US 20110277256A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2011/0277256 A1**

(43) **Pub. Date: Nov. 17, 2011**

Jo et al.

(54) **TOOTHBRUSH**

(75) Inventors: **Hyun Ju Jo**, Gyeonggi-do (KR); **Ki Hyun Lee**, Gyeonggi-do (KR)

(73) Assignee: **Hyun Ju Jo**, Suwon-si, Gyeonggi-do (KR)

(21) Appl. No.: **13/145,562**

(22) PCT Filed: **Apr. 29, 2009**

(86) PCT No.: **PCT/KR2009/002258**

§ 371 (c)(1), (2), (4) Date: **Jul. 20, 2011**

(30) **Foreign Application Priority Data**

Jan. 20, 2009 (KR) 10-2009-0004430

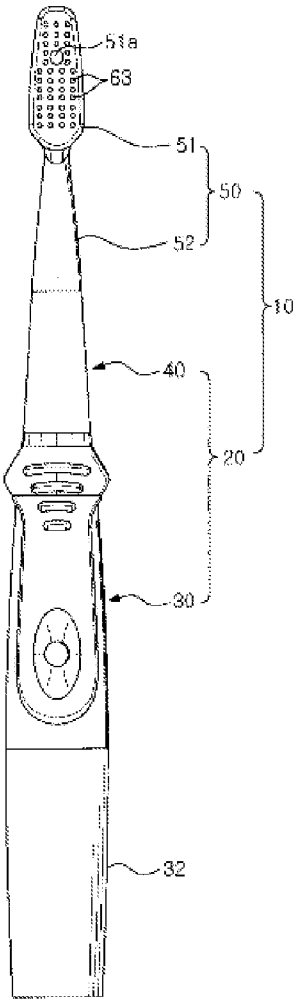
Publication Classification

(51) **Int. Cl.**
A46B 15/00 (2006.01)

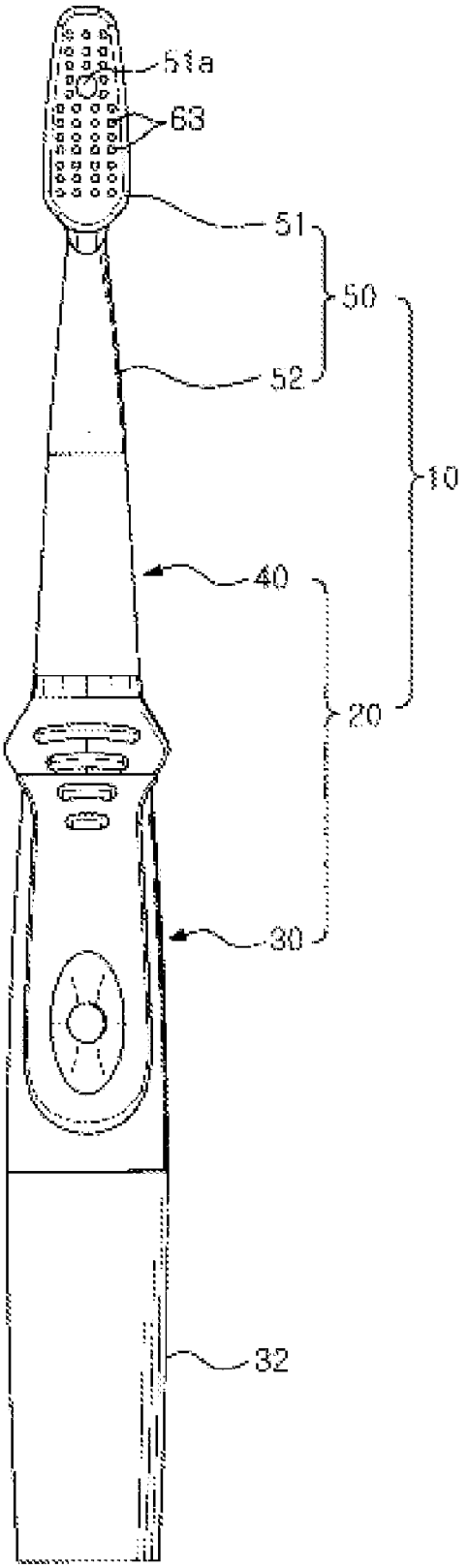
(52) **U.S. Cl.** **15/106**

(57) **ABSTRACT**

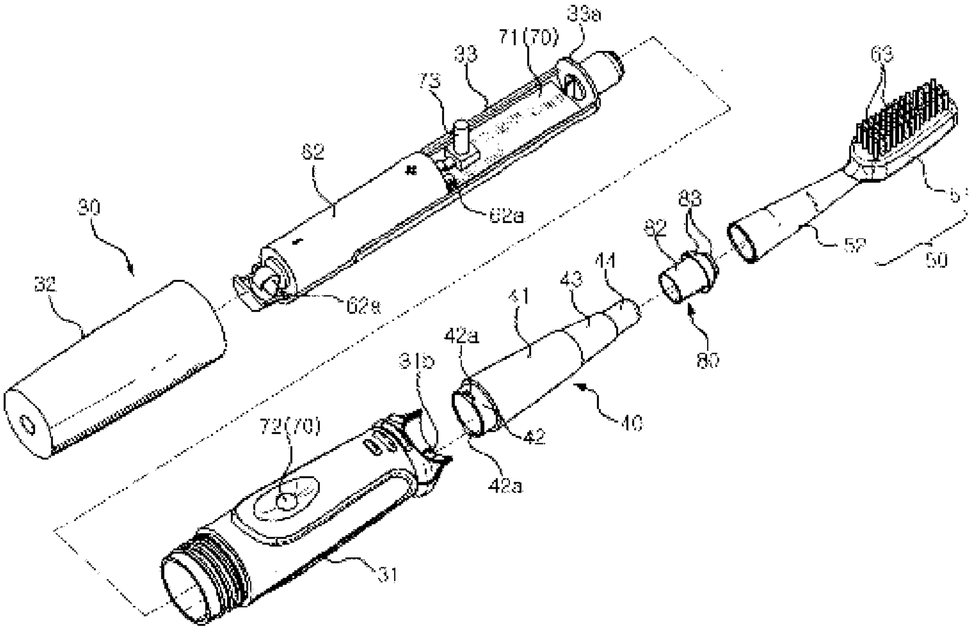
The present invention relates to a toothbrush, comprising: a toothbrush body unit having a gripping handle and a head part coupled to the front end of the gripping handle; a bristle implanted in one area of the outer surface of the head part; a laser diode mounted on the gripping handle to emit a laser beam to the inside of the head part; a battery mounted on the gripping handle and electrically connected to the laser diode; a laser driving unit having a start switch installed on the gripping handle; a reflector installed within the head part to guide the laser beam emitted by the laser diode to the bristle; and a light-scattering member having a scattering body which is made of a transparent material and which has a laser passage hole with a cross-sectional area smaller than the illumination area of the laser beam emitted by the laser diode, and which is arranged in the toothbrush body unit to enable the laser beam emitted by the laser diode to pass through the laser passage hole and be scattered.



