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(54) **Light guide type pain reliever**

(57) A light guide type pain reliever includes a handle (200) including a barrel (1) accommodating a battery (100), a rear end cap (2) and a front end cap (4) respectively capped on two opposite ends of the barrel (1), a pushbutton (21) mounted in the rear end cap (2) and a switching connector (3) mounted in the rear end cap (2) and electrically connected to the battery (100) and drivable by the pushbutton (21) to switching on/off the battery (100), a holder shell (5) connected to the front end cap (4) and electrically coupled to the battery (100) and having electrically connected thereto a vibrator (55) and a light-emitting device (57), an adapter (6) connected to the holder shell (5), and a light guide plate (7) connected to adapter (6) guiding out light rays emitted by the light-emitting device (57).

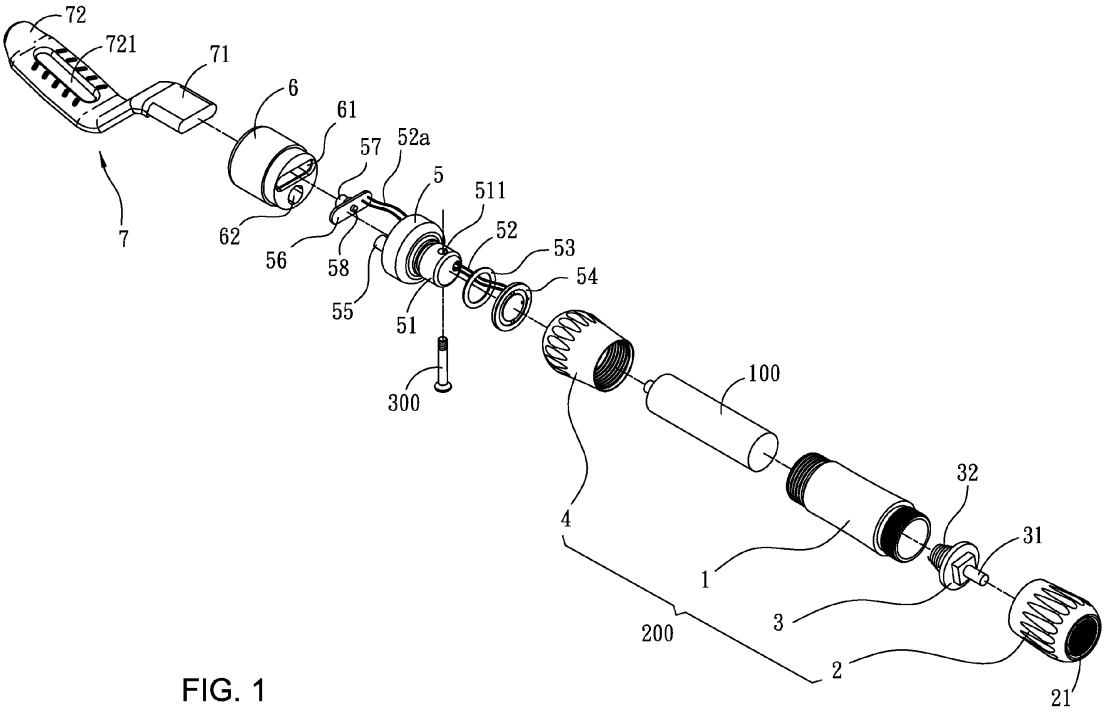

FIG. 1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention:

[0001] The present invention relates to medical implements and more particularly, to a light guide type pain reliever that provides vibration and illumination functions.

2. Description of the Related Art:

[0002] Today's dental technology has been mature, unlike the rough techniques of early dental clinics. However, many people are still afraid to visit the dentist today. Even a mature-age person may feel uneasy or nervous when sitting on the consultation chair. When going to inject the medicine in the patient's mouth during a dental treatment, patient's fear may arise.

[0003] In order to reduce the patient's anxiety and fear, the most common method is to let the patient inhale a nitrous oxide and oxygen mixture before surgery, helping the patient calm down and relax. Thus, the patient's pain can be reduced when taking an injection of local anesthetics or drugs. However, not every dental clinic can afford to buy a nitrous oxide and oxygen mixture supply equipment. Further, a potential crisis exists in using this kind of equipment, i.e., this kind of equipment is not suitable for use in a human streamlined clinic.

