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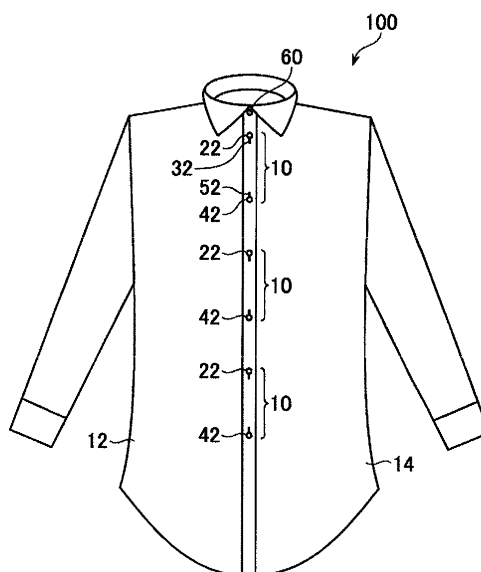
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(54) **BUTTON AND BUTTON HOLE STRUCTURE**

(57) A button and buttonhole structure is configured so that parts linking each of a pair of buttons and a section of fabric on one side are positioned at the distal ends or proximal ends of a pair of buttonholes provided to a section of fabric on the other side. Therefore, when the buttons are buttoned, it is possible to have the buttons move

less, relative to the buttonholes, than in the past, and the buttons can stay buttoned more stably. As a result, the buttons are less likely to come undone inadvertently, and increasing the size of the buttonholes facilitates buttoning and unbuttoning of the buttons.

FIG. 1



Description

Technical field

[0001] The present invention relates to a button applied to clothing and the like, more specifically, a button and buttonhole structure wherein both sections are buttoned to each other by fastening the button attached to one section of a fabric through the buttonhole provided to the other section of the fabric (hereinafter sometimes simply referred to as "buttonhole type").

Background of the invention

[0002] It has been conventionally done to button a pair of sections of a fabric wherein each section is separated from each other such as front opening parts of coats or sides of boots. One of the most widely used buttons among the above buttons is a buttonhole type which can button both sections by fastening the button attached to one section of the fabric through the buttonhole provided to the other section of the fabric. When buttoning or unbuttoning using with the buttonhole type, the button has to be passed through the buttonhole. This operation is not easy for an infant. Also, it is not easy for a senior when a button is small. Additionally, it is difficult when fingers do not move as operator wants, such as when the operator wears gloves or the hand is numb with cold.

[0003] To simplify buttoning and unbuttoning, it is simply considered that a size of the buttonhole is extended. In this case, however, since the button could be undone suddenly, it is hard to exhibit a function as the button which buttons a pair of the sections of the fabric. The structure except the buttonhole type is developed under such circumstances. For example, cloths which allow even infants and seniors to simplify fastening a pair of sections of the cloth have been invented as follows:

[0004]

Patent document 1

Publication of Japanese Utility Model Application No. 1989-157101

Patent document 2

Publication of Japanese Utility Model Registration No. 3175405

[0005] A shirt having hook and loop fasteners which are attached to opposite surfaces of a pair of overlapping parts thereof and fasten the overlapping parts is disclosed in patent document 1.

[0006] A shirt having snap-buttons which are attached to a plurality of a pair of overlapping parts is disclosed in patent document 2.

[0007] Patent document 1 and 2 show that a pair of sections of a fabric can be fastened by mutually pressing the hook and loop fasteners and by fitting a convex part of the snap button into a concave part thereof. Therefore, a pair of sections of a fabric can be easily fastened com-

pared with the conventional buttonhole type. Also, according to patent document 1 and 2, since the hook and loop fasteners and snap buttons can be easily undone by pulling the sections in the opposite directions, a latching fabric can be relatively easily separated.

Summary of the invention

[0008] The buttonhole type is, however, still the most popular and is used for most clothing and the like. This tendency is quite significant in the field of shirt or the like. It is considered that the reason why a buttonhole type is not completely replaced with a hook and loop fastener and a snap button as follows.

[0009] Firstly, there is a problem of a cost. Since the material cost for the hook and loop fastener and the snap button is higher than that cost for the buttonhole type which needs simply the button cost, it is a burden on the manufacturers.

[0010] Secondly, there is a problem that it is unacceptable to users. Especially, elderly people have difficulty changing the buttonhole type to the hook and loop fastener or the snap button, since they are used to buttoning through a buttonhole.

[0011] On the other hand, there are some advantages in buttonhole type. For example, the brain is activated by using fingers while buttoning or unbuttoning. Particularly, it is said that brain development in early childhood is accelerated by buttoning and unbuttoning.

[0012] In light of the aforementioned conventional technical problem, the present invention aims to provide a button and buttonhole which can facilitate buttoning and unbuttoning of the buttons and are not easily undone inadvertently.

[0013] The above-described problems are solved by a button and buttonhole structure having a button attached to a section of fabric on one side and a buttonhole provided on a section of fabric on the other side for passing the button comprising:

at least one pair of said buttons and buttonholes, wherein a distal end and a proximal end are respectively provided in said pair of the buttonholes, wherein parts linking each of the pair of the buttons with the sections of the fabric on one side are configured so as to be positioned at the distal ends or the proximal ends respectively.

[0014] According to the present invention, since a button and buttonhole structure is configured so that parts linking each of a pair of buttons with a section of fabric on one side are positioned at the distal ends or proximal ends of a pair of buttonholes provided to a section of fabric on the other side, when the buttons are buttoned, it is possible to have the buttons move less, relative to the buttonholes, than that of the conventional configuration. Thus, a latching state of the button can be stabilized, it can be prevented that the buttons are less likely to come

undone through the buttonholes inadvertently. On the other hand, when a size of the buttonhole is increase, it becomes easier to button and unbutton.