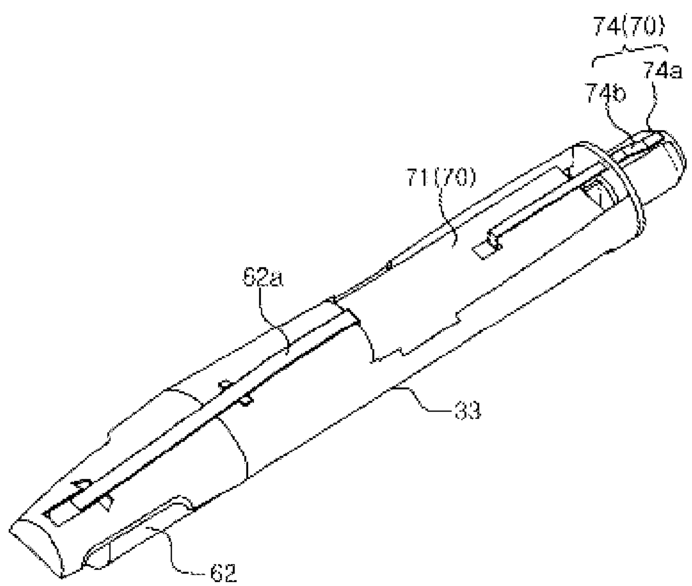
【Fig 1】



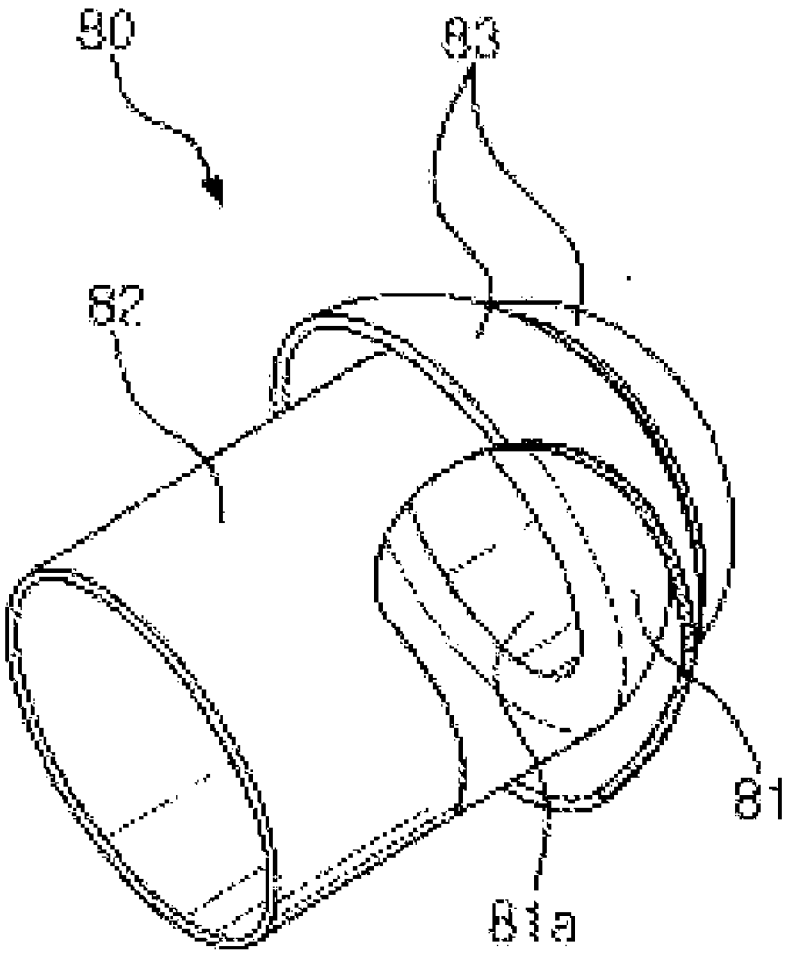
【Fig 2】


33a
71(70)
33
73
62
62a
30
32
62a
63
83
82
52
50
80
44
43
41
42a
31b
72(70)
42
40
42a
31

