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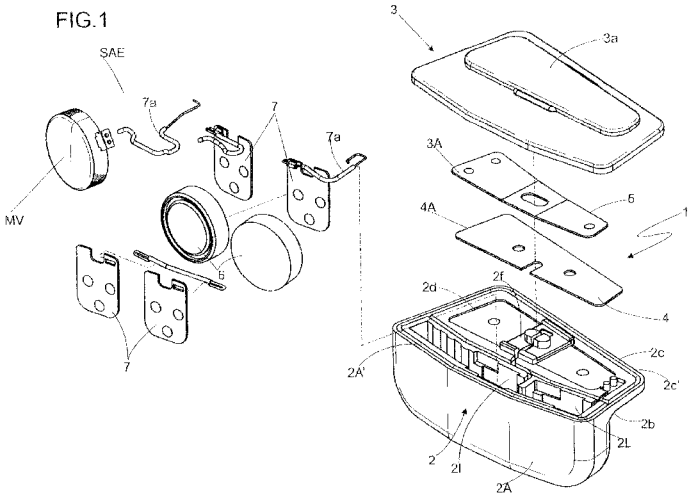
FIG.1



(57) Abstract: Improvements introduced in intraoral vibratory devices applied to bruxism treatment, mere precisely an intraoral device (1) to develop vibratory movements that inhibit the patient's parafunctional movements; said intraoral device (1) is composed of a capsule (2) and a cap (3), which contain the vibratory micromotor (MV) electromechanical driving system (SAE); said electromechanical driving system (SAE) being configured by a pair of contacts composed of a fixed laminar contact (4), arranged on the capsule surface (2) and a flexible moving laminar contact (5) coplanary to the fixed contact (4), however, kept slightly away, susceptible to being pressed by the patient bite over the fixed contact (4), configuring the punctual electric contact (CPE); the positioning of fixed (4) and flexible moving (5) laminar contacts work on the on/off control switching (CH) of said vibratory micromotor (MV), which, on its turn, is powered by one or more electrical batteries (6) by means of conducting plates (7) and conducting wires (7a) of the electromechanical driving system (SAE).

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"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT".

APPLICATION FIELD

The present patent of invention refers to improvements introduced in intraoral vibratory devices applied to bruxism treatment wherein, notably, said intraoral device comprises a capsule and a cap, which contain the vibratory micromotor electromechanical driving system, which on its turn, develops vibrating movements inhibiting the patient's parafunctional movements.

BACKGROUNF OF THE ART

Bruxism consists of a parafunctional and daily dysfunction wherein involuntary, rhythmized and spasmodic movements allow teeth grinding or clenching, usually occurring during sleep and, when it is not diagnosed timely, may bring consequences to the masticatory system, temporomandibular disorders, such as temporomandibular arthritis, better known as "TMA", dental enamel wear, head and ears aches, among other inconveniences.

In general, causes for triggering bruxism are related to psychological factors, such as, emotional stress, repressed aggression, anxiety, anger, fear, frustration and stress, and the diagnosis is

usually made after said consequences manifest.

Currently there are several types of treatment by means of using interocclusal plates associated to relaxing therapies, and said plates reduce night muscular activities, in addition to protecting teeth from wearing caused by the habit.

Said plates are removable oral appliances made of silicon or acrylic resin, which are applied between the maxilla and the jaw, and they may be lower or upper ones, whose function includes mastication neuromuscular system stabilization, in order to create a mechanical disadvantage for parafunctional forces.

Despite the advantages obtained with said occlusal plate by obtaining a harmonic relationship between the mastication muscles, temporomandibular articulation and the teeth, said plate does not inhibit involuntary bruxism movements, working only as immediate correction.

Another existing way to minimize pain caused by bruxism consists of applying infrared wave laser, which is used for reducing muscular pain, imitating nervous impulses that generate muscles movement, promoting muscular relaxing by means of endorphin release, which is known for relaxing and

calming down.

STATE OF THE ART ANALYSIS

The state-of-the-art discloses some documents related to intraoral appliances or devices developed for inhibiting bruxism. One example is Brazilian patent PI 0605444-7, for a pap function conditioning occlusal plate, comprising a device shaped as upper or lower dental arcade, following the parameter used in dental trays, intended to condition patients carrying "bruxism syndrome", by means of the bio-feedback technique, to not clench and/or grind teeth in stress moments, and while sleeping, the device is made of silicon or other resilient material, allowing its deformation when submitted to pressures by teeth antagonist to the material, and it is provided with sensors, control circuit, supplying battery and vibrating motors intended to produce vibration that is inconvenient whenever the user tries to grind the teeth. All said components are embedded in the plate material, which, for being insulating, prevents any risk of shock for the patient. The document, as it was filed, does not disclose the appliance constructive solution and neither provides application ways and methods that might subside better understanding, working only as a literary reference.

Another document found, no. PI 0801033-1 is for an intrabuccal appliance for treating sleep and respiratory disorders that applies to orthodontics and facial orthopedics in patients with chronic respiratory disorders problems. The appliance comprises an upper acrylic plate where the following are installed: metallic braces, telescopic tubes and metal hooks, a lower acrylic plate where metallic stems and metal hooks are installed, having the orthodontic plaster models molded according to the arcade of each patient.

Another document found, no. MU 8502724-3 is for a mandibular motor-protruding ring with temporizable hydro-pneumatic driving, adaptable to jaw intraoral plates by power transmission mechanical action, by hydropneumatic injection and/or ejection; two units are interconnected by a connecting hose, namely, motor driving unit and motor transmitting unit, which input passive motion, progressive in advance and mandible receding, adjustable along time, allowing post-isometric tension muscular relaxing.

Other products, belonging to the same application field of the object in question, may be viewed on documents US 20100147315, US 20030125661, US 20060021622 and US 20110030704, which work for

understanding the existing problems and some technical solutions, although different from the ones provided in the present invention.

BRIEF DESCRIPTION OF THE INVENTION

Considering everything that has been exposed, the objective of the present invention is to provide a vibratory intraoral device to inhibit bruxism, composed by capsule and cap, which contains a vibratory micromotor electromechanical driving system, which, when driven by means of pressure, vibrates in such a way to cause the individual to be sensitized and interrupts the biting action or mandibular pressure. The intraoral device is provided in two models, a right model and another left model, perfectly identical to each other, except for the inverse shape.

The right and left models were developed to meet the functional requirements, as well as to allow its industrialization within the standards ensuring standardized reproduction of their main characteristics by means of compatible manufacturing processes, also providing manufacturing costs ensuring the economical-financial feasibility for manufacturing and commercialization.

Said electromechanical driving system is configured by a fixed contact and a moving

contact, which, by means of a punctual electrical contact, work as an on/off switch for said vibratory micromotor, which, on its turn, is fed by electric batteries. Said moving contact and fixed contact may be replaced with other transducing devices, micro electromechanical devices, sensors of the membrane leyboard type or a piezoelectric type sensor.

