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(54) **DEVICE FOR ATTACHING BUTTON OR THE LIKE AND BUTTON TO BE ATTACHED THERETO**

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Description

Technical Field

[0001] 0001 The present invention relates to a piece for attaching buttons or the like and an attaching button for attachment thereto, and to a method for manufacturing garments with buttons attached; in particular it relates to a piece for attaching buttons or the like for the purpose of removably attaching buttons to fabric and attaching buttons for attachment thereto, and to a method of manufacturing a piece for attaching buttons or the like and clothing to which buttons or the like are attached.

Background Art

[0002] 0002 Various methods are known for attaching buttons or the like, such as buttons or accessories, sewed onto fabric using thread.

[0003] Laid Open Utility Model S.57-15208 (Patent Document 1) sets forth a quick-attaching button. In the button set forth here, multiple pins project from the rear of the button these pins penetrate the fabric, and the button is attached thereto by affixing the pins projecting from the rear side of the fabric using a dedicated affixing hardware

[0004] 0003 Laid Open Patent H8-103303 (Patent Document 2) sets forth a button having a holding piece on its rear side. In the button described here, the holding piece is connected by thread on the rear side of a standard button, and the button is attached to the fabric by insertion of this holding piece into a button hole provided in the clothing, in the manner of a cuff button.

[0005] 0004 Laid Open Utility Model S.59-134410 (Patent Document 3) sets forth a clothing button. In the clothing button described, feet project on the rear side, and the button is attached to the fabric by gripping the fabric between a disk formed between these feet and a separate attaching piece.

[0006] 0005 Laid Open Utility Model H.7-16605 (Patent Document 4) sets forth an easy-attaching button. In the easy-attaching button described, a fine needle is passed through a hole in the button main body; this needle is stuck into and passed through the fabric; the needle projecting on the rear side of the fabric is then passed through an auxiliary button to connect same, and finally a cap is placed on the auxiliary button.

[0007] 0006

Patent Document 1: Laid Open Utility Model S.57-15208

Patent Document 2: Laid Open Patent H.8-103303

Patent Document 3: Laid Open Utility Model S.59-134410

Patent Document 4: Laid Open Utility Model H.7-16605

[0008] Documents JP 22 796 C1 and JP 60 083311 U

discloses further devices for attaching a button.

Disclosure of the Invention

5 Problems the Invention Is to Solve

[0009] 0007 However, the buttons set forth in Laid Open Utility Models S.57-15208 and JS.59-134410 have a special structure, and do not permit use of standard buttons in general distribution. While standard buttons can be used in the invention set forth in Laid Open Utility Model H.7-16605, they cannot be easily detached once attached to the fabric. With the invention of Laid Open Patent H.8-103303, standard buttons can be used and can be detached, but because they have the shape of cuff link buttons, they differ in appearance and usage feeling from standard buttons.

[0010] 0008 Therefore the present invention has the object of providing a piece for attaching buttons or the like and an attaching button for attachment thereto, and a method for manufacturing clothing with buttons attached, capable of using standard buttons and of attaching buttons which can be easily detached and which impart a usage sensation no different from standard buttons.

Means for Resolving Problem

[0011] 0009 In order to resolve the above-described problem, the present invention is a piece for attaching buttons or the like for detachably attaching buttons or the like to fabric, comprising: an attaching piece main portion having a main through-hole through which thread passed through a button attaching hole formed in the fabric is inserted and the thread extending from the button or the like to be attached to the fabric; a thread anchoring portion for winding thread passing through the main through-hole; and a thread gripping portion for gripping and affixing the end of thread wound on the thread anchoring portion.

[0012] 0010 In the present invention thus constituted, a thread extending from the button to be attached to the fabric is inserted through a button attaching hole formed in the fabric, and is inserted through a main through-hole in the attaching piece main portion. Thread passing through the main through-hole is wound on the thread holding portion, and the end of the wound thread is gripped by the thread anchoring portion and affixed. To detach buttons, it is sufficient to remove the gripped thread from the thread anchoring portion and return the thread wound on the thread anchoring portion to its original place.

[0013] 0011 In the present invention thus constituted, buttons can be easily attached and detached. Also, because standard buttons in general circulation can be attached using standard thread, there is no difference in usage sensation from standard buttons.

[0014] 0012 In the present invention, the attaching

piece main portion and the thread anchoring portion are comprised of separate insertable parts, and the thread gripping portion is formed between the inserted attaching piece main portion and the thread anchoring portion.

[0015] In the present invention thus constituted, a thread gripping portion capable of reliably affixing thread can be easily formed.

[0016] 0013 In the present invention, the attaching piece main portion comprises a main unit insertion portion in which the main through-hole is formed, inserted in the thread anchoring portion; and a main unit flat plate portion formed around the main unit insertion portion.

[0017] In the present invention thus constituted, the main unit flat plate portion is formed around the main unit insertion portion so that the perimeter of the main through-hole can be reinforced.

[0018] 0014 In the present invention the thread anchoring portion preferably includes a thread anchoring portion insertion portion inserted in the main unit insertion portion, and a thread winding arm extending from the thread anchoring portion insertion portion, with a widened tip.

[0019] In the present invention thus constituted, the tip of the thread winding arm is formed to widen out, thereby preventing thread wound on the thread winding arm from pulling off.

[0020] 0015 In the present invention, the thread gripping portion preferably comprises protrusion formed from the main unit flat plate portion and/or the thread winding arm.

[0021] In the present invention thus constituted, a protruding portion is formed on the thread gripping portion, therefore the end of the thread can be securely gripped and affixed.

[0022] 0016 In the present invention, multiple sew-on holes for sewing the attaching piece main portion onto fabric are preferably formed on the attaching piece main portion.

[0023] In the present invention thus constituted, sew-on holes are formed in the attaching piece main portion so that the attaching piece main portion can be easily sewn to the fabric.

[0024] 0017 The present invention is also preferably provided with an affixing member having an affixing member through-hole for inserting thread extending from the button or the like, and the affixing member being affixed to the fabric by insertion with the attaching piece main portion such that the fabric is gripped through the button attaching hole.

[0025] 0018 In the present invention thus constituted, buttons are attached to fabric by gripping the fabric between an affixing member and an attaching piece main portion.

[0026] In the present invention thus constituted, the piece for attaching buttons or the like can be attached to the fabric without sewing.

[0027] 0019 In the present invention the thread anchoring portion is preferably integrally formed with the attaching piece main portion, and the thread gripping portion

is formed between the integrated thread anchoring portion and the fabric.

[0028] In the present invention thus constituted, a thin profile piece for attaching buttons or the like can be formed.

[0029] 0020 In the present invention, the affixing member preferably has a joining member receiving concavity for receiving and holding a joining member for joining a button attaching thread inserted in a hole in a button or the like to an anchoring thread wound on the thread anchoring portion.

[0030] 0021 In the present invention thus constituted, the button attaching thread inserted through the button hole is joined to the anchoring thread by the joining member. This joining member is received by the joining member receiving concavity formed in the affixing member and held in place.

[0031] 0022 In the present invention thus constituted, the joining member is received by the joining member receiving concavity and held in place, therefore when the anchoring thread is pulled in order to wind on the thread anchoring portion, the joining member can be prevented from pulling out the back side of the fabric.

[0032] 0023 The present invention is an attaching button for attachment to the piece for attaching buttons or the like according to the present invention, comprising: a button or the like; a button attaching thread inserted in a hole in button or the like; an anchoring thread affixed to the piece for attaching buttons or the like; and a joining member for joining the button attaching thread with the anchoring thread, wherein the anchoring thread comprises string woven from single strand or multistrand threads.

[0033] 0024 By using the attaching button of the present invention thus constituted, threads of superior design qualities can be used as the button attaching thread, and thread appropriate for winding on the thread anchoring portion can be used for the anchoring thread.

[0034] 0025 Moreover, the present invention is a method for manufacturing a garment to which buttons or the like are attached, comprising steps of: forming a button attaching hole in a location to which the button or the like is to be attached to the garment; providing the piece for attaching buttons or the like according to any one of claims 1 through 9; inserting thread extending from the button or the like into the button attaching hole; inserting thread passed through the button attaching hole into the main through-hole in the piece for attaching a button or the like; winding thread passed through the main through-hole onto the thread anchoring portion; and gripping and affixing thread wound on the thread anchoring portion to the thread gripping portion.

Effect of the Invention

[0035] 0026 With the piece for attaching buttons or the like and the attaching button for attachment thereto and the method for manufacturing clothing with buttons or the like attached of the present invention, normal buttons can

be used, removal and attachment is facilitated, and there is no difference in usage sensation compared to normal buttons.

Best Mode for Practicing the Invention

[0036] 0027 Next, referring to Figs. 1 through 5, we discuss a piece for attaching buttons or the like according to a first embodiment of the present invention. Fig. 1 (a) is a front view of a piece for attaching buttons or the like according to the embodiment; (b) is a side view cross-section thereof. Fig. 2 (a) is a front view of an attaching piece main portion constituting the piece for attaching buttons or the like of the present embodiment; (b) is a side view cross-section thereof. Fig. 3 (a) is a front view of the thread anchoring portion constituting a piece for attaching buttons or the like; (b) is a side view cross-section thereof.

[0037] 0028 As shown in Fig. 1, the piece for attaching buttons or the like 1 according to the present embodiment of the present invention has an attaching piece main portion 2 and a thread anchoring portion 4. A thread gripping portion 6 is formed between the attaching piece main portion 2 and the thread anchoring portion 4 in order to grip and affix the end portion of the thread for attaching the button. In the present embodiment, the attaching piece main portion 2 and the thread anchoring portion 4 are respectively constituted of different parts; these parts

[0038] 0029 As shown in Fig. 2, the attaching piece main portion 2 has a main unit insertion portion 2a and a main unit flat plate portion 2b formed around the perimeter of the main unit insertion portion.

[0039] The main unit insertion portion 2 is formed in an approximately columnar shape, which is snapped into the thread anchoring portion 4 to fit the attaching piece main portion 2 to the thread anchoring portion. In addition, two main through-holes 2c extending in the axial direction of the columns are provided on the main unit insertion portion 2a

[0040] 0030 The main unit flat plate portion 2b is a disk-shaped part formed on the end surface of the main unit insertion portion 2a; it is formed concentrically with the main unit insertion portion 2a. Four arc-shaped long holes 2d serving as sew-on holes are formed on the main unit flat plate portion 2b; the attaching piece main portion 2 can be sewn on to material by passing thread through these long holes 2d. In addition, protrusions 2e, consisting of thickened portions of the disk, are formed on the outside perimeter of the main unit flat plate portion 2b.

[0041] 0031 As shown in Fig. 3, the thread anchor portion 4 has an annular thread anchoring portion insertion portion 4a and four thread winding arms 4b extending radially from this thread anchoring portion insertion portion 4a.

[0042] The thread anchoring portion insertion portion 4a is a toroidal portion; the attaching piece main portion 2 and the thread anchoring portion 4 are engaged together

er by the snap-on receiving of the main unit insertion portion 2 therein.

[0043] Four thread winding arms 4b are formed to extend radially at equal spacing from the thread anchoring portion insertion portion 4a; the ends thereof have a widened arc shape. The arc-shaped portions at the end of these thread winding arms 4b are thickened to constitute protrusions 4c.

[0044] 0032 As shown in Fig. 1, the protrusions 2e formed on the main unit flat plate portion 2b and the protrusions 4c formed at the ends of the thread winding arms 4b come into gapless contact when the attaching piece main portion 2 and the thread anchoring portion 4 are engaged together, such that thread can be reliably gripped.

[0045] Next, referring to Figs. 4 and 5, we discuss a method for manufacturing a garment using a piece for attaching buttons or the like according to the first embodiment of the present invention. Fig. 4 (a) is an oblique view seen from the front side of a garment, in which the garment button attaching portion is expanded; (b) is an oblique view seen from the rear side of the garment. Fig. 5 shows an example of how thread is wound on the thread anchoring portion 4.

[0046] 0033 First, as shown in Fig. 4 (a), a button attaching hole 8a is formed at the location where a button is to be attached to the garment 8. To avoid fraying at the edge of the button attaching hole 8a, the edge of the hole is whip stitched in the manner of a button hole. At the same time, as shown in Fig. 4 (b), the piece for attaching buttons or the like 1 is disposed on the rear side of the garment 8 in such a way that the button attaching hole 8a and the main through-hole 2c match. Next the piece for attaching buttons or the like 1 is sewn on to the garment 8 by the sew on thread 8b, using the main unit flat plate portion 2b.

[0047] 0034 Next, as shown in Fig. 4 (a), the thread 12 is passed through the hole 10a in the button 10 serving as a buttons or the like. Both ends of the thread 12 extending from the button 10 are inserted through the button attaching hole 8a. Furthermore, thread which has passed through a button attaching hole 8a is caused to pass through the respective main through-holes 2c in the piece for attaching buttons or the like 1. Both end portions of the thread 12 are preferably affixed by an optional appropriate adhesive or the like so as to be easily passed through button attaching hole 8a or main through-hole 2c.

[0048] 0035 As shown in Fig. 5 (a), the thread 12 which has passed through a main through-hole 2c on the left side and then through the rear side of the garment 8 is then wound onto the thread winding arm 4b also on the left side. Next, as shown in Fig. 5 (b), the thread 12 wound onto a thread winding arm 4b on the left side is wound starting from the rear side onto the thread winding arm 4b below, and thread emerging on the front side is again passed through the back side of the thread winding arm 4b at the left. Finally, the end portion of the thread 12 is affixed by gripping between the main unit flat plate portion

2b protrusions 2e and thread winding arm 4b protrusions 4c. At this point, the end portion of the thread 12 may also be wound several times at the arc-shaped part at the end of the thread winding arm 4b.

[0049] 0036 Similarly, as shown in Fig. 5 (c), a thread 12 passing through a main through-hole 2c on the right side and the rear side of the garment 8 is wound onto the thread winding arm 4b at the top right side; finally the end of the thread 12 is affixed. The operation of attaching a single button is thus completed. Note that when changing a button 10 for something else, or when removing a button 10 for cleaning the garment 8 or the like, a reverse operation can be used to remove the thread 12 from the thread winding arm 4b, taking out the button 10 and the thread 12 from the button attaching hole 8a, so that the button 10 can be easily removed.

[0050] 0037 In the first embodiment piece for attaching buttons or the like of the present invention, a button can be easily attached or removed simply by pulling out gripped thread from the thread anchoring portion and returning thread wound onto the thread anchoring portion to its original position. Also, normal buttons in general circulation can be attached using normal thread, therefore there is no difference in usage sensation from normal buttons.

[0051] 0038 In the piece for attaching buttons or the like of the present embodiment, the attaching piece main portion and the thread anchoring portion are constituted by separate components engaged together, therefore a tightly contacting thread gripping portion can be easily formed.

[0052] Furthermore, in the piece for attaching buttons or the like of the present embodiment, the end of the thread winding arm is formed to be wide, therefore thread wound around the thread winding arm can be prevented from pulling out.

[0053] 0039 In the piece for attaching buttons or the like of the present embodiment, the thread gripping portion is formed so that thread ends can be gripped by a large pressure, and thread can be reliably gripped and affixed.

[0054] Moreover, in the present embodiment long holes for sew-on purposes are formed in the attaching piece main portion by virtue of the piece for attaching buttons or the like, therefore the attaching piece main portion can be easily sewn onto fabric.

[0055] 0040 Next, referring to Figs. 6 and 7, we discuss a piece for attaching buttons or the like according to a second embodiment of the present invention.

[0056] The piece for attaching buttons or the like of the present embodiment differs from that described above in the first embodiment in that it has a single main through-hole, and two thread winding arms. Therefore we will discuss here only the points of difference between the second embodiment and the first embodiment of the present invention, and will omit discussion of points in common. Fig. 6 (a) is a front view of a piece for attaching buttons or the like according to the second embodiment;

(b) is a side view cross-section thereof. Fig. 7 shows an example of how to wind a thread relative to a thread anchoring portion.

[0057] 0041 As shown in Fig. 6, the piece for attaching buttons or the like 200 of the second embodiment of the present invention has an attaching piece main portion 202 and a thread anchoring portion 204. There is also a thread gripping portion 206 formed between the attaching piece main portion 202 and the thread anchoring portion 204 to grip and affix the ends of the thread used to attach a button. In the present embodiment, as well, the attaching piece main portion 202 and the thread anchoring portion 204 are formed of separate components, and are engaged together to make the shape shown in Fig. 6.

