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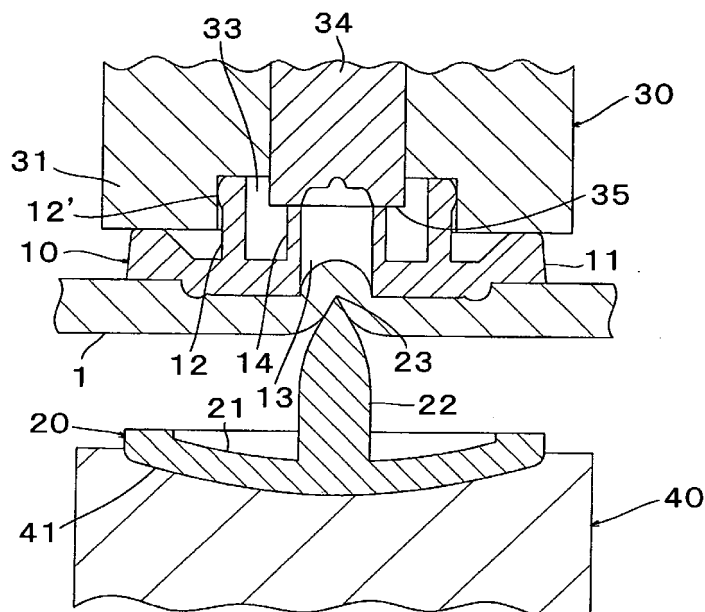
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(54) **METHOD FOR MOUNTING MALE SNAP BUTTON, MALE SNAP BUTTON, MALE SNAP BUTTON STRUCTURE, METHOD FOR MOUNTING FEMALE SNAP BUTTON, FEMALE SNAP BUTTON, AND FEMALE SNAP BUTTON STRUCTURE**

(57) In a male or female snap button (10, 50, 70) including a base (11, 51, 71) and a mounting opening (13, 53, 73), a cylindrical protrusion (14, 54, 74) is provided around the mounting opening. When the male or female snap button (10, 50, 70) is being mounted to a fabric (1), after a post (22) of a button fastener (20) has passed through the fabric (1) and then the mounting

opening (13, 53, 73), the post (22) is swaged by an upper die. At this time, the protrusion (14, 54, 74) of the male or female snap (10, 50, 70) is crushed between the post (12) and the base (11, 51, 71). Thereby, a part of a load as imposed on the male or female snap button (10, 50, 70) can be absorbed by the deformation of the protrusion (14, 54, 74).

Fig. 3



Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a method for mounting a male snap button, a male snap button, a male snap button structure, a method for mounting a female snap button, a female snap button, and a female snap button structure, and more specifically, to a method for mounting a male/female snap button by swaging a post of a button fastener after the post has pierced a fabric using an upper die, such male and female snap buttons, and a male/female snap button structure composed of a male/female snap button and a button fastener.

[0002] A pair of a male snap button (male snap) and a female snap button (female snap) which composes a snap button have been widely used in clothes, bags, etc. at their parts to be put together. To one fabric of the put-together parts, a male snap is mounted, and to the other fabric a female snap is attached. By engaging and disengaging the male and female snaps, the put-together parts can be closed and opened. To mount a male snap and a female snap onto their respective fabrics, generally, a post of a button fastener pierces a fabric and then passes through an opening, which is formed in a base of the male or female snap, and subsequently the post is swaged by a punch of an upper die on the base of the male or female snap.

[0003] However, when the post of the button fastener is being swaged by the punch of the upper die, a high load is imposed on the male or female snap. Therefore, it is necessary to produce male and female snaps with an enough strength to bear a high load at the time of swaging, so there is a certain limitation in a choice of materials and sizes. Besides, the upper die is provided with a cylindrical elastic member to absorb an excess load (see e.g. JP,H11-1812,A), which increases costs accordingly.

[0004] [Patent document 1] JP,H11-1812,A

[0005] An object of the invention as made in view of the above-mentioned problems is to provide a method for mounting a male snap button, a male snap button, a male snap button structure, a method for mounting a female snap button, a female snap button, and a female snap button structure, in which a part of a load can be absorbed at the time of swaging a post of a button fastener, whereby it would be possible to lower the product strength of a male snap button or a female snap button or to make the elastic member in an upper die unnecessary.

SUMMARY OF THE INVENTION

[0006] To solve the problems, according to the present invention, there is provided a method for mounting a male snap button to a fabric using a button fastener having a post, the male snap button comprising an almost disk-like base, a projection projecting from the base to engage with a projection-receiving space of a female snap button,

a mounting opening formed in a center area of the base, and a cylindrical protrusion protruding around the mounting opening of the base, the method comprising the steps of: passing the post of the button fastener through the fabric and then the mounting opening of the male snap button; and swaging the post, which has passed through the fabric and the mounting opening, on the base while compressing the protrusion between the post as being swaged and the base. The fabric can cover cloth, felt, nonwoven fabric, leather, resin sheet, etc.

[0007] In the invention, at the time of mounting the male snap button to the fabric, after the post of the button fastener passes through the fabric and then the mounting opening of the male snap button, the post is swaged by an upper die. At this time, the post as being deformed by the swaging can deform the protrusion of the male snap button so as to crush the protrusion against the base. Thereby, a part of a load imposed on the male snap button can be absorbed by the deformation of the protrusion.

[0008] According to another aspect of the invention, there is provided a male snap button, which includes an almost disk-like base, a projection projecting from the base to engage with a projection-receiving space of a female snap button, a mounting opening formed in a center area of the base to pass a post of a button fastener therethrough, the male snap button being to be mounted to a fabric by swaging the post on the base after the post has passed through the fabric and then the mounting opening, wherein the male snap button includes a cylindrical protrusion protruding around the mounting opening of the base, the protrusion being to be deformed together with the post as the post is being swaged. The protrusion of the male snap button can absorb a part of a load by being crushed against the base by the post which is being deformed by the swaging at the time of mounting the male snap button to the fabric.

[0009] According to still another aspect of the invention, there is provided a male snap button structure comprising a male snap button and a button fastener for use in mounting the male snap button to a fabric, wherein the male snap button comprises an almost disk-like base, a projection projecting from the base to engage with a projection-receiving space of a female snap button, a mounting opening formed in a center area of the base, and a cylindrical protrusion protruding around the mounting opening of the base, wherein the button fastener comprises a base and a post projecting from the base, the post being to be swaged on the base of the male snap button after the post has passed through the fabric and then the mounting opening at the time of mounting the male snap button to the fabric, wherein, in a state where the post is swaged, the protrusion is compressed between the swaged post and the base. In the male snap button structure, the protrusion, which is crushed between the post and the base at the time of mounting the male snap button to the fabric, can absorb a part of a load.

