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(71) Applicant (for all designated States except US): **HUBIT CO., LTD.** [KR/KR]; A-1204, Byeoksan Technopia, Ojeon Gongop gil 9ho, Ojeon-dong, Uiwang-si, Gyeonggi-do 437-821 (KR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CHO, Duck Kyoan** [KR/KR]; #108-207 Woosung Apt., Bongcheon-dong, Gwanak-gu, Seoul 151-050 (KR). **KIM, Woo Sik** [KR/KR]; 679-1 Jichuk-dong, Deokyang-gu, Goyang-si, Gyeonggi-do 412-815 (KR). **PARK, Eun Kyu** [KR/KR]; 64-167 Sadang-dong, Dongjak-gu, Seoul 156-090 (KR).

SO, Yoon Suk [KR/KR]; 146-69 2F Sam-dong, Uiwang-si, Gyeonggi-do 437-040 (KR). **YOO, Hag Dong** [KR/KR]; #252-905 Ggotmenoeulmaeul Hankuk, Apt., 882-5, Jeongja-dong, Jangan-gu, Suwon-si, Gyeonggi-do 440-300 (KR).

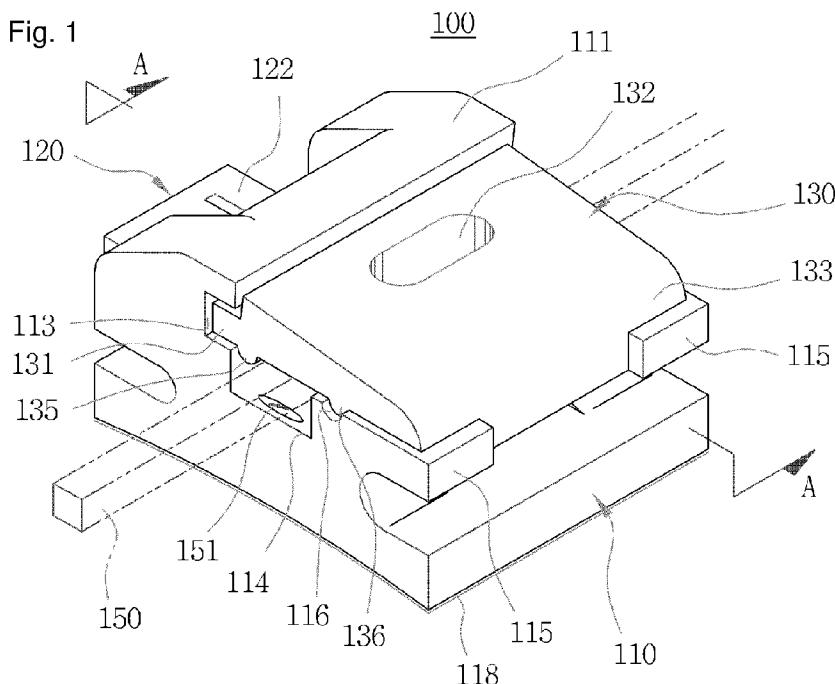
(74) Agent: **JUNG, Sesung**; 203, Bosung Bldg., 1425-1, Seocho-dong, Seocho-gu, Seoul 137-070 (KR).

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[Continued on next page]

(54) Title: SELF-LIGATING BRACKETS



(57) Abstract: An orthodontic appliance according to the present invention includes a bracket the bottom part of which adheres to a tooth when a row of teeth is corrected; an arch wire which is inserted into an arch wire receiving groove of said bracket; a cover capable of having a color; and an elastic fixing plate having a cover fixing part integrated which functions to fix said cover. The proposed orthodontic appliance is easy to install due to a self-ligating process, protects one's teeth and gums, and can have various colors to provide aesthetics.

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Description

SELF-LIGATING BRACKETS

Technical Field

- [1] The present invention relates to an orthodontic appliance, and particularly to an orthodontic appliance which is installed by self-ligating brackets in a patient's tooth to correct the tooth which is arranged crookedly. Due to the self-ligating bracket, the orthodontic appliance is easy to install, can come in various colors, and also protects the tooth so as to provide aesthetics when installed.

