



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.05.2017 Bulletin 2017/19

(51) Int Cl.:
A44B 19/06 (2006.01)
A44B 19/34 (2006.01)
A44B 19/32 (2006.01)

(21) Application number: **16194929.2**

(22) Date of filing: **20.10.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **Unitech Zipper & Machinery Co., Ltd.**
New Taipei City (TW)

(72) Inventor: **Cheng, Jung-Yuan**
New Taipei City (TW)

(74) Representative: **Lang, Christian**
LangPatent Anwaltskanzlei
IP Law Firm
Rosenheimer Straße 139
81671 München (DE)

(30) Priority: **22.10.2015 TW 104134674**
04.08.2016 TW 105211798 U
17.08.2016 TW 105212504 U

(54) **WATERTIGHT ZIPPER**

(57) A watertight zipper is provided to improve the watertight effect of the conventional watertight zipper. The watertight zipper includes a waterproof tape and a plurality of scoops (3, 7) arranged on the waterproof tape. The waterproof tape includes a waterproof material (1, 5) and a waterproof terminal member (2, 6). The waterproof material (1, 5) covers an inner end of the waterproof material (1, 5) by injection molding. The waterproof terminal member (2, 6) includes a top portion (2a, 6a) con-

nected to a top face (13, 53) of the waterproof material (1, 5), a bottom portion (2b, 6b) connected to a bottom face (14, 54) of the waterproof material (1, 5), and a lateral portion (2c, 6c) connecting the top portion (2a, 6a) to the bottom portion (2b, 6b) of the waterproof terminal member (2, 6). The lateral portion (2c, 6c) includes an abutment face (21, 61). One of the top portion (2a, 6a) and the bottom portion (2b, 6b) includes a plurality of first recesses (22, 62).

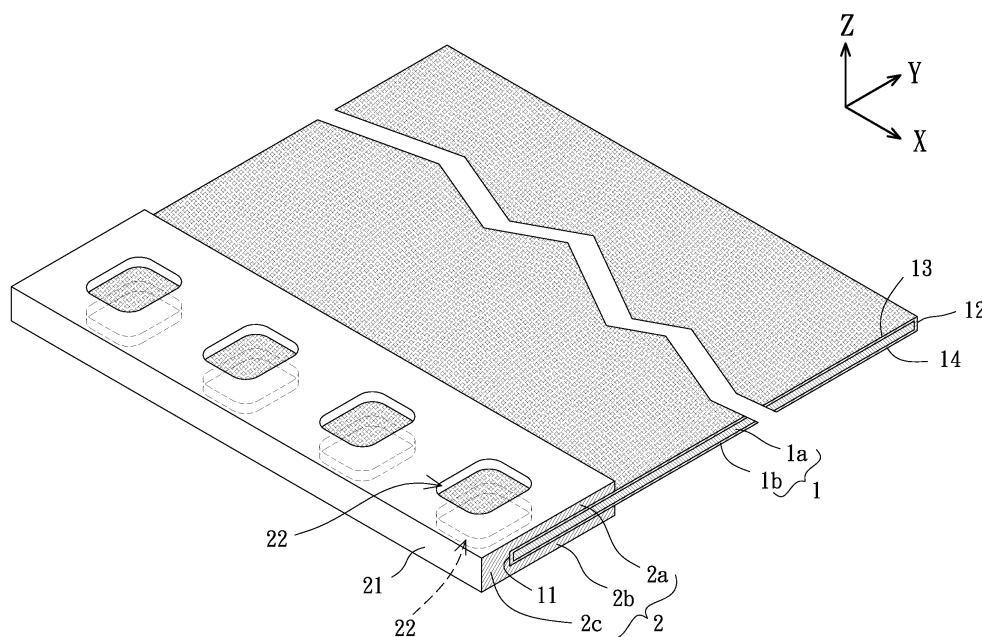


FIG. 2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present disclosure generally relates to a watertight zipper and, more particularly, to a watertight zipper that can efficiently prevent leakage of liquid.

2. Description of the Related Art

[0002] FIG. 1 shows a conventional watertight zipper 9. The watertight zipper 9 includes two tapes. Each of the tapes is coated with a covering layer 91 to form a waterproof tape. Each of the tapes has an inner edge facing the other tape. The waterproof tape forms a plurality of apertures 92 which is adjacent to the inner edge of the waterproof tape and is arranged in a row. Then, each aperture 92 is formed with a scoop 93 by injection molding, thereby attaching the scoops 93 to the covering layer 91. Thus, when the two waterproof tapes are engaged with each other by the scoops 93, the opposing end faces 911 of the covering layers 91 are pressed against each other in order to prevent the liquid from passing through the gaps between the left and right scoops 93. Such a conventional watertight zipper 9 can be seen in Taiwan Patent No. I339106.

[0003] For the conventional watertight zipper 9, a high polymer material in a molten state is extruded over the surface of the tape, thereby forming the watertight zipper 9 after the molten high polymer material cools down and solidifies. However, the extrusion process will cause expansion of the high polymer material, leading to an uneven cooling effect and uneven shrinkage of the high polymer material. As a result, the end face 911 of the covering layer 91 will be uneven. Therefore, when the left and right scoops 93 are engaged with each other, only some parts of the end faces 911 can be tightly pressed against each other, and there must be some tiny gaps existing between other parts of the end faces 911 of the covering layers 91. As such, the waterproof function effect is incomplete. When the conventional watertight zipper 9 is used in an occasion where a high waterproof effect is required, the end face 911 of the covering layer 91 needs to be ground or should be formed by a precise cutting process or a laser cutting process to increase the evenness of the end face 911. Disadvantageously, the production cost and time are increased.

[0004] Furthermore, the aperture 92 is circular and each scoop 93 includes upper and lower teeth that are connected only by the part of the polymer material inside the aperture 92. Therefore, if the scoops 93 are not properly bonded to the covering layer 91 during the formation process thereof, the scoops 93 tend to become lopsided when experiencing a pulling force. As a result, engagement or disengagement of the scoops 93 is not smooth.

SUMMARY OF THE INVENTION

[0005] To solve the above problem, it is the objective of the disclosure to provide a watertight zipper having a plurality of scoops and a waterproof tape. The waterproof tape includes a waterproof material and a waterproof terminal member covering an inner end of the waterproof material. The waterproof terminal member has an abutment face in evenness. Thus, with the watertight zipper, an excellent watertight effect can be attained.

[0006] It is also defined in the disclosure that the length of the waterproof tape extends in an **X** direction, the width of the waterproof tape extends in a **Y** direction, and the thickness of the waterproof tape extends in a **Z** direction. The **X**, **Y** and **Z** directions are orthogonal to each other.

[0007] In an embodiment, a watertight zipper including a waterproof tape and a plurality of scoops arranged on the waterproof tape is disclosed. The waterproof tape includes a waterproof material and a waterproof terminal member. The waterproof material has an inner end, an outer end, a top face and a bottom face. The inner and outer ends are opposite to each other, and the top and bottom faces are opposite to each other. The waterproof terminal member covers the inner end of the waterproof material by injection molding. The waterproof terminal member includes a top portion connected to the top face of the waterproof material, a bottom portion connected to the bottom face of the waterproof material, and a lateral portion connecting the top portion to the bottom portion of the waterproof terminal member. The lateral portion includes an abutment face which is a part of the lateral portion most distant to the outer end of the waterproof material. One of the top portion and the bottom portion includes a plurality of first recesses. The waterproof tape forms a plurality of apertures. Each of the plurality of scoops includes an upper scoop portion and a lower scoop portion. The plurality of first recesses and the plurality of apertures are filled with the upper scoop portions and the lower scoop portions of the plurality of scoops. The upper scoop portion and the lower scoop portion are connected to each other via one of the plurality of apertures.

[0008] Based on this, since the waterproof terminal member is arranged at the inner end of the waterproof material by injection molding, the abutment face can be in an even form. Thus, when the waterproof tape is used to produce a watertight zipper, an excellent watertight effect can be attained. Besides, with the watertight zipper produced from the waterproof tape, the scoops can be securely coupled with the waterproof terminal member without becoming lopsided when experiencing a pulling force. When a pair of the watertight zippers is used to form a zipper, the zipper can be smoothly zipped up and down, attaining a convenient operation and improving the durability thereof.

[0009] In a form shown, the waterproof material includes a tape and a waterproof layer. The waterproof layer is arranged on at least one surface of the tape. Each

of the plurality of first recesses is in a non-circular form. As such, lopsidedness of the scoops can be prevented.

[0010] In another form shown, the waterproof material includes a tape and a waterproof layer, and the waterproof layer covers an entire surface of the tape. The structure improves the waterproof effect.

[0011] In a further form shown, the waterproof material includes a tape and a waterproof layer. The tape includes a cord portion covered inside the waterproof terminal member. The waterproof layer is arranged on at least one surface of the tape. The plurality of first recesses is arranged at the cord portion. The abutment face of the waterproof terminal member extends beyond an outer end of the cord portion. This structure can prevent lopsidedness of the scoops.

[0012] Each of the plurality of first recesses includes a rear end extending beyond an inner end of the cord portion opposite to the outer end. This structure reinforces the coupling effect between the scoops and the waterproof material.

[0013] The waterproof layer covers an entire surface of the tape except for the cord portion. This structure can improve the bonding effect between the tape and the waterproof layer while reducing the thickness of the waterproof tape at the cord portion

[0014] Another one of the top portion and the bottom portion includes a plurality of second recesses. Each of the plurality of second recesses is aligned with a respective one of the plurality of first recesses. This structure can increase the positioning effect of the scoops.

[0015] Each of the plurality of apertures extends through the waterproof material and the waterproof terminal member, and is located in a respective one of the plurality of first recesses.

[0016] Each of the plurality of apertures has a diameter smaller than a diameter of the respective one of the plurality of first recesses.

[0017] In a form shown, the waterproof material includes a tape and a waterproof layer. The waterproof layer is arranged on at least one surface of the tape. The tape does not include any cord portion and is in a flat form. The plurality of scoops covers the plurality of first recesses. The structure can prevent lopsidedness of the scoops.

[0018] In another form shown, the waterproof material includes a tape and a waterproof layer. The tape includes a cord portion covered inside the waterproof terminal member. The waterproof layer is arranged on at least one surface of the tape. The plurality of first recesses is arranged on the cord portion. Each of the plurality of first recesses includes a rear end extending beyond an inner end of the cord portion opposite to the outer end. Each of the plurality of apertures is located between the rear end of the respective one of the plurality of first recesses and the cord portion. The structure can improve the bonding effect between the scoops and the waterproof tape.

[0019] In a form shown, each of the plurality of apertures extends through the waterproof terminal member

and the waterproof material and is located outside of a respective one of the plurality of first recesses.

[0020] In another form shown, each of the plurality of apertures extends through the waterproof material and is located outside of the waterproof terminal member.

[0021] The abutment face of the waterproof terminal member of the waterproof tape is in a shape corresponding to an abutment face of a waterproof terminal member of another waterproof tape to be connected to the waterproof tape. An interface between the abutment faces is in a step form having a plurality of interconnected sections extending in different directions. The structure can improve the watertight effect and provide a convenient manufacturing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The present invention will become more fully understood from the detailed description given hereinafter and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

FIG. 1 is a top view of a conventional watertight zipper in an engaged state.

FIG. 2 shows a waterproof tape according to a first embodiment of the disclosure.

FIG. 3 is a cross sectional view of the waterproof tape of the first embodiment of the disclosure.

FIG. 4 shows a watertight zipper produced from the waterproof tape of the first embodiment of the disclosure.

FIG. 5 is a cross sectional view of the watertight zipper of the first embodiment of the disclosure.

FIG. 6 is a cross sectional view of a zipper produced from two watertight zippers of the first embodiment of the disclosure, with the zipper being in an engaged state.

