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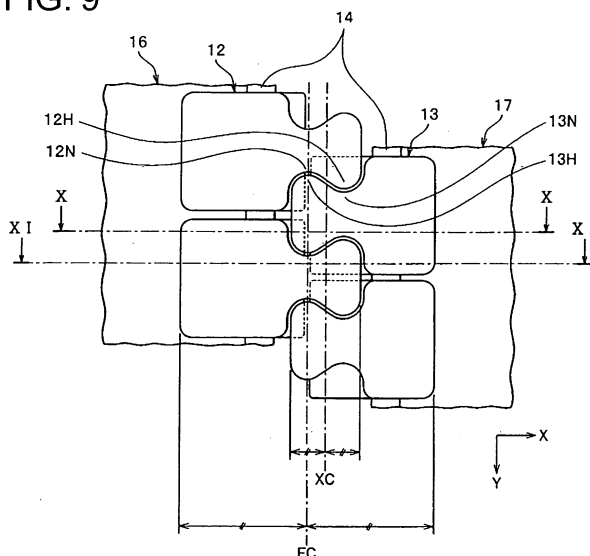
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(54) **SLIDE FASTENER**

(57) In a slide fastener in which engaging of a left-right direction in the slide fastener is performed by alternately engaging engagement neck portions (12N, 13N) and engagement head portions (12H, 13H) respectively formed in a pair of first and second element (12, 13) rows of left and right, and engaging of a front-back direction in the slide fastener is performed by alternately engaging back latch portions (12R, 13R) formed on front surface sides of the engagement head portions (12H, 13H) of the first and second element (12, 13) rows and front latch portions (12D, 13D) formed on sides and front surface sides in the engagement head portions (12H, 13H) or the engagement neck portions (12N, 13N), an extension length (12L) of the front latch portion (12D) in the first

element (12) row is formed to be shorter than an extension length (13L) of the front latch portion (13D) in the second element (13) row. When performing engaging and disengaging of the first and second element (12, 13) rows, joining or separation from the front-back direction and the left-right direction is obliquely performed, and thus it is possible to increase a curvature of the left-right direction of the first and second element (12, 13) rows when performing engaging and disengaging. As a result, a gap between the first and second elements (12, 13) that are lined, respectively, is narrowed, and an occupied area of the elements in the engaging state increases, and thus an appearance of the front surface of the slide fastener can be aesthetically finished.

FIG. 9



Description

TECHNICAL FIELD

[0001] The invention relates to a slide fastener in which, for example, in a case where a slide fastener is used to open or close right and left front bodies of clothing, elements capable of aesthetically finishing an appearance of a slide fastener front surface shown at a front side of corresponding clothing are lined.

BACKGROUND ART

[0002] Conventionally, performing decorations on front surfaces of elements lined in a slide fastener or forming the shape of each element in the shape of goods or in the shape of a logo mark has been known (for example, see Patent Document 1).

[0003] Further, conventionally, a three-dimensional slide fastener has been known in which elements in which a protruding edge capable of increasing the lateral pulling strength in a width direction (a right-left direction) of the slide fastener and a fitting groove engaged to the protruding edge are formed are lined, and when engaging left and right elements to each other, left and right element rows are introduced from left and right shoulder mouths of a slider at different front-back levels, and the left and right element rows are obliquely joined and engaged from a front-back direction and a left-right direction (for example, see Patent Documents 2 and 3).

Patent Document 1: WO 2005/101974 A

Patent Document 2: Japanese Patent Application Publication No. 61-22961

Patent Document 3: Japanese Patent Application Publication No. 62-40002

DISCLOSURE OF INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0004] In the slide fastener described in Patent Document 1, the surface of an element is formed in the shape of goods or a logo mark, and it has a design that attracts a user's attention when enlarged and viewed. Generally, the long side of each of elements of the slide fastener has the size of about 3 mm to 5 mm. Thus, there arises a problem in that it is difficult to recognize the shape of goods or the logo mark shown on the element when viewed from some distance.

[0005] Further, in the slide fastener having an element by resin molding usually used in the past and the three-dimensional slide fasteners described in Patent Documents 2 and 3, since the shape of the single element has a functional shape necessary when engaged, the appearance is obviously the slide fastener itself, and it is difficult to perform an aesthetic arrangement for the appearance. Thus, there has been a problem in that the

slide fasteners have not been merged with a design of goods in a case where used in goods such as clothing, bags, or the like.

[0006] Further, in the conventional slide fastener, when engaging the left and right elements fixed to opposing side edges of left and right fastener stringers, the mutual elements are engaged by joining the left and right elements, in the form of a letter "Y," from the left-right direction on the same plane as a fastener tape. As described above, in a case where engaging and disengaging of the mutual elements are performed only from the left-right direction, since the fastener stringers need to be bent at a small curvature in the left-right direction, a gap between the elements lined at the side edge of the fastener tape needed to be kept about 1 mm to 2 mm.

[0007] In a state in which the left and right elements are engaged and the left and right fastener stringers are closed, gaps between the elements are alternately dotted at both sides of the left and right element rows as spaces. The presence of the spaces dotted in the left and right element rows has constantly appealed the presence of the slide fastener in an appearance of goods such as clothing, bags, or the like.

[0008] The invention is made to improve the above described conventional art and aims to provide a slide fastener in which a sense of the presence of left and right element rows that are in an engaging state is reduced, and elements capable of finishing an appearance aesthetically are lined.

MEANS FOR SOLVING THE PROBLEM

[0009] In order to solve the problem, a slide fastener according to the invention includes: a first element row fixed to one side edge of a fastener tape in a first fastener stringer; a second element row fixed to one side edge of a second fastener stringer; and a slider including an element guide passage that allows the first element row and the second element row arranged to face each other to pass through and performs engaging and disengaging, wherein in a case where one surface of a direction vertical to fastener tape surfaces of the first and second fastener stringers is defined as a front surface, and another surface is defined as a back surface, elements of the first element row and the second element row include element body portions from which a pair of front and back fixing leg portions fixed to the fastener stringers are extended, engagement neck portions that extend toward opposing elements row sides from the element body portions, engagement head portions that are swollen toward forefronts further from the engagement neck portions, front latch portions that extend toward opposing elements row sides from front surface sides of the element body portions, and back latch portions formed on front surface sides in the engagement neck portions or the engagement head portions, the element guide passage of the slider includes left and right shoulder mouths that allows the first element row and the second element row in a

disengaging state to enter into or be discharged from and is arranged to have a step difference in a front-back direction, and a rear mouth that allows the first element row and the second element row in an engaging state to enter into or be discharged from, being **characterized in that** an extension length of the front latch portion in the first element row is formed to be shorter than an extension length of the front latch portion in the second element row.

[0010] Further, according to another invention, it is **characterized in that** front surface sides of the first element row and the second element row have a rectangular shape.

[0011] Further, according to another invention, it is **characterized in that** front surface sides of the first element row and the second element row have a plane shape.