[0058] 0042 As shown in Fig. 6, the attaching piece main portion 202 has a main unit insertion portion 202a and a main unit flat plate portion 202b formed around this main unit insertion portion; the attaching piece main portion 202 and the thread anchoring portion 204 are engaged together by the insertion of the main unit insertion portion 202a into the thread anchoring portion 204. A single main through-hole 202c is disposed at the center of the main unit insertion portion 202a. The main unit flat plate portion 202b is a disk-shaped portion, on which two long holes 202d serving as sew-on holes are formed. The attaching piece main portion 202 is sewed onto the fabric using these long holes 202d. Protrusions 202e are also formed on the outside perimeter of the main unit flat plate portion 202b.

[0059] 0043 As shown in Fig. 6, the thread anchoring portion 204 has a toroidal thread anchoring portion insertion portion 204a, and two thread winding arms 204b extending at both sides of the thread anchoring portion insertion portion 204a. The attaching piece main portion 202 and the thread anchoring portion 204 are engaged together by the receiving of the main unit insertion portion 202a into the thread anchoring portion insertion portion 204a. Two thread winding arms 204b are formed to extend from both sides of the thread anchoring portion insertion portion 204a; the ends thereof are widened and have approximately a fan shape. At the arc-shaped portion at the end of the thread winding arms 204b are protrusions 204c.

[0060] 0044 The protrusions 202e formed on the main unit flat plate portion 202b and the protrusions 204c formed at the tip of the thread winding arm 204b make gapless contact; between them a thread can be reliably held in place.

[0061] 0045 The method of manufacturing a garment using a piece for attaching buttons or the like 200 according to the second embodiment of the present invention is similar to the method for manufacturing a garment using a piece for attaching buttons or the like according to the first embodiment, but differs in that both ends of thread passed through a button hole are passed in a single gathered form through the main through-hole 202c.

[0062] 0046 Next, referring to Fig. 7, we discuss an example of how thread with both ends gathered in a sin-

gle form is wound on to the thread winding arm 204b. First, as shown in Fig. 7 (a), thread coming out at the rear side from the main through-hole 202c (with both ends gathered together) is passed under the thread winding arm 204b at the right. Next, as shown in Fig. 7 (b), thread passed under the thread winding arm 204b at the right is passed from over the thread winding arm 204b to under the same. Then, as shown in Fig. 7 (c), thread wound on the thread winding arm 204b at the left is again wound onto the thread winding arm 204b, and finally the ends of the thread are affixed to the thread anchoring portion 206.

[0063] 0047 In the piece for attaching buttons or the like of the second embodiment of the present invention, both ends of the thread are wound onto the thread winding arm as a single gathered piece, thereby enabling a speeding up of the work to wind the thread.

[0064] 0048 Next, referring to Figs 8 through 14, we discuss the piece for attaching buttons or the like and attaching buttons used to attach thereto according to a third embodiment of the present invention.

[0065] In the present embodiment, the fact that a button attaching thread passed through a button and an anchoring thread engaged in the piece for attaching buttons or the like are joined by a crimp bead serving as a joining member is different from the embodiment described above. Therefore we discuss here only the points of difference between the third embodiment and the first and second embodiments of the present invention, and omit a discussion of common points. Fig. 8 (a) is a front view of a piece for attaching buttons or the like according to a third embodiment of the present invention; (b) is a side view cross-section thereof. Fig. 9 (a) is a front view of the piece for attaching buttons or the like constituting the attaching piece main portion of the present embodiment; (b) is a side view cross-section thereof. Fig. 10 (a) is a front view of the thread anchoring portion constituting the piece for attaching buttons or the like; (b) is a side view cross-section thereof.

[0066] 0049 As shown in Fig. 8, the piece for attaching buttons or the like 300 according to a third embodiment of the present invention has an attaching piece main portion 302 and a thread anchoring portion 304. A thread gripping portion 306 is formed between the attaching piece main portion 302 and the thread anchoring portion 304 for gripping and affixing the ends of thread used to attach a button. In the present embodiment as well, the attaching piece main portion 302 and the thread anchoring portion 304 are formed of respectively separate components, which are engaged together to form the shape shown in Fig. 8.

[0067] 0050 As shown in Fig. 9, the attaching piece main portion 302 has a main unit insertion portion 302a and a main unit flat plate portion formed around this main unit insertion portion.

[0068] The main unit insertion portion 302a is formed in an approximately rectangular ring shape, and the attaching piece main portion 302 and the thread anchoring

portion 304 are engaged together by the snap insertion of the thread anchoring portion 304 into this portion. An interior hole in the ring-shaped main unit insertion portion 302a functions as a main through-hole 302c.

[0069] 0051 The main unit flat plate portion 302b is an approximately rectangular plate-shaped portion formed around the main unit insertion portion 302a. 12 circular small holes 302d serving as sew-on holes are formed in the main unit flat plate portion 302b; the attaching piece main portion 302 can be sewed on to fabric by passing a thread through these small holes 302d and sewing. In addition, protrusions 302e having thicker portions of the disk are formed around the main unit flat plate portion 302b.

[0070] 0052 As shown in Fig. 10, the thread anchoring portion 304 has a cylindrical thread anchoring portion insertion portion 304a approximately rectangular in section, and four thread winding arms 304b extending radially from the four corners of this thread anchoring portion insertion portion 304a.

[0071] 0053 The thread anchoring portion insertion portion 304a is a cylindrical portion approximately rectangular in section, on the end of which a flange shaped edge is disposed. By inserting this thread anchoring portion insertion portion 304a into the main unit insertion portion 302a in such a way that the edge at that end projects on the rear side of the attaching piece main portion 302, the attaching piece main portion 302 and the thread anchoring portion 304 are snap engaged together. As discussed below, a crimp bead 316 (Fig. 11) is received inside the thread anchoring portion insertion portion 304a. Four thread winding arms 304b are formed to extend radially from the four corners of the rectangular thread anchoring portion insertion portion 304a; the ends thereof are widened and are approximately fan shaped. The arc-shaped portions at the ends of these thread winding arms 304b are thickened, and constitute protrusions 304c.

[0072] 0054 As shown in Fig. 8, the protrusion 302e formed on the main unit flat plate portion 302b and the protrusion 304c formed on the end of the thread winding arm 304b make gapless contact when the attaching piece main portion 302 and the thread anchoring portion 304 are engaged together, such that thread can be reliably gripped between the two.

[0073] 0055 Next, referring to Figs. 11 through 14, we discuss an attaching button for attaching a piece for attaching buttons or the like according to a third embodiment of the present invention.

[0074] Fig. 11 is a side view of an attaching button for attaching a piece for attaching buttons or the like according to the present embodiment. Fig. 12 is an oblique view (a) and a side view (b) showing the structure of an attaching button. Figs. 13 and 14 depict an example of a method for manufacturing an attaching button.

[0075] 0056 As shown in Fig. 11, an attaching button 301 has a button 310 serving as a button or the like; a button attaching thread 312 inserted through-holes in this

button 310; an anchoring thread for engaging to a piece for attaching buttons or the like 300; and a crimp bead 316 serving as a joining member for joining the button attaching thread 312 and the anchoring thread 314. In the present embodiment, the crimp bead 316 is a ring-shaped brass member with a diameter of approximately 2.5 mm, comprised such that it can be easily crushed and crimped using pliers or other tools. It is desirable to form the crimp bead from a material with high malleability, ductility, and corrosion resistance; materials coated with gold, silver, chrome, or the like are preferred.

[0076] 0057 As shown in Fig. 12 (a), a loop is formed with respect to the attaching button 301 by passing the button attaching thread 312 through the button 310 hole 310a and joining the two ends of the button attaching thread 312. Next, the button attaching thread 312 joint is affixed with adhesive, and the anchoring thread 314 is passed through the loop formed by the button attaching thread 312. In the present embodiment, the button attaching thread 312 joint is affixed using an adhesive containing a cyanoacrylate component. In addition, as shown in Fig. 12 (b), the two end portions of the anchoring thread 314 are aligned, and the aligned end portions are passed through the crimp bead 316. The crimp bead 316 is then moved to the position at which the anchoring thread 314 is passed through the button attaching thread 312, as shown in Fig. 11, and the button attaching thread 312 and the anchoring thread 314 are then joined by crimping the crimp bead 316 in that state. Finally, the ends of the anchoring thread 314 are hardened by the application of adhesive, and the end portion of the anchoring thread 314 is slightly thickened to make the anchoring thread 314 easier to wind. In the present embodiment, an epoxy resin adhesive is applied to the end portion of the anchoring thread 314.

[0077] 0058 Next, referring to Figs. 13 and 14, we discuss an example of the manufacturing method for industrially manufacturing attaching buttons 301.

[0078] First, as shown in Fig. 13 (a), the anchoring thread 314 is temporarily affixed to the rear side of a temporary button 310 holding sheet 318 by a basting thread 320. Next, as shown in Fig. 13 (b), the button 301 is disposed on the front side of the sheet 318 so that the hole 310a in the button 310 spans the anchoring thread 314. A button attaching sewing machine or the like is then used in this state to sew the button 310 onto the sheet 318 using button attaching thread 312. Thus as shown in Fig. 13 (c), the button attaching thread 312 is sewed on so as to span the anchoring thread 314.

[0079] 0059 As shown in Fig. 14 (a), after the button 310 has been sewn onto the sheet 318 and the anchoring thread 314 using the button attaching thread 312, the sheet 318 is torn off. Thus, as shown in Fig. 14 (b), the anchoring thread 314 is passed through the button attaching thread 312 loop, and finally the crimping bead 316 is attached and the attaching button 301 is completed.

[0080] 0060 Since the procedure for attaching an at-

taching button 301 manufactured in this fashion to a piece for attaching buttons or the like 300 according to the third embodiment of the present invention is the same as in embodiments discussed above, an explanation thereof is here omitted. However, in the present embodiment the anchoring thread 314, which is a thread extending from the button 310, is passed through the crimping bead 316 and the attaching piece main portion 302 main through-hole 302c, and the crimping bead 316 is received in the main through-hole 302c. Also, the anchoring thread 314 is wound on the thread anchoring portion 304 thread winding arms 304b, and the end portion of the anchoring thread 314 is gripped and affixed by the thread gripping portion 306.

[0081] 0061 The piece for attaching buttons or the like of the third embodiment of the present invention uses an attaching button in which the button attaching thread passed through the button hole and the anchoring thread engaged on the piece for attaching buttons or the like are joined by a crimping bead, therefore thread with superior design qualities can be used for the button attaching thread, and a thread appropriate for winding on the thread anchoring portion can be used as the anchoring thread.

[0082] 0062 In the embodiment described above, a small hole was provided on the attaching piece main portion main unit flat plate portion for sewing this onto fabric, but as a variation the attaching piece main portion could also be formed of a soft material without providing a small hole in the attaching piece main portion. In this case, the attaching piece main portion is sewed directly onto the fabric while puncturing the attaching piece main portion made of soft material using a sewing machine or other sewing needle.

[0083] 0063 Next, referring to Figs. 15 through 19, we discuss a piece for attaching buttons or the like according to a fourth embodiment of the present invention.

[0084] With the piece for attaching buttons or the like of the present embodiment, the ability to attach to fabric without sewing differs from the embodiments described above. Therefore here we will discuss only the points of difference between this fourth embodiment of the present invention and Embodiments 1 through 3, and will omit a discussion of points held in common. Fig. 15 is a side view cross-section of a piece for attaching buttons or the like according to a fourth embodiment of the present invention. Fig. 16 is an exploded oblique view of a piece for attaching buttons or the like according to the present embodiment. Fig. 17 is an oblique view of an attaching piece main portion constituting the piece for attaching buttons or the like the present embodiment. Fig. 18 is an oblique view of a thread anchoring portion constituting the piece for attaching buttons or the like according to the present embodiment. Finally, Fig. 19 is an oblique view of an affixing member constituting the piece for attaching buttons or the like according to the present embodiment.

[0085] 0064 As shown in Figs. 15 and 16, the piece for attaching buttons or the like 400 according to the fourth

embodiment of the present invention has an attaching piece main portion 402, a thread anchoring portion 404, and an affixing member 405. A thread gripping portion 406 for gripping and affixing the end portions of thread used to attach buttons is formed between the attaching piece main portion 402 and the thread anchoring portion 404. As shown in Fig. 15, in the piece for attaching buttons or the like 400 according to the present embodiment the affixing member 405 is affixed to the fabric by passing through the garment 8 button attaching hole 8a and insertion together with the attaching piece main portion 402 thread anchoring portion 404.

[0086] 0065 As shown in Fig. 17, the attaching piece main portion 402 has a main unit insertion portion 402a and a main unit flat plate portion 402b formed around this main unit insertion portion. The main unit insertion portion 402a is formed in an approximately rectangular tabular shape, in the center of which is provided a main through-hole 402c having an approximately rectangular cross-section. There are also engaging holes 402d on both sides of the main unit insertion portion 402a main through-hole 402c for receiving fitting pins 404e (Fig. 18) provided on the thread anchoring portion 404.

[0087] 0066 The main unit flat plate portion 402b is a tabular, approximately rectangular part with rounded corners formed around the main unit insertion portion 402a, and is formed concentrically with the main unit insertion portion 402a. In addition, protrusions 402e are formed on the short sides on both sides of the main unit flat plate portion 402b.

[0088] 0067 As shown in Fig. 18, the thread anchoring portion 404 has a rectangular, tabular, rounded corner thread anchoring portion insertion portion 404a and four thread winding arms 404b extending radially from the thread anchoring portion insertion portion 404a.

[0089] 0068 An approximately rectangular through-hole 404d is formed at the center of the thread anchoring portion insertion portion 404a to align with the attaching piece main portion 402 main through-hole 402c. In addition, fitting pins 404e are respectively provided at positions on both sides of the thread anchoring portion insertion portion 404a through-holes 404d to align with the engaging holes 402d (Fig. 17). The insertion into the engaging holes 402d by these fitting pins 404e results in the insertion together of the attaching piece main portion 402 and the thread anchoring portion 404. Four thread winding arms 404b are formed to extend radially from the four sides of the thread anchoring portion insertion portion 404a; the ends thereof are widened to allow for thread to be wound. The end portion of these thread winding arms 404b are made thicker, thereby constituting protrusions 404c.

[0090] 0069 As shown in Fig. 15, the protrusions 402e formed on the main unit flat plate portion 402b and the protrusions 404c formed at the ends of the thread winding arm 404b make gapless contact when the attaching piece main portion 402 and the thread anchoring portion 404 are engaged together, thereby enabling thread to be re-

liably held between the two.

[0091] 0070 As shown in Fig. 19, the affixing member 405 has an approximately rectangular tabular flange portion 405a and approximately rectangular solid insertion portion 405b formed on the rear side of this flange portion 405a. As shown in Fig. 15, the insertion portion 405b of the affixing member 405 is inserted into the main through-hole 402c and through the button attaching hole 8a so that the garment 8 fabric is gripped between the flange portion 405a and the attaching piece main portion 402, thereby attaching the piece for attaching buttons or the like 400 to the fabric.

[0092] 0071 The flange portion 405a is an approximately rectangular tabular portion at the center of which an affixing member through-hole 405c, approximately rectangular in section, is formed. The flange portion 405a is formed to project outward around the insertion portion 405b, engaging on its rear side the edge of the button attaching hole 8a formed on garment 8.

[0093] 0072 The insertion portion 405b is an approximately rectangular solid part on the inside of which is formed an affixing member through-hole 405c continuing from the flange portion 405a. The entrance portion of the affixing member through-hole 405c is formed with an expanded width, thereby constituting a joining member receiving concavity 405d, for receiving the crimping bead 316 (Fig. 11) serving as a joining member. In other words, the crimping bead 316 which joins the button attaching thread 312 inserted into a hole in the button 310 with the anchoring thread 314 is received in the joining member receiving concavity 405d, and the anchoring thread 314 joined by the crimping bead 316 is passed to the rear side of the fabric through the affixing member through-hole 405c.

[0094] 0073 In addition, engaging tabs 405e are respectively formed on the long sides at the bottom end of the insertion portion 405b. These engaging tabs 405e are constituted to engage with the edge of the through-hole 404d when the insertion portions 405b are inserted to an appropriate position in the main through-hole 402c and the through-hole 404d. The affixing member 405 is thus prevented from dropping out of the attaching piece main portion 402.

[0095] 0074 Next we discuss a method of manufacturing a garment using the piece for attaching buttons or the like 400 according to a fourth embodiment of the present invention. First, a button attaching hole 8a is formed at the location where the garment 8 button is to be attached. To avoid fraying at the edge of the button attaching hole 8a, the edge of the hole is preferably whip stitched in the manner of a button hole. Next, the affixing member 405 insertion portions 405b are inserted into the button attaching hole 8a, and the engaging tabs 405e provided on the bottom end thereof are made to project on the rear side of the garment 8 fabric. The thread anchoring portion 404 engaging pins 404e and the attaching piece main portion 402 engaging holes 402d are also engaged, thereby causing the thread anchoring portion

404 and the attaching piece main portion 402 to be engaged together.