FIG. 7 is a cross sectional view of a zipper produced from two watertight zippers of the first embodiment of the disclosure, with the two watertight zippers engaged with each other through two abutment faces which are in a step form.

FIG. 8 is a cross sectional view of a zipper produced from two watertight zippers of the first embodiment of the disclosure, with the two watertight zippers engaged with each other through two abutment faces which are in corresponding inwardly and outwardly curved shapes.

FIG. 9 is a cross sectional view of a modified water-

tight zipper of the first embodiment of the disclosure.

FIG. 10 is a cross sectional view of another modified watertight zipper of the first embodiment of the disclosure.

FIG. 11 shows a waterproof tape according to a second embodiment of the disclosure.

FIG. 12 is a cross sectional view of the waterproof tape of the second embodiment of the disclosure.

FIG. 13 shows a watertight zipper produced from the waterproof tape of the second embodiment of the disclosure.

FIG. 14 a cross sectional view of the watertight zipper produced from the waterproof tape of the second embodiment of the disclosure.

FIG. 15 is a cross sectional view of a modified watertight zipper of the second embodiment of the disclosure.

[0023] In the various figures of the drawings, the same numerals designate the same or similar parts. Furthermore, when the terms "first", "second", "third", "fourth", "inner", "outer", "top", "bottom", "front", "rear" and similar terms are used hereinafter, it should be understood that these terms have reference only to the structure shown in the drawings as it would appear to a person viewing the drawings, and are utilized only to facilitate describing the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0024] FIGS. 2 and 3 show a waterproof tape according to a first embodiment of the disclosure. The waterproof tape includes a waterproof material 1 and a waterproof terminal member 2 connected to an inner end 11 of the waterproof material 1.

[0025] Specifically, the waterproof material 1 includes the inner end 11 and an outer end 12. The inner end 11 and the outer end 12 face away from each other in a Y direction. The waterproof material 1 further includes a top face 13 and a bottom face 14. The top face 13 and the bottom face 14 face away from each other in a Z direction. The waterproof material 1 can prevent penetration of the liquid from the top face 13 to the bottom face 14. For example, the waterproof material 1 may include a tape 1a and a waterproof layer 1b. The waterproof layer 1b is arranged on at least one surface of the tape 1a. The tape 1a can be in a flat form without any cord portion as shown in FIG. 2, or can have a cord portion C as shown in FIG. 11. The disclosure is not limited to either implementation. The waterproof layer 1b may have different structures in correspondence to the shapes of the tape 1a. The tape 1a does not include any cord portion

in this embodiment, but a tape 5a will be described as having a cord portion C in the second embodiment later.

[0026] Referring to FIGS. 2 and 3 again, the waterproof material 1 may be formed by extruding the high polymer material over the surface of the tape 1a to form the waterproof layer 1b. The waterproof layer 1b can cover the entire surface of the tape 1a, thereby achieving the complete waterproof effect via the fastest production process. Alternatively, a waterproof film can be adhered to the surface of the tape 1a such that the waterproof layer 1b can properly cover the tape 1a to provide a desired waterproof effect. In another embodiment, a waterproof glue can be sprayed onto the surface of the tape 1a. Still alternatively, the waterproof layer can be forced into the tape 1a by pressure. These approaches can make the tape 1a waterproof, thus forming the waterproof material 1.

[0027] In the disclosure, a waterproof terminal member 2 which is formed by injection molding is connected to the inner end 11 of the waterproof material 1. The waterproof terminal member 2 covers the inner end 11 of the waterproof material 1. The waterproof terminal member 2 includes a top portion 2a, a bottom portion 2b and a lateral portion 2c. The top portion 2a is connected to the top face 13 of the waterproof material 1. The bottom portion 2b is connected to the bottom face 14 of the waterproof material 1. The lateral portion 2c is connected between the top portion 2a and the bottom portion 2b. The lateral portion 2c includes an abutment face 21 which is the part of the lateral portion 2c most distant to the outer end 12 of the waterproof material 1. Since the waterproof terminal member 2 is formed by injection molding, it can be expected that the abutment face 21 of the lateral portion 2c is in an even form (which is shown as a plane face in this embodiment, but is not limited thereto). The evenness of the abutment face 21 will not be affected by the uneven cooling and shrinking effects. Moreover, the waterproof terminal member 2 can be made of the same or similar material as the waterproof layer 1b to improve the bonding effect between the waterproof terminal member 2 and the waterproof material 1. This reduces the possibility that the waterproof terminal member 2 disengages from the waterproof material 1 after a certain period of time of use. Therefore, the zipper produced by the waterproof tapes of the disclosure can have a longer service life.

[0028] The top portion 2a or bottom portion 2b of the waterproof terminal member 2 further includes a plurality of recesses 22. Each of the recesses 22 may extend from one face of the top portion 2a through another face of the top portion 2a, so that the surface of the waterproof material 1 is exposed via the recesses 22. Alternatively, each of the recesses 22 may also extend from one face of the top portion 2a towards but spaced from the other face of the top portion 2a, such that the surface of the waterproof material 1 is not exposed via the recess 22. Each of the recesses 22 may be formed with a single scoop in which the recess 22 is filled by the scoop. In this

regard, the recess 22 may be in a circular form, or may be in a non-circular form (having a non-circular cross section when seen in the top side), such as a square form, a rectangular form, a pair of long, narrow form, or any others. Also, when each of the recesses 22 is in a circular form, several recesses 22 can be used to form a single scoop in which these recesses 22 are filled by the scoop. This can ensure that the scoop will not become lopsided. In a preferred case, both the top portion 2a and the bottom portion 2b include a plurality of recesses 22, in which each of the recesses 22 in the top portion 2a corresponds to a respective one of the recesses 22 in the bottom portion 2b. In this arrangement, a single scoop can be formed in a pair of corresponding upper and lower recesses 22 to attain a reinforced positioning effect.

[0029] Besides, each recess 22 can be used as a positioning center of the injection molding process of the waterproof terminal member 2. In this regard, the waterproof material 1 is clamped by the molds to keep the inner end 11 of the waterproof material 1 in position during the injection process. In this manner, the waterproof terminal member 2 can have a higher yield rate. The recesses 22 can be formed after the molds are removed, and can be used to prevent lopsidedness of the scoops.

[0030] Based on the above structure, the waterproof tape of the first embodiment of the disclosure can be manufactured as a watertight zipper as shown in FIGS. 4 and 5. The watertight zipper includes a plurality of scoops 3 arranged in a row on the waterproof terminal member 2. Specifically, the waterproof tape includes a plurality of apertures 4, and the scoops 3 are formed on the waterproof tape in injection molding. Each of the scoops 3 includes an upper scoop portion 3a and a lower scoop portion 3b. The recess 22 and the aperture 4 are filled with the upper scoop portion 3a and the lower scoop portion 3b. The upper scoop portion 3a and the lower scoop portion 3b are connected by the material inside the aperture 4. The upper scoop portions 3a of the scoops 3 are arranged in intervals on the top portion 2a of the waterproof terminal member 2, and the lower scoop portions 3b of the scoops 3 are arranged in intervals on the bottom portion 2b of the waterproof terminal member 2. The shape of the aperture 4 can be circular or any others. In the embodiment, the aperture 4 extends through the waterproof terminal member 2 and the waterproof material 1 and is located in the recess 22. The diameter of the aperture 4 is preferably smaller than that of the recess 22.

[0031] During the formation of the scoops 3, the recesses 22 are filled with the molten high polymer material. In the case where the recess 22 is in a non-circular form, each scoop 3 will contain a part having the same non-circular shape as the recess 22. Based on this, no matter whether the scoops 3 are bonded with the waterproof terminal member 2, the formed scoops 3 can remain in position on the waterproof terminal member 2. In this case, even though the scoops 3 experience a pulling force, the scoops 3 will not become lopsided. In the other case where a single scoop 3 is formed in more than one

recess 22, it can still be ensured that the positioning of the scoop 3 is not affected by the pulling force even though the recesses 22 are in a circular form.

[0032] Referring to FIG. 6, when the scoops 3 of the left watertight zipper are engaged with the scoops 3 of the right watertight zipper, the abutment face 21 of the waterproof terminal member 2 of the left watertight zipper can be pressed against the abutment face 21 of the waterproof terminal member 2 of the right watertight zipper. Thus, the abutment faces 21 of the two watertight zippers can tightly abut against each other without interstice therebetween. This ensures that the liquid cannot penetrate the watertight zipper through the interstices between the left and right scoops 3, attaining an excellent waterproof effect.

[0033] Referring to FIGS. 7 and 8, in another embodiment, when it is desired to connect two waterproof terminal members 2 to each other, the abutment faces 21 of the lateral portions 2c of the waterproof terminal members 2 may be designed in the corresponding shapes, such as in the corresponding steps as shown in FIG. 7, or in the corresponding inwardly and outwardly curved shapes as shown in FIG. 8. Referring to FIG. 7, the interface between the abutment faces 21 is in the step form having a plurality of interconnected sections extending in different directions. In this regard, although the liquid penetrates the watertight zipper from one side, the liquid cannot easily reach the other side of the watertight zipper. Therefore, the watertight zipper can have a larger tolerance in size.

[0034] In a further embodiment, the aperture 4 may be arranged outside of the recess 22. Referring to FIG. 9, the aperture 4 penetrates the waterproof terminal member 2 and the waterproof material 1 and is located outside of the recess 22. Alternatively, the aperture 4 can also penetrate the waterproof material 1 and be located outside of the waterproof terminal member 2. Based on this, the scoop 3 will cover the recess 22 and the aperture 4 with different locations. This also prevents lopsidedness of the scoops 3 even though the scoops 3 are in a circular form. In a still further embodiment, the aperture 4 can cover both the cases of FIGS. 5 and 9. Specifically, a part of the aperture 4 can be located in the recess 22 (as is the case of FIG. 5) while another part of the aperture 4 can penetrate the leftmost part of the waterproof terminal member 2 and the waterproof material 1 (as is the case of FIG. 9).

[0035] FIGS. 11 and 12 show a waterproof tape according to a second embodiment of the disclosure. The second embodiment is substantially the same as the first embodiment except for that the waterproof material 5 in the second embodiment includes a tape 5a having a cord portion C at an inner end 51 of the waterproof material 5. The waterproof tape in this embodiment further includes a waterproof terminal member 6 connected to the inner end 51 of the waterproof material 5.

[0036] Specifically, the waterproof material 5 may include a tape 5a and a waterproof layer 5b. The waterproof

layer 5b is arranged on at least one surface of the tape 5a. The cord portion **C** is located at the inner end 51 of the waterproof material 5. The waterproof layer 5b can cover the entire surface of the tape 5a, and preferably does not cover the cord portion **C** in order to provide a proper bonding effect between the tape 5a and the waterproof layer 5b. This can also reduce the thickness of the waterproof tape at the cord portion **C**. In another embodiment, a waterproof glue can be sprayed onto the surface of the tape 5a, or the waterproof layer can be forced into the tape 5a by pressure. Either approach can make the tape 5a and the cord portion **C** waterproof.

[0037] The waterproof terminal member 6 which is formed by injection molding is connected to the inner end 51 of the waterproof material 5, so that the cord portion **C** is covered within the waterproof terminal member 6. The waterproof terminal member 6 includes a top portion 6a, a bottom portion 6b and a lateral portion 6c. The top portion 6a is connected to a top face 53 of the waterproof material 5. The bottom portion 6b is connected to a bottom face 54 of the waterproof material 5. The lateral portion 6c is connected between the top portion 6a and the bottom portion 6b. The lateral portion 6c is located outwardly of an outer end C1 of the cord portion **C**. The lateral portion 6c includes an abutment face 61 which is the part of the lateral portion 6c most distant to an outer end 52 of the waterproof material 5. In this embodiment, since the waterproof terminal member 6 is also formed by injection molding, it can be expected that the abutment face 61 of the lateral portion 6c is in an even form (which is shown as a plane face in this embodiment, but is not limited thereto). The evenness of the abutment face 61 will not be affected by the uneven cooling and shrinking effects.