Background Art

- [2] Generally, a state in which a tooth is crooked and a row of teeth is arranged unevenly is referred to as "malocclusion" in dentistry, and a treatment which corrects the malocclusion is referred to as orthodontic treatment.
- [3] When a tooth or a row of teeth is in a malocclusion state, several kinds of problems occur. For example, a face looks frowned, food is hard to chew, and pronunciation is obscured when speaking since wind escapes between teeth.
- [4] Therefore, in order to address such problems, various orthodontic appliances have been developed and commercially used. The conventional orthodontic appliance is comprised of a bracket having two binding wings at each side, an arch wire, a binding tie, etc.
- [5] In these orthodontic appliances, a bracket which adheres to a tooth requiring orthodontic treatment, a binding wing which locks the arch wire and a center bracket portion are integrally formed on a base. In these wings and the center bracket portion, an oblong arch wire, which functions to fasten and align the bracket, can be inserted in a vertical direction relative to the center bracket portion, wherein the insertion groove can be formed to insert an arch wire of a square shape.
- [6] However, in these orthodontic appliances of the prior art, the oblong arch wire and the center bracket portion with the oblong insertion groove have an oblong assembly structure, which makes the insertion and removal of the arch wire into/from the insertion groove of the bracket inconvenient.
- [7] To solve this problem, Korea Patent Publication No. 10-0220103, the title of which is "Plain arch wire appliance" was disclosed.
- [8] Fig. 8 shows an orthodontic appliance of the above Korea Patent Publication No. 10-0220103. Herein, a bracket 10 includes an insertion groove which is formed at wings 11 of the orthodontic bracket, and which has a slant surface 13 of 15° through 25° to possibly use a vertical tube, an arch wire 20, binder 30 and a wedge. Also, the arch wire 20 is put into the insertion groove 12 of the bracket 10, and has a slant

surface 22 at a distal side 21. Furthermore, the binder 30 and the wedge 40 can be held in a space between the arch wire 20 and the insertion groove 12 which is put in the bracket 10.

[9] However, the above Korean Patent needs a separate binding tie by which the arch wire is fastened to each bracket, but a part protruding outside after installment is not smooth enough to provide aesthetics. Furthermore, holding the arch wire in the bracket slot requires ligature with a slender wire or the like, but this ligature work usually takes too much time.

[10] Also, there exists other problems in that the patient's lip and the inside of the cheek can get pricked as ligated with a slender wire, or the installed wire is easy to unfasten, or the force of friction that hinders taking the wire out of the bracket slot increases due to such ligature.

Disclosure of Invention

Technical Problem

[11] The present invention has been made to solve the above mentioned problems, and the object of the present invention is to provide an orthodontic appliance using a self-ligating method which enables ligature without requiring any separate binding tie, so that pain during treatment hardly occurs by the self-ligating, that ligature can be easily performed without fear of harming the gum and the like, and the treatment period can be shortened and the number of visits to the doctor can decrease.

Technical Solution

[12] To accomplish those objects, an orthodontic appliance using a self-ligating method is provided including: a bracket, wherein its lower side portion adheres to a tooth, one upper surface with a protruding head portion, a binding part receiving groove that is formed horizontally at the sidewall portion of said head portion, an arch wire receiving groove is formed at the lower side of the binding part of said receiving groove, and an elastic fixing plate holding aperture is formed by punching through to cross the arch wire receiving groove at the lower side of said arch wire receiving groove; an elastic fixing plate that is made of an elastic material and formed to be inserted into the elastic fixing plate holding aperture of said bracket. One of its end portions has a locking part, and the end of the other indented part, which winds towards the upper side, has a cover fixing part to fix a cover; and a cover that is fixed to said elastic fixing plate and to the appliance when the appliance is ligated in order to protect the tooth. The cover can have various colors.

[13] According to the present invention, said bracket has cover wing supporting parts at each side of the back surface of the arch wire receiving groove, wherein the front end of each cover wing supporting part has a locking groove, and the cover has a bonding

part bonded by insertion to said binding part receiving groove and a projection B received into the locking groove of said cover wing supporting part at both wing parts.

[14] According to the present invention, the top side of said cover has a locking projection A at both wing parts and a work groove punched through to facilitate ligation.

[15] According to the present invention, both bottom sides of said arch wire receiving groove have protrusion parts to reduce the force of friction with the arch wire.

[16] According to the present invention, a sliding member is further inserted and received in the arch wire receiving groove of said bracket, wherein the sliding member has an arch wire slot at its upper side to have the arch wire inserted.

[17] According to the present invention, both sides of said sliding member have embossing parts to reduce the force of friction.

[18] According to the present invention, the bottom part of said bracket has an anchor structure surface formed by coating double melted zirconia and alumina powders.

Advantageous Effects

[19] The present invention is advantageous in that pain according to treatment hardly occurs by self-ligating, a ligating work can be easily performed without any fear of harming the gum or the like, aesthetics can be provided according to each user's taste as the cover part can have various colors.

Brief Description of Drawings

[20] FIG. 1 shows a skew view of the assembled state of an embodiment of the present invention;

[21] FIG. 2 shows an exploded skew view of FIG. 1;

[22] FIG. 3 shows a sectional view taken according to the line A through A of FIG. 1;

[23] FIG. 4 shows a skew view of the assembled state of another embodiment of the present invention;

[24] FIG. 5 shows an exploded skew view of FIG. 4;

[25] FIG. 6 shows a sectional view taken according to the line B through B of FIG. 4;

[26] FIG. 7 shows a plan view of a row of teeth correction state of an orthodontic appliance according to an embodiment of the present invention; and

[27] FIG. 8 shows an exploded skew view of the prior art orthodontic appliance.