EFFECT OF THE INVENTION

[0012] According to the invention, the extension length of the front latch portion formed in the first element row fixed to the opposing side edge of the first fastener stringer is formed to be shorter than the extension length of the front latch portion formed in the second element row fixed to the opposing side edge of the second fastener stringer. Thus, when engaging the left and right element rows, the first element row having the short extension length and the second element row having the long extension length are introduced from the back surface side and the front side, respectively, at different front-back levels, and the left and right element rows are obliquely joined from a front-back direction and a left-right direction, such that the mutual elements are easily engaged. Further, when disengaging the left and right element rows in the engaging state, the element rows are obliquely disengaged in the front-back direction and the left-right direction, such that the mutual elements are easily disengaged.

[0013] In a conventional slide fastener, engaging and disengaging have been performed only by movement of the left-right direction. On the other hand, by employing the element shape that enables engaging and disengaging to be performed by concurrently using movement of the front-back direction, movement of the left-right direction can be reduced when performing engaging and disengaging of the element rows. If movement of the left-right direction is reduced, a minimum curvature in a plane of the fastener tape required in the fastener stringer can increase. Thus, the gap between the elements lined at the side edge of the fastener tape gets narrow up to about 0.3 mm to 0.7 mm, and an occupied area of the front surface side of the elements in the engaging state can increase. Further, by narrowing the gap between the elements lined at the side edge of the fastener tape, an appearance that reduces a sense of the presence of the slide fastener can be obtained.

[0014] Further, by forming the front surface sides of

the first element row and the second element row in the rectangular shape, it is possible to finish with an appearance that is difficult to be reminiscent of the elements of the slide fastener. Further, by using the decoration surface in which a concave convex shape, an engraving, or a pattern is formed on the front surface side, or colorization such as gradation is performed on the front surface side, the element row of the slide fastener can be used as a part of decorations of goods such as clothing, bags, or the like. Further, an appearance of goods can be more aesthetically finished.

[0015] Further, since the front surface sides of the first element row and the second element row have the plane shape, post processing such as inkjet printing, film sticking, thermal transfer of patterns or the like, engraving, laser processing, or the like can be easily performed. Thus, the slide fastener with more fine and clear pattern or logo mark can be provided at a low cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 is a plane view in which a slide fastener according to the invention is viewed from a front side and is a view for explaining a state in which element rows that are in a disengaging state in an upper part of the same drawing transition to an engaging state downward.

FIG. 2 is a left side view of the slide fastener illustrated in FIG. 1.

FIG. 3 is a perspective view in which a slide fastener in an engaging state is viewed from a +Z side (a front side).

FIG. 4 is a perspective view in which a slide fastener in an engaging state is viewed from a -Z side (a back side).

FIG. 5 is a front view in which a first element is viewed toward a +Y side from a -Y side.

FIG. 6 is a back view in which a first element is viewed toward a +Z side (a front surface side) from a -Z side (a back surface side).

FIG. 7 is a front view in which a second element is viewed toward a +Y side from a -Y side.

FIG. 8 is a back view in which a second element is viewed toward a +Z side (a front surface side) from a -Z side (a back surface side).

FIG. 9 is a back view in which an engaging state of a left-right direction by a first element row and a second element row is viewed from a back surface side of a slide fastener (a -Z side).

FIG. 10 is a view in which an engaging state of a front-back direction by a first element row and a second element row is viewed from a -Y side and a cross-sectional view taken along line X-X illustrated in FIG. 9.

FIG. 11 is a view in which an engaging state of a front-back direction by a first element row and a second element row is viewed from a -Y side and a cross-sectional view taken along line XI-XI illustrated in

FIG. 9.

EXPLANATIONS OF LETTERS AND NUMERALS

[0017]

10	slide fastener
12	first element
13	second element
12B, 13B	element body portion
12D, 13D	front latch portion
12F, 13F	decoration surface
12H, 13H	engagement head portion
12L	first extension length
13L	second extension length
12N, 13N	engagement neck portion
12R, 13R	back latch portion
12U, 13U	front fixing leg portion
12V, 13V	back fixing leg portion
14	core portion
16	first fastener stringer
17	second fastener stringer
50	slider
50D	connecting post
50E	front-back disengaging wall
50F	flange
50L	first shoulder mouth
50R	second shoulder mouth
50T	rear mouth
51	element guide passage
52	upper blade piece
53	lower blade piece
56	attaching post
56A	bearing hole
59	tab
CR	gap

BEST MODE FOR CARRYING OUT THE INVENTION

[0018] Hereinafter, exemplary embodiment of a slide fastener according to the invention will be described in detail with reference to the accompanying drawings.

[0019] FIG. 1 is a plane view in which a slide fastener according to the invention is viewed from the front side and is a view for explaining a state in which element rows that are in a disengaging state in an upper part of the same drawing transition to an engaging state downward. FIG. 2 is a left side view of the slide fastener illustrated in FIG. 1. Further, in FIGS. 1 and 2, for conveniently describing the engaging state and the disengaging state of the element rows, a slider 50 is denoted by an imaginary line.

[0020] First, a definition is made on a coordinate system of a slide fastener 10 illustrated in FIGS. 1 and 2. As illustrated in FIG. 1, a fastener tape plane of each of a first fastener stringer 16 and a second fastener stringer 17 is defined as an X-Y plane. In a case where a first element 12 row at a left side and a second element 13

row at a right side in the slide fastener 10 are engaged, a straight line of a longitudinal direction parallel to an engaging axial line is defined as a Y axis, and a side at which the first element 12 row and the second element 13 row become the disengaging state and are opened is defined as a +Y direction.

[0021] A left-right direction (a width direction) of the slide fastener 10 illustrated in FIG. 1 is defined as an X axis, a left side where the first fastener stringer 16 is present is defined as a -X direction, and a right side where the second fastener stringer 17 is present is defined as a +X direction.

[0022] Further, as illustrated in FIG. 2, a front-back direction of each fastener tape in the slide fastener 10 is defined as a Z axis. A surface on which a decoration surface 12F in the first element 12 and a decoration surface 13F in the second element 13 row are formed, respectively, is defined as a front surface of the slide fastener 10, and a front surface side of the slide fastener 10 is defined as a +Z direction. Therefore, a back surface side of the slide fastener 10 becomes a -Z direction.

[0023] For example, the slide fastener 10 is an opening/closing device for opening/closing left and right front bodies of outer clothes or an opening of bags or the like. As illustrated in FIG. 1, core portions 14 that are swollen in the front-back direction of the fastener tape along corresponding side edge portions are formed in opposing side edge portions of the first fastener stringer 16 and the second fastener stringer 17 of left and right that configure the slide fastener 10. Left and right element rows are formed such that a plurality of first elements 12 and a plurality of second elements 13 are lined at a predetermined interval CR to sandwich the core portions 14. Further, as a material of the first element 12 and the second element 13, resin molding such as polyacetal may be used.

[0024] Further, as will be described in detail later, according to the invention, as illustrated in the slide fastener 10 of FIG. 1, the front surfaces of the first element 12 and the second element 13 may be formed in a rectangular shape. Further, it is possible to narrow the interval CR between the elements in the first element 12 row and the second element 13 row. As described above, an occupied area of the elements in the engaging state can increase by forming the front surfaces of the first element 12 and the second element 13 in the rectangular shape or narrowing the interval CR between the elements. Thus, it is possible to obtain an appearance that reduces a sense of the presence of the slide fastener 10 to the user.