[0038] The top portion 6a or bottom portion 6b of the waterproof terminal member 6 further includes a plurality of recesses 62 at the cord portion **C**. The recess 62 is not limited to any shape. In a preferred case, both the top portion 6a and the bottom portion 6b include a plurality of recesses 62, in which each of the recesses 62 in the top portion 6a corresponds to a respective one of the recesses 62 in the bottom portion 6b. In this arrangement, a single scoop can be formed in a pair of corresponding upper and lower recesses 62 to attain a reinforced positioning effect. The recess 62 includes a front end 621 (as labeled in FIG. 14) that cannot extend beyond the outer end C1 of the cord portion **C**. The recess 62 further includes a rear end 622 that can extend beyond an inner end C2 of the cord portion **C** opposite to the outer end C1.

[0039] Based on the above structure, the waterproof tape of the second embodiment of the disclosure can be manufactured as a watertight zipper as shown in FIGS. 13 and 14. The watertight zipper includes a plurality of scoops 7 arranged in a row on the waterproof terminal member 6. Specifically, each of the recesses 62 can include an aperture 8. The aperture 8 is located between the rear end 622 of the recess 62 and the cord portion **C**. Namely, the aperture 8 is arranged at the portion of

the tape 5a adjoining the cord portion **C**. The aperture 8 extends through the waterproof terminal member 6 and the waterproof material 5. The shape of the aperture 8 can be circular or any others. The diameter of the aperture 8 is preferably smaller than that of the recess 62.

[0040] The scoops 7 are formed in the recesses 62 by injection molding. Each scoop 7 includes an upper scoop portion 7a and a lower scoop portion 7b that are connected by the part of the polymer material inside the aperture 8. The upper scoop portions 7a of the scoops 7 are arranged in intervals on the top portion 6a of the waterproof terminal member 6, and the lower scoop portions 7b of the scoops 7 are arranged in intervals on the bottom portion 6b of the waterproof terminal member 6. When two watertight zippers of the second embodiment of the disclosure are to be engaged with each other, the scoops 7 of the left watertight zipper can be engaged with the scoops 7 of the right watertight zipper. In this regard, the abutment face 61 of the waterproof terminal member 6 of the left watertight zipper can be pressed against the abutment face 61 of the waterproof terminal member 6 of the right watertight zipper, attaining an excellent waterproof effect.

[0041] During the formation of the scoops 7, the recesses 62 and the apertures 8 are filled with the molten high polymer material. Therefore, after the formation of the scoops 7, the upper scoop portion 7a and the lower scoop portion 7b not only can jointly cover the cord portion **C** of the tape 5a, but also can be connected by the part of the polymer material inside the aperture 8. This ensures a reinforced coupling effect between the scoops 7 and the waterproof terminal member 6. Even though the scoops 7 experience a pulling force, the scoops 7 will not become lopsided (or loosened). In addition, since the rear end 622 of the recess 62 extends beyond the inner end C2 of the cord portion **C**, some parts of the waterproof layer 5b are exposed via the recesses 62 to provide a coupling effect between the waterproof layer 5b and the scoops 7. As a result, the bonding strength between the scoops 7 and the waterproof material 5 is improved. Also, since the scoops 7 are coupled with some parts of the waterproof layer 5b, the waterproof layer 5b does not come off the tape 5a easily.

[0042] Referring to FIG. 15, in another embodiment, the aperture 8 can also be arranged outside of the recess 62. For example, the rear end 622 of the recess 62 may be more close to the cord portion **C**, so that the aperture 8 can extend through the waterproof material 5 and the waterproof terminal member 6 and be arranged outside of the recess 62. Alternatively, the aperture 8 can extend through the waterproof material 5 and be arranged outside of the waterproof terminal member 6. Based on this, the scoop 7 will cover the recess 62 and the aperture 8 with different locations. Furthermore, the waterproof layer 5b can also cover the entire surface of the tape 5a such that the waterproof layer 5b also covers the cord portion **C**. Thus, the waterproof effect at the cord portion **C** can be improved while preventing the waterproof layer

5b from coming off the tape 5a.

[0043] In summary, since the waterproof tape of the disclosure provides a waterproof terminal member at the inner end of the waterproof material through injection molding, the abutment face of the waterproof terminal member can be in high evenness. As a result, two waterproof tapes can be used to form a zipper having an excellent watertight effect.

[0044] Moreover, the waterproof tape of the disclosure further provides a plurality of recess on the waterproof terminal member to ensure that the scoops can be securely coupled with the waterproof terminal member. In this regard, although the scoops experience a pulling force, the scoops will not become lopsided. Advantageously, the zipper produced by the two waterproof tapes can be smoothly zipped up or down, attaining convenient operation and improving the durability of the zipper.

[0045] As stated above, the waterproof terminal member of the disclosure is formed by injection molding. This ensures a high evenness of the abutment face. In contrast to the prior art, the conventional grinding process cannot achieve a low surface roughness, and it is also difficult to grind the polymer material. The conventional punching process can cause deformation of the watertight zipper as the waterproof tape is usually long, leading to an uneven surface of the abutment face. The conventional laser cutting process can cause carbonization of the polymer material. The conventional precise cutting process uses an extremely thin blade so that the blade tends to shake during the cutting process, resulting in a slight displacement of the blade. The injection molding of the disclosure does not have such the disadvantages of the conventional techniques and can produce a zipper with an excellent watertight effect.

Claims

1. A watertight zipper comprising:

a plurality of scoops (3, 7); and
a waterproof tape comprising a waterproof material (1, 5) having an inner end (11, 51), an outer end (12, 52), a top face (13, 53) and a bottom face (14, 54), wherein the inner and outer ends (11 and 12; 51 and 52) are opposite to each other, wherein the top and bottom faces (13 and 14; 53 and 54) are opposite to each other, wherein the watertight zipper is **characterized in that:**

the waterproof tape further comprises a waterproof terminal member (2, 6) covering the inner end (11, 51) of the waterproof material (1, 5) by injection molding, wherein the waterproof terminal member (2, 6) comprises a top portion (2a, 6a) connected to the top face (13, 53) of the waterproof material (1,

5), a bottom portion (2b, 6b) connected to the bottom face (14, 54) of the waterproof material (1, 5), and a lateral portion (2c, 6c) connecting the top portion (2a, 6a) to the bottom portion (2b, 6b) of the waterproof terminal member (2, 6), wherein the lateral portion (2c, 6c) comprises an abutment face (21, 61) which is a part of the lateral portion (2c, 6c) most distant to the outer end (12, 62) of the waterproof material (1, 5), wherein one of the top portion (2a, 6a) and the bottom portion (2b, 6b) comprises a plurality of first recesses (22, 62), wherein the plurality of scoops (3, 7) is arranged on the waterproof tape, wherein the waterproof tape forms a plurality of apertures (4, 8), wherein each of the plurality of scoops (3, 7) comprises an upper scoop portion (7a) and a lower scoop portion (7b), wherein the plurality of first recesses (22, 62) and the plurality of apertures (4, 8) are filled with the upper scoop portions (7a) and the lower scoop portions (7b) of the plurality of scoops (3, 7), and wherein the upper scoop portion (7a) and the lower scoop portion (7b) are connected to each other via one of the plurality of apertures (4, 8).

2. The watertight zipper as claimed in claim 1, **characterized in that** each of the plurality of apertures (4, 8) extends through the waterproof material (1, 5) and the waterproof terminal member (2, 6), and is located in a respective one of the plurality of first recesses (22, 62).

3. The watertight zipper as claimed in claim 2, **characterized in that** each of the plurality of apertures (4, 8) has a diameter smaller than a diameter of the respective one of the plurality of first recesses (22, 62).

4. The watertight zipper as claimed in claim 2, **characterized in that** the waterproof material (1) comprises a tape (1a) and a waterproof layer (1b), wherein the waterproof layer (1b) is arranged on at least one surface of the tape (1a), wherein the tape (1a) does not comprise any cord portion and is in a flat form, and wherein the plurality of scoops (3) covers the plurality of first recesses (22).

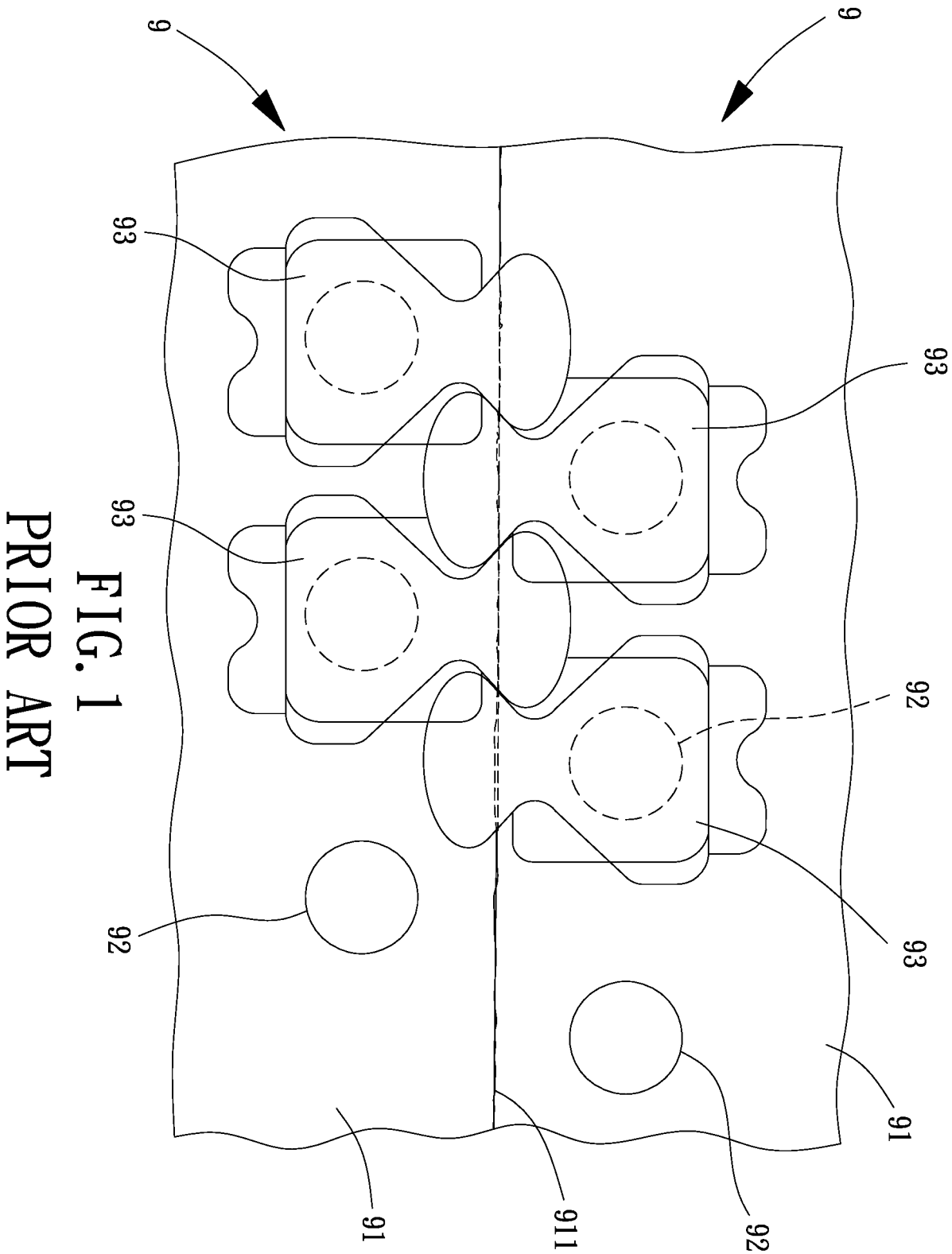
5. The watertight zipper as claimed in claim 2, **characterized in that** the waterproof material (5) comprises a tape (5a) and a waterproof layer (5b), wherein the tape (5a) comprises a cord portion (C) covered inside the waterproof terminal member (6), wherein the waterproof layer (5b) is arranged on at least one surface of the tape (5a), wherein the plurality of first recesses (62) is arranged on the cord portion (C), wherein each of the plurality of first recesses (62) comprises

