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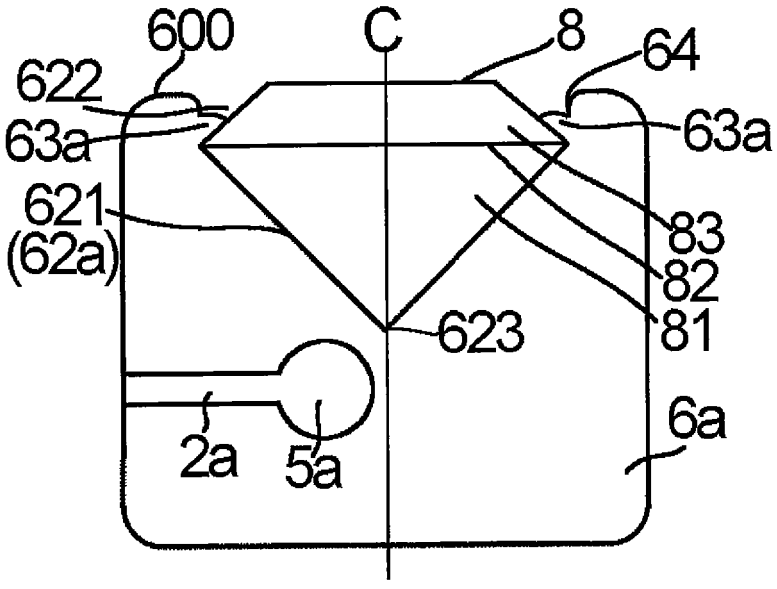
(54) SLIDE FASTENER, TOP STOP FOR SLIDE FASTENERS AND SLIDE FASTENER PRODUCTION METHOD

(57) Provided is a slide fastener including a pair of fastener tapes (2a, 2b), chains of fastener elements (3a, 3b) arranged along opposing tape side edges (21a, 21b) of the fastener tapes (2a, 2b), a slider (7) for engaging and separating the fastener elements (3a, 3b), a bottom stopper (4) arranged at one ends of the chains of the fastener elements (3a, 3b) on the pair of fastener tapes (2a, 2b) and a pair of top stoppers (6a, 6b) arranged at the other ends of the chains of the fastener elements (3a, 3b), wherein the slide fastener (1) includes a concave storage (32, 42, 62a, 62b, 72a, 72b, 72c) placed on at least one surface (300, 400, 600, 700) of the fastener elements (3a, 3b), the slider (7), the bottom stopper (4) and the top stoppers (6a, 6b), a decorative part (8) stored in the storage and a fixer (33) which is formed integrally with the storage and protrudes into the storage and fixes the decorative part (8) in the storage.

【FIG.5】



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Description

TECHNICAL FIELD

[0001] The present invention relates to a slide fastener, and more particularly relates to a slide fastener in which decorative parts are arranged on configuration members of the slide fastener, and a top stopper for the slide fastener, and a method of producing the slide fastener.

BACKGROUND ART

[0002] In a slide fastener, a slider is inserted into left and right element chains that are attached to tape side edges opposite to a pair of left and right fastener tapes, and since the slider is slid along the element chains, the element chains are engaged or separated. In the foregoing slide fastener, decorative parts are arranged on the surfaces of fastener elements and the like, and decoration property is given to improve its esthetic appearance. For example, the publication of Japanese Patent No.3176936 discloses an element to which the decoration property is given. The above patent describes that concave grooves are formed on the surface of the element, and decoration stones are fitted onto the concave grooves.

[0003] However, the invention described in the publication of Japanese Patent No.3176936 does not disclose a concrete method of fitting the decoration stones onto the concave grooves. On the other hand, since the decorative part is configured by parts different from the configuration parts of the slide fastener, its connection reliability is weak, and during the use thereof, the decorative part is fallen off from the slide fastener. Thus, there was a case that its design level was damaged.

[Citation List]

[Patent Document]

[0004] [Patent Document 1] Japanese Patent No.3176936

SUMMARY OF INVENTION

[0005] The present invention provides a slide fastener in which a decorative part and a slide fastener configuration member can be connected stronger and the design level is improved, a top stopper for the slide fastener, and a method of producing the slide fastener.

[0006] In order to solve the above-mentioned problems, the present invention provides, in one aspect, a slide fastener which includes: a pair of fastener tapes; chains of fastener elements arranged along opposing tape side edges of the fastener tapes; a slider for engaging and separating the fastener elements; a bottom stopper arranged at one ends of the chains of the fastener elements on the pair of fastener tapes; and a pair of top stoppers arranged at the other ends of the chains of the fastener elements, wherein the slide fastener includes: a concave storage provided on a surface of at least one of the fastener elements, the slider, the bottom stopper and the top stoppers; a decorative part stored in the storage; and a fixer, which is formed integrally with the storage and protrudes from the storage and fixes the decorative part in the storage.

[0007] In on embodiment of the slide fastener according to the present invention, the decorative part includes a body unit, a surface exposure portion, and a maximum diameter portion whose cross-section has a maximum diameter of the decorative part and defines a boundary between the body unit and the surface exposure portion, wherein the body unit is positioned lower than the maximum diameter portion and the surface exposure portion is tapered upwardly from the body unit, wherein the maximum diameter portion of the decorative part is fixed to inside the storage so as to be arranged lower than the surface of the fastener elements, the slider, the bottom stopper or the top stoppers where the decorative part is arranged.

[0008] In another embodiment of the slide fastener according to the present invention, the decorative part includes a body unit, a surface exposure portion, and a maximum diameter portion whose cross-section has a maximum diameter of the decorative part and defines a boundary between the body unit and the surface exposure portion, wherein the body unit is positioned lower than the maximum diameter portion and the surface exposure portion is tapered upwardly from the body unit, wherein a top surface of the surface exposure portion of the decorative part is fixed to inside the storage so as to be located on the same flat surface as the surface of the fastener elements, the slider, the bottom stopper or the top stoppers or located lower than the surface.

[0009] In still another embodiment of the slide fastener according to the present invention, the decorative part includes a body unit, a surface exposure portion, and a maximum diameter portion whose cross-section has a maximum diameter

of the decorative part and defines a boundary between the body unit and the surface exposure portion, wherein the body unit is positioned lower than the maximum diameter portion and the surface exposure portion is tapered upwardly from the body unit, wherein the storage includes a first groove which stores the body unit and a second groove connected to the first groove above the first groove and stores the surface exposure portion, and wherein the fixer is expansively protruded from a side wall of the second groove and covers a part of the surface exposure portion.

[0010] In still another embodiment of the slide fastener according to the present invention, when the decorative part is arranged in one of the fastener elements and the top stoppers, a length in a lateral direction of the fastener tapes embedded in the fastener elements or the top stoppers is 50 % or less of the maximum diameter of the storage.

[0011] In still another embodiment of the slide fastener according to the present invention, when the decorative part is arranged in one of the fastener elements and the top stoppers, the fastener tapes are arranged away from a center of the storage so that the fastener tapes are not embedded on a central axis of the storage.

[0012] The present invention provides, in another aspect, a top stopper for a slide fastener encompassing: a first top stopper made of resin which includes a concave first storage which is arranged on a tape side edge of a first fastener tape and formed on a surface, a first decorative part stored in the first storage, and a first fixer that is integrated with the first storage and protrudes from the first storage and fixes the first decorative part; a second top stopper which includes a concave second storage which is arranged on a tape side edge of a second fastener tape opposite to the first fastener tape and formed on the surface, a second decorative part stored in the second storage, and a second fixer which is integrated with the second storage and protrudes from the second storage and fixes the second decorative part; and a stopper, which is arranged on the tape side edge and located opposite to the fastener element located closest to the side of the first top stopper in the chains of the fastener elements arranged along the tape side edge of the first fastener tape and formed integrally with the second top stopper.

