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(54) **ELASTIC CUSHION AND ELASTIC MATTRESS**

(57) An elastic cushion (10) is provided. The elastic cushion (10) comprises at least one elastic module (2), the at least one elastic module (2) comprises multiple rows of springs (21), fixing seats (6), and one or more flexible bands (3), two adjacent rows of the multiple rows of the springs (21) are staggered, waists of the springs (21) comprise the fixing seats (6), at least two opposing sides of the fixing seats (6) comprise perforations (61), the perforations (61) in the fixing seats (6) of the two adjacent rows of the springs (21) define a substantially continuous straight line (62), the one or more flexible bands (3) pass through the perforations (61) in the substantially continuous straight line (62), and the two adjacent rows of the springs (21) are connected in series by the one or more flexible bands (3).

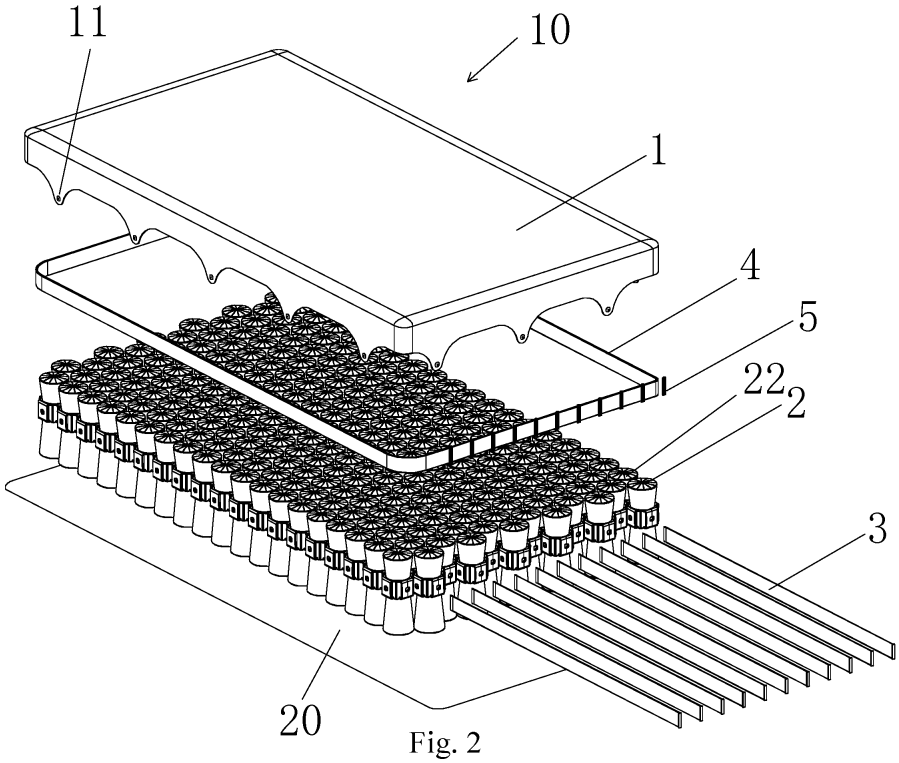


Fig. 2

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## Description

### RELATED APPLICATIONS

**[0001]** This application claims priority to Chinese patent application 202310651825.9, filed on June 2, 2023. Chinese patent application 202310651825.9 is incorporated herein by reference.

### FIELD OF THE DISCLOSURE

**[0002]** The present disclosure relates to an elastic cushion having springs, and in particular relates to an elastic cushion with a non-rigid connection between the springs.

### BACKGROUND OF THE DISCLOSURE

**[0003]** Existing elastic cushions made of springs require a plurality of the springs to achieve elastic support. Generally, upper ends of the springs are connected together, or a sponge having an appropriate thickness is laid on the upper ends of the springs, so that force is dispersed when the springs are compressed. When the plurality of the springs are compressed, the plurality of the springs are linked for support. Flexible support of a human body needs an elasticity of the springs to change according to a posture change of the human body. An elasticity of the springs, as a whole, cannot enable the human body to stretch in various postures, and different parts of the human body may require variable hardnesses. In addition, different people desire and require variable hardnesses. In existing beds having variable hardnesses, the hardness of the beds are adjustable due to various deformation degrees generated by the springs. A deformation member enables the springs to deform independently from deformation of the springs caused by the human body. That is, during initialization time, the hardness of the beds is adjustable according to wishes of the user. The hardness of the bed can also be compensated for possible changes in elastic properties of the springs in a random pattern. However, common problems of these existing beds having variable hardnesses are that the existing beds having variable hardnesses are relatively complex, heavy, and expensive to produce. These existing beds are also relatively difficult and cumbersome for use. Further, even if these existing beds provide a certain degree of adjustability, it is usually not user-friendly and leads to a lot of trouble for the producers.

### BRIEF SUMMARY OF THE DISCLOSURE

**[0004]** The present disclosure provides an elastic cushion in which the springs are relatively independently supported by each other, and the springs in different directions are differently linked.