Said capsule is made of injected thermoplastic or another appropriate material which meets the dimensional requirements and the physical-chemical properties required for application, i.e., or another material and by means of different conforming or milling processes industrially accepted, and said capsule is configured in a single piece and provides housings and seating means and adjustment of a pair of batteries, a vibratory micromotor, fixed contact and moving contact, in addition to providing channels for application of adhesive resin for fixing the cap.

The main advantages of said capsule are:

a) Electrical insulation of internal components, in addition to resistance to liquid solutions, keeping the integrity of the moving contact;

b) Anatomical shape providing more comfort and less trauma during the device adaptation to the tissues

on the internal wall of the cheek mucosa;

c) Provision of housings intended to accommodate the batteries positioning them in such a way to avoid contact between them and the possibility of a short-circuit;

d) Provision of housing for vibratory micromotor, which may be adjusted by means of slots provided on the housing walls, allowing the transmission of the vibratory energy to the whole device and, consequently, to the patient;

e) Fitting dimensioned to house the moving contact component, ensuring the proper positioning and also the fixation, which may be developed by means of gluing, pressing or ultrasonic welding.

f) Depressions provided on the internal batteries housing walls to assemble the conducting plates, which are composed of stainless steel or other materials with similar electrical properties, ensuring perfect assembly of batteries and vibratory micromotor, ensuring the electrical circuit works and preventing the occurrence of any type of short circuit; and

g) The angular shape of the capsule housings adapt to most dental arcades profiles, both upper and lower, and they may also occupy different positions along

the respective arcades.

The cap, on its turn, is also made of injected thermoplastic or another material appropriate to the manufacturing process meeting the dimensional requirements and the physical-chemical properties required by the application. The cap raw material may contain additives providing the component with a certain color, and said cap is conformed as a single piece and has a peripheral shape identical to the peripheral shape of the capsule basis, and among the main advantages of said capsule there are:

a) Rounding of the edges, providing more comfort against the internal mouth tissues;

b) Peripheral channels practiced on the internal surface for adhesive resin application during the capsule assembly process;

c) Housing for accommodating the moving contact, allowing its flexion when the on/off electromechanical switch is driven; and

d) Moving contact housing basis with thickness dimensioned to suffer possible elastic deformations when submitted to mechanical efforts originating from the driving of the on/off electromechanical switch, in addition to supporting the breaking and shearing stress generated by the contact with teeth

surfaces.

Both the batteries and the vibratory micromotor have low voltage and low working amperage, avoiding any risk of causing a shock to the patient.

The fixed contact is preferably made by a stainless steel plate, and provides tears and holes allowing positioning in the capsule during the over-injection process or positioning in case of assembly after the injection process, by gluing or any other type of mechanical or chemical anchoring. Trapezoidal shape allows driving the device in several different points, by means of the wide area for punctual electrical contact.

The moving contact, on its turn, os preferably made of a stainless steel plate and provides a central cut allowing positioning and fixation of this component in the assembly process to the capsule. Fixation may be developed by means of gluing, pressing of ultrasonic welding, in addition to providing semi-spherical relieves allowing punctual electrical contact with the fixed contact.

For better understanding, please find below the procedures allowing the dental surgeon to position the intraoral device in the patient arcade without the need of the participation of specialized

prosthetics:

i. Definition of the application on the upper arcade or lower arcade of the patient, observing the teeth anatomy, the on/off electromechanical switch starting and the adaptation of the device to the patient, causing the best comfort possible during its use;

ii. Molding of the determined arcade performing the procedures to obtain the plaster model of the respective arcade, and the plaster model will have an insulator for acrylic resins applied along the whole molded surface of the patient arcade, including the soft tissues molded surfaces;

iii. Preparation of the left model and right model, individually, in order to define the positions along the chosen arcade, applying on the internal area of the devices a universal adhesive for tray;

iv. Preparation of a silicon-based compound having a catalyst starting the polymerization process of said compound, and after the preparation the compound is applied throughout the area formed by surfaces on which the universal adhesive for tray was applied, and the amount shall be enough to involve the whole area to be molded;

v. Positioning of left and right devices individually along the determined patient arcade, prioritizing the

position to favor the best actuation of the on/off electromechanical switch of the device, considering that the teeth cuspids ends shall meet the internal occlusal surface of the device, and the central area of the electromechanical switch shall be avoided concerning teeth contact, mainly before the moment when the vibratory micromotor component driving occurs;

vi. After the positioning the patient shall close the mouth and clench the teeth hard enough to drive the electromechanical switch, promoting the vibratory micromotor starting, and this condition goes on until the silicon compound polymerization occurs, when it will be removed from the patient's mouth;

vii. After it is removed from the patient's mouth, the silicon compound will be polymerized with the device, forming a silicon mold of the area where it will be later applied over the plaster model of said arcade. The excess silicon compound is removed from the undesired areas in the devices;

viii. Left and right models are positioned in the plaster model, and they shall take the same positions determined in the device positioning on the patient's arcade;

ix. After positioning the devices in the plaster model, a self-polymerizable acrylic resin is applied on

the area comprised between the left model and the right model, forming a connection bridge between them, respecting the dental limits and preventing invasion over soft tissues. Thereafter, the resin is applied on any occlusal surfaces not covered by the devices. The excess resin are removed while it is in the plastic phase, providing the shape that best adapts to the patient's arcade. The devices remain in the plaster model until complete resin polymerization, when they are removed, configuring the plate;

x. The silicon molds are removed from the devices contained in the plate, filling the spaces with the same self-polymerizable acrylic resin used before;

xi. The plate is repositioned in the plaster model, suffering pressure until the devices take the same positions previously defined in the patient's arcade. The plate remains in the plaster model until complete polymerization of the acrylic resin;

xii. The plate is submitted to a finishing process using metallic milling machines to relief the excess resin on undesirable areas, and also to provide to surfaces with any contact with soft tissues with polished finishing. Final finishing is performed by means of rubbers and emery papers over the external surface of the polymerized resin. During the finishing

process caps and capsules milling shall be avoided, for both devices, keeping their airtight assembly intact; and

xiii. The plate is tested on the patient's arcade, by observing the perfect driving of devices on both sides, and checking the need of any adjustment for better adaptation of them to the patient, providing them with the best comfort possible.