Best Mode for Carrying out the Invention

[28] FIG. 1 shows a skew view of the assembled state of an embodiment of the present invention, FIG. 2 shows an exploded skew view of FIG. 1, and FIG. 3 shows a sectional view taken according to the line A through A of FIG. 1.

[29] An orthodontic appliance 100 according to the present invention includes a bracket 110 the bottom part of which adheres to a tooth to correct a row of teeth; a cover 130 capable of having a color; and an elastic fixing plate 120 having a cover fixing part

integrally, which functions to fix said cover 130.

- [30] Said bracket 110 has a heading part 111, which protrudes at one side of its upper surface, and a binding part receiving groove 113, which is formed at the sidewall portion of said heading part 111 horizontally.
- [31] Said binding part receiving groove 113 has an arch wire receiving groove 114 towards its lower side, and said arch wire receiving groove 114 has an elastic fixing plate holding aperture 117 punched through to cross said arch wire receiving groove 114 at its lower side.
- [32] Said bracket 110 has cover wing supporting parts 115 at both sides of the back side of the arch wire receiving groove 114, and the front end of each cover wing supporting part 115 has a locking groove 116.
- [33] The cover 130 is fixed to the elastic fixing plate 120 which is inserted into the elastic fixing plate holding aperture 117 of said bracket 110.
- [34] Said cover 130 has a bonding part 131 bonded by insertion to the binding part receiving groove 113 of said bracket 110 and a locking projection B 136 received into the locking groove 116 of the cover wing supporting part 115 at both wing parts 133.
- [35] The top side of said cover 130 has a locking projection A 135 at both wing parts 133 and a work groove 132 punched through to facilitate ligation.
- [36] Both bottom sides of said arch wire receiving groove 114 desirably has protrusion parts 151 to reduce the force of friction with the arch wire 150.
- [37] Also, the bottom part of said bracket 110 has an anchor structure surface 118 formed by coating double melted zirconia and alumina powders to strengthen the adhesion with a tooth 200 by the penetration of such adhesive 119.
- [38] Said anchor structure surface 118 is formed by melting zirconia and alumina powders through the first step and the second step with each step having a different heating temperature.
- [39] The anchor structure surface 118 has concavo-convex parts so that the adhesive 119 is sufficiently penetrated to provide a strong bond to the tooth.
- [40] According to the orthodontic appliance 100 of the present invention, a bracket adheres to a tooth 200 which requires orthodontic treatment, and the orthodontic treatment of the tooth can be performed by aligning a separate bracket 200 to each tooth using an arch wire.
- [41] FIG. 4 shows a skew view of the assembled state of another embodiment of the present invention, FIG. 5 shows an exploded skew view of FIG. 4, and FIG. 6 shows a sectional view taken according to the line B through B of FIG. 4.
- [42] An orthodontic appliance 100 according to the present invention includes a bracket 110 the bottom part of which adheres to a tooth to correct a row of teeth; a sliding member 140, which is inserted and received in the arch wire receiving groove 114 of

said bracket 110; a cover 130 capable of having various colors; and an elastic fixing plate 120 having a cover fixing part 121, which functions to fix said cover 130.

[43] Therefore, the friction of the arch wire 150 with the bracket 110 can be minimized by enlarging the volume of the arch wire receiving groove 114 and installing a separate sliding member 140 therein.

[44] In the arch wire receiving groove 114 with said sliding member 140, a protrusion part 151 should not be formed.

[45] The bracket 110 has a heading part 111, which protrudes out of one side of its upper surface, and a binding part receiving groove 113, which is formed at the sidewall portion of said heading part 111 horizontally. Said binding part receiving groove 113 has an arch wire receiving groove 114 towards its lower side, and said arch wire receiving groove 114 has an elastic fixing plate holding aperture 117 punched through to cross said arch wire receiving groove 114 at its lower side.

[46] Said bracket 110 has cover wing supporting parts 115 at both sides of the back side of the arch wire receiving groove 114. The front end of each cover wing supporting part 115 has a locking groove 116.

[47] Also, the bottom part of the bracket 110 has an anchor structure surface 118 formed by coating double melted zirconia and alumina powders to strengthen adhesion with a tooth 200 by the penetration of such adhesive 119.

[48] Said sliding member 140 is inserted and received in the arch wire receiving groove 114 of said bracket 110, and the sliding member 140 has an arch wire slot 141 at its upper side to have the arch wire 150 inserted.

[49] Both sides of the sliding member 140 have embossing parts 143 to reduce the force of friction.

[50] Said elastic fixing plate 120 is an elastic body, one of its end portions has a locking part 122, and the end of the other indented part 123, which winds towards the upper side, has a cover fixing part 121 formed integrally to fix a cover 130.

