



(11)

EP 3 791 747 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
17.03.2021 Bulletin 2021/11

(51) Int Cl.:
A44B 19/02 (2006.01)

(21) Application number: **19799628.3**

(86) International application number:
PCT/JP2019/017816

(22) Date of filing: **25.04.2019**

(87) International publication number:
WO 2019/216256 (14.11.2019 Gazette 2019/46)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(30) Priority: **10.05.2018 VN 201801982**

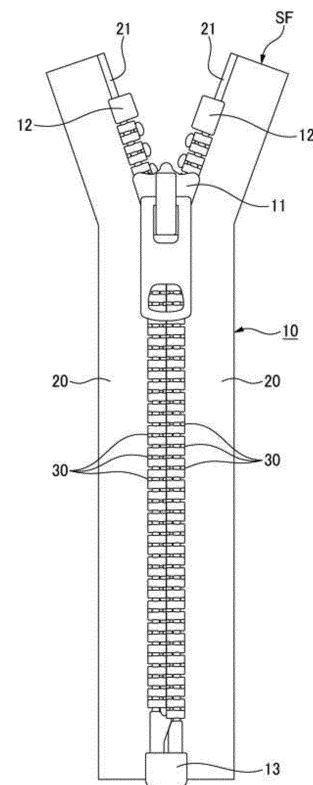
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(54) **FASTENER STRINGER**

(57) Provided is a fastener stringer which is capable of enhancing the strength of elements while making the elements appear to have a slimmer width in the lateral direction. The elements (30) each have an upper half portion (40) disposed on the upper surface side of a tape (20) and a lower half portion (50) disposed on the under-surface side of the tape. The upper half portion (40) has a first division part (41) and a second division part (42) that are divided in the longitudinal direction of the tape, and reinforcement parts (43, 44) that connect between the first division part (41) and the second division part (42). The tape (20) is exposed between the first division part (41) and the second division part (42).

FIG.1



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Description**TECHNICAL FIELD**

[0001] The present invention relates to a fastener stringer of a slide fastener. 5

BACKGROUND ART

[0002] As conventional fastener stringers, a fastener stringer is known, which includes a pair of tapes and a plurality of elements attached along each of opposing side edges of the pair of tapes, and in which each of the elements includes a first portion arranged on an upper surface of each tape and a second portion arranged on a lower surface of the tape and having an engaging head portion, and a groove is formed at the middle portion, in a right and left direction, of the first portion so that the first portion is divided into right and left portions by the groove (e.g., see Patent Document 1). 10 15 20

PRIOR ART DOCUMENT**PATENT DOCUMENT**

[0003] Patent Document 1: Chinese Patent No. 103564993 25

SUMMARY OF INVENTION**TECHNICAL PROBLEM**

[0004] In the fastener stringer as described in Patent Document 1, a bottom of the groove reaches the tape and thus the divided portions of the first portion are individually coupled to the second portion. Therefore, although the element looks as if a width thereof in the right and left direction is narrow, a coupling strength of the first portion to the second portion is low and as a result, the element is likely to be separated from the tape. Further, an embodiment, in which the bottom of the groove does not reach the tape, is also disclosed in Patent Document 1 (see Figs. 10 and 11 of Patent Document 1). In this case, since the tape is not visible between the right and left divided portions of the first portion, the element does not look as if a width thereof in the right and left direction is narrow. 30 35 40 45

[0005] The present invention has been made keeping in mind the above problems, and an object thereof is to provide a fastener stringer in which it is possible to enhance strength of elements while making the elements look as if a width thereof in the right and left direction is narrow. 50

SOLUTION TO PROBLEM

[0006] The object of the present invention is achieved by the following configurations. 55

(1) A fastener stringer comprising a pair of tapes and a plurality of elements attached along each of opposing side edges of the pair of tapes, wherein each of the elements comprises an upper half portion arranged on an upper surface of each tape and a lower half portion arranged on a lower surface of the tape and is attached on the tape with the tape sandwiched therebetween, wherein the lower half portion comprises a base portion configured to be attached on the tape; a head portion configured to be engaged with the elements on the other side; and a neck portion formed between the base portion and the head portion, wherein the upper half portion comprises a first and second divided portions divided from each other in a tape length direction, and at least one reinforcing portion connecting the first divided portion with the second divided portion, wherein each of the first and second divided portions is arranged to cover the neck portion of the lower half portion while exposing the head portion as viewed in a top view of the elements, wherein the tape is exposed between the first divided portion and the second divided portion. 5 10 15 20 25

(2) The fastener stringer according to (1), wherein when the elements are engaged with each other, the first divided portions of the elements of one tape are respectively adjacent to the second divided portions of the elements of the other tape and also are arrayed in a straight line shape along a tape width direction. 30

(3) The fastener stringer according to (1) or (2), wherein the at least one reinforcing portion is formed to have a circular arc-shaped cross-sectional shape. 35

(4) The fastener stringer according to any one of (1) to (3), wherein the at least one reinforcing portion comprises a first reinforcing portion connecting one end portion of the first divided portion with one end portion of the second divided portion, and a second reinforcing portion connecting the other end portion of the first divided portion with the other end portion of the second divided portion. 40 45

(5) The fastener stringer according to any one of (1) to (4), wherein the first divided portions and the second divided portions are arrayed at equal intervals along the tape length direction. 50

ADVANTAGEOUS EFFECTS OF INVENTION

[0007] According to the present invention, the upper half portion includes first and second divided portions divided from each other in the tape length direction and at least one reinforcing portion connecting the first divided portion with the second divided portion, and also the tape is exposed between the first divided portion and the second divided portion. Therefore, it is possible to enhance strength of the elements while making the elements look as if a width thereof in the right and left direction is narrow. 55

BRIEF DESCRIPTION OF DRAWINGS

[0008]

[Fig. 1] A top view explaining a slide fastener employing one embodiment of a fastener stringer according to the present invention.