[0010] According to still another aspect of the invention, there is provided a method for mounting a female

snap button to a fabric using a button fastener having a post, the female snap button comprising an almost disk-like base, a periphery side projecting from the base and defining a projection-receiving space to receive a projection of a male snap button, a mounting opening formed in a center area of the base, and a cylindrical protrusion protruding around the mounting opening of the base, the method comprising the steps of: passing the post of the button fastener through the fabric and then the mounting opening of the female snap button; and swaging the post, which has passed through the fabric and the mounting opening, on the base while compressing the protrusion between the post as being swaged and the base.

[0011] In the invention, at the time of mounting the female snap button to the fabric, after the post of the button fastener passes through the fabric and then the mounting opening of the female snap button, the post is swaged by an upper die. At this time, the post as being deformed by the swaging can deform the protrusion of the female snap button so as to crush the protrusion against the base. Thereby, a part of a load imposed on the female snap button can be absorbed by the deformation of the protrusion.

[0012] According to still another aspect of the invention, there is provided a female snap button, which includes an almost disk-like base, a periphery side projecting from the base and defining a projection-receiving space to receive a projection of a male snap button, a mounting opening formed in a center area of the base to pass a post of a button fastener therethrough, the female snap button being to be mounted to a fabric by swaging the post on the base after the post has passed through the fabric and then the mounting opening, wherein the female snap button includes a cylindrical protrusion protruding around the mounting opening of the base, the protrusion being to be deformed together with the post as the post is being swaged. The protrusion of the female snap button can absorb a part of a load by being crushed against the base by the post which is being deformed by the swaging at the time of mounting the female snap button to the fabric.

[0013] According to still another aspect of the invention, there is provided a female snap button structure comprising a female snap button and a button fastener for use in mounting the female snap button to a fabric, wherein the female snap button comprises an almost disk-like base, a periphery side projecting from the base and defining a projection-receiving space to receive a projection of a male snap button, a mounting opening formed in a center area of the base, and a cylindrical protrusion protruding around the mounting opening of the base, wherein the button fastener comprises a base and a post projecting from the base, the post being to be swaged on the base of the female snap button after the post has passed through the fabric and then the mounting opening at the time of mounting the female snap button to the fabric, wherein, in a state where the post is swaged, the protrusion is compressed between the swaged post

and the base. In the female snap button structure, the protrusion, which is crushed between the post and the base at the time of mounting the female snap button to the fabric, can absorb a part of a load.

[0014] As materials for the male and female snap buttons and the button fastener, thermoplastic resin such as commodity plastic, engineering plastic can be preferably cited, but not limited thereto. Metal etc. can be used.

[0015] In the invention, at the time of swaging the post of the button fastener by an upper die when the male or female snap button is being mounted to the fabric, by deforming the protrusion of the male or female snap button together with the post, a part of a load as imposed on the male or female snap button can be absorbed by the deformation of the protrusion. Thus, it will be possible to reduce a load as imposed on the base of the male or female snap button. Thereby, it will be possible to lower the product strength of the male or female snap button, extending a choice of materials and sizes of the male or female snap button. Further, it would be possible to make an elastic member unnecessary, which is provided in an upper die to absorb an excess load imposed on the male or female snap button.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Fig. 1 is a partially cutaway perspective view showing a male snap button in accordance with an embodiment of the present invention.

Fig. 2 is an illustrative sectional view showing a state where an upper die, the male snap button in Fig. 1, a fabric, a button fastener, etc. are arranged in the up-and-down direction when the male snap button is mounted to the fabric.

Fig. 3 is an illustrative sectional view in a button-mounting process showing a state immediately before a post of the button fastener pierces the fabric. Fig. 4 is an illustrative sectional view in a button-mounting process showing a state where the post of the button fastener has pierced the fabric.

Fig. 5 is an illustrative sectional view in a button-mounting process showing an initial state in a swaging step by a punch of the upper die.

Fig. 6 is an illustrative sectional view in a button-mounting process showing a middle state in a swaging step.

Fig. 7 is an illustrative sectional view in a button-mounting process showing a completed state in a swaging step.

Fig. 8 is an illustrative view similar to Fig. 4 showing another example of a male snap button and an upper die.

Fig. 9 is an illustrative view similar to Fig. 7 showing a completed state in a swaging step with the Fig. 8 male snap button.

Fig. 10 is an illustrative view similar to Fig. 2 showing

an upper die, a female snap button, a fabric, the button fastener, etc. when the female snap button is mounted to the fabric.

Fig. 11 is an illustrative view similar to Fig. 7 showing a completed state in a swaging step with the Fig. 10 female snap button.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Hereinafter, preferred embodiments of the invention will be described while referring to the drawings. Fig. 1 is a partially cutaway perspective view of a male snap button (hereinafter referred to simply as "male snap") 10 in accordance with an embodiment of the present invention. The male snap 10, which is a molded article made of thermoplastic resin, comprises an almost disk-like base 11 and a cylindrical projection 12 projecting upward from the base 11 concentrically therewith. The thickness of a radially outer part of the base 11 is made thick upward. As well known, the male snap 10 can be connected with and disconnected from a female snap 70 (see Fig. 10) by engaging and disengaging the projection 12 with and from a projection-receiving space 75 of the female snap 70. To enhance a resistance of the projection 12 to the disengagement from the projection-receiving space 75 of the female snap 70, there is provided a bulge 12' bulging radially outward at an upper end part of the projection 12. Further, the male snap 10 includes a circular mounting opening (hereinafter referred to simply as "opening") 13 which is open in a center area of the base 11 radially inward rather than the projection 12, and a cylindrical protrusion 14 which protrudes upward from the base 11 around the opening 13 and extends upward the opening inner periphery surface 13' that defines the opening 13. In this embodiment, the height of the protrusion 14 from the upper surface 11' of the base 11 is lower than that of the projection 12, and is set for approximately 2/3 of the height of the projection 12.

[0018] Fig. 2 shows a state where a button fastener 20, an upper die 30, and a lower die 40, the male snap 10 and a fabric 1 are arranged in the up-and-down direction, the button fastener 20, the upper die 30 and the lower die 40 are used to mount the male snap 10 onto the fabric 1. The male snap 10 and the button fastener 20 constitute a male snap button structure in accordance with an embodiment of the present invention. The button fastener 20 is made of acetal resin, and comprises an almost disk-like base 21 and a post 22 projecting upward from the base 21 concentrically therewith. The post 22 tapers upward and has a sharpened tip 23. Although not shown in the drawings, the upper die 30 is connected to an up-and-down unit of a press machine for mounting of buttons. The upper die 30 includes an annular punch guide 31 and a steel punch 34 which is cylindrical (in its lower part as shown) and is moved up and down through a center bore 32 along the axis of the punch guide 31. In the bottom of the punch guide 31, there is provided a snap holding portion 33 which is depressed upward to

hold the male snap 10 by receiving the projection 12 of the male snap 10. The projection 12 can be attached to the snap holding portion 33 with the outer diameter of the bulge 12' elastically reduced. On the bottom of the punch 34, there are formed a horizontal, annular bottom surface 35 and a swaging depression 36 as being depressed upward in the area radially inward from the bottom surface 35, which is for swaging the post 22 of the button fastener 20. The outer diameter of the bottom of the punch 34 is greater than that of the protrusion 14 of the male snap 10, and the diameter of the swaging depression 36 is almost the same as the inner diameter of the protrusion 14 of the male snap 10 (see Fig. 3). The lower die 40 includes a base setting portion 41 on its upper surface to conformably receive the base 21 of the button fastener 20. The button fastener 20 with the base 21 set in the base setting portion 41, the axis of the post 22 aligns with the axis of the punch 34 concentrically with the upper die 30.