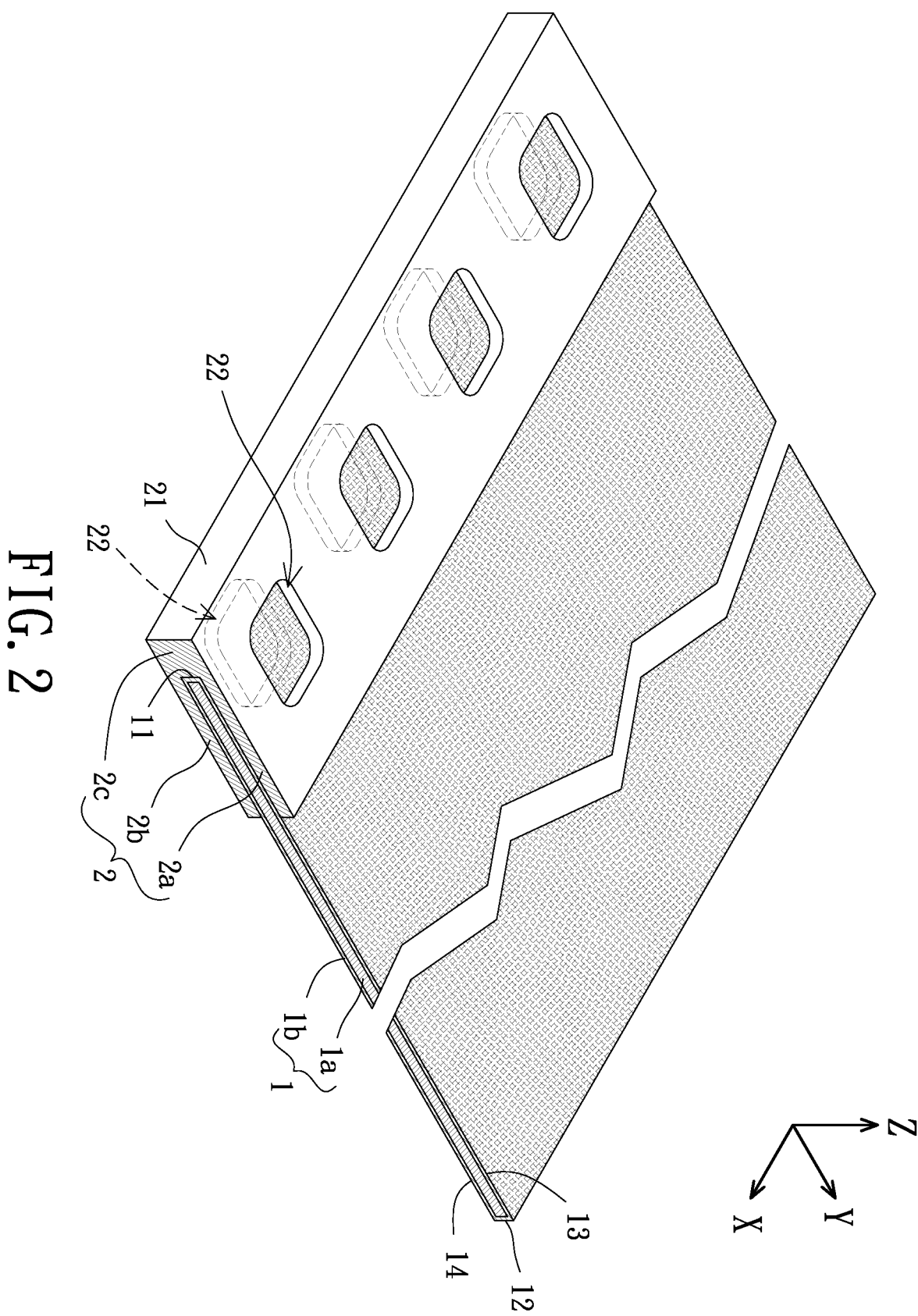
a rear end (622) extending beyond an inner end (C2) of the cord portion (C) opposite to the outer end (C1), and wherein each of the plurality of apertures (8) is located between the rear end (622) of the respective one of the plurality of first recesses (62) and the cord portion (C).

6. The watertight zipper as claimed in claim 1, **characterized in that** each of the plurality of apertures (4, 8) extends through the waterproof terminal member (2, 6) and the waterproof material (1, 5) and is located outside of a respective one of the plurality of first recesses (22, 62). 5
7. The watertight zipper as claimed in claim 1, **characterized in that** each of the plurality of apertures (4, 8) extends through the waterproof material (1, 5) and is located outside of the waterproof terminal member (2, 6). 10
8. The watertight zipper as claimed in any one of claims 1 to 7, **characterized in that** the abutment face (21, 61) of the waterproof terminal member (2, 6) of the waterproof tape is in a shape corresponding to an abutment face (21, 61) of a waterproof terminal member (2, 6) of another waterproof tape to be connected to the waterproof tape, wherein an interface between the abutment faces (21, 61) is in a step form having a plurality of interconnected sections extending in different directions. 15 20 25 30
9. The watertight zipper as claimed in claim 1, **characterized in that** the waterproof material (1, 5) comprises a tape (1a, 5a) and a waterproof layer (1b, 5b), wherein the waterproof layer (1b, 5b) is arranged on at least one surface of the tape (1a, 5a), and wherein each of the plurality of first recesses (22, 62) is in a non-circular form. 35
10. The watertight zipper as claimed in claim 1, **characterized in that** the waterproof material (1, 5) comprises a tape (1a, 5a) and a waterproof layer (1b, 5b), wherein the waterproof layer (1b, 5b) covers an entire surface of the tape (1a, 5a). 40 45
11. The watertight zipper as claimed in claim 1, **characterized in that** the waterproof material (5) comprises a tape (5a) and a waterproof layer (5b), wherein the tape (5a) comprises a cord portion (C) covered inside the waterproof terminal member (6), wherein the waterproof layer (5b) is arranged on at least one surface of the tape (5a), wherein the plurality of first recesses (62) is arranged at the cord portion (C), and wherein the abutment face (61) of the waterproof terminal member (6) extends beyond an outer end (C1) of the cord portion (C). 50 55
12. The watertight zipper as claimed in claim 11, **char-**

acterized in that each of the plurality of first recesses (62) comprises a rear end (622) extending beyond an inner end (C2) of the cord portion (C) opposite to the outer end (C1).

13. The watertight zipper as claimed in claim 11, **characterized in that** the waterproof layer (5b) covers an entire surface of the tape (5a) except for the cord portion (C).
14. The watertight zipper as claimed in any one of claims 1 to 13, **characterized in that** another one of the top portion (2a, 6a) and the bottom portion (2b, 6b) comprises a plurality of second recesses (22, 62), wherein each of the plurality of second recesses (22, 62) is aligned with a respective one of the plurality of first recesses (22, 62).





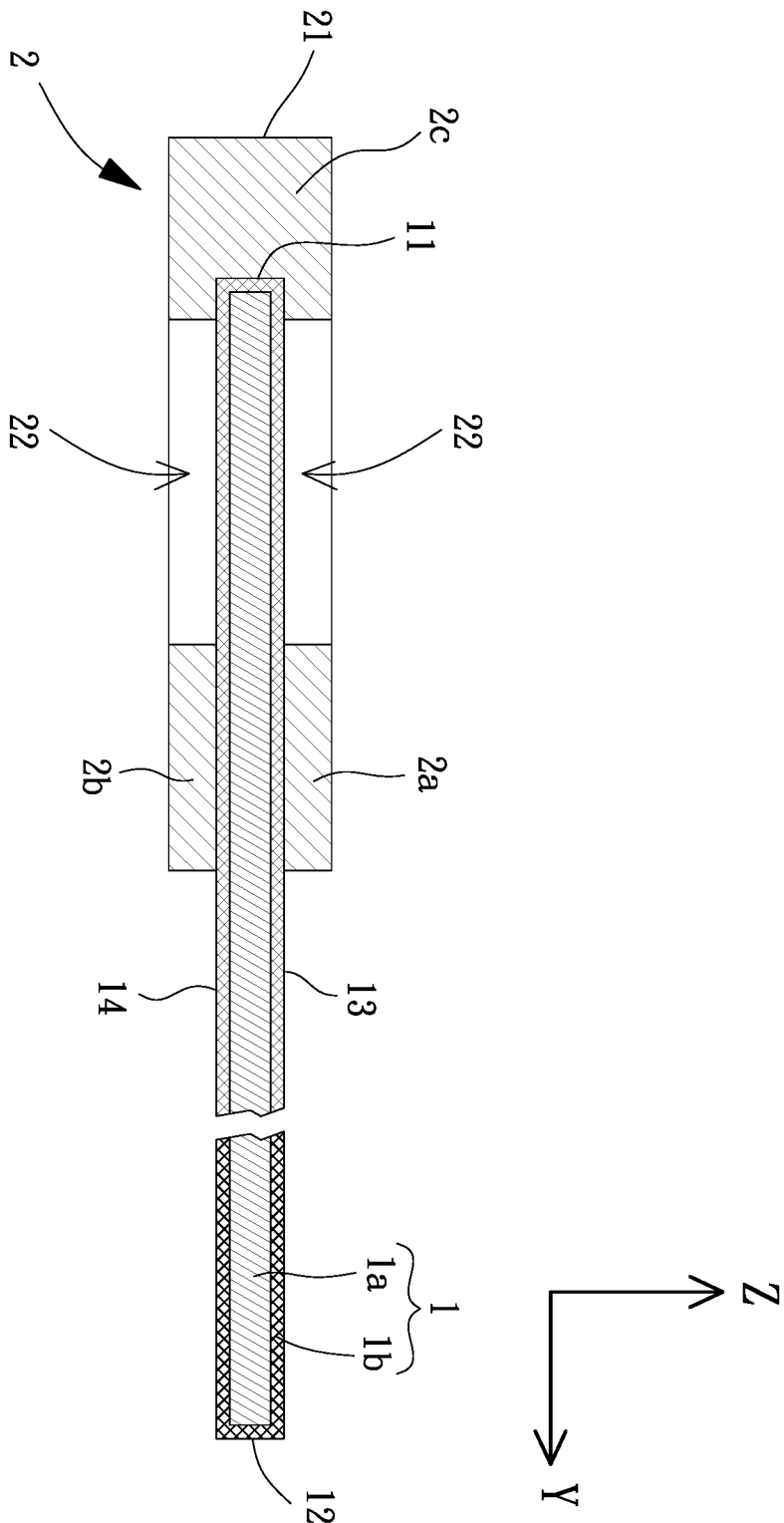
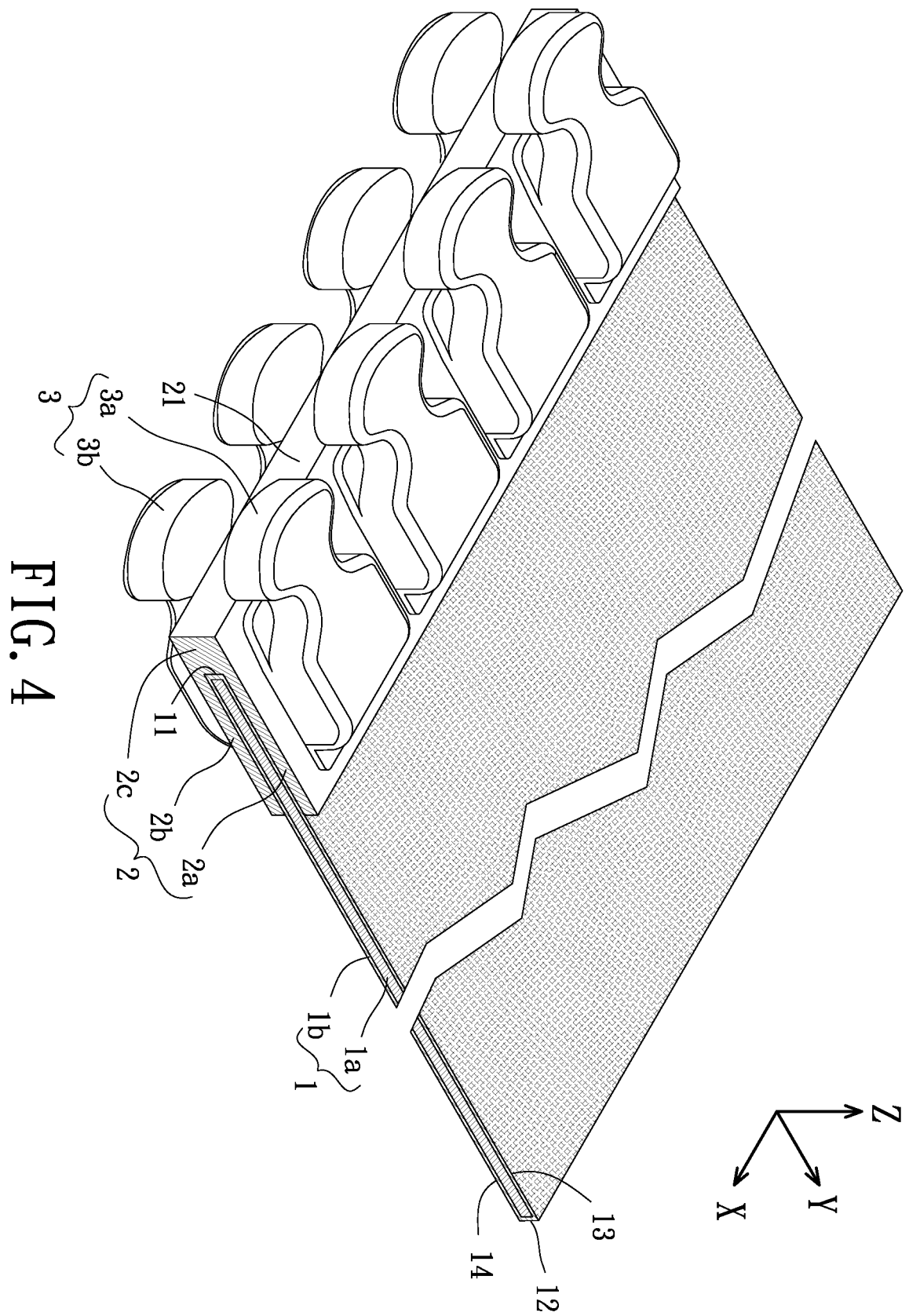