[Fig. 2] An enlarged top view of elements in an engaged state as shown in Fig. 1.

[Fig. 3] An enlarged bottom view of elements in the engaged state as shown in Fig. 2.

[Fig. 4] A top view of an element.

[Fig. 5] A bottom view of the element.

[Fig. 6] A front view of the element.

[Fig. 7] A sectional view taken along a line A-A in Fig. 4.

DESCRIPTION OF EMBODIMENTS

[0009] Hereinafter, a slide fastener employing one embodiment of a fastener stringer according to the present invention will be described in detail on the basis of the accompanying drawings. Meanwhile, in the following description, as for a slide fastener, an upper side refers to a near side with respect to the paper surface of Fig. 1; a lower side refers to a far side with respect to the paper surface of Fig. 1; a front side refers to a upper side with respect to the paper surface of Fig. 1; a rear side refers to a lower side with respect to the paper surface of Fig. 1; a left side refers to a left side with respect to the paper surface of Fig. 1; and a right side refers to a right side with respect to the paper surface of Fig. 1. Also, as for an element, an upper side refers to a near side with respect to the paper surface of Fig. 4; a lower side refers to a far side with respect to the paper surface of Fig. 4; a front side refers to a upper side with respect to the paper surface of Fig. 4; a rear side refers to a lower side with respect to the paper surface of Fig. 4; a left side refers to a left side with respect to the paper surface of Fig. 4; and a right side refers to a right side with respect to the paper surface of Fig. 4. Further, a right and left direction is also referred to as a width direction.

[0010] First, a slide fastener SF employing a fastener stringer 10 according to the present embodiment will be described. As shown in Fig. 1, the slide fastener SF includes a pair of right and left tapes 20; a plurality of elements 30 attached along each of opposing side edges of the right and left tapes 20; a slider 11 for engaging and disengaging the right and left elements 30 with and from each other; top end stops 12 attached, respectively, on upper end portions of the side edges of the right and left tapes 20; and an opener 13 attached on lower ends of the side edges of the right and left tapes 20. In addition, the right and left tapes 20 and the elements 30 attached on each of the right and left tapes 20 constitute the fastener stringer 10. Alternatively, the opener 13 may be replaced with bottom end stops.

[0011] As shown in Figs. 2 and 3, the tape 20 is a band-

shaped body having an upper surface and a lower surface and is provided with a core portion 21 along one side edge thereof. As shown in Fig. 7, the core portion 21 is formed such that a thickness thereof in an upward and downward direction is greater than those of the other portions of the tape 20. Also, a plurality of elements 30 is attached along the core portion 21 of the tape 20.

[0012] As shown in Figs. 2 to 7, each of the elements 30 has an upper half portion 40 arranged on the upper surface of the tape 20 and a lower half portion 50 arranged on the lower surface of the tape 20 and is attached on the tape 20 with the tape 20 (core portion 21) sandwiched therebetween. The upper half portion 40 and the lower half portion 50 are formed to have substantially the same height dimension. Also, the element 30 is made of synthetic resin or metal.

[0013] As shown in Fig. 5, the lower half portion 50 includes a base portion 51 configured to be attached on the tape 20; a head portion 52 extending from the base portion 51 toward the other tape 20 and configured to be engaged with elements 30 on the other side; and a neck portion 53 formed between the base portion 51 and the head portion 52 and having a width narrower than that of the head portion 52.

[0014] As shown in Figs. 4, 6 and 7, the upper half portion 40 includes first and second divided portions 41, 42 divided from each other in a tape length direction (right and left direction of the element); a first reinforcing portion 43 connecting a front end portion of the first divided portion 41 with a front end portion of the second divided portion 42; and a second reinforcing portion 44 connecting a rear end portion of the first divided portion 41 with a rear end portion of the second divided portion 42. The first divided portion 41 is provided at a front side in the tape length direction (the upper side in Fig. 2) of the upper half portion 40 and the second divided portion 42 is provided at a rear side in the tape length direction (the lower side in Fig. 2) of the upper half portion 40. The first reinforcing portion 43 is provided to connect the front end portion of the first divided portion 41 with the front end portion of the second divided portion 42 and also to be connected to the neck portion 53 of the lower half portion 50. The second reinforcing portion 44 is provided to connect the rear end portion of the first divided portion 41 with the rear end portion of the second divided portion 42 and also to be positioned on the tape 20.

[0015] Each of the first and second divided portions 41, 42 is arranged to cover the neck portion 53 of the lower half portion 50 while exposing the head portion 52 as viewed in a top view of the element. Also, each of the first and second divided portions 41, 42 is coupled to an upper surface of the lower half portion 50 at a part thereof, which is positioned in front of the core portion 21 of the corresponding tape 20.

[0016] Also, in the upper half portion 40, an opening portion 45 opened upward is formed by the first divided portion 41, the second divided portion 42, the first reinforcing portion 43 and the second reinforcing portion 44,

and thus the core portion 21 of the tape 20 is exposed through the opening portion 45. That is, the tape 20 is exposed between the first divided portion 41 and the second divided portion 42.