[0013] In an embodiment of the top stoppers for the slide fastener according to the present invention, a center of the first top stopper is arranged so as to be shifted to a side of the second fastener tape from a tip of the first fastener tape embedded in the first top stopper, and a center of the second top stopper is arranged to be shifted to a side of the first fastener tape from a tip of the second fastener tape embedded in the second top stopper.

[0014] The present invention provides, in still another aspect, a method of producing a slide fastener which includes a pair of fastener tapes; chains of fastener elements arranged along opposing tape side edges of the fastener tapes; a slider for engaging and separating the fastener elements; a bottom stopper arranged at one ends of the chains of the fastener elements on the pair of fastener tapes; and a pair of top stoppers arranged at the other ends of the chains of the fastener elements, the method includes: a step of forming a concave storage on a surface of at least one of the fastener elements, the slider, the bottom stopper and the top stoppers; a step of storing a decorative part in the storage; and a step of partially melting a part of the storage and forming a fixer protruding into the storage and fixing the decorative part to inside the storage by using the fixer.

[0015] In an embodiment of the method of producing the slide fastener according to the present invention, the step of partially melting the part of the storage and forming the fixer protruding into the storage includes a step of applying supersonic vibration to the storage and melting a part of the storage.

[0016] According to the present invention, it is possible to provide the slide fastener in which the decorative part and the slide fastener configuration member can be connected more strongly and the design level is improved, and the top stoppers for the slide fastener, and the method of producing the slide fastener.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Fig. 1 is a schematic view showing an example of a slide fastener according to an embodiment of the present invention;
Fig. 2 is a side view of the slide fastener in Fig. 1;
Fig. 3 is a cross-sectional view showing an example of a top stopper for the slide fastener according to the embodiment of the present invention;
Fig. 4 is a perspective view showing an example of the top stopper for the slide fastener according to the embodiment of the present invention;
Fig. 5 is a cross-sectional view showing a situation after a decorative part is fixed to the top stopper for the slide fastener according to the embodiment of the present invention;
Fig. 6 is a modification of the top stopper shown in Fig. 5;
Fig. 7 is another modification of the top stopper shown in Fig. 5;
Fig. 8 is still another modification of the top stopper shown in Fig. 5;
Fig. 9 is still another modification of the top stopper shown in Fig. 5;
Fig. 10 is still another modification of the top stopper shown in Fig. 5;
Fig. 11 is still another modification of the top stopper shown in Fig. 5;

Fig. 12 is a plan view showing an example of a fastener element of the slide fastener according to the embodiment of the present invention;
Fig. 13 is a cross-sectional view showing an example of the fastener element in Fig. 12;
Fig. 14 is a plan view showing an example of a bottom stopper in the slide fastener according to the embodiment of the present invention;
Fig. 15 is a cross-sectional view showing an example of the bottom stopper in Fig. 14;
Fig. 16 is a plan view showing an example of a puller in a slider according to the embodiment of the present invention+
Fig. 17 is a cross-sectional view showing an example viewed from an A-A direction of the puller in Fig. 16.

DETAILED DESCRIPTION OF THE INVENTION

[0018] The embodiment of the present invention will be described below with reference to the drawings. In the following descriptions of the drawings, the same or similar symbol is assigned to the same or similar portion. It is noted that the following embodiment exemplifies an apparatus and method for embodying the technical idea of the present invention and is not intended to limit the structures, arrangements, materials and the like of configuration parts to the followings.

[0019] As shown in Figs. 1 and 2, a slide fastener 1 according to the embodiment of the present invention includes: a pair of fastener tapes 2a, 2b; chains of fastener elements 3a, 3b arranged along opposing tape side edges 21a, 21b of the fastener tapes 2a, 2b; a slider 7 for engaging and separating the fastener elements 3a, 3b; a bottom stopper 4 arranged to straddle the pair of fastener tapes 2a, 2b at one ends of the chains of the fastener elements 3a, 3b; and a pair of top stoppers 6a, 6b arranged at the other ends of the chains of the fastener elements 3a, 3b.

[0020] In the foregoing and following descriptions, "one ends of the chains of the fastener elements 3a, 3b" refers to ends on the sides that face a direction in which the slide fastener 1 is opened when the slider 7 is slid in the longitudinal direction of the fastener tapes 2a, 2b. "The other ends of the chains of the fastener elements 3a, 3b" refers to ends on the side that face a direction in which the slide fastener 1 is closed when the slider 7 is slid in the longitudinal direction of the fastener tapes 2a, 2b. Also, a front-rear direction of the fastener tapes 2a, 2b is defined as "an upper-lower direction" or "a height (depth) direction". That is, this embodiment is described under an assumption that the front surface side of the fastener tapes 2a, 2b is defined as "an upper portion" and the rear surface side of the fastener tapes 2a, 2b is defined as "a lower portion".

[0021] For the fastener tapes 2a, 2b, a band-shaped material that is woven or knitted from synthetic fiber or natural fiber is used, and cores 5a, 5b are arranged along tape side edges 21a, 21b extending in the longitudinal direction. The fastener elements 3a, 3b are shaped substantially symmetric with respect to the front and rear surfaces of the fastener tapes 2a, 2b, with the fastener tapes 2a, 2b as centers, as shown in Fig. 2. There is not any limit on the concrete shapes of the fastener elements 3a, 3b. For example, as shown in Fig. 12, the fastener element 3b includes a base 35 fixed onto the fastener tape 2b, a neck 36 protruding from the base 35 to the side of the opposite fastener tape 2a, and an engagement head 37 further expanding to the side of the fastener tape 2a from the neck 36. Since the slider 7 shown in Fig. 1 is slid from one ends to the other ends of the chains of the fastener elements 3a, 3b, the chains of the fastener elements 3a, 3b can be engaged or separated.

[0022] As shown in Fig. 2, the slider 7 includes: a slider body 71 which accommodates the fastener elements 3a, 3b therein so that the fastener elements 3a, 3b are engaged or separated; a puller holder 74 arranged on the surface of the slider body 71; and a puller 75 supported by the puller holder 74. The bottom stopper 4 is a part that is molded at the vicinity of the bottom ends of the chains of the fastener elements 3a, 3b by mold injection, as shown in Fig. 1, and has the outer appearance of an approximate rectangle. On the other hand, the top stoppers 6a, 6b are parts that are molded at the vicinities of the top ends of the chains of the fastener elements 3a, 3b, and in Fig. 1, its planar viewing is circular. The top stoppers 6a, 6b are formed to have the heights at a degree that the top stoppers 6a, 6b do not enter the front port ends of the slider 7 (namely, the ends of the slider 7 located on a directional side in which the slide fastener 1 is closed), respectively, in the front-rear direction of the fastener tapes 2a, 2b. The shapes of the bottom stopper 4 and the top stoppers 6a, 6b are not limited to the example shown in Fig. 1. The various outer appearances can be naturally employed.

[0023] Resins are used for the fastener elements 3a, 3b, the slider 7, the bottom stopper 4 and the top stoppers 6a, 6b. As a concrete example, it is possible to use polyamide (PA), polyacetal (POM), polycarbonate (PC), modified polyphenylene ether (m-PPE), polybutylene terephthalate (PBT), polyethylene terephthalate (PET), glass fiber reinforcement polyethylene terephthalate (GF-PET), cyclic polyolefin (COP) and the like. The fastener elements 3a, 3b, the slider 7, the bottom stopper 4 and the top stoppers 6a, 6b may be made of the materials that are melted by ultrasonic vibration which will be described later and they are not especially limited. A low melting point metal, for example, lead, tin and the like, may be used.