On the other hand, in case the surgeon needs the participation of specialized prosthetics, more precisely for positioning the intraoral device in the plaster model of the patient's arcade plaster model, the procedures are the following:

i. The dentist performs the procedures to obtain the plaster model of the upper and lower patient arcade;

i. The dentist makes the bite recording in wax;

ii. The dentist develops the spatial recording of the occlusal plan with the facial arch;

iii. The dentist assembles the plaster models in the articulator reproducing the patient's bite and sends it to the prosthetics;

iv. The prosthetics performs the positioning of left model and right model devices over the chosen arcade, choosing the upper one or the lower one;

v. The prosthetics positions the devices individually

along the patient chosen arcade, prioritizing the position favoring the best starting of the on/off electromechanical switch, considering that the teeth cuspids ends shall meet the internal occlusal surface of the device. The central area of the electromechanical switch shall be avoided concerning teeth contact, mainly before the moment in which the vibratory micromotor component driving occurs;

After the positioning of the intraoral device in the plaster model in the patient's arcade, the prosthetic makes the support for the devices in self-polymerizable acrylic resin, and he may choose among the following procedures:

- Method A:

- After positioning the devices in the plaster model, a self-polymerizable acrylic resin is applied in the area comprised between the left model and the right model, forming a connecting bridge between them, observing the dental limits and preventing the invasion over soft tissues. Thereafter, resin is applied to any occlusal surfaces not covered by the devices. The excess resin is removed while it is in the plastic phase, giving the shape that best adapts to the patient's arcade plaster model. The devices remain in the plaster model until complete resin polymerization,

when they are removed, configuring the plate.

- Method B:

- With the devices already positioned in the plaster model, the prosthetic makes, in wax, the bridge and the ends of the supporting plate to said devices;

- With the wax plate containing the devices over the plaster model, the prosthetic includes the whole set in a metallic muffle filled with previously insulated plaster;

- After pressing the plaster, the prosthetic removes, with heated water, the wax and the silicon from the plaster model with the devices included in it;

- The prosthetic fills the space left by the wax and the silicon with thermo-polymerizable resin, and closes the muffle with pressure. Its polymerization shall be made under heat;

- After the polymerization time, the prosthetic opens the muffle and performs plate finishing.

Another procedure used for installing the device, performed only by the dental surgeon, comprises positioning the product directly on a pre-molded intraoral plate, which procedure simplifies all procedures, due to the following factors:

i. Left model and right model devices are already

contained in the intraoral plate;

ii. The intraoral plate has several sizes and shapes models. The dentist only has to choose the one that best adapts to the patient's arcade;

iii. The intraoral plate enables customized adjustment of the "boil and bite" type to the patient's arcade;

iv. The time for intraoral plate adjustment is considerably lower than the other methods;

v. The application of the intraoral plate does not require complementary materials used in the other methods;

vi. Procedures for intraoral plate application and adjustment are considerably simpler than the other methods, reducing the possibilities of mistakes and devices damaging.

Said vibratory intraoral device may be assembled on several types of dental appliances made of resins, plastics, metals, silicons or other biocompatible supporting materials, by following the procedures and positioning methods, and said appliances may be of the palatine plate type, Hawley's plate, Bionator appliance, Planas' appliances, appliances for snoring, appliances for apnea, palatine cutout, bruxism plates, etc.

DESCRIPTION OF THE DRAWINGS

To complement the present description in such a way to obtain a better understanding of the characteristics of the present invention, and according to a preferred practical embodiment of it, the description is accompanied by an appended set of drawings, wherein, in an exampling but not limiting way, its operation was represented:

Figures 1 and 2 represent exploded perspective views of the elements composing the vibratory intraoral device;

Figures 3 and 4 show perspective views of the assembled vibratory micromotor electromechanical driving;

Figure 5 shows a perspective view of the assembled device;

Figures 6 and 7 show the device lower and upper views;

Figure 8 represents a sectional view of the device indicated in Figure 7;

Figures 9 and 10 show cross-sectional views of the device indicated in Figure 7, illustrating the devices starting by means of the punctual electrical contact; and

Figures 11 and 12 show perspective views of a protecting cover model applied to the

intraoral plate along with the vibratory devices.

DETAILED DESCRIPTION OF THE INVENTION

With reference to the drawings, the present invention relates to "IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT", more precisely an intraoral device (1) developing vibratory movements that inhibit the patient's parafunctional movements.

According to the present invention, said intraoral device (1) is composed of a capsule (2) and a cap (3), which contain the vibratory micromotor (MV) electromechanical driving system (SAE), said electromechanical driving system (SAE) being configured by a pair of contacts composed of a fixed laminar contact (4), arranged on the capsule surface (2) and a flexible moving laminar contact (5) coplanary to the fixed contact (4), however, kept slightly away, susceptible to being pressed by the patient bite over the fixed contact (4), configuring the punctual electric contact (CPE) (figures 9 and 10). The positioning of fixed (4) and flexible moving (5) laminar contacts work on the on/off control switching (CH)of said vibratory micromotor (MV), which, on its turn, is powered by one or more electrical batteries (6) by means of conducting plates (7) and conducting

wires (7a) of the electromechanical driving system (SAE).

Said capsule (2) is made of injected thermoplastic or another appropriate material, and is configured as a single piece and composed of an oblong bag (2A) with a "U" section, from whose upper side edge (2b) a rim (2c) develops, provided with a central depression (2d) for assembling said fixed contact (4) by means of the over-injection process or another appropriate one, in addition to providing a peripheral channel (2e) with preferably semicircular section for application of adhesive resin (RA) or of another appropriate product allowing the cap fixation (3). The central depression (2d) provides an electrical insulator (IS) comprising a basis (2f) developing from the depression peripheral edges (2d), establishing spacing (x) for assembling the fixed contact (4); from the basis upper face (2f) a pair of projections (2g) develops, for fixing the moving contact (5).

Said bag (2A) has reduced width (y) and side walls (2h) with angularity (α) to adapt to any shape of dental arcade, and the internal bag portion (2A) is divided in three parts by means of vertical walls (2i) and arch projection (2j), establishing individual cribs (BE_1), (BE_2) and (BE_3) for

accommodating batteries (6) and vibratory micromotor (MV), and the internal faces of the cribs (BE_1) and (BE_2) provide depressions (21) establishing drawers (GV) for assembling the conducting plates (7), while the internal face of the crib wall (BE_3) has slots (2m) for appropriate adaptation and positioning of the vibratory micromotor (MV).

The cap (3) has peripheral shape identical to the peripheral edge (2c') association shape of said rim (2c) and peripheral edge (2A') of bag (2A), allowing integral protection of internal components; said cap (3) is configured as a single piece and is made also, of thermoplastic. It provides bulged deformation (3a) with trapezoidal shape for accommodating the moving contact (5), as well as its flexibility during tensions applied by the patient's teeth.

On the lower face of the cap (3), a peripheral channel is provided (3b), with a preferably semicircular section where the adhesive resin is applied, which, when aligned to the peripheral channel (2e) of the capsule (2) promotes the connection of the components, configuring an airtight set.

The process to mount the cap (3) on the capsule (2) comprises the use of any other

industrial processes, such as, heating, ultrasonic weld, high frequency weld, by interference or by friction.