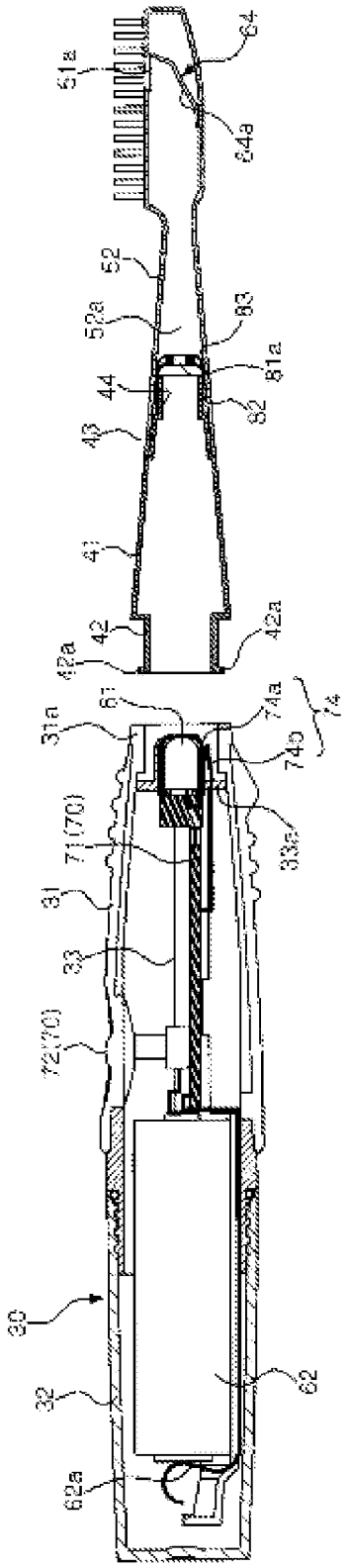
【Fig 3】


74(70)
74a
74b
71(70)
62a
33
62

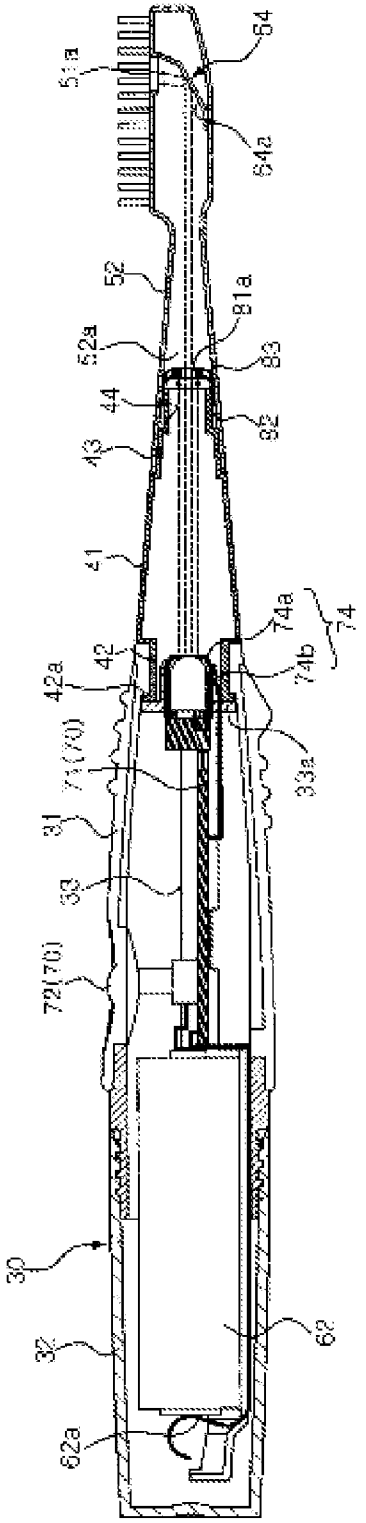
【Fig 4】



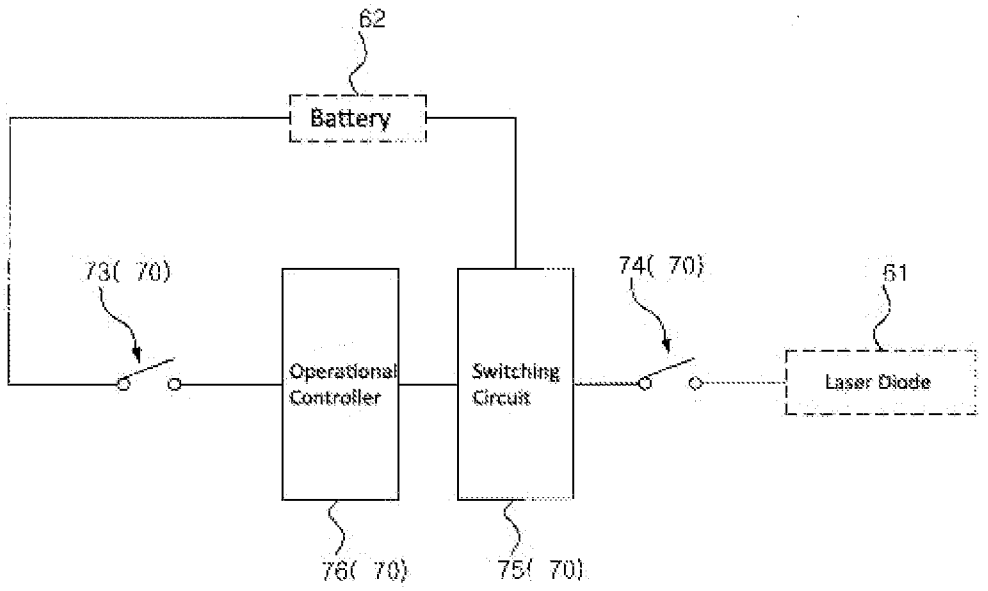
【Fig 5】


64
51a
64a
52
52a
93
81a
44
82
43
41
42
42a
42a
61
74a
74
31a
74b
71(70)
33a
31
33
72(70)
30
32
62
62a

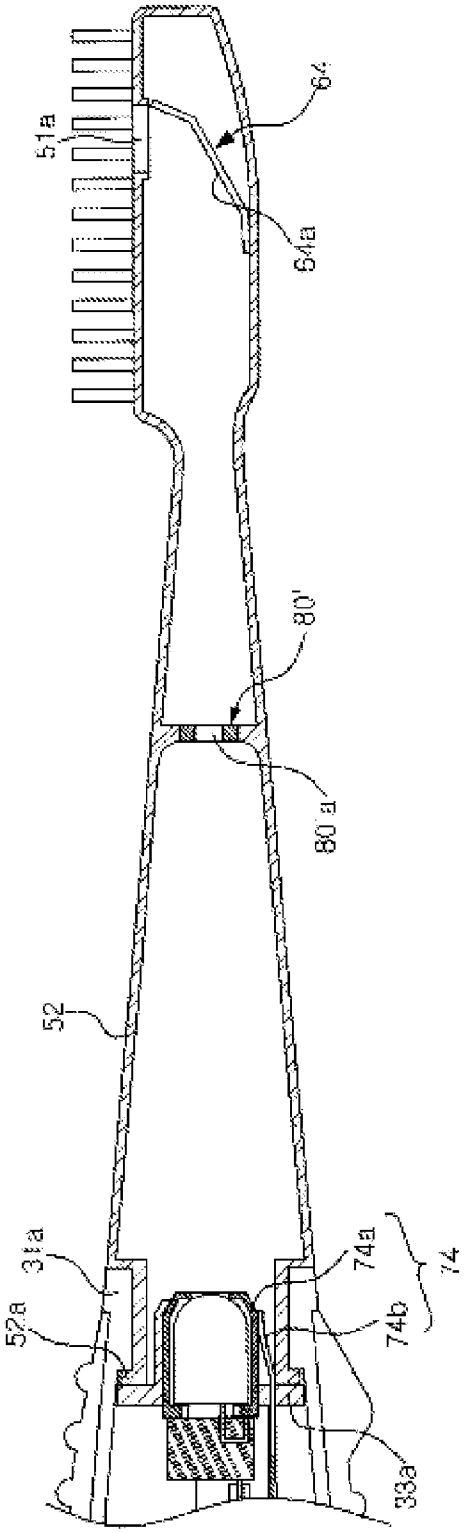
【Fig 6】


51a
64
64a
52
81a
52a
83
44
82
43
41
74a
74
42
74b
42a
71(70)
33a
91
33
72(70)
30
32
62
62a

