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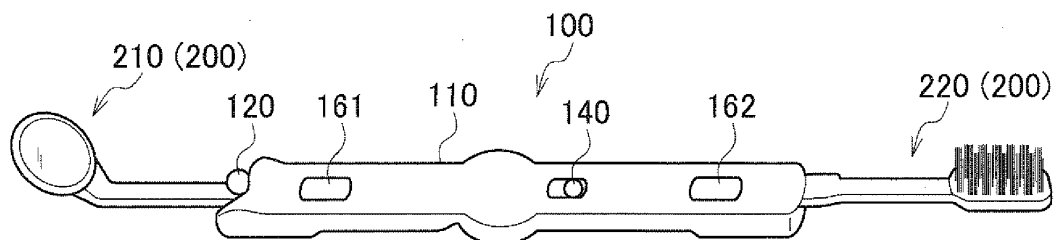
(54) **LIGHTED SYSTEM TOOTHBRUSH**

(57) There is provided a system toothbrush with illumination that allows a user to easily observe the inside of the oral cavity during tooth brushing at homes, helps the health care in the oral cavity, as well as contributes to the user's economies and earth environments.

The system toothbrush with illumination includes a gripping portion 100 that is formed to be slightly flat and stores therein an LED light source 120, a battery 130, and a switch 140 performing ON/OFF operations of the LED light source 120; and an attachment portion 200 detachably and compatibly connected to both ends of

the gripping portion 100. The attachment portion 200 includes at least a mirror portion 210 and a toothbrush portion 220, and may further include an auxiliary toothbrush portion 230. Storage insertion holes 161, 162 are formed in the gripping portion 100 to store the attachment portion 200, and two button-shaped batteries 130 are overlappingly stored in the horizontal orientation at substantially the center of the gripping portion 100. And, an LED light source 120 is arranged near the one end of the gripping portion 100, and the light is emitted towards the attachment portion 200.

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Description

Technical Field

[0001] The present invention is directed to systemization of a dental mirror with illumination and a toothbrush, which is used for health care in oral cavity at homes.

Background Art

[0002] Conventionally, various studies have been carried out on a dental mirror or toothbrush for the purpose of health care in oral cavity at homes.

[0003] As an example, a toothbrush with mirror is disclosed in Japanese Patent Application Laid-Open No. H 8-275826, in which a mirror is attached to an end of a brush handle. That is, this toothbrush with mirror allows a user to brush his/her teeth while examining with the mirror that dental plaque is removed from teeth surface.

[0004] Also, a dental mirror with illuminating device is disclosed in Japanese Utility Model Registration No. 3066246. That is, this dental mirror with illuminating device allows a user to easily observe the inside of the oral cavity by fixing the shaft of the dental mirror to the gripping portion that stores a battery and a light emitter so that light emitted from the illuminating device is directed toward the mirror surface of the dental mirror.

[0005] Japanese Utility model registration No. 3039611 discloses a brush portion interchangeable toothbrush which may replace the brush portion of the toothbrush with another one.

[0006] Japanese Patent Application National Publication (Laid-Open) No. 2001-517479 discloses a toothbrush with illumination, which enables a user to brush his/her teeth under a bright oral environment by having light illuminate the inside of the oral cavity through bristles of the toothbrush.

Patent Document: Japanese Patent Application Laid-Open No. H 8-275826

Patent Document2: Japanese Utility Model Registration No. 3066246

Patent Document3: Japanese Utility Model Registration No. 3039611

Patent Document4: Japanese Patent Application National Publication (Laid-Open) No. 2001-517479

Disclosure of the Invention

Problem to be solved by the Invention

[0007] Removing dental plaque by brushing is important to prevent oral diseases such as dental caries, periodontal diseases and so forth. However, it is known to medical experts, such as dentists, that there are lots of positions where dental plaque is difficult to remove. As a solution to this problem, a method has been conventionally fulfilled, which is to dye the dental plaque with a

dying material after usual brushing and then to remove the dyed dental plaque by brushing. However, it is difficult to clearly remove the dental plaque since it is dark in the oral cavity and this makes it difficult for the user to directly view into molar teeth or backside of teeth. Furthermore, oral diseases are generally found late, so that they often have a tendency to become serious. It is important to perform a self check in the house with a mirror with illumination in order to clearly remove the dental plaque and find the oral diseases earlier to prevent the oral diseases from being serious. However, such a mirror with illumination is not prevalent in general houses.