[0017] Further, on a lower surface of the front end portion of each of the first and second divided portions 41, 42, a stepped portion 46 is formed to extend toward the inside of the neck portion 53 of the lower half portion 50 and also to be recessed upward. In an element-engaged state, an upper surface of the head portion 52 of the element 30 is arranged to face the stepped portions 46 of the elements 30 (i.e., lower surfaces of front end portions of first and second divided portions 41, 42) on the other side. Also, when the fastener stringer 10 in the element-engaged state is curved to be convex on an upper surface side thereof, a part of the head portion 52 of the element 30 on the other side enters the stepped portions 46, thereby enhancing flexibility of the fastener stringer 10 while maintaining engagement of the elements 30.

[0018] The first and second reinforcing portions 43, 44 are formed along the tape length direction (right and left direction). Also, the first reinforcing portion 43 is formed to have a rectangular cross-sectional shape, and the second reinforcing portion 44 is formed to have a circular arc-shaped cross-sectional shape. Alternatively, both the first and second reinforcing portions 43, 44 may be formed to have a circular arc-shaped cross-sectional shape, or only the first reinforcing portion 43 may be formed to have a circular arc-shaped cross-sectional shape. Since the reinforcing portion is formed to have a circular arc-shaped cross-sectional shape, it is possible to make the first and second divided portions 41, 42 visible while making the reinforcing portion invisible. Meanwhile, the cross-sectional shapes of the first and second reinforcing portions 43, 44 are not limited, but any other shapes may be selected.

[0019] Further, according to the present embodiment, in order to maintain strength of the element 30 while making the first and second divided portions 41, 42 visible, a height H1 of the first reinforcing portion 43 and a height H2 of the second reinforcing portion 44 are set to 50% or less of a height H3 of the upper half portion 40, preferably, for example to 25% to 50% (see Fig. 7). Herein, each of the heights H1 to H3 is a height from a boundary position between the upper half portion 40 and the lower half portion 50 to the respective upper surfaces. Further, a width of the first and second reinforcing portions 43, 44 in the front and rear direction can be freely set within a range in which the first and second reinforcing portions 43, 44 do not overlap the core portion 21 of the tape 20.

[0020] Further, according to the present embodiment, as shown in Figs. 1 and 2, each of the elements 30 are arranged such that when elements are engaged with each other, first divided portions 41 of elements 30 of one tape 20 are respectively adjacent to second divided portions 42 of elements 30 of the other tape 20 and also are arrayed in a straight line shape along a tape width direction.

[0021] Further, according to the present embodiment, a distance between the first divided portion 41 and the second divided portion 42 of each of the elements 30 and also a distance between adjacent elements 30 are set such that the first divided portions 41 and the second divided portions 42 are arrayed at equal intervals along the tape length direction.

[0022] In the fastener stringer 10 configured in this way, the upper half portion 40 of each of the elements 30 is divided into the first divided portion 41 and the second divided portion 42, thereby making one element 30 look like two narrower elements. Therefore, it is possible to make the elements 30 look as if a width thereof in the right and left direction is narrow.

[0023] Also, the first divided portion 41 and the second divided portion 42 are connected with each other by the first and second reinforcing portions 43, 44, so that the first divided portion 41 and the second divided portion 42 are integrated with each other. Therefore, it is possible to enhance a coupling strength of the first and second divided portions 41, 42 to the lower half portion 50 and thus to enhance strength of the element 30.

[0024] Further, first divided portions 41 of elements 30 of one tape 20 are respectively adjacent to second divided portions 42 of elements 30 of the other tape 20 and also are arrayed in a straight line shape along the tape width direction. Further, the first divided portions 41 and the second divided portions 42 are arrayed at equal intervals along the tape length direction. When viewing the right and left elements 30 in the engaged state considering together with the second reinforcing portions 44, the first divided portions 41 and the second divided portions 42 look as if they are connected with each other in a zigzag shape.

[0025] As set forth above, according to the fastener stringer 10 of the present embodiment, the upper half portion 40 includes the first reinforcing portion 43 connecting the front end portion of the first divided portion 41 with the front end portion of the second divided portion 42 and the second reinforcing portion 44 connecting the rear end portion of the first divided portion 41 with the rear end portion of the second divided portion 42, and also the tape 20 is exposed between the first divided portion 41 and the second divided portion 42. Therefore, it is possible to enhance strength of the elements 30 while making the elements 30 look as if a width thereof in the right and left direction is narrow.

[0026] Also, according to the fastener stringer 10 of the present embodiment, when elements are engaged with each other, first divided portions 41 of elements 30 of one tape 20 are respectively adjacent to second divided portions 42 of elements 30 of the other tape 20 and also are arrayed in a straight line shape along the tape width direction. Therefore, it is possible to enhance the aesthetic appearance of the slide fastener SF.

[0027] Further, according to the fastener stringer 10 of the present embodiment, the second reinforcing portion 44 is formed to have a circular arc-shaped cross-section-

al shape. Therefore it is possible to make the first and second divided portions 41, 42 visible while making the second reinforcing portion 44 invisible.

[0028] Further, according to the fastener stringer 10 of the present embodiment the height H1 of the first reinforcing portion 43 and the height H2 of the second reinforcing portion 44 is set to 50% or less of the height H3 of the upper half portion 40. Therefore, it is possible to maintain strength of the elements 30 while making the first and second divided portions 41, 42 visible.

[0029] Further, according to the fastener stringer 10 of the present embodiment, when viewing the right and left elements 30 in the engaged state considering together with the second reinforcing portions 44, the first divided portions 41 and the second divided portions 42 look as if they are connected with each other in a zigzag shape. Therefore, it is possible to enhance the aesthetic appearance of the slide fastener SF.

[0030] Meanwhile, the present invention is not limited to the foregoing embodiments, but may be appropriately modified without departing from the spirit and scope of the present invention.