[0019] Next, as an embodiment of a method for mounting a male snap button in accordance with the invention, a process to mount the male snap 10 to the fabric 1 will be described. Fig. 3 shows a state where the post 22 of the button fastener 20 is pushing up the fabric 1 as placed between the male snap 10 and the button fastener 20 while the upper die 30 is moving down, the upper die 30 holding the male snap 10 with the projection 12 attached to the snap holding portion 33 of the punch guide 31, and the button fastener 20 being set in the base setting portion 41 of the lower die 40. At this time, the bottom surface 35 of the punch 34 is bumping against the top of the protrusion 14. From this state, because of the upper die 30 lowering further, as shown in Fig. 4, the post 22 pierces the fabric 1 and then passes through the opening 13 of the male snap 10, and the tip 23 of the post 20 goes into and bumps against the swaging depression 36. In addition, at this time, the fabric 1 is held and compressed between the base 11 of the male snap 10 and the base 21 of the button fastener 20.

[0020] In an initial state in a swaging step, as shown in Fig. 5, the swaging depression 36 of the punch 34 begins to compress the post 22 with the tip 23 in the lead, and the bottom surface 35 of the punch 34 starts to deform the protrusion 14 of the male snap 10 so as to divert its upper end side radially outward. From this state, because of the punch 34 lowering further, as shown in Fig. 6, the post 22 is crushed to fill the swaging depression 36 and then begins to expand radially outward. This radially outward expansion of the post 22, combined with a press from the bottom surface 35 of the punch 34, bends the protrusion 14 of the male snap 10 radially outward further. Fig. 7 shows a state where the swaging has been completed. In this state, the protrusion 14 of the male snap 10 is bent radially outward and crushed onto the upper surface 11' of the base 11. On the crushed protrusion 14', the radially outward expanded portion 22' of the post 22 is swaged to overlap therewith.

[0021] In the above-described swaging step, the male

snap 10 can partially absorb the pressure from the punch 34 by deforming the protrusion 14, so it will be possible to reduce a load as imposed on the base 11. Thereby, it will be possible to lower the product strength of the male snap 10 and to extend a choice of materials and sizes of the male snap 10. Further, it would be possible to make a cylindrical elastic member (spring) unnecessary, which has been conventionally provided in an upper die to reduce a load imposed on the base 11.

[0022] Fig. 8 shows another example of a male snap and an upper die. This male snap 50 is the same as the above-described male snap 10 except for the height of the protrusion 54. Further, the upper die 60 is the same as the above-described upper die 30, except that the bottom of the punch 64 is flat with no swaging depression. Therefore, the same reference numerals as in Fig. 2 etc. are used to the constructions other than the male snap 50 and the upper die 30. The height of the protrusion 54 of the male snap 50 is the same as that of the projection 52. The post 22 of the button fastener 20, which has pierced the fabric 1 and then passed through the opening 53 of the male snap 50, is swaged by the bottom surface 65 of the punch 64 of the upper die 60 so as to be axially compressed and radially expanded as shown in Fig. 9 from the Fig. 8 state. At this time, the protrusion 54 of the male snap 50 is crushed on the base 51 by the punch 64 and the post 22 as being deformed (the deformed protrusion 54 is indicated by the reference numeral 54').

[0023] Fig. 10 shows an arrangement state similar to Fig. 2, including a female snap button (hereinafter referred to simply as "female snap") 70 in accordance with an embodiment of the present invention. Since the fabric 1, the button fastener 20 and the lower die 40 are substantially the same as those in Fig. 2 etc., descriptions thereof are omitted using the same reference numerals. The female snap 70 and the button fastener 20 constitute a female snap button structure in accordance with an embodiment of the present invention. The female snap 70 comprises an almost disk-like base 71, a cylindrical periphery side 72 projecting upward from the base 71 concentrically therewith and defining the projection-receiving space 75 to detachably receive the projection 12, 52 of the male snap 10, 50, a skirt-like flange 76 extending radially outward from an upper end part of the periphery side 72, a circular opening 73 provided in a center area of the base 71 radially inward rather than the periphery side 72, and a cylindrical protrusion 74 protruding upward from the base 71 around the opening 73. To enhance a resistance against the projection 12, 52 of the male snap 10, 50, there is provided a bulge 72' bulging radially inward at the upper end part of the periphery side 72. The height of the protrusion 74 from the upper surface of the base 71 is upper than 1/2 of the height of the periphery side 72, but not limited thereto. For example, the protrusion 74 can be of the same height as the periphery side 72.

[0024] The upper die 80 includes an annular punch guide 81 and a punch 84 which is cylindrical (in its lower

part as shown) and is moved up and down through a center bore 82 along the axis of the punch guide 81. In the bottom of the punch guide 81, there is provided a cylindrical snap holding portion 83 which extends downward to hold the female snap 70 by putting it into the projection-receiving space 75 of the female snap 70. The periphery side 72 can be attached to the snap holding portion 83 with the inner diameter of the bulge 72' elastically expanded. On the bottom of the punch 84, there are formed a horizontal, annular bottom surface 85 and a swaging depression 86 as being depressed upward in the area radially inward from the bottom surface 85, which is for swaging the post 22 of the button fastener 20. The outer diameter of the bottom of the punch 84 is greater than that of the protrusion 74 of the female snap 70, and the diameter of the swaging depression 86 is almost the same as the inner diameter of the protrusion 74 of the female snap 70.

[0025] A process to mount the female snap 70 to the fabric 1 using the button fastener 20, as an embodiment of a method for mounting a female snap button in accordance with the invention, is implemented similarly with the process of mounting the male snap 10 by lowering the upper die 80 which has held the female snap 70 by attaching the snap holding portion 83 of the punch guide 81 to the projection-receiving space 75. That is, after the post 22 of the button fastener 20 pierces the fabric 1 and then passes through the opening 73 of the male snap 10, the punch 84 is lowered to swage the post 22 as shown in Fig. 11 while deforming the protrusion 74 of the female snap 70. In this case, the protrusion 74 is crushed between the post 22 as being deformed and the base 71 of the female 70 (the deformed protrusion 74 is indicated by the reference numeral 74'). Thereby, a part of the pressure from the punch 84 can be absorbed, and a load as imposed on the base 71 can be reduced.