[0008] The conventional one, for example, the dental mirror disclosed in Japanese Utility Model Registration No. 3066246 has a problem in that the gripping portion is thick and heavy since a general battery is stored in the gripping portion. Accordingly, it could not be considered appropriate for usual brushing in terms of operability or storage capability.

[0009] Further, the toothbrush with mirror disclosed in Japanese Patent Application Laid-Open No. H 8-275826 has a difficulty in observing the inside of the oral cavity since there is not provided any illumination device. Moreover, it was impossible to replace the mirror and toothbrush head portion with bristles by a new one since they are integrated with the gripping portion, and this gave rise to problems in terms of economies and environments.

[0010] In addition, the head portion with bristles was integrated with the gripping portion and it was impossible to replace only the head portion with bristles by another one, and this gave rise to problems in terms of economies and environments.

[0011] In the meanwhile, it is important for a guardian to fulfill tooth cleaning in order to prevent infant dental caries. In this connection, there is a tooth cleaning method called "brushing while being laid" or "finish brushing" among dental experts. This is a method of the guardian brushing infant teeth with a toothbrush for finish brushing while looking into the oral cavity, with the infant being laid upwards between both knees of the guardian. However, this method had a problem in that brushing is difficult to perform since it is dark in the oral cavity.

[0012] Further, there is a case that requires an additional toothbrush used as an auxiliary toothbrush for cleaning between teeth in addition to the general toothbrush in order to prevent dental caries and periodontal diseases. For this case, the user should purchase two types of toothbrushes, each of which has its own brush handle for use, and this caused inconvenience. Furthermore, this gave rise to problems in terms of economies and environments.

[0013] A general object of the present invention is to provide a system toothbrush with illumination, which may solve the above-mentioned problems with respect to health care in oral cavity at homes.

Means for solving problem

[0014] To achieve the above-mentioned object, the present invention provides a system toothbrush with illumination, which is composed of a gripping portion that stores an LED light source and a battery therein and attachment portions which are detachably connected to both ends of the gripping portion.

[0015] According to the present invention, the attachment portion mounted at both ends of the gripping portion includes at least a mirror portion and a toothbrush portion, and may further include an auxiliary toothbrush portion. Furthermore, insertion holes are formed in the both ends of the gripping portion, which have the same shape. Accordingly, an insertion shaft formed in the attachment portion may be elastically fitted into the insertion hole, and this enables the mirror portion, the toothbrush portion, and the auxiliary toothbrush portion to be interchangeable to each other, thus allowing any combination to be made freely for use.

[0016] In addition, two thin, button-shaped lithium batteries, each of which supplies a voltage of 3V, are overlappingly arranged and stored in the horizontal orientation in the center of the gripping portion, so that the gripping portion may be made thin and light. By doing so, operability and storage capability may be improved in use. Furthermore, these batteries supply a voltage of 6V to the LED light source stored in the gripping portion, thus allowing light emission with high illuminance.

[0017] The LED light source is arranged in one of both ends of the gripping portion, and the combination of the LED light source and the batteries makes it possible to supply necessary light to the attachment portion mounted at one end of the gripping portion where the LED light source is arranged. That is, the LED light source is arranged so that the light emitted from the LED light source is directed to the center of the mirror surface when the mirror portion is mounted as the attachment portion and the light is directed to the tip of bristles of the toothbrush head portion with bristles when the toothbrush head portion with bristles or the auxiliary toothbrush head portion with bristles is mounted as the attachment portion. In addition, such an arrangement of the LED light source in the end of the gripping portion makes it possible not to disturb brushing and enables a sufficient amount of light to be supplied in the oral cavity without interruption of light emitted from the LED light source when the toothbrush head portion with bristles or the auxiliary toothbrush head portion with bristles is mounted as the attachment portion at one end where the LED light source is arranged among both ends of the gripping portion.