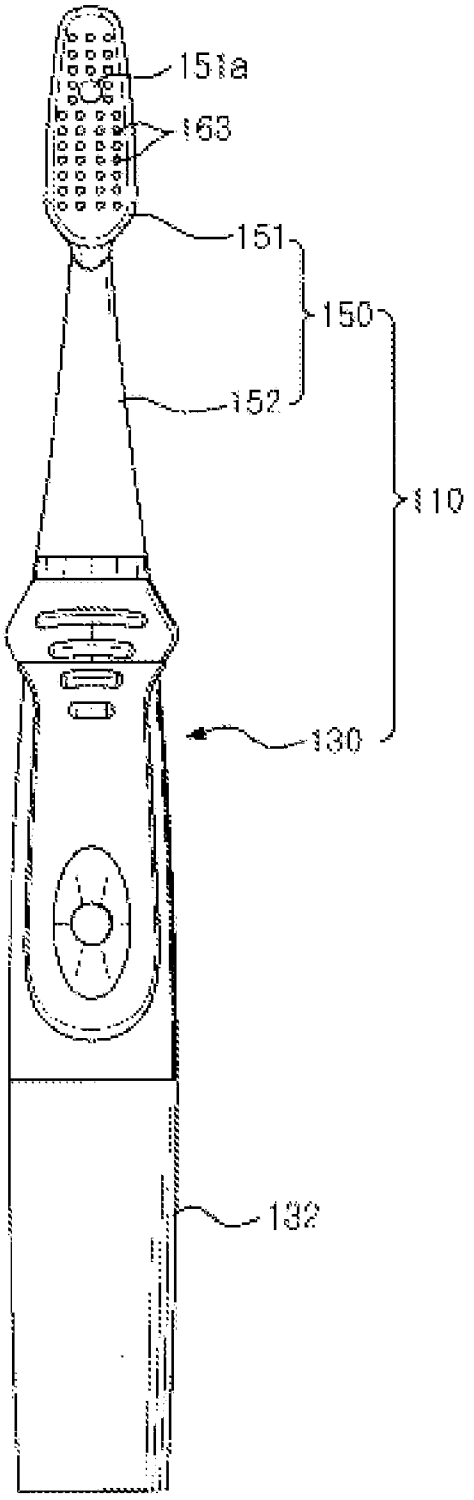
【Fig 7】


62
Battery
73(70)
Operational Controller
Switching Circuit
74(70)
61
Laser Diode
76(70)
75(70)

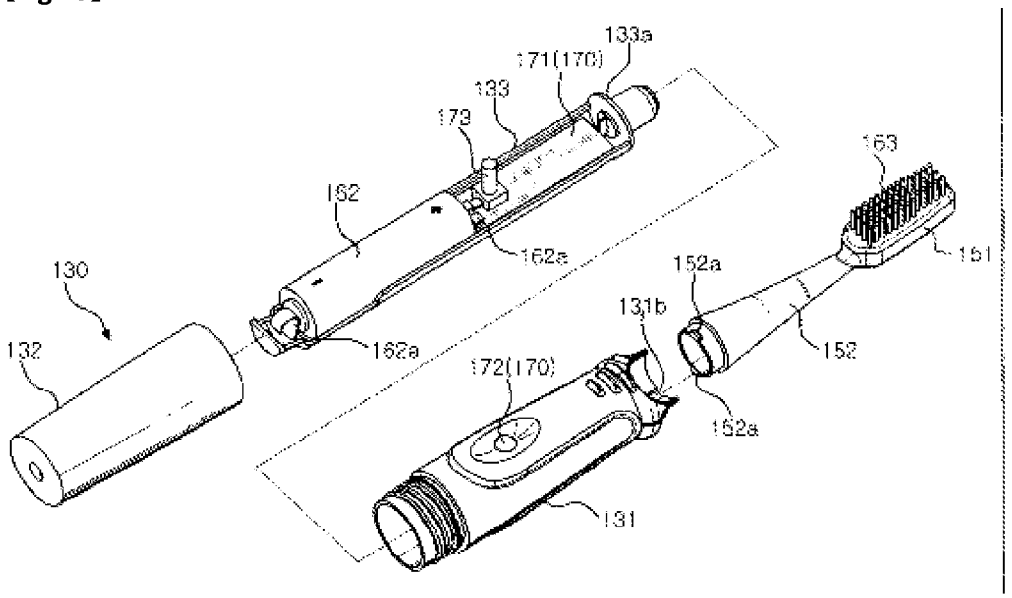
【Fig 8】



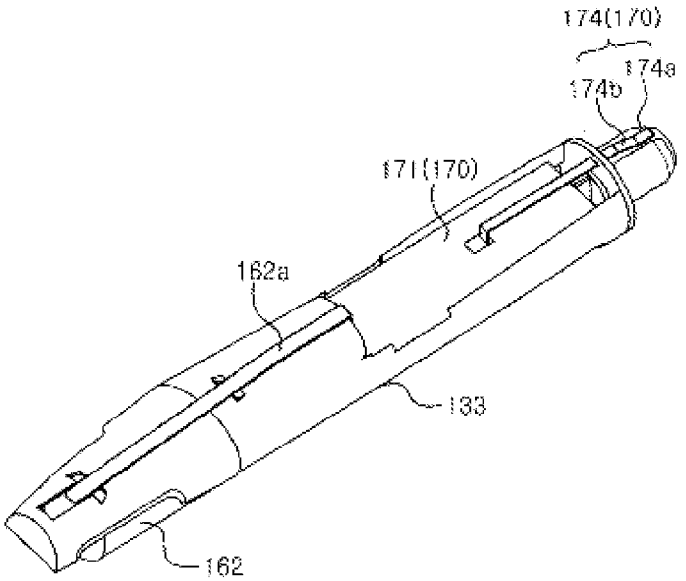
【Fig 9】



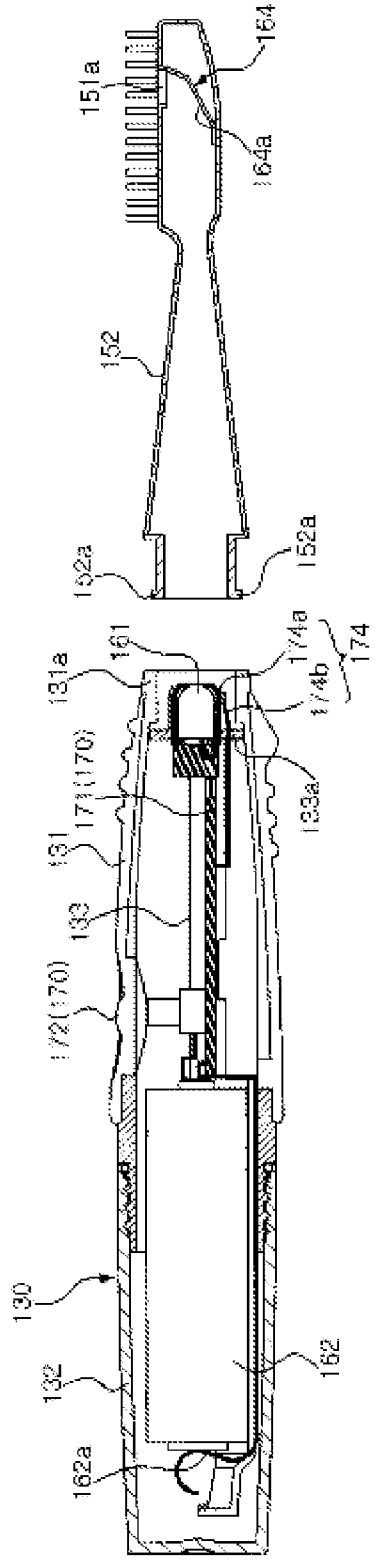
【Fig 10】


133a
171(170)
133
179
152
162a
163
151
130
152a
131b
132
162a
172(170)
152
152a
131

