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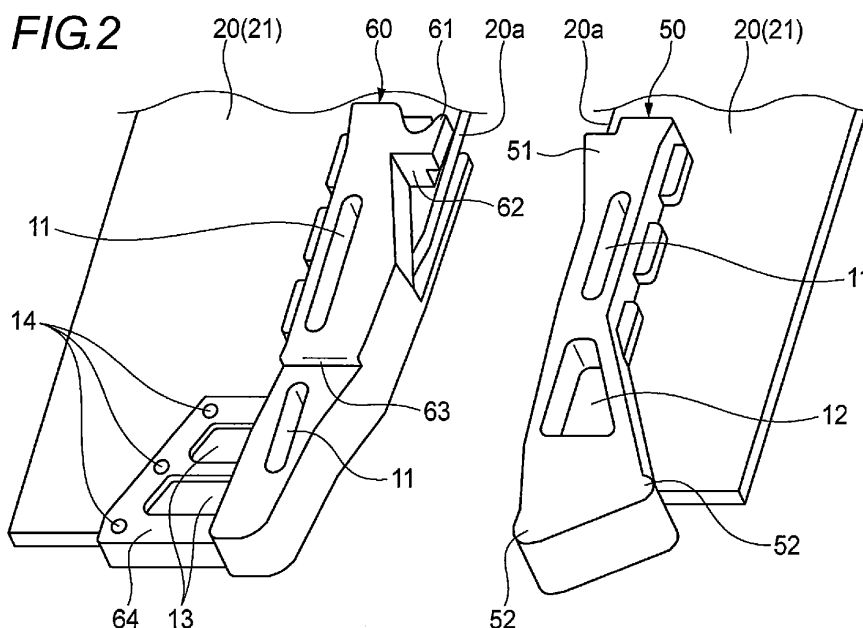
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(54) **SLIDE FASTENER**

(57) There is provided a slide fastener in which the position of a fastener tape can be reliably fixed during injection molding. The slide fastener includes a pair of fastener tapes 20 each having a waterproof layer 21, a pair of fastener element rows 30 each having a plurality of fastener elements 31 which are respectively arranged along opposing side edges 20a of the pair of fastener tapes, an upper opening slider 40A which disengages the engagement of the pair of fastener element rows from

above, a box pin 50 attached to both the front and back surfaces of one end of one fastener tape 20, the one end where the fastener elements are not present, and an insert pin 60 attached to both the front and back surfaces of one end of the other fastener tape 20, the one end where the fastener elements are not present. At least one recess 11, 12 which is elongated in a longitudinal direction of the pair of fastener tapes is formed on each of both the front and back surfaces of the box pin and both the front and back surfaces of the insert pin.



Description**Means for Solving Problems****Technical Field**

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

[0001] The present invention relates to a slide fastener, and more particularly, to a box pin, a box body and an insert pin of the slide fastener.

Background Art

[0002] It is known that in a conventional slide fastener, a plurality of fastener elements are arranged along opposing flat element attachment edges of a pair of waterproof fastener tapes each having a waterproof layer which covers the surface of a strip-like core material, a box pin and an insert pin are integrally fixed in an opposing manner to both the front and back surfaces of flat one end of the pair of fastener tapes, the flat one end in which the fastener elements are not present, the slide fastener has a slider through which the fastener elements pass, and an insert pin-fixing member which extends from a portion of the side surface of the insert pin at a side of a tape end to both the front and back surfaces of the fastener tape and is integrally fixed (e.g., refer to Patent Document 1).

Prior Art Document**Patent Document**

[0003] Patent Document 1: Japanese Patent Application Publication No. 2007-097840A

Summary of Invention**Problems to Be Solved by Invention**

[0004] In the slide fastener described in foregoing Patent Document 1, injection molding is performed in order to form the box pin, the box body and the insert pin on the fastener tapes. The fastener tape is pressed by using a tape-pressing member in order to fix the position of the fastener tape during the injection molding. However, since a waterproof layer made of synthetic resin is provided on the surface of the fastener tape and the tape-pressing member for pressing the edges of the fastener tapes in which the box pin, the box body and the insert pin are to be formed is pin-shaped, the pressing force is weak. Thus, the position of the fastener tape may be moved due to the pressure during the injection molding.

[0005] Accordingly, the present invention has been made keeping in mind the above problems, and an object of the present invention is to provide a slide fastener in which the position of a fastener tape can be reliably fixed during injection molding.

(1) A slide fastener including a pair of fastener tapes each having a waterproof layer, a pair of fastener element rows each having a plurality of fastener elements which are respectively arranged along opposing side edges of the pair of fastener tapes, an upper opening slider configured to disengage engagement of the pair of fastener element rows from above, a box pin attached to both front and back surfaces of one end of one of the fastener tapes, the one end where the fastener elements are not present, and an insert pin attached to both front and back surfaces of one end of the other one of the fastener tapes, the one end where the fastener elements are not present, wherein at least one recess which is elongated in a longitudinal direction of the pair of fastener tapes is formed on each of both front and back surfaces of the box pin and both the front and back surfaces of the insert pin.

(2) The slide fastener according to (1), wherein the at least one recess includes a plurality of recesses, and wherein at least one through-hole is formed on each of the fastener tapes at a position between the plurality of recesses.

(3) The slide fastener according to (1), further including the upper opening slider configured to disengage the engagement of the pair of fastener element rows from above, and a lower opening slider configured to disengage the engagement of the pair of fastener element rows from below, wherein the recess which is formed on the box pin is configured such that a width dimension thereof increases with distance from the fastener elements in the longitudinal direction of the fastener tapes.

(4) The slide fastener according to (1), wherein the at least one recess which is formed on the insert pin includes a plurality of recesses, and wherein the front surface of the insert pin is formed with a step at a position between the plurality of recesses.

Advantageous Effects of Invention

[0007] According to the slide fastener of the present invention, at least one recess which is elongated in a longitudinal direction of the fastener tapes is formed on each of both the front and back surfaces of the box pin and both the front and back surfaces of the insert pin. Thus, it is possible to form the recesses during the injection molding while increasing the pressing area of the tape-pressing member for pressing the fastener tapes to be greater than the pressing area of a conventional pin-shaped tape-pressing member. Consequently, it is possible to reliably fix the position of the fastener tapes during the injection molding. With this configuration, since the

position of the fastener tape during the injection molding is stabilized, it is possible to remarkably increase the attachment strength of the box pin and the insert pin to the fastener tapes. In addition, since the pressing area of the tape-pressing member is large, it is possible to reduce the amount of resin to be used, thereby reducing manufacturing cost.