Both the fixed contact (4) and the moving contact (5) are configured by metallic and laminar plates (4A) and (5A), with preferably trapezoidal shape, whose area (A) provides device (1) driving in several bite points (PM), and each plate (4A) and (5A) is made preferably of stainless steel, but they do not exclude the building in another type of steel or material of the bronze, brass, copper type and the like, and they may be replaced with other transducing devices, electromechanical microdevices, keyboard type sensor or a piezoelectric type sensor.

After the assembly of the batteries (6) and vibratory micromotor (MV) in the capsule (2), an adhesive resin (RA) to insulate the components, while the moving contact (5) assembly on the projections (2g) on the base (2f), associated to plate (5A) angularity (β), promotes distancing (W) between the lower surface (5b) and the upper surface (4b) of fixed contact (4), and said lower face (5b) has at least three semi-spherical projections (5c) promoting the punctual electrical contact (CPE).

Said vibratory intraoral device (1)

provides right model and left model, and may be assembled on several types of dental appliances, such as palatine plate, Hawley's plate, Bionator appliance, Planas' appliances, appliances for snoring, appliances for apnea, palatine cutout, bruxism plates, etc., and for better devices (1) adaptation to an intraoral plate, a protecting cover is provided in a single piece whose basis (8a) has different shapes and size for adapting the several intraoral plate models.

It is clear that when the present invention is put into practice, changes may be introduced concerning certain construction and shape details, without departing from the fundamental principles clearly substantiated in the claims, being thus understood that the terminology used had a non-limiting purpose.

CLAIMS

1ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, more precisely an intraoral device (1) to develop vibratory movements that inhibit the patient's parafunctional movements; characterized in that the intraoral device (1) is composed of a capsule (2) and a cap (3), which contain the vibratory micromotor (MV) electromechanical driving system (SAE); said electromechanical driving system (SAE) being configured by a pair of contacts composed of a fixed laminar contact (4), arranged on the capsule surface (2) and a flexible moving laminar contact (5) coplanary to the fixed contact (4), however, kept slightly away, susceptible to being pressed by the patient bite over the fixed contact (4), configuring the punctual electric contact (CPE); the positioning of fixed (4) and flexible moving (5) laminar contacts work on the on/off control switching (CH)of said vibratory micromotor (MV), which, on its turn, is powered by one or more electrical batteries (6) by means of conducting plates (7) and conducting wires (7a) of the electromechanical driving system (SAE).

2ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to the previous claim,

characterized in that the capsule (2) is configured as a single piece and composed of an oblong bag (2A) with a "U" section, from whose upper side edge (2b) a rim (2c) develops, provided with a central depression (2d) for assembling said fixed contact (4) by means of the over-injection process or another appropriate one, in addition to providing a peripheral channel (2e) with preferably semicircular section for application of adhesive resin (RA) or of another appropriate product allowing the cap fixation (3); the central depression (2d) provides an electrical insulator (IS) comprising a basis (2f) developing from the depression peripheral edges (2d), establishing spacing (x) for assembling the fixed contact (4); from the basis upper face (2f) a pair of projections (2g) develops, for fixing the moving contact (5); said bag (2A) has reduced width (y) and side walls (2h) with angularity (α) to adapt to any shape of dental arcade, and the internal bag portion (2A) is divided in three parts by means of vertical walls (2i) and arch projection (2j), establishing individual cribs (BE_1), (BE_2) and (BE_3) for accommodating batteries (6) and vibratory micromotor (MV), and the internal faces of the cribs (BE_1) and (BE_2) provide depressions (21) establishing drawers (GV) for assembling the conducting plates (7), while

the internal face of the crib wall (BE_3) has slots (2m) for appropriate adaptation and positioning of the vibratory micromotor (MV).

3ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to the previous claims, characterized in that the capsule (2) is made of injected thermoplastic or another appropriate material which meets the dimensional requirements and the physical-chemical properties required for application, i.e., or another material and by means of different conforming or milling processes industrially accepted, and said capsule is configured as a single piece and provides housings and seating means and adjustment of a pair of batteries, a vibratory micromotor, fixed contact and moving contact, in addition to providing channels for application of adhesive resin for fixing the cap.

4ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to claim 1, characterized in that the cap (3) has peripheral shape identical to the peripheral edge (2c') association shape of said rim (2c) and peripheral edge (2A') of bag (2A); said cap (3) is configured as a single piece and provides bulged deformation (3a) with trapezoidal shape for accommodating the moving contact

(5): on the lower face of the cap (3), a peripheral channel is provided (3b), with preferably semicircular section.

5ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to claims 1 and 3, characterized in that the cap (3) is made of thermoplastic.

6ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to claim 1, characterized in that the fixed contact (4) and the moving contact (5) are configured by metallic and laminar plates (4A) e (5A), with preferably trapezoidal shape, whose area (A) provides device (1) driving in several bite points (PM).

7ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to claims 1 and 5, characterized in that each plate (4A) and (5A) is made of stainless steel, but they do not exclude the building in another type of steel or material of the bronze, brass, copper type and the like.

8ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to the previous claims, characterized in that the moving contact (5) assembly on the projections (2g) on the

base (2f), associated to plate (5A) angularity (β), promotes distancing (W) between the lower surface (5b) and the upper surface (4b) of fixed contact (4), and said lower face (5b) has at least three semi-spherical projections (5c) promoting the punctual electrical contact (CPE).

9ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to the previous claims, characterized in that the vibratory intraoral device (1) is made as right model and left model.

10ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to claim 8, characterized in that right and left models are identical and having inverted shape.

11ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to previous claims, characterized in that the vibratory intraoral device (1) may be provided with a protecting cover (8), provided in a single piece whose basis (8a) has different shapes and size for adapting the several intraoral plate models.

12ª) **"IMPROVEMENTS INTRODUCED IN INTRAORAL VIBRATORY DEVICES APPLIED TO BRUXISM TREATMENT"**, according to previous claims, characterized in that the conducting

plates (7) are preferably made of stainless steel or other materials with similar electrical properties.