[0004] A pain reliever is known comprising a retractor and a handle. The handle has mounted therein a vibrator. The retractor can be used to drag the oral edge and to transmit vibrating waves to the oral edge, transferring the patient's attention, and thus, the patient's pain can be reduced when taking an injection of local anesthetics or drugs.

[0005] The aforesaid prior art pain reliever is convenient for use, however, the retractor can simply drag the oral edge, i.e., the applicable to any other area of the patient that does not allow traction. Therefore, there is a strong demand for a pain reliever that eliminates the aforesaid problem.

SUMMARY OF THE INVENTION

[0006] The present invention has been accomplished under the circumstances in view. It is one object of the present invention to provide a light guide type pain reliever, which can be pressed on the patient's affected area to guide a medication injection accurately, and controlled to transfer vibrating waves to the patient's affected area to reduce patient's pain during the medication injection.

[0007] It is another object of the present invention to provide a light guide type pain reliever, which uses a light guide plate as a depressor plate so that the light guide plate can illuminate the surroundings when it is pressed on the patient's affected area.

[0008] To achieve these and other objects of the present invention, a light guide type pain reliever comprises a hollow handle, which comprises a barrel accommodating therein a battery, a rear end cap capped on one end of the barrel, a pushbutton mounted in the rear end cap, a front end cap thread-connected to an opposite end of the barrel and a switching connector mounted in the rear end cap and electrically connected to the batter and drivable by the pushbutton to switch on/off the battery, a holder shell connected to the front end cap and electrically coupled to the battery and having electrically connected thereto a vibrator and a light-emitting device, an adapter connected to the holder shell and adapted to accommodate the vibrator and the light-emitting device and provided with a plug hole in a front side thereof, and a light guide plate having one end thereof plugged into the plug hole of the adapter and kept in line with the light-emitting device for receiving light rays emitted by the light-emitting device and an opposite end thereof suspending outside the adapter and provided with an insertion slot.

[0009] Other advantages and features of the present invention will be fully understood by reference to the following specification in conjunction with the accompanying drawings, in which like reference signs denote like components of structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

FIG. 1 is an exploded view of a light guide type pain reliever in accordance with the present invention.

FIG. 2 corresponds to FIG. 1 when viewed from another angle.

FIG. 3 is a perspective view of the light guide type pain reliever in accordance with the present invention.

FIG. 4 is a schematic sectional view of the light guide type pain reliever in accordance with the present invention.

FIG. 5a is an oblique top elevation of the light guide plate of the light guide type pain reliever in accordance with the present invention.

FIG. 5b is an oblique bottom elevation of the light guide plate of the light guide type pain reliever in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] Referring to FIGS. 1 and 2, a light guide type pain reliever in accordance with the present invention is a shown. As illustrated, the light guide type pain reliever comprises a barrel **1**, a battery **100** accommodated in the barrel **1**, an rear end cap **2** capped on a rear end of the barrel **1**, a pushbutton **21** mounted in a rear end of the rear end cap **2,** a switching connector **3,** which is made in the form of a circuit board and mounted in the

rear end cap **2** and, which comprises a conducting terminal **32** made in the form of a metal spring and located at a front side thereof and stopped against the negative terminal of the battery **100** and a switching rod **31** located at a rear side thereof and connected to the pushbutton **21** and movable by the pushbutton **21** to switch on/off the battery **100,** a front end cap **4** capped on a front end of the barrel **1** and constituting with the barrel **1** and the rear end cap **2** a handle **200** for gripping by the user and defining therein a center through hole **41,** a hollow holder shell **5** having a tubular bottom neck **51** inserted into the center through hole **41,** a screw bolt **300** transversely inserted through the front end cap **4** and a transverse mounting hole **511** on the tubular bottom neck **51** to fasten the front end cap **4** and the hollow holder shell **5** together, a gasket ring **53** mounted around the tubular bottom neck **51** and sealed in between the front end cap **4** and the tubular bottom neck **51,** a plate electrode **54** mounted in the front end cap **4** and electrically kept in contact with the positive terminal of the battery **100,** a first electrical wire **52** electrically connected between the plate electrode **54** and the holder shell **5,** a vibrator **55** mounted in the holder shell **5,** a substrate **56** accommodated in the holder shell 5, a light-emitting device, for example, LED **57** installed in the substrate **57,** a second electrical wire **52a** electrically connected between the holder shell **5** and the substrate **56,** and a selector switch **58** for selecting operating modes, for example, the mode of exclusively driving the light-emitting device **57** to give off light, the mode of exclusively driving the vibrator **55** to vibrate, or the mode of driving the light-emitting device **57** to give off light and the vibrator **55** to vibrate at the same time.