Brief Description of Drawings

[0008]

FIG. 1 is a front view depicting a first embodiment of a slide fastener according to the present invention; FIG. 2 is an enlarged perspective view illustrating the periphery of the insert pin and the box pin which are shown in FIG. 1;

FIG. 3 is an enlarged front view illustrating the periphery of the insert pin and the box pin which are shown in FIG. 1;

FIG. 4 is an enlarged rear view illustrating the periphery of the insert pin and the box pin which are shown in FIG. 3;

FIG. 5 is a cross-sectional view taken in the direction of arrow along line A-A in FIG. 3;

FIG. 6 is a cross-sectional view taken in the direction of arrow along line B-B in FIG. 3;

FIG. 7 is a cross-sectional view taken in the direction of arrow along line C-C in FIG. 3;

FIG. 8 is an enlarged front view illustrating the periphery of the insert pin and the box pin in a state where the lower opening slider of the slide fastener shown in FIG. 1 is moved in the closing direction;

FIG. 9 is a cross-sectional view illustrating the section corresponding to FIG. 5 in a state where the fastener tape is disposed within a mold;

FIG. 10 is a cross-sectional view illustrating the section corresponding to FIG. 6 in a state where the fastener tape is disposed within a mold;

FIG. 11 is an enlarged cross-sectional view depicting a modified embodiment of the slide fastener of the first embodiment;

FIG. 12 is a cross-sectional view illustrating the section corresponding to FIG. 11 in a state where the fastener tape is mounted within a mold;

FIG. 13 is an enlarged front view depicting a second embodiment of the slide fastener according to the present invention, and illustrating the periphery of an insert pin and a box pin in a state where elements are disengaged; and

FIG. 14 is an enlarged front view illustrating the periphery of the insert pin and the box pin of the slide fastener of the second embodiment in a state where the elements are engaged.

Embodiments of Invention

[0009] Hereinafter, each embodiment of a slide fastener

er according to the present invention will be described in detail with reference to the accompanying drawings. In the following description, as for the fastener tape, a front side refers to a near side with respect to the paper surface of FIG. 1, a back side refers to a far side with respect to the paper surface of FIG. 1, and a direction perpendicular to the plane of the fastener tape may be referred to as a front-back direction. An upper side refers to an upper side with respect to the paper surface of FIG. 1, a lower 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. As for the slider, an upper side refers to a near side with respect to the paper surface of FIG. 1 (a side in which a pull-tab which will be described later is provided), a lower side refers to a far side with respect to the paper surface of FIG. 1, a front side refers to an 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. In addition, the left and right direction of the fastener tape and the slider is also referred to as a width direction. In addition, an up-down direction is also referred to as a longitudinal direction of the fastener tape. The width direction is also a direction that is parallel to the plane of the fastener tape and perpendicular to the longitudinal direction.

[First Embodiment]

[0010] A first embodiment of the slide fastener according to the present invention will be described first with reference to FIG. 1 to FIG. 12.

[0011] As shown in FIG. 1 and FIG. 2, the slide fastener 10 of this embodiment includes a pair of left and right fastener tapes 20, a pair of left and right fastener element rows 30, an upper opening slider 40A, a lower opening slider 40B, a box pin 50, an insert pin 60 and top end stops 70. Each of the pair of left and right fastener tapes 20 has waterproof layers 21 on front and back surfaces of a woven or knitted tape material. The waterproof layers 21 are made of a synthetic resin thermoplastic elastomer (e.g. polyester elastomer, polyurethane elastomer, or the like). Each of the pair of left and right fastener element rows 30 has a plurality of fastener elements 31 which are respectively arranged along opposing tape side edges 20a of the pair of left and right fastener tapes 20. Each of the upper and lower opening sliders 40A, 40B passes the pair of left and right fastener element rows 30 there-through, and engage and disengage the pair of left and right fastener element rows 30 with and from each other. The box pin 50 is attached to both the front and back surfaces of the lower end (one end) of the right (one) fastener tape 20, where the fastener elements 31 are not present. The insert pin 60 is attached to both the front and back surfaces of the lower end (one end) of the left

(the other) fastener tape 20, where the fastener elements 31 are not present. The top end stops 70 are respectively attached to upper ends of the pair of left and right fastener tapes 20, where the fastener elements 31 are not present.

[0012] The waterproof layer 21 is a layer that does not allow fluid such as water to pass through. Here, the fluid is not limited to water but may be any types of liquid (fluid), for example, oil or gas. In addition, the tape material may be non-woven fabric rather than the woven or knitted material. In addition, the top end stops 70 may be provided on the pair of left and right fastener tapes 20, or no top end stops 70 may be provided. In this case, when attaching the slide fastener 10 to an object such as a garment, the slide fastener 10 is attached such that the upper opening slider 40A is not dislodged.

[0013] Each of the pair of left and right fastener element rows 30 is composed of a plurality of fastener elements 31. Each fastener element 31 is formed on the tape side edge 20a of the fastener tape 20 by injection molding using synthetic resin, such as polyamide, polyacetal, polypropylene, polybutyleneterephthalate, or the like.

[0014] The upper opening slider 40A and the lower opening slider 40B are sliders with automatic stop function, and are provided such that rear mouth sides thereof face each other. When the upper opening slider 40A is moved upwards (in a direction away from the lower opening slider 40B) by pulling a pull-tab 41, the left and right fastener element rows 30 which are in the disengaged state are engaged with each other. When the upper opening slider 40A is moved downwards (in a direction approaching the lower opening slider 40B), the left and right fastener element rows 30 which are in the engaged state are disengaged from each other. In addition, when the lower opening slider 40B is moved upwards (in a direction approaching the upper opening slider 40A) by pulling the pull-tab 41, the left and right fastener element rows 30 which are in the engaged state are disengaged from each other. When the lower opening slider 40B is moved downwards (in a direction away from the upper opening slider 40A), the pair of left and right fastener element rows 30 which are in the disengaged state are engaged with each other.

[0015] Each of the box pin 50 and the insert pin 60 is formed on the respective lower ends of the tape side edges 20a of the fastener tapes 20, as shown in FIG. 2 to FIG. 7, by injecting molding using synthetic resin, such as polyamide, polyacetal, polypropylene, polybutyleneterephthalate, or the like.

[0016] The box pin 50 is a member that is substantially rectangular column-shaped. The box pin 50 is configured such that at the lower end thereof the width dimension thereof increases with distance from the fastener elements 31 in the longitudinal direction of the fastener tapes 20 (in the downward direction). In addition, a stopper 51 is formed on a side surface of the upper end of the box pin 50, the side surface that faces the insert pin 60. The stopper 51 is configured to be engaged with an engagement recess 62 of the insert pin 60, which will be de-

scribed later, and as shown in FIG. 8, determines an inserting position of the insert pin 60 into the lower opening slider 40B.

[0017] The insert pin 60 is a member that is substantially rectangular column-shaped. The insert pin 60 has an engagement section 61 on a side surface of the upper end thereof, the side surface that faces the box pin 50. As shown in FIG. 8, the engagement section 61 is configured to be engaged with the lowermost fastener element 31 of the fastener element row 30 at a side of the box pin 50. In addition, the engagement recess 62 configured to be engaged with the stopper 51 of the box pin 50 is formed on a side surface of the insert pin 60 below the engagement section 61. In addition, as shown in FIG. 7 and FIG. 8, a step 63 is formed on the front surface of the insert pin 60 at substantially the central section thereof. A stop claw 44 of the lower opening slider 40B is configured to be engaged with the step 63. As shown in FIG. 7, the thickness of the lower side of the step 63 in the front-back direction is smaller than that of the upper side of the step 63. In addition, as shown in FIG. 2 to FIG. 4, an insert pin-fixing member 64 is formed on a side surface of the lower end of the insert pin 60, the side surface that is directed away from the box pin 50. The insert pin-fixing member 64 extends outwardly in the width direction (in a direction away from the box pin 50) from the side surface of the insert pin 60, and is formed on both the front and back sides of the fastener tape 20. In addition, the thickness of the insert pin-fixing member 64 is set to be smaller than that of the insert pin 60.