[0025] Further, as illustrated in FIGS. 1 and 2, the slide fastener 10 includes the slider 50 that allows the first element 12 row and the second element 13 row to pass though and makes an upward opening possible. The slider 50 includes an upper blade piece 52 that guides the +Z side of the first element 12 row and the second element 13 row and a lower blade piece 53 that guides the -Z side of the first element 12 row and the second element

13 row.

[0026] In order to engage the first element 12 row with the second element 13 row as the slider 50 moves, flanges 50F that join both elements from the left-right direction are extended at both side edge portions of the upper blade piece 52 and the lower blade piece 53 of the slider 50. Further, even though not illustrated in FIGS. 1 and 2, tape grooves that allow the fastener tapes of the first fastener stringer 16 and the second fastener stringer 17 to pass through are formed at spindly gap portions where the flanges 50F extended to the upper blade piece 52 and the lower blade piece 53 are opposite to each other.

[0027] Further, as illustrated in FIG. 2, an attaching post 56 is erected on the front surface of the +Z side of the upper blade piece 52 in the slider 50. A bearing hole 56A that rotatably holds a shaft portion of a tab 59 gripped by the user when moving the slider 50 in the $\pm Y$ direction is opened at a central portion of the attaching post 56.

[0028] As illustrated in FIG. 1, an element guide passage 51 that allows the first element 12 row and the second element 13 row to pass through in the front-back direction of the slider 50 (the +Y direction and the -Y direction) is formed in the shape of a letter "Y" in a planar view in the form surrounded by the left and right flanges 50F. A connecting post 50D that connects the upper blade piece 52 with the lower blade piece 53 is arranged at an intermediate portion of a first shoulder mouth 50L and a second shoulder mouth 50R that are opened at the +Y side of the element guide passage 51. Since the connecting post 50D is formed in the shape of a sharp wedge toward the -Y side, by moving the slider 50 in the -Y direction, the first element 12 and the second element 13 that are in the engaging state can be disengaged in the left-right direction.

[0029] As illustrated in FIG. 2, the first shoulder mouth 50L is opened with a step difference at the -Z side of the back surface side further than the second shoulder mouth 50R. Thus, the first shoulder mouth 50L and the second shoulder mouth 50R introduce or discharge the first element 12 row and the second element 13 row of left and right that are in the disengaging state at different front-back levels. Further, a front-back disengaging wall 50E for disengaging the first element 12 and the second element 13 of left and right that are in the engaging state in the front-back direction is formed inside the element guide passage 51.

[0030] A rear mouth 50T is opened at the -Y side of the element guide passage 51. The rear mouth 50T introduces or discharges the first element 12 row and the second element 13 row of left and right that are engaged into the element guide passage 51.

[0031] For example, in order to engage the first element 12 row and the second element 13 row of left and right that are in the disengaging state inside the element guide passage 51, the slider 50 moves in the +Y direction. The first element 12 and the second element 13 row that are in the disengaging state are introduced at different front-back levels from the first shoulder mouth 50L and

the second shoulder mouth 50R, respectively, and both element rows in the element guide passage 51 are obliquely joined from the front-back direction and the left-right direction and engaged to each other. Then, the first element 12 row and the second element 13 row that have become the engaging state are discharged from the rear mouth 50T.

[0032] Meanwhile, in order to disengage the first element 12 row and the second element 13 row of left and right that are in the engaging state inside the element guide passage 51, the slider 50 moves in the -Y direction. The first element 12 row and the second element 13 row that are in the engaging state are introduced through the rear mouth 50T of the slider 50, both element rows are disengaged in the front-back direction in the front-back disengaging wall 50E (see FIG. 2) formed in the element guide passage 51, and both element rows are obliquely disengaged in the left-right direction in the connecting post 50D (see FIG. 1) formed in the element guide passage 51. Then, the first element 12 row and the second element 13 row that have become the disengaging state are discharged from the first shoulder mouth 50L and the second shoulder mouth 50R, respectively.

[0033] Next, a description will be made in connection with an appearance of the slide fastener 10 in a state in which the first element 12 row and the second element 13 row are engaged to each other. FIG. 3 is a perspective view in which the slide fastener 10 in the engaging state is viewed from the +Z side (the front side), and FIG. 4 is a perspective view viewed from the -Z side (the back side). Further, the same members as the members illustrated in FIGS. 1 and 2 are denoted by the same reference numerals, and thus a description thereof will be omitted.

[0034] In an embodiment illustrated in FIG. 3, decoration surfaces 12F and 13F of the +Z side of the first element 12 and the second element 13 have rectangular plane surfaces, and "ABC" is formed on the decoration surfaces 12F and 13F as a pattern. The pattern may be engraved on an element forming mold in advance or may be formed by post processing such as inkjet printing, film sticking, thermal transfer, engraving, laser processing, or the like. As described above, by forming fine and clear pattern or color on the decoration surfaces 12F and 13F of the first element 12 and the second element 13, it is possible to reduce a sense of the presence of the slide fastener 10 and use the slide fastener 10 as a part of decorations in goods such as clothing or bags, or the like. Further, an appearance of goods such as clothing or bags, or the like can be more aesthetically finished.

[0035] Further, in an embodiment illustrated in FIG. 4, the back surfaces of the -Z side of the first element 12 and the second element 13 have almost the same appearance as an element of resin molding that has been sold in the past. As illustrated in FIG. 4, an appearance of the back surface in the slide fastener 10 is immediately reminiscent of an element row by resin molding. On the other hand, an appearance of the decoration surfaces 12F and 13F of the first element 12 row and the second

element 13 row illustrated in FIG. 3 is not immediately reminiscent of the presence of the slide fastener 10.

[0036] Next, configurations of the first element 12 and the second element 13 will be described with reference to FIGS. 5 to 8. FIG. 5 is a front view in which the first element 12 is viewed toward the +Y side from the -Y side, and FIG. 6 is a back view viewed toward the +Z side (the front surface side) from the -Z side (the back surface side). FIG. 7 is a front view in which the second elements 13 is viewed toward the +Y side from the -Y side, and FIG. 8 is a back view viewed toward the +Z side (the front surface side) from the -Z side (the back surface side). The same members as the members illustrated in FIGS. 1 to 4 are denoted by the same reference numerals, and thus a description thereof will be omitted.

[0037] As illustrated in FIGS. 5 and 6, the first element 12 includes a pair of front fixing leg portion 12U and back fixing leg portion 12V of front and back that sandwich and fix the fastener tape and the core portion 14 of the first fastener stringer 16 from the front side and the back side, an element body portion 12B from which the front fixing leg portion 12U and the back fixing leg portion 12V are extended in the -X direction, an engagement neck portion 12N that extends toward the +X direction of the opposing second element 13 row side from the element body portion 12B, and an engagement head portion 12H that is swollen at a forefront side further than the engagement neck portion 12N.

[0038] The engagement neck portion 12N is a portion in which a constriction is formed to hold the engagement head portions formed in the opposing two second elements 13 in the +Y and -Y sides. The engagement head portion 12H is a portion swollen to enter the engagement neck portions formed in the opposing two second elements 13. The engagement neck portion 12N and the engagement head portion 12H are an engaging portion for performing engaging that endures lateral pulling force of the left-right direction in a state in which the first fastener stringer 16 and the second fastener stringer 17 of left and right are closed.