[0015] In addition, when one button of the pair of the buttons and one buttonhole of the pair of the buttonholes are arranged in an orthogonal direction to a movement direction of the both sections of fabric when the other button of the pair of the buttons is buttoned into the other buttonhole of the pair of the buttonholes and the buttonhole is cut linearly in the orthogonal direction, it is easy to control the movement of the button with respect to the buttonhole and a comparatively larger area where the button is buttoned to the other section of the fabric can be ensured. Therefore, the configuration having large buttonholes in which it is easy to button and unbutton and the buttons are not easily undone inadvertently is easily provided.

[0016] Furthermore, when either the distal end or proximal end of the buttonhole is bent in the lateral direction, it is easier to button and unbutton compared with the buttonholes having straight line shapes only as the buttons may be more easily passed through the buttonholes.

[0017] Also, even if the buttonhole is formed of two or more straight line shapes, curved shapes or shapes of other figures, it is easy to button and unbutton compared with the buttonholes having only a straight line.

Brief description of drawings

[0018]

FIG. 1 is a front view of a shirt with a button and buttonhole structure of the first embodiment of the present invention.

FIG. 2 is an enlarged view of a main part of the first embodiment of the present invention when buttoning.

FIG. 3 is a front view of some placement examples of a button and buttonhole structure of the first embodiment of the present invention.

FIG. 4 is an enlarged view of a main part of the second embodiment of the present invention when buttoning.

FIG. 5 is an enlarged view of a main part of the third embodiment of the present invention when buttoning.

FIG. 6 is a front view of a variety of the shapes of the buttonhole of the embodiments from the 4th to 21st of the present invention.

FIG. 7 is a front view of a shirt with a button and buttonhole structure of the 22nd embodiment of the present invention.

Description of the embodiments

[0019] Different embodiments of the present invention are described with reference to FIGS. 1 to 7. The present invention, however, is not limited to these embodiments.

[0020] FIG. 1 shows a shirt 100 with a button and buttonhole structure (hereinafter simply referred to as "button structure") 10 of the first embodiment of the present invention. Buttons 22, 42 and 60 are attached to one section of a fabric 12 of the shirt 100. The buttons 22, 42 and 60 are passed through buttonholes 32, 42 (An illustration of the buttonhole of the top (first) button 60 is omitted.) which are provided on the other section of the fabric 14 of the shirt 100 so that the buttons 22, 42 and 60 are buttoned into the other section of the fabric 14, namely, both sections of the fabric 12 and 14 are fastened. The shirt 100 has the first button 60 near the collar and three pairs of the button structure 10 under the top of the second button 22. One section of the fabric 12 and the other section of the fabric 14 are connected with each other in the shirt 100, but the present invention can be applied for a button and buttonhole structure provided on a pair of sections of separate fabrics. In addition, just one pair of the button structure 10 functions adequately, but multiple pairs thereof can be provided as the present embodiment.

[0021] An enlarged view of a main part of the button structure 10 is shown in FIG. 2. As shown in FIG. 2, the button structure 10 comprises a pair of the buttons 22, 42 and a pair of the buttonholes 32, 52. The buttons 22, 42 of button structure 10 have circular shapes, and the buttonholes 32, 52 are cut linearly in the orthogonal direction (Y-direction) relative to the lateral direction (X-direction), that is the direction of movement of both fabrics 12, 14 when one intends to pass the button 22 through the buttonhole 32. The X-direction is typically identical with that of the width of a human body. The Y-direction is typically identical with that of the height of a human body. For convenience, the width of the buttonholes is shown with exaggeration in FIG. 2, which is also the case with FIGS. 3 to 7.

[0022] The buttonholes 32, 52 are cut linearly in the Y-direction, and distal ends 34, 54 and proximal ends 36, 56 are respectively provided in the Y-direction. Furthermore, linking parts 24, 44 where the buttons 22, 42 are connected to one section of the fabric 12 are configured so as to be positioned at the distal ends 34, 54 when the buttons 22, 42 are buttoned. The button structure 10 is configured so that the linking parts 24, 44 are positioned at the distal ends 34, 54 at the time of non-wearing of the shirt 100, but the button structure 10 may also be configured so that the linking parts 24, 44 are positioned at the distal ends 34, 54 at the time of wearing of the shirt 100. The linking parts 24, 44 are typically formed of threads for connecting the buttons 22, 42 and the one section of the fabric 12, but linking parts can be formed of parts of the buttons 22, 24, such as metal fastening parts of covered buttons.

[0023] According to the above configuration, even if the buttons 22, 42 are moved to the upward direction in FIG. 2, the button 22 cannot be moved thereto from the distal end 34 of buttonhole 32. Therefore, the button 42 which is attached to the same fabric 12 as the button 22

is also hardly moved thereto.

[0024] Also, even if the buttons 22, 42 are moved to the downward direction in FIG. 2, the button 42 cannot be moved thereto from the proximal end 54 of buttonhole 32. Therefore, the button 22 which is attached to the same fabric 12 as the button 42 is also hardly moved thereto. As a result, it is possible to have the buttons 22, 42 move less relative to the buttonholes 32, 52 so that the buttons 22, 42 can stay buttoned more stably. Thereby, the button structure in which the buttons are not easily undone inadvertently compared with the conventional buttonhole type can be provided.

[0025] In consideration of the thickness of the button and/or the correlations with other buttonholes, and the like, it is sufficient that the buttonhole according to the present invention has the size capable of passing the button. When the size of the buttonhole in the longitudinal direction (Y-direction) is almost as same as that of the button in the same direction, the button structure in which the buttons are not easily undone inadvertently compared with the conventional buttonhole type can be provided as described above. On the other hand, the size of the buttonhole in the longitudinal direction (Y-direction) can be more increasingly than that of the diameter of the buttons 22, 42 (approximately 1.2 times) such as the buttonholes 32, 52 of the button structure 10. Thereby, it becomes easy to pass the button 22, 42 through the buttonholes 32, 52, namely, the button structure facilitating buttoning and unbuttoning compared with the conventional structure can be provided. According to the button structure 10, both functions of facilitating buttoning and unbuttoning and being not easily undone inadvertently are realized. The more the size of the buttonhole is increased, the easier the button is buttoned and unbuttoned, but the size of the buttonhole can be arranged according to the purpose of use.