[0012] Referring to FIGS. 1 and 2 again, the light guide type pain reliever further comprises an adapter **6,** and a light guide plate **7** coupled to the holder shell **5** by the adapter **6.** The adapter **6** comprises a locating slot **61** and a vibrator hole **62** located in the rear side thereof, and a plug hole **63** located in the front side thereof. The locating slot **61** is adapted to the light-emitting device **57** and the substrate **56,** enabling the light-emitting device **57** to be kept inside the adapter **6.** The vibrator hole **62** is adapted to accommodate the vibrator **55,** enabling the adapter **6** to be vibrated by the vibrator **55.** The plug hole **63** is kept in line with the locating slot **61,** and adapted for the mounting of the light guide plate **7.** The light guide plate **7** is a curved plate member comprising a mounting portion **71** located at one end thereof and plugged into the plug hole **63** of the adapter **6** and kept in line with the light-emitting device **57,** and a depressor portion **72** located at one end thereof. The depressor portion **72** is shaped like a closed loop, defining therein an insertion slot **721** for the insertion of a syringe to inject a medicine into a predetermined part of the patient's body. FIG. 3 illustrates the light guide type pain reliever well assembled.

[0013] Referring to FIG. 4, after installation of the light guide plate **7** with the adapter **6** in the holder shell **5** at one end of the handle **200,** the mounting portion **71** of the light guide plate **7** is kept in line with the light-emitting device **57.** Thus, when switched on the pushbutton **21** at the rear side of the handle **200,** the battery **100** is electrically conducted to the light-emitting device **57** and the vibrator **55,** causing the light-emitting device **57** to give off light and the vibrator **55** to vibrate. At this time, the light guide plate **7** guides the emitted light to the depressor portion **72** for divergent illumination, enabling light rays to go in all directions around the desired area. Thus, when a physician uses the depressor portion **72** to perform an oral cavity treatment, the depressor portion **72** simultaneously illuminates the oral cavity, enabling the physician to see clearly all corners in the oral cavity. When starting the vibrator **55,** the vibrator **55** will vibrate the adapter **6** and the light guide plate **7.** At this time, the light guide plate **7** can be pressed on the affected area in the oral cavity of the patient to transmit vibrating waves to the affected area, and the physician can then insert the needle of the syringe through the insertion slot **721** in the depressor portion **72** into the affected area in the oral cavity of the patient to inject a medicine. Subject to the effects of vibration on the affected area, the patient will feel less pain in the affected area.

[0014] Referring to FIGS. 5a and 5b, the light guide plate **7** comprises a frosted structure of beads or tiny rhombic facets on opposing top and bottom surfaces for reflecting incident light rays in different directions, enhancing the uniformity of illumination. Thus, the physician can selectively press the top surface or bottom surface of the light guide plate **7** on the patient's affected area, giving sufficient illumination.

[0015] Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

Claims

1. A light guide type pain reliever, comprising:

a hollow handle (200), said hollow handle (200) comprising a barrel (1) accommodating therein a battery (100), a rear end cap (2) capped on one end of said barrel (1), a pushbutton (21) mounted in said rear end cap (2), a front end cap (4) thread-connected to an opposite end of said barrel (1), and a switching connector (3) mounted in said rear end cap (2) and electrically connected to said battery (100), said switching connector (3) comprising a switching rod (31) linked to said pushbutton (21) and drivable by said pushbutton (21) to switch on/off said battery (100);

a holder shell (5) being a hollow member con-

nected to said front end cap (4) and electrically coupled to said battery (100), said holder shell (5) having electrically connected thereto a vibrator (55) and a light-emitting device (57);
an adapter (6) connected to said holder shell (5) and adapted to accommodate said vibrator (55) and said light-emitting device (57), said adapter (6) comprising a plug hole (63) located in a front side thereof; and
a light guide plate (7) having one end thereof plugged into said plug hole (63) of said adapter (6) and kept in line with said light-emitting device (57) for receiving light rays emitted by said light-emitting device (57) and an opposite end thereof suspending outside said adapter (6) and provided with an insertion slot (721).