[0031] For example, although two reinforcing portions, i.e., the first and second reinforcing portions are provided in the present embodiments, the present invention is not limited thereto. Only one of the first and second reinforcing portions may be provided.

[0032] This application is based on a Vietnamese patent application (1-2018-01982) filed on May 10, 2018, that is incorporated in this application by reference in its entirety.

REFERENCE SIGNS LIST

[0033]

10	Fastener Stringer
20	Tape
21	Core Portion
30	Element
40	Upper Half Portion
41	First Divided Portion
42	Second Divided Portion
43	First Reinforcing Portion
44	Second Reinforcing Portion
45	Opening Portion
46	Step Portion
50	Lower Half Portion
51	Base Portion
52	Head Portion
53	Neck Portion
H1	Height of First Reinforcing Portion
H2	Height of Second Reinforcing Portion
H3	Height of Upper Half Portion
SF	Slide Fastener

Claims

1. A fastener stringer (10) comprising a pair of tapes (20) and a plurality of elements (30) attached along each of opposing side edges of the pair of tapes (20), wherein each of the elements (30) comprises an upper half portion (40) arranged on an upper surface of each tape (20) and a lower half portion (50) arranged on a lower surface of the tape (20) and is attached on the tape (20) with the tape (20) sandwiched therebetween, wherein the lower half portion (50) comprises a base portion (51) configured to be attached on the tape (20); a head portion (52) configured to be engaged with the elements (30) on the other side; and a neck portion (53) formed between the base portion (51) and the head portion (52), wherein the upper half portion (40) comprises a first and second divided portions (41, 42) divided from each other in a tape length direction, and at least one reinforcing portion (43, 44) connecting the first divided portion (41) with the second divided portion (42), wherein each of the first and second divided portions (41, 42) is arranged to cover the neck portion (53) of the lower half portion (50) while exposing the head portion (52) as viewed in a top view of the elements, wherein the tape (20) is exposed between the first divided portion (41) and the second divided portion (42).
2. The fastener stringer (10) according to claim 1, wherein when the elements are engaged with each other, the first divided portions (41) of the elements (30) of one tape (20) are respectively adjacent to the second divided portions (42) of the elements (30) of the other tape (20) and also are arrayed in a straight line shape along a tape width direction.
3. The fastener stringer (10) according to claim 1 or 2, wherein the at least one reinforcing portion is formed to have a circular arc-shaped cross-sectional shape.
4. The fastener stringer (10) according to any one of claims 1 to 3, wherein the at least one reinforcing portion comprises a first reinforcing portion (43) connecting one end portion of the first divided portion (41) with one end portion of the second divided portion (42), and a second reinforcing portion (44) connecting the other end portion of the first divided portion (41) with the other end portion of the second divided portion (42).
5. The fastener stringer (10) according to any one of claims 1 to 4, wherein the first divided portions (41) and the second divided portions (42) are arrayed at equal intervals along the tape length direction.