**[0005]** A first technical solution of the present disclosure is as follows.

**[0006]** An elastic cushion comprises at least one elastic module, the at least one elastic module comprises multiple rows of springs, fixing seats, and one or more flexible bands, two adjacent rows of the multiple rows of the springs are staggered, waists of the springs comprise the fixing seats, at least two opposing sides of the fixing seats comprise perforations, the perforations in the fixing seats of the two adjacent rows of the springs define a substantially continuous straight line, the one or more flexible bands pass through the perforations in the substantially continuous straight line, ends of the one or more flexible bands comprise stoppers or buckles, two ends of the one or more flexible bands are fixed to the fixing seats of two springs at two ends of the two adjacent rows of the springs, and the two adjacent rows of the springs are connected in series by the one or more flexible bands.

**[0007]** In a preferred embodiment, the springs are wrapped by cloth sleeves, and waists of the cloth sleeves comprise the fixing seats.

**[0008]** In a preferred embodiment, the springs are waist-shaped springs.

**[0009]** In a preferred embodiment, four sides of the at least two opposing sides of the fixing seats have same structures, and the perforations of the four sides of the fixing seats comprise same structures.

**[0010]** In a preferred embodiment, the fixing seats comprises a stop structure, the stop structure cooperates with the stoppers of the one or more flexible bands to fix the one or more flexible bands, and outside of the two ends of the one or more flexible bands comprise stop positions for receiving the stoppers.

**[0011]** In a preferred embodiment, the one or more flexible bands comprise webbing or cord.

**[0012]** In a preferred embodiment, the springs wrapped by the cloth sleeves comprises independent springs pocketed in bags.

**[0013]** A second technical solution of the present disclosure is as follows.

**[0014]** An elastic cushion comprises at least one elastic module, the at least one elastic module comprises multiple rows of springs, fixing seats, and one or more flexible bands, rows of the multiple rows of the springs are respectively aligned each other, waists of the springs comprise the fixing seats, at least two opposing sides of the fixing seats comprise perforations, the fixing seats of two adjacent rows of the multiple rows of the springs are connected together, the perforations in the fixing seats of the two adjacent rows of the springs define two rows of the perforations, the one or more flexible bands pass through the two rows of the perforations, ends of the one or more flexible bands comprise stoppers or buckles, two ends of the one or more flexible bands are fixed to the fixing seats of two springs at two ends of the two adjacent rows of the springs, and the two adjacent rows of the springs are connected in series by the one or more flexible bands.

**[0015]** In a preferred embodiment, the springs are

wrapped by cloth sleeves, and waists of the cloth sleeves comprise the fixing seats.

**[0016]** A third technical solution of the present disclosure is as follows.

**[0017]** An elastic mattress, the elastic mattress comprises one or more of the elastic cushions.

**[0018]** A fourth technical solution of the present disclosure is as follows.

**[0019]** An elastic mattress, the elastic mattress comprises a plurality of the elastic cushions of claim 1 spliced together.

**[0020]** In the elastic module of the present disclosure, each of the springs is independently compressed. Therefore, elasticity of the elastic module changes according to a posture change of a human body. At the same time, the waists of the springs are connected in series, and non-compressed springs can be pulled towards compressed springs by the flexible band instead of moving away from the compressed springs, so that gaps between the springs will be avoided. A structure of the elastic module is simple, and a connection of the elastic module is easy due to a series connection.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0021]**

Fig. 1 shows a structure of an elastic cushion (i.e., a flexible cushion) of Embodiment 1 of the present disclosure;

Fig. 2 shows an exploded view of the structure of the elastic cushion of Embodiment 1 of the present disclosure;

Fig. 3A shows a structure of a stopper for a webbing in Fig. 2, and Fig. 3B shows an enlarged view of a part of the elastic cushion in which the webbing stopper is in the elastic cushion;

Fig. 4 shows a structure of a spring of Embodiment 1;

Figs. 5A, 5B, and 5C are views of a spring arrangement of part of a spring module of Embodiment 1. Fig. 5A shows a front view of the spring arrangement, Fig. 5B shows a top view of the spring arrangement, and Fig. 5C shows a perspective view of the spring arrangement;

Fig. 6 shows a structure of the spring module connected in series using the webbing of Embodiment 1.

Fig. 7 shows a structure of a spring module connected in series using a webbing of Embodiment 2.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

Embodiment 1

**[0022]** An elastic cushion 10 of Embodiment 1 is shown in Figs. 1-4. The elastic cushion 10 comprises a spring module (i.e., an elastic module) 2, and the spring module 2 comprises springs 21 and a flexible band 3 (e.g., webbing 3). Two adjacent rows of the springs 21 define a staggered arrangement. The springs 21 are wrapped by cloth sleeves 22, or the springs 21 are independent springs pocketed in bags. Preferably, the springs 21 are anti-waisted drum springs (i.e., waist-shaped springs). That is, diameters of waists of the springs 21 are smaller than diameters of ends of the springs 21 (e.g., small than diameters of at least one end of each of the springs 21). Middle parts (i.e., waists) of the springs 21 comprise fixing seats 6, and the springs 21 of the spring module 2 are arranged as shown in Figs. 5A, 5B, and 5C. Referring to Fig. 6, a series connection of the webbing 3 is as follows: the springs 21 contact or are close to one another to be arranged in rows in a lateral direction, two adjacent rows of the rows are staggered, and at least two opposing sides of the fixing seats 6 comprise perforations 61. The two adjacent rows of the springs are staggered to enable the perforations 61 in the fixing seats 6 to be connected in series to form a substantially continuous straight line 62. The webbing 3 passes through the perforations 61 in the substantially continuous straight line 62, and two ends of the webbing 3 comprise stoppers 5 or buckles, so that the two adjacent rows of the springs 21 are connected in series. In this way, the webbing 3 connects the springs 21 of the two adjacent rows of the springs 21 in series, so that compressed springs 21 in a first row of the two adjacent rows and uncompressed springs 21 in a second row of the two adjacent rows are forced in series without creating large gaps. Preferably, first ends of the stoppers 5 are configured to be fixed to the webbing 3, and second ends of the stoppers 5 are configured to be detachably fixed to the webbing 3.