2. The light guide type pain reliever as claimed in claim 1, wherein said front end cap (4) defines a center through hole (41) for the connection of said holder shell (5).

3. The light guide type pain reliever as claimed in claim 2, wherein said holder shell (5) comprises a tubular bottom neck (51) inserted into said center through hole (41)of said front end cap (4), a mounting hole transversely located in said tubular bottom neck (51), and a screw bolt (300) inserted through said mounting hole to fasten said holder shell (5) to said front end cap (4).

4. The light guide type pain reliever as claimed in claim 1, further comprising a gasket ring (53) mounted around said tubular bottom neck (51) and sealed between said front end cap (4) and said holder shell (5).

5. The light guide type pain reliever as claimed in claim 1, further comprising a plate electrode (54) electrically connected between said battery (100) and said holder shell (5).

6. The light guide type pain reliever as claimed in claim 1, further comprising a substrate (56) electrically connected to said holder shell (5) substrate (56) and adapted to carry said light-emitting device (57).

7. The light guide type pain reliever as claimed in claim 1, wherein said light guide plate (7) comprises a mounting portion (71) located at one end thereof and plugged into said plug hole (63), and depressor portion (72) located at an opposite end thereof.

8. The light guide type pain reliever as claimed in claim 7, wherein said depressor portion (72) is a shaped like a closed loop.

9. The light guide type pain reliever as claimed in claim 1, wherein said light guide plate (7) is a curved plate member.

10. The light guide type pain reliever as claimed in claim 1, wherein said adapter (6) comprises a locating slot (61) and a vibrator (55) hole in a rear side thereof for accommodating said light-emitting device (57) and said vibrator (55) respectively.

11. The light guide type pain reliever as claimed in claim 1, wherein said holder shell (5) has mounted therein a selector switch for controlling operating modes of said vibrator (55) and said light-emitting device (57).

12. The light guide type pain reliever as claimed in claim 11, wherein said selector switch is installed in said substrate (56).

13. The light guide type pain reliever as claimed in claim 1, wherein said light guide plate (7) comprises a frosted structure on a surface thereof.