[0026] Button structure 10 can be applied even if a plurality of the button structures 10 are aligned in the different arrangement manners as shown in FIG. 3. The X-direction and the Y-direction in FIG. 3-7 are identical with those in FIG. 2. For example, as shown in FIG. 3(a) and similarly to the shirt 100 (See FIG. 1.), it is possible to include a button 62 which does not constitute the button structure 10 and a plurality of the button structures 10 to follow the button 62. When the buttons 22, 42 and the buttonholes 32, 52 of the button structure 10 are adjacent to each other, the distortion of the fabric which is produced by buttoning the buttons 22, 42 into the buttonholes 32, 52 can be suppressed. On the other hand, as shown in FIG. 3(b), it is also possible to include a plurality of the button structure 10 which are aligned around the button 64 which does not constitute the button structure 10. In short, it is not necessary that the buttons 22, 42 and the buttonholes 32, 52 of the button structure 10 are adjacent to each other.

[0027] FIG. 4 shows a button structure 10a of the second embodiment of the present invention. Since the basic structure of the button structure 10a is similar to the but-

ton structure 10, different points will be described below.

[0028] In the button structure 10a, similarly to the button structure 10, the buttonholes 32a, 52a are cut linearly in the Y-direction. In the buttonholes 32a, 52a, however, the distal ends, 34, 54, where the linking parts 24, 44 linking the buttons 22, 42 with the one section of the fabric 12 are positioned, are bent in the lateral direction (the left direction in FIG. 4) so that hooking parts 38, 58 are formed.

[0029] When buttoning the buttons 22, 42 of structure 10a, the parts 24, 44 can be caught on the hooking parts 38, 58 as illustrated. Thereby, it becomes more difficult to move the buttons 22, 42 to the Y-direction and it is possible to securely prevent the buttons 22, 42 from being undone inadvertently compared with the button structure 10. Furthermore, since the extent of the buttonholes 32a, 42a through which the buttons 22, 42 are passed become larger than that of the buttonholes 32, 52 with the straight line shape such as the button structure 10, it is also possible to facilitate buttoning and unbuttoning.

[0030] As shown in FIG. 5, a button structure 10b can be configured so that the linking parts 24, 44 linking the buttons 22, 42 with the one section of the fabric 12 are positioned at the proximal ends 36b, 56b of the buttonholes 32b, 52b respectively when buttoning the buttons 22, 42. The button structure 10b can perform similar effects to those of the button structure 10. In addition, though illustrations are omitted, hook parts similar to the hooking parts 38, 58 of the button structure 10a can be provided with the proximal ends 36b, 56b of the button structure 10b.

[0031] FIG. 6 shows different variations of the buttonhole which can be applied to the present invention. The buttonholes in FIG. (a) to (g) have two or more straight line shapes. The distal ends 36c, 56c of the button structure 10c in FIG. 6 (a) in which the linking parts 24, 44 of the buttons 22, 42 are not positioned are bent in the right direction in FIG. 6 (a). Therefore, the buttonholes 32c, 52c are cut linearly in the Y-direction and are also cut linearly in the X-direction. Since this allows the extent of the buttonholes 32a, 42a through which the buttons 22, 42 are passed to become larger, it facilitates buttoning and unbuttoning. In order to obtain this effect, the proximal end or the distal end, regardless of existence of the linking part of the button, can be bent in either direction, right or left. Also, the proximal end or the distal end can be bent into a curved shape such as the proximal ends 36d, 56d of the button structure 10d in FIG. 6 (b).

[0032] Also, in order to increase the extent of the buttonhole passing the button, the shape of the buttonhole can be T-shaped such as the buttonholes 32e, 52e in FIG. 6 (c) or the buttonholes 32f, 52f in FIG. 6 (d). In addition, the buttonhole can be formed in cross-shaped as shown in FIG. 6 (e), (f) or Y-shaped as shown in FIG. 6 (g).

[0033] On the other hand, it is not necessary that the buttonhole which can be applied to the present invention always needs to be cut linearly in the Y-direction. For

example, the shapes of the buttonhole can be a V-shaped such as buttonholes 32j, 52j in FIG. 6 (h) or a curved shape such as buttonhole 32k, 52k in FIG. 6 (i) (the button structure 10k has a U-shaped.). As shown in FIG. 6 (j), the buttonhole can be the buttonhole 321, 521 having a straight line shape inclined to the Y-direction.

[0034] According to the buttonholes 32j, 32k as shown in FIGS. 6 (h), (j), it is easy to pass the button 22 through the buttonhole 32j, 32k, because the shape of the buttonhole changes to the shape similar to that of the buttonhole 52m due to the segments 31, 31a being folded when buttoning or unbuttoning.

[0035] Also, as shown in FIG. 6 (k) to (r), the extent of the buttonhole passing a button can be increased by forming the buttonhole into other differently figured shapes. In that case, the size of the buttonhole is determined in consideration of the thickness of the button and/or the correlations with other buttonholes, and the like. Also, as is shown in FIG. 6 (q), (r), the pairs of buttonholes 32r, 52r, 32t, 52t do not need to be symmetric in the shapes. This is also the case with the buttonholes of straight shapes or curved shapes.

[0036] In the foregoing description, the embodiments in which the button and buttonhole are provided in the Y-direction; but the present invention can also apply to a pair of the buttons 22, 42 and the buttonholes 32u, 52u arranged in the X-direction, such as, a coat 100a with a button line of the double-breasted coat of FIG. 7. The specific explanation is omitted because its function is similar to that of the button structure 10; but the buttonholes 32u, 52u are cut linearly in the X-direction, and a distal end and a proximal end are provided in that direction, though not illustrated. And, in the case of the button structure 10u, the linking parts (not shown) of the buttons 22, 42 with one fabric 12a are configured to be positioned at the distal ends of the respective buttonholes 32u, 52u. It goes without saying that the shapes of the buttonholes 32u, 52u can assume other shapes than those described above.