[0024] The decorative part 8 is attached onto a surface 300, 400, 600 or 700 of at least one of the fastener elements 3a, 3b, the slider 7, the bottom stopper 4 and the top stoppers 6a, 6b. An example in which decorative parts 8 are attached onto, for example, the top stoppers 6a, 6b is described. As shown in Fig. 1, the first top stopper 6a made of

the resin is arranged on the tape side edge 21 a of the top end of the first fastener tape 2a. The second top stopper 6b is arranged on the tape side edge 21b of the top end of the second fastener tape 2b opposite to the first fastener tape 2a. The first top stopper 6a includes: a concave first storage 62a formed on the surface 600; a first decorative part 8a stored in the first storage 62a; and a first fixer 63a that is integrated with the first storage 62a and protrudes from inside the first storage 62a and fixes the first decorative part 8a. The second top stopper 6b includes: a concave second storage 62b formed on the surface 600; a second decorative part 8b stored in the second storage 62b; and a second fixer 63b that is integrated with the second storage 62b and protrudes from inside the second storage 62b and fixes the second decorative part 8b.

[0025] As shown in Figs. 1 and 4, a stopper 61, which is arranged on the tape side edge 21b and located opposite to the fastener element 3a (that is not shown) positioned closest to the first top stopper 6a in the chains of the fastener elements 3a and formed integrally with the second top stopper 6b, is placed on the second top stopper 6b. A thickness of the front-rear direction of the fastener tape 2b of the stopper 61 is equal to each of the fastener elements 3a, 3b, and a length when it is viewed from the lateral direction of the fastener tape 2b of the stopper 61 is approximately equal to a length of the base 35 of the fastener element 3b. Since the stopper 61 is formed, the slider 7 can be protected from being separated from the chains of the fastener elements 3a, 3b. Thus, the strengths when the fastener tapes 2a, 2b are pulled in their width directions are improved.

[0026] As shown in Fig. 3, the first storage 62a includes: a first groove 621 whose shape is tapered as it goes toward a lower portion (the depth direction) of the top stopper 6a; and a second groove 622 that is connected to the first groove 621 above the first groove 621 and linked to the surface 600. As shown in Fig. 5, when with a maximum diameter portion 82 whose cross-section has the maximum diameter as a boundary, the decorative part 8 includes a body unit 81 positioned lower than the maximum diameter portion 82, and a surface exposure portion 83 that is tapered upwardly from the body unit 81, the body unit 81 of the decorative parts 8 is stored in the first groove 621, and the surface exposure portion 83 is stored in the second groove 622. As shown in Fig. 3, the fastener tape 2a which has the core 5a at its tip is embedded in a further lower portion of the first storage 62a. In the present embodiment, a tip of the fastener tape 2a (core 5a) is preferably located just under a center 623 (central axis C) of the first storage 62a, or arranged so as to be shifted from the center 623 (central axis C). In other words, the center 623 (central axis C) of the first top stopper 6a is preferably located just under the tip of the first fastener tape 2a embedded in the first top stopper 6a, or arranged so as to be shifted to the side of the second fastener tape 2b from the tip. Similarly, the center (that is not shown) of the second top stopper 6b shown in Fig. 1 or 4 is preferably located at the tip of the second fastener tape 2b embedded in the second top stopper 6b, or arranged so as to be shifted to the side of the first fastener tape 2a from the tip. Since the fastener tape 2a and the core 5a are arranged so as to be shifted from the central axis C, in a producing method that will be described later, the vibration generated when the decorative part 8 is fixed is unlikely to be transmitted to the fastener tape 2a or core 5a. Thus, a work for fixing the decorative part 8 can be completed in a short time. Although values are not limited to the followings, in order to efficiently fix the decorative part 8, a displacement d4 (refer to Fig. 3) in a width direction (lateral direction) between the tip of the fastener tape 2a (the tip of the core 5a) and the central axis C can be separated by a distance of, for example, 0 mm or more, preferably, about 0 to 1 mm.

[0027] A length d2 in the lateral direction of the fastener tape 2a embedded in the first top stopper 6a is preferred to be 50 % or less of a length in a width direction of a maximum diameter d1 of the first storage 62a and further preferred to be 25 to 50 %. With the employment of such configuration, when the decorative part 8 is welled and fixed by supersonic vibration, the supersonic vibration is more efficiently transmitted to the resin layer configuring the first top stopper 6a, as compared with the fastener tape 2a and the core 5a. Thus, the decorative part 8 can be fixed more efficiently in a shorter time. Although values are not limited to the followings, a distance d3 between the center (the deepest portion) 623 of the first storage 62a and the highest end of the fastener tape 2a (core 5a) can be typically set to about 0 to 1 mm. Although their illustrations and detailed explanations are omitted, even for the second storage 62b of the second top stopper 6b, it is naturally possible to employ the configuration substantially equal to the first top stopper 6a.

[0028] In a case of a member whose object lies in jewelry such as a crystal, a stone, a jewel and the like, the material of the decorative part 8 is not especially limited. Also, there is not any limit on the concrete shapes of the decorative part 8. For example, as shown in Fig. 5 or 10, with the maximum diameter portion 82 whose cross-section has the maximum diameter as the boundary, the decorative part 8 may be shaped (diamond-shaped) to include: the body unit 81 that is tapered downwardly from the maximum diameter portion 82; and the surface exposure portion 83 that is tapered upwardly from the body unit 81. As shown in Fig. 6, the decorative part 8 may be shaped to include the body unit 81 that is pillared and the surface exposure portion 83 that is tapered upwardly from the body unit 81 with the maximum diameter portion 82 as the boundary. As shown in Fig. 7 or 8, the decorative part 8 may be pyramidal shaped to include the body unit 81 that is tapered downwardly from the maximum diameter portion 82 whose cross-section has the maximum diameter. As shown in Fig. 9, the decorative part 8 may be spherical or elliptical. As shown in Fig. 11, the decorative part 8 may be shaped to contain the surface exposure portion 83 that is tapered upwardly from the maximum diameter portion 82.

[0029] The positional relation between the decorative part 8 and the snap fastener configuration members (the fastener elements 3a, 3b, the slider 7, the bottom stopper 4 and the top stoppers 6a, 6b) is not especially limited. The decorative

part 8 may be preferably fixed to inside the storage (the first storage 62a) in such a way that the maximum diameter portion 82 of the decorative part 8 is located lower than the surface 600 of the first top stopper 6a. Consequently, the decorative part 8 is stabilized in the storage and unlikely to be fallen off.

[0030] Also, the decorative part 8 may be fixed to inside a storage 32, 42, 62a, 62b, 72a, 72b or 72c in such a way that the top surface of the surface exposure portion 83 of the decorative part 8 is located on the same flat surface as the surface 300, 400, 600 or 700 of at least one of the fastener elements 3a, 3b, the slider 7, the bottom stopper 4 and the top stoppers 6a, 6b or the top surface of the surface exposure portion 83 of the decorative part 8 is located lower than the surface 300, 400, 600 or 700. That is, in the example shown in Fig. 10, a top surface 83a of the surface exposure portion 83 of the decorative part 8 is located on the same flat surface as the surface 600 of the first top stopper 6a. Consequently, as compared with a case in which the surface exposure portion 83 protrudes from the surface 600 of the first top stopper 6a, the influence of the friction caused by outer contact and the like is unlikely to be received, which causes the decorative part 8 to be unlikely to be fallen off from the slide fastener 1.