**[0023]** A bottom side of the spring module 2 can be fixed on a rigid or flexible base plate 20.

**[0024]** The fixing seats 6 comprises a stop structure 63. The stop structure 63 cooperates with the stoppers 5 of the webbing 3 to fix the webbing 3, and an outside of the two ends of the webbing 3 comprise stop positions 31 for receiving the stoppers 5.

**[0025]** An elastic mattress (i.e., spring mattress) made of the spring module 2 is shown in Fig. 1. The elastic mattress comprises a top layer 1 and a peripheral fixing webbing 4, and the peripheral fixing webbing 4 loops an outer periphery of the spring module 2 together. The top layer 1 comprises side edges 11, and the side edges 11 can be snapped to the fixing seats 6 of the springs 21 or the rigid or flexible base plate 20 of the spring module 2.

Embodiment 2

**[0026]** Referring to Fig. 7, this embodiment differs from Embodiment 1 in that the two adjacent rows of the springs 21 in the spring module 2 are respectively aligned with each other, a single row of the two adjacent rows of the springs 21 are connected in series using the webbing 3, and the fixing seats 6 of the two adjacent rows of the springs 21 are snapped together or connected by a third piece. In this way, the single row of the two adjacent rows of the springs 21 are connected in series by the webbing

3, and different rows of the two adjacent rows of the springs 21 are connected by the fixing seats 6. The springs 21 deform independently while obstructing each other without moving away from each other.

**[0027]** An arrangement of the springs 21 and connectors of Embodiments 1-2 do not limit the spring module 2 and the elastic cushion 10 made therefrom of the present disclosure, and the spring module 2 can be made using other arrangements by a person of skill in the art. The connectors are not limited to only those specified in Embodiments 1-2, and the present disclosure covers any modifications and variations of the presently presented embodiments provided the springs 21 are connected by the flexible band. The elastic cushion 10 can be made using the spring module 2 in various ways as well.

**[0028]** The invention may be summarized as follows: An elastic cushion is provided. The elastic cushion comprises at least one elastic module, the at least one elastic module comprises multiple rows of springs, fixing seats, and one or more flexible bands, two adjacent rows of the multiple rows of the springs are staggered, waists of the springs comprise the fixing seats, at least two opposing sides of the fixing seats comprise perforations, the perforations in the fixing seats of the two adjacent rows of the springs define a substantially continuous straight line, the one or more flexible bands pass through the perforations in the substantially continuous straight line, and the two adjacent rows of the springs are connected in series by the one or more flexible bands.

## Claims

1. An elastic cushion (10), it comprises:
   at least one elastic module (2), **characterized in that**:

   the at least one elastic module (2) comprises multiple rows of springs (21), fixing seats (6), and one or more flexible bands (3),
   two adjacent rows of the multiple rows of the springs (21) are staggered,
   waists of the springs (21) comprise the fixing seats (6),
   at least two opposing sides of the fixing seats (6) comprise perforations (61),
   the perforations (61) in the fixing seats (6) of the two adjacent rows of the springs (21) define a substantially continuous straight line (62),
   the one or more flexible bands (3) pass through the perforations (61) in the substantially continuous straight line (62),
   ends of the one or more flexible bands (3) comprise stoppers (5) or buckles,
   two ends of the one or more flexible bands (3) are fixed to the fixing seats (6) of two springs at two ends of the two adjacent rows of the springs (21), and
   the two adjacent rows of the springs (21) are connected in series by the one or more flexible bands (3).

2. The elastic cushion according to claim 1, **characterized in that**:

   the springs (21) are wrapped by cloth sleeves (22), and
   waists of the cloth sleeves (22) comprise the fixing seats (6).

3. The elastic cushion according to claim 1 and/or 2, **characterized in that**: the springs (21) are waist-shaped springs.

4. The elastic cushion according to any one or more of claims 1 to 3, **characterized in that**:

   four sides of the at least two opposing sides of the fixing seats (6) have a same structure, and the perforations (61) of the four sides of the fixing seats (6) have a same structure.

5. The elastic cushion according to any one or more of claims 1 to 4, **characterized in that**:

   the fixing seats (6) comprises a stop structure (63),
   the stop structure (63) cooperates with the stoppers (5) of the one or more flexible bands (3) to fix the one or more flexible bands (3), and
   an outside of the two ends of the one or more flexible bands (3) comprise stop positions (31) for receiving the stoppers (5).

6. The elastic cushion according to any one or more of claims 1 to 5, **characterized in that**: the one or more flexible bands (3) comprise webbing or cord.

7. The elastic cushion according to any one or more of claims 1 to 6, **characterized in that**: the springs (21) are wrapped by the cloth sleeves (22) and/or comprise independent springs pocketed in bags.