[51] Said cover 130 is fixed to said elastic fixing plate 120, and protrudes outside when the appliance is ligated, and it prevents ceramics with a strong nature from directly approaching a tooth, and therefore prevents damage to the tooth and protects the tooth. Also, the cover part can have various colors according to each user's taste, so aesthetics can be provided.

[52] That is, said cover 130, which is fixed to an elastic fixing plate 120 inserted into the elastic fixing plate holding aperture 117 of said bracket 110, has a bonding part 131 bonded by insertion to the binding part receiving groove 113 of said bracket 110 and a locking projection B 136 received into the locking groove 116 of said cover wing supporting part 115 at both wing parts 133.

[53] Also, the upper side of said cover 130 has a work groove 132 punched through to

facilitate ligation. Furthermore, a locking projection A 135 is provided at each wing part 133 so that the cover 130 is locked to the locking groove 116 of said cover wing supporting part 115 for preventing a complete separation in case that the cover 130 is moving in the separation direction due to a user's carelessness.

[54] According to the orthodontic appliance 100 of the present invention, after a bracket 110 adhered to a tooth 200 which requires orthodontic treatment, the orthodontic treatment of the tooth can be performed by aligning a separate bracket 110 adhered to each tooth using an arch wire 150.

[55] FIG. 7 shows a plane view of a row of corrected teeth of an orthodontic appliance according to an embodiment of the present invention.

[56] As described above, after a bracket 110 adhering to a tooth 200 which requires orthodontic treatment, an arch wire 150 is inserted into an arch wire receiving groove 114 of said bracket 110, then, an elastic fixing plate 120 adhering to a cover 130 is inserted into an elastic fixing plate holding aperture 117 of said bracket 110 for complete bonding.

[57] Also, according to another embodiment of the present invention including a sliding member 140, after a bracket 110 adhering to a tooth 200 which requires orthodontic treatment, a sliding member 140 is inserted into an arch wire receiving groove 114 of said bracket 110. Subsequently, an arch wire 150 is inserted through an arch wire slot 141 of adjacent sliding member 140, and then an elastic fixing plate 120 adhering to a cover 130 is inserted into an elastic fixing plate holding aperture 117 of said bracket 110 for complete bonding.

[58] Both sides of the arch wire slot 141 of said sliding member 140 have embossing parts 143 to reduce the force of friction with the arch wire 150, so that orthodontic treatment can be performed more easily and so that the treatment period can be shortened.

[59] Said elastic fixing plate 120 has an end portion locking part 122, which is then locked to the locking jaw 112 of the bracket 110 as an orthodontic appliance is completely bonded to prevent a separation.

[60] Also, a projection B 136, which is formed at both wing parts 133 is received into the locking groove 116 of said cover wing supporting part 115 for much stronger bonding.

[61] The top side of the cover 130, which adheres to said elastic fixing plate 120, has a work groove 132 to facilitate ligation.

[62] The surface of said cover 130 can have different desired colors to satisfy user tastes.

Industrial Applicability

[63] As described above, the present invention relates to the field of an orthodontic appliance in great demand to meet requirements of a number of modern people that are interested in beauty or dental health. In particular, the proposed orthodontic appliance

has efficient features in comparison with prior art correcting appliances and can be applicable to various industries.

