Embodiment 1 and will not be described herein.

Embodiment 4

[0098] Referring to FIGS. **34**-**40**, the plurality of pre-compressed springs **1** of this embodiment are the same as that of Embodiment 1. This embodiment differs from Embodiment 1 in that a first connecting structure and a third connecting structure are respectively disposed on two opposite sides of each of the connecting members **2**, and the first connecting structure is different from the third connecting structure.
[0099] Specifically, a first extended portion **24** and a second extended portion **25** respectively extend outward from the two opposite sides of each of the connecting members **2**. The first extended portion **24** on one side comprises a rotatable protrusion **241** configured to rotate about the first extended portion **24** and acting as a first connecting structure. The second extended portion **25** on another side comprises a recessed hole **251** into which the rotatable protrusion **241** can extend and acts as a third connecting structure.

[0100] In this embodiment, each of one or more lapping members **3** is integrally formed by sixteen of a plurality of lapping units **34**. Each of the plurality of lapping units **34** comprises a connecting hole **341** into which the rotatable protrusion **241** can extend and acts as a second connecting structure.

[0101] When the plurality of pre-compressed springs **1** are connected, the rotatable protrusion **241** on one of the connecting members **2** extends into the connecting hole **341** on a corresponding one of the plurality of lapping units **34**. At this time, positions of the rotatable protrusion **241** and the connecting hole **341** are limited in a horizontal direction, and the rotatable protrusion **241** rotates to be misaligned with the connecting hole **341**. At this time, positions of the rotatable protrusion **241** and the connecting hole **341** are limited in a vertical direction to achieve a connection and the plurality of lapping units **34** and the connecting members **2**. The plurality of pre-compressed springs **1** are respectively connected to the sixteen of the plurality of lapping units **34** of a corresponding one of the one or more lapping members **3**, so that the plurality of pre-compressed springs **1** are connected in series to form rows.

[0102] When the plurality of pre-compressed springs **1** in two adjacent rows are connected, the rotatable protrusion **241** of each of the plurality of pre-compressed springs **1** in a rear row of the two adjacent rows is inserted into the recessed hole **251** of each of the plurality of pre-compressed springs **1** in a front row of the two adjacent rows that have been connected in series and the connecting hole **341** of each of the plurality of lapping units **34** of a corresponding one of the one or more lapping members **3**, and the rotatable protrusion **241** then rotates to be misaligned with the recessed hole **251** and the connecting hole **341**. At this time, a connection of the plurality of pre-compressed springs **1** in rear and front rows is achieved by a position-limited cooperation of the rotatable protrusion **241**, the recessed hole **251**, and the connecting hole **341**. As a simple alternative of this embodiment, the plurality of pre-compressed springs **1** forming the rows by connecting in series through the one or more lapping members **3** and in the front and rear rows can be connected by directly extending the rotatable protrusion **241** of each of the plurality of pre-compressed springs **1** in the rear row into the recessed hole **251** of each of the plurality of pre-compressed springs **1** in the front row, and the rotatable protrusion **241** rotates to be misaligned with the recessed hole **251** to limit a position of the rotatable protrusion **241** for the connection.

[0103] When the plurality of pre-compressed springs **1** are disassembled, the rotatable protrusion **241** rotates to be aligned with the recessed hole **251** and the connecting hole **341**, and the rotatable protrusion **241** can be taken out from a lower side.

[0104] In this embodiment, the sixteen of the plurality of lapping units **34** are integrally formed into a corresponding one of the one or more lapping members **3**. The plurality of pre-compressed springs **1** are respectively connected to the sixteen of the plurality of lapping units **34**, so that sixteen of the plurality of pre-compressed springs **1** are connected in series to form one or the rows. The rotatable protrusion **241** then extends into the recessed hole **251** and the connecting hole **341** of a corresponding one of the one or more lapping members according to the aforementioned connection method. The rotatable protrusion **241** rotates to be misaligned with the recessed hole **251** and the connecting hole **341** to connect the plurality of pre-compressed springs **1** in the two adjacent rows. Similarly, seven rows of the sixteen of the plurality of pre-compressed springs **1** are connected to each other through the one or more lapping members **3** to form the elastic module. The rest of Embodiment 4 is the same as Embodiment 1 and will not be described herein.