8. An elastic cushion (10), it comprises:
   at least one elastic module (2), **characterized in that**:

   the at least one elastic module (2) comprises multiple rows of springs (21), fixing seats (6), and one or more flexible bands (3),
   rows of the multiple rows of the springs (21) are respectively aligned each other,
   waists of the springs (21) comprise the fixing seats (6),
   at least two opposing sides of the fixing seats (6) comprise perforations (61),

the fixing seats (6) of two adjacent rows of the multiple rows of the springs (21) are connected together,
the perforations (61) in the fixing seats (6) of the two adjacent rows of the springs (21) define two rows of the perforations (61),
the one or more flexible bands (3) pass through the two rows of the perforations (61),
ends of the one or more flexible bands (3) comprise stoppers (5) or buckles,
two ends of the one or more flexible bands (3) are fixed to the fixing seats (6) of two springs at two ends of the two adjacent rows of the springs (21), and
the two adjacent rows of the springs (21) are connected in series by the one or more flexible bands (3).

**9.** The elastic cushion according to claim 8, **characterized in that**:

the springs (21) are wrapped by cloth sleeves (22), and
waists of the cloth sleeves (22) comprise the fixing seats (6).

**10.** An elastic mattress, wherein the elastic mattress comprises one or more of the elastic cushions (10) of any one or more of claims 1-9.

**11.** An elastic mattress, wherein the elastic mattress comprises a plurality of the elastic cushions (10) of any one or more of claims 1-9 spliced together.