[0039] Further, as illustrated in FIGS. 5 and 6, a front latch portion 12D that extends toward the +X direction of the second element 13 row side from the front surface side in the element body portion 12B of the first element 12 is formed toward the -Z side. The front latch portion 12D extends toward the +Z side of the engagement neck portion 12N and both of the +Y side and the -Y side of the engagement neck portion 12N.

[0040] Further, in an embodiment illustrated in FIG. 5, a back latch portion 12R facing the +Z direction is formed at the +Z side of the front surface side of the engagement neck portion 12N and the engagement head portion 12H.

[0041] The back latch portion 12R is an engaging member that is engaged with the front latch portions formed in the opposing two second elements 13 and thus prevents engaging of the front-back direction from being deviated as the first element 12 in the engaging state moves on the second element 13 in the +Z direction.

[0042] Further, the front latch portion 12D is an engaging portion that is engaged with the back latch portions respectively formed in the opposing two second elements 13 and thus prevents engaging of the front-back direction from being deviated as the first element 12 in the engaging state moves on the second element 13 in the -Z direction.

[0043] As described above, by forming the front latch portion 12D and the back latch portion 12R in the first element 12, it is possible to perform engaging that endures shearing force of the front-back direction in a state in which the first fastener stringer 16 and the second fastener stringer 17 of left and right are closed.

[0044] Further, as illustrated in FIG. 6, the front latch portion 12D extending toward the +X direction is formed to have a first extension length 12L shorter than an extension length of a front latch portion of the second element 13 which will be described later. By setting the short first extension length 12L of the front latch portion 12D as described above, it is possible to reduce movement of the left-right direction required when performing engaging and disengaging of the first element 12 row and the second element 13 row. As a result, it is possible to set the narrow gap CR between the first elements 12 or between the second elements 13.

[0045] Next, the shape of the single second element 13 will be described with reference to FIGS. 7 and 8.

[0046] As illustrated in FIGS. 7 and 8, the second element 13 includes a pair of front fixing leg portion 13U and back fixing leg portion 13V of front and back that sandwich and fix the fastener tape and the core portion 14 of the second fastener stringer 17 from the front side and the back side, an element body portion 13B from which the front fixing leg portion 13U and the back fixing leg portion 13V are extended in the +X direction, an engagement neck portion 13N that extends toward the -X direction of the opposing first element 12 row side from the element body portion 13B, and an engagement head portion 13H that is swollen at a forefront side further than the engagement neck portion 13N.

[0047] The engagement neck portion 13N is a portion in which a constriction is formed to hold the engagement head portions 12H formed in the opposing two first elements 12 in the +Y and -Y sides. The engagement head portion 13H is a portion swollen to enter the engagement neck portions 12N formed in the opposing two first elements 12. The engagement neck portion 13N and the engagement head portion 13H are an engaging portion for performing engaging that endures lateral pulling force of the left-right direction in a state in which the first fastener stringer 16 and the second fastener stringer 17 of left and right are closed.

[0048] Further, as illustrated in FIGS. 7 and 8, a front latch portion 13D that extends toward the -X direction of the first element 12 row side from the front surface side in the element body portion 13B of the second element 13 is formed toward the -Z side. The front latch portion 13D extends toward the +Z side of the engagement neck

portion 13N and both of the +Y side and the -Y side of the engagement neck portion 13N.

[0049] Further, in an embodiment illustrated in FIG. 7, a back latch portion 13R facing the +Z direction is formed at the +Z side of the front surface side of the engagement head portion 13H.

[0050] The back latch portion 13R is an engaging member that is engaged with the front latch portions 12D formed in the opposing two first elements 12 and thus prevents engaging of the front-back direction from being deviated as the second element 13 in the engaging state moves on the first element 12 in the +Z direction.

[0051] Further, the front latch portion 13D is an engaging portion that is engaged with the back latch portions 12R respectively formed in the opposing two first elements 12 and thus prevents engaging of the front-back direction from being deviated as the second element 13 in the engaging state moves on the first element 12 in the -Z direction.

[0052] As described above, by forming the front latch portion 13D and the back latch portion 13R in the second element 13, it is possible to perform engaging that endures shearing force of the front-back direction in a state in which the first fastener stringer 16 and the second fastener stringer 17 of left and right are closed.

[0053] Further, as illustrated in FIG. 8, the front latch portion 13D extending toward the -X direction is formed to have a second extension length 13L longer than the above described first extension length 12L of the front latch portion 12D of the first element 12. By setting the long second extension length 13L of the front latch portion 13D as described above, it is possible to narrow the gap between the decoration surface 12F and the decoration surface 13F when the first element 12 row is engaged with the second element 13 row. The decorations portrayed on the decoration surface 12F and the decoration surface 13F is more continuously finished, and thus an appearance of the slide fastener 10 can be aesthetically finished. Further, by setting the long second extension length 13L of the front latch portion 13D, it is possible to improve bearing force when thrust force is applied to the first element 12 row and the second element 13 row that are in the engaging state.

[0054] Next, the engaging state of the first element 12 row and the second element 13 row will be described with reference to FIGS. 9 to 11. FIG. 9 is a back view in which the engaging state of the left-right direction by the first element 12 row and the second element 13 row is viewed from the back surface side (the -Z side) of the slide fastener 10. FIGS. 10 and 11 are views in which the engaging state of the front-back direction by the first element 12 row and the second element 13 row is viewed from the -Y side. FIG. 10 is a cross-sectional view taken along line X-X illustrated in FIG. 9, and FIG. 11 is a cross-sectional view taken along line XI-XI illustrated in FIG. 9.

[0055] First, the engaging state of the left-right direction of the first element 12 row and the second element 13 row will be described with reference to FIG. 9. As

illustrated in FIG. 9, the first element 12 holds the engagement head portions 13H of the opposing two second elements 13 at the +Y side and the -Y side by using the constricted side surface of the engagement neck portion 12N. Similarly, the second element 13 holds the engagement head portions 12H of the opposing two first elements 12 at the +Y side and the -Y side by using the constricted side surface of the engagement neck portion 13N. Thus, engaging that endures force applied in the left-right direction (the +X direction and the -X direction) can be performed.

[0056] Further, as illustrated in FIG. 9, an intermediate straight line (a straight line parallel to the Y axis) between a straight line that connects forefronts of the engagement head portions 12H in the first element 12 row and a straight line that connects forefronts of the engagement head portions 13H in the second element 13 row is defined as an engaging axial line XC of the left-right direction. Further, an intermediate straight line (a straight line parallel to the Y axis) between two straight lines that connect end portions of the fixing leg portions in the first element 12 row and the second element 13 row is defined as an element center line FC. The element center line FC is a line that becomes a center line of the decoration surfaces 12F and 13F in the first element 12 row and the second element 13 row in a case where the slide fastener 10 is viewed from the front surface side.

[0057] In the invention, as illustrated in FIG. 6 and 8, the first extension length 12L of the front latch portion 12D in the first element 12 is formed to be shorter than the second extension length 13L of the front latch portion 13D in the second element 13. Thus, by displacing the element center line FC in the -X direction of the first element 12 side further than the engaging axial line XC, the decoration surface 12F and the decoration surface 13F illustrated in FIGS. 5 and 7 can be symmetric in the left and right, and the beauty of the slide fastener 10 can be improved.

[0058] Next, the engaging state of the front-back direction of the first element 12 row and the second element 13 row will be described with reference to FIGS. 10 and 11.