[0031] When the decorative part 8 is attached, the decorative part 8 is arranged, for example, in the first storage 62a shown in Fig. 3. After that, from the top surface of the decorative part 8 to the resin layer configuring the first storage 62a, the supersonic vibration of about 20 kHz, preferably, about 20 to 40 kHz is applied to the surface of the decorative part 8 by using a supersonic transmitter. With the application of the supersonic vibration, as shown in Fig. 5, the resin located close to the boundary between the first groove 621 and the second groove 622 of the first storage 62a opposite to the maximum diameter portion 82 of the decorative part 8 is melted, and the resin is expansively eluted from a side wall 64 of the second groove 622 inside the first storage 62a, and the fixer 63a (first fixer) for covering a part of the surface exposure portion 83 is formed. The fixer 63a is formed such that the resin configuring the first top stopper 6a is partially melted and integrated. Thus, as compared with a case in which it is fixed onto the surface exposure portion 83 by using a different member, the decorative part 8 is unlikely to be separated, which enables the decorative part 8 and the slide fastener configuration member to be more strongly connected. Moreover, since the resin is melted and eluted by the supersonic vibration, the decorative part 8 can be fixed easily and efficiently. Since the fixer 63a covers only the part of the surface exposure portion 83, the outer appearance of the decorative part 8 is not damaged, and its design level is also improved.

[0032] Figs. 12 and 13 show the examples when the decorative part 8 is attached to the fastener element 3b. The storage 32 is arranged on the surface 300 of the base 35. As shown in Fig. 13, the storage 32 has a first groove 321 and a second groove 322 which is connected to the first groove 321 above the first groove 321. The fastener tape 2b and the core 5b placed at the tip thereof are embedded in the lower portion of the fastener element 3b. A length in the lateral direction of the fastener tape 2b embedded in the base 35 is preferred to be 50 % or less of the maximum diameter of the storage 32. Also, the tip of the fastener tape 2b (the tip of the core 5b) is preferably arranged so as to be away from the center of the storage 32. When the decorative part 8 shown in Fig. 5 is arranged in the storage 32, the body unit 81 is stored in the first groove 321, and the surface exposure portion 83 is stored in the second groove 322. After that, since the supersonic vibration is applied to the decorative part 8, the resin configuring the base 35 is melted and protruded from the boundary between the first groove 321 and the second groove 322 (a side wall 34 of the second groove 322), and the fixer (that is not shown) for covering the part of the decorative part 8 is consequently formed.

[0033] Figs. 14 and 15 show the examples when the decorative part 8 is attached to the bottom stopper 4. The storage 42 is arranged on the surface 400 of the bottom stopper 4. As shown in Fig. 15, the storage 42 has a first groove 421 and a second groove 422 which is connected to the first groove 421 above the first groove 421. The fastener tapes 2a, 2b and the cores 5a, 5b, which are placed at their tips, respectively, are embedded in the lower portion of the bottom stopper 4. Even in the case shown in Fig. 15, the tips of the fastener tapes 2a, 2b (the tip of the core 5a) are preferably arranged so as to be away from the center of the storage 42. When the decorative part 8 shown in Fig. 5 is arranged in the storage 42, the body unit 81 is stored in the first groove 421, and the surface exposure portion 83 is stored in the second groove 422. After that, since the supersonic vibration is applied to the decorative part 8 and the bottom stopper 4, the resin configuring the bottom stopper 4 is melted and protruded from the boundary between the first groove 421 and the second groove 422 (the vicinity of a side wall 44 of the second groove 422), and the fixer (that is not shown) for covering the part of the decorative part 8 is consequently formed.

[0034] Figs. 16 and 17 show the examples when the decorative part 8 is attached to the puller 75 of the slider 7. The storages 72a, 72b and 72c are arranged on the surface 700 of the puller 75. As shown in Fig. 17, the storages 72a, 72b have first grooves 721a, 721b and second grooves 722a, 722b which are connected to the first grooves 721a, 721b above the first grooves 721a, 721b, respectively. When the decorative part 8 shown in Fig. 5 is arranged in the puller 75, the body unit 81 is stored in the first grooves 721a, 721b, and the surface exposure portion 83 is stored in the second grooves 722a, 722b. After that, since the supersonic vibration is applied to the decorative part 8 and the puller 75, the resin configuring the bottom stopper 4 is melted and protruded from the boundaries between the first grooves 721a, 721b and the second grooves 722a, 722b, respectively, and the fixer (that is not shown) for covering the part of the decorative part 8 is consequently formed.

[0035] Although the embodiments of the present invention have been described as mentioned above, the discussions

and drawings that configure a part of this disclosure should not be understood to limit the present invention. For example, this embodiment indicates the example in which the front surface side of the fastener tapes 2a, 2b is defined as "the upper portion" and the rear surface side of the fastener tapes 2a, 2b is defined as "the lower portion", and the decorative part 8 is formed on the front surface side of the fastener tapes 2a, 2b in the fastener elements 3a, 3b, the slider 7, the bottom stopper 4 or the top stoppers 6a, 6b. However, the decorative part 8 may be naturally arranged on the rear surface side of the fastener tapes 2a, 2b. In this case, an assumption that the rear surface side of the fastener tapes 2a, 2b is defined as "the upper portion" and the front surface side of the fastener tapes 2a, 2b is defined as "the lower portion" may be easily understood by one skilled in the art. In this way, the present invention naturally includes various embodiments that are not clearly described herein and can be varied and embodied in a range without departing from its scope and spirit in the embodying stage.

DESCRIPTION OF REFERENCE NUMBERS

[0036]

1	Slide Fastener
2a, 2b	Fastener Tape
3a, 3b	Fastener Element
4	Bottom Stopper
5a, 5b	Core
6a, 6b	Top Stopper
7	Slider
8, 8a, 8b	Decorative part
21a, 21b	Tape Side Edge
32, 42, 62a, 62b, 72a, 72b, 72c	Storage
33, 63a, 63b	Fixer
34, 44, 64	Side Wall
61	Stopper
71	Slider Body
74	Puller Holder
75	Puller
81	Body Unit
82	Maximum Diameter Portion
83	Surface Exposure Portion
83a	Top Surface
300, 400, 600, 700	Surface
321, 421, 621, 721a, 721b	First Groove
322, 422, 622, 722a, 722b	Second Groove

Claims

1. A slide fastener (1) comprising:

a pair of fastener tapes (2a, 2b);
chains of fastener elements (3a, 3b) arranged along opposing tape side edges (21a, 21b) of the fastener tapes (2a, 2b);
a slider (7) for engaging and separating the fastener elements (3a, 3b);
a bottom stopper (4) arranged at one ends of the chains of the fastener elements (3a, 3b) on the pair of fastener tapes (2a, 2b); and
a pair of top stoppers (6a, 6b) arranged at the other ends of the chains of the fastener elements (3a, 3b),
wherein the slide fastener (1) comprises:

a concave storage (32, 42, 62a, 62b, 72a, 72b, 72c) provided on a surface (300, 400, 600, 700) of at least one of the fastener elements (3a, 3b), the slider (7), the bottom stopper (4) and the top stoppers (6a, 6b);
a decorative part (8, 8a, 8b) stored in the storage (32, 42, 62a, 62b, 72a, 72b, 72c); and
a fixer (33, 63a, 63b), which is formed integrally with the storage (32, 42, 62a, 62b, 72a, 72b, 72c) and protrudes from the storage (32, 42, 62a, 62b, 72a, 72b, 72c) and fixes the decorative part (8, 8a, 8b) in the

storage (32, 42, 62a, 62b, 72a, 72b, 72c).