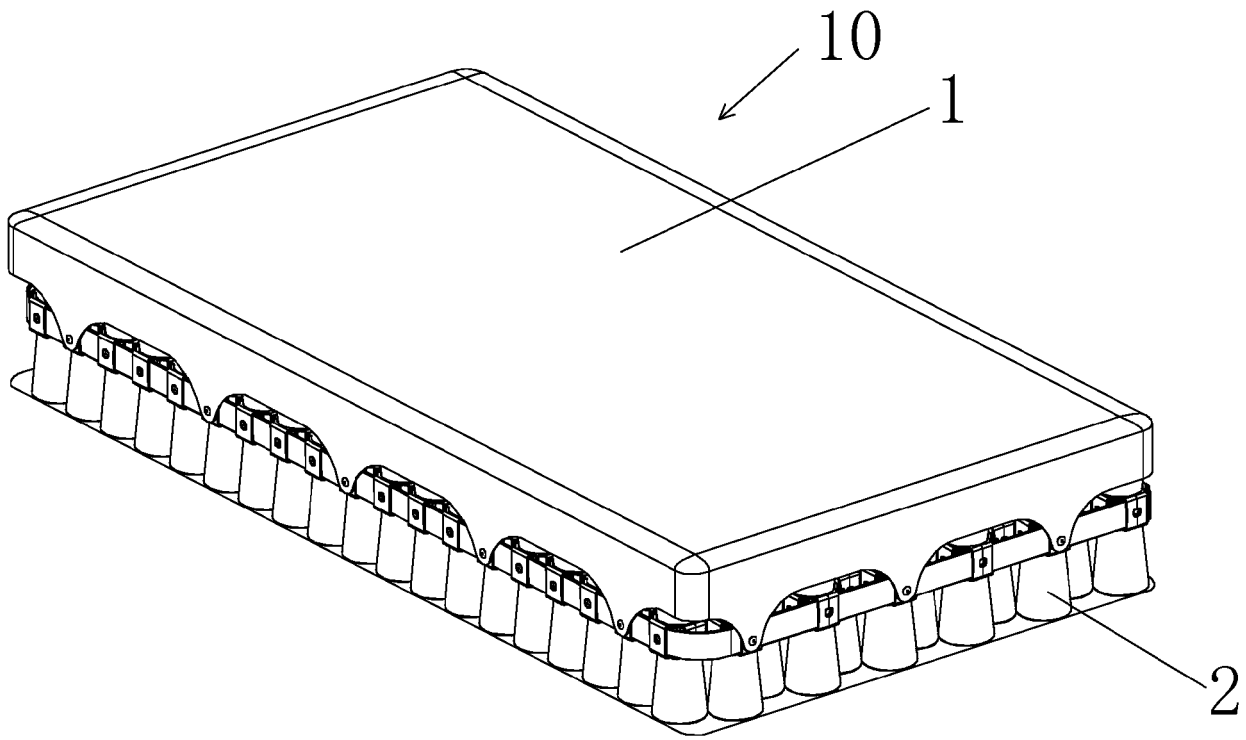


Fig. 1

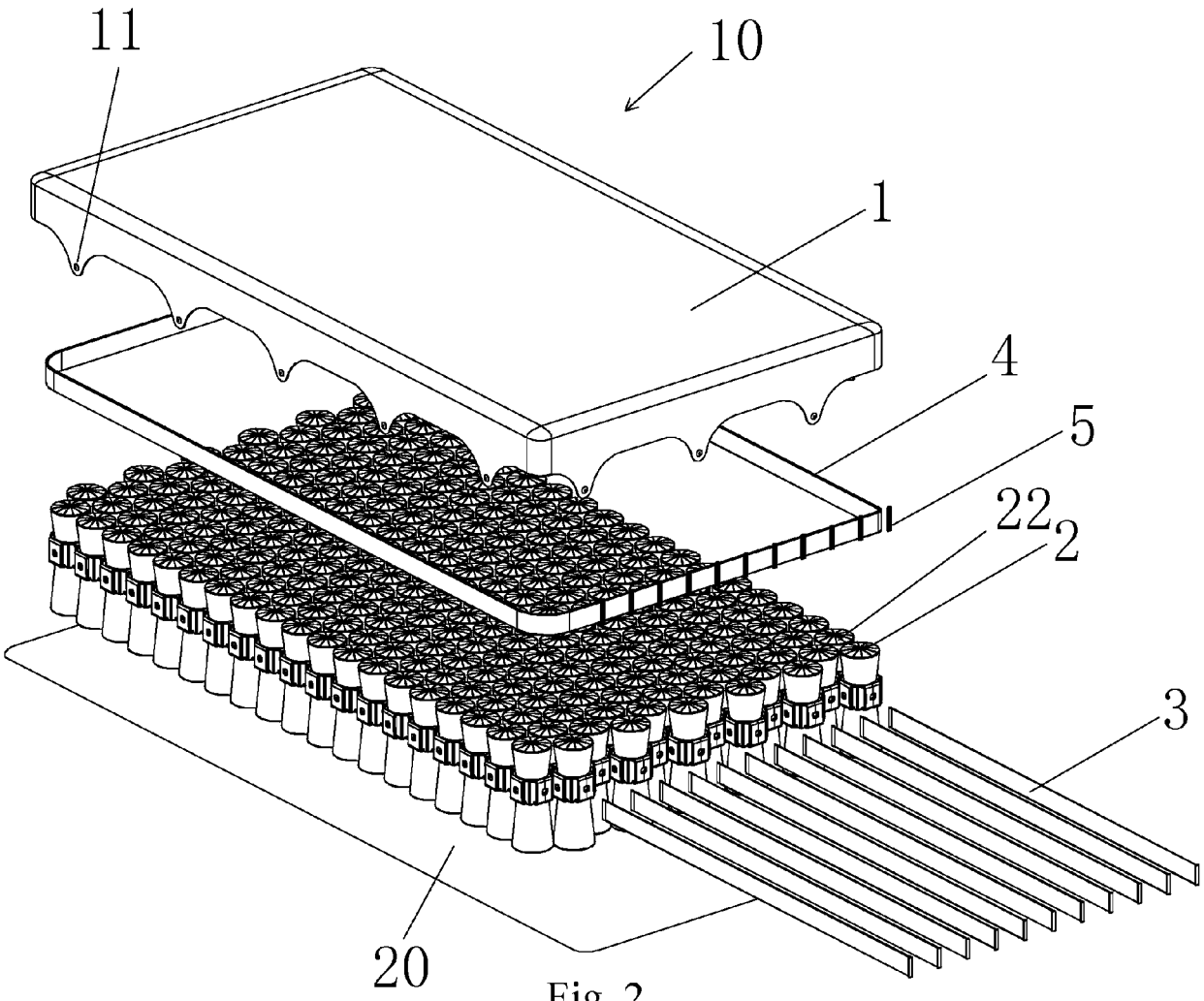


Fig. 2

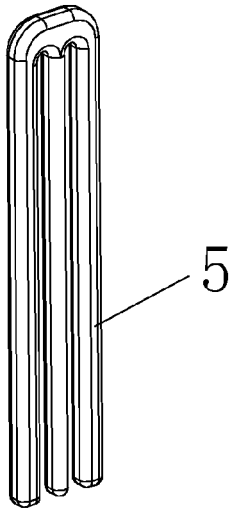


Fig. 3A

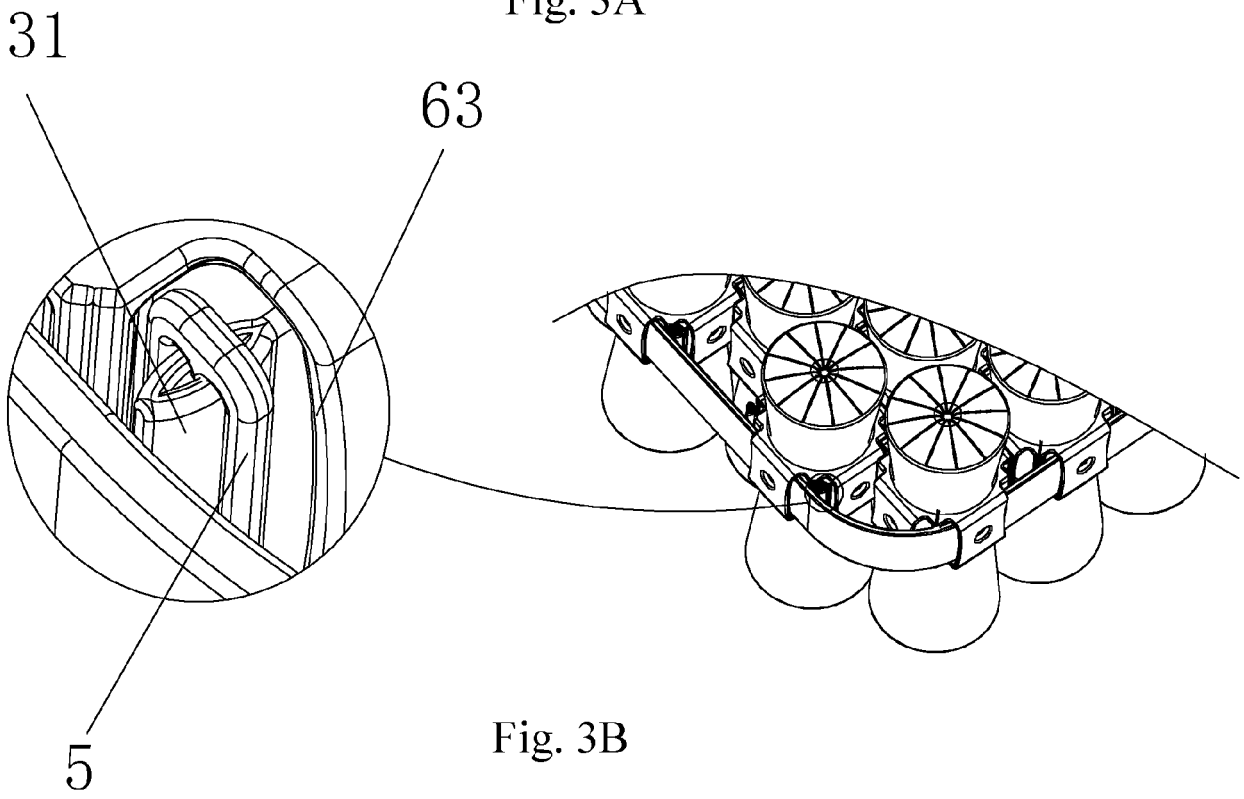


Fig. 3B

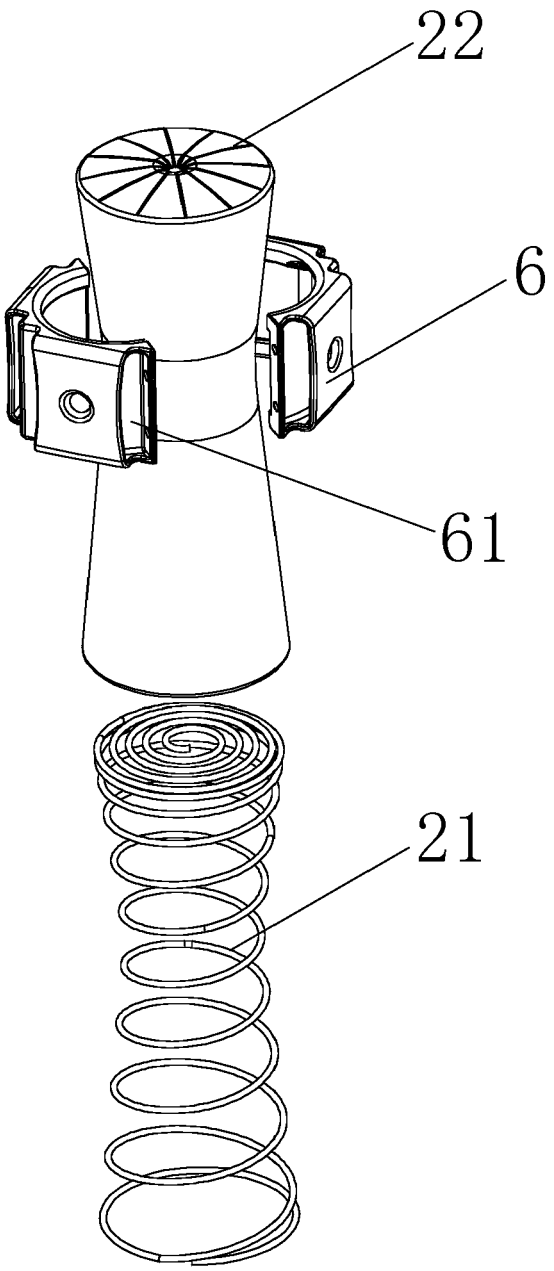


Fig. 4

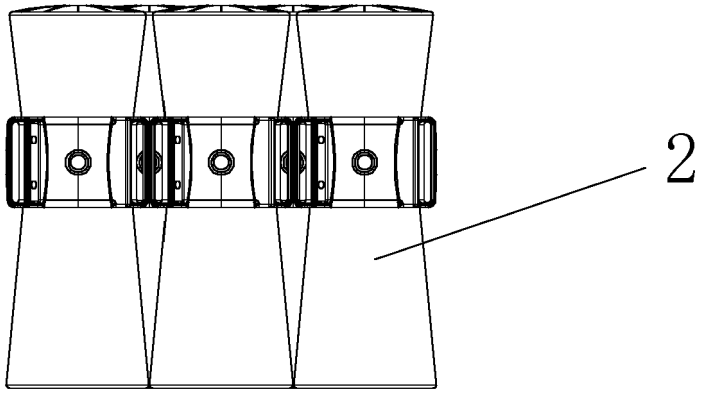


Fig. 5A

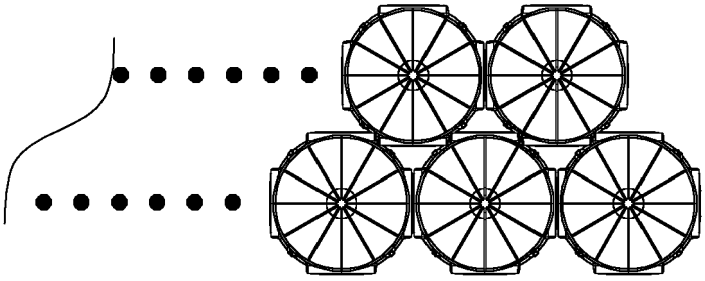

Fig. 5B

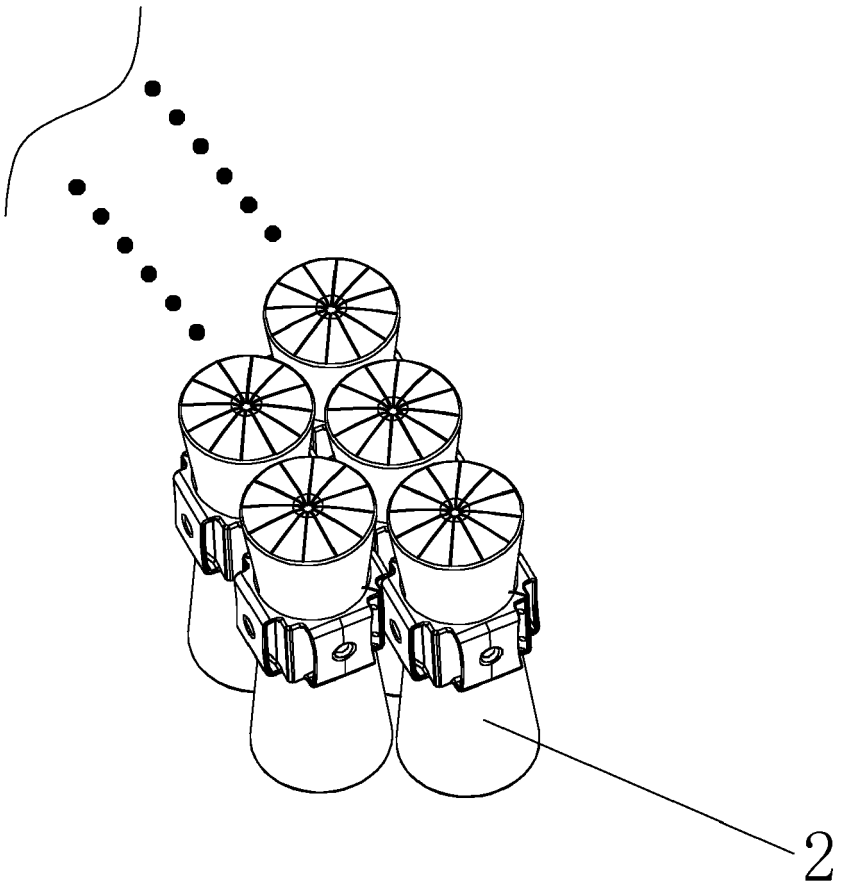


Fig. 5C

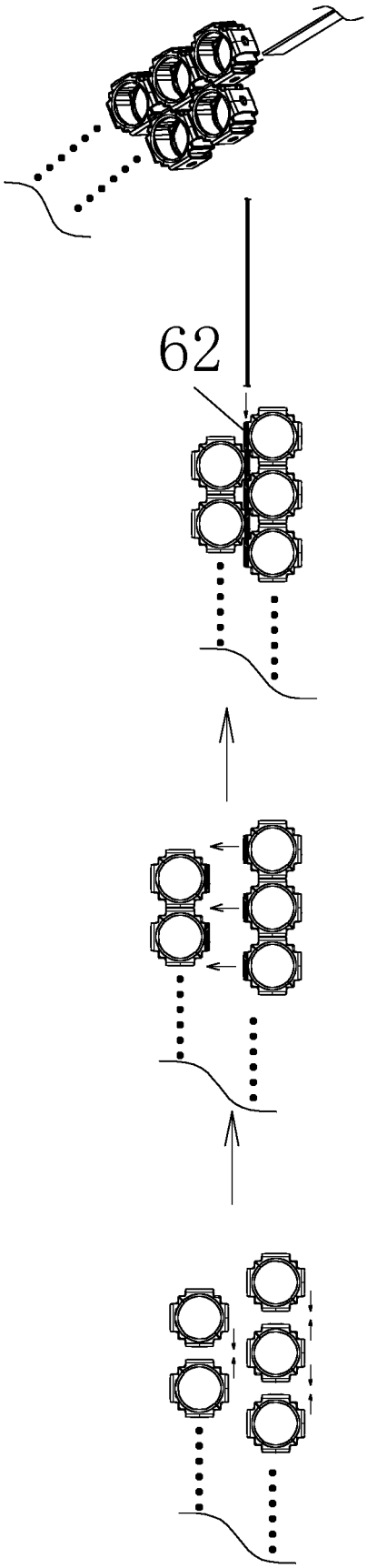


Fig. 6

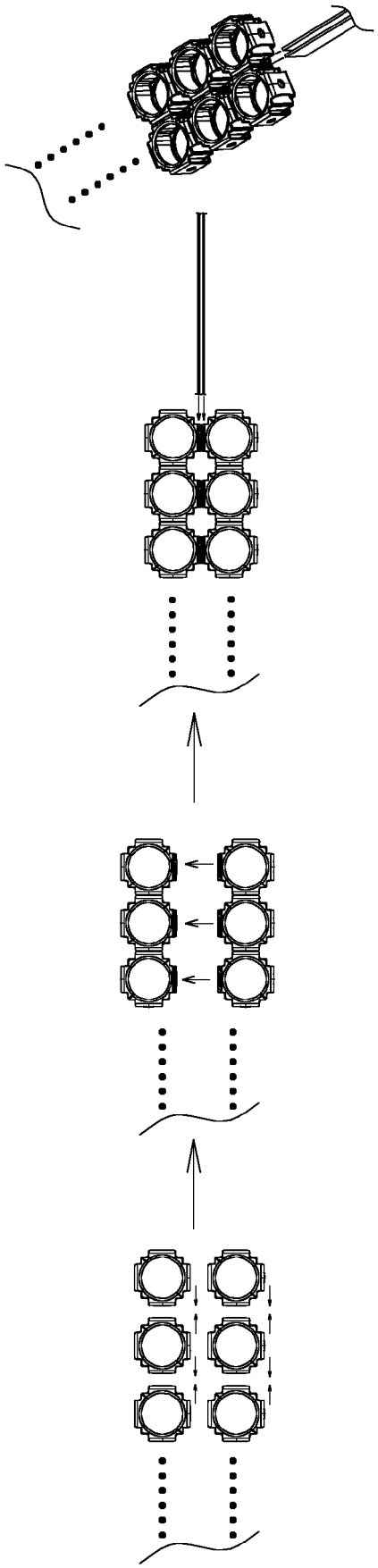

Fig. 7

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# PARTIAL EUROPEAN SEARCH REPORT

under Rule 62a and/or 63 of the European Patent Convention. This report shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number
EP 23 19 4363

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| A | WO 2016/148594 A1 (MARES VIT [RS]) 22 September 2016 (2016-09-22) * page 12, paragraph 4 - page 15, line 1; figures 34-49 * | 1-7,10, 11 | INV. A47C27/045 A47C27/06 A47C27/07 |
| A | US 412 506 A (ANTHONY HUBER) 8 October 1889 (1889-10-08) * page 1, column 1, line 42 - page 2, column 1, line 5; figures 1-4 * | 1-7,10, 11 | |

TECHNICAL FIELDS SEARCHED (IPC)

A47C

## INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 1 May 2024 | Kus, Slawomir |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04E07)

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## INCOMPLETE SEARCH SHEET C

Application Number
EP 23 19 4363

Claim(s) completely searchable:
1-7

Claim(s) searched incompletely:
10, 11

Claim(s) not searched:
8, 9

Reason for the limitation of the search:

1.0. Incomplete Search under Rule 62a EPC
1.1. The present set of claims 1-11 contains two independent claims 1,8 in the same category.
Under Article 84 in combination with Rule 43(2) EPC, an application may contain more than one independent claim in a particular category only if the subject-matter claimed falls within one or more of the exceptional situations set out in paragraph (a), (b) or (c) of Rule 43(2) EPC. This is not the case in the present application.
Independent claims 1,8 relate neither to inter-related products - exception (a) (in the sense of plug-and-socket), nor to different uses of a product or apparatus - exception (b) (no use is claimed) (see Guidelines F-IV 3.2 and 3.3).
Regarding exception (c) it is noted that claims 1,8 do not relate to an exceptional case of "alternative" solutions in the sense of mutually exclusive possibilities, since it would have always been possible to recast these two independent claims into a single independent claim followed by a set of dependent claims. Therefore, claims 1,8 can not be considered as alternativesolutions.
Furthermore overlaps and similarities in the features of the independent claims of the same category are an indication that it would be appropriate to replace such claims with a single independent claim, e.g. by selecting a common wording for the essential features (see F-IV, 4.5).
1.2. In accordance with Rule 62a(1) EPC the applicant had been invited to indicate the single independent apparatus claim on the basis of which the search had to be carried out. No reply had been received within the the period set in the invitation dated 13.02.2024. Therefore, in accordance with Rule 62a(1) EPC, second sentence, the search has been carried out on the basis of the first independent claim 1 and the dependent claims 2-7,10 (when dependent on 1-7),11 (when dependent on 1-7) as filed on 30.08.2023.
1.3. The claims must be amended in such way as to remove the unsearched subject-matter and the description must be adapted accordingly.
In addition, the amendments may not relate to subject-matter that was excluded from the search following an invitation under Rule 62a(1) EPC. The applicant is also informed that any attempt to reintroduce subject-matter not searched under Rule 62a(1) will be objected under Rule 137(5) EPC.
1.4. The subject-matter to be excised may be made the subject of one or more divisional applications. The divisional applications must be filed with the European Patent Office in Munich, The Hague or Berlin and shall be in the language of the proceedings relating to the present application (cf. Article 76(1) and Rule 36(2) EPC). The time limit for filing divisional applications (Rule 36(1) EPC) must be observed.

# ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 19 4363

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

01-05-2024

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| WO 2016148594 A1 | 22-09-2016 | RS 1452 U1 | 28-04-2016 |
| | | WO 2016148594 A1 | 22-09-2016 |
| US 412506 A | 08-10-1889 | NONE | |

## REFERENCES CITED IN THE DESCRIPTION

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

### Patent documents cited in the description


- CN 202310651825 **[0001]**