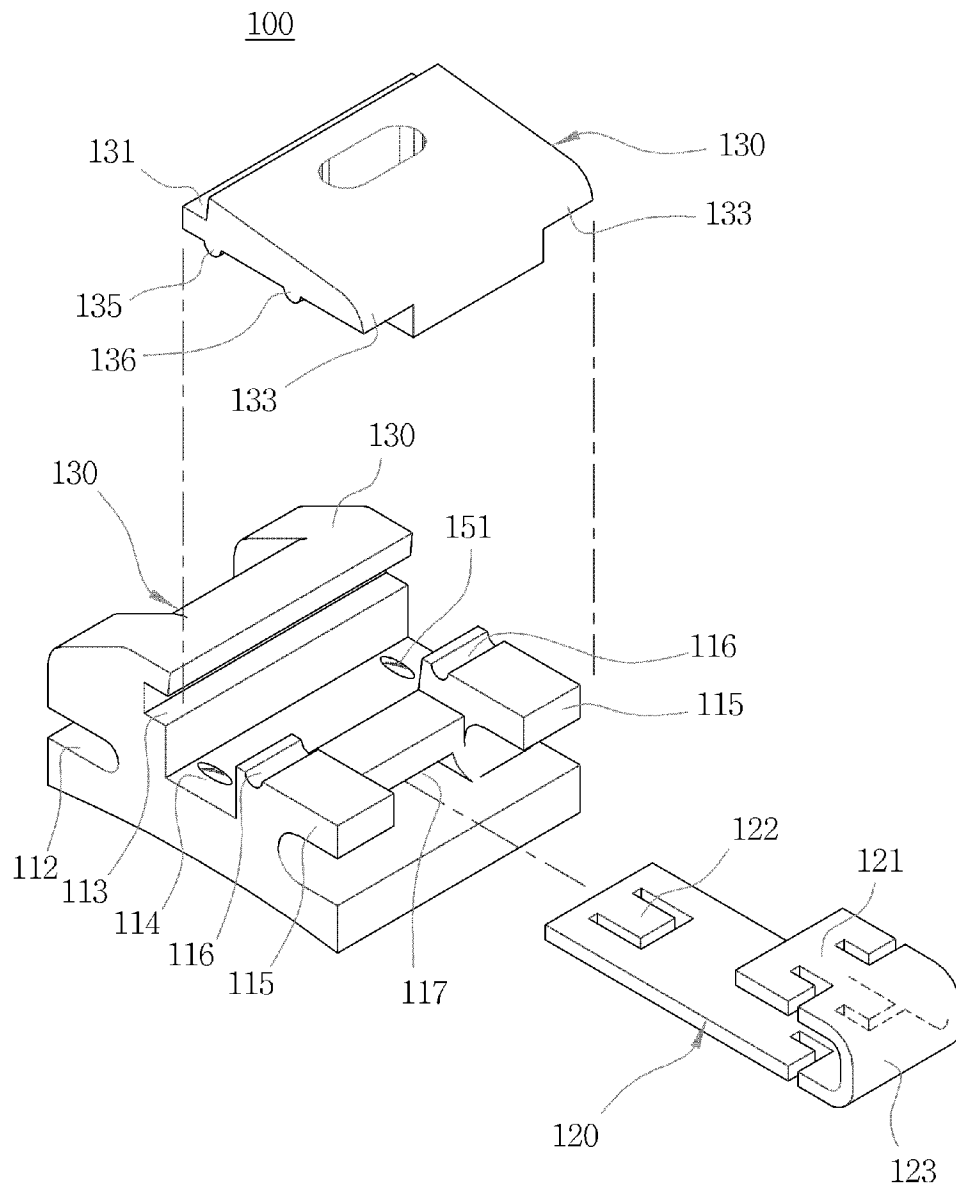
Claims

- [1] An orthodontic appliance using a self-ligating method, comprising:
A bracket 110, wherein its lower side portion adheres to a tooth, one upper side of its upper surface with a protruding head portion 111, the sidewall portion of said heading portion 111 with a binding part receiving groove 113 horizontally, the lower side of said binding part receiving groove 113 with an arch wire receiving groove 114, and the lower side of said arch wire receiving groove 114 with an elastic fixing plate holding aperture 117 formed by punching through to cross said arch wire receiving groove 114;
An elastic fixing plate 120 formed to be inserted into the elastic fixing plate holding aperture 117 of said bracket 110, one of its end portions having a locking part 122, and the end of the other indented part 123, which winds towards the upper side, with a cover fixing part 121 formed integrally to fix a cover 130; and the cover 130 fixed to said elastic fixing plate 120 and protruding from the appliance when the appliance is ligated in order to protect the tooth, wherein the cover 130 has various colors.
- [2] The appliance as claimed in Claim 1,
Said bracket 110 has cover wing supporting parts 115 at each side of the back surface of the arch wire receiving groove 114, wherein the front end of each cover wing supporting part 115 has a locking groove 116,
Said cover 130, which is fixed to an elastic fixing plate 120 inserted into the elastic fixing plate holding aperture 117 of said bracket 110, has a bonding part 131 bonded by insertion to the binding part receiving groove 113 of said bracket 110 and a locking projection B 136 received into the locking groove 116 of said cover wing supporting part 115 at both wing parts 133.
- [3] The appliance as claimed in Claim 1 or 2,
The top side of said cover 130 has a locking projection A 135 at both wing parts 133 and a work groove 132 punched through to facilitate ligation.
- [4] The appliance as claimed in Claim 1,
Both bottom sides of said arch wire receiving groove 114 has protrusion parts 151 to reduce the force of friction with the arch wire 150.
- [5] The appliance as claimed in Claim 1,
A sliding member 140 is further inserted and received in the arch wire receiving groove 114 of said bracket 110, wherein the sliding member 140 has an arch wire slot 141 at its upper side to have the arch wire 150 inserted.
- [6] The appliance as claimed in Claim 5,
Both sides of the sliding member 140 have embossing parts 143 to reduce the