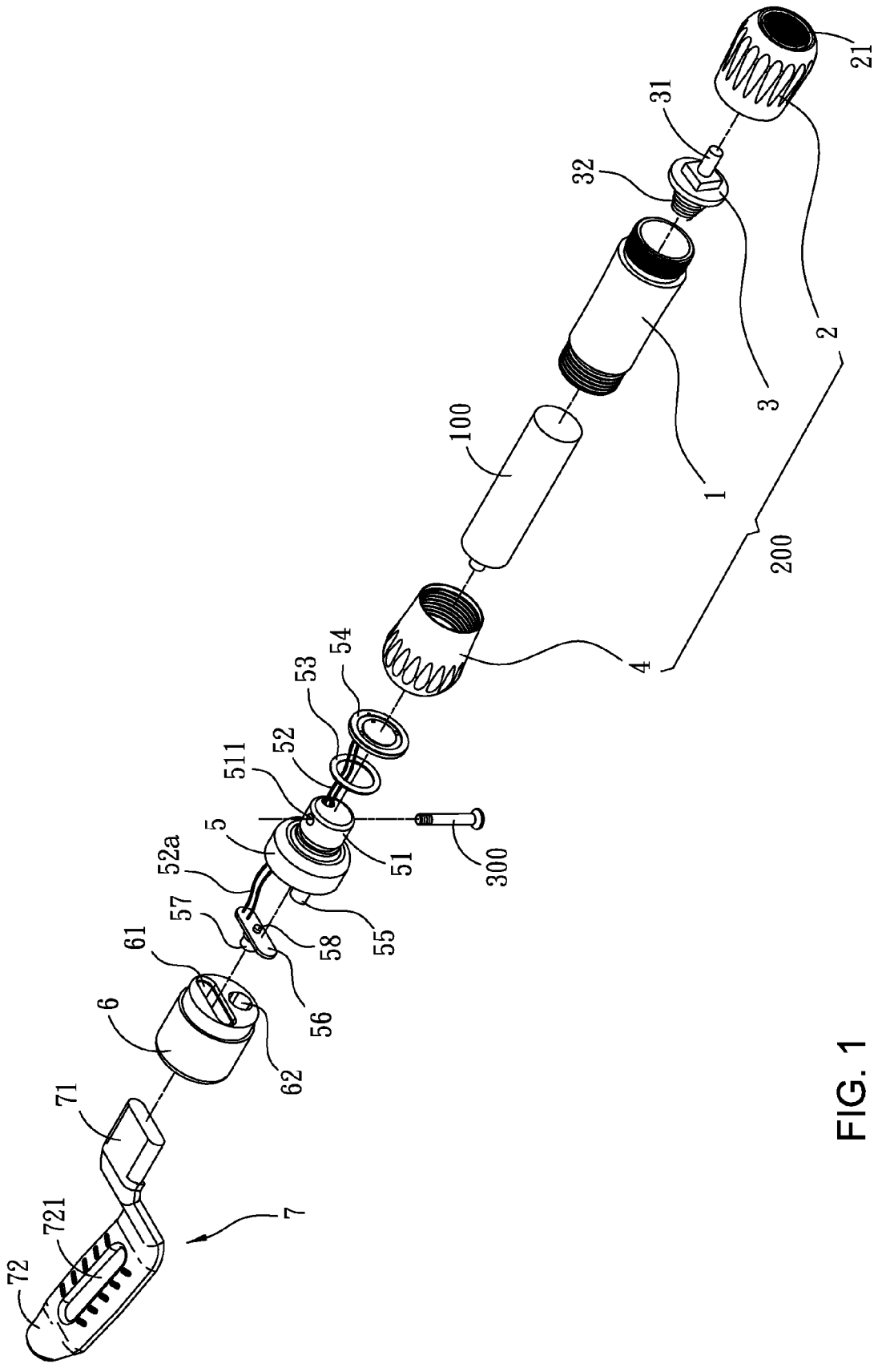
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FIG. 1