[0018] In the above-described embodiment, the insert pin 60 is a member that is to be inserted from the left side of a guide post of the upper opening slider 40A, and the box pin 50 is a member that holds the upper opening slider 40A and the lower opening slider 40B. Therefore, the insert pin 60 and the box pin 50 are accommodated inside the upper opening slider 40A and the lower opening slider 40B, and the dimension thereof in the front-back direction is formed to be greater than that of the fastener tape 20. Thus, the insert pin 60 and the box pin 50 abuts flanges of the slider when the insert pin 60 and the box pin 50 are accommodated inside the slider and this prevents the insert pin 60 and the box pin 50 from escaping in the width direction.

[0019] Here, describing the slide fastener 10, in a state where the upper opening slider 40A and the lower opening slider 40B are moved to the lower end (to the box pin 50), the insert pin 60 is inserted into the upper opening slider 40A until the insert pin 60 is engaged with the stopper 51 of the box pin 50. Afterwards, the upper opening slider 40A is moved upwards, so that the left and right fastener element rows 30 are engaged with each other, thereby closing the slide fastener 10. When the lower opening slider 40B is moved upwards in this state, the left and right fastener element rows 30 are separated from a side of the box pin 50 and the insert pin 60.

[0020] In this embodiment, as shown in FIG. 2 to FIG. 7, both the front and back surfaces of the box pin 50 are

formed with recesses 11, 12 each having a depth such that the recess 11, 12 reaches the fastener tape 20 from the front or back surface of the box pin 50. Both the front and back surfaces of the insert pin 60 is formed with recesses 11, 11 having a depth such that the recess 11 reaches the fastener tape 20 from the front or back surface of the insert pin 60. The recesses 11, 12 are formed as tape-pressing members 81 of a mold 80 shown in FIG. 9 and FIG. 10 (a mold at a side of the insert pin 60 is not shown) press the fastener tapes 20 when forming the box pin 50 and the insert pin 60 by the injection molding. Consequently, the recesses 11 and 12 are formed at an inner side than the tape side edges 20a of the fastener tapes 20 (i.e. on the fastener tapes 20). In the meantime, reference numeral 82 in FIG. 9 and FIG. 10 denotes a cavity with which molten resin is filled in order to form the box pin 50 by injection molding. Reference numeral 83 denotes an element-accommodating space in which the fastener elements 31 are to be accommodated during the injection molding. Since the tape-pressing members 81 press the fastener tapes 20 along the tape side edges 20a, the tape side edges 20a are not waved in the front-back direction.

[0021] In addition, the recess 11 of the box pin 50 at a side of the fastener element row 30 and the recesses 11 of the insert pin 60 are formed into an elongated circular shape along the longitudinal direction of the fastener tapes 20. The recess 12 of the box pin 50 at a lower side (below the above recess 11) have a substantially trapezoidal shape along the longitudinal direction such that the width dimension thereof increases with distance from the fastener elements 31 in the longitudinal direction of the fastener tapes 20 (in the downward direction). In addition, as shown in FIG. 3 and FIG. 4, two trapezoidal-shaped recesses 13 and three circular-shaped recesses 14 are formed on each of both the front and back surfaces of the insert pin-fixing member 64. In addition, as shown in FIG. 1, an recess 15 which is formed into elongated circular shape along the longitudinal direction of the fastener tapes is formed on each of both the front and back surfaces of the top end stops 70.

[0022] In addition, as shown in FIG. 3 to FIG. 7, in the right fastener tape 20, fixing through-holes 22 are formed at positions above the recess 11 of the box pin 50, between the recesses 11, 12, and below the recess 12. With this configuration, the box pin 50 on the front surface of the fastener tape 20 and the box pin 50 on the back surface of the fastener tape 20 are connected in the front-back direction via connecting sections 22a which are formed in three fixing through-holes 22. In the meantime, the fixing through-holes 22 penetrate through the fastener tape 20 in the front-back direction.

[0023] In addition, in the left fastener tape 20, the fixing through-holes 22 are formed at positions above the recess 11, between the recesses 11, 11, and below the recess 11 of the insert pin 60. With this configuration, the insert pin 60 on the front surface of the fastener tape 20 and the insert pin 60 on the back surface of the fastener

tape 20 are connected in the front-back direction via connecting sections 22a which are formed in three fixing through-holes 22. In addition, a fixing through-hole 23 which is the same as the fixing through-holes 22 is also formed at a position between upper recesses 14, 14 of the insert pin-fixing member 64.

[0024] In addition, fixing through-holes 24 are formed at forming positions of respective fastener elements 31 on the pair of left and right fastener tapes 20. With this configuration, the fastener elements 31 on the front surface of the fastener tape 20 and the fastener elements 31 on the back surface of the fastener tape 20 are connected in the front-back direction via connecting sections 24a which are formed in the fixing through-holes 24.

[0025] As described above, according to the slide fastener 10 of this embodiment, the recesses 11 and 12 which are elongated in the longitudinal direction of the fastener tapes 20 are formed on both the front and back surfaces of the box pin 50 and both the front and back surfaces of the insert pin 60. Thus, it is possible to form the recesses 11, 12 during the injection molding while increasing the pressing area of the tape-pressing members 81 for pressing the fastener tapes 20 to be greater than the pressing area of a conventional pin-shaped tape-pressing member. It is therefore possible to reliably fix the position of the fastener tapes 20 in the width direction and in the front-back direction during the injection molding. With this configuration, since the position of the fastener tapes 20 during the injection molding is stabilized when forming the box pin 50 and the insert pin 60 on the fastener tapes 20 having the waterproof layer 21, it is therefore possible to remarkably increase the attachment strength of the box pin 50 and the insert pin 60 to the fastener tapes 20. In addition, since the pressing area of the tape-pressing members 81 is large, it is possible to reduce the amount of resin to be used, thereby reducing manufacturing cost. Furthermore, the longitudinal dimension of each of the recesses 11, 12 is greater than the width dimension thereof, preferably, the longitudinal dimension is more than twice the width dimension, and more preferably, the longitudinal direction is more than three times the width dimension.

[0026] In addition, according to the slide fastener 10 of this embodiment, the fixing through-holes 22 are formed on the fastener tapes 20 at positions between the recesses 11, 12 (11, 11), and the box pin 50 and the insert pin 60 are connected in the front-back direction via the fixing through-holes 22 in a state where the fastener tapes 20 are reliably pressed. Thus, it is possible to further increase the attachment strength of the box pin 50 and the insert pin 60 to the fastener tapes 20.

[0027] In addition, according to the slide fastener 10 of this embodiment, the recess 12 which is formed on the box pin 50 is configured such that the width dimension thereof increases with distance from the fastener elements 31 in the longitudinal direction of the fastener tapes 20. Thus, it is therefore possible to further increase the pressing area of the tape-pressing members 81 at the

lower end side of the fastener tape 20, thereby further reliably fixing the position of the fastener tape 20 during the injection molding. In addition, it is possible to further decrease the amount of resin to be used, thereby further reducing the manufacturing cost.

[0028] In addition, in order to maintain the strength of the box pin 50 and the insert pin 60, it is preferable to form the recesses 11 of the insert pin 60 so as to be positioned below the engagement section 61, as shown in FIG. 8. Consequently, in a state where the engagement section 61 is engaged with the lowermost fastener element 31 at a side of the box pin 50, the strength can sufficiently stand against lateral pulling force. Further, the lower recess 11 of the recesses 11 of the insert pin 60 is positioned at a left side relative to an abutting position between the step 63 and the stop claw 44 in a state where the lower opening slider 40B abuts against the step 63. This consequently prevents the stop claw 44 of the lower opening slider 40B from being clogged in the recess 11. In addition, the recesses 11 of the box pin 50 are formed so as to be positioned below the surface in which the stopper 51 is engaged with the engagement recess 62 of the insert pin 60. Thus, the attachment strength can be maintained.