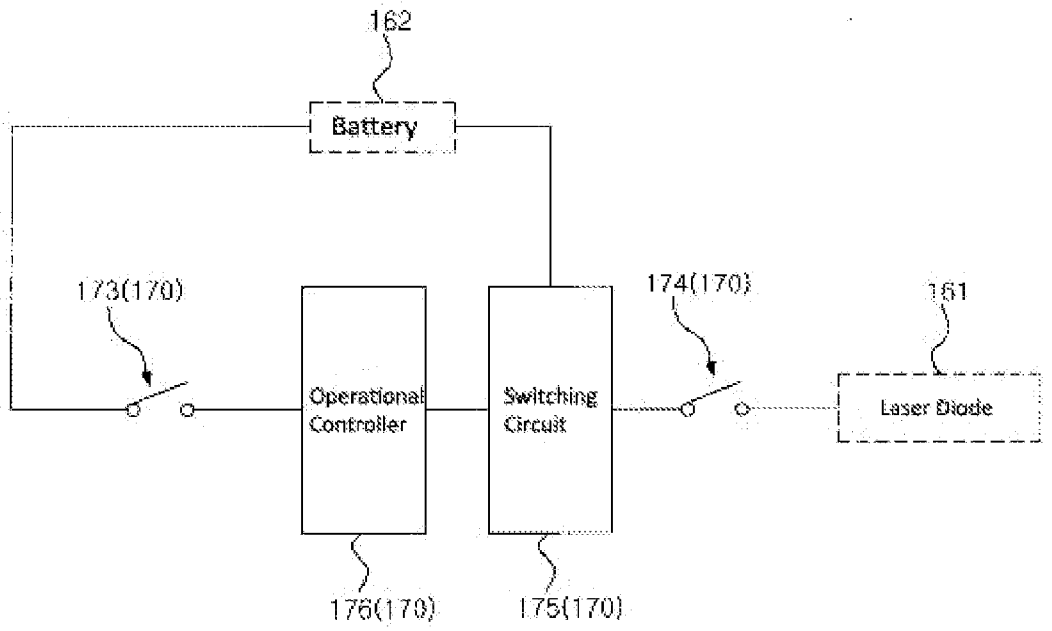
【Fig 11】


174(170)
174a
174b
171(170)
162a
133
162

【Fig 12】


164
151a
164a
152
152a
162a
161
174a
174b
174
131a
171(170)
133a
131
133
172(170)
130
132
162
162a

【Fig 13】


162
Battery
173(170)
Operational Controller
Switching Circuit
174(170)
161
Laser Diode
176(170)
175(170)

TOOTHBRUSH

TECHNICAL FIELD

[0001] This invention is implied on the toothbrush which has the structure of laser irradiating toward bristles.

BACKGROUND ART

[0002] Recently some invented toothbrushes with laser irradiation have been used which have biological effects such as promoting blood circulation in the mouth and the gums and sterilizing effect on bristles.

[0003] FIG. **9** is the perspective view of the former toothbrush, FIG. **10** is the perspective view of breakdown of the former toothbrush. FIG. **11** is the detailed drawing of carrier part, illustrated on FIG. **10**, FIG. **12** is the sectional view of the former toothbrush, FIG. **13** is the wiring diagram of the former toothbrush.

[0004] As illustrated on these figures, the conventional toothbrush is composed of the toothbrush body (**110**) which has the toothbrush stem (**130**) and the toothbrush head (**150**) connected to the stem (**130**), laser diode (**161**) and battery (**162**) installed in the stem (**130**), laser actuator (**170**) which opens and closes electrical connection between the laser diode (**161**) and the battery (**162**), bristles (**163**) which are tufted at the surface of the working area of the head (**150**), and reflector (**164**) installed on the inside of the head (**150**).

[0005] The toothbrush stem (**130**) is composed of the tubular toothbrush stem body (**131**), the end-cap (**132**) coupled to the downstream of the stem body (**131**) and carrier (**133**) installed in the internal space of the stem body (**131**) and the end-cap (**132**).

[0006] Interior surface on the front zone of the stem Body (**131**) is formed the insertion hill (**131***a*).

[0007] At the insertion hill (**131***a*) a pair of insertion guide grooves (**131***b*) are formed along the length direction.

[0008] The carrier (**133**) is formed as a semicircular cross section and the supporting disk (**133***a*) is formed at the front.

[0009] Such structural type of carrier (**133**) is bonded and connected to toothbrush stem body (**131**) to let supporting disk (**133***a*) enter the inside of the stem body (**131**) over the insertion hill (**131***a*).

[0010] The head (**150**) has head body (**151**) at the front and the stem connector (**152**) extended from head body (**151**).

[0011] The head body (**151**) is formed as hollowness and laser irradiator (**151***a*) is formed at the bristles (**163**) tufted area

[0012] On the surface of the Toothbrush stem connector (**152**), a pair of connection protuberances (**152***a*) is formed to fit to the insertion guide grooves (**131***b*)

[0013] The head (**150**) is made of transparent resins and is connected to the stem body (**131**) as followings.

[0014] First, insert the connection protuberances (**152***a*) into the insertion guide groove (**131***b*).

[0015] Next, after the connection protuberances (**152***a*) completely pass through the insertion guide groove (**131***b*) spin the Head (**150**) a little.

[0016] Connection of the head (**150**) and the stem body (**131**) is kept by hooking action between the connection protuberances (**152***a*) and the insertion hill (**131***a*).

[0017] The laser diode (**161**) is installed in the central region of the supporting disk (**133***a*).

[0018] The battery (**162**) is installed to be connected electrically to the a pair of battery terminals (**162***a*) which is installed at the carrier (**133**).

[0019] The laser actuator (**170**) has the PCB (**171**) mounted on the carrier (**133**), the elastic push button (**172**) located at the central area of the handle body (**131**), the operational switch (**173**) installed on the carrier (**133**), the safety switch (**174**) connected to PCB (**171**), and the switching circuit (**175**) and the operational controller (**176**) embodied on the PCB (**171**).

[0020] The operational switch (**173**) has the starting contact, which is ON when the push button (**172**) is pressed and is OFF when the push button (**172**) is released, and ON-state signal generator, which supplies ON-state voltage signal to the operational controller (**176**).

[0021] The safety switch (**174**) is composed of the tubular shaped safety fixing terminal (**174***a*) connected electrically to the laser diode (**161**) and of the straight line of the safety operating terminal (**174***b*) connected electrically to the switching circuit (**175**).