2. The slide fastener (1) according to the claim 1, wherein the decorative part (8, 8a, 8b) comprises a body unit (81), a surface exposure portion (83), and a maximum diameter portion (82) whose cross-section has a maximum diameter of the decorative part (8, 8a, 8b) and defines a boundary between the body unit (81) and the surface exposure portion (83), wherein the body unit (81) is positioned lower than the maximum diameter portion (82) and the surface exposure portion (83) is tapered upwardly from the body unit (81),
wherein the maximum diameter portion (82) of the decorative part (8, 8a, 8b) is fixed to inside the storage (32, 42, 62a, 62b, 72a, 72b, 72c) so as to be arranged lower than the surface (300, 400, 600, 700) of the fastener elements (3a, 3b), the slider (7), the bottom stopper (4) or the top stoppers (6a, 6b) where the decorative part (8, 8a, 8b) is arranged.

3. The slide fastener (1) according to the claim 1, wherein the decorative part (8, 8a, 8b) comprises a body unit (81), a surface exposure portion (83), and a maximum diameter portion (82) whose cross-section has a maximum diameter of the decorative part (8, 8a, 8b) and defines a boundary between the body unit (81) and the surface exposure portion (83), wherein the body unit (81) is positioned lower than the maximum diameter portion (82) and the surface exposure portion (83) is tapered upwardly from the body unit (81),
wherein a top surface (83a) of the surface exposure portion (83) of the decorative part (8, 8a, 8b) is fixed to inside the storage (32, 42, 62a, 62b, 72a, 72b, 72c) so as to be located on the same flat surface as the surface (300, 400, 600, 700) of the fastener elements (3a, 3b), the slider (7), the bottom stopper (4) or the top stoppers (6a, 6b) or located lower than the surface (300, 400, 600, 700).

4. The slide fastener (1) according to the claim 1, wherein the decorative part (8, 8a, 8b) comprises a body unit (81), a surface exposure portion (83), and a maximum diameter portion (82) whose cross-section has a maximum diameter of the decorative part (8, 8a, 8b) and defines a boundary between the body unit (81) and the surface exposure portion (83), wherein the body unit (81) is positioned lower than the maximum diameter portion (82) and the surface exposure portion (83) is tapered upwardly from the body unit (81),
wherein the storage (32, 42, 62a, 62b, 72a, 72b, 72c) comprises a first groove (321, 421, 621, 721a, 721b) which stores the body unit (81) and a second groove (322, 422, 622, 722a, 722b) connected to the first groove (321, 421, 621, 721a, 721b) above the first groove (321, 421, 621, 721a, 721b) and stores the surface exposure portion (83), and wherein the fixer (33, 63a, 63b) is expansively protruded from a side wall (34, 64) of the second groove (322, 422, 622, 722a, 722b) and covers a part of the surface exposure portion (83).

5. The slide fastener (1) according to the claim 1, wherein, when the decorative part (8, 8a, 8b) is arranged in one of the fastener elements (3a, 3b) and the top stoppers (6a, 6b), a length in a lateral direction of the fastener tapes (2a, 2b) embedded in the fastener elements (3a, 3b) or the top stoppers (6a, 6b) is 50 % or less of the maximum diameter of the storage (32, 42, 62a, 62b).

6. The slide fastener (1) according to the claim 1, wherein, when the decorative part (8, 8a 8b) is arranged in one of the fastener elements (3a, 3b) and the top stoppers (6a, 6b), the fastener tapes (2a, 2b) are arranged away from a center of the storage (32, 62a, 62b) so that the fastener tapes (2a, 2b) are not embedded on a central axis of the storage (32, 62a, 62b).

7. A top stopper (6a, 6b) for a slide fastener (1) comprising:

a first top stopper (6a) made of resin which comprises a concave first storage (62a) which is arranged on a tape side edge (21a) of a first fastener tape (2a) and formed on a surface (600), a first decorative part (8a) stored in the first storage (62a), and a first fixer (63a) that is integrated with the first storage (62a) and protrudes from the first storage (62a) and fixes the first decorative part (8a);
a second top stopper (6b) which comprises a concave second storage (62b) which is arranged on a tape side edge (21b) of a second fastener tape (2b) opposite to the first fastener tape (2a) and formed on the surface (600), a second decorative part (8b) stored in the second storage (62b), and a second fixer (63b) which is integrated with the second storage (62b) and protrudes from the second storage (62b) and fixes the second decorative part (8b); and
a stopper (61), which is arranged on the tape side edge (21b) and located opposite to the fastener element (3a) located closest to the side of the first top stopper (6a) in the chains of the fastener elements (3a) arranged along the tape side edge (21a) of the first fastener tape (2a) and formed integrally with the second top stopper (6b).

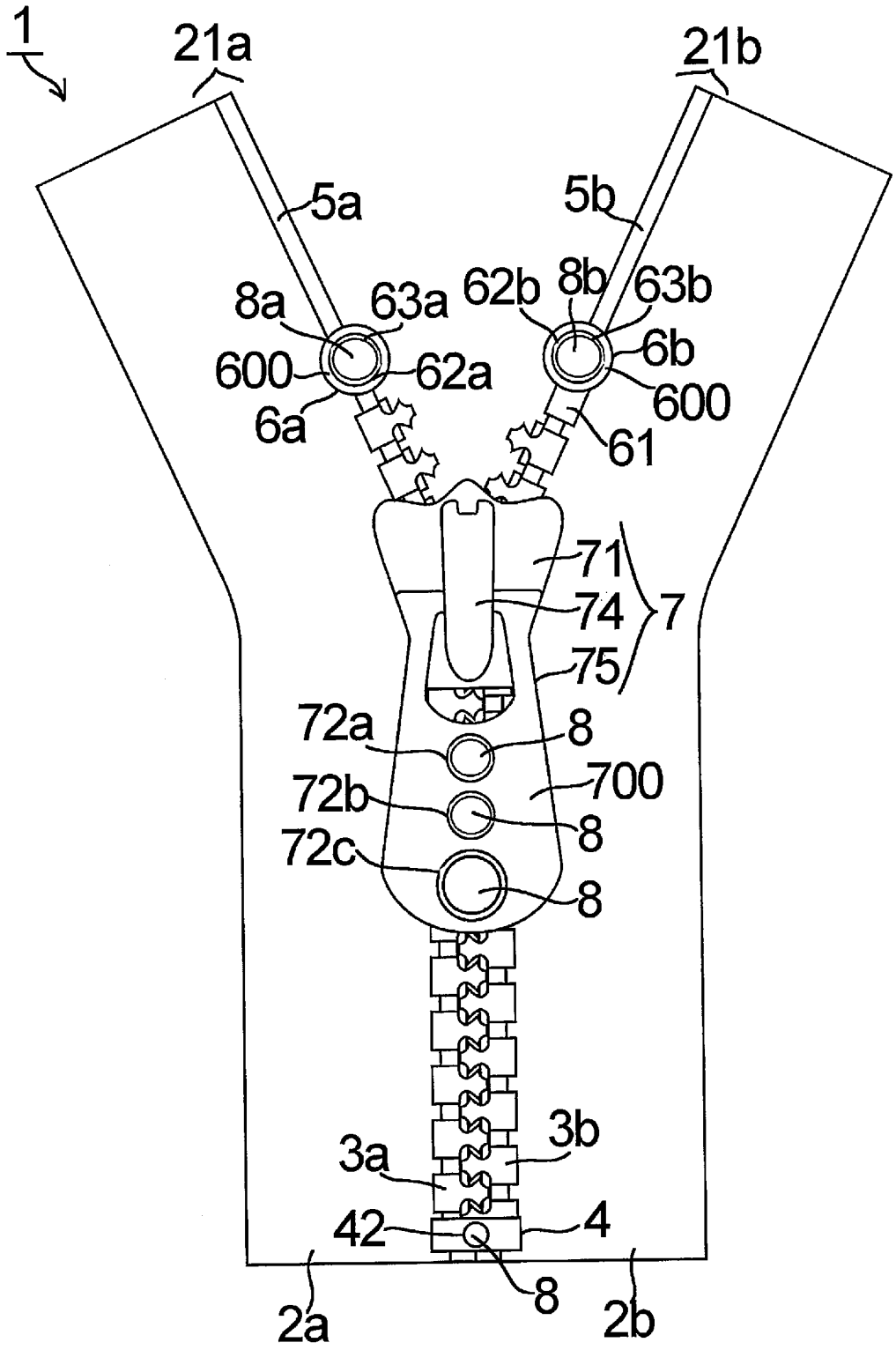
8. The top stopper (6a, 6b) for the slide fastener, according to the claim 7, wherein a center of the first top stopper (6a) is arranged so as to be shifted to a side of the second fastener tape (2b) from a tip of the first fastener tape (2a) embedded in the first top stopper (6a), and a center of the second top stopper (6b) is arranged to be shifted to a side of the first fastener tape (2a) from a tip of the second fastener tape (2b) embedded in the second top stopper (6b).