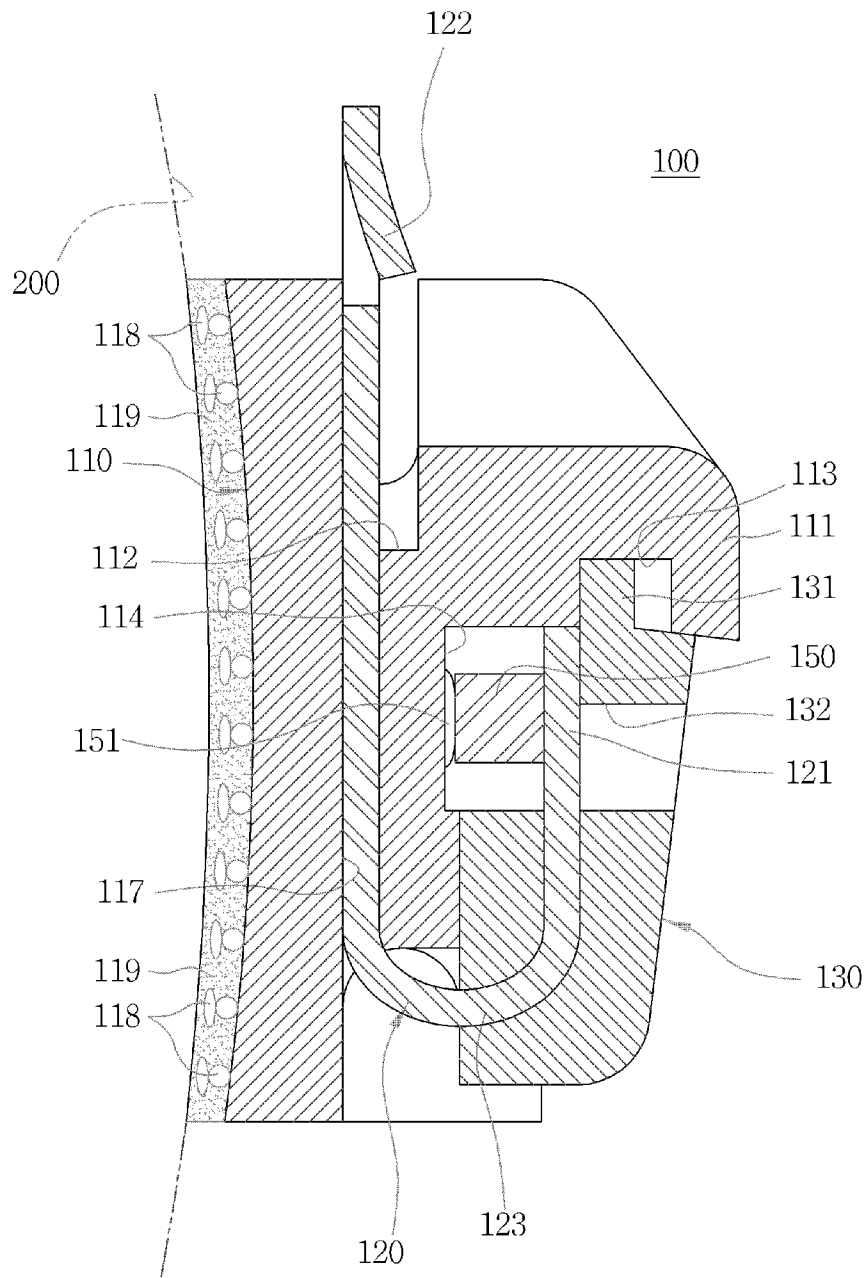
force of friction.

- [7] The appliance as claimed in Claim 1,
The bottom part of said bracket 110 has an anchor structure surface 118 formed
by coating double melted zirconia and alumina powders.

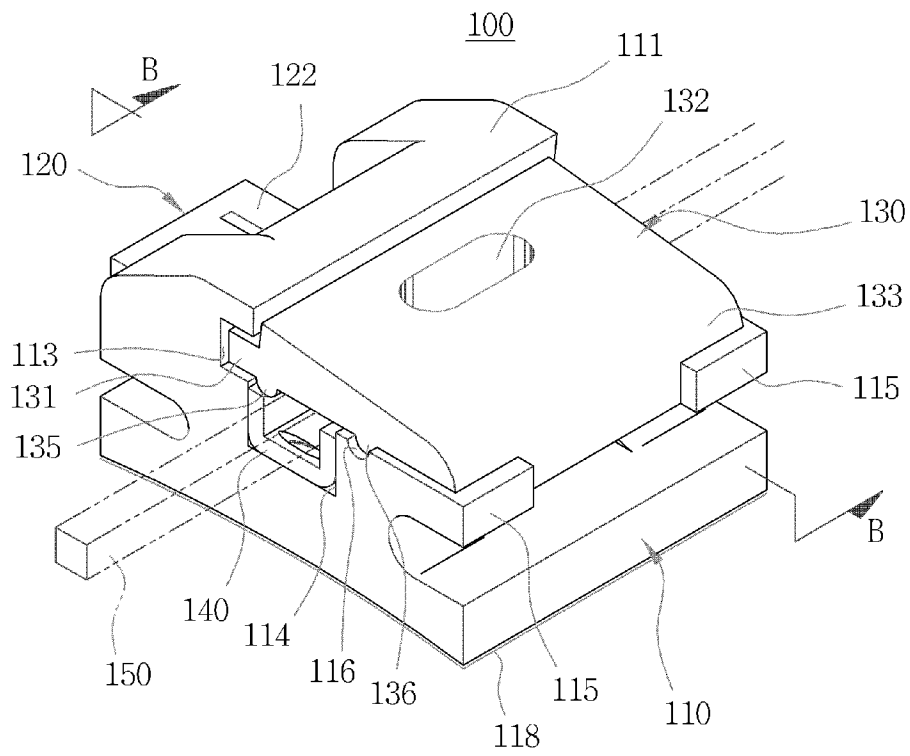
[Fig. 2]