[0022] The safety fixing terminal (**174***a*) is installed on the supporting disk (**133***a*) to enclose the laser diode (**161**).

[0023] The end of the safety operating terminal (**174***b*) is fixed to the PCB to be located between the insertion hill (**131***a*) and the safety fixing terminal (**174***a*).

[0024] The safety operating terminal (**174***b*) is connected electrically to the safety fixing terminal (**174***a*) as the toothbrush stem connector (**152**) enters the stem body (**131**) and the safety switch (**174**) turns on. Therefore, the safety switch (**174**) is able to connect electrically between the laser diode (**161**) and the switching circuit (**175**).

[0025] And the switching circuit (**175**) can turn on and turn off the electrical connection between the battery (**162**) and the laser diode (**161**) according to the controlling signals from the operational controller (**176**). Since the configuration of the switching circuit (**175**) to perform these functions is well known the detailed description shall be omitted.

[0026] The input of the operational controller (**176**) is connected to the operational switch (**173**).

[0027] The operational controller (**176**) controls the switching circuit (**175**) to block the battery voltage supplied to laser diode (**161**) if ON-state voltage signal is input by the operational switch (**173**) when the safety switch is ON or if the battery voltage is supplied to the laser diode (**161**) and ON-state voltage signal is not input the operational switch (**173**).

[0028] The reflector (**164**) has 2-time bended reflective surface (**164***a*) and the reflective surface (**164***a*) is installed in the rear area of the bristles (**163**) of the head (**150**) to reflect towards the bristles (**163**).

[0029] The reflector (**164**) can be installed inside of the head (**150**) by the insert injection molding method.

[0030] Therefore, the reflector (**164**) can direct the laser irradiated from the laser diode (**161**) towards the bristles (**163**).

[0031] The directions of using the former toothbrush with foregoing configurations are described below,

[0032] First, connect the head (**150**) into the toothbrush stem body (**131**).

[0033] As the head (**150**) is connected into the stem body (**131**), the safety operating terminal (**174***b*) contacts the safety fixing terminal and the safety switch (**174**) becomes ON.

[0034] Then, press the push button (**172**).

[0035] If On-state voltage signal is input from the operational switch (**173**) as the push button (**172**) is pressed, the operational controller (**176**) controls the switching circuit to connect laser diode (**161**) and battery (**162**) electrically.

[0036] As the laser diode (**161**) and the battery (**162**) are connected electrically, the laser is irradiated from the laser diode (**161**).

[0037] The laser irradiated from the laser diode (**161**) is reflected by the reflector (**164**) and irradiated to the area of the teeth area through irradiator (**151***a*).

[0038] When the laser is irradiated the user may brush his/her teeth with bristles (**163**).

[0039] After brushing press the push button (**172**) again.

[0040] If the push button is pressed again On-state voltage signal is input from the operational switch (**173**) and the operational controller (**176**) controls the switching circuit (**175**) to cut off the electrical connections between the laser diode (**161**) and the battery (**162**).

[0041] When the electrical connections is blocked laser irradiation from the laser diode (**161**) is stopped.

[0042] If the user wants brush teeth again, press the push button (**172**) again.

[0043] However, since the former toothbrush does not have the laser scattering structure in the path of the laser, there's a problem that the user does not know whether or not the laser is irradiated from the laser diode (**161**).

DETAILED DESCRIPTION OF THE INVENTION

Technical Problem

[0044] Therefore, the purpose of the present invention is providing the toothbrush which can be easily found whether the laser from the laser diode is irradiated by the user.

Technical Solutions

[0045] The above purpose according to the present invention is to have the toothbrush with the toothbrush stem, the toothbrush body with the head which is connected to the of the front of the toothbrush stem, the bristles which are tufted at the surface of the working area of the head, the laser diode which is installed in the toothbrush stem and irradiates laser towards the inside of the head, the battery which is installed in the toothbrush stem to be connected electrically to the laser diode, the laser actuator which opens and closes electrical connection between laser diode and battery depending on the operational status of the operational switch installed in the toothbrush stem and the laser diode irradiating the laser which is guided to bristles by the reflector installed in the head. To reach this purpose, it is made of transparent materials and it has the light scatter installed the toothbrush body to recognize light scattering status of the light scattering body. Laser irradiated from the laser diode passes through the laser path way which has smaller cross sectional area than irradiating area.

[0046] To prevent the light scatter from contaminated by foreign objects, it is desirable to install the light scatter inside of the body.

[0047] And, to be usable to other body parts such as inside of ears, it is desirable that the head, which has head body where bristles are tufted and the toothbrush stem which is the extended line of the head body and has the space for the light scatter, is able to combine or remove through the toothbrush stem connector and the light scatter and the light scatter is combined to the toothbrush stem to be landed in the scatter settle space.

[0048] Moreover, to prevent the body damage from the contact with the light scatter, it is desirable to include another contact safety part extended from the outer surface of the light scattering body to have umbrella shape with the cooperation with the light scattering body.

Beneficial Effects

[0049] According to the present invention, with the installation of the light scatter on the toothbrush body which scatters laser irradiated from the laser diode, the user able to identify whether the laser is irradiated from the laser diode.

A BRIEF DESCRIPTION OF FIGURES

[0050] FIG. **1** is the perspective view of the toothbrush according to the working example of the present invention.

[0051] FIG. **2** is the perspective view of breakdown of the toothbrush according to the working example of the present invention.

[0052] FIG. **3** is the detailed drawing of carrier part, illustrated on FIG. **2**.

[0053] FIG. **4** is the perspective view of the light scattering part, illustrated on FIG. **2**.

[0054] FIG. **5** and FIG. **6** are the sectional view according to the working example of the present invention.

[0055] FIG. **7** is the wiring diagram of the toothbrush according to the working example of the present invention.

[0056] FIG. **8** is the sectional view of essential parts according to another working example of the present invention.

[0057] FIG. **9** is the perspective view of the former toothbrush.

[0058] FIG. **10** is the perspective view of breakdown of the former toothbrush.

[0059] FIG. **11** is the detailed drawing of carrier part, illustrated on FIG. **10**.

[0060] FIG. **12** is the sectional view of the former toothbrush.

[0061] FIG. **13** is the wiring diagram of the former toothbrush.

[0062]

Code Description of the main parts on drawings

10, 110: Toothbrush body	20, 130: toothbrush stem
30: handle	31: handle body
40: Head connector	41: head connector body
50, 150: head	51, 151: head body
52, 152: toothbrush stem connector	61, 161: laser diode
63, 163: bristles	70, 170: laser actuator
73, 173: operational switch	74, 174: safety switch
80, 80': light scatter	81: light scattering body
131: toothbrush stem body	

THE BEST FORM FOR IMPLEMENTATION OF THE INVENTION

[0063] The present invention is to be explained in detail with attached figures.