[0059] In the engaging state illustrated in FIG. 10, the front latch portion 12D of the first element 12 and the back latch portion 13R of the second element 13 that are formed on surfaces opposing to each other are engaged with each other. This engagement prevents the second element 13 from moving on the first element 12 in the +Z direction and being deviated. Similarly, the first element 12 can be prevented from moving on the second element 13 in the -Z direction and being deviated.

[0060] Further, as illustrated in FIG. 11, the back latch portion 12R of the first element 12 and the front latch portion 13D of the second element 13 that are formed on surfaces opposing to each other are engaged with each other. This engagement prevents the second element 13 from moving on the first element 12 in the -Z direction and being deviated. Similarly, the first element 12 can be

prevented from moving on the second element 13 in the +Z direction and being deviated. As described above, the front latch portion 12D and the back latch portion 13R, and the back latch portion 12R and the front latch portion 13D are alternately engaged along the Y axis, and thus engaging that endures shearing force applied in the front-back direction can be performed.

INDUSTRIAL APPLICABILITY

[0061] The slide fastener according to the invention can be used not only for opening/closing of clothing, bags, or the like but also for opening/closing of shoes, tents, or the like.

[0062] Further, in the slide fastener according to the invention, when performing engaging and disengaging of the left and right element rows, the left and right element rows are obliquely joined or disengaged from both the front-back direction and the left-right direction. Thus, compared to the conventional art, large swelling of the engagement head portion of the element can be set, and the element having the engagement neck portion whose constriction is deeply set can be used. As a result, engaging strength in the left-right direction is improved, and thus the slide fastener that endures stronger lateral pulling force can be provided.

Claims

1. A slide fastener, including:

a first element (12) row fixed to one side edge of a fastener tape in a first fastener stringer (16);
a second element (13) row fixed to one side edge of a second fastener stringer (17); and

a slider (50) including an element guide passage (51) that allows the first element (12) row and the second element (13) row arranged to face each other to pass through and performs engaging and disengaging, wherein

in a case where one surface of a direction vertical to fastener tape surfaces of the first and second fastener stringers (16, 17) is defined as a front surface, and another surface is defined as a back surface,

elements of the first element (12) row and the second element (13) row include element body portions (12B, 13B) from which a pair of front and back fixing leg portions (12U, 12V, 13U, 13V) fixed to the fastener stringers (16, 17) are extended, engagement neck portions (12N, 13N) that extend toward opposing elements (12, 13) row sides from the element body portions (12B, 13B), engagement head portions (12H, 13H) that are swollen toward forefronts further from the engagement neck portions (12N, 13N), front latch portions (12D, 13D) that extend to-

ward opposing elements (12, 13) row sides from front surface sides of the element body portions (12B, 13B), and back latch portions (12R, 13R) formed on front surface sides in the engagement neck portions (12N, 13N) or the engagement head portions (12H, 13H), the element guide passage (51) of the slider (50) includes left and right shoulder mouths (50L, 50R) that allows the first element (12) row and the second element (13) row in a disengaging state to enter into or be discharged from and is arranged to have a step difference in a front-back direction, and a rear mouth (50T) that allows the first element (12) row and the second element (13) row in a engaging state to enter into or be discharged from, being **characterized in that** an extension length (12L) of the front latch portion (12D) in the first element (12) row is formed to be shorter than an extension length (13L) of the front latch portion (13D) in the second element (13) row.

2. The slide fastener according to claim 1, being **characterized in that** front surface sides of the first element (12) row and the second element (13) row have a rectangular shape.
3. The slide fastener according to claim 1 or 2, being **characterized in that** front surface sides of the first element (12) row and the second element (13) row have a plane shape.