[0018] Further, as combinations of the gripping portion and the attachment portions, for example, when the mirror portion is mounted at one end where the LED light source is arranged among both ends of the gripping portion, it may be used as a dental mirror with illumination, and when the toothbrush portion is mounted at one end where the LED light source is arranged among both ends

of the gripping portion, it may be used as a toothbrush with illumination. Further, a user may observe the inside of his/her oral cavity with the dental mirror with illumination anytime he/she wants to without replacement of the equipment during usual brushing in a case where a toothbrush portion is additively mounted at the end of the gripping portion included in the constituent member as the dental mirror with illumination, and therefore, the user may use it without changing his/her usual brushing habit, thus it is expected the user conventionally performs a self check of his/her oral cavity without any difficulty.

[0019] As such, it is not necessary for the user to separately purchase a dental mirror with illumination having a gripping portion, a general toothbrush having a gripping portion, an auxiliary toothbrush having a gripping portion, and the like, since this toothbrush according to the present invention may be continuously used by additively buying only the necessary attachment portion and mounting the different attachment portion to both ends of the gripping portion. Accordingly, the present invention may alleviate inconvenience of replacement of equipment during usual brushing and be advantageous in terms of user's economies and environments.

[0020] Also, a storage insertion hole is formed in the inside of each of both ends of the gripping portion, which is used for storing the attachment portions. The storage insertion hole is configured to insert and store the mirror portion or toothbrush portion detached from the end of the gripping portion. This enables the gripping portion to be stored in a toothbrush stand by detaching the attachment portion, which is mounted at one end of both ends of the gripping portion, and storing it in the storage insertion hole located at the opposite end.

Effect of the Invention

[0021] As described above, the system toothbrush with illumination according to the present invention, allows a user to easily observe the inside of the oral cavity with the dental mirror with illumination upon tooth brushing in the house, thus it is expected to enabling the user to conventionally perform a self check of the oral cavity in daily life. This improves efficiency of tooth brushing and therefore contributes to prevention and early detection of oral diseases. In addition, the system toothbrush with illumination according to the present invention may replace the attachment portion with another one, and this may lessen user's economical burdens and improve environmental problems.

[0022] Furthermore, the system toothbrush with illumination according to the present invention may save costs in development and production in terms of manufacturing aspects, compared with separately manufacturing each of the dental mirror with illumination, the toothbrush with mirror, the toothbrush with illumination, and the like.

Brief Description of the Drawings

[0023]

Fig. 1 is a perspective view illustrating the external appearance of a system toothbrush with illumination according to an embodiment of the present invention.

Fig. 2 is a cross sectional view of a gripping portion of the system toothbrush with illumination as seen from the side.

Fig. 3A is a perspective view illustrating the external appearance of an attachment portion (mirror portion) of the system toothbrush with illumination.

Fig. 3B is a perspective view illustrating the external appearance of an attachment portion (toothbrush portion) of the system toothbrush with illumination.

Fig. 3C is a perspective view illustrating the external appearance of an attachment portion (auxiliary toothbrush portion) of the system toothbrush with illumination.

[Description of reference numerals]

[0024]

100	gripping portion
110	gripping portion body
120	LED light source
130	battery
140	slide-type switch
151,152	insertion hole
161,162	storage insertion hole
180	battery cover
200	attachment portion
210	mirror portion
211	mirror surface
220	toothbrush portion
221	toothbrush head portion with bristles
222	toothbrush neck portion
223	toothbrush insertion shaft
230	auxiliary toothbrush portion
231	auxiliary toothbrush head portion with bristles

Best mode for carrying out the Invention

[0025] Hereinafter, embodiments of the present invention will be described with reference to Fig. 1, Fig. 2, Fig. 3A, Fig. 3B, and Fig. 3C.