DESCRIPTION OF REFERENCE NUMBERS

[0026]

10, 50	male snap button
11, 51, 71	base
12, 52	protrusion
13, 53, 73	mounting opening
14, 54, 74	protrusion
14', 54', 74'	deformed protrusion
20	button fastener
30, 60, 80	upper die
31, 81	punch guide
34, 64, 84	punch
36, 86	swaging depression
40	lower die
70	female snap button
72	periphery side
75	projection-receiving space

Claims

1. A method for mounting a male snap button (10, 50) to a fabric (1) using a button fastener (20) having a post (22), the male snap button (10, 50) comprising an almost disk-like base (11, 51), a projection (12, 52) projecting from the base (11, 51) to engage with a projection-receiving space (75) of a female snap button (70), a mounting opening (13, 53) formed in a center area of the base (11, 51), and a cylindrical protrusion (14, 54) protruding around the mounting opening (13, 53) of the base (11, 51), the method comprising the steps of:
 - passing the post (22) of the button fastener (20) through the fabric (1) and then the mounting opening (13, 53) of the male snap button (10, 50); and
 - swaging the post (22), which has passed through the fabric (1) and the mounting opening (13, 53), on the base (11, 51) while compressing the protrusion (14, 54) between the post (22) as being swaged and the base (11, 51).
2. A male snap button (10, 50), which includes an almost disk-like base (11, 51), a projection (12, 52) projecting from the base (11, 51) to engage with a projection-receiving space (75) of a female snap button (70), a mounting opening (13, 53) formed in a center area of the base (11, 51) to pass a post (22) of a button fastener (20) therethrough, the male snap button (10, 50) being to be mounted to a fabric (1) by swaging the post (22) on the base (11, 51) of the male snap button (10, 50) after the post (22) has passed through the fabric (1) and then the mounting opening (13, 53), wherein the male snap button (10, 50) includes a cylindrical protrusion (14, 54) protruding around the mounting opening (13, 53) of the base (11, 51), the protrusion (14, 54) being to be deformed together with the post (22) as the post (22) is being swaged.
3. A male snap button structure comprising a male snap button (10, 50) and a button fastener (20) for use in mounting the male snap button (10, 50) to a fabric (1), wherein the male snap button (10, 50) comprises an almost disk-like base (11, 51), a projection (12, 52) projecting from the base (11, 51) to engage with a projection-receiving space (75) of a female snap button (70), a mounting opening (13, 53) formed in a center area of the base (11, 51), and a cylindrical protrusion (14, 54) protruding around the mounting opening (13, 53) of the base, wherein the button fastener (20) comprises a base (21) and a post (22) projecting from the base (21), the post (22) being to be swaged on the base (11, 51) of the male snap button after the post (22) has passed through the fabric (1) and then the mounting opening (13, 53) at the time of mounting the male snap button (10, 50) to the fabric (1), wherein, in a state where the post (22) is swaged, the protrusion (14, 54) is compressed between the swaged post (22) and the base (11, 51).
4. A method for mounting a female snap button (70) to a fabric (1) using a button fastener (20) having a post (21), the female snap button (70) comprising an almost disk-like base (71), a periphery side (72) projecting from the base (71) and defining a projection-receiving space (75) to receive a projection (12, 52) of a male snap button (10, 50), a mounting opening (73) formed in a center area of the base (71), and a cylindrical protrusion (74) protruding around the mounting opening (73) of the base (71), the method comprising the steps of:
 - passing the post (22) of the button fastener (20) through the fabric (1) and then the mounting opening (73) of the female snap button (70); and
 - swaging the post (22), which has passed through the fabric (1) and the mounting opening (73), on the base (71) while compressing the protrusion (74) between the post (22) as being swaged and the base (71).
5. A female snap button (70), which includes an almost disk-like base (71), a periphery side (72) projecting from the base (71) and defining a projection-receiving space (75) to receive a projection (12, 52) of a male snap button (10, 50), a mounting opening (73) formed in a center area of the base (71) to pass a post (22) of a button fastener (20) therethrough, the female snap button (70) being to be mounted to a fabric (1) by swaging the post (22) on the base (71) after the post (22) has passed through the fabric (1) and then the mounting opening (73), wherein the female snap button (70) includes a cylindrical protrusion (74) protruding around the mounting opening (73) of the base (71), the protrusion (74) being to be deformed together with the post (22) as the post (22) is being swaged.
6. A female snap button structure comprising a female snap button (70) and a button fastener (20) for use in mounting the female snap button (70) to a fabric (1), wherein the female snap button (70) comprises an almost disk-like base (71), a periphery side (72) projecting from the base (71) and defining a projection-receiving space (75) to receive a projection (12, 52) of a male snap button (10, 50), a mounting opening (73) formed in a center area of the base (71), and a cylindrical protrusion (74) protruding around the mounting opening (73) of the base (71), wherein the button fastener (20) comprises a base (21) and a post (22) projecting from the base (21),

the post (22) being to be swaged on the base (71) of the female snap button (70) after the post (22) has passed through the fabric (1) and then the mounting opening (73) at the time of mounting the female snap button (70) to the fabric (1),
wherein, in a state where the post (22) is swaged, the protrusion (74) is compressed between the swaged post (22) and the base (71).