[0105] A number of the plurality of lapping units of the one or more lapping members **3**, a number of the plurality of pre-compressed springs **1** connected in series to form the rows, a number of the rows of the plurality of pre-compressed springs **1**, a connection sequence of the one or more lapping members **3** and the plurality of pre-compressed springs **1**, and the like can be adjusted according to a size of the elastic module or requirements of the user and the disclosure is not limited to what is mentioned in Embodiments 1-4.

[0106] The aforementioned description of the specification and the embodiments is used to explain

the protection scope of the present disclosure and is not a limitation of the protection scope of the present disclosure. Modifications, equivalent substitutions, or other improvements of the embodiments of the present disclosure or some of the technical features thereof fall into the protection scope of the present disclosure provided that they are obtained through logical analysis, reasoning, or limited experimentation by combining at least one of common knowledge, ordinary technical knowledge in the art, or the existing techniques through a revelation of the present disclosure or the embodiments by a person of ordinary skill in the art.

Claims

1. An elastic module, comprising: a plurality of pre-compressed springs, and one or more lapping members, wherein: the plurality of pre-compressed springs contact or approach each other, middle parts of the plurality of pre-compressed springs are disposed with one or more connecting members, the plurality of pre-compressed springs are connected to the one or more lapping members through the one or more connecting members, and the one or more lapping members enable the plurality of pre-compressed springs to be connected in series to form rows and connect the plurality of pre-compressed springs in two adjacent ones of the rows together.
2. The elastic module according to claim 1, wherein: a plurality of lapping units are integrally formed into the one or more lapping members, or the plurality of lapping units are spliced together to form the one or more lapping members.
3. The elastic module according to claim 2, wherein: the one or more connecting members comprise first connecting structures, the plurality of lapping units comprise second connecting structures, and the first connecting structures are connected to the second connecting structures to achieve a connection between the plurality of lapping units and the one or more connecting members.
4. The elastic module according to claim 3, wherein: one or more side surfaces of each of the one or more connecting members comprise one or more buckling pins acting as the first connecting structures, and one or more position-buckled members configured to limit a position of the one or more buckling pins are respectively disposed on two side surfaces of each of the plurality of lapping units acting as the second connecting structures.
5. The elastic module according to claim 4, wherein: the one or more buckling pins comprise one or more connecting arms and one or more position-buckled portions, the one or more connecting arms are fixedly connected to the one or more connecting members, and one or more widths of the one or more connecting arms are smaller than one or more widths of the one or more position-buckled portions to enable the one or more buckling pins to form one or more T-shaped buckling pins.
6. The elastic module according to claim 5, wherein: the one or more position-buckled members comprise: one or more position-buckled notches into which the one or more T-shaped buckling pins are inserted, position-limited portions configured to limit a position of the one or more position-buckled portions in a horizontal direction and formed by extending inward in opposite directions from two sides of the one or more position-buckled members in a direction facing away from the plurality of lapping units, and one or more position-buckled structures configured to limit a position of the one or more T-shaped buckling pins in a vertical direction.
7. The elastic module according to claim 6, wherein: the one or more position-buckled structures are disposed on at least one side of the position-limited portions and limit a position of the one or more connecting arms of the one or more T-shaped buckling pins, or the one or more position-buckled structures are disposed in the one or more position-buckled notches and limit a position of the one or more position-buckled portions of the one or more T-shaped buckling pins.
8. The elastic module according to claim 6, wherein: the one or more position-buckled members further comprise one or more releasing members for releasing from limiting a position of the one or

more buckling pins.

9. The elastic module according to claim 8, wherein: the one or more position-buckled structures have elasticity, the one or more releasing members are connected to the one or more position-buckled structures, and the one or more releasing members push and pull the one or more position-buckled structures to limit a position of the one or more buckling pins and release the one or more buckling pins.