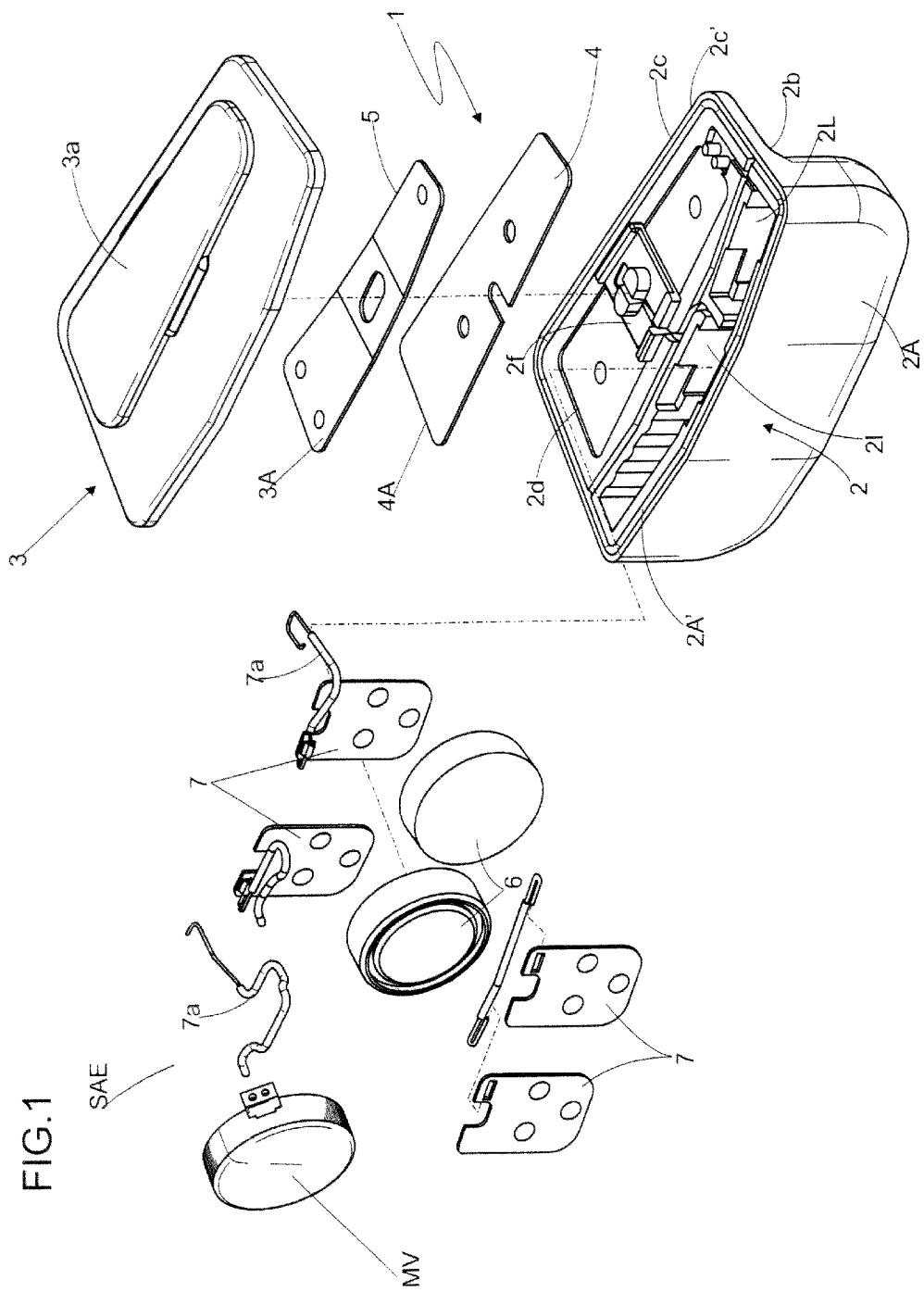


FIG.1

FIG.2

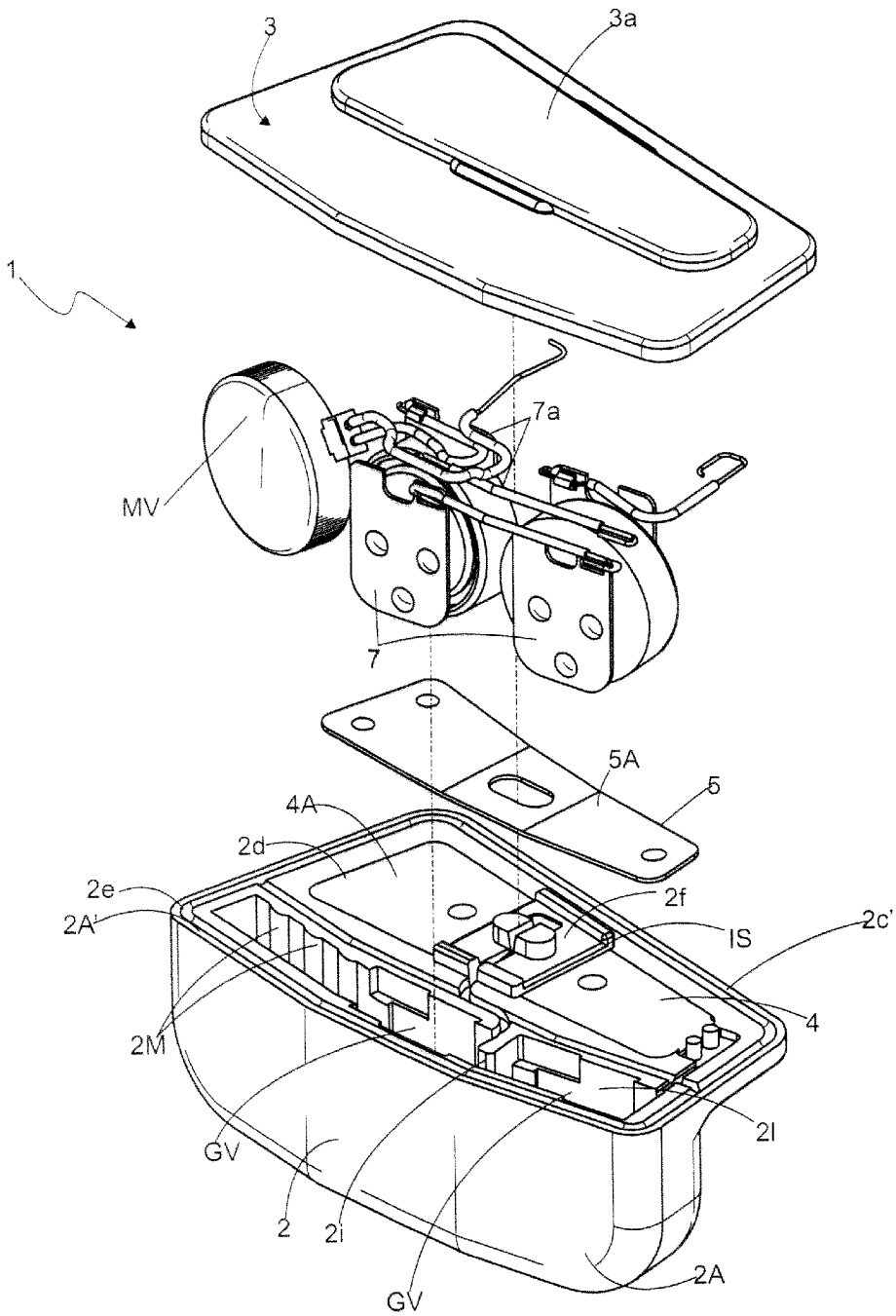


FIG.3

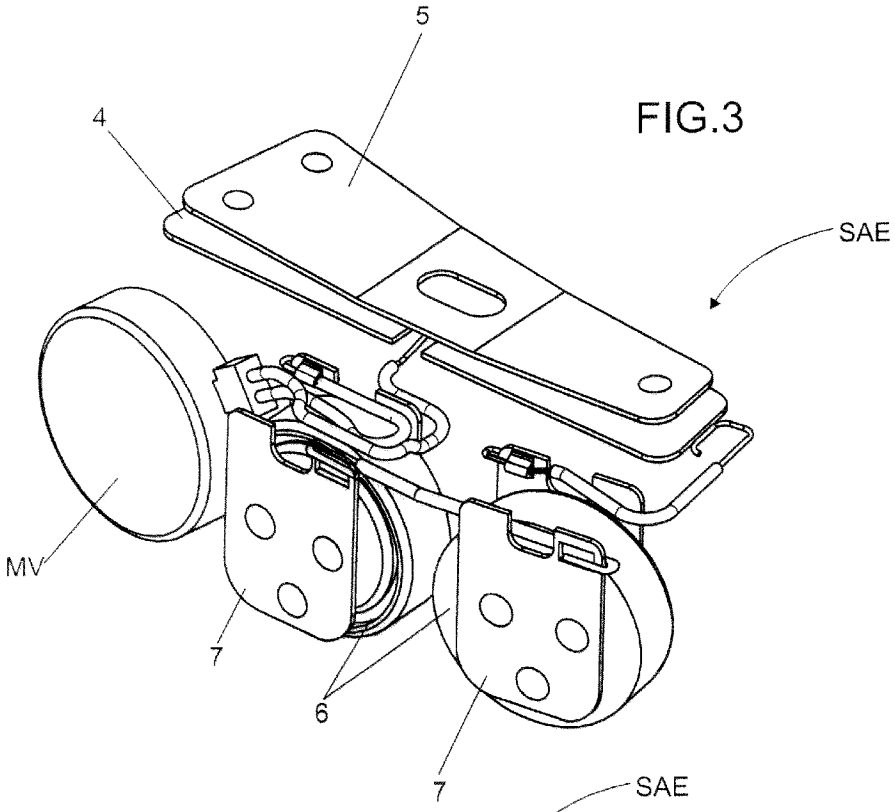


FIG.4