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Fig. 1

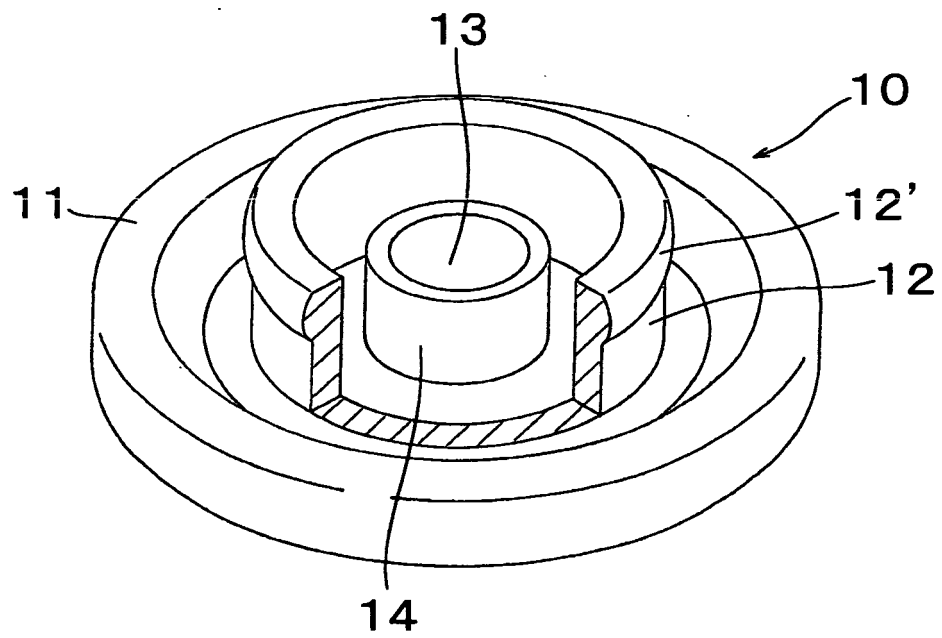


Fig. 2

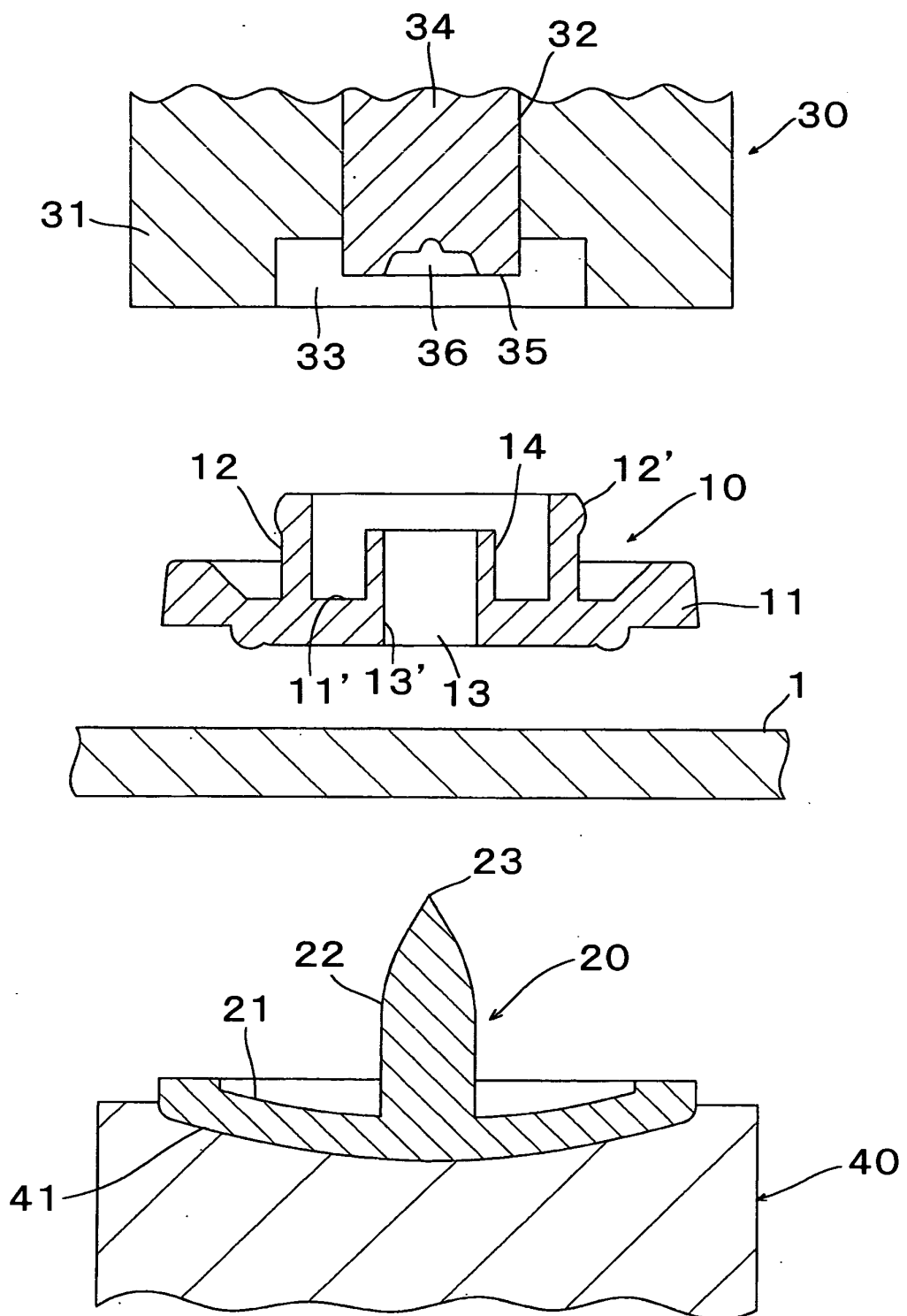


Fig. 3

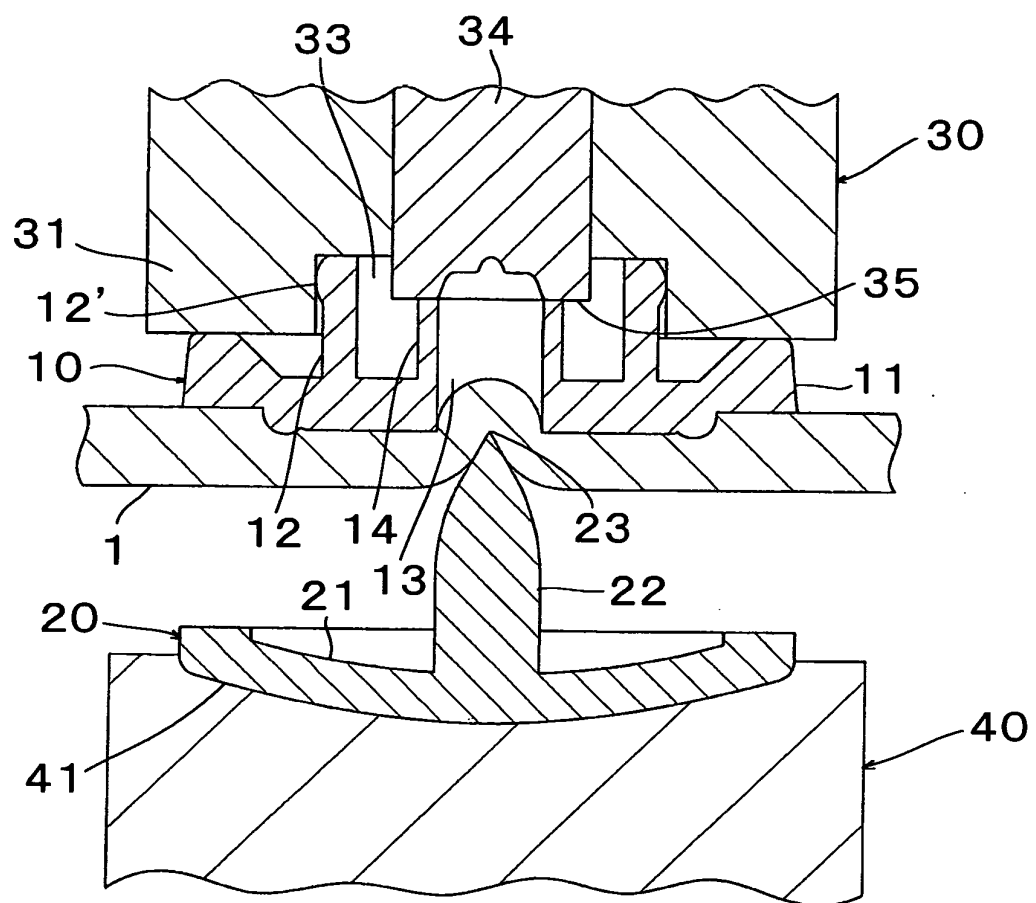


Fig. 4

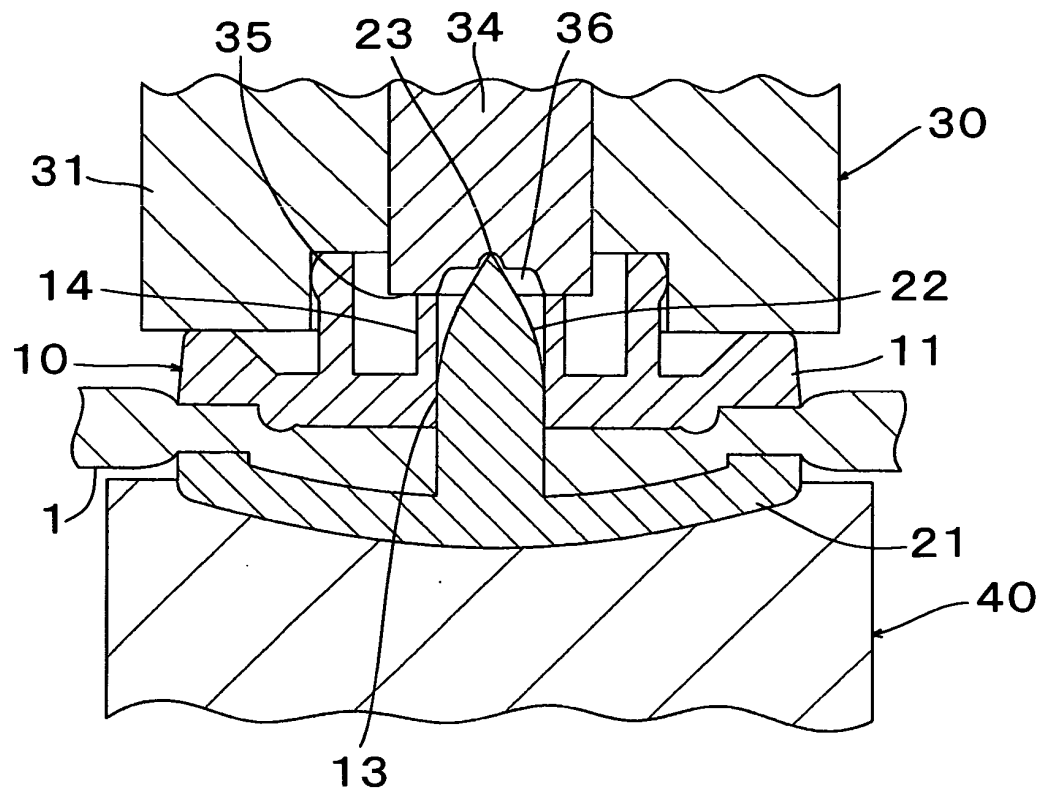


Fig. 5

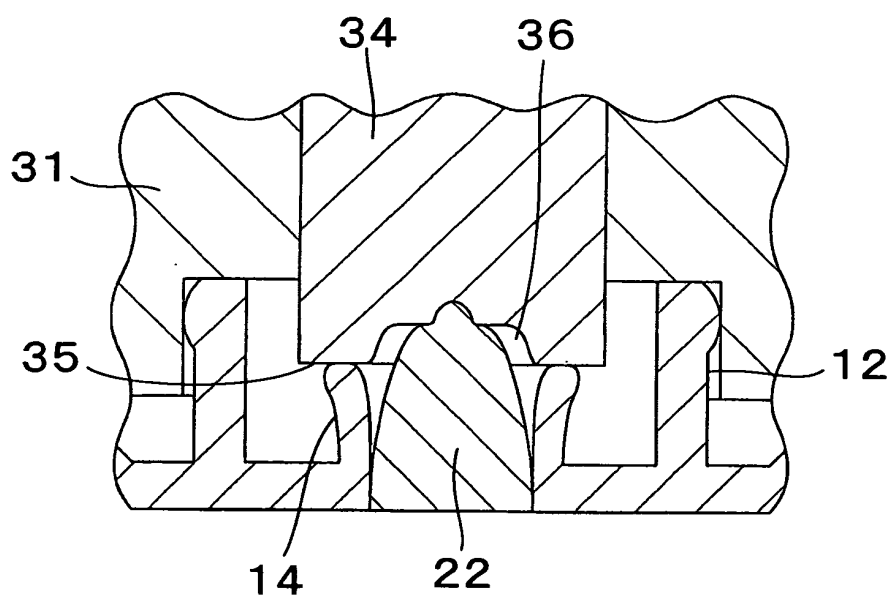


Fig. 6

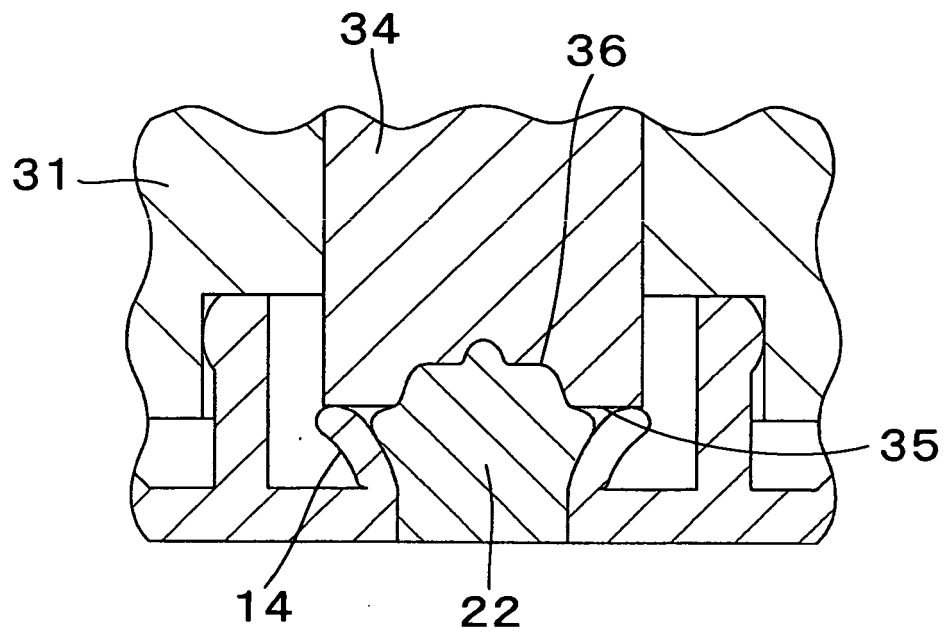


Fig. 7

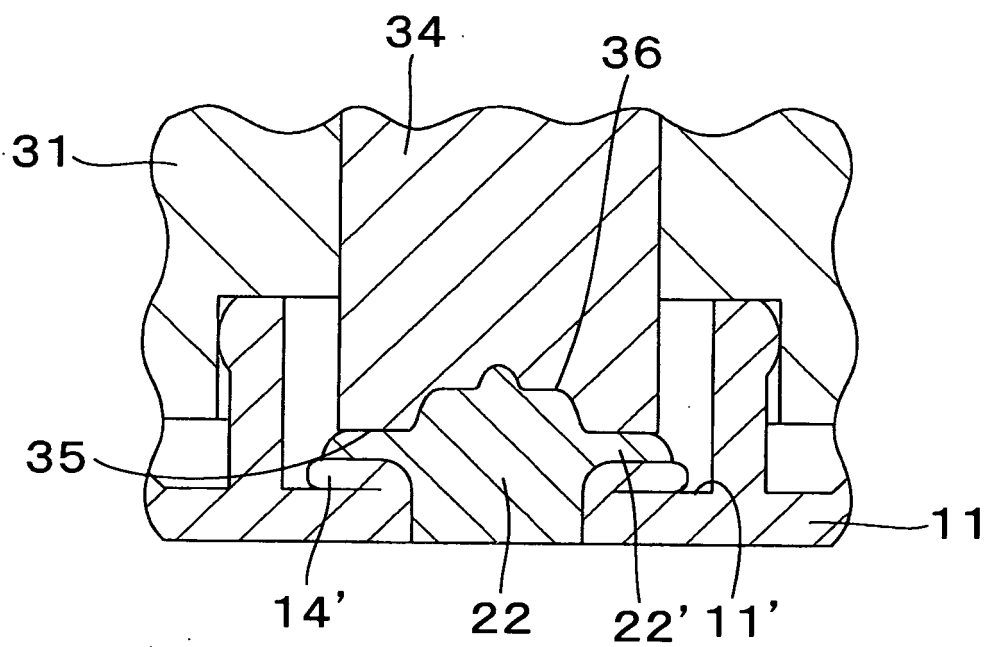


Fig. 8

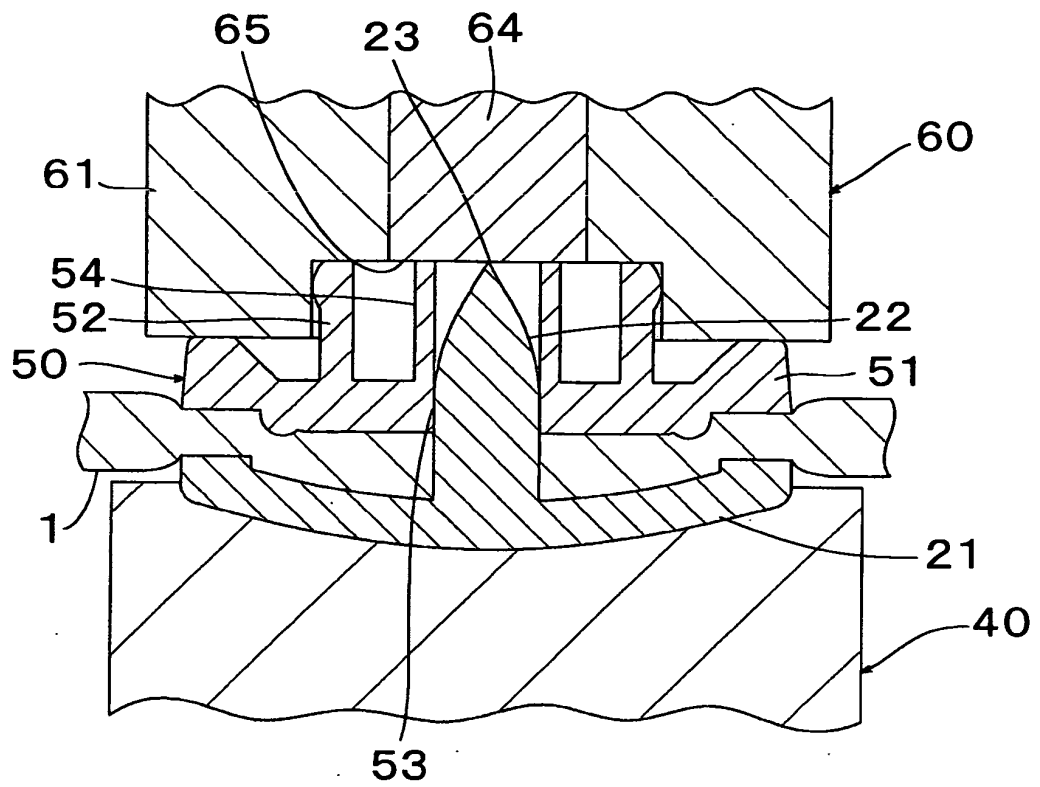


Fig. 9

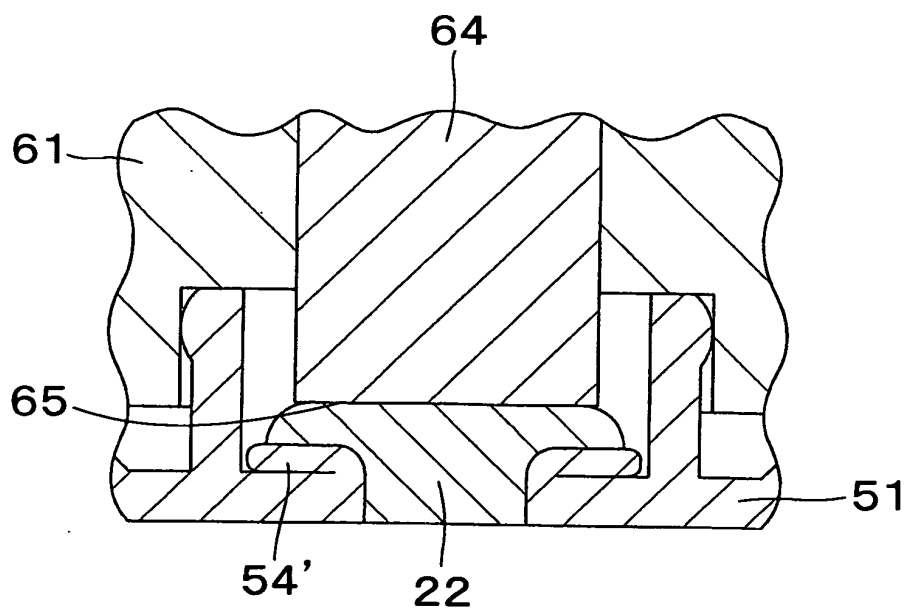


Fig. 10