[0029] In addition, according to the slide fastener 10 of this embodiment, a plurality of recesses 11, 11 are formed on the insert pin 60 and the step 63 is formed at a position between the recesses 11, 11 on the front surface of the insert pin 60. It is therefore possible to form the step 63 at a suitable position of the insert pin 60 on which the recesses 11 and 11 are formed.

[0030] As a modified embodiment of this embodiment, as shown in FIG. 11 and FIG. 12, the waterproof layer 21 may be provided only on the front surface of the fastener tapes 20.

[Second Embodiment]

[0031] In sequence, a second embodiment of the slide fastener according to the present invention is described with reference to FIG. 13 and FIG. 14. In the meantime, as for the same or equivalent portions as the first embodiment, the same reference numerals will be used in the drawings and descriptions of some features will be omitted or simplified.

[0032] As shown in FIG. 13 and FIG. 14, the fastener 10 of this embodiment uses an opening unit 90 in place of an inverse opening unit which includes the box pin 50, the insert pin 60 and the lower opening slider 40B in the first embodiment. Therefore, although not shown, the slide fastener 10 of this embodiment has only the upper opening slider 40A.

[0033] The opening unit 90 includes the box pin 50, a box body 55 and the insert pin 60. The box pin 50 and the box body 55 are formed on the lower end of the tape side edge 20a of the right fastener tape 20. The insert pin 60 is formed on the lower end of the tape side edge 20a of the left fastener tape 20, and can be inserted into

the box body 55.

[0034] The box body 55 is integrally molded on the lower section of the box pin 50, and an insert pin-receiving space 56 is formed in the left half section of the box body 55. The insert pin-receiving space 56 is opened in the up-down direction such that the insert pin 60 is inserted thereto. In addition, a slit 57a is formed on a sidewall section 57 at a side of the insert pin 60, the sidewall section defining the insert pin-receiving space 56, such that the insert pin-fixing member 64 of the insert pin 60 is to be inserted thereto. In addition, rectangular-shaped recesses 16 are formed on both the front and back surfaces of the right half section of the box body 55, along the longitudinal direction of the fastener tapes 20. Each recess 16 has a depth such that the recess 16 reaches the fastener tape 20. Although the box pin 50 and the box body 55 are integrally molded in this embodiment, this is not limited. The box pin 50 and the box body 55 may be molded as separate pieces, and the box body 55 may be engaged with and fixed to the lower section of the box pin 50.

[0035] As described above, according to the slide fastener 10 of this embodiment, the recesses 11, 16 which are elongated in the longitudinal direction of the fastener tapes 20 are formed on both the front and back surfaces of the box pin 50, the box body 55 and the insert pin 60. Thus, it is possible to form the recesses 11, 16 during the injection molding while increasing the pressing area of the tape-pressing members for pressing the fastener tapes 20 to be greater than the pressing area of a conventional pin-shaped tape-pressing member. Consequently, it is possible to reliably fix the position of the fastener tapes 20 in the width direction and in the front-back direction during the injection molding. With this configuration, since the position of the fastener tapes 20 during the injection molding is stabilized when forming the box pin 50 and the insert pin 60 on the fastener tapes 20 having the waterproof layer 21, it is therefore possible to remarkably increase the attachment strength of the box pin 50, the box body 55 and the insert pin 60 to the fastener tapes 20. In addition, since the pressing area of the tape-pressing members is large, it is possible to reduce the amount of resin to be used, thereby reducing manufacturing cost.

The other configurations, operations and advantageous effects are the same as those of the above-described first embodiment.

[0036] In the meantime, the present invention is not limited to those that were illustrated in the foregoing embodiments but can be suitably changed without departing from the concept of the invention.

In an example, the fastener element row can be prepared by other methods than the injection molding. Specifically, coil-type fastener elements which are formed by molding a mono-filament into the shape of a coil may be arranged on the tape side edge 20a.

Description of Reference Numerals**[0037]**

10 Slide Fastener

11 Recess

12 Recess

16 Recess

20 Fastener Tape

20a Tape Side Edge

21 Waterproof Layer

22 Fixing Through-Hole

30 Fastener Element Row

31 Fastener Element

40a Upper Opening Slider

40B Lower Opening Slider

50 Box Pin

55 Box Body

60 Insert Pin

of fastener tapes is formed on each of both front and back surfaces of the box pin and both front and back surfaces of the insert pin.

5 **2.** The slide fastener according to claim 1, wherein the at least one recess (11, 12) comprises a plurality of recesses, and wherein at least one through-hole (22) is formed on each of the fastener tapes (20) at a position between the plurality of recesses (11, 12).

10 **3.** The slide fastener according to claim 1, further comprising:

15 the upper opening slider (40A) configured to disengage the engagement of the pair of fastener element rows (30) from above; and a lower opening slider (40B) configured to disengage the engagement of the pair of fastener element rows from below, wherein the recess (12) which is formed on the box pin (50) is configured such that a width dimension thereof increases with distance from the fastener elements (31) in the longitudinal direction of the fastener tapes (20).

20 **4.** The slide fastener according to claim 1, wherein the at least one recess (11) which is formed on the insert pin (60) comprises a plurality of recesses, and wherein the front surface of the insert pin is formed with a step (63) at a position between the plurality of recesses.

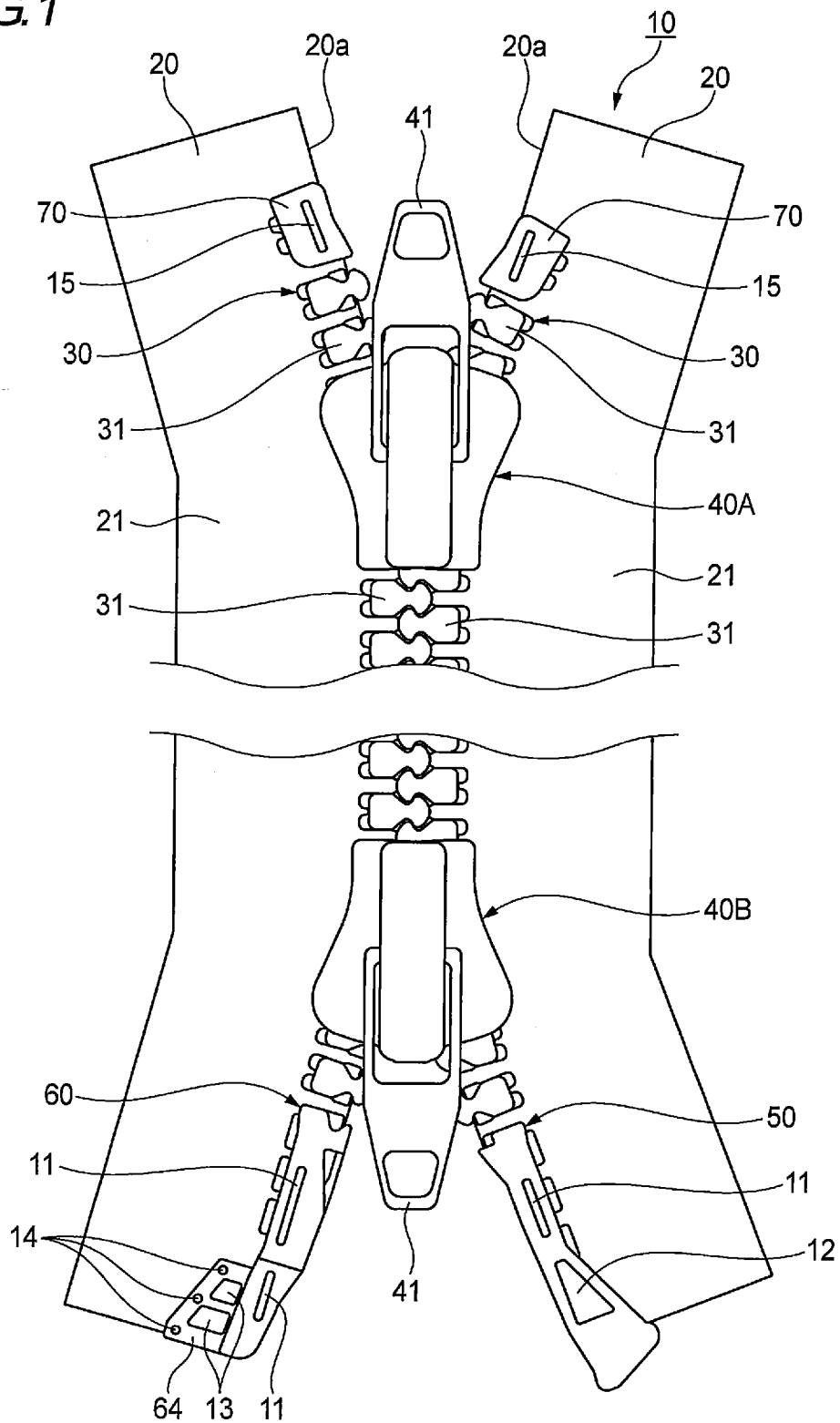
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Claims