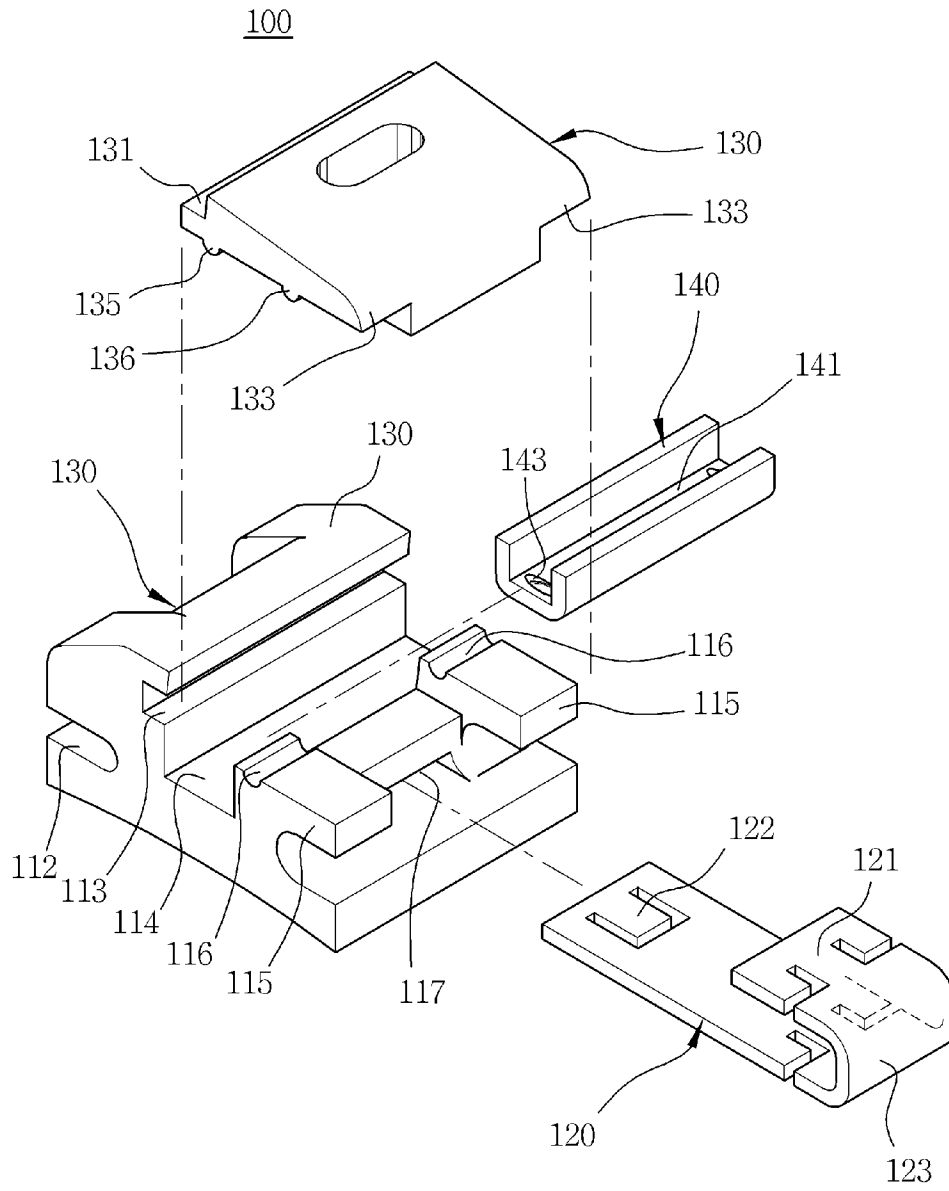
[Fig. 3]