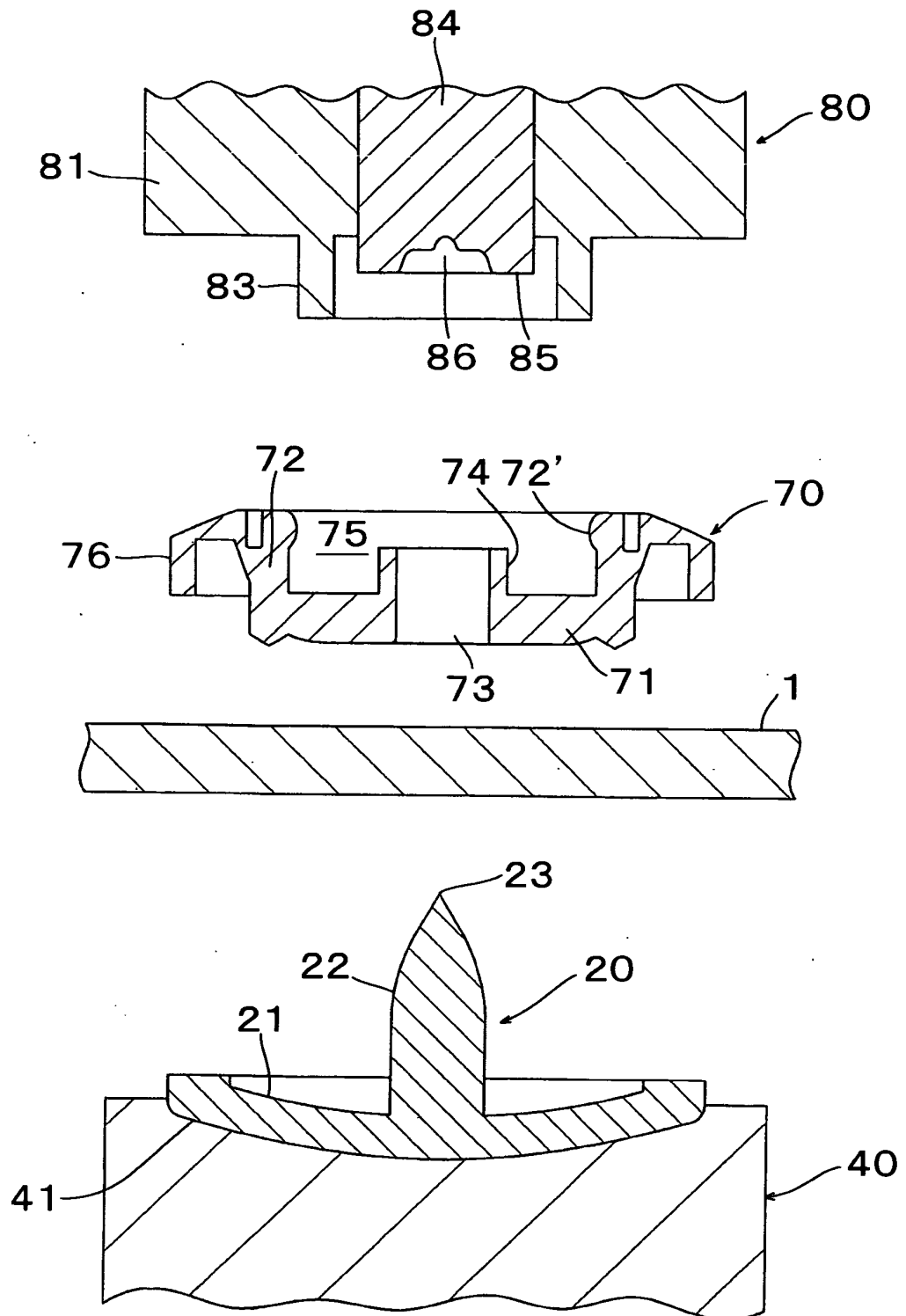
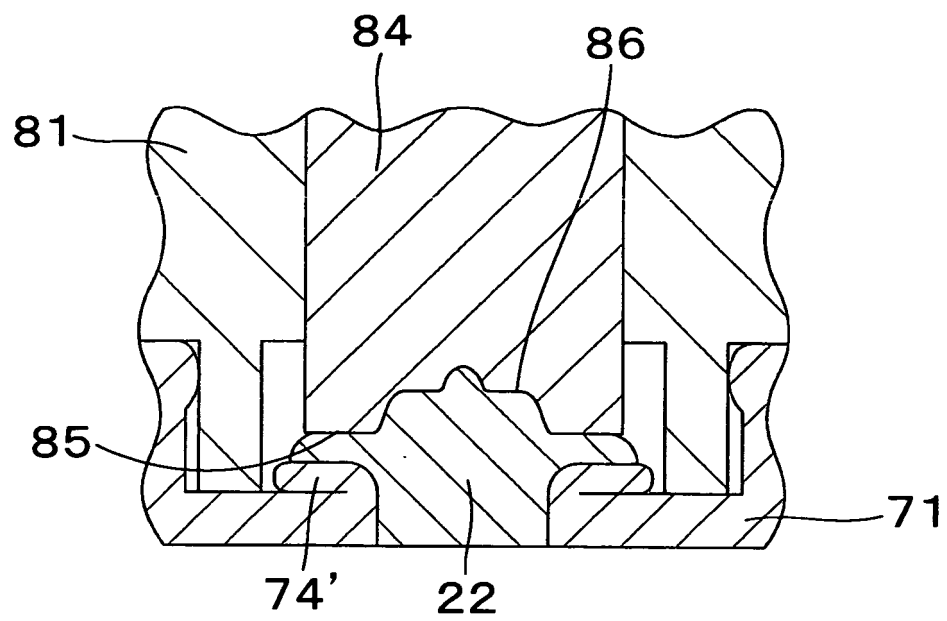


Fig. 11



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/071673

A. CLASSIFICATION OF SUBJECT MATTER

A44B17/00(2006.01)i, A44B1/18(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)

A44B17/00, A44B1/18

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2010
 Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 137882/1979(Laid-open No. 53911/1981) (Sei TAKEDA), 12 May 1981 (12.05.1981), claims; specification, page 3, line 19 to page 5, line 13; fig. 2 to 3 (Family: none)	1-6
A	JP 11-32816 A (Sei TAKEDA), 09 February 1999 (09.02.1999), paragraph [0014]; fig. 1, 4 to 5 (Family: none)	1-6

☒ 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
24 March, 2010 (24.03.10)Date of mailing of the international search report
06 April, 2010 (06.04.10)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/071673

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 11-32815 A (YKK Corp.), 09 February 1999 (09.02.1999), paragraphs [0062] to [0064]; fig. 15 to 17 & US 5933929 A & EP 891723 A2	1-6
A	JP 10-229906 A (Sei TAKEDA), 02 September 1998 (02.09.1998), claims; paragraphs [0013] to [0016]; fig. 1 to 6 (Family: none)	1-6
A	JP 2004-201999 A (Sei TAKEDA), 22 July 2004 (22.07.2004), claims; fig. 1 to 6 (Family: none)	1-6
A	US 2018105 A (The Patent Button Co.), 22 October 1935 (22.10.1935), page 2, left column, lines 44 to 63; fig. 1 to 2 (Family: none)	1-6

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP H111812 A [0003] [0004]