FIG.1

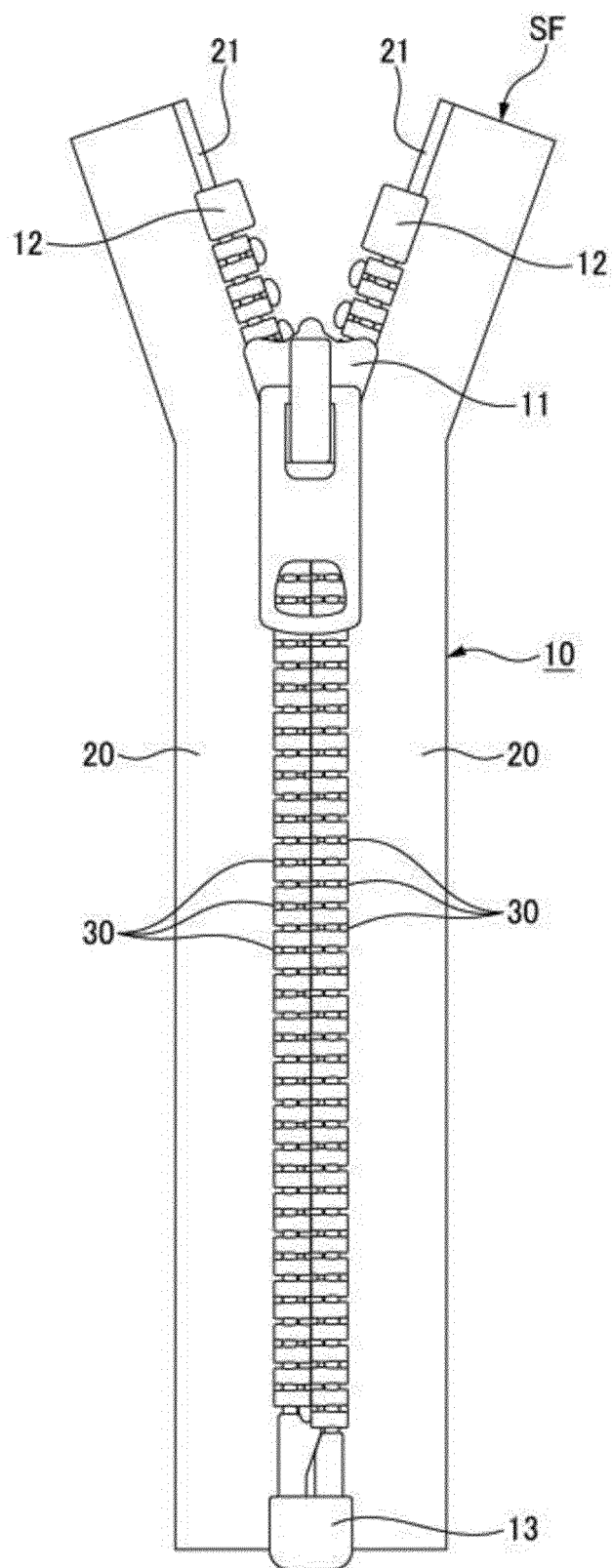


FIG.2

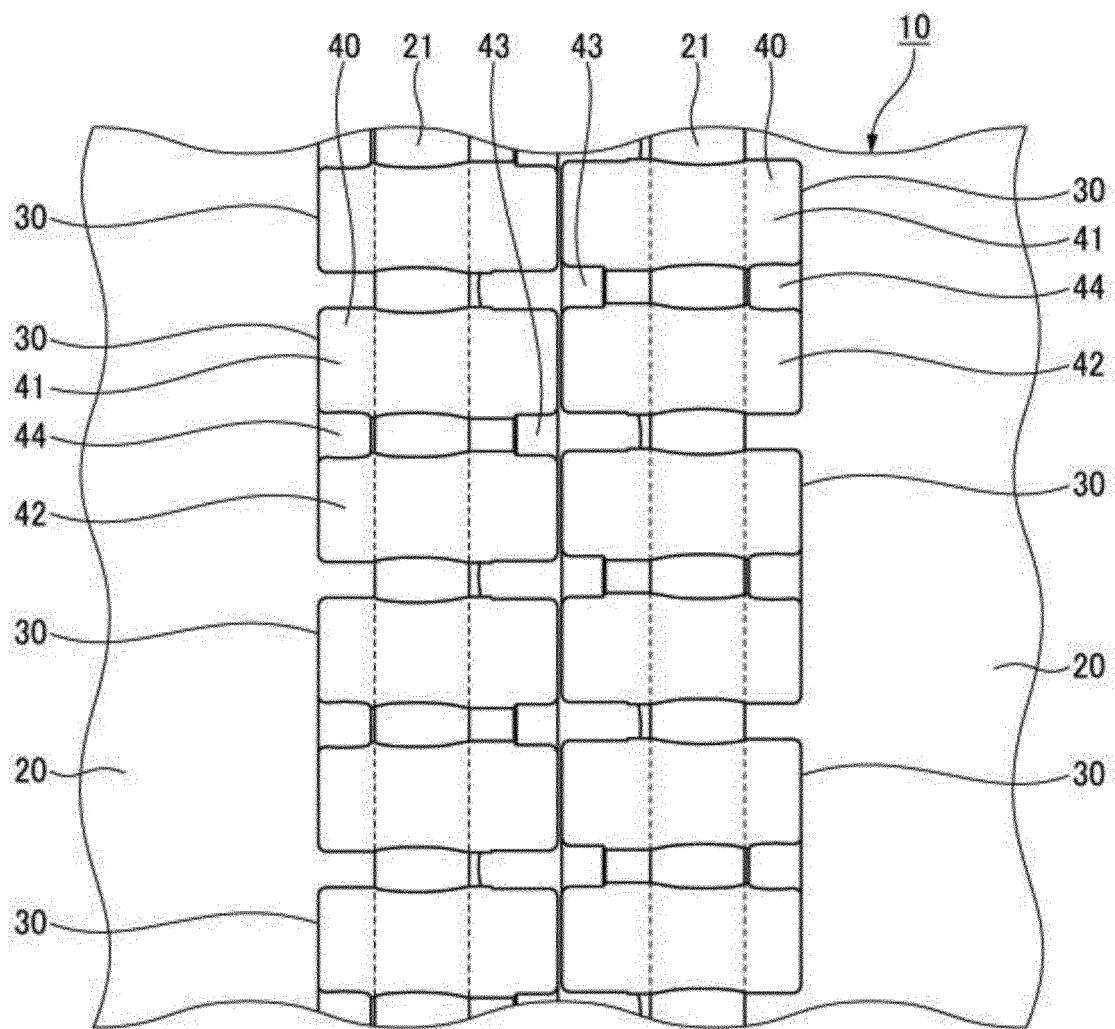


FIG.3

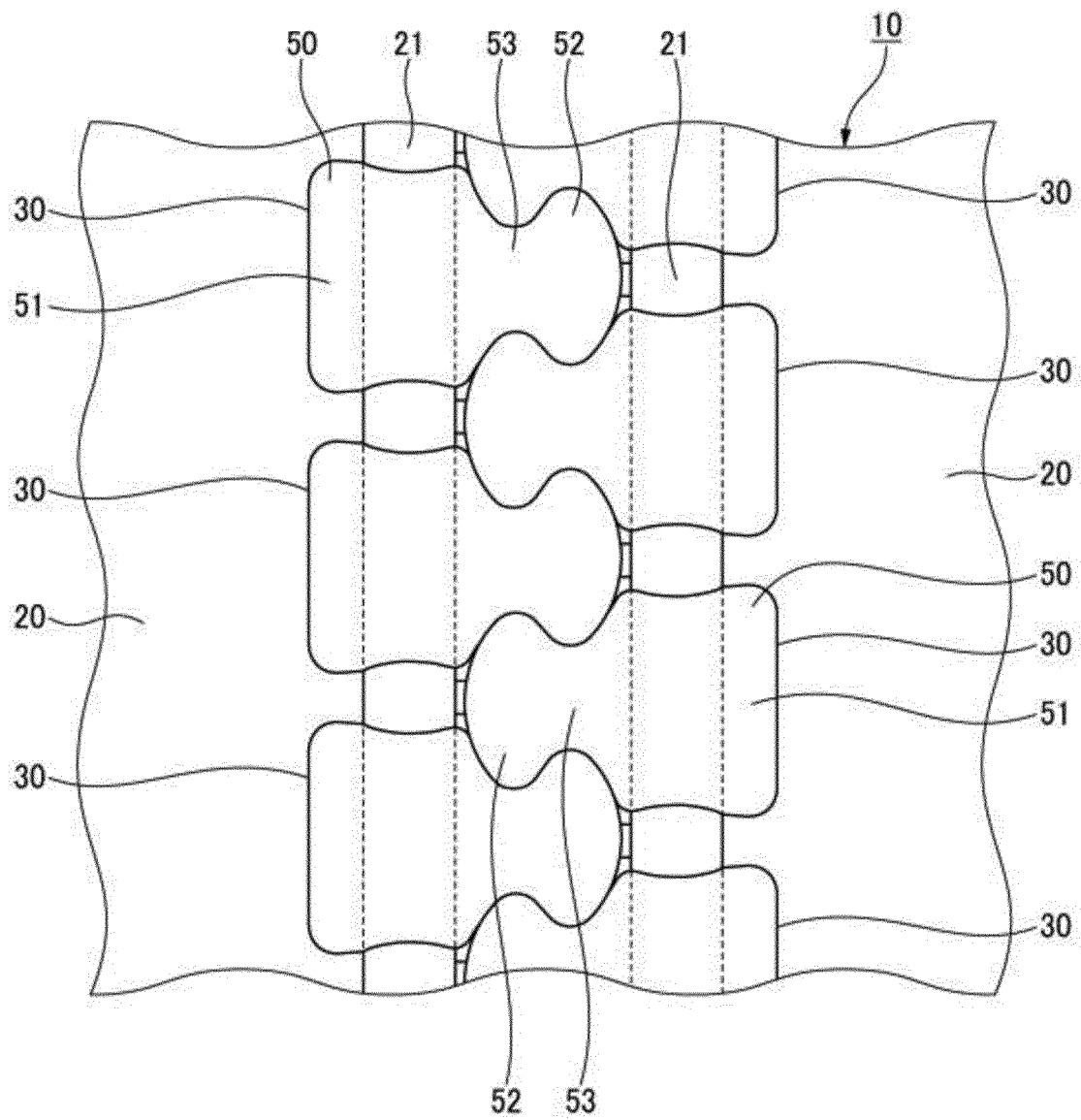


FIG.4

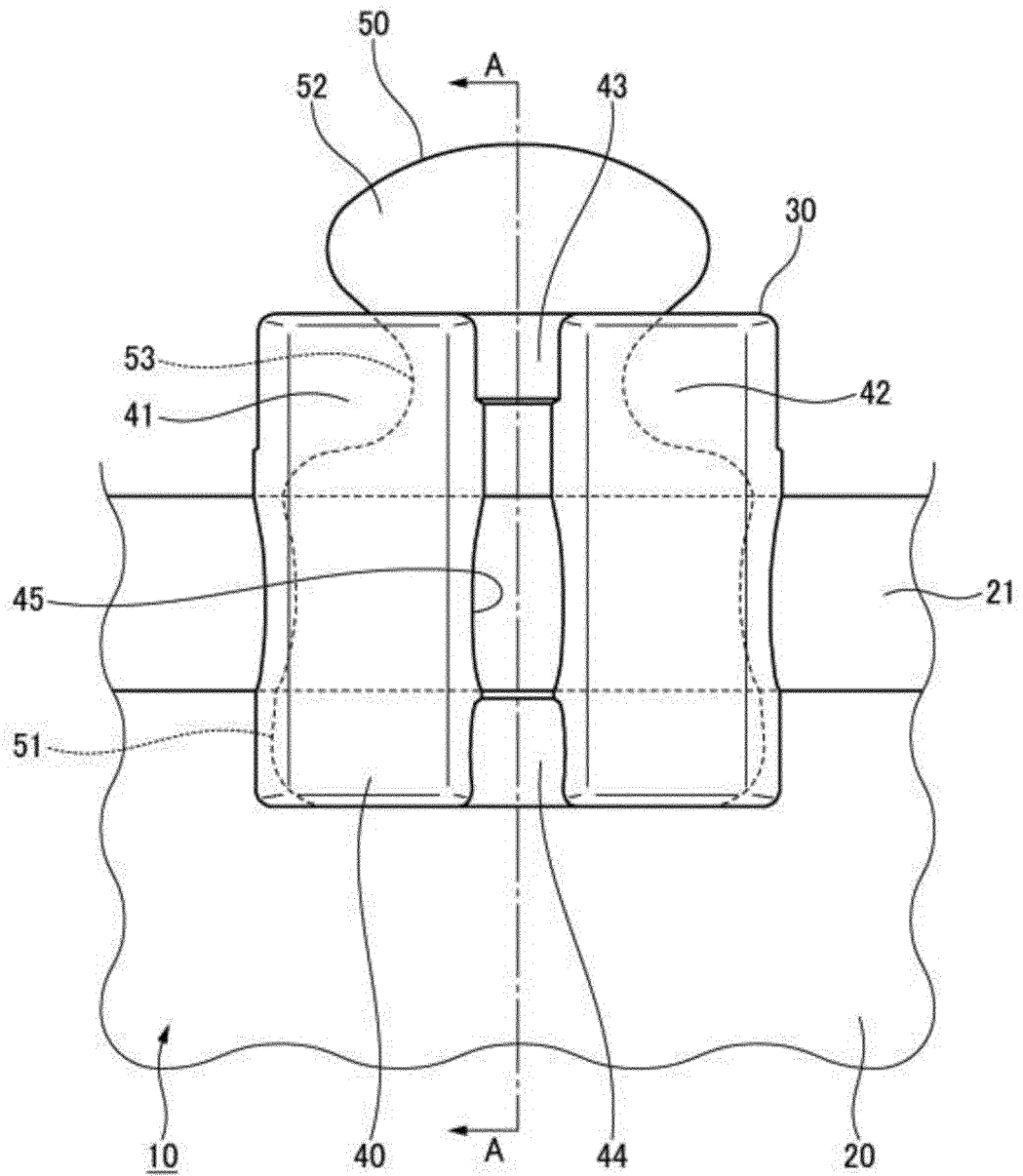


FIG.5

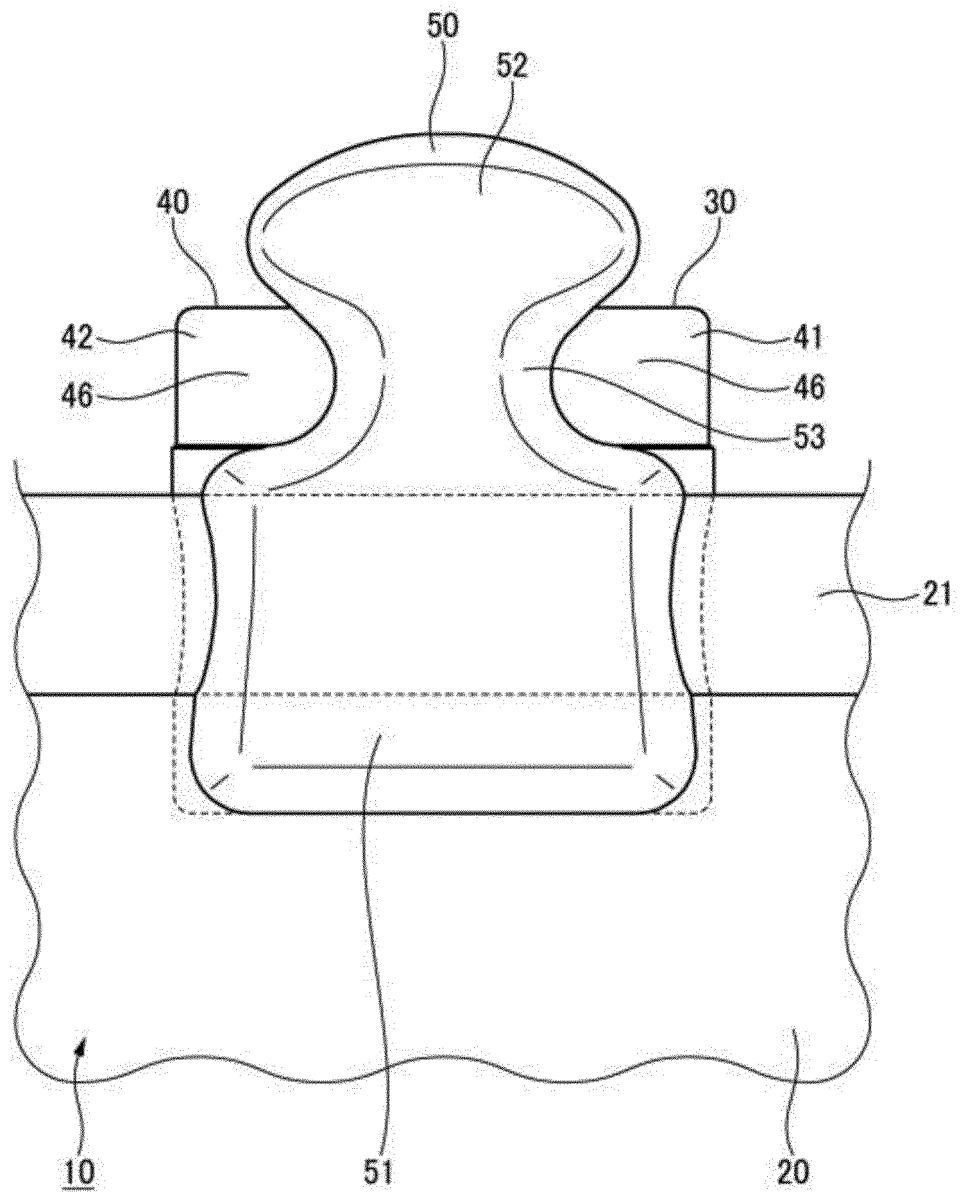


FIG.6

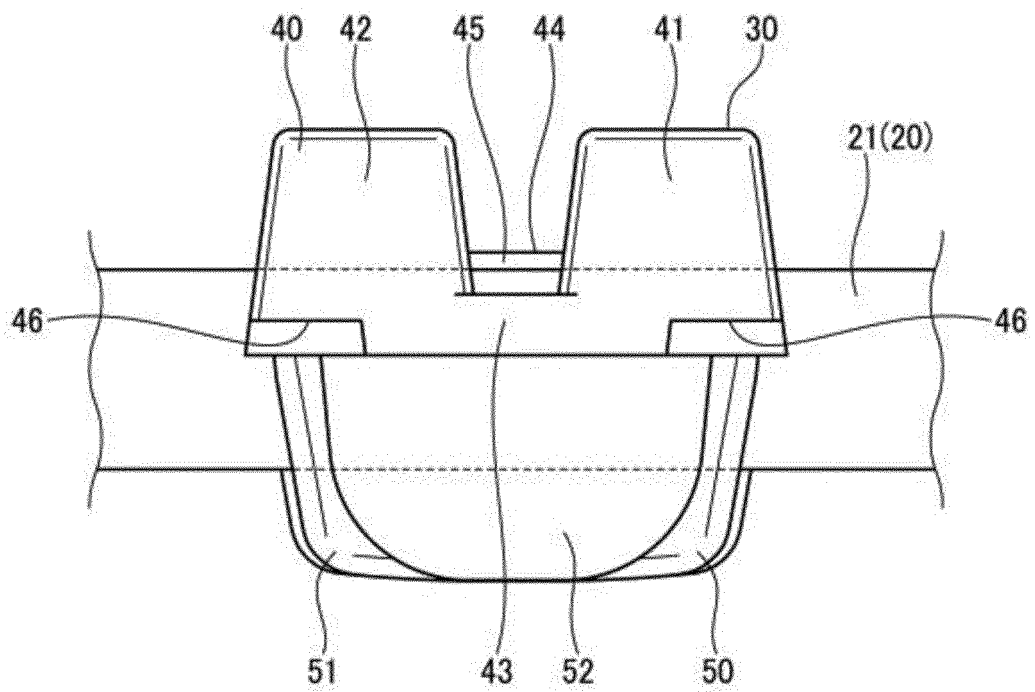
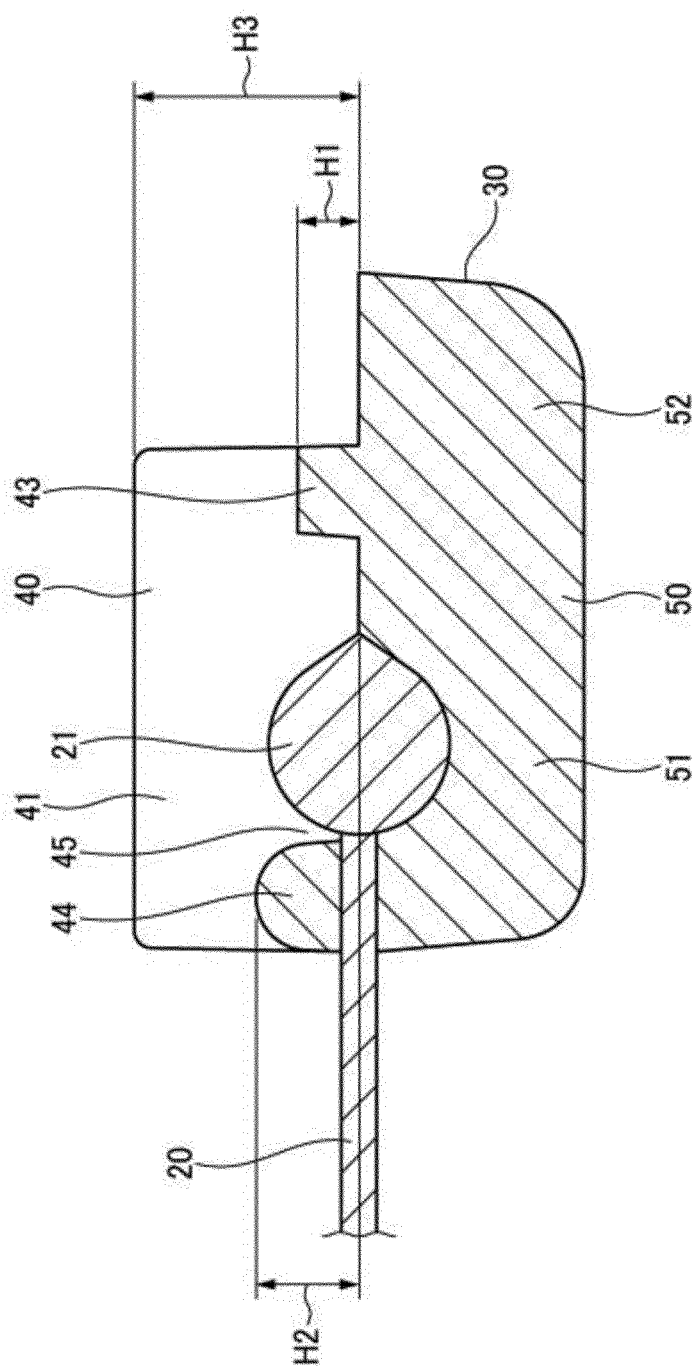


FIG.7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/017816