10. The elastic module according to claim 4, wherein: cantilevered arms are respectively disposed on two sides of the one or more buckling pins, the cantilevered arms are divided into first parts extending upward in a vertical direction and second parts extending outward in a horizontal direction, the first parts comprise second position-buckled structures extending outward in the horizontal direction, and the second position-buckled structures and the second parts form buckling grooves.

11. The elastic module according to claim 10, wherein: the one or more position-buckled members are one or more insertion grooves into which the one or more buckling pins are inserted, two side surfaces of the one or more insertion grooves are inwardly hollowed out in the horizontal direction to form position-limited portions on two sides of upper portions of the one or more insertion grooves, and the buckling grooves and the position-limited portions achieve a position-limited cooperation in the vertical direction after the one or more buckling pins are inserted into the one or more insertion grooves.

12. The elastic module according to claim 11, wherein: the one or more buckling pins further comprise a releasing member for releasing from limiting a position of the one or more buckling pins, the releasing member is connected to the cantilevered arms, and the releasing member pushes and pulls the cantilevered arms to drive the second position-buckled structures to be buckled to or be separated from the position-limited portions to limit a position of the one or more buckling pins and release the one or more buckling pins using the one or more position-buckled members.

13. The elastic module according to claim 2, wherein: side surfaces of the one or more connecting members comprise one or more first connecting structures and one or more third connecting structures, the one or more first connecting structures are different from the one or more third connecting structures, the plurality of lapping units comprise one or more second connecting structures, the one or more first connecting structures are connected to the one or more second connecting structures to enable the plurality of pre-compressed springs connected in series to form in a front row, and the one or more first connecting structures on the plurality of pre-compressed springs in a rear row and the one or more third connecting structures on the plurality of pre-compressed springs which have been connected in series to form the front row are connected together to achieve a connection of the plurality of pre-compressed springs in the front row and the rear row.

14. The elastic module according to claim 13, wherein: two side surfaces of the one or more connecting members extend outward to form one or more first extended portions and one or more second extended portions, the one or more first extended portions on a first side surface of the two side surfaces comprise one or more rotatable protrusions configured to rotate about the one or more first extended portions as the one or more first connecting structures, and the one or more second extended portions on a second side surface of the two side surfaces comprise one or more recessed holes configured to enable the one or more rotatable protrusions to pass through as the one or more third connecting structures.

15. The elastic module according to claim 14, wherein: the plurality of lapping units comprise one or more connecting holes acting as the one or more second connecting structures, the one or more rotatable protrusions extend into the one or more connecting holes and rotate to be misaligned with the one or more connecting holes to connect the plurality of pre-compressed springs connected in series to form the front row, and the one or more rotatable protrusions of the plurality of pre-compressed springs in the rear row extend into the one or more recessed holes of the plurality of

pre-compressed springs connected in series to form the front row and rotate be misaligned with the one or more recessed holes to connect the plurality of pre-compressed springs in the front row and the rear row together.

16. The elastic module according to claim 2, wherein: first ends of the plurality of lapping units comprise insertion members, second ends of the plurality of lapping units comprise insertion sockets, and one of the insertion members on one of the plurality of lapping units is inserted into one of the insertion sockets of another one of the plurality of lapping units to be spliced to form a corresponding one of the one or more lapping members.

17. The elastic module according to claim 16, wherein: elastic position-limited members are disposed on surfaces of the insertion members, the elastic position-limited members comprise downwardly-inclined planes along an insertion direction of the insertion members, and a position-limited cooperation of the insertion sockets and the elastic position-limited members achieves a spliced connection of the plurality of lapping units.

18. The elastic module according to claim 17, wherein: the insertion members rotate around the insertion sockets to enable the elastic module to be folded and raised.

19. An elastic mattress, wherein the elastic mattress comprises the elastic module according to claim 1.

20. A method for applying the elastic mattress, comprising: assembling the elastic mattress according to claim **19** in bed mattresses, sofas, or upholstered stools.