[0026] Fig. 1, Fig. 2, Fig. 3A, Fig. 3B, and Fig. 3C illustrate an embodiment of a system toothbrush with illumination according to the present invention. Fig. 1 is a perspective view illustrating the external appearance of the system toothbrush with illumination, Fig. 2 is a cross sectional view of a gripping portion of the system toothbrush with illumination as seen from the side, and Fig. 3A is a perspective view illustrating the external appearance of an attachment portion (mirror portion) of the system toothbrush with illumination. Also, Fig. 3B is a perspective view illustrating the external appearance of an attachment portion (toothbrush portion) of the system toothbrush with illumination. And, Fig. 3C is a perspective view illustrating the external appearance of an attachment portion (auxiliary toothbrush portion) of the system toothbrush with illumination.

[0027] The system toothbrush with illumination according to the present invention is composed of a gripping portion 100 and an attachment portion 200 shown in each of Fig. 3A, Fig. 3B, and Fig. 3C. The attachment portion 200 includes at least a mirror portion 210 and a toothbrush portion 220, and an auxiliary toothbrush portion 230 may be additively provided as the attachment portion 200. Fig. 1 illustrates a state where each of the mirror portion 210 and the toothbrush portion 220 is mounted at each of both ends of the gripping portion 100 as the attachment portion 200. The gripping portion 100 is composed of a gripping portion body 110 formed of a synthetic resin such as polypropylene, a battery 130 and an LED light source 120 stored in the gripping portion body 110, and a slide-type switch 140.

[0028] Further, insertion holes 151, 152, into which insertion shafts 213, 223, 233 are elastically fitted, are formed in the both ends of the gripping portion 100 as shown in Fig. 2, wherein the insertion holes 151, 152 have the same shape. And, each of the insertion shafts 213, 223, 233 has a width that gradually decreases as going toward the end, and its cross section has a rectangular shape as shown in Fig. 3A, Fig. 3B, and Fig. 3C. This structure of the insertion shafts 213, 223, 233 contributes to facilitate insertion into the insertion holes 151, 152, to control the insertion orientation and to prevent rotation.

[0029] The LED light source 120 is arranged in near the end of the gripping portion body 110. The LED light source 120 is arranged so that in a case where the mirror portion 210 is mounted as the attachment portion 200, light emitted from the LED light source 120 is directed to substantially the center of the mirror surface 211, and in a case where the toothbrush portion 220 or the auxiliary toothbrush portion 230 is mounted as the attachment portion 200, the light is directed to near the tip of bristles of the toothbrush head portion with bristles 221 or the auxiliary toothbrush head portion with bristles 231.

[0030] And, the battery 130 is stored in substantially the center of the gripping portion body 110, and includes two manganese-lithium batteries, each of which overlaps the other in the horizontal orientation as shown in Fig. 2. Each battery has a voltage of 3V. As an example, CR1616 battery, which has a diameter of 16mm and a thickness of 1.6mm and is commercially available from Hitachi Maxell, Ltd., may be suitable for the battery 130. Further, the slide-type switch 140 is arranged adjacent to the battery 130, and the LED light source 120 emits light when the slide-type switch 140 slides toward the battery 130. Furthermore, a battery cover 180 is provided

for replacement of batteries at the rear surface of the gripping portion body 110 storing the battery 130. The battery cover 180 and the slide-type switch 140 may be desirably subjected to a waterproof treatment with taking into consideration of use environments.

[0031] Further, the storage insertion holes 161, 162 are formed in the insides of both ends of the gripping portion 100 to store the attachment portion 200 as shown in Fig. 2. The insertion shafts 213, 223, 233 formed in the attachment portion 200 may be elastically fitted and stably fixed to the storage insertion holes 161, 162.