FIG. 1

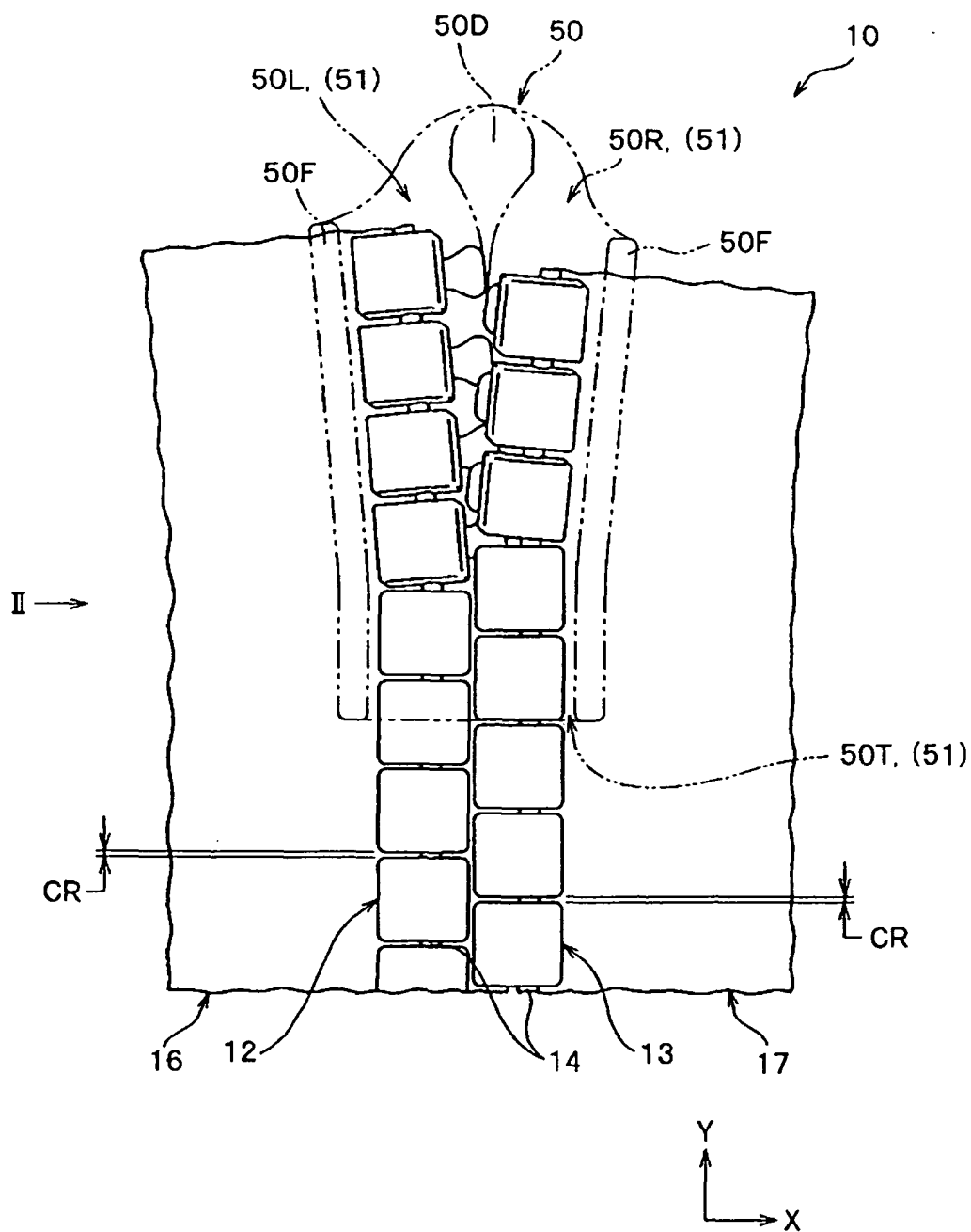


FIG. 2

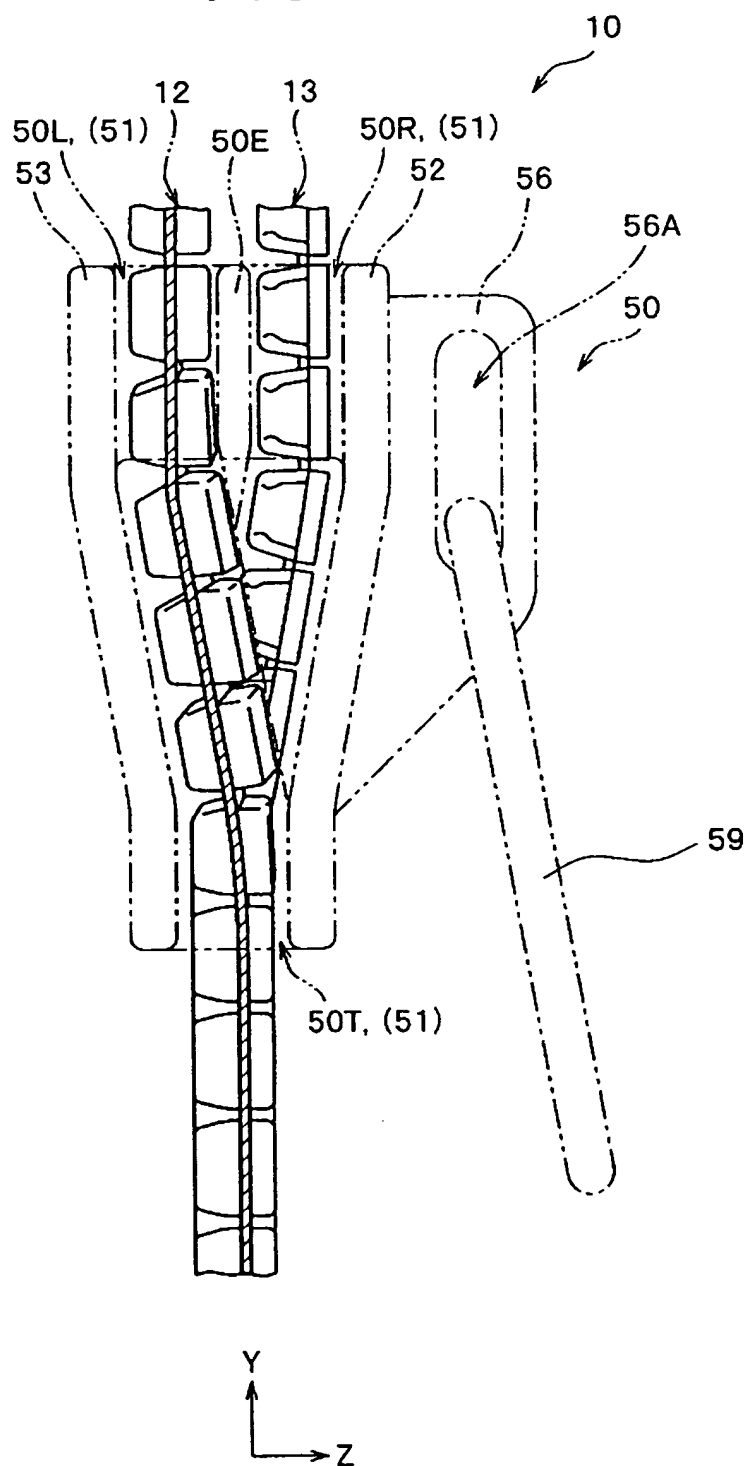


FIG. 3

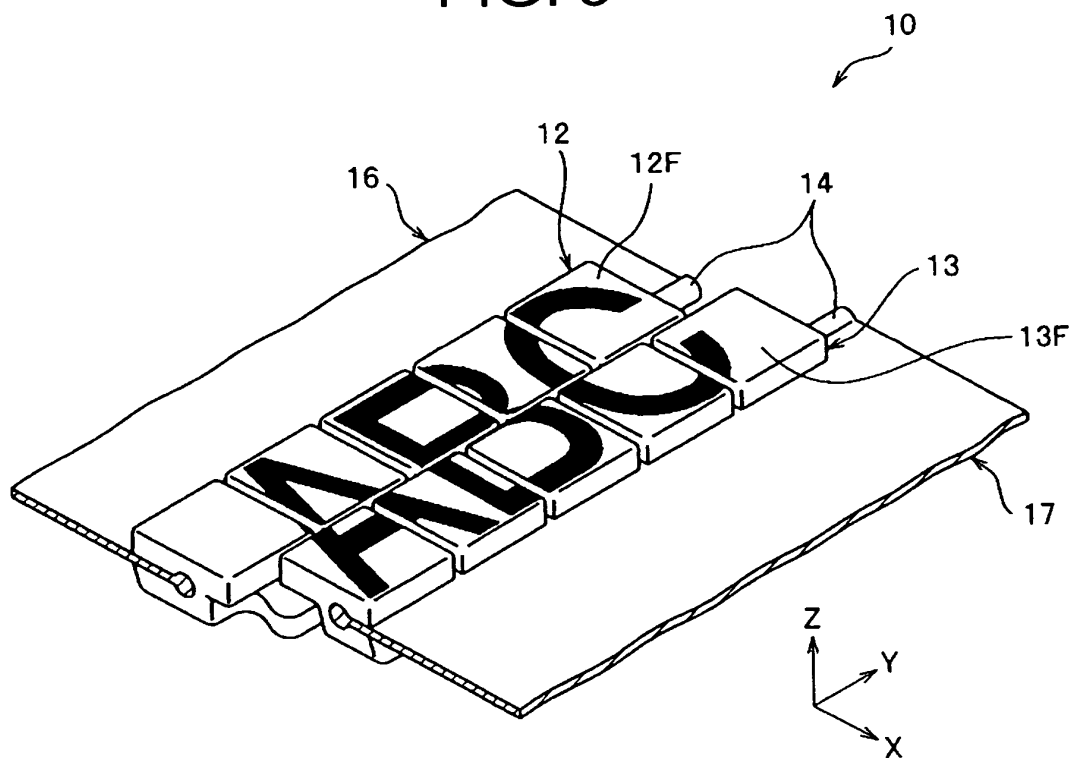


FIG. 4

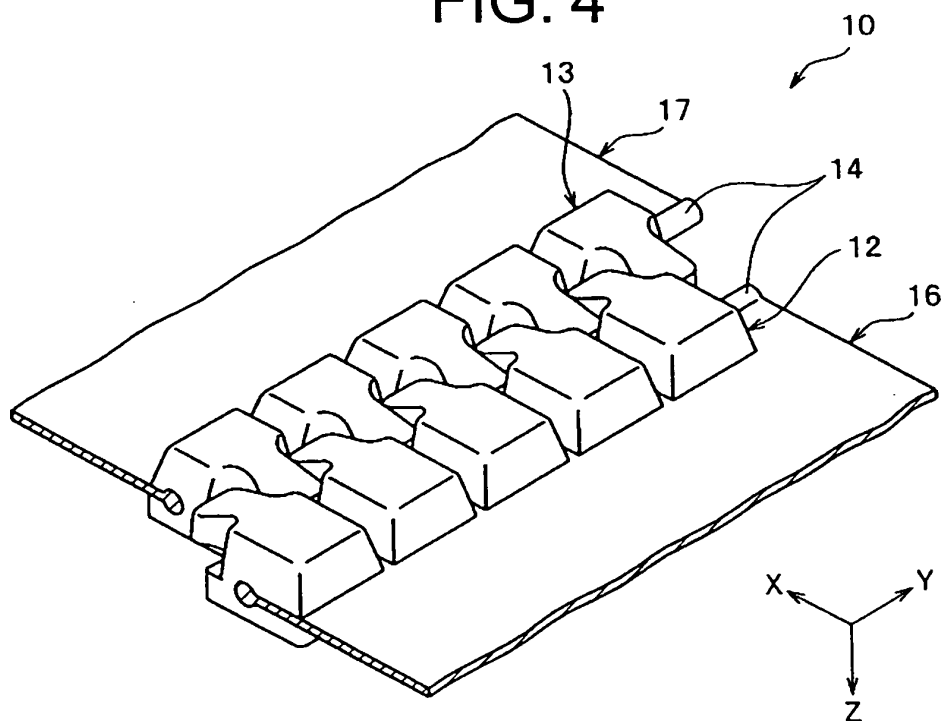


FIG. 5

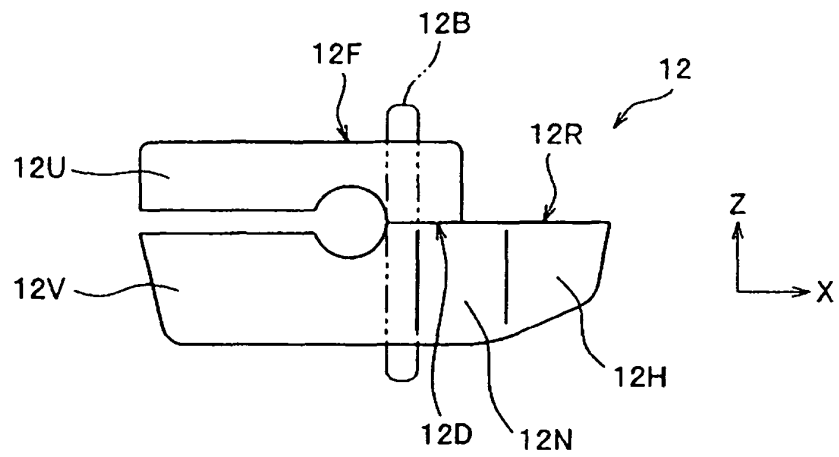


FIG. 6

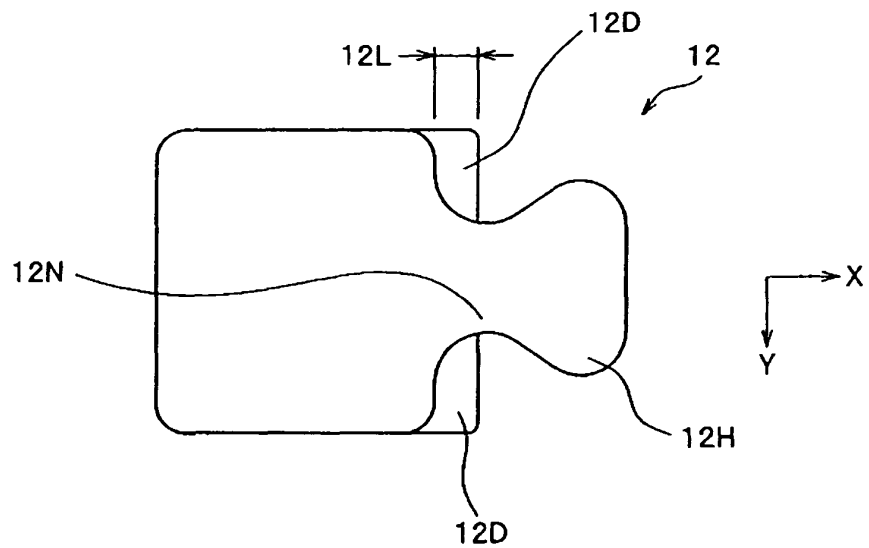


FIG. 7

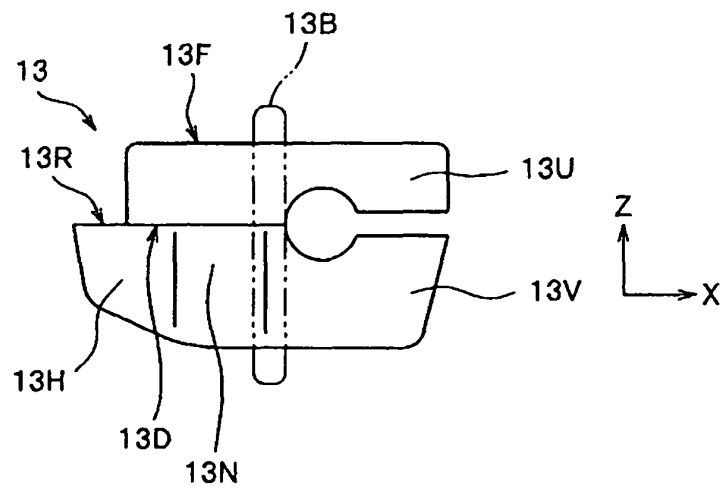


FIG. 8

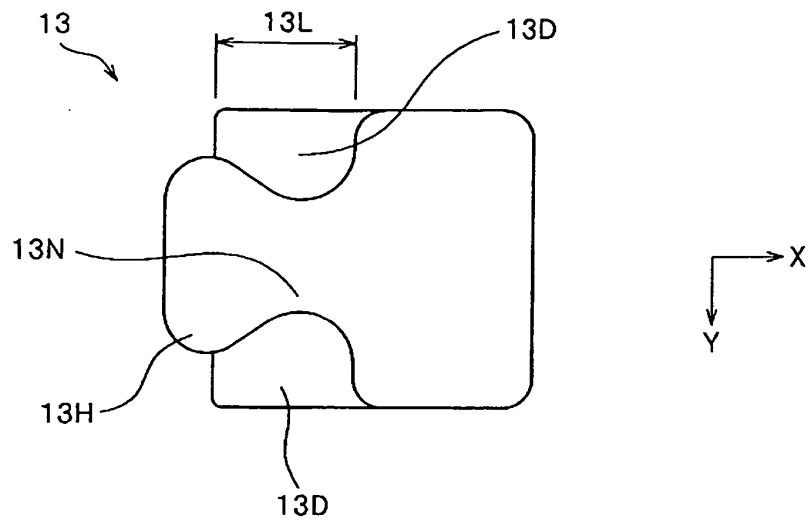


FIG. 9

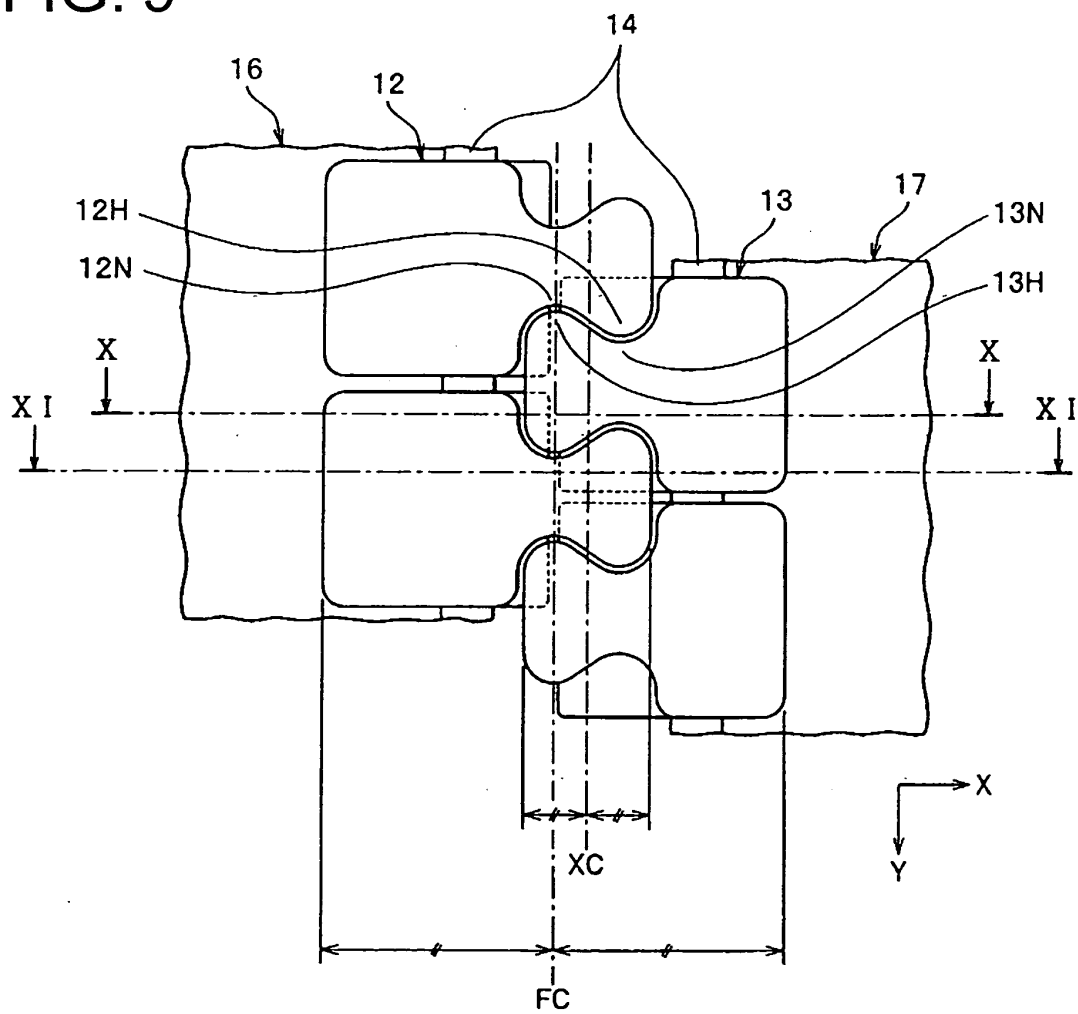


FIG. 10

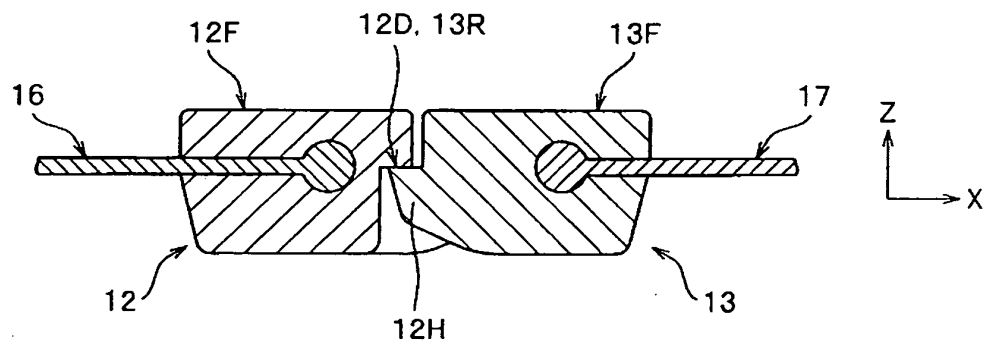
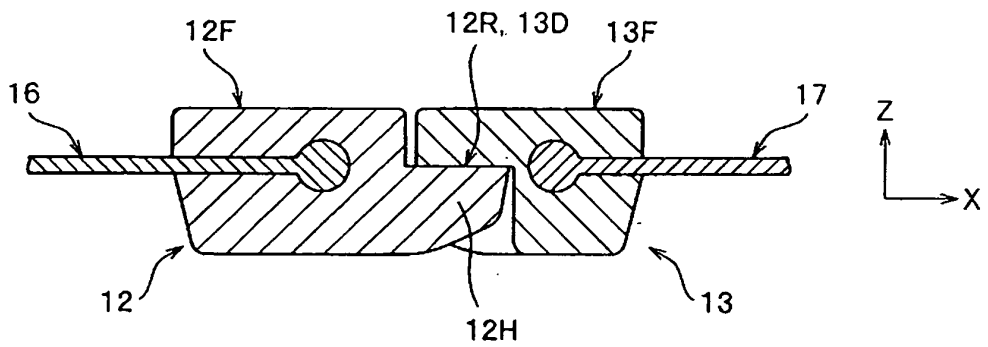


FIG. 11



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/050284

A. CLASSIFICATION OF SUBJECT MATTER

A44B19/06 (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)