[0096] 0075 Next, the insertion portions 405b projecting at the rear side of the fabric are inserted into the main through-hole 402c and the through-hole 404d respectively formed in the inserted-together attaching piece main portion 402 and thread anchoring portion 404. The engaging tabs 405e at the bottom end of the insertion portions 405b thus engage the edge of the through-hole 404d, and the attaching piece main portion 402, thread anchoring portion 404, and affixing member 405 are strongly engaged together. At this point, the edge of the button attaching hole 8a of the garment 8 is gripped between the affixing member 405 flange portion 405a and the attaching piece main portion 402, thereby affixing the piece for attaching buttons or the like 400 to the fabric.

[0097] 0076 Next, an attaching button 301 (Fig. 11) is prepared, and an anchoring thread 314 extending from the button 310 is inserted into the attaching piece main portion 402 main through-hole 402c. The crimping bead 316 joined to the anchoring thread 314 is thus received by the affixing member 405 joining member receiving concavity 405d. Since the width of the affixing member through-hole 405c is formed to be smaller than the crimping bead 316, the crimping bead 316 is held at the joining member receiving concavity 405d. Therefore even if the anchoring thread 314 is pulled when winding on the thread winding arms 404b, the crimping bead 316 will not pass through the main unit flat plate portion 405c and pull out the rear side of the fabric.

[0098] 0077 Finally, the anchoring thread 314 is wound on the thread anchoring portion 404 thread winding arms 404b, and the ends of the thread are gripped and affixed by the thread gripping portion 406 between the attaching piece main portion 402 protrusions 402e and the thread winding arm 404b protrusions 404c. This ends the operation of attaching the button 310. We hereby omit a discussion of the way in which the anchoring thread 314 is wound, as it is the same as discussed in the embodiments above.

[0099] 0078 In the piece for attaching buttons or the like of the fourth embodiment of the present invention, the piece for attaching buttons or the like can be attached to fabric by gripping the fabric between the affixing member and the attaching piece main portion, therefore the piece for attaching buttons or the like can be attached to fabric without sewing.

[0100] 0079 Also, with the piece for attaching buttons or the like of the present embodiment, the crimping bead is received by the affixing member to form a joining member receiving concavity for holding, therefore pulling out of the crimping bead from the rear side of the fabric can be prevented when the anchoring thread is pulled as a result of winding on the thread winding arms.

[0101] 0080 Next, referring to Figs. 20 through 23, we discuss a piece for attaching buttons or the like according to a fifth embodiment of the present invention.

[0102] The piece for attaching buttons or the like of the

present embodiment differs from the fourth embodiment described above in that the attaching piece main portion and the thread anchoring portion are not engaged together. Therefore we will here discuss the points of difference between the fifth embodiment and Embodiments 1-4 of the present invention, and will omit a discussion of points in common. Fig. 20 is an exploded view showing the attachment of a piece for attaching buttons or the like according to the fifth embodiment of the present invention as seen from the side. Fig. 21 is a front view (a) and a side view (b) of an attaching piece main portion constituent of the piece for attaching buttons or the like according to the present embodiment. Fig. 22 is (a) a front view and (b) a side view of a thread anchoring portion constituent of the piece for attaching buttons or the like according to the present embodiment. In addition, Fig. 23 is (a) a front view and (b) a side view of an affixing member constituent of the piece for attaching buttons or the like according to the present embodiment.

[0103] 0081 As shown in Fig. 20, the piece for attaching buttons or the like 500 according to the fifth embodiment of the present invention has an attaching piece main portion 502, a thread anchoring portion 504, and an affixing member 505. A thread gripping portion 506 is formed between the attaching piece main portion 502 and the thread anchoring portion 504 for gripping and affixing the end portion of thread used to attach the button. Also, the piece for attaching buttons or the like 500 is affixed to the fabric by passing an affixing member 505 through the garment 8 button attaching hole 8a and inserting it into the attaching piece main portion 502 and the thread anchoring portion 504.

[0104] 0082 As shown in Figs. 21 (a) and (b), the attaching piece main portion 502 has a main unit insertion portion 502a and a main unit flat plate portion 502b formed around the main unit insertion portion.

[0105] The main unit insertion portion 502a is formed in an approximately rectangular tabular shape, and a main through-hole 502c approximately rectangular in cross section is formed at the center thereof.

[0106] The main unit insertion portion 502a is a flat, approximately rectangular part with rounded corners formed around the main through-hole 502c; main unit flat plate portion 502b is formed on both sides of the main unit insertion portion 502a.

[0107] 0083 As shown in Fig. 22 (a) and (b), the thread anchoring portion 504 has a rounded corner, rectangular, tabular thread anchoring portion insertion portion 504a, and two thread winding arms 504b extending at both sides of this thread anchoring portion insertion portion 504a.

[0108] 0084 An approximately rectangular through-hole 504d is formed at the center of the thread anchoring portion insertion portion 504a to align with the attaching piece main portion 502 main through-hole 502c. Two thread winding arms 504b are formed to extend radially from the two sides of the thread anchoring portion insertion portion 504a; the ends thereof are widened to allow

for thread to be wound. The end portions of these thread winding arms 504b are made thicker, thereby constituting protrusions 504c.

[0109] 0085 As shown in Fig. 20, the main unit flat plate portion 502b and the protrusions 504c at the end of the thread winding arms 504b come into gapless contact when the attaching piece main portion 502, the thread anchoring portion 504, and the affixing member 505 are engaged together, so that thread can be reliably gripped between the two. As shown in Fig. 22 (b), the height h of the protrusions 504c differs between the front and back sides of the thread anchoring portion 504, and as described below, differential use can be made of the front and rear sides in accordance with usage state.

[0110] 0086 As shown in Fig. 23 (a) and (b), the affixing member 505 has an approximately rectangular tabular flange portion 505a, and an approximately rectangular solid shaped insertion portion 505b formed on the rear side of this flange portion 505a. As shown in Fig. 20, by inserting the affixing member 505 insertion portion 505b into the main through-hole 502c and the through-hole 504d via the button attaching hole 8a, the garment 8 is sandwiched between the flange portion 505a and the attaching piece main portion 502, while at the same time the attaching piece main portion 502, thread anchoring portion 504, and affixing member 505 are engaged together as a single piece. The piece for attaching buttons or the like 500 is thus attached to the fabric.

[0111] 0087 The flange portion 505a is an approximately rectangular, tabular part formed to project around the insertion portion 505b; an affixing member through-hole 505c with an approximately rectangular cross section is formed at the center thereof. When attaching to a garment, the rear side of the flange portion 505a makes contact at the perimeter of the button attaching hole 8a formed on the garment 8. The dimensions of the flange portion 505a are made to be approximately the same as those of the attaching piece main portion 502 and the thread anchoring portion 504. As described below, this means that even if the piece for attaching buttons or the like 500 of the present embodiment is used without the attaching piece main portion 502, the end portion of the anchoring thread 314 can be sandwiched together with the fabric between the flange portion 505a and the protrusions 504c on the thread winding arms 504b.

[0112] 0088 The insertion portion 505b is an approximately rectangular solid-shaped part; an affixing member through-hole 505c extending from the flange portion 505a is formed therein. The entrance portion of the affixing member through-hole 505c is formed with an expanded width, thereby constituting a joining member receiving concavity 505d for receiving the crimping bead 316 (Fig. 11) serving as a joining member.

[0113] 0089 In addition, engaging tabs 505e are respectively formed on the long sides at the bottom end of the insertion portion 505b. These engaging tabs 505e are constituted to engage with the edge of the through-hole 504d when the insertion portions 505b are inserted

to an appropriate position in the main through-hole 502c and the through-hole 504d. As a result, the affixing member 505, the attaching piece main portion 502, and the thread anchoring portion 504 are engaged together as a single piece, and the affixing member 505 is prevented from dropping out of the attaching piece main portion 502. Tab receiving concavities 504e (Fig. 22) are respectively formed on the edges at both sides of the through-hole 504d, and the engaging tabs 505e engaged with the edge of the through-hole 504d are seated in the tab receiving concavities 504e. As a result, the bottom end of the insertion portion 505b does not project out from the thread anchoring portion insertion portion 504a, and a good usage sensation is obtained for the piece for attaching buttons or the like 500.

[0114] 0090 The method of manufacturing a garment using the piece for attaching buttons or the like 500 according to the fifth embodiment of the present invention is the same as for the fourth embodiment, therefore a discussion thereof is here omitted. However, in contrast to the pre-fitting of the attaching piece main portion 402 and the thread anchoring portion 404 in the fourth embodiment, in the piece for attaching buttons or the like 500 of the present embodiment, when the affixing members 505 insertion portion 505b are inserted into the main through-hole 502c and the through-hole 504d respectively formed on the attaching piece main portion 502 and the thread anchoring portion 504, this is the first engagement. Also, because the present embodiment the flange portion 505a is formed in a large size on the affixing member 505, the piece for attaching buttons or the like 500 is strongly affixed to the garment 8.

[0115] 0091 As described above, the height h of the protrusions 504c on the thread anchoring portion 504 differs on each surface, and differential use can be made of the surfaces disposed on the side of the attaching piece main portion 502. In other words, when the surface with the lower height h of the protrusions 504c is disposed on the side of the attaching piece main portion 502, the gap between the thread winding arms 504b and the main unit flat plate portion 502b is small, and is appropriate for use with approximately two windings of the anchoring thread 314 around the thread winding arms 504b; disposing the surface with the higher height h on the side of the attaching piece main portion 502 is appropriate for approximately three windings of the anchoring thread 314. It is also possible to make differential use of the surface disposed on the attaching piece main portion 502 side in accordance with the thickness of the anchoring thread 314 used or the thickness of the fabric to which the piece for attaching buttons or the like 500 is to be attached.

[0116] 0092 In addition, for a thick garment 8 fabric, the attaching piece main portion 502 in the piece for attaching buttons or the like 500 of the present embodiment can be omitted, and the thread anchoring portion 504 and affixing member 505 used alone. In such cases, the piece for attaching buttons or the like 500 is affixed to the garment 8 by sandwiching fabric between the affixing

member 505 flange portion 505a and the thread anchoring portion 504. Therefore in these cases the thread anchoring portion 504 functions as an integrated attaching piece main portion and thread anchoring portion, and the thread anchoring portion 504 through-hole 504d functions as a main through-hole. The end portion of the anchoring thread 314 wound on the thread anchoring portion 504 thread winding arms 504b is held between the protrusions 504c and the fabric, therefore this part functions as the thread gripping portion.

[0117] 0093 Alternatively, the height of the affixing member 505 insertion portion 505b can be pre-formed to a low height, and usage can occur without the attaching piece main portion 502. Thus the piece for attaching buttons or the like 500 of the present embodiment can be applied to various fabrics and anchoring threads by appropriately varying the use of the attaching piece main portion 502, the placement of the thread anchoring portion 504, and the height of the affixing member 505 insertion portion 505b.

[0118] 0094 For example, the entire piece for attaching buttons or the like 500 can be made thin in form by not using the attaching piece main portion 502, and combining an affixing member 505 with a low-height insertion portion 505b with the thread anchoring portion 504, thereby imparting a favorable feeling against the skin. Alternatively, when using the piece for attaching buttons or the like 500 of the present embodiment on knit or delicate materials, the fabric can be sandwiched between the affixing member 505 and the attaching piece main portion 502.

[0119] 0095 In the fifth embodiment piece for attaching buttons or the like of the present invention, there are two thread anchoring portion thread winding arms, therefore the size of the piece for attaching buttons or the like can be made more compact than with four arms.

[0120] In addition, because the attaching piece main portion can be omitted in the piece for attaching buttons or the like of the present embodiment (the attaching piece main portion and thread anchoring portion can be integrated as a single piece), the entire piece for attaching buttons or the like can be structured as a thin form.

[0121] 0096 We have discussed preferred embodiments of the present invention above, but various changes can also be made to the above-described embodiments. In particular, in the above-described embodiments we discussed the cases in which the standard two hole and four hole buttons in general circulation are used, but various button types can be applied in the present invention, including buttons with pedestals and buttons or accessories of any desired form. The material to which the button is attached can also be freely selected from among non-woven material, synthetic leather, leather, knit, vinyl sheet, and the like, in addition to woven material. Note that the word "fabric" in the present invention includes these materials.

[0122] 0097 In general, coarse count yarn such as 5-40 count is used for button attachment, and fine count yarn

such as 50-120 count is used for sewing on, but the thickness of the thread used can be appropriately selected to match an application. Thread material can include synthetic textiles such as rayon, silk, nylon, and polyester, as well as resins, metals, or other desired material. Thread is generally manufactured by twisting together two or three single strand or multistrand threads, but single strands of artificial silk or metal filament may also be used for thread. In addition, string in which approximately 8-12 single or multistrand threads are woven in a string form (circular) or flat knit (tabular) form can be used as thread. String woven in this way are particularly suited as anchoring threads, since even when the button and the piece for attaching buttons or the like are repeatedly taken on and off, the thread does not become untwisted or frayed. Use of an 8 strand nylon thread twisted into a string form and stretched, with a thickness of approximately 0.5 mm, is preferred. Note that "thread (including button attaching thread and anchoring thread)" in the present Specification includes single strand, string, and the like.

[0123] 0098 In the above-described Embodiments 1-3 of the present invention, the piece for attaching buttons or the like comprises two components: an attaching piece main portion and a thread anchoring portion; these were described as being integrated into a single piece by being engaged together, but they can also be integrated into a single piece by adhesion or welding, or formed from the beginning as a single piece from the attaching piece main portion and the thread anchoring portion.

[0124] 0099 In addition, in the above-described embodiments a thread gripping portion was comprised by the protrusions respectively formed on the main unit flat plate portion and the thread winding arms, but any desired constitution whereby thread is gripped and affixed can be adopted for the thread gripping portion. For example, a notch could be formed in the attaching piece main portion or the thread anchoring portion for gripping the thread, and this could also be used as the thread gripping portion.

[0125] 0100 In the above-described embodiment the attaching button was constituted by affixing an intermediate section of the anchoring thread with a crimping bead, but the attaching button could also be constituted so that a single anchoring thread extended from the button.

[0126] 0101 Furthermore, in the above-described embodiments a metal ring was used as the crimping bead (joining member), but other types of objects could also be used as the joining member. As a variant, a bent wire with an approximately eyeglass shape such as shown in Fig. 24 (a) could also be used as the joining member. As shown in Fig. 24 (a), the crimping bead 516 of the variant is formed by bending a single wire, such that two ring-shaped portions 516a are formed on the left and right. When using a crimping bead 516 of this variant, two anchoring threads 314 are inserted between the ring-shaped portions 516a from 516b, then one anchoring

thread each is disposed in each of the ring-shaped portion 516a through the gap 516c. Next, the anchoring thread 314 is affixed as shown in Fig. 24 (b) by crimping the crimping bead 516.

[0127] 0102 Alternatively, as shown in Fig. 24 (c), a wire bent in an approximately upright rectangular shape can be used as the joining member. In this crimping bead 518 variant as well, two anchoring threads 314 are disposed therein, as shown in Fig. 24 (c), then, as shown in (d), the crimping bead 518 is crimped and the anchoring thread 314 is affixed. Workability of the crimping bead attachment is improved, since there is no need with these crimping bead 516 and 518 variants to insert the anchoring thread from the end portion into the crimping bead.

Brief Description of Figs.