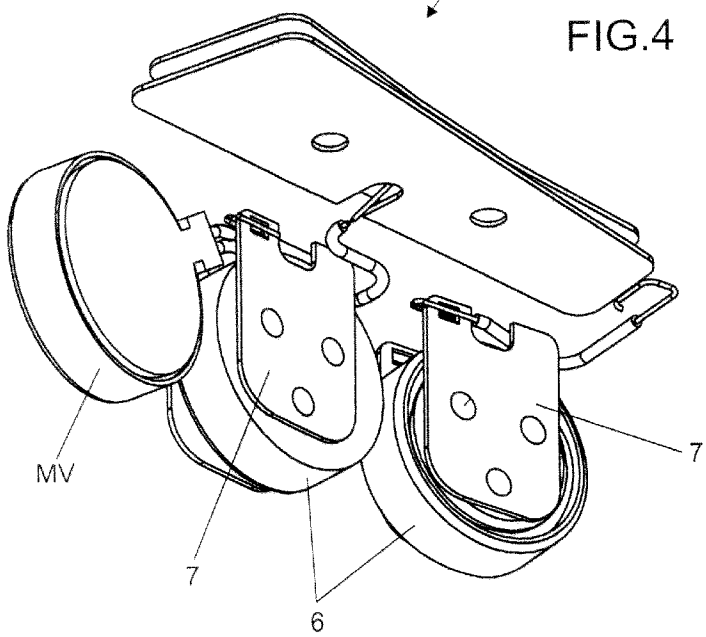


FIG.5

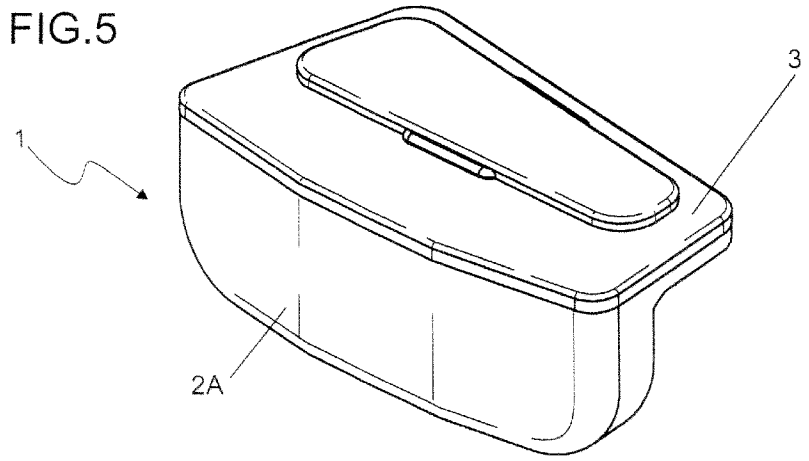


FIG.6

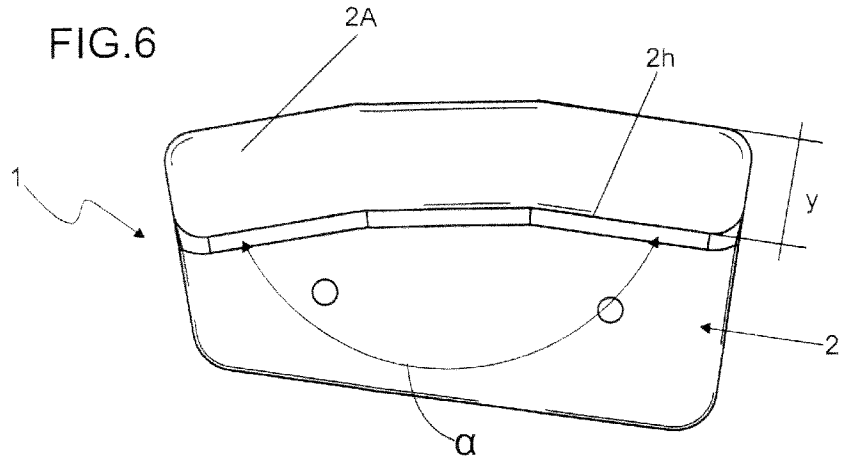
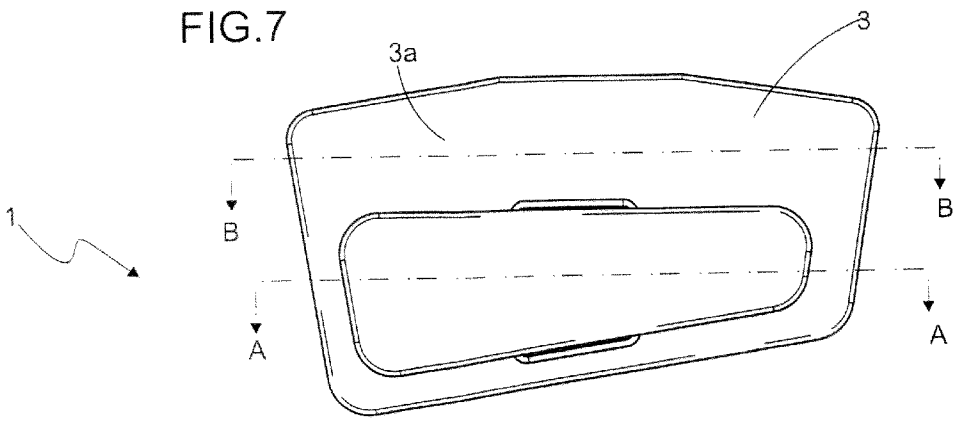