A44B19/06

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	1996-2009
Kokai Jitsuyo Shinan Koho	1971-2009	Toroku Jitsuyo Shinan Koho	1994-2009

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.
A	US 3886634 A (New Japan Slide Fastener Mfg. Co., Ltd.), 03 June, 1975 (03.06.75), Column 5, line 23 to column 6, line 19; Figs. 15 to 19 & DE 2313353 A	1-3
A	US 6681456 B1 (Delphi Oracle Corp.), 27 January, 2004 (27.01.04), Column 6, line 56 to column 7, line 12; Figs. 7D to 7E (Family: none)	1-3

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
09 April, 2009 (09.04.09)Date of mailing of the international search report
21 April, 2009 (21.04.09)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/050284

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 142846/1976 (Laid-open No. 61204/1978) (Sanwa Enjiniaringu Kabushiki Kaisha), 24 May, 1978 (24.05.78), Description, page 7, line 18 to page 8, line 8; Figs. 9 to 12 (Family: none)	1-3
A	JP 47-37061 B1 (Shin Nippon Suraido Fasuna Kogyo Kabushiki Kaisha), 18 September, 1972 (18.09.72), Column 1, line 31 to column 2, line 19; column 5, line 16 to column 6, line 9; Figs. 1 to 3, 17 to 19 (Family: none)	1-3

Form PCT/ISA/210 (continuation of second sheet) (April 2007)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2005101974 A [0003]
- JP 61022961 A [0003]
- JP 62040002 A [0003]