[0128] 0103

- Fig. 1 (a) is a front view and (b) a side view of a piece for attaching buttons or the like according to a first embodiment of the present invention.
- Fig. 2 (a) is a front view and (b) a side view cross section of an attaching piece main portion constituting a piece for attaching buttons or the like according to a first embodiment of the present invention.
- Fig. 3 (a) is a front view and (b) a side view cross section of a thread anchoring portion constituting a piece for attaching buttons or the like according to a first embodiment of the present invention.
- Fig. 4 (a) is an oblique view seen from the front side of a garment, and (b) an oblique view seen from the rear side of the garment, in which the garment button attaching portion is expanded.
- Fig. 5 Fig. 5 shows an example of how thread is wound on the thread anchoring portion 4.
- Fig. 6 (a) is a front view and (b) a side view cross-section of a piece for attaching buttons or the like according to a second embodiment of the present invention.
- Fig. 7 An example of how a thread is wound relative to a thread anchoring portion.
- Fig. 8 (a) is a front view and (b) a side view cross section of a piece for attaching buttons or the like according to a third embodiment of the present invention.
- Fig. 9 (a) is a front view and (b) a side view cross section of an attaching piece main portion constituting a piece for attaching buttons or the like according to a third embodiment of the present invention.
- Fig. 10 (a) is a front view and (b) a side view cross section of a thread anchoring portion constituting a piece for attaching buttons or the like according to a third embodiment of the present invention

- Fig. 11 A side view of an attaching button for attachment to a piece for attaching buttons or the like according to a third embodiment of the present invention.
- Fig. 12 (a) an oblique view and (b) a side view showing the structure of an attaching button.
- Fig. 13 An example of a method for manufacturing an attaching button.
- Fig. 14 An example of a method of manufacturing an attaching button.
- Fig. 15 A side view cross section of a piece for attaching buttons or the like according to a fourth embodiment of the present invention.
- Fig. 16 An exploded oblique view of a piece for attaching buttons or the like according to a fourth embodiment of the present invention.
- Fig. 17 An oblique view of an attaching piece main portion constituting a piece for attaching buttons or the like according to a fourth embodiment of the present invention.
- Fig. 18 An oblique view of a thread anchoring portion constituting a piece for attaching buttons or the like according to a fourth embodiment of the present invention.
- Fig. 19 An oblique view of an affixing member constituting a fourth embodiment of the present invention.
- Fig. 20 An separated view showing a view from the side of the manner of attaching a piece for attaching buttons or the like according to a fifth embodiment of the present invention.
- Fig. 21 (a) is a front view and (b) a side view of an attaching piece main portion constituting a piece for attaching buttons or the like according to a fifth embodiment of the present invention.
- Fig. 22 (a) is a front view and (b) a side view of a thread anchoring portion constituting a piece for attaching buttons or the like according to a fifth embodiment of the present invention.
- Fig. 23 (a) is a front view and (b) a side view of an affixing member constituting a piece for attaching buttons or the like according to a fifth embodiment of the present invention.
- Fig. 24 A diagram depicting a variant crimping bead.

Description of Reference Numerals

[0129]

- 1 Piece for attaching buttons or the like according to a first embodiment of the present invention.
- 2 Attaching piece main portion
- 2a Main unit insertion portion
- 2b Main unit flat plate portion
- 2c Main through-hole
- 2d Long hole (sew-on hole)
- 2e Protrusions

4 Thread anchoring portion
 4a Thread anchoring portion insertion portion
 4b Thread winding arms
 4c Protrusions
 6 Thread gripping portion
 8 Garment
 8b Sew-on thread
 10 Button
 10a Hole
 12 Thread
 200 Piece for attaching buttons or the like according to a second embodiment of the present invention
 202 Attaching piece main portion
 202a Main unit insertion portion
 202b Main unit flat plate portion
 202c Main through-hole
 202d Long hole (sew-on hole)
 202e Protrusions
 204 Thread anchoring portion
 204a Thread anchoring portion insertion portion
 204b Thread winding arms
 206 Thread gripping portion
 300 Piece for attaching buttons or the like according to a third embodiment of the present invention
 301 Attaching button
 302 Attaching piece main portion
 302a Main unit insertion portion
 302b Main unit flat plate portion
 302c Main through-hole
 302d Small hole (sew-on hole)
 302e Protrusions
 304 Thread anchoring portion
 304a Thread anchoring portion insertion portion
 304b Thread winding arms
 304c Protrusions
 306 Thread gripping portion
 310 Button
 312 Button attaching thread
 314 Anchoring thread
 316 Crimping bead
 318 Sheet
 320 Basting
 400 Piece for attaching buttons or the like according to a fourth embodiment of the present invention
 402 Attaching piece main portion
 402a Main unit insertion portion
 402b Main unit flat plate portion
 402c Main through-hole
 402d Fitting hole
 402e Protrusions
 404 Thread anchoring portion
 404a Thread anchoring portion insertion portion
 404b Thread winding arms
 404c Protrusions
 404d Through-holes
 404e Fitting pin
 405 Affixing member

405a Flange portion
 404b Insertion portion
 405c Affixing member through-hole
 405d Joining member receiving concavity
 5 406 Thread gripping portion
 500 Piece for attaching buttons or the like according to a fifth embodiment of the present invention
 502 Attaching piece main portion
 502a Main unit insertion portion
 10 502b Main unit flat plate portion
 502c Main through-hole
 504 Thread anchoring portion
 504a Thread anchoring portion insertion portion
 504b Thread winding arms
 15 504c Protrusions
 504d Through-holes
 504e Tab receiving concavities
 505a Flange portion
 505b Insertion portion
 20 506 Thread gripping portion
 516 Variant crimping bead
 518 Variant crimping bead

25 Claims

1. A piece (1, 200, 300, 400, 500) for attaching buttons (10, 310) or the like for detachably attaching buttons (10, 310) or the like to fabric (8), comprising
 30 an attaching piece main portion (2, 202, 302, 402, 502) having a main through-hole (2c, 202c, 302c, 402c, 502c) through which thread passed through a button attaching hole (8a) formed in the fabric (8) is inserted and the thread extending from the button or the like to be attached to the fabric;
 35 a thread anchoring portion (4, 204, 304, 404, 504) for winding thread passing through the main through-hole (2c, 202c, 302c, 402c, 502c); and
 40 a thread gripping portion (6, 206, 306, 406, 506) for gripping and affixing the end of thread wound on the thread anchoring portion (4, 204, 304, 404, 504),
characterized in that
 the attaching piece main portion (2, 202, 302, 402, 502) and the thread anchoring portion (4, 204, 304, 404, 504) are comprised of separate insertable parts,
 45 and the thread gripping portion (6, 206, 306, 406, 506) is formed between the inserted attaching piece main portion (2, 202, 302, 402, 502) and the thread anchoring portion (4, 204, 304, 404, 504), and
 50 the attaching piece main portion (2, 202, 302, 402, 502) comprises a main unit insertion portion (2a, 202a, 302a, 402a, 502a) in which the main through-hole (2c, 202c, 302c, 402c, 502c) is formed, inserted in the thread anchoring portion (4, 204, 304, 404, 504); and a main unit flat plate portion (2b, 202b, 302b, 402b, 502b) formed around the main unit insertion portion (2a, 202a, 302a, 402a, 502a).
 55

2. The piece (1, 200, 300, 400, 500) for attaching buttons (10, 310) or the like according to claim 1, wherein the thread anchoring portion (4, 204, 304, 404, 504) includes a thread anchoring portion insertion portion (4a, 204a, 304a, 404a, 504a) inserted in the main unit insertion portion (2a, 202a, 302a, 402a, 502a), and a thread winding arm (4b, 204b, 304b, 404b, 504b) extending from the thread anchoring portion insertion portion (4a, 204a, 304a, 404a, 504a), with a widened tip. 5
3. The piece (1, 200, 300, 400, 500) for attaching buttons (10, 310) or the like according to claim 2, wherein the thread gripping portion (6, 206, 306, 406, 506) comprises protrusion (2e, 202e, 302e, 402e, 4c, 204c, 304c, 404c, 504c) formed from the main unit flat plate portion (2b, 202b, 302b, 402b, 502b) and/or the thread winding arm (4b, 204b, 304b, 404b, 504b). 10
4. The piece (1, 200, 300, 400, 500) for attaching buttons (10, 310) or the like according to any one of claims 1 through 3, wherein multiple sew-on holes (2d, 202d, '302d) for sewing the attaching piece main portion (2, 202, 302, 402, 502) onto fabric (8) are formed on the attaching piece main portion (2, 202, 302, 402, 502). 15
5. The piece (400, 500) for attaching buttons (10, 310) or the like according to any one of claims 1 through 3, further comprising an affixing member (405, 505) having an affixing member through-hole (405c, 505c) for inserting thread extending from the button (10, 310) or the like, and the affixing member (405, 505) being affixed to the fabric (8) by insertion with the attaching piece main portion (402, 502) such that the fabric (8) is gripped through the button attaching hole (8a). 20
6. The piece (500) for attaching buttons (10, 310) or the like according to claim 5, wherein the thread anchoring portion (504) is integrally formed with the attaching piece main portion (502), and the thread gripping portion is formed between the integrated thread anchoring portion (504) and the fabric (8). 25
7. The piece (400, 500) for attaching buttons (10, 310) or the like according to claim 5 or 6, the affixing member (405, 505) having a joining member receiving concavity (405d, 505d) for receiving and holding a joining member (316) for joining a button attaching thread (312) inserted in a hole in a button (10, 310) or the like to an anchoring thread (314) wound on the thread anchoring portion (404, 504). 30
8. An attaching button (301) for attachment to the piece (1, 200, 300, 400, 500) for attaching buttons (10, 310) or the like according to any one of claims 1 through 7, comprising 35

a button (10, 310) or the like;
 a button attaching thread (312) inserted in a hole in button (10, 310) or the like;
 an anchoring thread (314) affixed to the piece (1, 200, 300, 400, 500) for attaching buttons (10, 310) or the like; and
 a joining member (316) for joining the button attaching thread (312) with the anchoring thread (314), wherein the anchoring thread (314) comprises string woven from single strand or multistrand threads. 40

9. A method for manufacturing a garment to which buttons (10, 310) or the like are attached, comprising steps of: 45

forming a button attaching hole (8a) in a location to which the button (10, 310) or the like is to be attached to the garment;
 providing the piece (1, 200, 300, 400, 500) for attaching buttons (10, 310) or the like according to any one of claims 1 through 7;
 inserting thread extending from the button (10, 310) or the like into the button attaching hole;
 inserting thread passed through the button attaching hole (8a) into the main through-hole in the piece for attaching a button or the like;
 winding thread passed through the main through-hole (2c, 202c, 302c, 402c, 502c) onto the thread anchoring portion (4, 204, 304, 404, 504); and
 gripping and affixing thread wound on the thread anchoring portion (4, 204, 304, 404, 504) to the thread gripping portion (6, 206, 306, 406, 506). 50

Patentansprüche

1. Teil (1, 200, 300, 400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem zum abnehmbaren Anbringen von Knöpfen (10, 310) oder ähnlichem an Stoff (8), das umfasst: 55

einen Anbringungsteilhauptabschnitt (2, 202, 302, 402, 502) mit einem Hauptdurchgangsloch (2c, 202c, 302c, 402c, 502c), durch das ein Faden, der durch ein in dem Stoff (8) ausgebildetes Knopfanbringungsloch (8a) geführt ist, eingeführt wird, und wobei der Faden sich von dem Knopf oder ähnlichem, der an dem Stoff angebracht werden soll, erstreckt;
 einen Fadenverankerungsabschnitt (4, 204, 304, 404, 504) zum Wickeln eines Drahts, der durch das Hauptdurchgangsloch (2c, 202c, 302c, 402c, 502c) geht; und
 einen Fadengreifabschnitt (6, 206, 306, 406, 506) zum Greifen und Befestigen des Endes des auf den Fadenverankerungsabschnitt (4, 204, 304, 404, 504) gewickelten Fadens, 60

dadurch gekennzeichnet, dass

- der Anbringungsteilhauptabschnitt (2, 202, 302, 402, 502) und der Fadenverankerungsabschnitt (4, 204, 304, 404, 504) aus mehreren einföhrbaren Teilen bestehen, und der Fadengreifabschnitt (6, 206, 306, 406, 506) zwischen dem eingeföhrten Anbringungsteilhauptabschnitt (2, 202, 302, 402, 502) und dem Fadenverankerungsabschnitt (4, 204, 304, 404, 504) ausgebildet ist, und
- der Anbringungsteilhauptabschnitt (2, 202, 302, 402, 502) einen Haupteinheitseinföhrungsabschnitt (2a, 202a, 302a, 402a, 502a), in dem das Hauptdurchgangsloch (2c, 202c, 302c, 402c, 502c) ausgebildet ist, das in den Fadenverankerungsabschnitt (4, 204, 304, 404, 504) eingeföhrt ist; und einen flachen Haupteinheitsscheibenabschnitt (2b, 202b, 302b, 402b, 502b), der um den Haupteinheitseinföhrungsabschnitt (2a, 202a, 302a, 402a, 502a) herum ausgebildet ist, umfasst.
2. Teil (1, 200, 300, 400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem nach Anspruch 1, wobei der Fadenverankerungsabschnitt (4, 204, 304, 404, 504) einen Fadenverankerungsabschnitt-Einföhrungsabschnitt (4a, 204a, 304a, 404a, 504a), der in den Haupteinheitseinföhrungsabschnitt (2a, 202a, 302a, 402a, 502a) eingeföhrt ist, und einen Fadenwickelarm (4b, 204b, 304b, 404b, 504b), der sich von dem Fadenverankerungsabschnitt-Einföhrungsabschnitt (4a, 204a, 304a, 404a, 504a) erstreckt, mit einer verbreiterten Spitze umfasst.
 3. Teil (1, 200, 300, 400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem nach Anspruch 2, wobei der Fadengreifabschnitt (6, 206, 306, 406, 506) einen Vorsprung (2e, 202e, 302e, 402e, 4c, 204c, 304c, 404c, 504c) umfasst, der aus dem flachen Haupteinheitsscheibenabschnitt (2b, 202b, 302b, 402b, 502b) und/oder dem Fadenwickelarm (4b, 204b, 304b, 404b, 504b) ausgebildet ist.
 4. Teil (1, 200, 300, 400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem nach einem der Ansprüche 1 bis 3, wobei mehrere Aufnählöcher (2d, 202d, 302d) zum Nähen des Anbringungsteilhauptabschnitts (2, 202, 302, 402, 502) auf den Stoff (8) auf dem Anbringungsteilhauptabschnitt (2, 202, 302, 402, 502) ausgebildet sind.
 5. Teil (400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem nach einem der Ansprüche 1 bis 3, das ferner ein Befestigungselement (405, 505) mit einem Befestigungselementdurchgangsloch (405c, 505c) zum Einföhren des Fadens, der sich von dem Knopf (10, 310) oder ähnlichem erstreckt, umfasst, und wobei das Befestigungselement (405, 505) durch Einföhren des Befestigungsteilhauptabschnitts (402, 502) an dem Stoff (8) befestigt wird, so dass der Stoff (8) durch das Knopfanbringungsloch (8a) gegriffen wird.
 6. Teil (500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem nach Anspruch 5, wobei der Fadenverankerungsabschnitt (504) integral mit dem Anbringungsteilhauptabschnitt (502) ausgebildet ist und der Fadengreifabschnitt zwischen dem integrierten Fadenverankerungsabschnitt (504) und dem Stoff (8) ausgebildet ist.
 7. Teil (400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem nach Anspruch 5 oder 6, wobei das Anbringungselement (405, 505) eine Verbindungselementaufnahmewölbung (405d, 505d) hat, um ein Verbindungselement (316) aufzunehmen und zu halten, um einen Knopfanbringungsfaden (312), der in ein Loch in einem Knopf (10, 310) oder ähnliches eingeföhrt ist, mit einem Verankerungsfaden (314) zu verbinden, der auf den Fadenverankerungsabschnitt (404, 504) gewickelt ist.
 8. Anbringungsknopf (301) zum Anbringen an dem Teil (1, 200, 300, 400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem nach einem der Ansprüche 1 bis 7, der umfasst:
 - einen Knopf (10, 310) oder ähnliches;
 - einen Knopfanbringungsfaden (312), der in ein Loch in dem Knopf (10, 310) oder ähnlichem eingeföhrt ist;
 - einen Verankerungsfaden (314), der an dem Teil (1, 200, 300, 400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem befestigt ist; und
 - ein Verbindungselement (316) zum Verbinden des Knopfanbringungsfadens (312) an dem Verankerungsfaden (314), wobei der Verankerungsfaden (314) eine Schnur umfasst, die aus Einzelstrang- oder Mehrstrangfäden gewoben ist.
 9. Verfahren zur Herstellung eines Kleidungsstücks, an dem Knöpfe (10, 310) oder ähnliches angebracht werden, das die folgenden Schritte umfasst:
 - Ausbilden eines Knopfanbringungslochs (8a) an einer Stelle, an welcher der Knopf oder ähnliches an dem Kleidungsstück angebracht werden soll;
 - Bereitstellen des Teils (1, 200, 300, 400, 500) zum Anbringen von Knöpfen (10, 310) oder ähnlichem nach einem der Ansprüche 1 bis 7;
 - Einföhren des Fadens, der sich von dem Knopf (10, 310) oder ähnlichem erstreckt, in das Knopfanbringungsloch;

Einführen des Fadens, der durch das Knopf-
bringungsloch (8a) geht, in das Hauptdurch-
gangsloch in dem Teil zum Anbringen eines
Knopfs oder ähnlichem;

Wickeln des Fadens, der durch das Hauptdurch-
gangsloch (2c, 202c, 302c, 402c, 502c) geht,
auf den Fadenverankerungsabschnitt (4, 204,
304, 404, 504); und

Greifen und Befestigen des auf den Fadenver-
ankerungsabschnitt (4, 204, 304, 404, 504) ge-
wickelten Drahts an dem Fadengreifabschnitt
(6; 206, 306, 406, 506).