[0032] Further, a toothbrush neck portion 222 of the toothbrush portion 220 of the attachment portion 200 is formed to be narrower in width and longer (about 35mm in length) in the axial direction than the toothbrush insertion shaft 223 as shown in Fig. 3B. Accordingly, the toothbrush neck portion 222 is elastically deformed to alleviate the stress exerted against the gripping portion body 110 around the insertion hole 151 (or 152) through the insertion shaft 223 when an excessive force is exerted against the toothbrush head portion with bristles 221 upon tooth brushing, thus preventing any damage to the gripping portion body 110.

[0033] While the preferred embodiments of the present invention have been described with reference to the accompanying drawings, it is obvious that the present invention is not limited to such examples. It will be obvious to those skilled in the art that may conceive of various examples of changes and variations within the scope of to the appended claims and it is to be understood that these various examples of changes and variations are also included within the technical scope of the present invention.

Claims

1. A system toothbrush with illumination, comprising:

a gripping portion (100) that stores therein an LED light source (120), a battery (130), and a switch performing ON/OFF operations of the LED light source (120); and

an attachment portion (200) detachably and compatibly connected to insertion holes (151, 152) that are formed in the both ends of the gripping portion (100), wherein

the attachment portion (200) includes at least a mirror portion (210) and a toothbrush portion (220), and may further include an auxiliary toothbrush portion (230), wherein

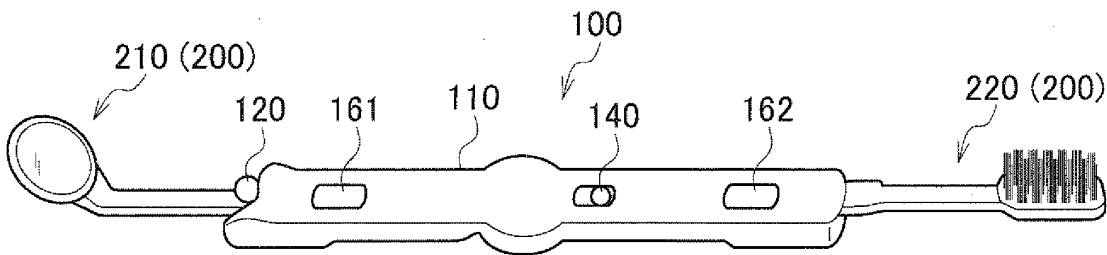
the LED light source (120) is arranged so that when the mirror portion (210) is mounted at an end of the gripping portion (100), light emitted from the LED light source (120) is directed to substantially the center of a mirror surface (211) and when the toothbrush portion (220) is mounted at an end of the gripping portion (100), the

light is directed to the tip of bristles of toothbrush head portion with bristles (221).

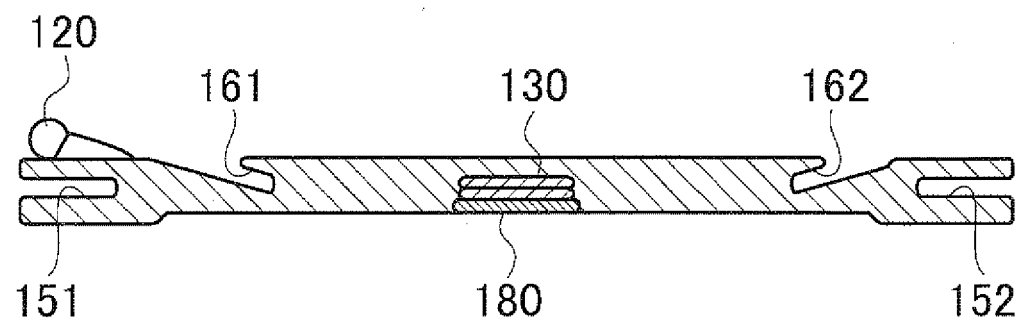
2. The system toothbrush with illumination according to claim 1, wherein the LED light source (120) is arranged near the one end of the gripping portion (100), and two thin, button-shaped lithium batteries (130) are overlappingly arranged and stored in horizontal orientation in substantially the center of the gripping portion (100), each of which supplies a voltage of 3V, wherein the gripping portion (100) is formed to be slightly flat.