FIG.7



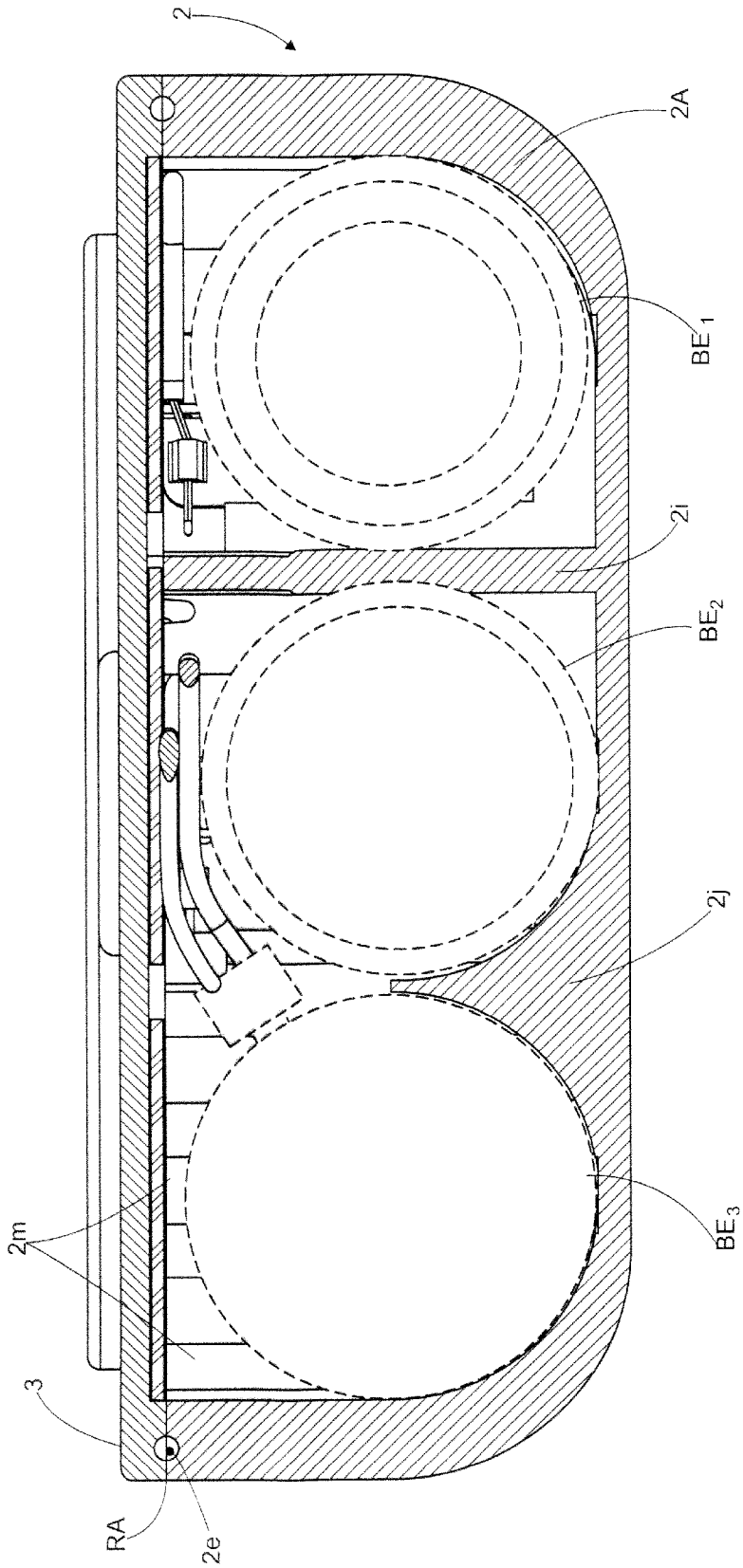


FIG.8

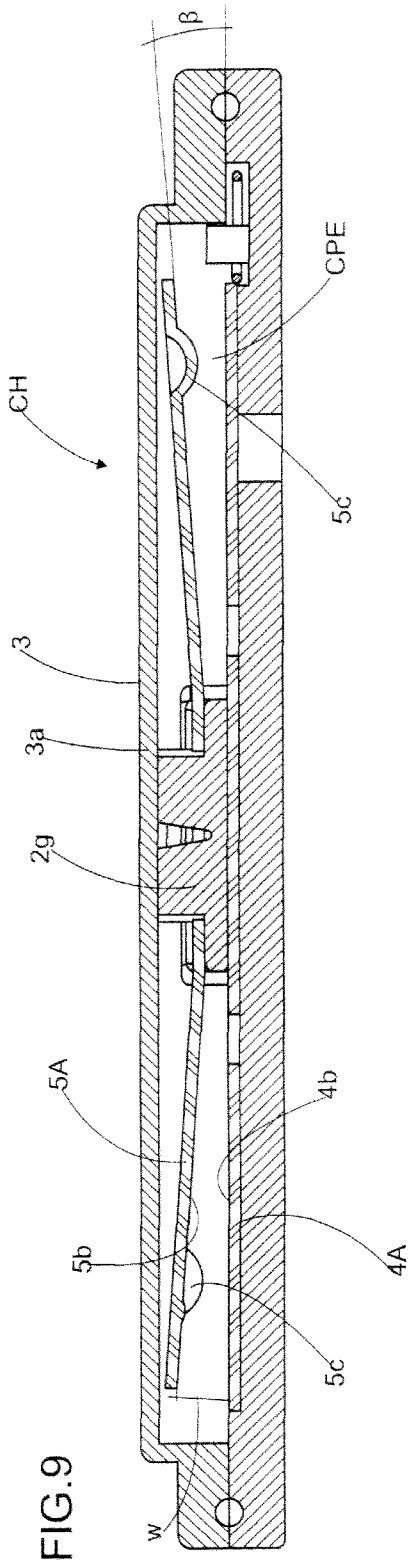


FIG.9

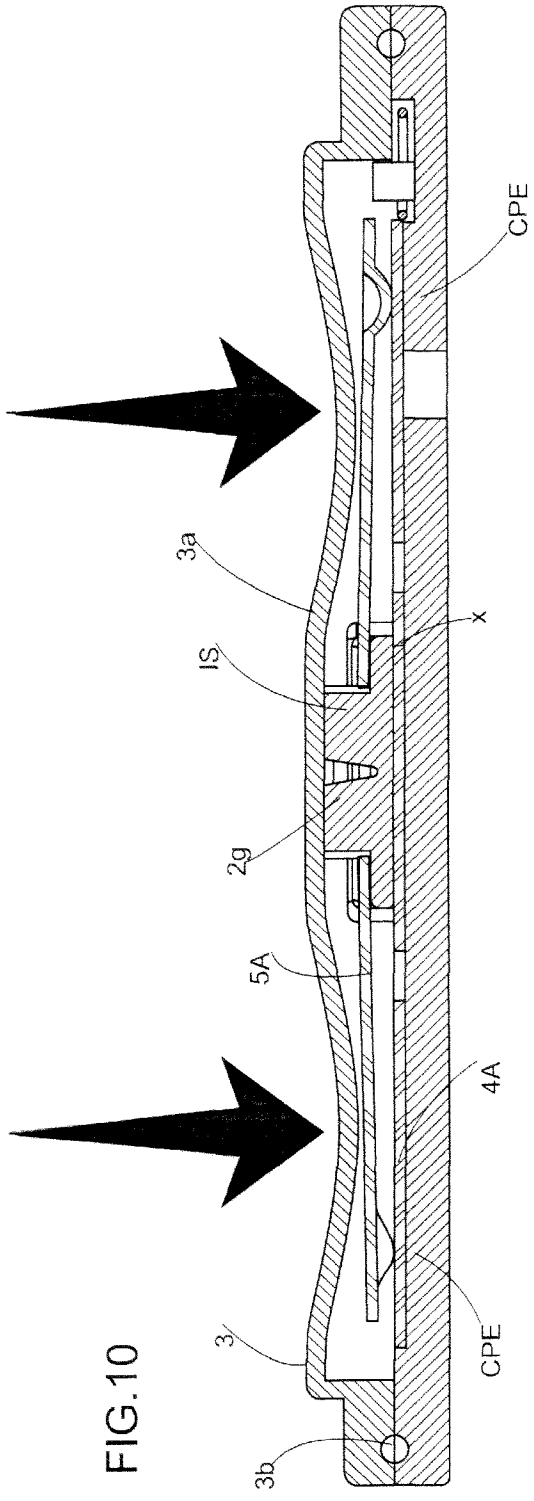


FIG.10

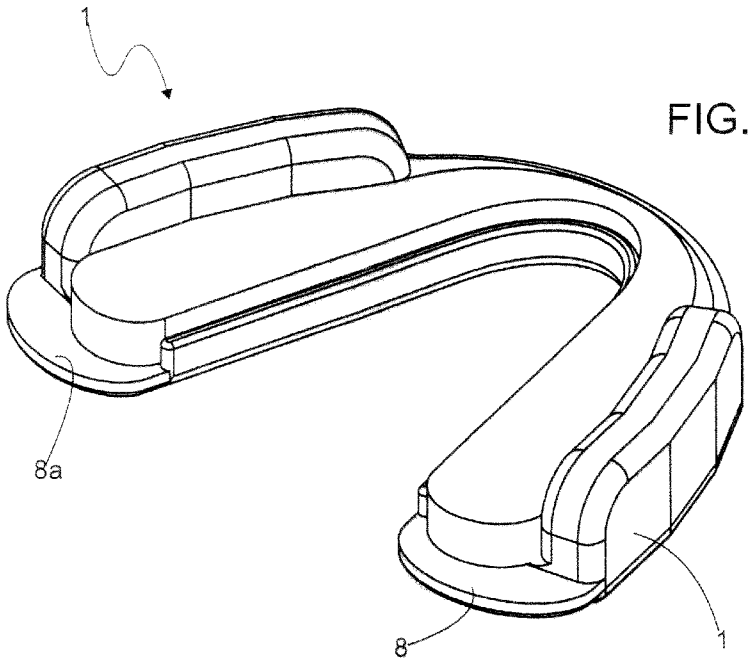
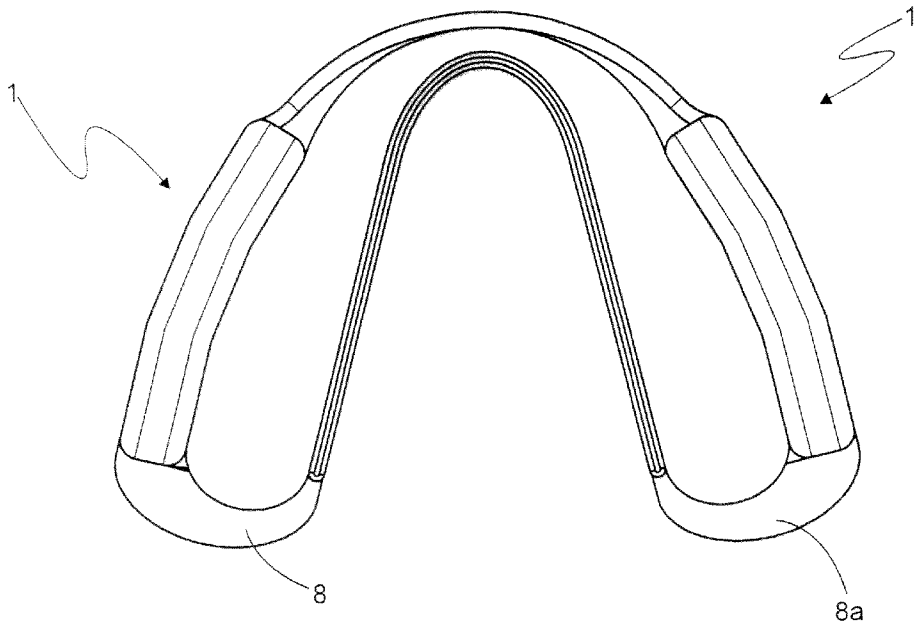


FIG.11

FIG.12



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/053745

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F5/56
ADD.

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)
A61F

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 586 562 A (MATZ WARREN W [US]) 24 December 1996 (1996-12-24) abstract	1
A	US 4 979 516 A (ABRAHAM II JAMES G [US]) 25 December 1990 (1990-12-25) the whole document	1
A	US 5 190 051 A (WILSON MARK J [US]) 2 March 1993 (1993-03-02) the whole document	1
A	DE 10 2006 056239 A1 (PALAIA SALVATORE [DE]) 5 June 2008 (2008-06-05)	1
A	WO 2009/013371 A1 (UNIV MADRID POLITECNICA [ES]; LAFONT MORGADO PILAR [ES]; LORENZO YUSTO) 29 January 2009 (2009-01-29) the whole document	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 April 2013	24/04/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Sánchez y Sánchez, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2012/053745

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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