[0064] FIG. **1** is the perspective view of the toothbrush according to the working example of the present invention

[0065] FIG. **2** is the perspective view of breakdown of the toothbrush according to the working example of the present invention

[0066] FIG. **3** is the detailed drawing of carrier part, illustrated on FIG. **2**

[0067] FIG. **4** is the perspective view of the light scatter, illustrated on FIG. **2**

[0068] FIG. **5** and FIG. **6** are the sectional view according to the working example of the present invention

[0069] FIG. **7** is the wiring diagram of the toothbrush according to the working example of the present invention.

[0070] According to the working example of the present invention, as illustrated on these figures, the toothbrush is composed of toothbrush stem (**20**), the toothbrush body (**10**) which has the head combined with the toothbrush stem (**20**), laser diode (**61**) and battery (**62**) installed in the stem (**20**), the laser actuator (**70**) which opens and closes electrical connection between laser diode (**61**) and battery (**62**), bristles (**63**) which are tufted at the surface of the working area of head (**50**), and reflector (**64**) installed in the inside of the head (**50**).

[0071] The toothbrush stem (**20**) is composed of the cylindrical shaped handle (**30**) and the tubular shaped head connector (**40**) which is able to combine or remove to the front of the handle (**30**).

[0072] Toothbrush handle (**30**) is composed of the tubular toothbrush handle body (**31**), the end-cap (**32**) coupled to the downstream of the handle body (**31**) and the carrier (**33**) installed in the internal space of the handle body (**31**) and the end-cap (**32**).

[0073] Interior surface on the front zone of the handle Body (**31**) is formed the insertion hill (**31***a*).

[0074] At the insertion hill (**31***a*) a pair of insertion guide grooves (**31***b*) are formed along the length direction.

[0075] The carrier (**33**) is formed as a semicircular cross section and at the front the supporting disk (**33***a*) is formed.

[0076] Such structural type of the carrier (**33**) is bonded and connected to the toothbrush handle body (**31**) to let the supporting disk (**33***a*) enter the inside of the handle body (**31**) over insertion hill (**31***a*).

[0077] The head connector (**40**) has the tubular shaped head connector body (**41**), the tubular shaped handle connecting area (**42**) which is at the rear end of the head connector body (**41**) and has smaller external diameter than the head connector body (**41**), the tubular shaped head connecting area (**43**) which is at the front end of the head connector body (**41**) and has smaller external diameter than the head connector body (**41**), and the tubular shaped settle space area (**44**) which is at the front end of the head connecting area (**43**) and has smaller external diameter than the head connecting area (**43**).

[0078] On the surface of the handle connecting area (**42**), a pair of connection protuberances (**42***a*) is formed to fit to the insertion guide groove (**31***b*).

[0079] The head connector (**40**) is made of transparent resins and is connected to the handle (**30**) as below.

[0080] First, insert the connection protuberances (**42***a*) into the insertion guide groove (**31***b*).

[0081] Next, after the connection protuberances (**42***a*) completely pass through the insertion guide groove (**31***b*) spin the head connector (**40**) a little.

[0082] Connection of the head connector (**40**) and the handle (**30**) is kept by hooking action between the connection protuberances (**42***a*) and the insertion hill (**31***a*).

[0083] The head (**50**) has head body (**51**) at the front and the toothbrush stem connector (**52**) extended from head body (**51**).

[0084] Head body (**51**) is formed as hollowness and laser irradiator (**51***a*) at the bristles (**63**) tufted area

[0085] The toothbrush stem connector (**52**) has the scatter settle space (**52***a*) along the length direction at its longitudinal section. The scatter settle space (**52***a*) is formed to have a larger length interval than the head connecting area (**43**).

[0086] The head (**50**) is made of transparent resins and is connected to the head connector (**40**) to stick the outer surface of the head connecting area (**43**) fast to the internal surface of the toothbrush stem connector (**52**).

[0087] Laser diode (**61**) is installed in the central region of the supporting disk (**33***a*) to be lined up in settle space area (**44**).

[0088] Battery (**62**) is installed to be connected electrically to the a pair of battery terminals (**62***a*) which is installed at the carrier (**133**).

[0089] The laser actuator (**70**) has the PCB (**71**) mounted on the carrier (**33**), the elastic push button (**72**) located at the central area of the handle body (**31**), the operational switch (**73**) installed on the carrier (**133**), the safety switch (**74**) connected to PCB (**71**), and the switching circuit (**75**) and the operational controller (**76**) embodied on the PCB (**71**).

[0090] The operational switch (**73**) has the starting contact, which is ON when the push button (**72**) is pressed and is OFF when the push button (**72**) is released, and ON-signal generator, which supplies ON-state voltage signal to the operational controller (**76**).

[0091] The safety switch (**74**) is composed of the tubular safety fixing terminal (**74***a*) connected electrically to the laser diode (**61**) and the linear safety operating terminal (**74***a*) connected electrically to the switching circuit (**75**).

[0092] The safety fixing terminal (**74***a*) is installed on the supporting disk (**33***a*) to enclose the laser diode (**61**).

[0093] The end of the safety operating terminal (**74***b*) is fixed to the PCB to be located between the insertion hill (**31***a*) and the safety fixing terminal (**74***a*).

[0094] The safety operating terminal (**74***b*) is connected electrically to the safety fixing terminal (**74***a*) as the handle connecting area (**42**) enters the handle body (**31**) and the safety switch (**74**) turns on. Therefore, the safety switch (**74**) is able to connect electrically between the laser diode and the switching circuit (**175**).

[0095] The switching circuit (**75**) is connected to the output of the operational controller (**76**). And the switching circuit (**75**) can turn on and turn off the electrical connection between the battery (**62**) and the laser diode (**61**) according to the controlling signals from the operational controller (**76**). As the configuration of the switching circuit (**75**) to perform these functions are well known the detailed description shall be omitted.

[0096] The input of the operational controller (**76**) is connected to the operational switch (**73**).

[0097] The operational controller (**76**) controls the switching circuit (**75**) to block the battery voltage supplying to laser diode (**61**) if ON-state voltage signal is input by the operational switch (**73**) when the safety switch is ON or if the battery voltage is supplied to the laser diode (**161**) and ON-state voltage signal is not input the operational switch (**73**).

[0098] The light scattering part (**80**) is composed of the roughly hemisphere shaped the light scattering body and the scatter connecting duct (**82**) which is formed the extended

line from the scattering body (**81**), and a pair of contact safety part (**83**) which are formed the extended line from the outer surface of the scattering body.

[0099] The laser path way (**81***a*) is formed at and passes through the light scattering body (**81**). The laser path way (**81***a*) is formed to have smaller cross sectional area than laser irradiating area form the laser diode (**61**).

[0100] The scatter connecting duct (**82**) is formed to be placed against the straight line over the laser path way (**81***a*).