Revendications

1. Pièce (1, 200, 300, 400, 500) pour attacher des bou-
tons (10, 310), ou analogues, pour attacher de façon
détachable des boutons (10, 310), ou analogues, à
un tissu (8), comprenant :

une partie principale de pièce d'attache (2, 202,
302, 402, 502) comportant un trou traversant
principal (2c, 202c, 302c, 402c, 502c) à travers
lequel est inséré un fil traversant un trou d'atta-
che de bouton (8a) formé dans le tissu (8), et le
fil s'étendant à partir du bouton, ou analogue,

de façon à être attaché au tissu ;
une partie d'ancrage de fil (4, 204, 304, 404,
504) pour enrouler un fil traversant le trou tra-
versant principal (2c, 202c, 302c, 402c, 502c) ;
et

une partie de saisie de fil (6, 206, 306, 406, 506)
pour saisir et fixer l'extrémité d'un fil enroulé sur
la partie d'ancrage de fil (4, 204, 304, 404, 504),
caractérisée en ce que :

la partie principale de pièce d'attache (2,
202, 302, 402, 502) et la partie d'ancrage
de fil (4, 204, 304, 404, 504) sont consti-
tuées par des parties pouvant être insérées
séparées, et la partie de saisie de fil (6, 206,
306, 406, 506) est formée entre la partie
principale de pièce d'attache insérée (2,
202, 302, 402, 502) et la partie d'ancrage
de fil (4, 204, 304, 404, 504), et

la partie principale de pièce d'attache (2,
202, 302, 402, 502) comprend une partie
d'insertion d'unité principale (2a, 202a,
302a, 402a, 502a) dans laquelle est formé
le trou traversant principal (2c, 202c, 302c,
402c, 502c), insérée dans la partie d'ancra-
ge de fil (4, 204, 304, 404, 504) ; et une par-
tie de plaque plate d'unité principale (2b,
202b, 302b, 402b, 502b) formée autour de
la partie d'insertion d'unité principale (2a,
202a, 302a, 402a, 502a).

2. Pièce (1, 200, 300, 400, 500) pour attacher des bou-
tons (10, 310), ou analogues, selon la revendication
1, dans laquelle la partie d'ancrage de fil (4, 204,
304, 404, 504) comprend une partie d'insertion de
partie d'ancrage de fil (4a, 204a, 304a, 404a, 504a)
insérée dans la partie d'insertion d'unité principale
(2a, 202a, 302a, 402a, 502a), et un bras d'enroule-
ment de fil (4b, 204b, 304b, 404b, 504b) s'étendant
à partir de la partie d'insertion de partie d'ancrage
de fil (4a, 204a, 304a, 404a, 504a), avec une pointe
élargie.

3. Pièce (1, 200, 300, 400, 500) pour attacher des bou-
tons (10, 310), ou analogues, selon la revendication
2, dans laquelle la partie de saisie de fil (6, 206, 306,
406, 506) comprend une saillie (2e, 202e, 302e,
402e, 4c, 204c, 304c, 404c, 504c) formée à partir de
la partie de plaque plate d'unité principale (2b, 202b,
302b, 402b, 502b) et/ou du bras d'enroulement de
fil (4b, 204b, 304b, 404b, 504b).

4. Pièce (1, 200, 300, 400, 500) pour attacher des bou-
tons (10, 310), ou analogues, selon l'une quelconque
des revendications 1 à 3, dans laquelle de multiples
trous de couture (2d, 202d, 302d) pour coudre la
pièce principale de pièce d'attache (2, 202, 302, 402,
502) sur un tissu (8) sont formés sur la partie princi-
pale de pièce d'attache (2, 202, 302, 402, 502).

5. Pièce (400, 500) pour attacher des boutons (10,
310), ou analogues, selon l'une quelconque des re-
vendications 1 à 3, comprenant de plus un élément
de fixation (405, 505) comportant un trou traversant
d'élément de fixation (405c, 505c) pour insérer un fil
s'étendant à partir du bouton (10, 310), ou analogue,
et l'élément de fixation (405, 505) étant fixé au tissu
(8) par insertion avec la pièce principale de pièce
d'attache (402, 502), de telle sorte que le tissu (8)
soit saisi à travers le trou d'attache de bouton (8a).

6. Pièce (500) pour attacher des boutons (10, 310), ou
analogues, selon la revendication 5, dans laquelle
la partie d'ancrage de fil (504) est formée de façon
intégrée avec la partie principale de pièce d'attache
(502), et la partie de saisie de fil est formée entre la
partie d'ancrage de fil intégrée (504) et le tissu (8).

7. Pièce (400, 500) pour attacher des boutons (10,
310), ou analogues, selon la revendication 5 ou 6,
l'élément de fixation (405, 505) comportant une con-
cavité de réception d'élément de réunion (405b,
505b) pour recevoir et supporter un élément de réu-
nion (316) pour réunir un fil d'attache de bouton (312)
inséré dans un trou dans un bouton (10, 310), ou
analogue, à un fil d'ancrage (314) enroulé sur la par-
tie d'ancrage de fil (404, 504).

8. Bouton d'attache (301) pour l'attache à la pièce (1,

200, 300, 400, 500) pour attacher des boutons (10, 310), ou analogues, selon l'une quelconque des revendications 1 à 7, comprenant :

un bouton (10, 310), ou analogue ; 5
 un fil d'attache de bouton (312) inséré dans un trou dans un bouton (10, 310), ou analogue ;
 un fil d'ancrage (314) fixé à la pièce (1, 200, 300, 400, 500) pour attacher des boutons (10, 310), ou analogues ; et 10
 un élément de réunion (316) pour réunir le fil d'attache de bouton (312) au fil d'ancrage (314), dans lequel le fil d'ancrage (314) prend des brins tissés à partir de fils à brin unique ou à brins multiples. 15

9. Procédé pour fabriquer un vêtement auquel des boutons (10, 310), ou analogues, sont attachés, comprenant les étapes consistant à :

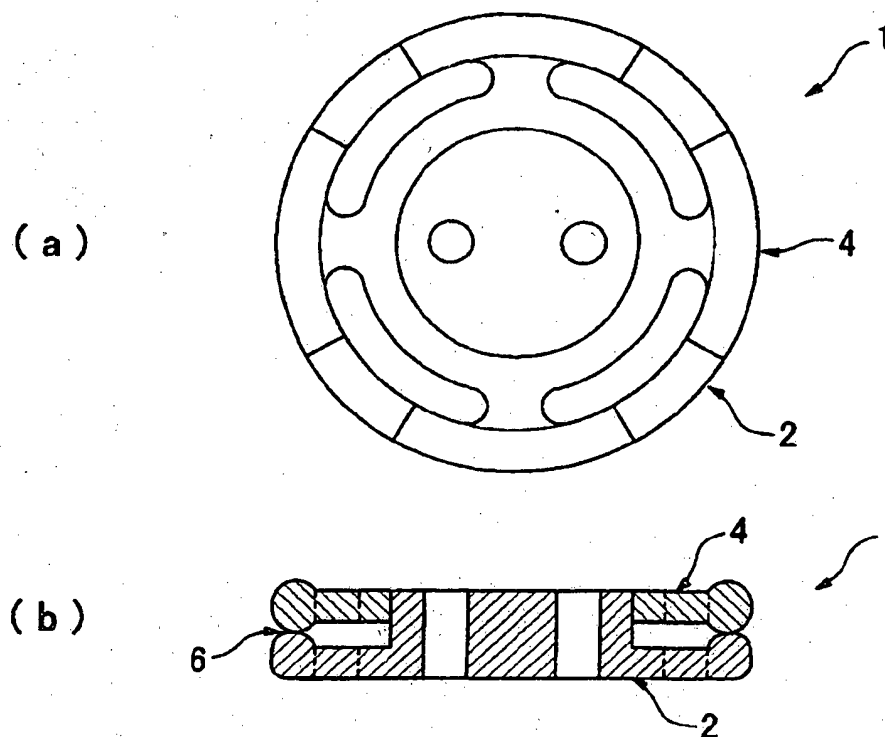
20
 former un trou d'attache de bouton (8a) dans un emplacement où le bouton (10, 310), ou analogue, doit être attaché au vêtement ;
 disposer la pièce (1, 200, 300, 400, 500) pour attacher des boutons (10, 310), ou analogues, selon l'une quelconque des revendications 1 à 7 ; 25
 insérer un fil s'étendant à partir du bouton (10, 310), ou analogue, dans le trou d'attache de bouton ; 30
 insérer un fil traversant le trou d'attache de bouton (8a) dans le trou traversant principal dans la pièce pour attacher un bouton, ou analogue ;
 enrouler un fil traversant le trou traversant principal (2c, 202c, 302c, 402c, 502c) sur la partie d'ancrage de fil (4, 204, 304, 404, 504) ; et 35
 saisir et fixer un fil enroulé sur la partie d'ancrage de fil (4, 204, 304, 404, 504) à la partie de saisie de fil (6, 206, 306, 406, 506). 40

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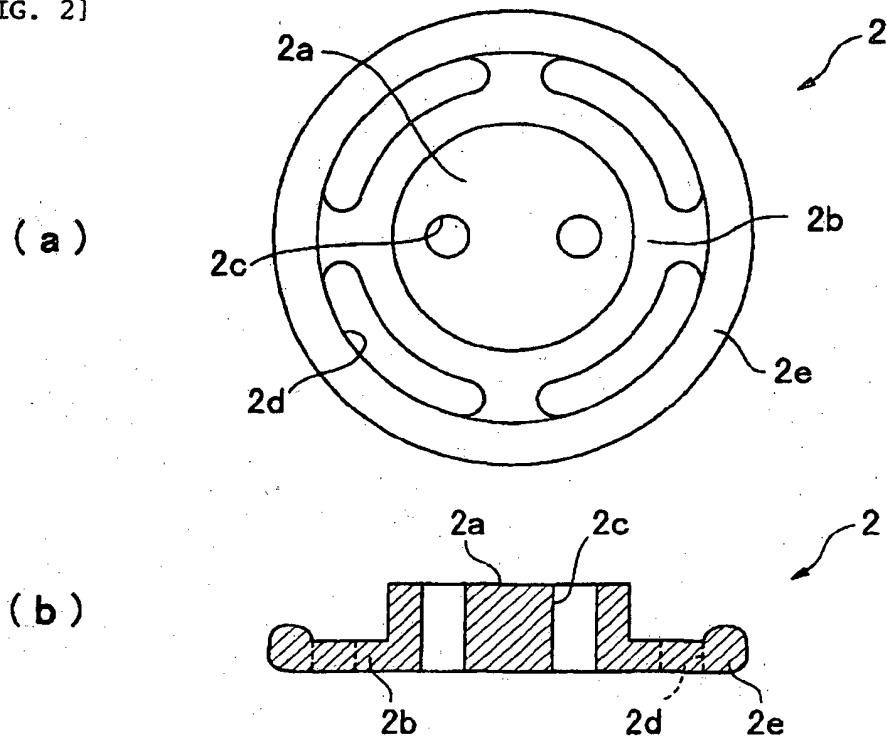
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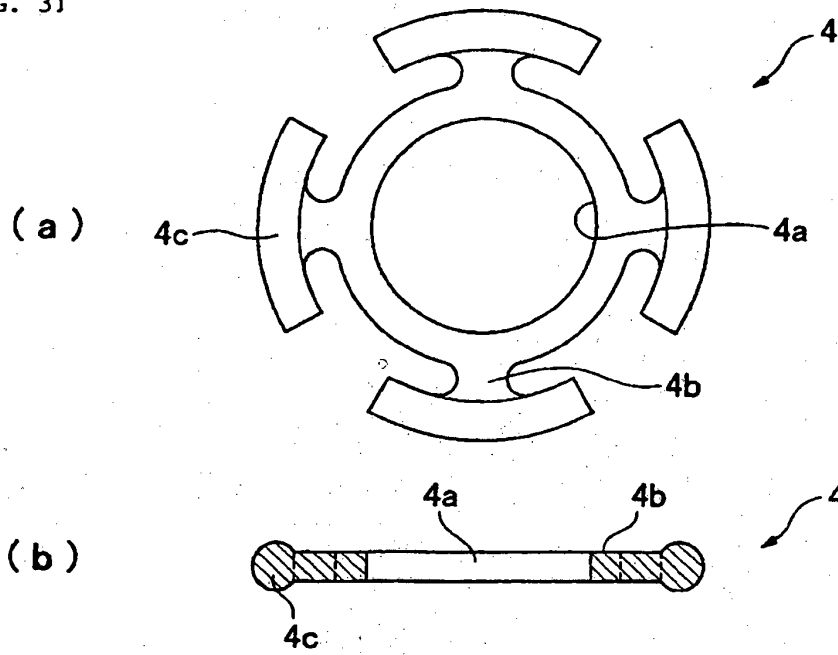
[FIG. 1]



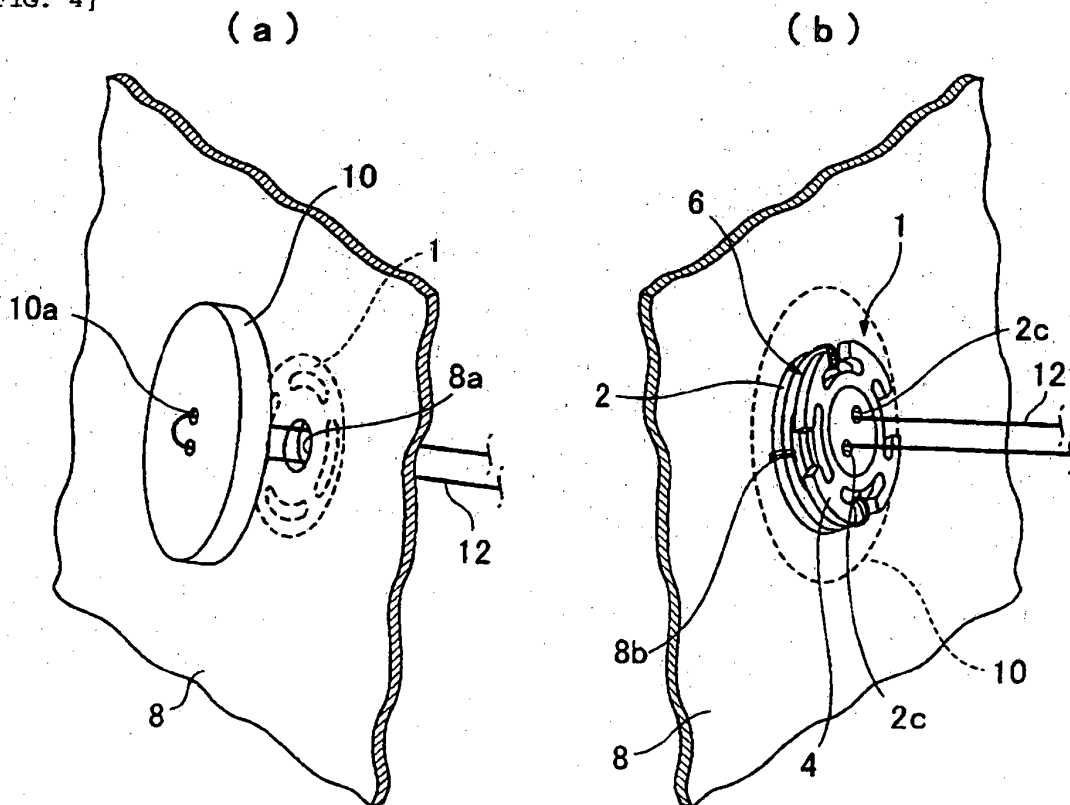
[FIG. 2]