FIG. 3



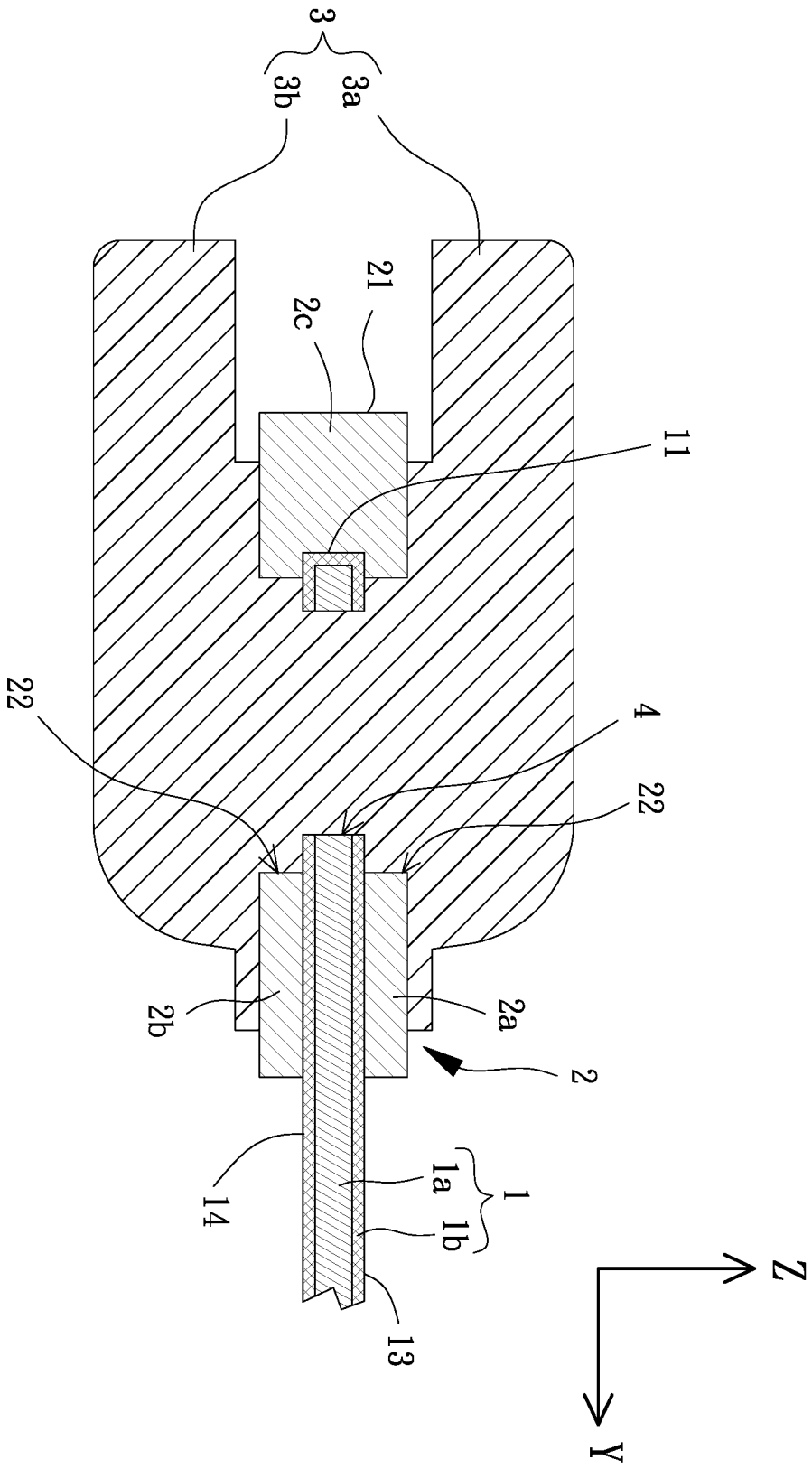


FIG. 5

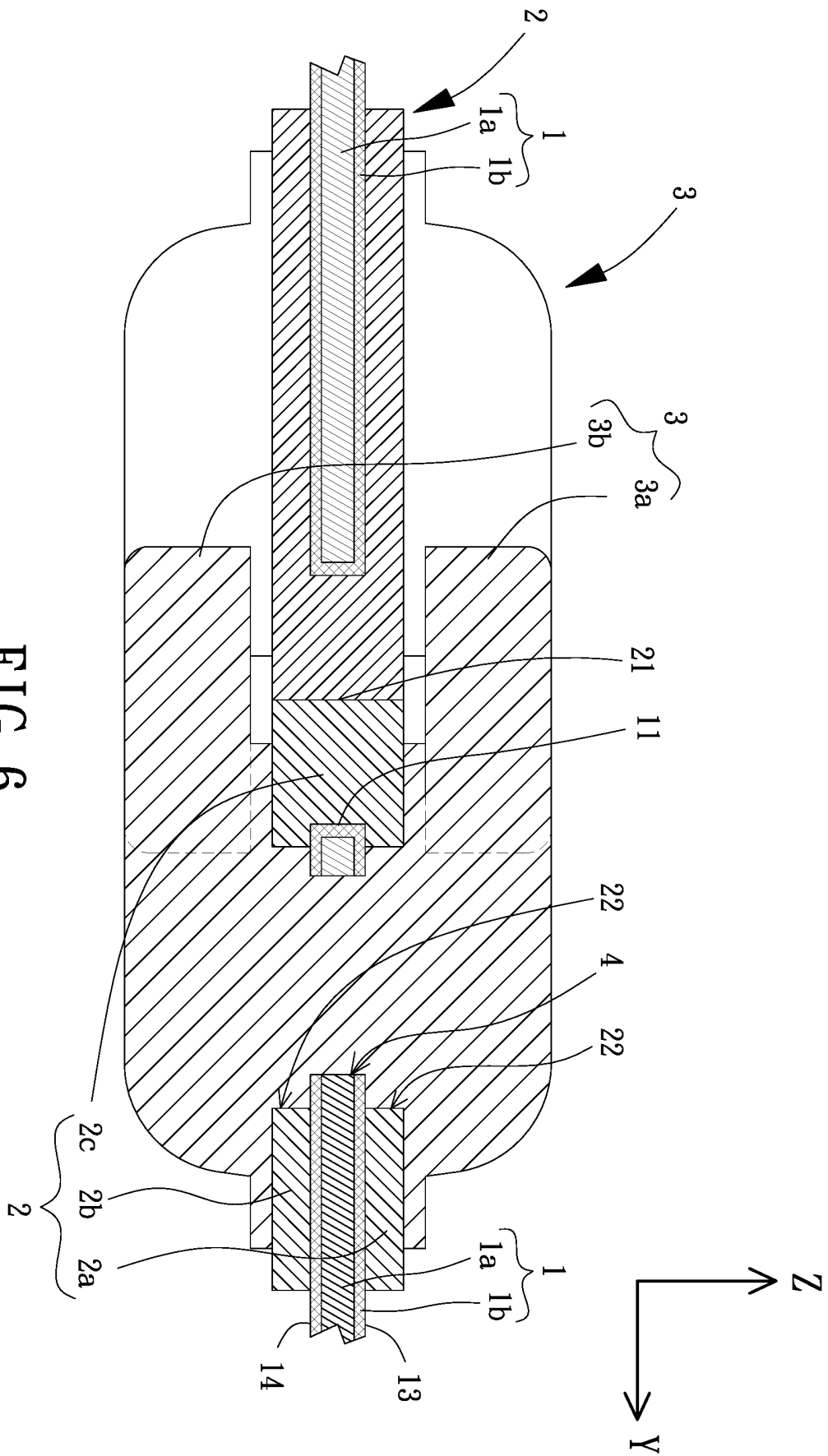


FIG. 6

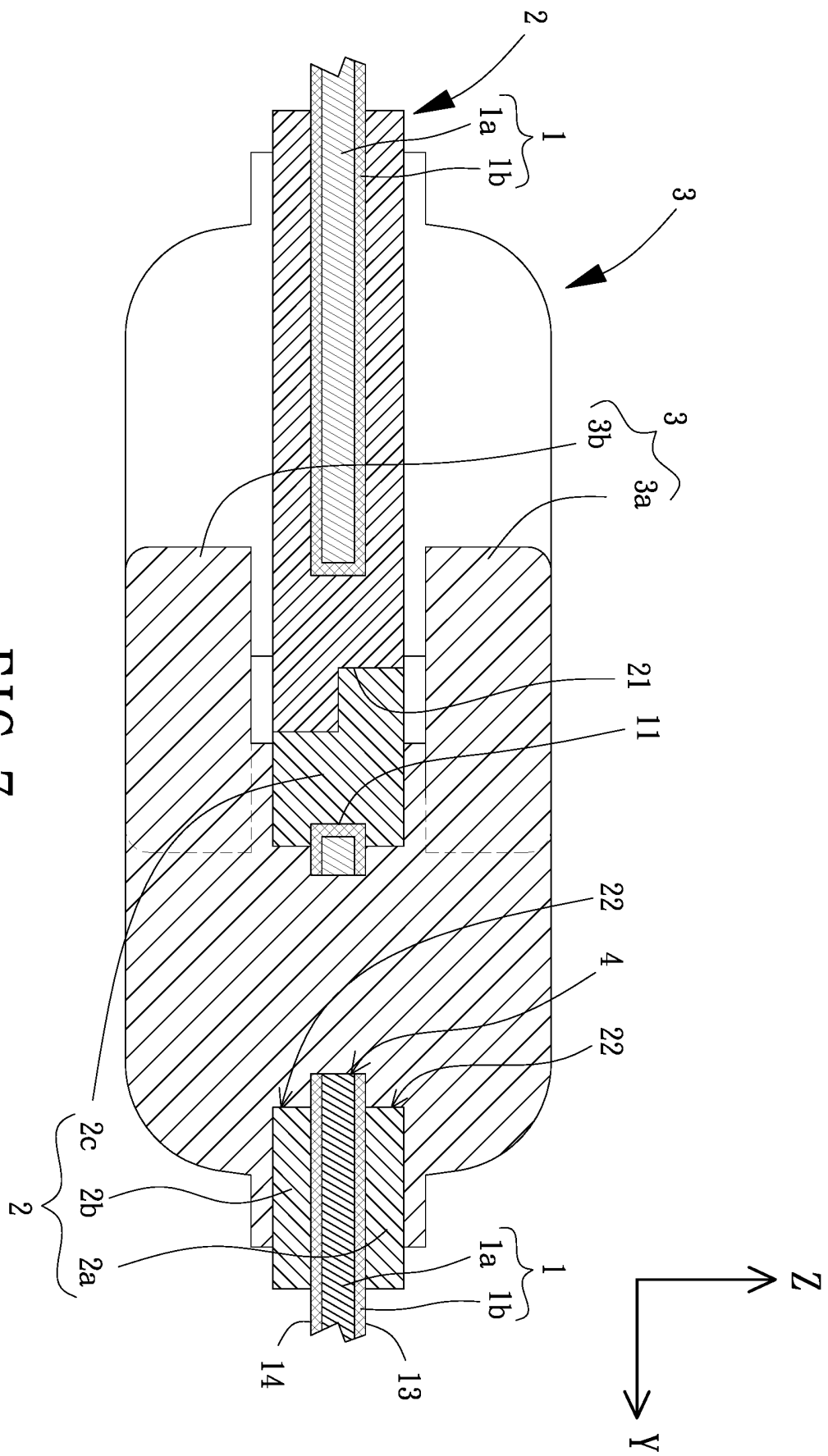