9. A method of producing a slide fastener (1) which comprises a pair of fastener tapes (2a, 2b); chains of fastener elements (3a, 3b) arranged along opposing tape side edges (21a, 21b) of the fastener tapes (2a, 2b); a slider (7) for engaging and separating the fastener elements (3a, 3b); a bottom stopper (4) arranged at one ends of the chains of the fastener elements (3a, 3b) on the pair of fastener tapes (2a, 2b); and a pair of top stoppers (6a, 6b) arranged at the other ends of the chains of the fastener elements (3a, 3b), the method comprises:

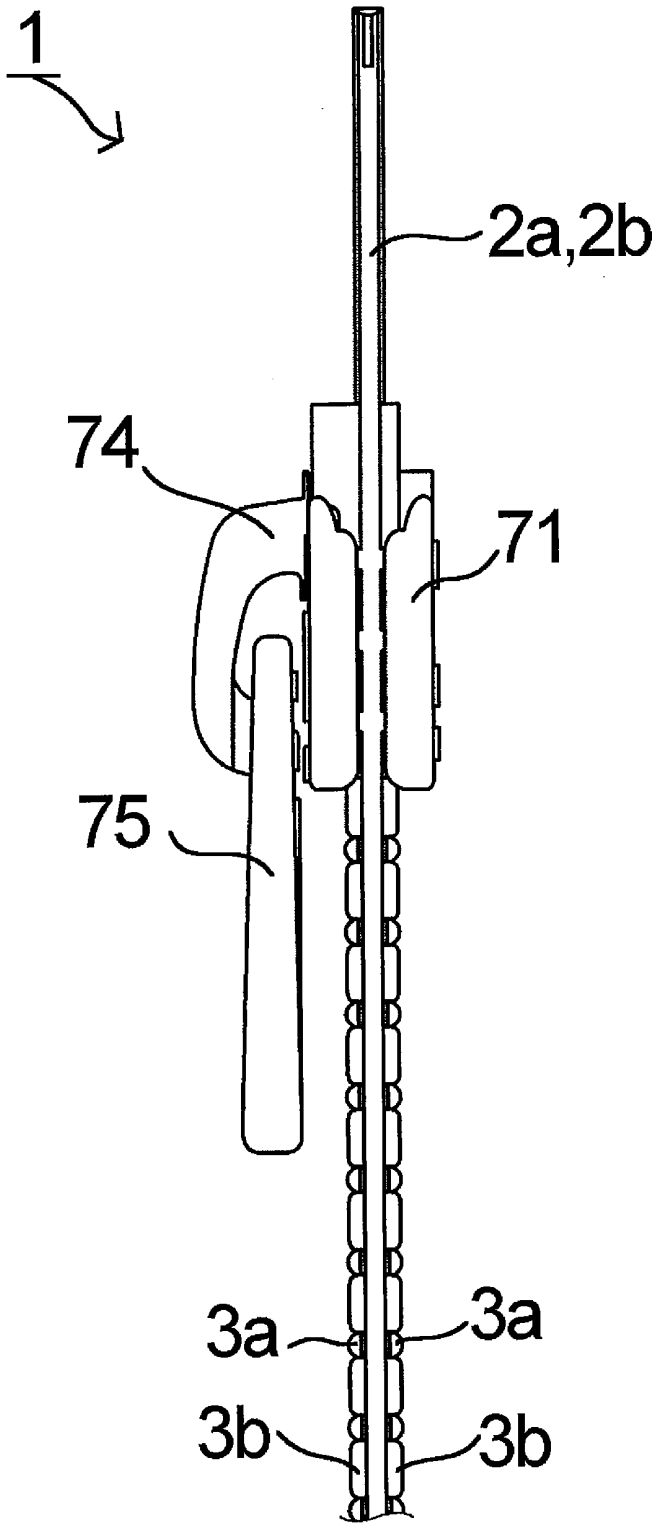
a step of forming a concave storage (32, 42, 62a, 62b, 72a, 72b, 72c) on a surface (300, 400, 600, 700) of at least one of the fastener elements (3a, 3b), the slider (7), the bottom stopper (4) and the top stoppers (6a, 6b);
a step of storing a decorative part (8, 8a, 8b) in the storage (32, 42, 62a, 62b, 72a, 72b, 72c); and
a step of partially melting a part of the storage (32, 42, 62a, 62b, 72a, 72b, 72c) and forming a fixer (33, 63a, 63b) protruding into the storage (32, 42, 62a, 62b, 72a, 72b, 72c) and fixing the decorative part (8, 8a, 8b) to inside the storage (32, 42, 62a, 62b, 72a, 72b, 72c) by using the fixer (33, 63a, 63b).

10. The method of producing the slide fastener (1) according to the claim 9, wherein the step of partially melting the part of the storage (32, 42, 62a, 62b, 72a, 72b, 72c) and forming the fixer (33, 63a, 63b) protruding into the storage (32, 42, 62a, 62b, 72a, 72b, 72c) includes a step of applying supersonic vibration to the storage (32, 42, 62a, 62b, 72a, 72b, 72c) and melting a part of the storage (32, 42, 62a, 62b, 72a, 72b, 72c).