1. A slide (10) fastener comprising:

a pair of fastener tapes (20) each having a waterproof layer (21); 40
a pair of fastener element rows (30) each having a plurality of fastener elements (31) which are respectively arranged along opposing side edges (20a) of the pair of fastener tapes; 45
an upper opening slider (40A) configured to disengage engagement of the pair of fastener element rows from above;
a box pin (50) attached to both front and back surfaces of one end of one of the fastener tapes, the one end where the fastener elements are not present; and 50
an insert pin (60) attached to both front and rear surfaces of one end of the other one of the fastener tapes, the one end where the fastener elements are not present, 55
wherein at least one recess (11, 12) which is elongated in a longitudinal direction of the pair

FIG. 1



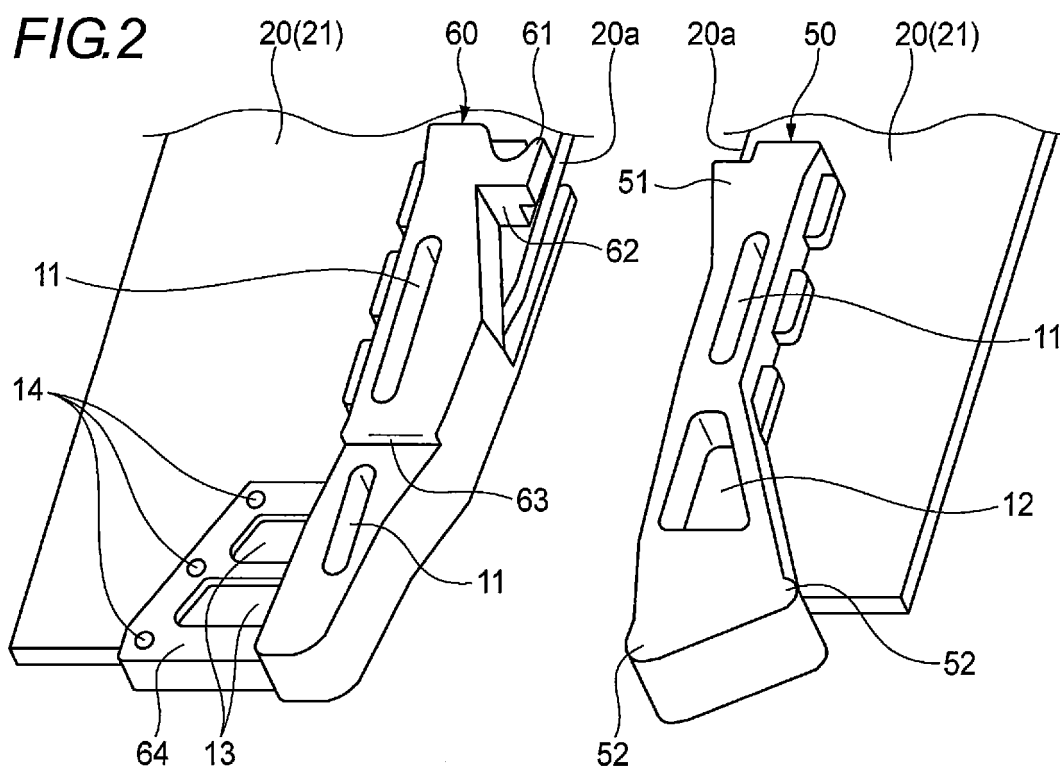


FIG.3

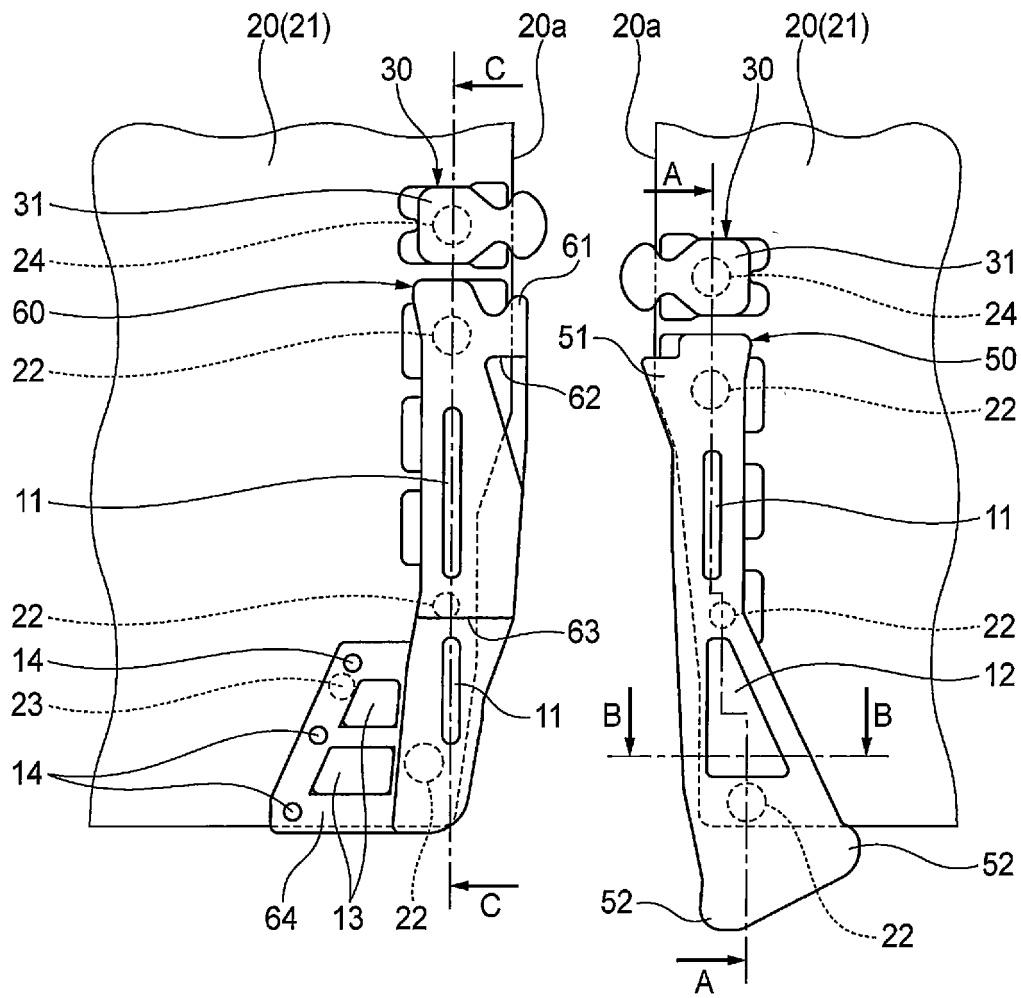


FIG. 4

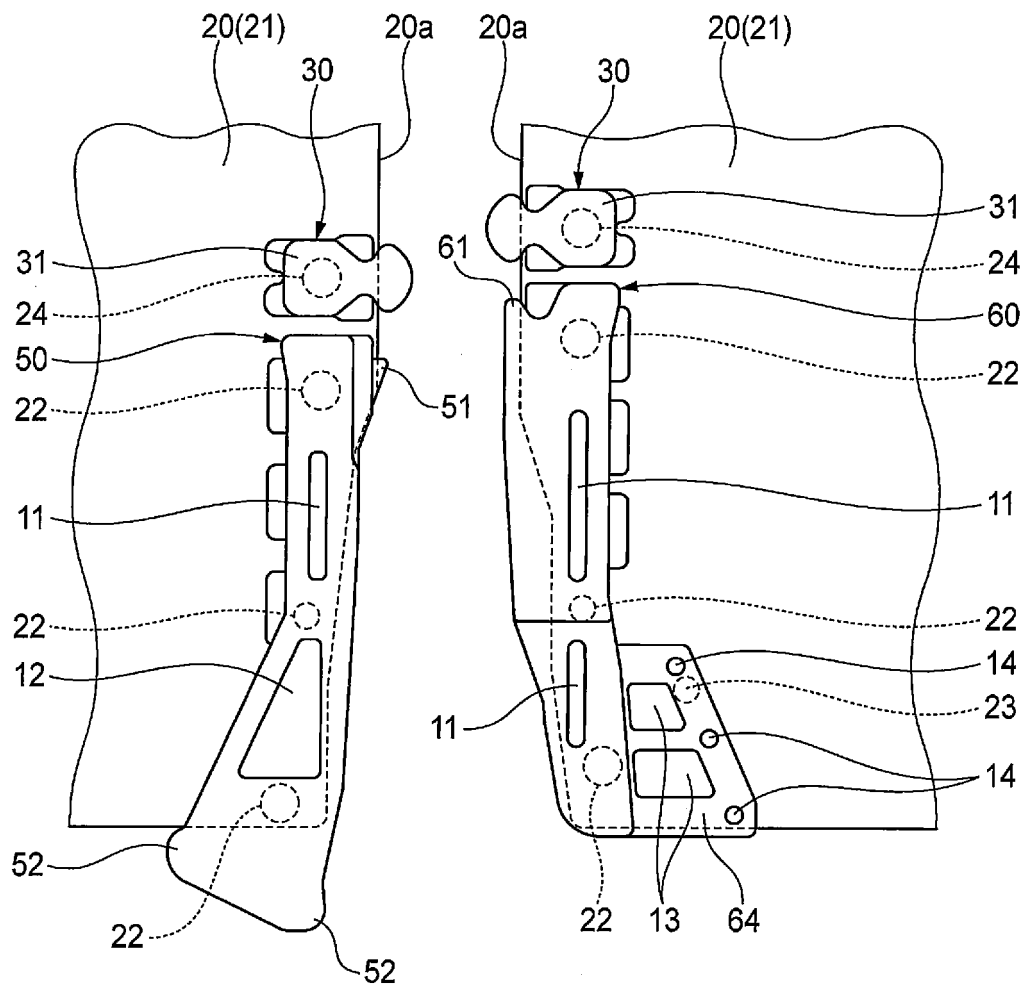


FIG.5

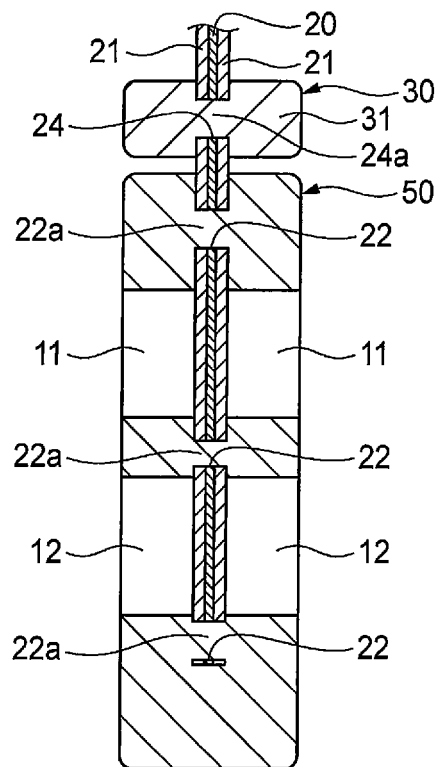


FIG.6

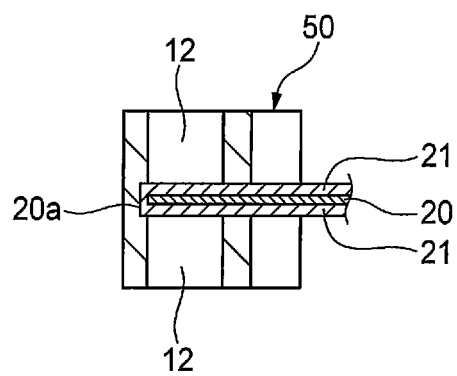


FIG. 7

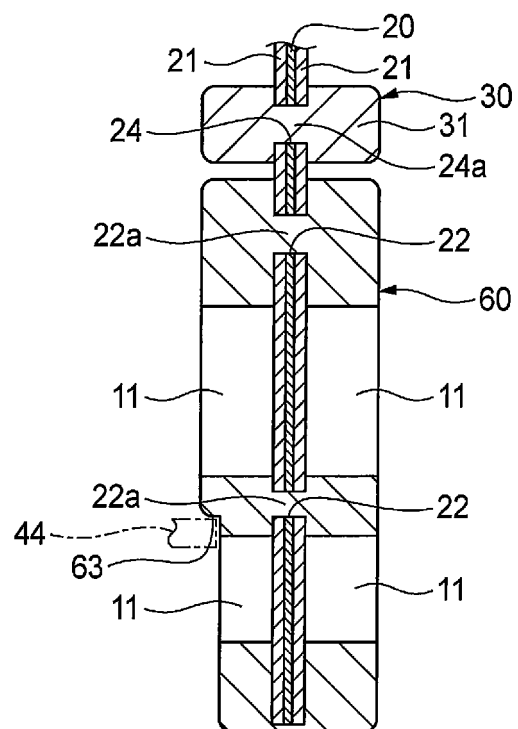


FIG. 8

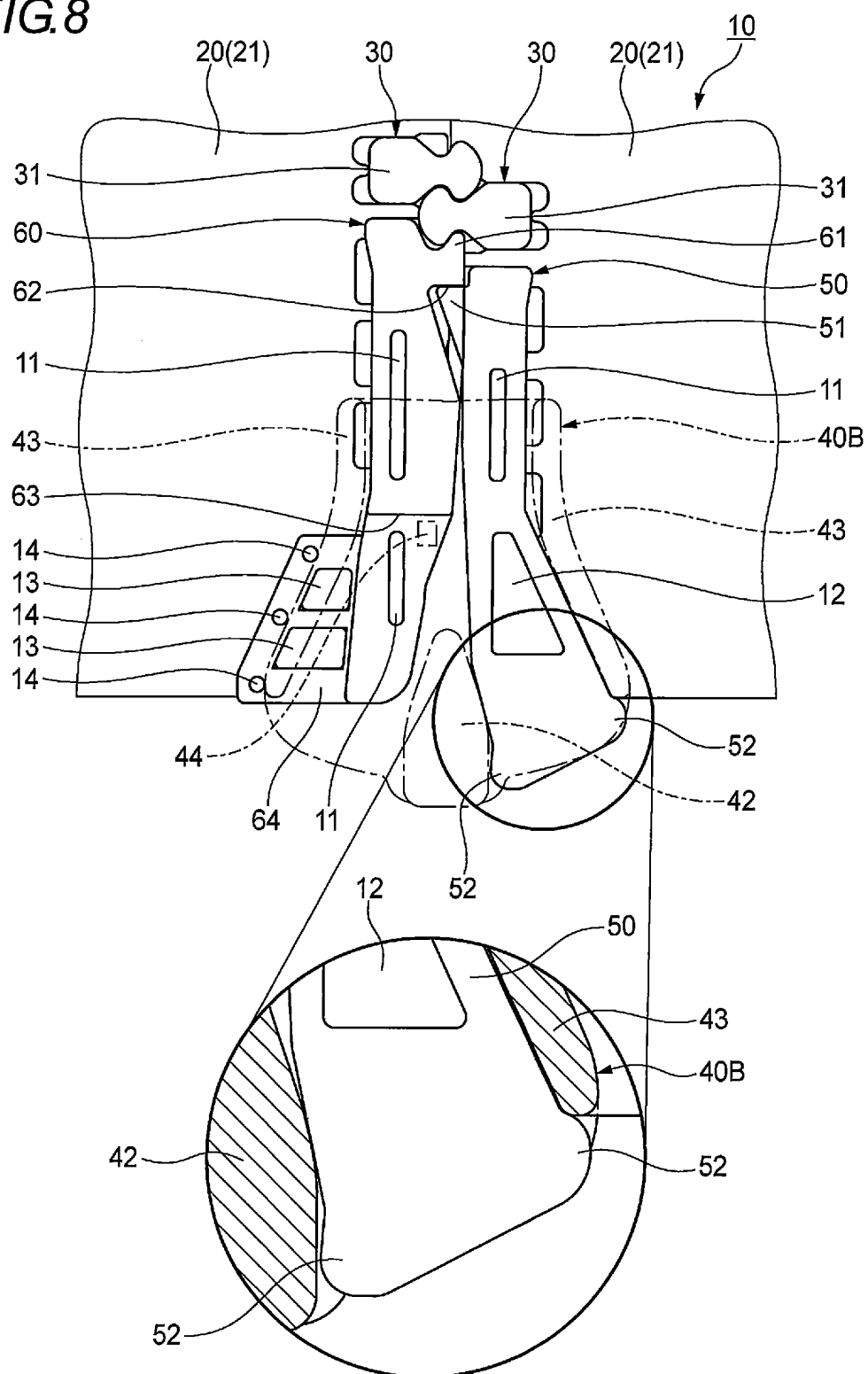


FIG. 9

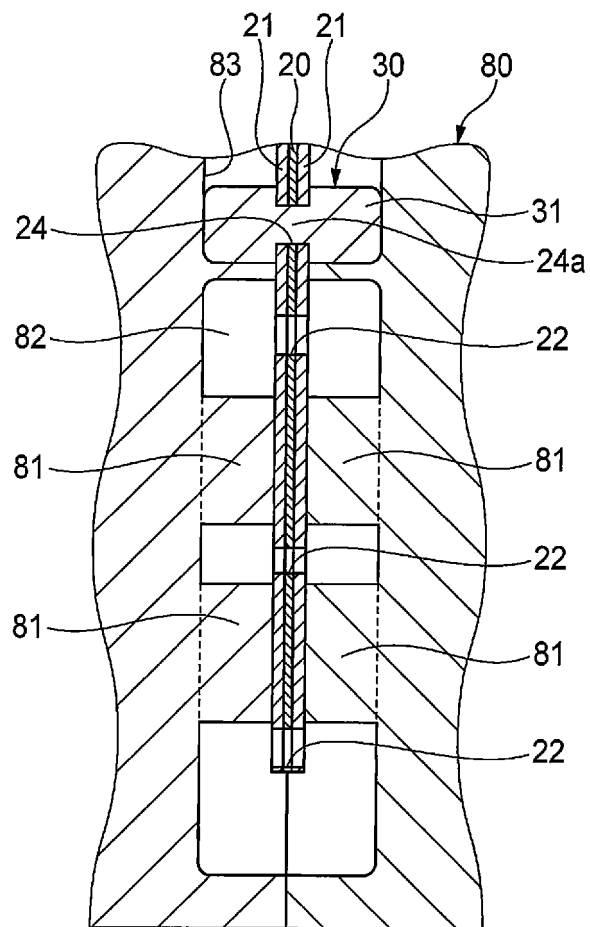


FIG.10

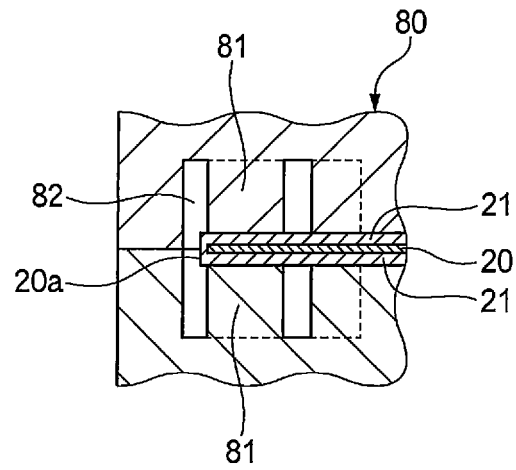


FIG.11

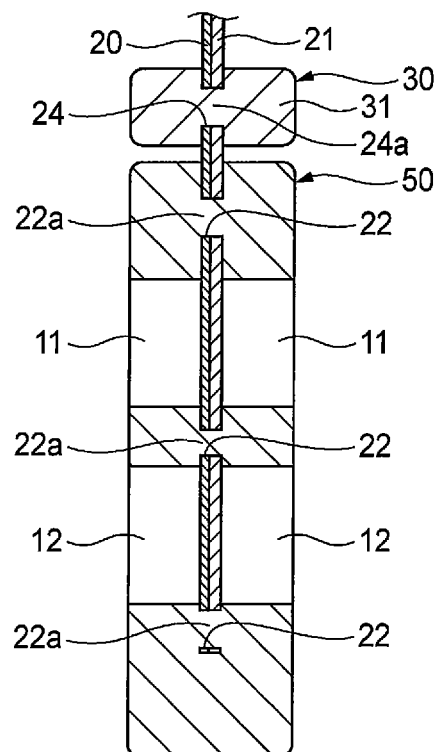


FIG. 12

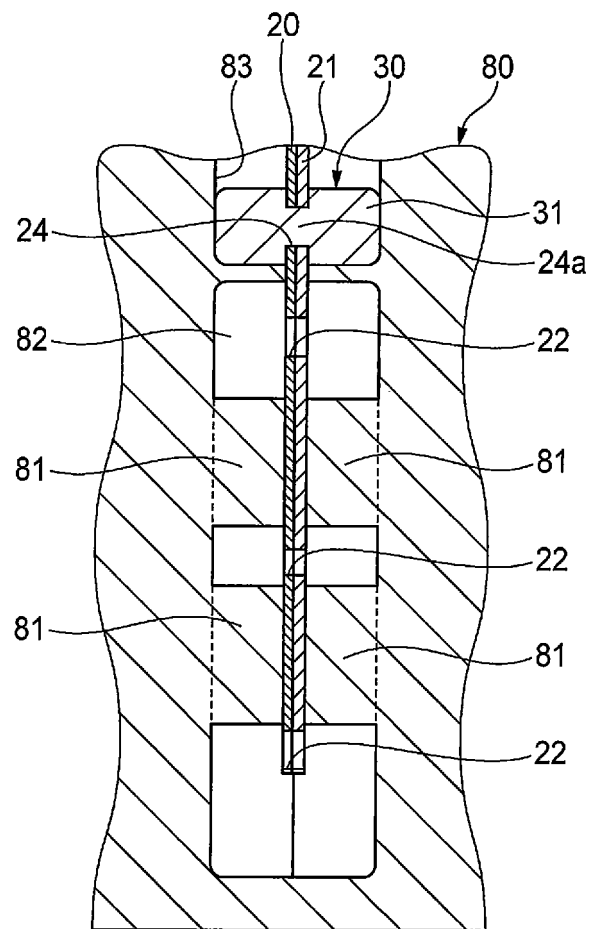