[0037] The present invention can be applied to a pair of buttonholes in which the proximal ends as well as the distal ends are respectively provided; and the direction of arrangement of a pair of buttons is not limited to the X-direction and the Y-direction. The proximal ends and the distal ends may not be necessarily the ends of the buttonholes themselves; those ends may be formed as result, for example, of threading a part of the buttonhole. Also, the present invention can apply regardless of the shapes of button themselves and the size of the buttonhole can be determined appropriately considering the shapes, the sizes of the buttons, and the like.

[0038] The button and the buttonhole structure of the present invention is applicable to other button arrangements than the button arrangement disposed in the front center, such as, those of shirts. Also, it is applicable to boots, hats, as well as bags, so long as a pair of button and buttonhole may be provided.

[0039] As described above, according to the present

invention, a button and buttonhole structure which facilitates buttoning and unbuttoning, and is less likely to come undone inadvertently can be provided.

5 Explanation of references

[0040]

- 10 button and buttonhole structure
- 12 one section of fabric (the button side)
- 14 another section of fabric (the buttonhole side)
- 22, 42 button
- 24, 44 linking part
- 32, 52 buttonhole
- 34, 54 distal end
- 36, 56 proximal end

Claims

1. A button and buttonhole structure having a button attached to a section of fabric on one side and a buttonhole provided on a section of fabric on the other side for passing the button comprising:
 - at least one pair of said buttons and buttonholes, wherein a distal end and a proximal end are respectively provided in said pair of the buttonholes,
 - wherein parts linking each of the pair of the buttons the sections of the fabric on one side are configured so as to be positioned at the distal ends or the proximal ends respectively.
2. The button and buttonhole structure according to claim 1, wherein said pairs of buttons and buttonholes are arranged orthogonally relative to the direction of movement of said sections of the fabric; and said buttonholes have linear cuts in said orthogonal direction.
3. The button and buttonhole structure according to claim 2, wherein either distal end or proximal end of said buttonholes is bent in said direction of movement.
4. The button and buttonhole structure according to claim 1, wherein said buttonholes are formed of two or more linear cuts, curved cuts or shapes of figures.