3. The system toothbrush with illumination according to claim 1 or 2, wherein storage insertion holes (161, 162) are formed in the insides of both ends of the gripping portion (100) to compatibly store the attachment portion (200).

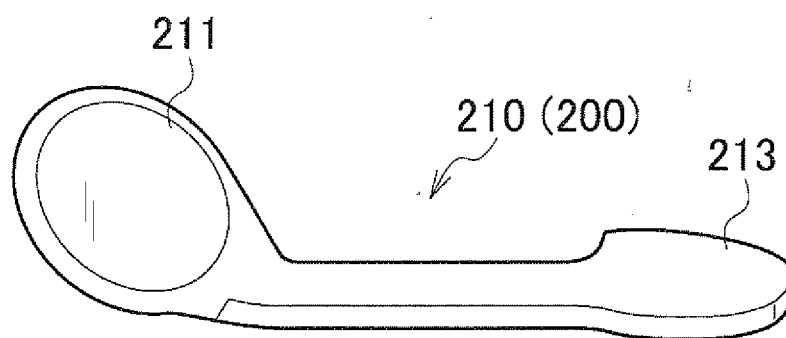
Fig. 1



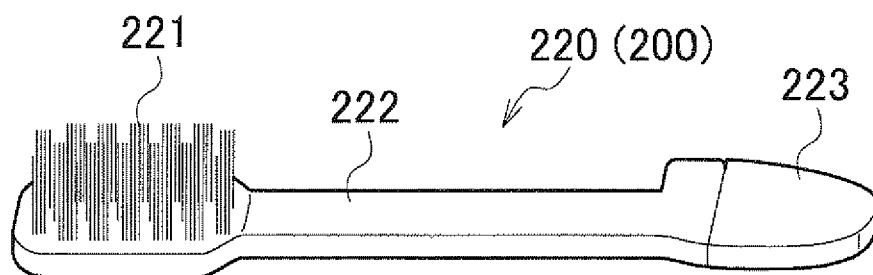
F i g . 2



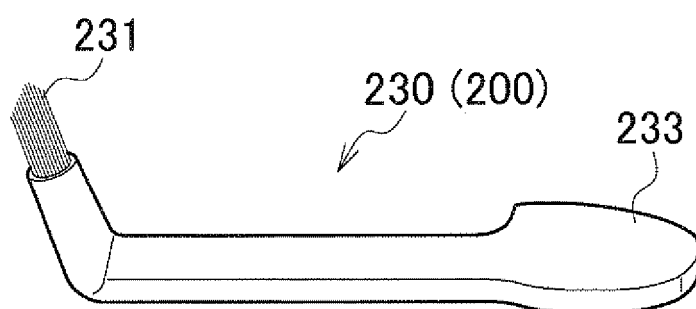
F i g . 3 A



F i g . 3 B



F i g . 3 C



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/001303

A. CLASSIFICATION OF SUBJECT MATTER

A46B15/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A46B15/00, 5/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2008

Kokai Jitsuyo Shinan Koho 1971-2008 Toroku Jitsuyo Shinan Koho 1994-2008

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 3-21223 U (Sony Corp.), 01 March, 1991 (01.03.91), (Family: none)	1-3
A	JP 3039611 U (Million Co., Ltd.), 31 July, 1997 (31.07.97), (Family: none)	1-3
A	JP 61-54832 U (Kabushiki Kaisha Shiken), 12 April, 1986 (12.04.86), (Family: none)	1-3

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

* Special categories of cited documents:

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Date of the actual completion of the international search
18 August, 2008 (18.08.08)Date of mailing of the international search report
02 September, 2008 (02.09.08)Name and mailing address of the ISA/
Japanese Patent Office

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP H8275826 B [0003] [0006] [0009]
- JP 3066246 B [0004] [0006] [0008]
- JP 3039611 B [0005] [0006]
- JP 2001517479 A [0006]