[0101] A pair of the contact safety part (**83**) are extended from the outer surface of the light scattering body (**81**) to form as umbrella shape with the cooperation with the light scattering body (**81**).

[0102] The light scatter (**80**) is made of transparent (semi-transparent) materials such as silicon. It's desirable to have the light scatter a color.

[0103] And the light scatter (**80**) is connected to the head connector (**40**) by putting scatter connecting duct (**82**) into the settle space area (**44**) by force. Therefore the light scatter (**80**) is taken into the light scatter settle space (**52***a*) and the laser path way (**81***a*) is located linearly against the laser diode (**61**)

[0104] As the laser path way (**81***a*) is placed at the linear line of the laser diode. Some of irradiated laser passes through the laser path way (**81***a*) but others are scattered as passed the light scattering body.

[0105] Since right under the head connector (**40**) with transparent material the light scatter (**80**) is placed you can see the scattering body (**81**) with naked eyes.

[0106] Thus, as the laser is scattered at the scattering body (**81**) and the scattering body (**81**) is seen with naked eyes the user is able to see the laser is irradiated from the laser diode (**61**).

[0107] The reflector (**64**) has 2-times bended reflective surface (**64***a*) and the reflective surface (**64***a*) is installed in the rear area of the bristles (**63**) of the head (**50**) to reflect towards the bristles (**63**).

[0108] The reflector (**64**) can be installed inside of the head (**50**) by the insert injection molding method.

[0109] Therefore, the reflector (**64**) can direct the laser towards the bristles (**63**)

[0110] The directions of using the working example of toothbrush with foregoing configurations are described below,

[0111] First, connect the head connector (**40**) into the toothbrush handle (**30**).

[0112] As the head connector (**40**) is connected into the handle (**30**), the safety operating terminal (**74***b*) contacts the safety fixing terminal and the safety switch (**74**) becomes ON.

[0113] Then, press the push button (**72**).

[0114] If On-state voltage signal is input from the operational switch (**73**) as the push button (**72**) is pressed the operational controller (**76**) controls the switching circuit to connect laser diode (**61**) and battery (**62**) electrically.

[0115] As the laser diode (**61**) and the battery (**62**) are connected electrically, the laser is irradiated from the laser diode (**61**).

[0116] The laser irradiated from the laser diode (**61**) passes the laser path way (**81***a*) and is scattered by the light scattering body (**81**). Irradiation from the laser diode (**61**) can be recognized by scattered laser by the light scattering body (**81**).

[0117] The laser passes the laser path way (**81***a*) is reflected by the reflector (**64**) and irradiated to the area of the teeth through irradiator (**51***a*).

[0118] When the laser is irradiated the user may brush his/her teeth with bristles (**63**).

[0119] After brushing press the push button (**72**) again.

[0120] If the push button is pressed again On-state voltage signal is input from the operational switch (**73**) and the operational controller (**76**) controls the switching circuit (**75**) to cut the electrical connections between the laser diode (**61**) and the battery (**62**).

[0121] When the electrical connections is blocked laser irradiation from the laser diode (**61**) is stopped.

[0122] If the user wants brush teeth again, press the push button (**72**) again

[0123] In the following ways, the toothbrush can be used in other parts of the body such as the mouth, nose or inner ear and so on.

[0124] First, separate the head (**50**) from the toothbrush stem (**20**).

[0125] Next, enter the light scatter (**80**) into the mouth, nose or inner ear. When you enter the light scatter (**80**) the contact safety part (**83**) prevents the body from damage.

[0126] Press the push button (**72**).

[0127] If the push button (**72**) is pressed the laser is irradiated from the laser diode (**61**).

[0128] The laser irradiated from the laser diode (**61**) passes the laser path way (**81***a*) and is scattered by the light scattering body (**81**).

[0129] The laser scattered by the light scattering body (**81**) lightens the mouth, nose or inner ear and the laser which passes the laser path way (**81***a*) sterilizes the mouth, nose or inner ear.

[0130] After looking at the mouth, nose or inner ear or sterilizing them, press the push button (**72**) again.

[0131] When the push button (**72**) is released, the electrical connection between the laser diode (**61**) and batter (**62**) is cut off and laser irradiation from the laser diode (**61**) is stopped.

[0132] [Forms for the Implementation of the Invention]

[0133] Although the light scatter (**80**) can be combined or removed to/from the toothbrush body (**10**) in the working example, the light scatter (**80**) can be installed in the toothbrush body (**10**) through the insert injection method as illustrated on FIG. **8**.

[0134] In the central area of the light scatter, the laser path way (**80***a*) is formed.

[0135] And the present invention can be carried by exposing the light scatter (**80**) to the outside of the toothbrush body (**10**).

[0136] [Potential Industrial Use]

[0137] As describe above and according to the working example of the present invention, the user can easily recognize whether the laser is irradiated from the laser diode (**61**) as the laser scatter (**80**, **80'**) is installed at the toothbrush body (**10**) to scatter the laser irradiated from the laser diode (**61**).

[0138] Installing the light scatter (**80**) inside of the toothbrush body (**10**) prevents the light scatter from contaminated by foreign objects.

[0139] Furthermore, the scatter settle space (**53**) is formed at the head (**50**) and the light scatter (**80**) is combined with the toothbrush stem (**20**) to be applied to the scatter settle space (**53**), it can be used to the other parts of body such as inner ear.

[0140] Since the contact safety part (**83**) is formed on the surface of the light scattering body (**81**), the body damage by using other parts of the body can be prevented.

1. The toothbrush is characterized to have the toothbrush stem, the toothbrush body with the head which is connected to

the front of the toothbrush stem, the bristles which are tufted at the surface of the working area of the head, the laser diode which is installed in the toothbrush stem and irradiates laser towards the inside of the head, the battery which is installed in the toothbrush stem to be connected electrically to the laser diode, the laser actuator which opens and closes electrical connections between laser diode and battery depending on the operational status of the operational switch installed in the toothbrush stem and the laser diode irradiating the laser which is guided to bristles by the reflector installed in the head. It is made of transparent materials and it has the light scatter installed in the toothbrush body to recognize light scattering status of the light scattering body. Laser irradiated from the laser diode passes through the laser path way which has smaller cross sectional area than irradiating area.

2. According to the claim **1**, it is characterized that the light scatter is installed in the toothbrush body.

3. According to the claim **2**, the head of the toothbrush, which has the head body where bristles are tufted and the toothbrush stem which is the extended line of the head body and has the space for the light scatter, is able to combine or remove through the toothbrush stem connector and the light scatter and;

The toothbrush is characterized that the light scatter is combined to the toothbrush stem to be landed in the scatter settle space.

4. According to the claim **3**,

The toothbrush is characterized to include another contact safety part formed from the extension of the outer surface of the light scattering body to have umbrella shape with the cooperation with the light scattering body and the light scatter.

* * * * *