FIG. 1

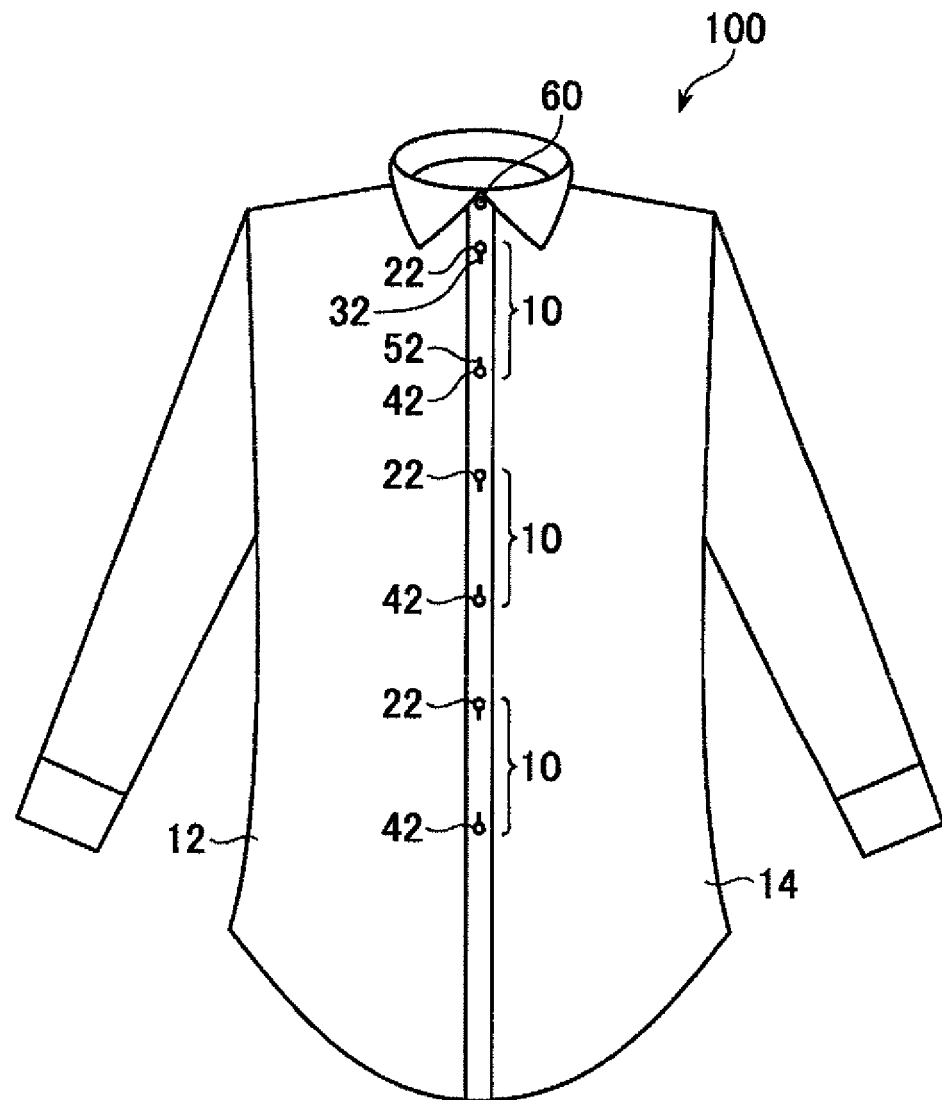


FIG. 2

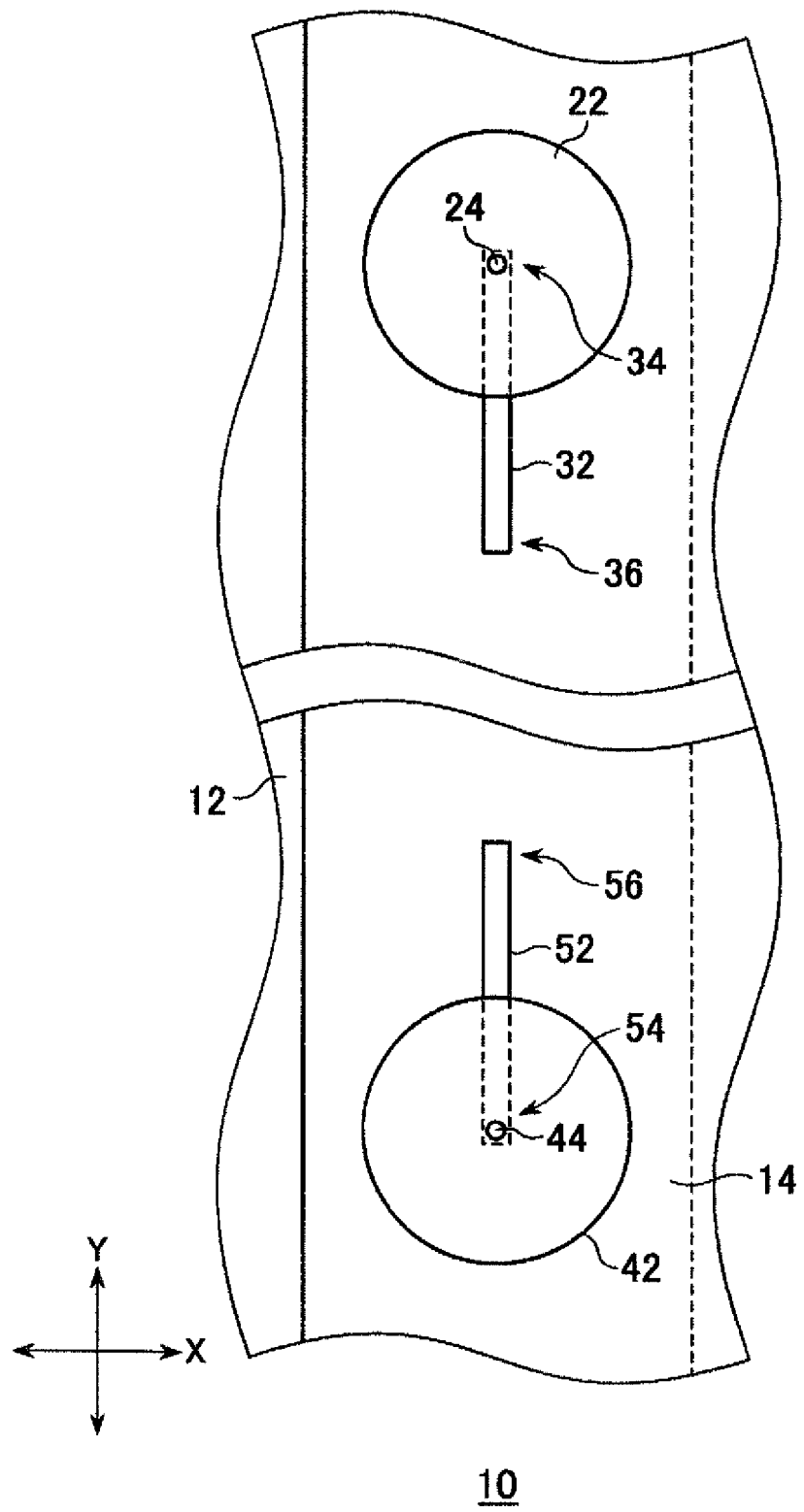


FIG. 3

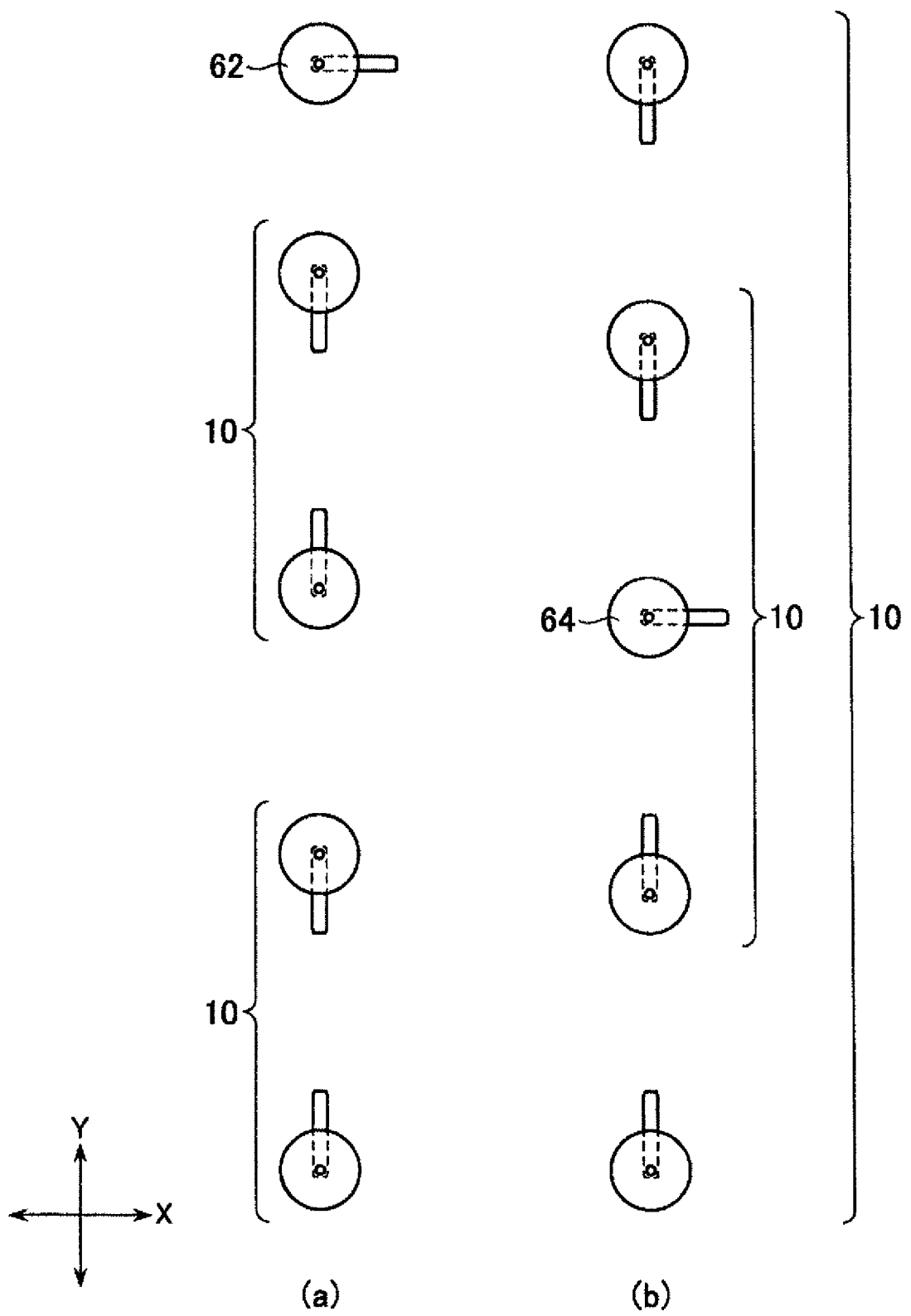


FIG. 4

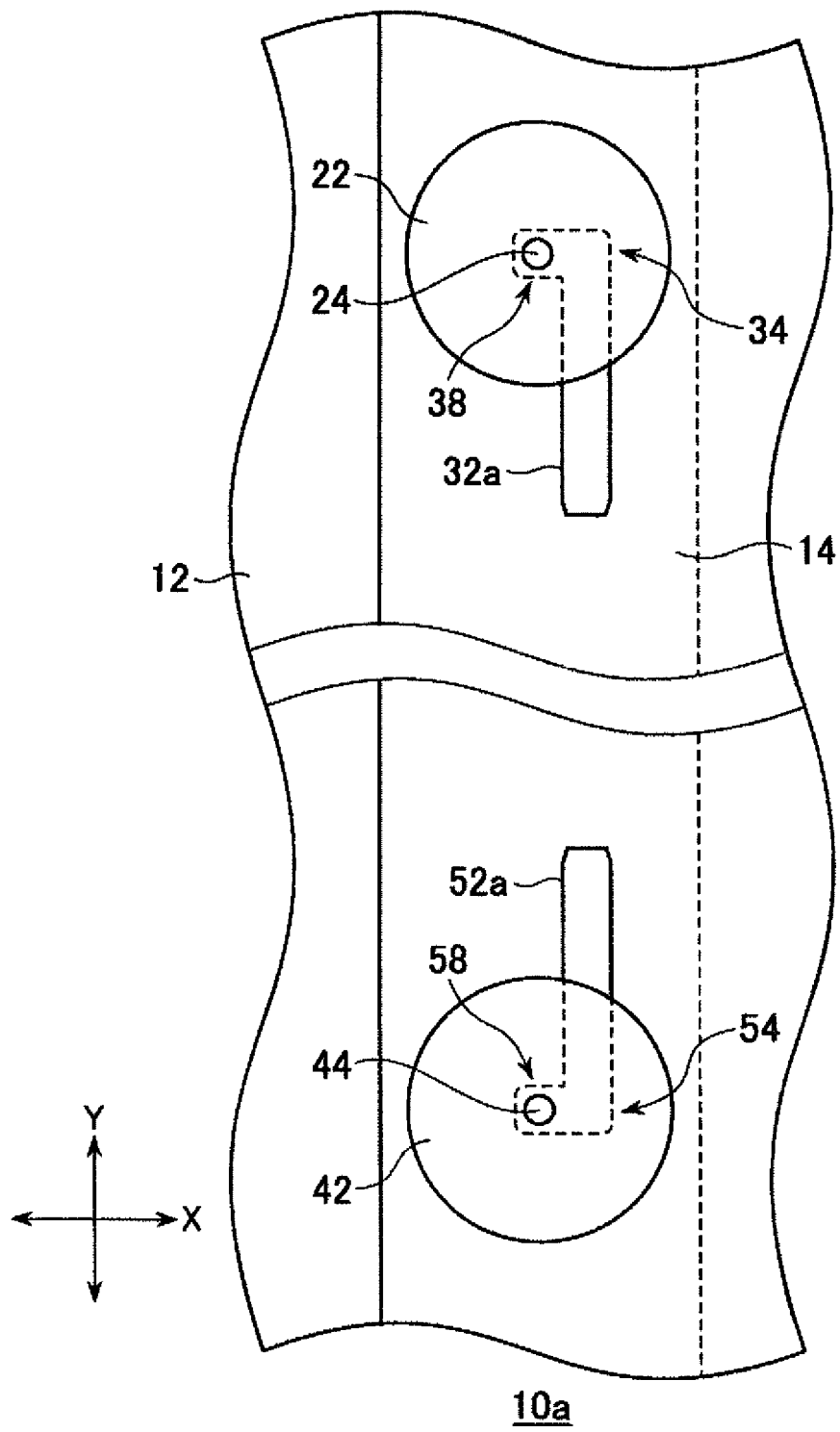


FIG. 5

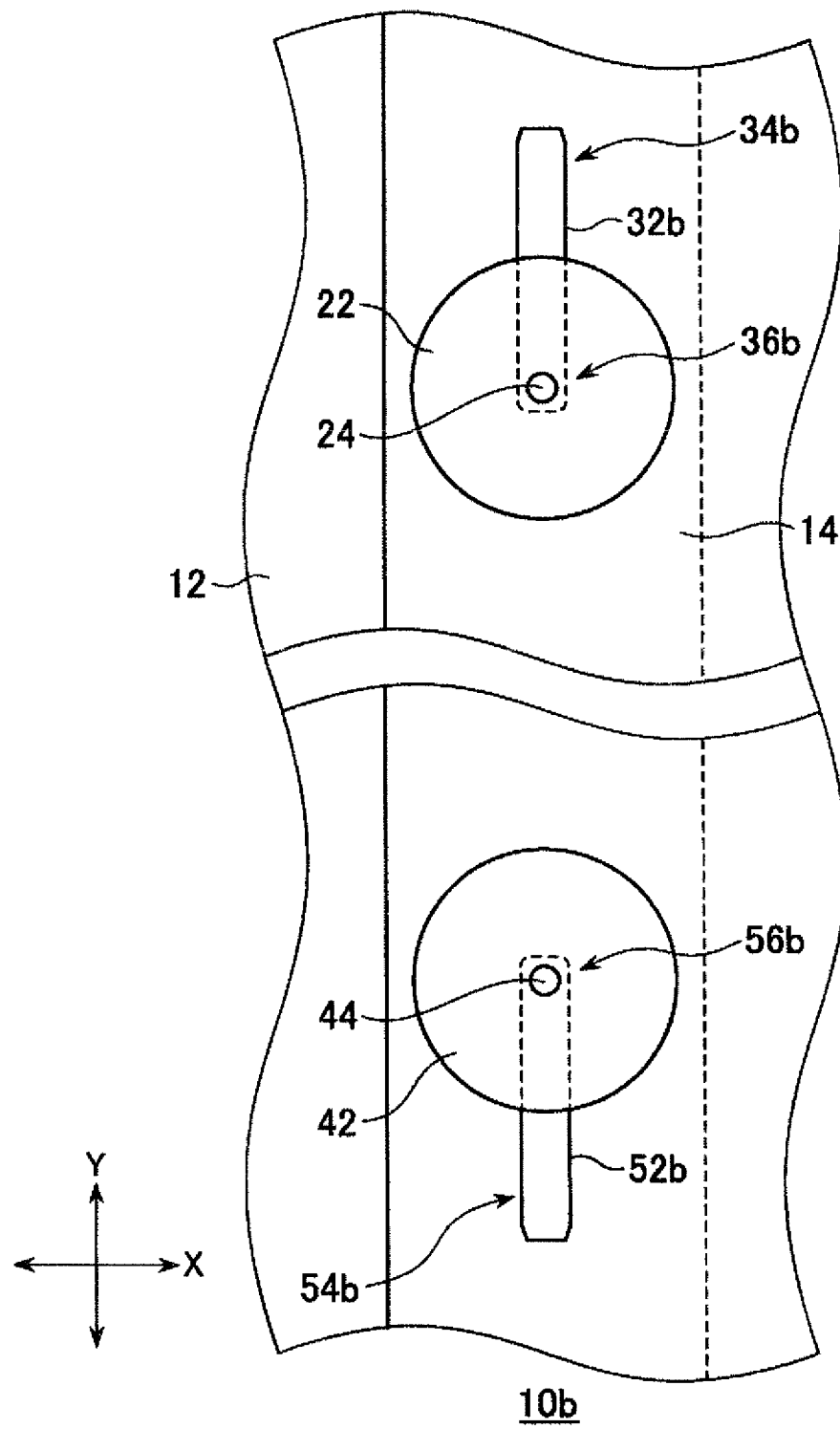


FIG. 6

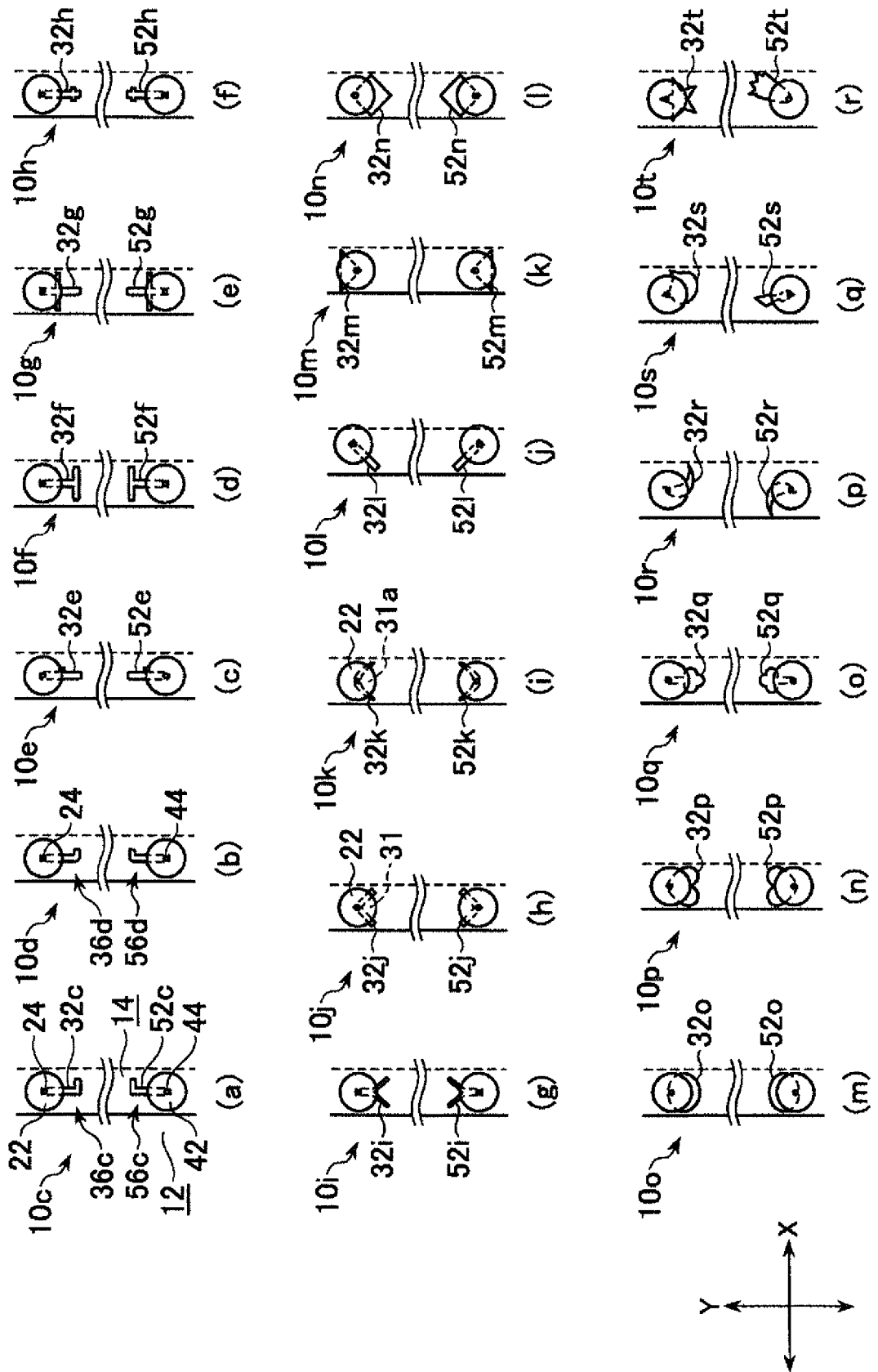
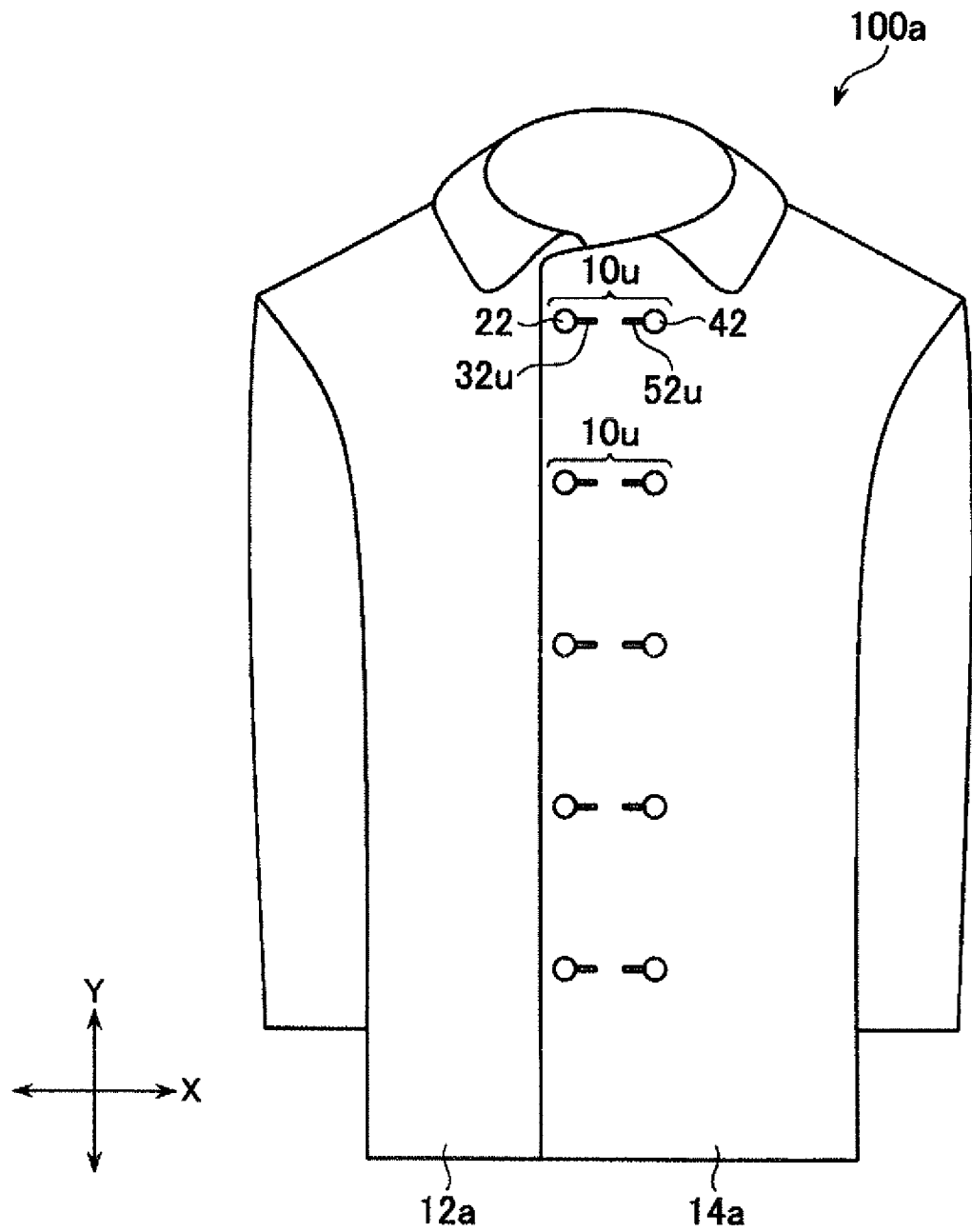


FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/072754

A. CLASSIFICATION OF SUBJECT MATTER