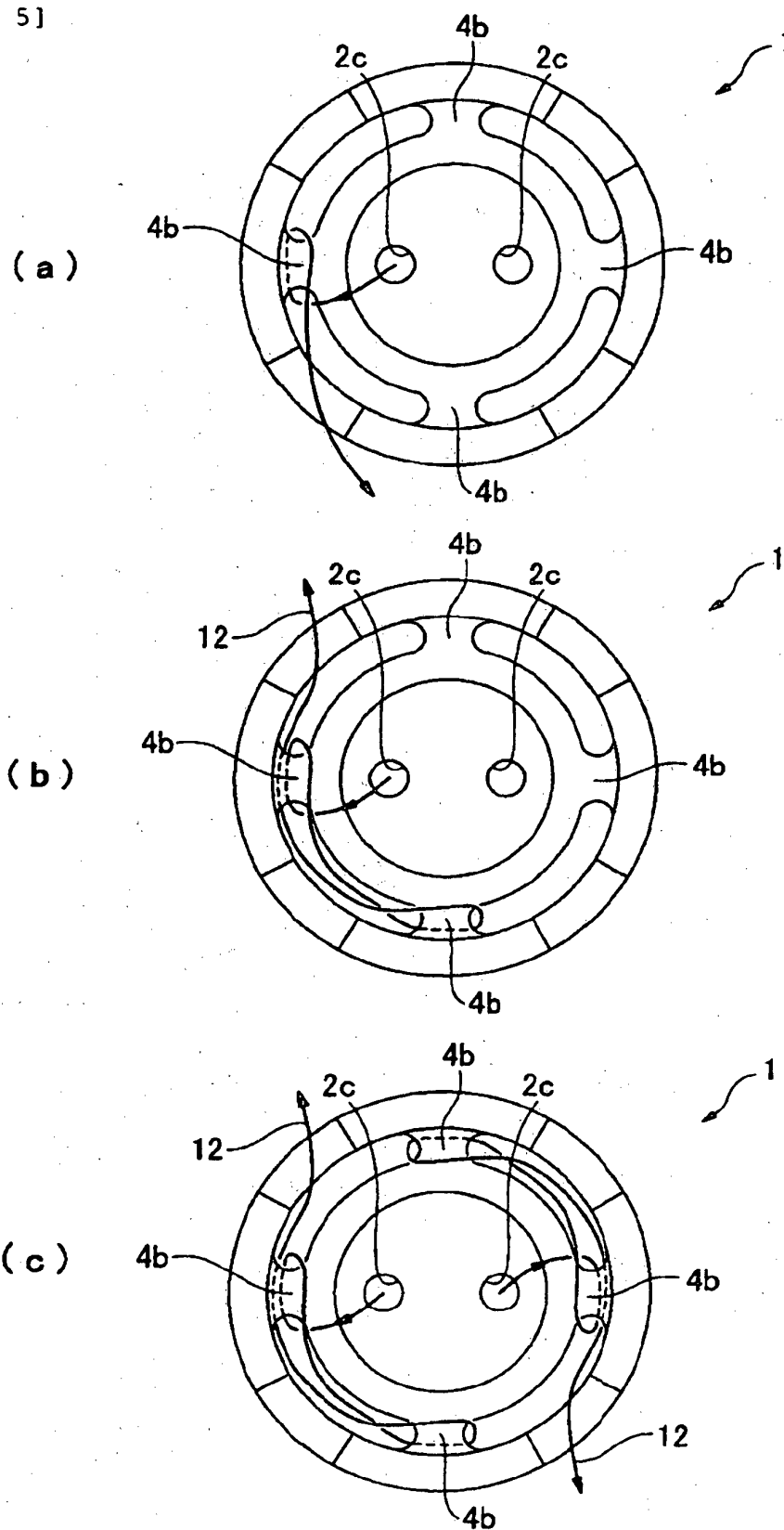
[FIG. 3]



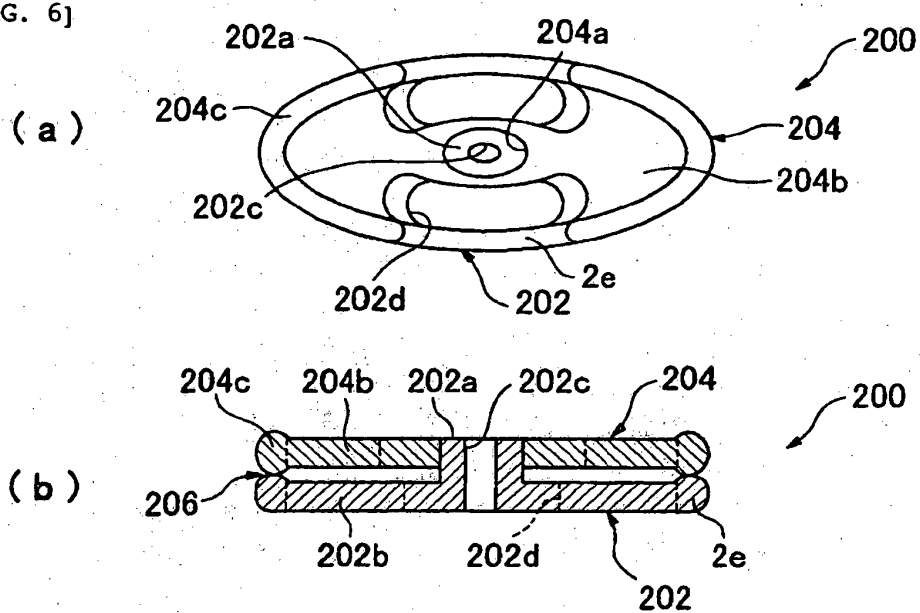
[FIG. 4]



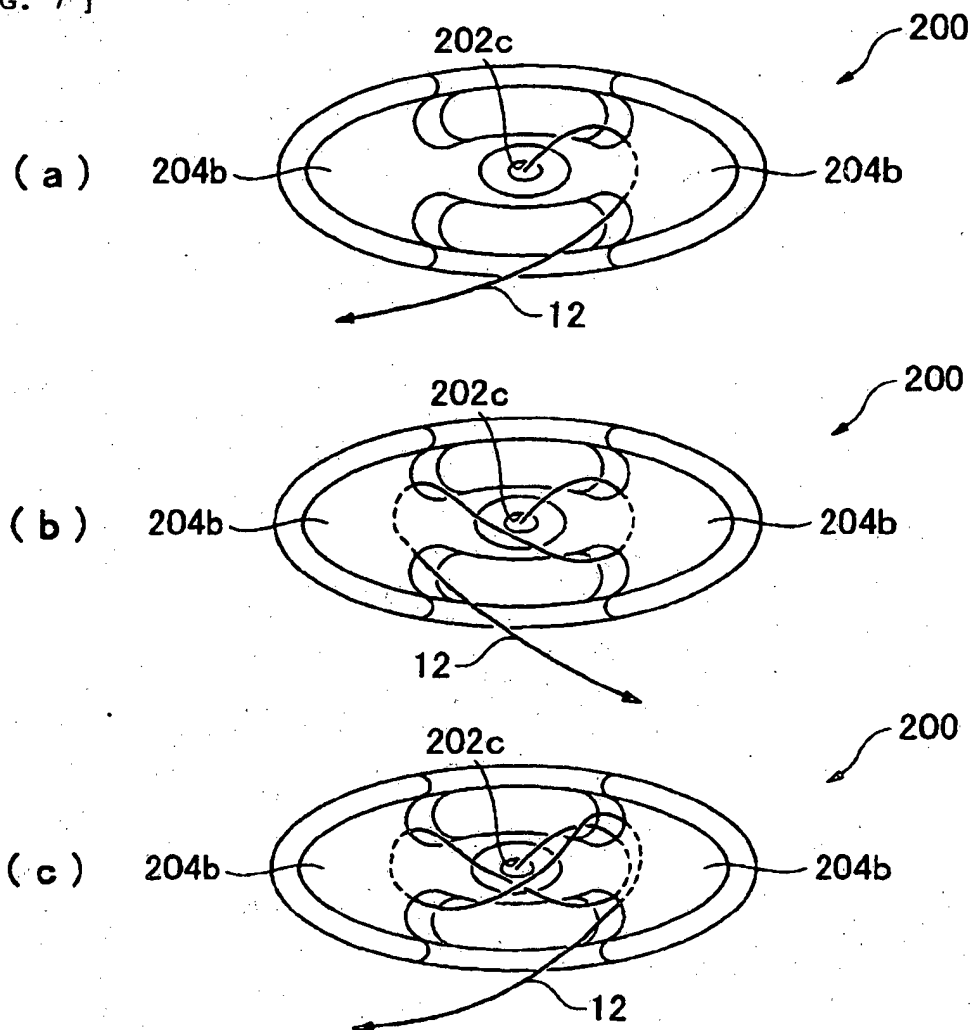
[FIG. 5]



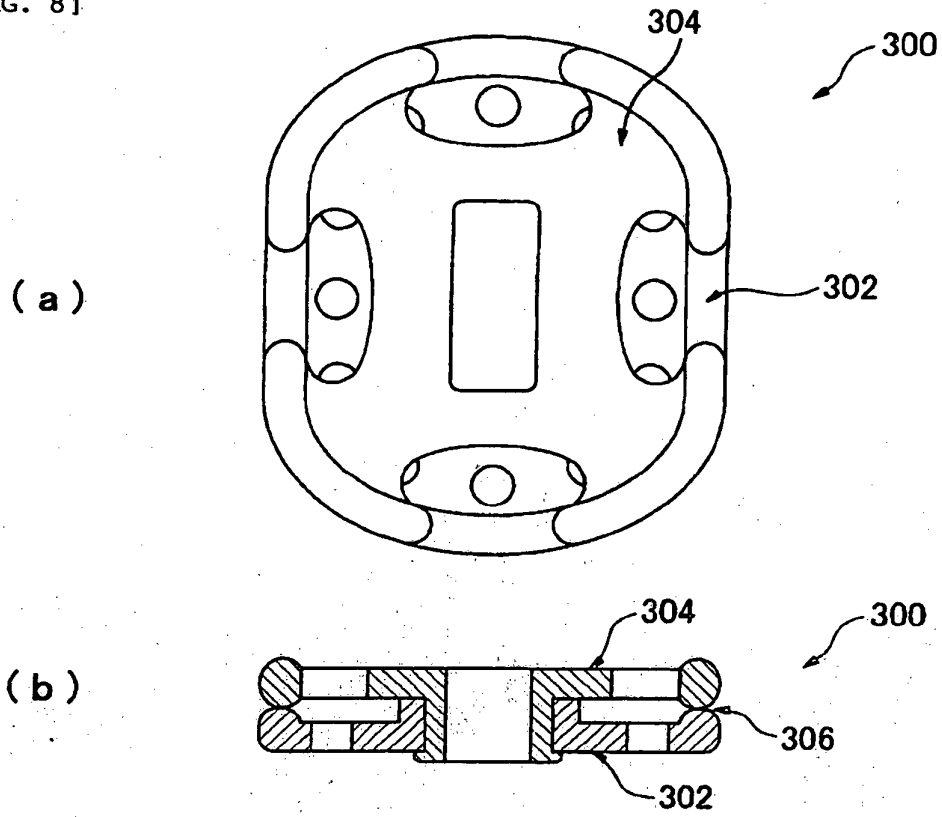
[FIG. 6]



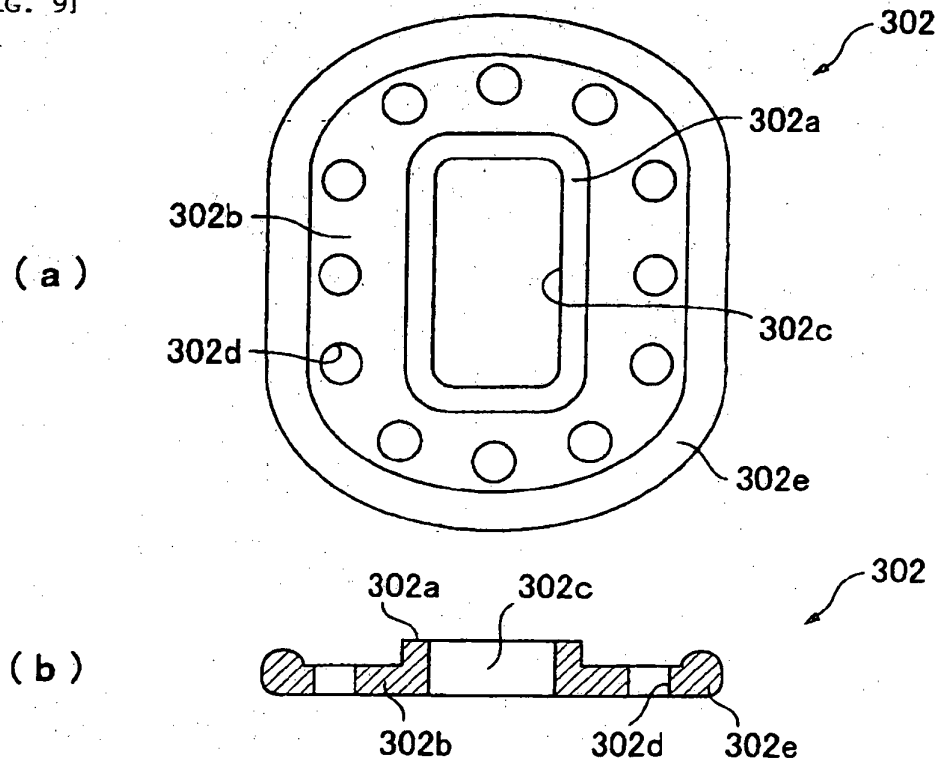
[FIG. 7]



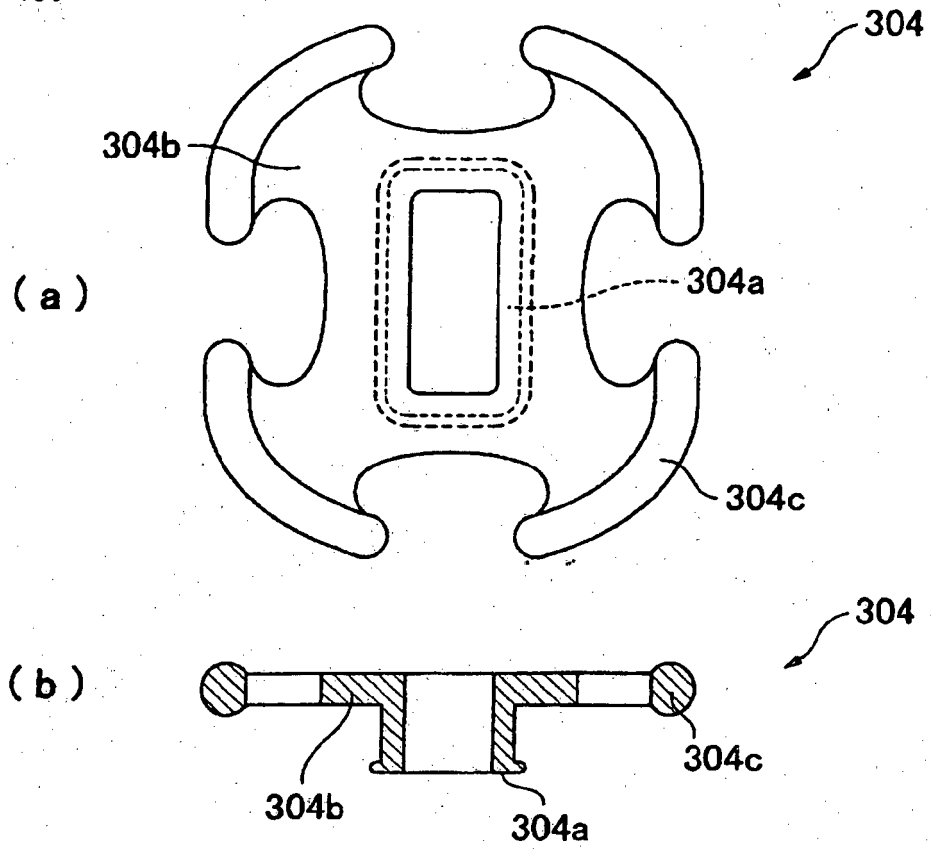
[FIG. 8]



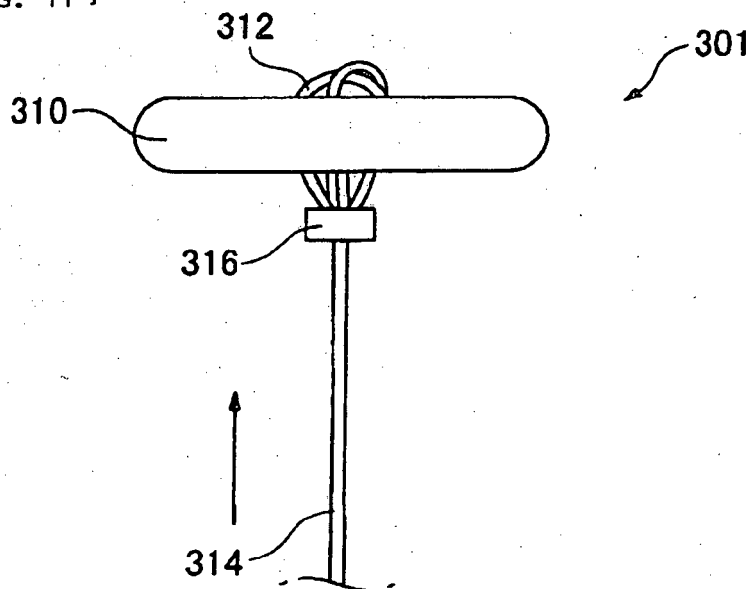
[FIG. 9]