FIG. 7

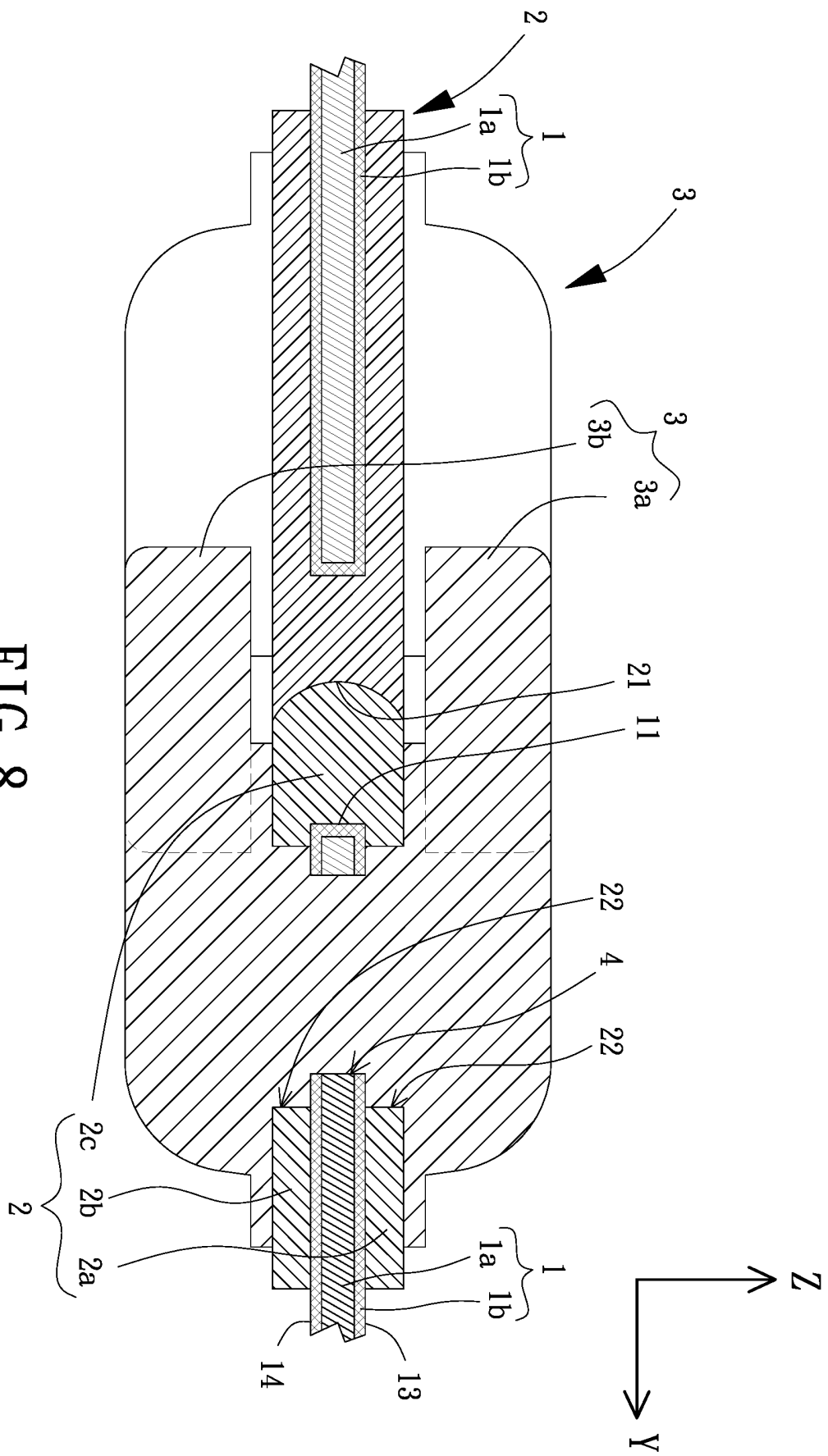


FIG. 8

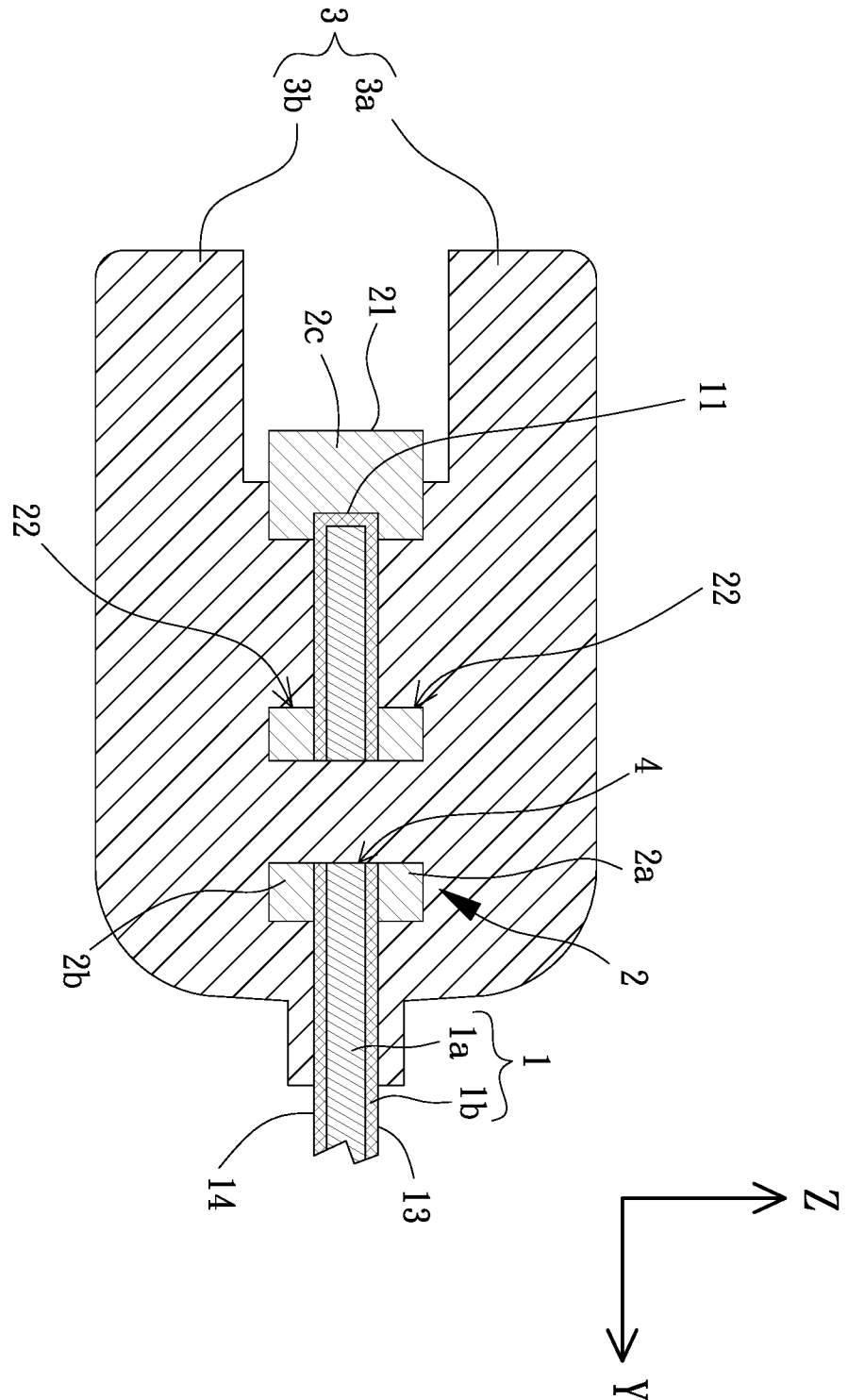
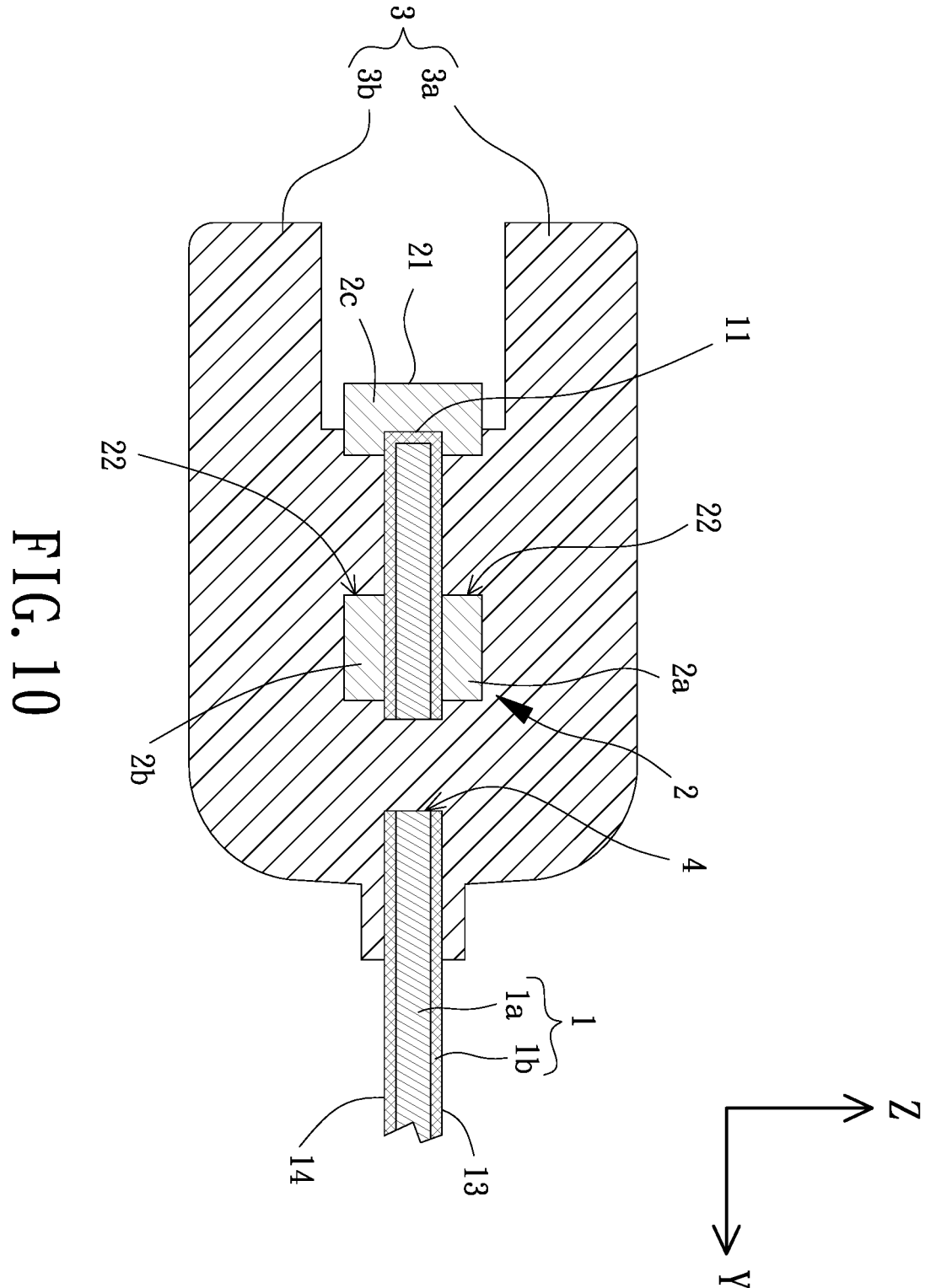