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. A44B19/02 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. A44B19/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2019

Registered utility model specifications of Japan 1996-2019

Published registered utility model applications of Japan 1994-2019

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	WO 2010/082291 A1 (YKK CORPORATION) 22 July 2010, paragraphs [0019]-[0060], fig. 1-11 & EP 2382888 A1, paragraphs [0019]-[0060], fig. 1-11 & TW 201026248 A & CN 102281787 A	1, 3-4 2, 5



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

23 July 2019 (23.07.2019)

Date of mailing of the international search report

30 July 2019 (30.07.2019)

Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/017816

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2018-47232 A (TSAO, changwen) 29 March 2018, paragraphs [0010], [0014], fig. 4 & US 2018/0078005 A1, paragraphs [0015], [0019], fig. 4 & DE 102017120992 A1 & FR 3056081 A1 & CN 206390415 U & TW M552755 U	1, 3-4
A	CN 103564993 A (SHANGHAI YKK ZIPPER CO., LTD.) 12 February 2014 & WO 2014/015704 A1 & TW 201410176 A	1-5
A	WO 2005/101974 A2 (ARTZIP LTD.) 03 November 2005 & US 2007/0209169 A1 & EP 1781133 A2 & CN 1997296 A	1-5

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 103564993 [0003]
- VN 1201801982 [0032]