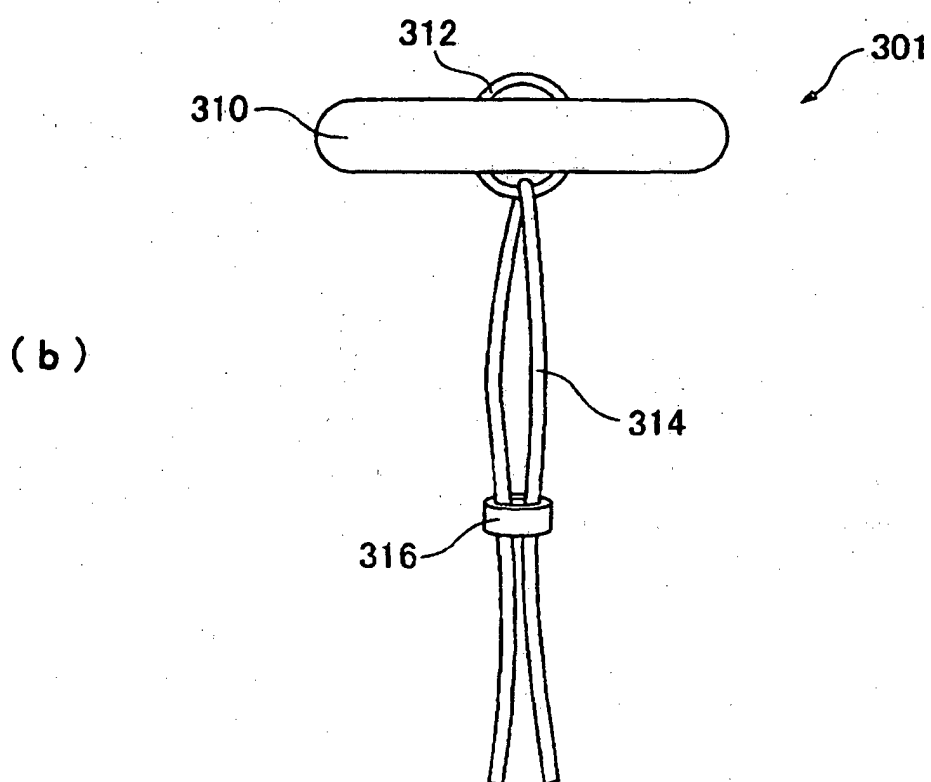
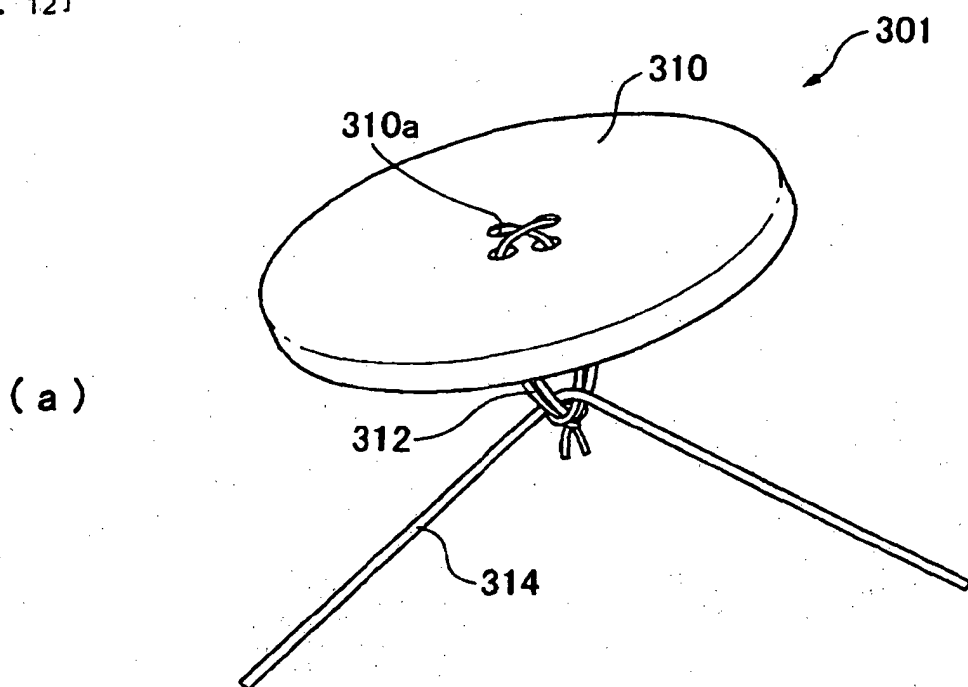
[FIG. 10]



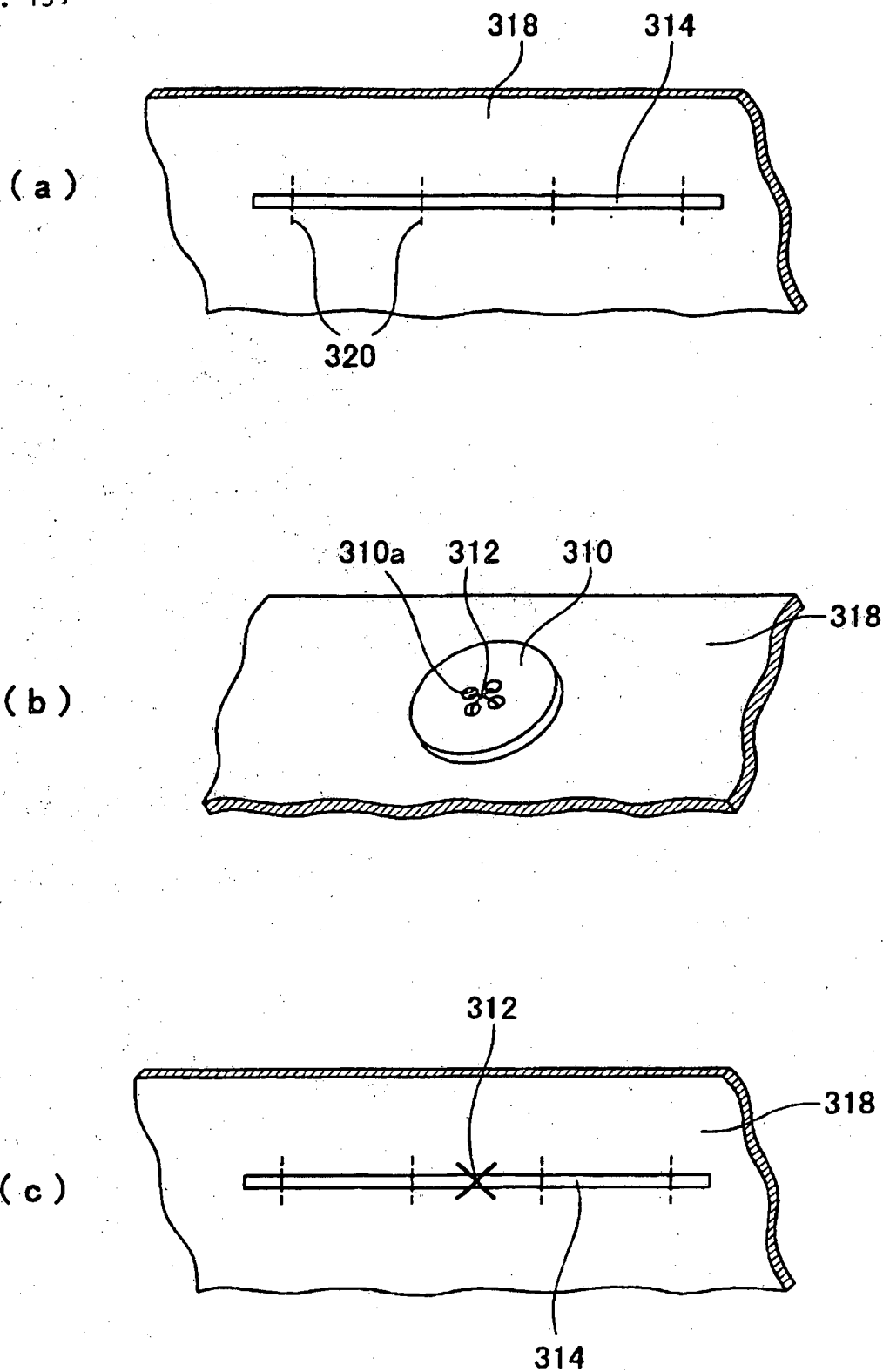
[FIG. 11]



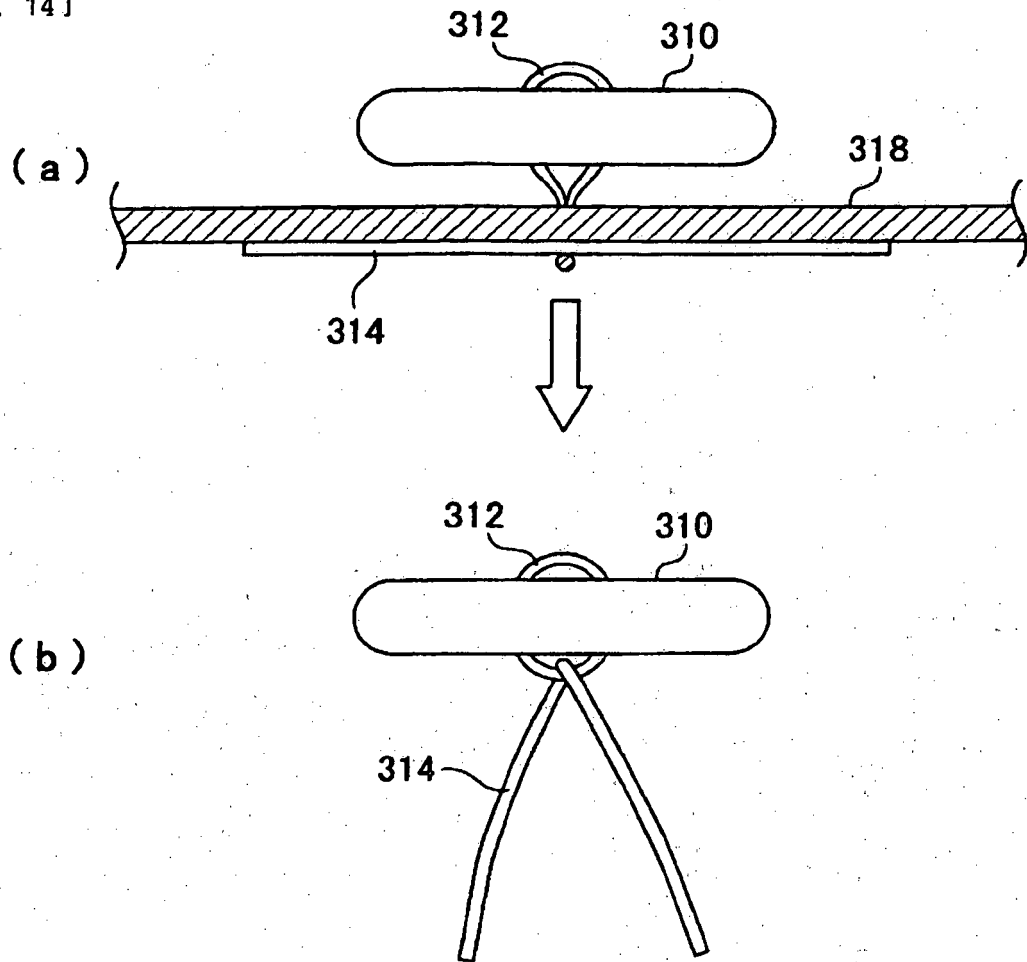
[FIG. 12]



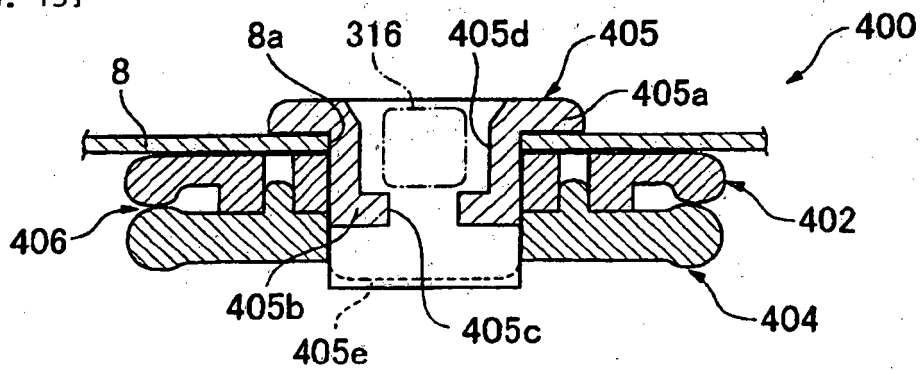
[FIG. 13]



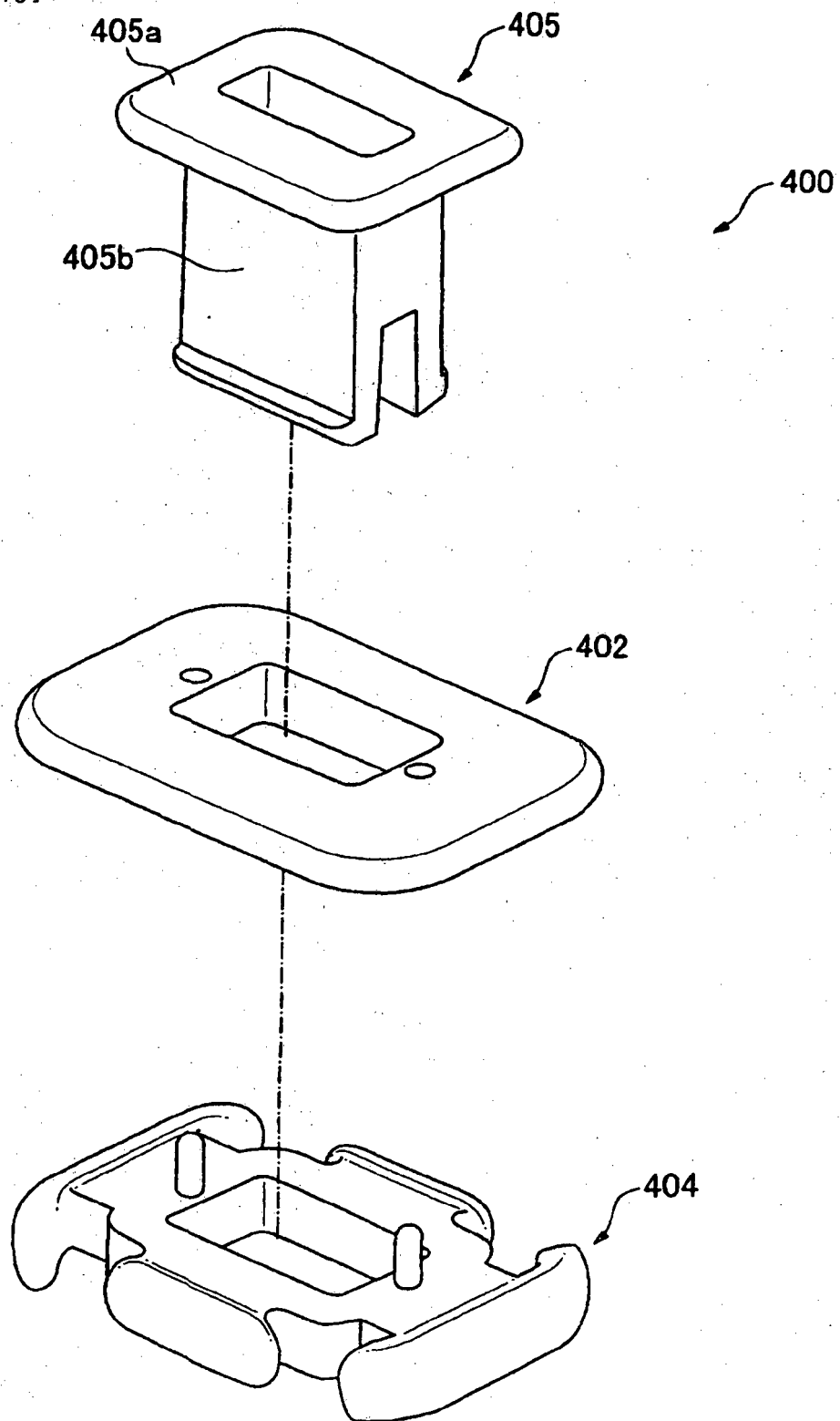
[FIG. 14]