FIG. 9



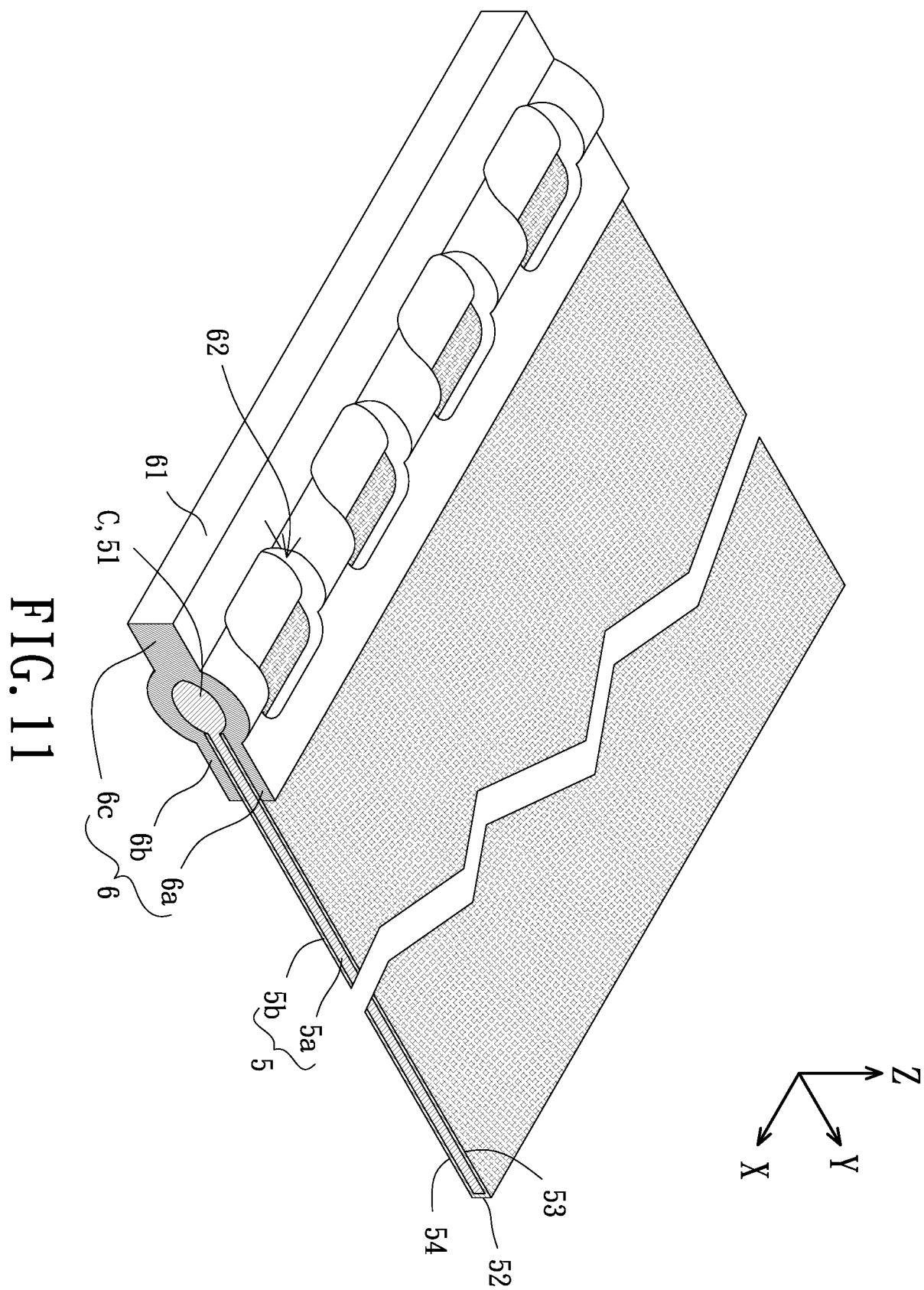


FIG. 11

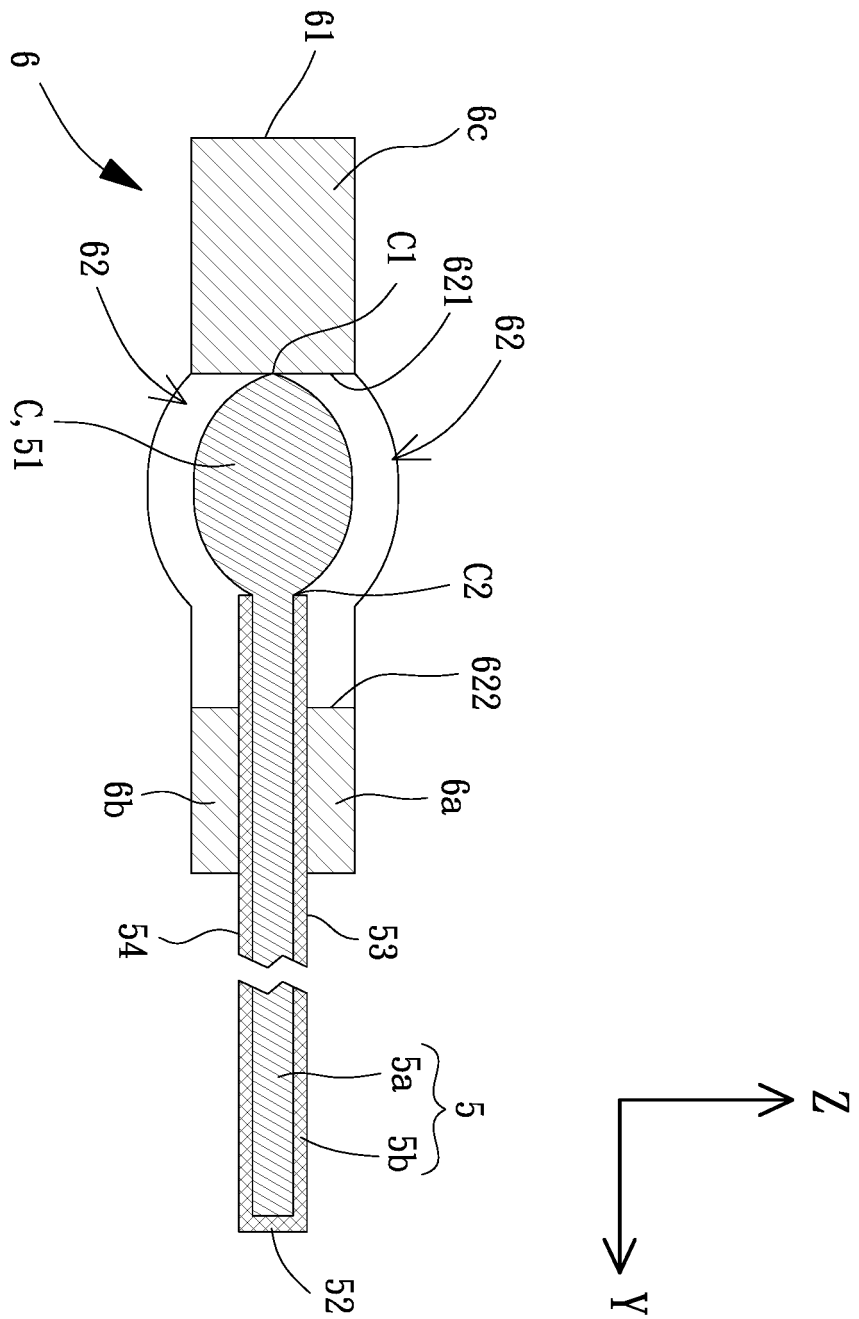


FIG. 12

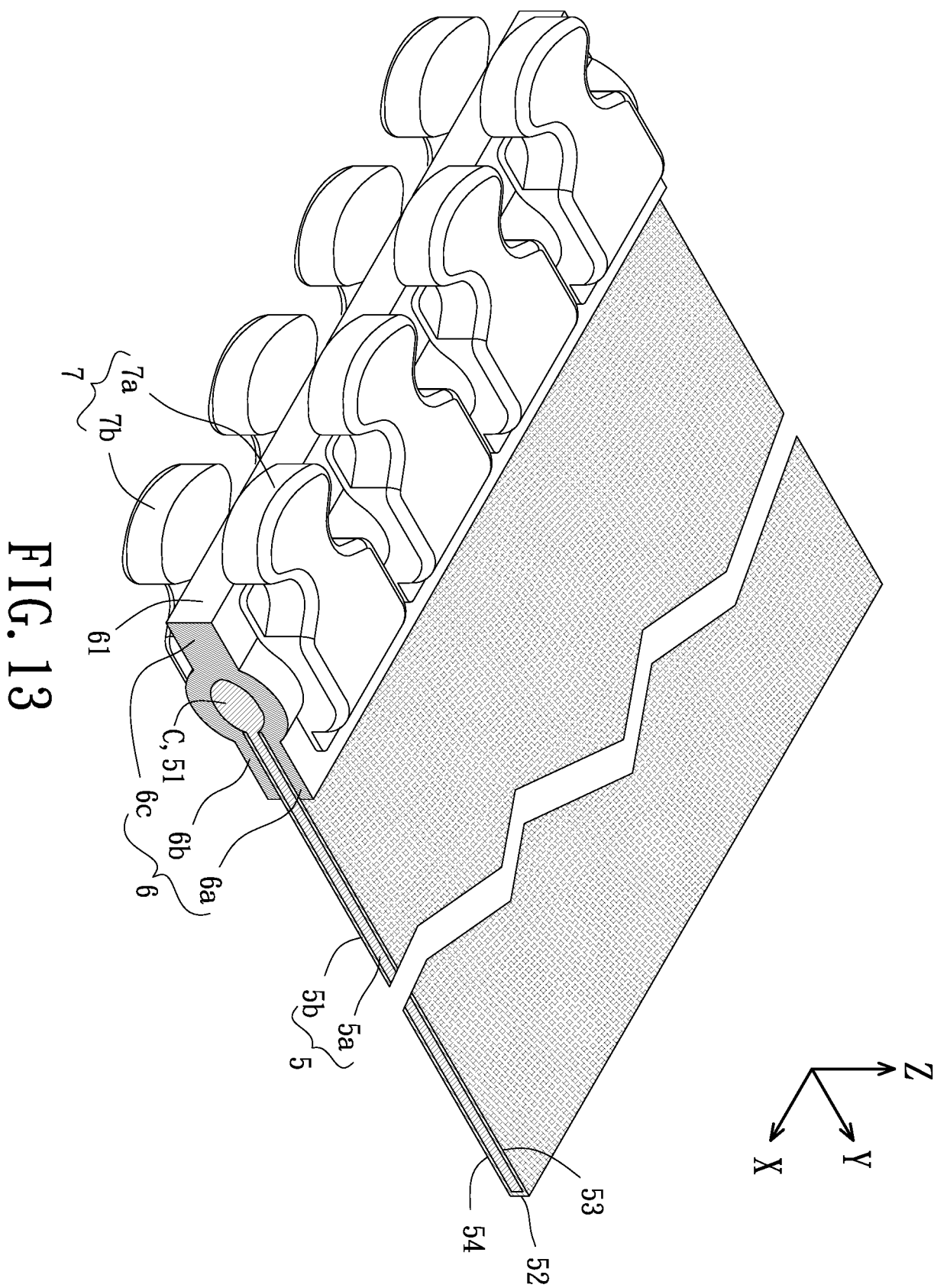
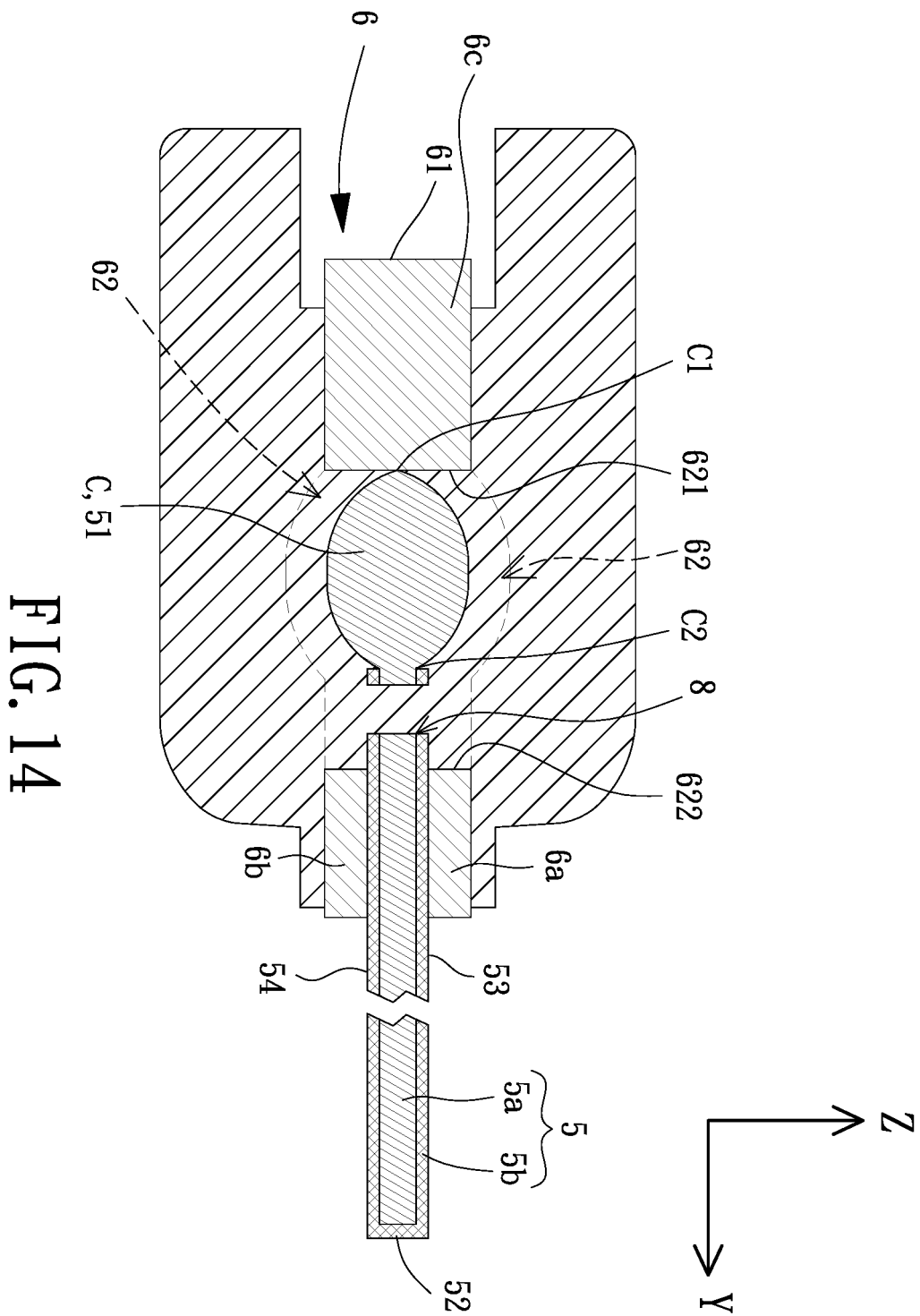


FIG. 13



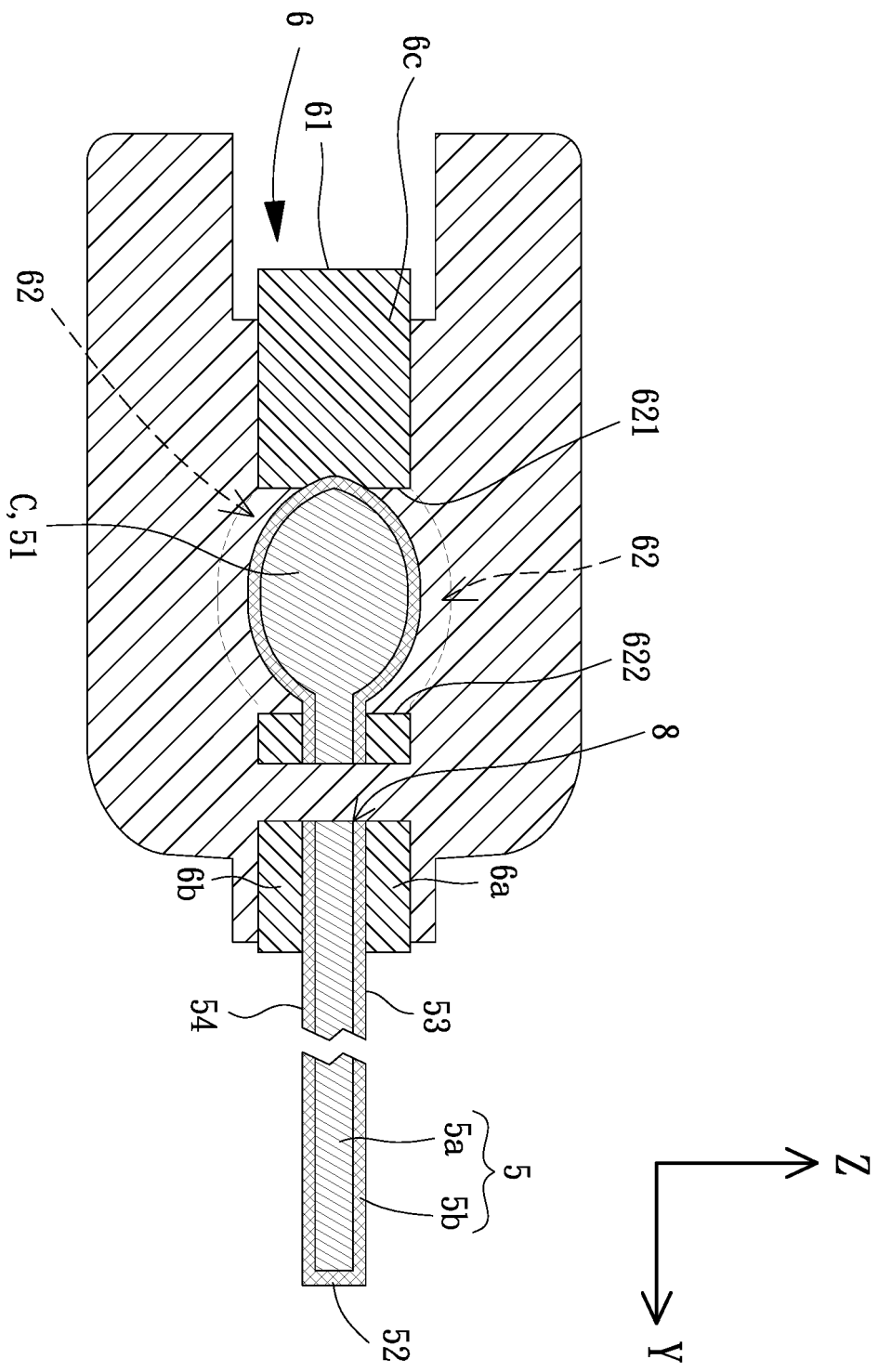


FIG. 15



EUROPEAN SEARCH REPORT

 Application Number
 EP 16 19 4929

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.02 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 388 302 A1 (YKK UK LTD [GB]) 11 February 2004 (2004-02-11) * paragraphs [0018] - [0022]; figures 2-4 *	1-14	INV. A44B19/06 A44B19/32 A44B19/34
A,D	US 2007/137006 A1 (MIKUMA RYO [JP] ET AL) 21 June 2007 (2007-06-21) * claim 1; figure 1 *	1-14	
A	US 4 402 115 A (MOERTEL GEORGE B [US]) 6 September 1983 (1983-09-06) * claim 1; figures 3,4,14 *	1-14	
A	US 2 910 754 A (MORIN LOUIS H) 3 November 1959 (1959-11-03) * claim 1; figures 3,9 *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			A44B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 February 2017	Examiner D'Souza, Jennifer
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 19 4929

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-02-2017

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1388302 A1	11-02-2004	NONE	

US 2007137006 A1	21-06-2007	CN 1985695 A	27-06-2007
		EP 1800557 A1	27-06-2007
		ES 2356659 T3	12-04-2011
		HK 1103919 A1	09-09-2011
		JP 4587949 B2	24-11-2010
		JP 2007167220 A	05-07-2007
		KR 20070065815 A	25-06-2007
		TW 1339106 B	21-03-2011
		US 2007137006 A1	21-06-2007

US 4402115 A	06-09-1983	DE 3123258 A1	13-05-1982
		GB 2081805 A	24-02-1982
		JP S5737404 A	01-03-1982
		US 4402115 A	06-09-1983

US 2910754 A	03-11-1959	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- TW I339106 [0002]