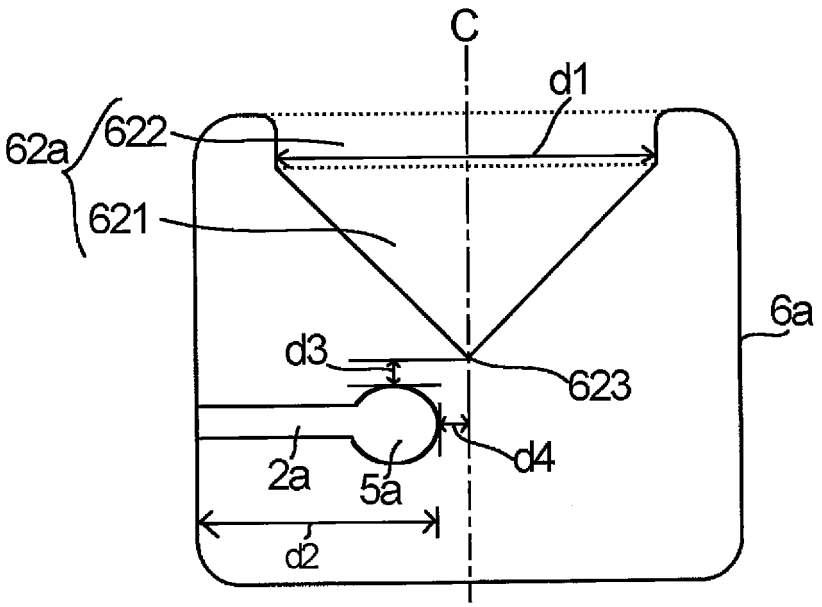
【FIG.1】


1
21a
21b
5a
5b
8a
63a
62b
8b
63b
600
62a
6b
600
6a
61
71
74
7
75
72a
8
72b
700
8
72c
8
3b
3a
42
4
8
2a
2b