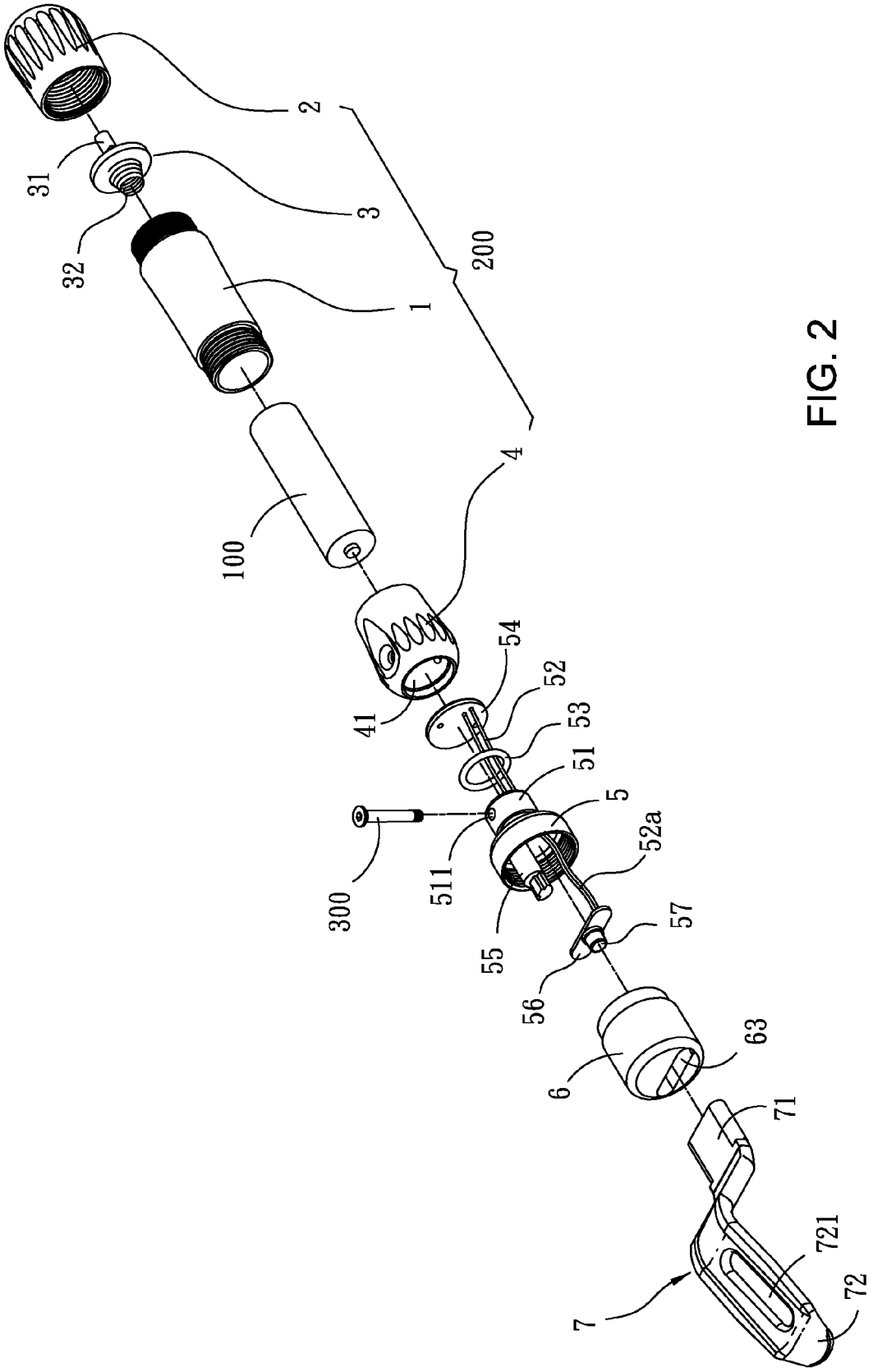
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FIG. 2