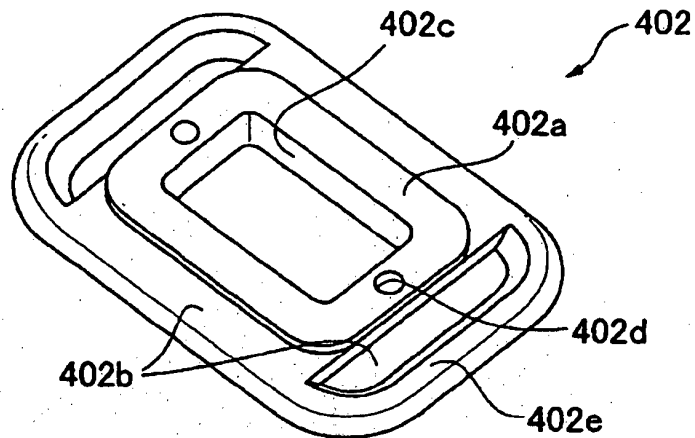
[FIG. 15]



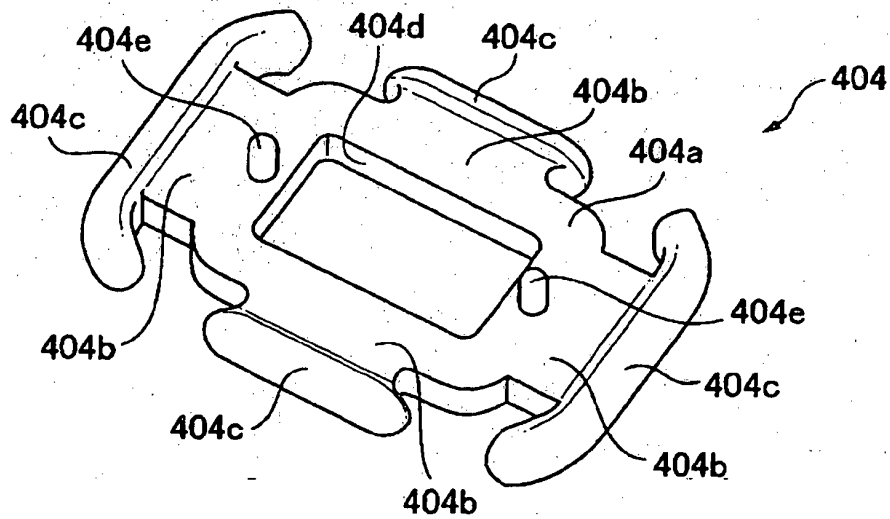
[FIG. 16]



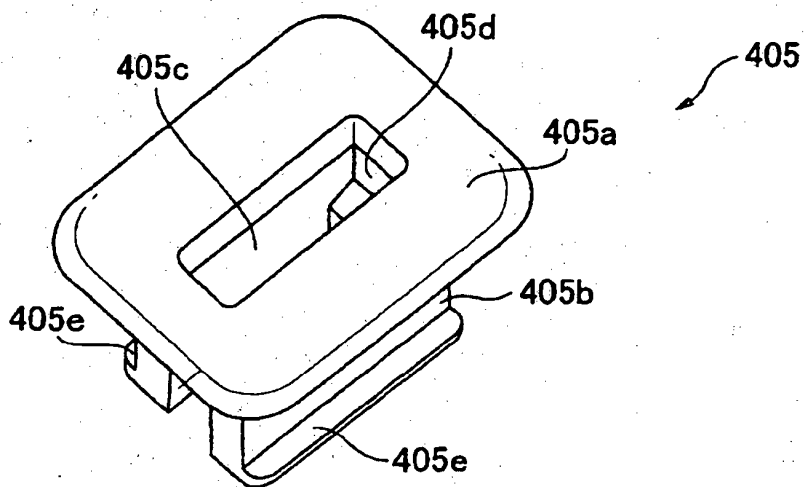
[FIG. 17]



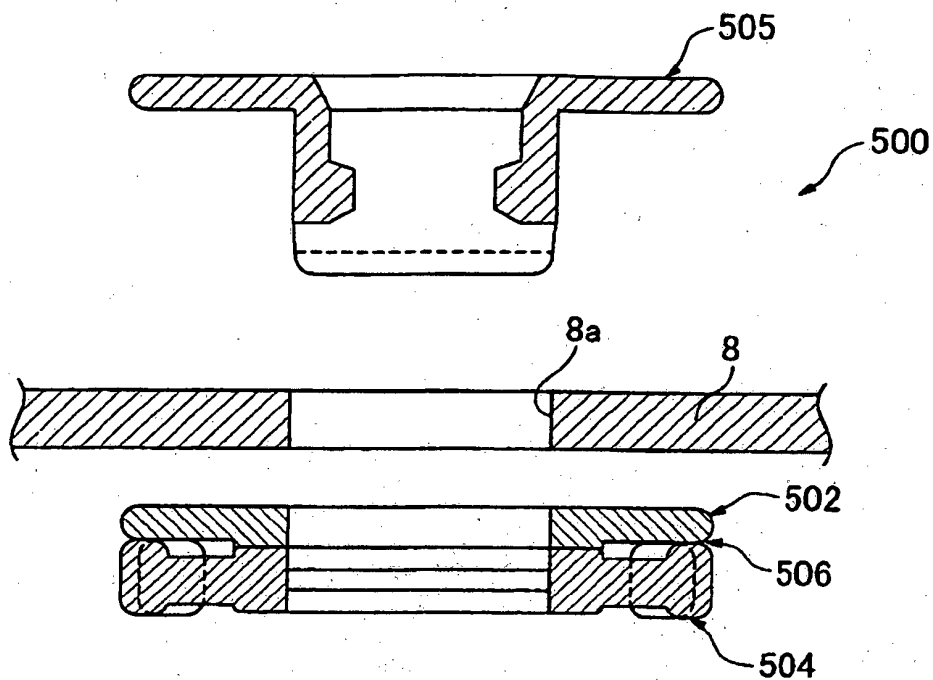
[FIG. 18]



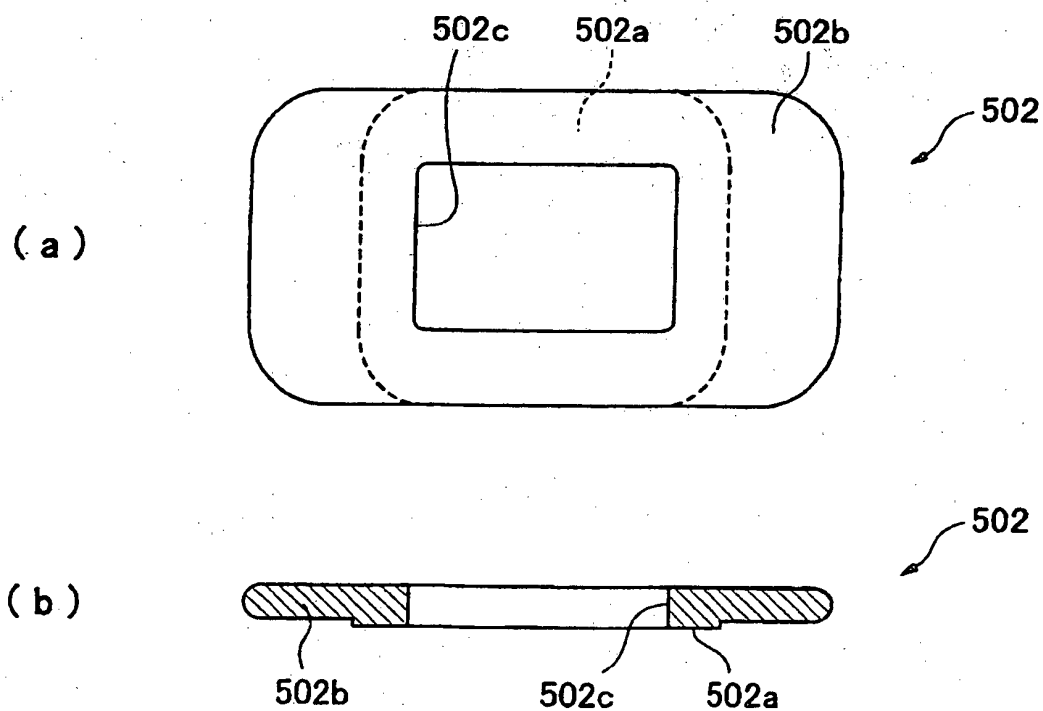
[FIG. 19]



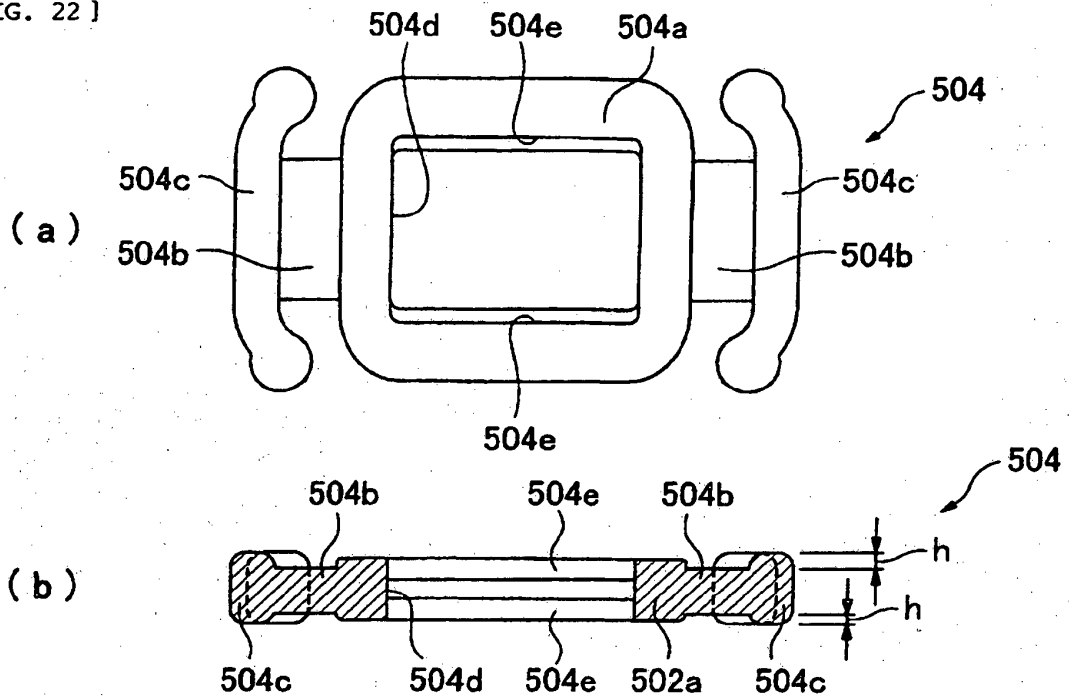
[FIG. 20]



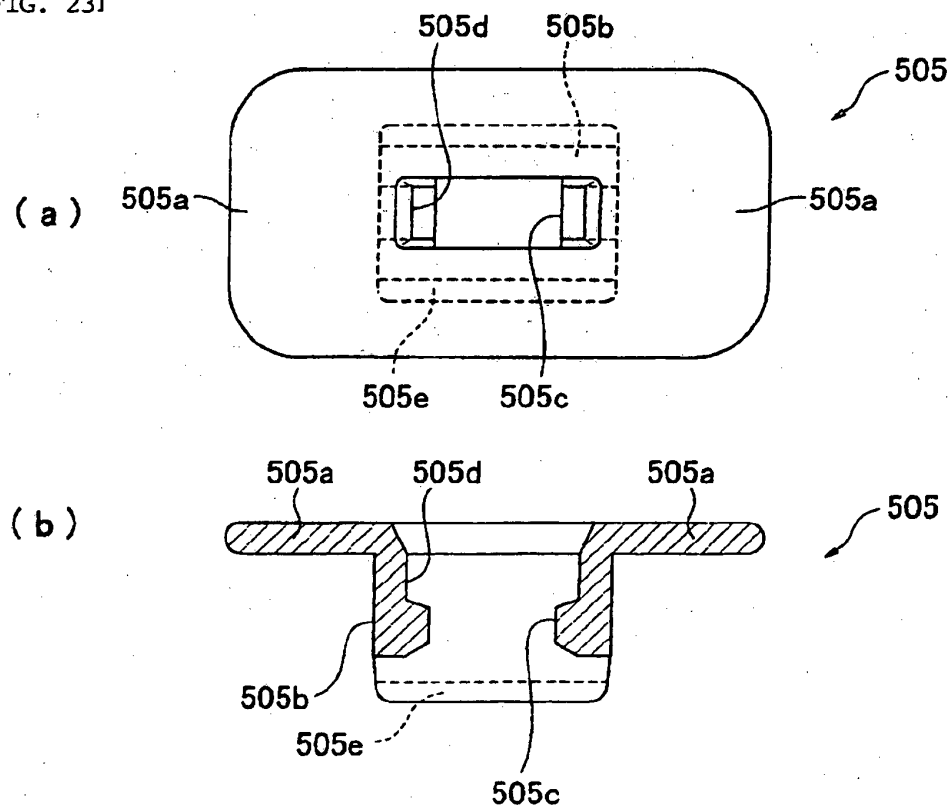
[FIG. 21]



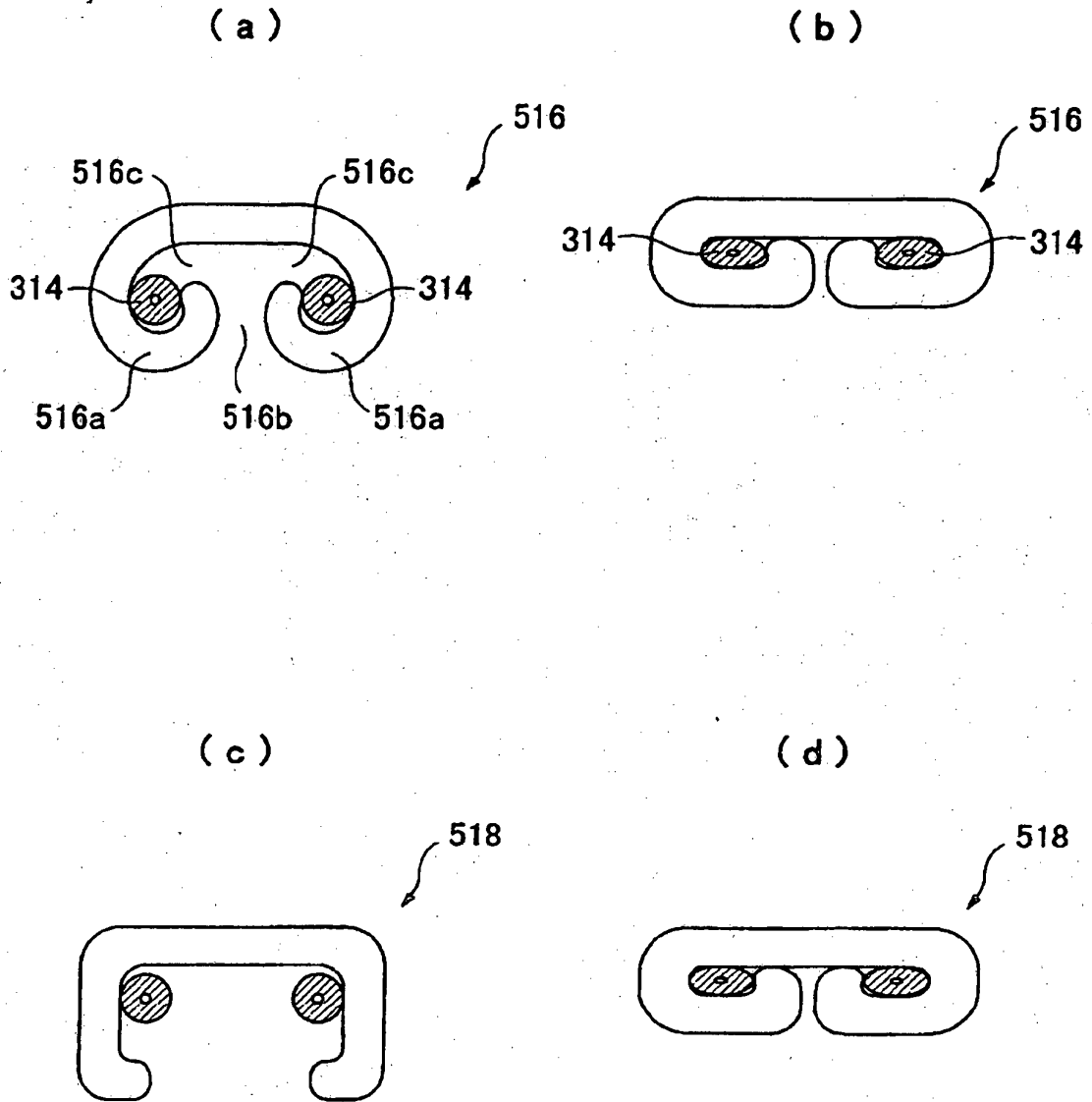
[FIG. 22]



[FIG. 23]



[FIG. 24]



REFERENCES CITED IN THE DESCRIPTION

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