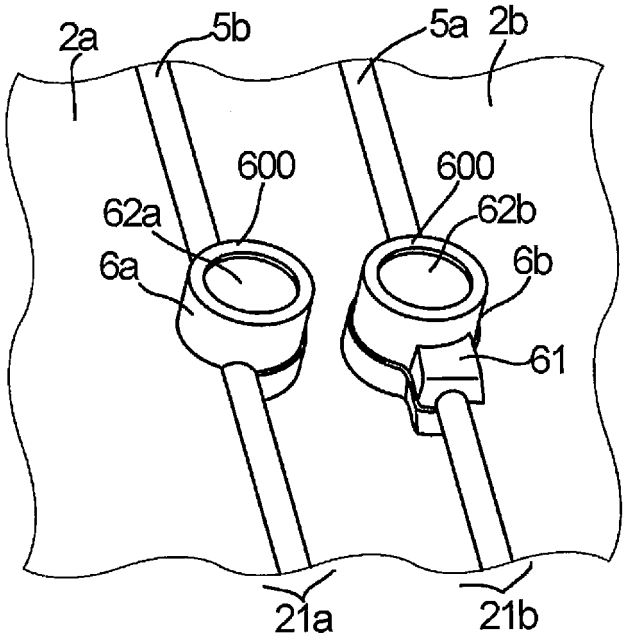
【FIG.2】



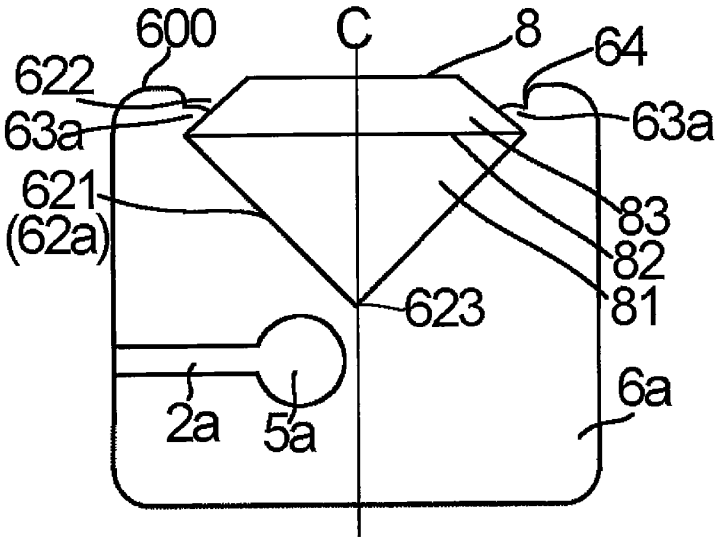
【FIG.3】


C
d1
62a
622
621
6a
d3
623
d4
2a
5a
d2

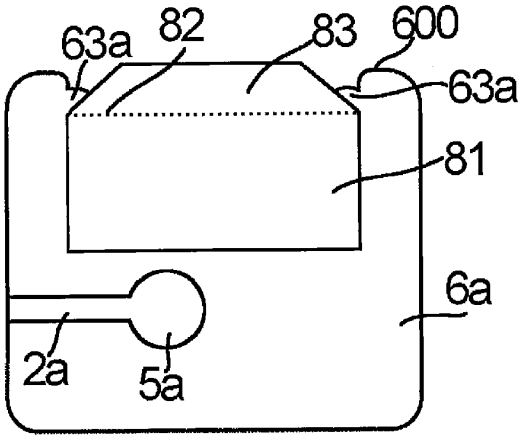
【FIG.4】


2a
5b
5a
2b
600
600
62a
62b
6a
6b
61
21a
21b

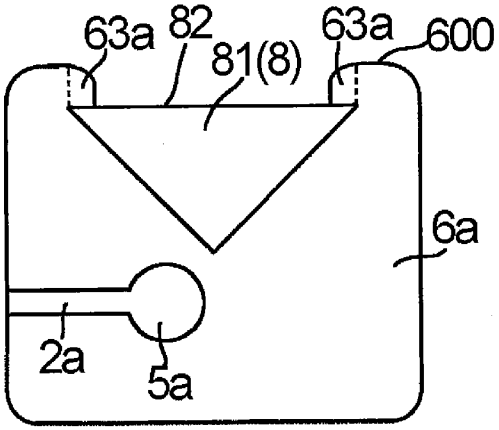
【FIG.5】



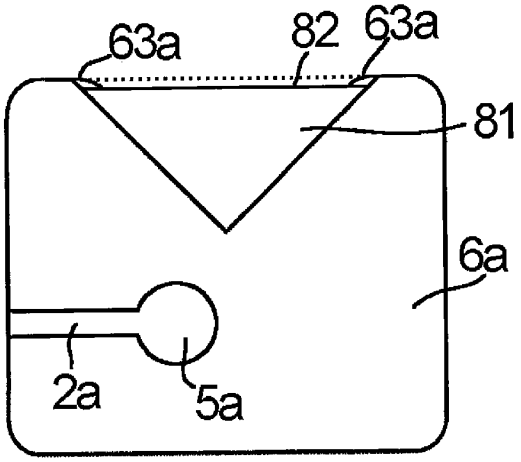
【FIG.6】



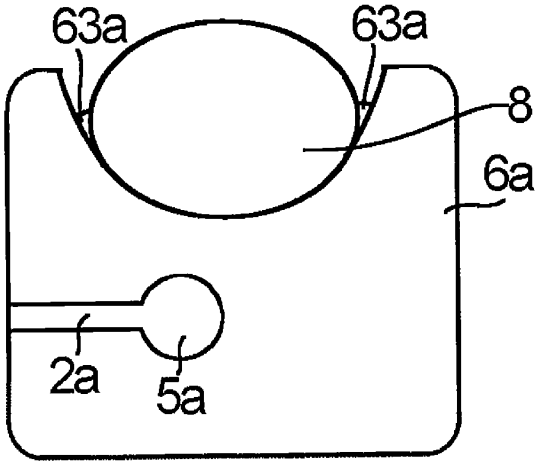
【FIG.7】



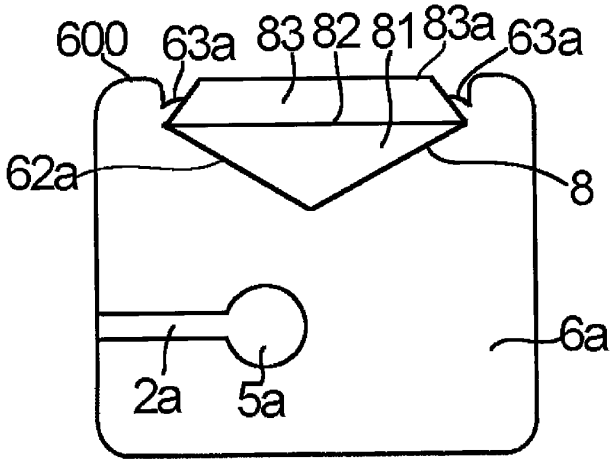
【FIG.8】



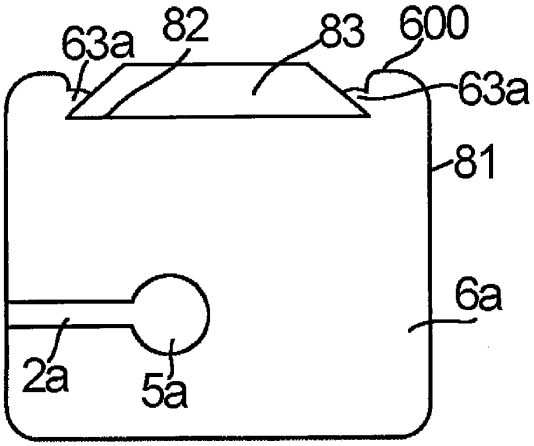
【FIG.9】



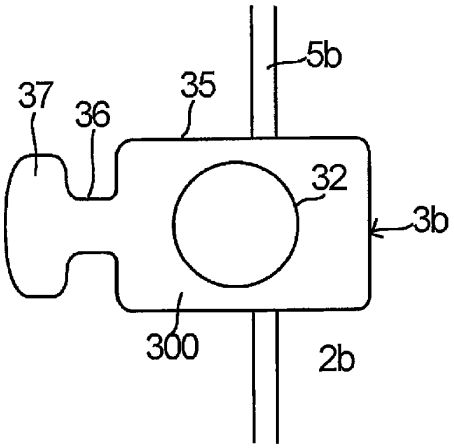
【FIG.10】



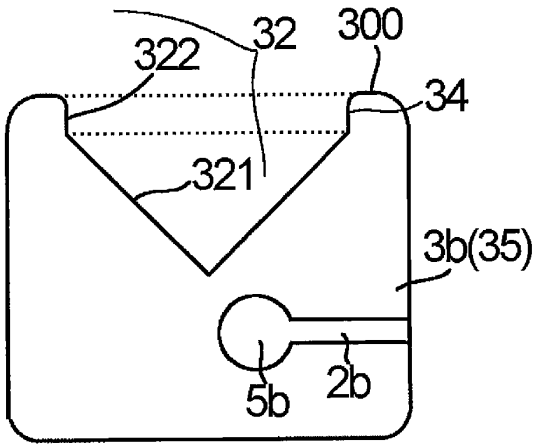
【FIG.11】



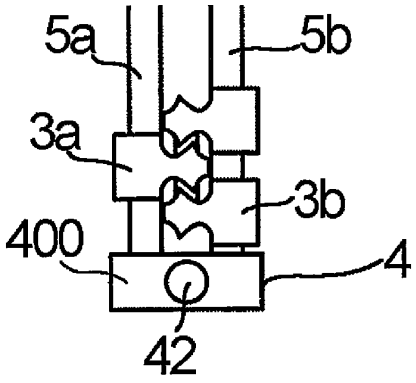
【FIG.12】



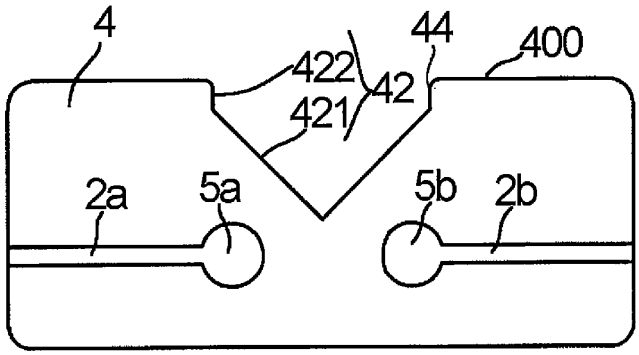
【FIG.13】



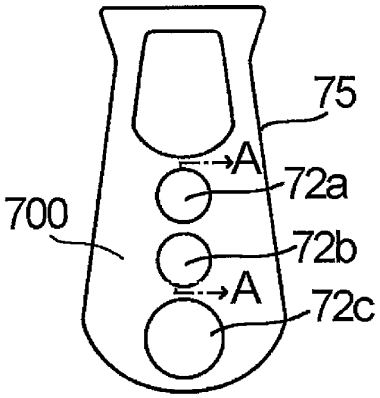
【FIG.14】



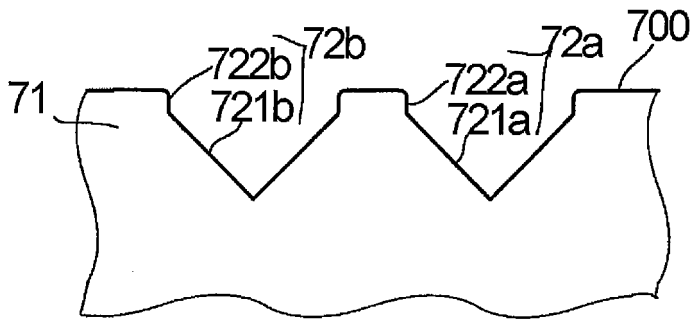
【FIG.15】



【FIG.16】



【FIG.17】



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/067893

A. CLASSIFICATION OF SUBJECT MATTER
A44B19/36(2006.01)i, *A44B19/14*(2006.01)i, *A44B19/26*(2006.01)i, *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)
A44B19/36, A44B19/14, A44B19/26, 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 1996-2011
Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011

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	JP 49-1340 A (Brier Manufacturing Co.), 08 January 1974 (08.01.1974), page 2, lower right column, line 14 to page 3, upper left column, line 17; fig. 3, 5 & US 3825978 A & GB 1413576 A & DE 2304341 A1	1-10
Y	US 5511292 A (D.SWAROVSKI & CO.), 30 April 1996 (30.04.1996), column 1, line 66 to column 2, line 35; fig. 1 to 5 (Family: none)	1-10

☒ 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	Date of mailing of the international search report
04 January, 2011 (04.01.11)	18 January, 2011 (18.01.11)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/067893

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 137549/1984(Laid-open No. 51023/1986) (Nagai Plastics Co., Ltd.), 05 April 1986 (05.04.1986), claims; specification, page 4, line 8 to page 6, line 6; fig. 1 to 4 (Family: none)	1-10
Y	JP 2008-161522 A (YKK Corp.), 17 July 2008 (17.07.2008), claims; fig. 1 to 8 & US 2008/0155797 A1 & EP 1938706 A1	7-8
A	US 5713110 A (D.SWAROVSKI & CO.), 03 February 1998 (03.02.1998), entire text; all drawings (Family: none)	1-10
A	US 2495033 A (THE NORTH & JUDD MANUFACTURING CO.), 17 January 1950 (17.01.1950), column 4, lines 45 to 56; fig. 3, 8 (Family: none)	1-10
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 38160/1977(Laid-open No. 132486/1978) (Masami SHIMADA), 20 October 1978 (20.10.1978), entire text; all drawings (Family: none)	1-10

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 3176936 B **[0002] [0003] [0004]**