FIG.13

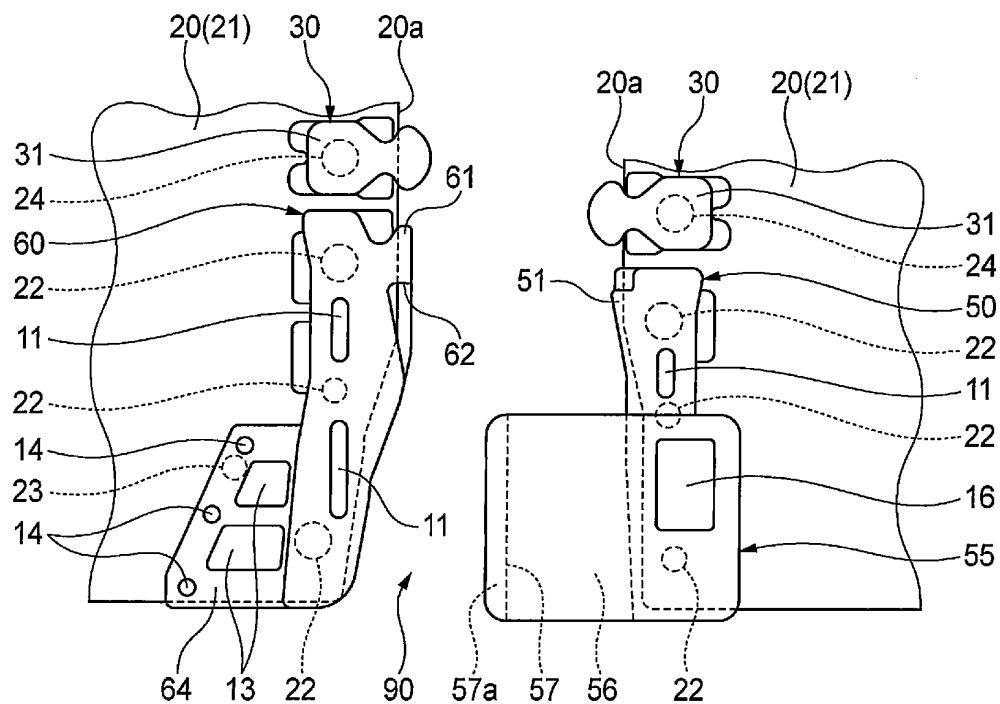
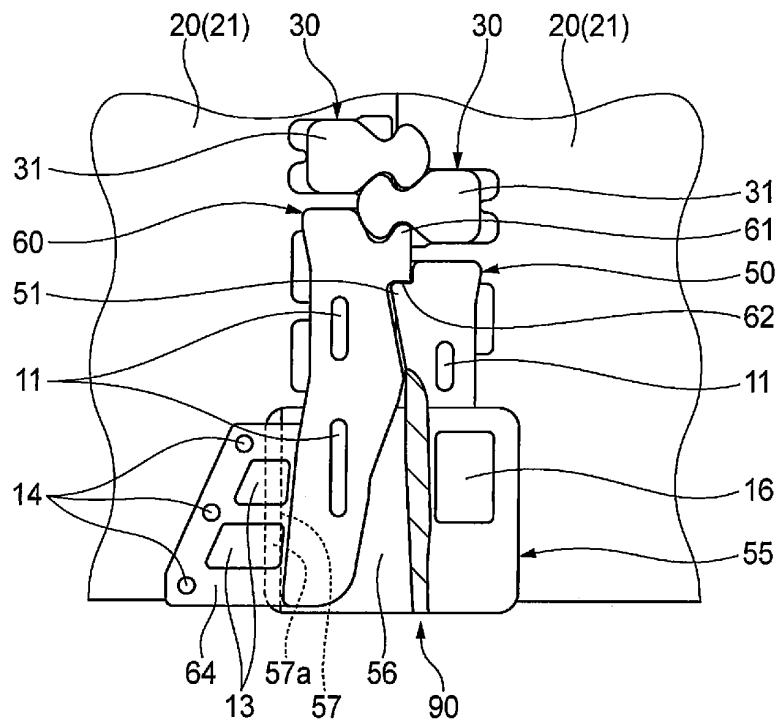


FIG.14



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/059219

A. CLASSIFICATION OF SUBJECT MATTER

A44B19/38 (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)

A44B19/38

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2010

Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010

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.
X Y	JP 2007-97840 A (YKK Corp.), 19 April 2007 (19.04.2007), entire text; all drawings & US 2007/0074380 A1 & EP 1772071 A1 & KR 10-2007-0037999 A & CA 2561984 A1	1, 3-4 2
Y	JP 2003-266439 A (Nissan Motor Co., Ltd.), 24 September 2003 (24.09.2003), fig. 7 (Family: none)	2
Y	JP 10-6352 A (Nanjo Sobi Kogyo Co., Ltd.), 13 January 1998 (13.01.1998), fig. 4 (Family: none)	2

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search
02 August, 2010 (02.08.10)Date of mailing of the international search report
10 August, 2010 (10.08.10)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/059219

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2008-43568 A (YKK Corp.), 28 February 2008 (28.02.2008), paragraphs [0029] to [0053]; fig. 1 to 6 & US 2008/0040901 A1 & EP 1889552 A2 & KR 10-2008-0016477 A & CN 101152030 A	1

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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