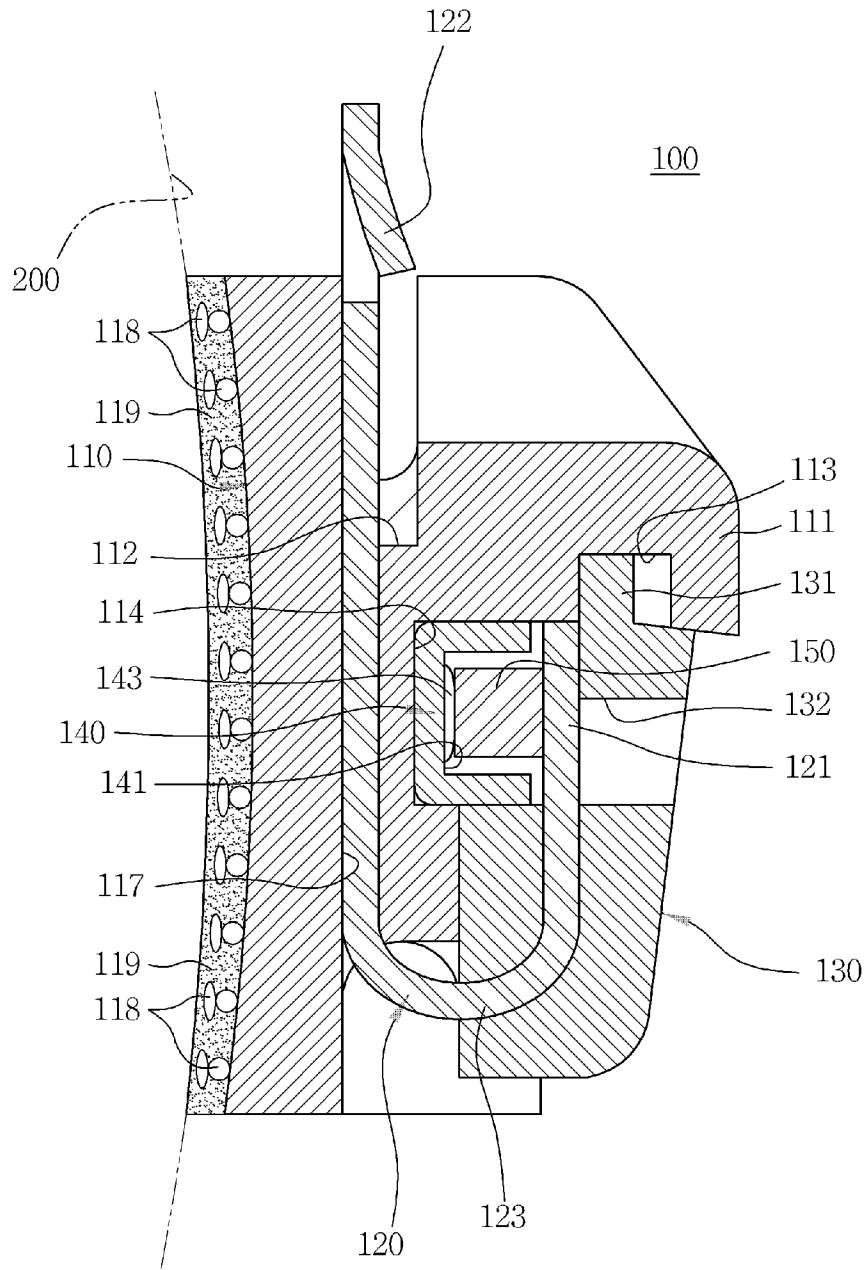
[Fig. 4]



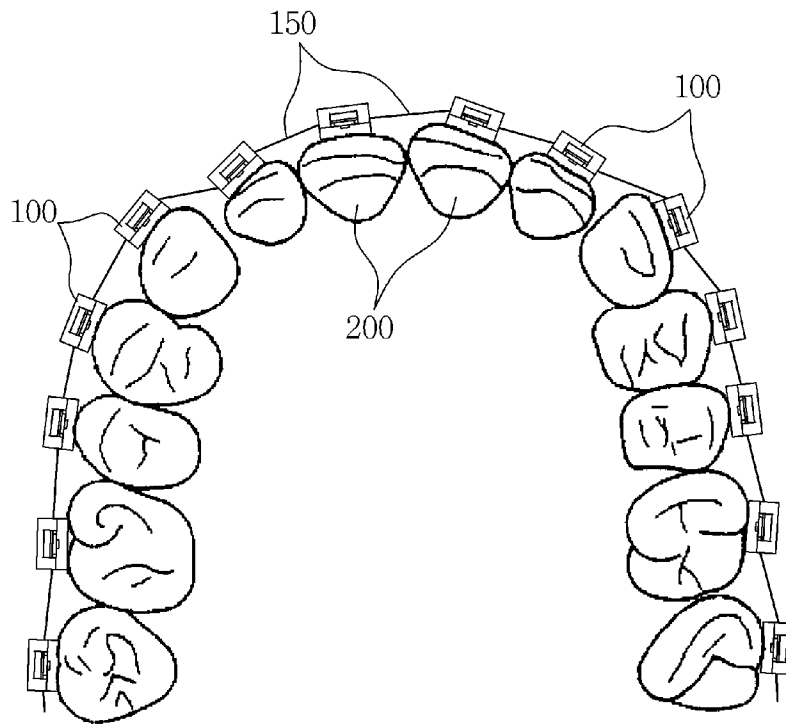
[Fig. 5]



[Fig. 6]



[Fig. 7]



[Fig. 8]