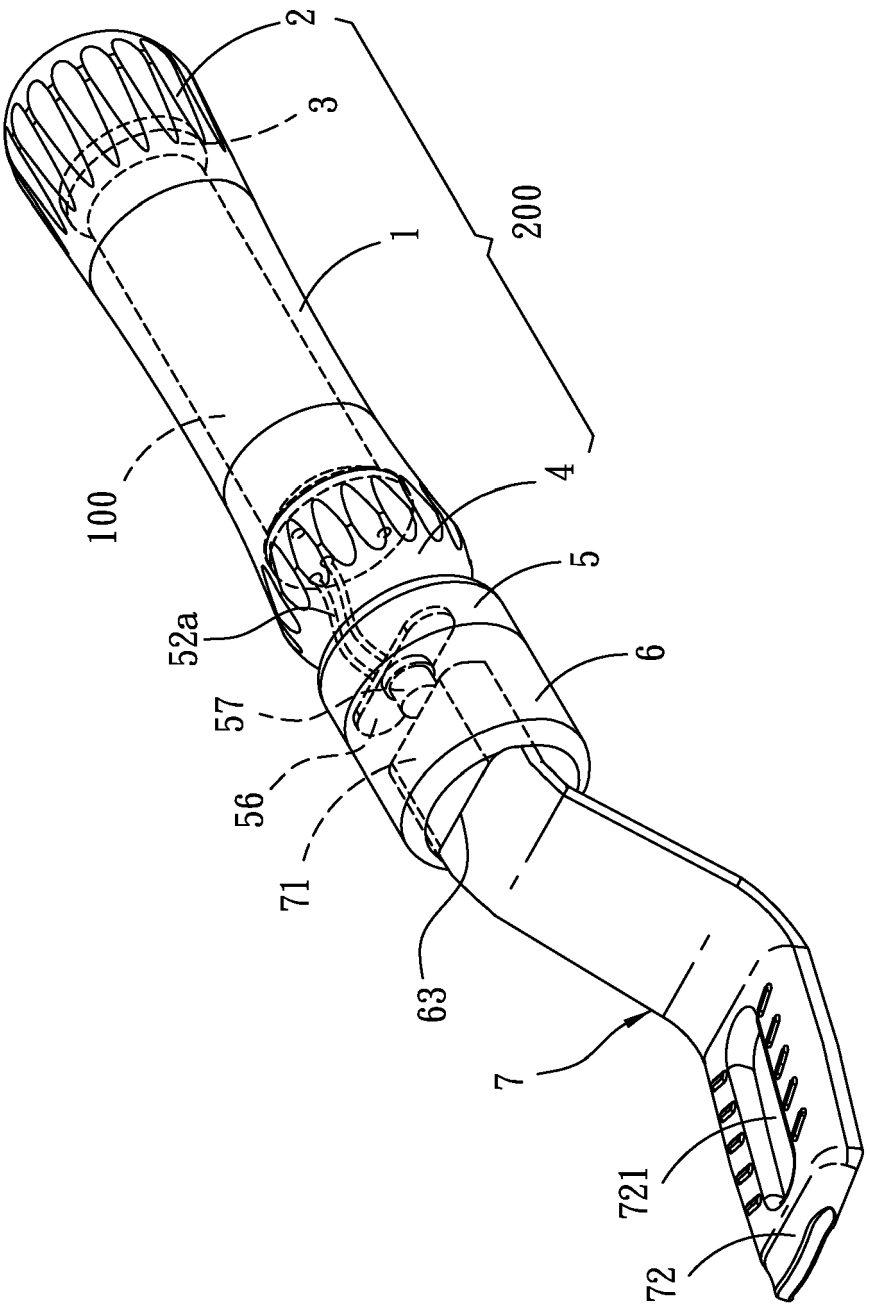

FIG. 3

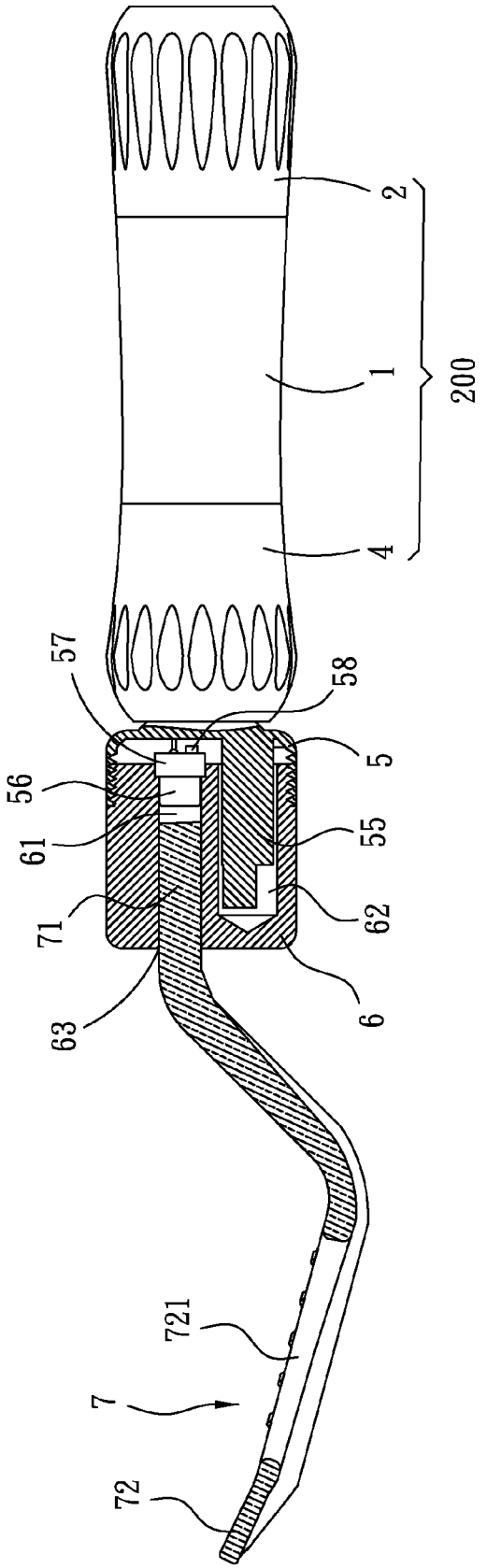

FIG. 4

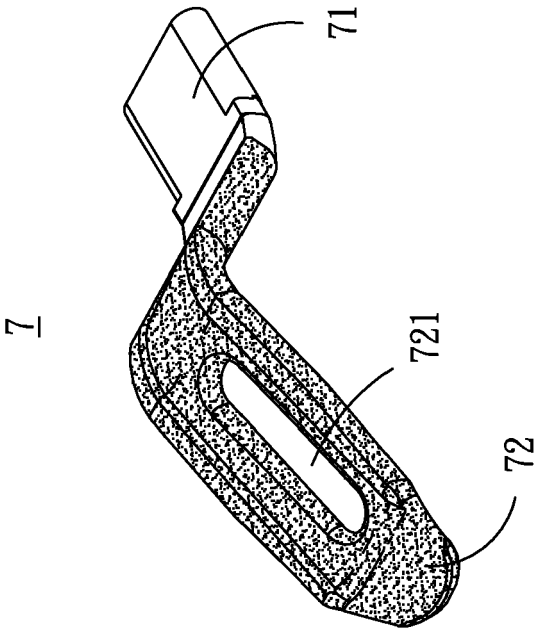

FIG. 5b

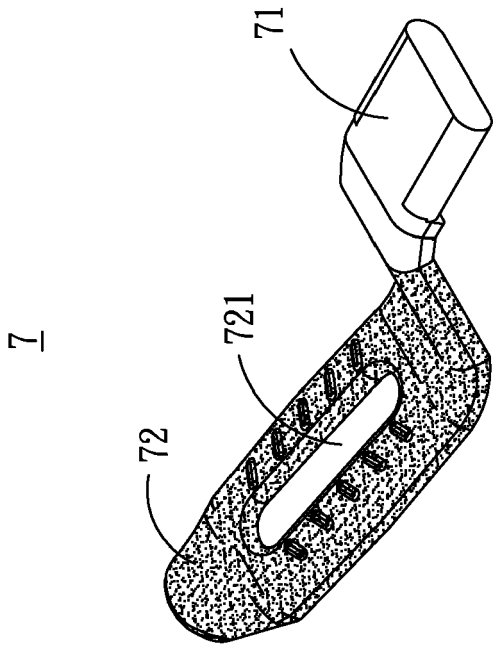

FIG. 5a

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EUROPEAN SEARCH REPORT

Application Number
EP 13 17 9687

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2010/110823 A1 (BING INNOVATIONS LLC [US]; GOLDBERG STEVEN [US]) 30 September 2010 (2010-09-30) * paragraphs [0006], [0007], [0030] - [0043]; claims; figures *	1-13	INV. A61H21/00 A61H23/02
X	WO 2006/034324 A2 (GOLDBERG STEVEN G [US]) 30 March 2006 (2006-03-30) * paragraphs [0008], [0024] - [0037]; claims; figures *	1-11	
X	US 2011/005486 A1 (NAKAMURA KAZUO [JP]) 13 January 2011 (2011-01-13) * paragraphs [0004] - [0012], [0030] - [0036]; claims; figures *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	25 November 2013	Fouquet, Michèle

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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& : member of the same patent family, corresponding document

1 EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 17 9687

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
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25-11-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010110823 A1	30-09-2010	AU 2010229783 A1	03-11-2011
		CA 2756890 A1	30-09-2010
		CN 102395397 A	28-03-2012
		EP 2411074 A2	01-02-2012
		JP 2012521809 A	20-09-2012
		KR 20120013348 A	14-02-2012
		RU 2011141339 A	10-05-2013
		US 2012016292 A1	19-01-2012
		WO 2010110823 A1	30-09-2010
		WO 2010111611 A2	30-09-2010
WO 2006034324 A2	30-03-2006	CA 2580792 A1	30-03-2006
		EP 1791510 A2	06-06-2007
		US 2008255483 A1	16-10-2008
		US 2011270154 A1	03-11-2011
		WO 2006034324 A2	30-03-2006
US 2011005486 A1	13-01-2011	DE 102010037709 A1	05-05-2011
		JP 5071464 B2	14-11-2012
		JP 2011099352 A	19-05-2011
		US 2011005486 A1	13-01-2011

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