A41H37/10(2006.01)i, A41F1/02(2006.01)i, A44B1/00(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)

A41H37/10, A41F1/02, A44B1/00

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 1996-2016

Kokai Jitsuyo Shinan Koho 1971-2016 Toroku Jitsuyo Shinan Koho 1994-2016

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2004-115934 A (Gakko Hojin Taisho Gakuen), 15 April 2004 (15.04.2004), paragraphs [0014] to [0016]; fig. 1, 5 to 6, 9 (Family: none)	1-4
X	JP 3117303 U (Yugen Kaisha Urukubo Hosei), 05 January 2006 (05.01.2006), paragraph [0010]; fig. 1 to 2 (Family: none)	1, 4

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

* Special categories of cited documents:

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Date of the actual completion of the international search
26 October 2016 (26.10.16)Date of mailing of the international search report
08 November 2016 (08.11.16)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/072754

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2001-505453 A (Kimberly-Clark Worldwide, Inc.), 24 April 2001 (24.04.2001), page 21, lines 4 to 10; fig. 4 & US 6585713 B1 column 10, lines 55 to 63; fig. 4 & WO 1998/020824 A1 & EP 951264 A1 & AU 5104898 A & CA 2269678 A	1-2 3-4

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 1157101 A [0004]
- JP 3175405 B [0004]